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To: Relevant ship owners, shipyards, product manufacturers and designers， CCS surveyors, Plan Approval Centers, relevant departments of the Headquarters of CCS.

Technical Notice on the Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (MSC.1/Circ.1628 to 1633) Issued by IMO

The Maritime Safety Committee of the International Maritime Organization, at its 102nd session, approved MSC.1/Circ.1628 to 1633 "Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms". MSC.1/Circ.980 was revised by these series of circulars, incorporating the latest amendments to LSA Code and MSC.81(70), which were divided into six parts according to the type of life-saving appliance.

The existing MSC.1/Circ.980 was revoked.

This technical notice is made public on CCS website (www.ccs.org.cn), and be transmitted to the relevant ship owners, shipyards, product manufacturers and designers by the branches/plan approval centers of CCS within their responsible areas. Please contact the Technology & Information Department of CCS Headquarter For any inquiry in this regard (E-mail: ti@ccs.org.cn).

Annexes:

MSC.1/Circ.1628 Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (Personal Life-Saving Appliances)

MSC.1/Circ.1629 Revised Standardized Life-Saving Appliance Evaluation and Test

Report Forms (Visual Signals)

MSC.1/Circ.1630 Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (Survival Craft)

MSC.1/Circ.1631 Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (Rescue Boats)

MSC.1/Circ.1632 Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (Launching And Embarkation Appliances)

MSC.1/Circ.1633 Revised Standardized Life-Saving Appliance Evaluation and Test Report Forms (Other Life-Saving Appliances)

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MSC.1/Circ.1628
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter II of the LSA Code, i.e. personal life-saving appliances (lifebuoys and associated equipment; lifejackets and associated equipment; immersion suits and associated equipment; anti-exposure suits; and thermal protective aids).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and resolution MSC.81(70), as amended. In the case of inconsistency between the forms and the LSA Code or the Revised recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customising the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or resolution MSC.81(70) have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (PERSONAL LIFE-SAVING APPLIANCES)

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2.1.1 LIFEBUOYS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____	
2.1.1.2 Quality assurance		**Regulations: MSC.81(70) 2/1.1, 1.2**	
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.		Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual:	Passed/ Failed Passed/ Failed Passed/ Failed

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.3 Visual inspection		**Regulations: LSA Code 1.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifebuoy. Conduct measurements and verify characteristics as required.	Be of international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea. Fitted with approved retro-reflective material in compliance with resolution A.658(16). Clearly marked with approval information from the organization that approved it and any operational restrictions.	Colour(s): Passed_____ Failed_____ Quantity: Spacing: Passed_____ Failed_____ Any operational restrictions? Passed _____ Failed_____ Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.3 Visual inspection (continued)		**Regulations: LSA Code 2.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by measurement, weighing and inspection that: Measure the inner and outer diameter. Weigh the lifebuoy. If it is intended to operate the quick-release arrangement provided for a self-activated smoke signal and self-igniting light, conduct the test in 2.1.1.10. Measure the lifebuoy grab-line diameter and length and assess how it is secured.	Be constructed of inherently buoyant material; it should not depend upon rushes, cork shavings or granulated cork, any other loose granulated material or any air compartment which depends on inflation for buoyancy. Should have an outer diameter of not more than 800 mm and an inner diameter of not less than 400 mm Not designed for quick release: Should have a mass of not less than 2.5 kg If it is intended to operate the quick-release arrangement provided for a self-activated smoke signal and self-igniting light, the lifebuoy has a mass of not less than 4 kg. Be fitted with a grab-line not less than 9.5 mm in diameter and not less than four times the outside diameter of the body of the buoy in length. The grab-line should be secured at four equidistant points around the circumference of the buoy to form four equal loops.	Construction materials: Outer diameter: _____ mm Inner diameter: _____ mm Mass: _____ kg Type / description of quick release arrangement: Does the lifebuoy have sufficient mass to activate the quick-release arrangement for a self-activated smoke signal and self-igniting light? Passed/ Failed Weight: _____ kg Grab-line diameter: _____ mm Grab-line length: _____ mm Buoy outer diameter times four: mm Grab-line four times the outer diameter of body? Passed/ Failed Grab-line secured in four equal loops? Passed/ Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.4 Temperature cycling test		**Regulations: LSA Code 1.2.2; MSC.81(70) 1 / 1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The following test should be carried out on two lifebuoys. Two lifebuoys should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: An 8 h exposure at a minimum temperature of +65°C to be completed in one day The specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day An 8 h exposure at a maximum temperature of -30°C to be completed the next day The specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	Not be damaged in stowage throughout the air temperature range - 30°C to + 65°C The lifebuoys should show no sign of loss of rigidity under high temperatures and, after the tests, should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Passed_____ Failed _____ (See following page for test data) Intact after this test? Lifebuoy No. 1 Observations on rigidity under high temp Observations after testing for shrinking, cracking etc. Lifebuoy No. 2 Observations on rigidity under high temp Observations after testing for shrinking, cracking etc. Intact after these tests? lifebuoy No.1: Passed/ Failed lifebuoy No.2: Passed/ Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.4	**Temperature cycling test – Test data**		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/1.2**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 2	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 3	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 4	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 5	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 6	Date In: _____ Time In : _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 7	Date In: _____ Time In : _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 8	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 9	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 10	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.5 Drop test		**Regulations: LSA Code 2.1.1.6; MSC.81(70) 1 / 1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Each lifebuoy should be suspended from its upper edge via a release device so that the lower edge of the lifebuoy is at the height at which it is intended to be stowed on ships in their lightest seagoing condition, or 30 m, whichever is the greater, and dropped into the water without suffering damage. In addition, one lifebuoy should be suspended from its upper edge via a release device so that the lower edge of the lifebuoy is at a height of 2 m, and dropped three times onto a concrete floor.	Be constructed to withstand a drop into the water from the height at which it is stowed above the waterline in the lightest seagoing condition or 30 m, whichever is the greater, without impairing either its operating capability or that of its attached components. The lifebuoy should withstand three drops from a height of 2m on to a concrete floor without suffering damage.	Number of lifebuoys: _____ Lifebuoy no. 1 Drop height in water: _____m Number of drops: _____m Passed/ Failed Lifebuoy no. 2 Drop height in water: _____m Number of drops: _____m Passed/ Failed Condition lifebuoy no. 1: _____ Passed/ Failed Condition lifebuoy no. 2: _____ Passed/ Failed Lifebuoy selected for 2m drop height on concrete: Drop 1: Passed/ Failed Drop 2: Passed/ Failed Drop 3: Passed/ Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.6 Test for oil resistance	**Regulations: LSA Code 1.2.2; MSC.81(70) 1 / 1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
One of the lifebuoys should be immersed horizontally for a period of 24 h under a 100 mm head of diesel oil at normal room temperature.	After this test the lifebuoy should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Lifebuoy No. Diesel oil head:_____mm Duration:_____hours Signs of damage? Passed Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.7 Fire test		**Regulations: LSA Code 2.1.1.5; MSC.81(70) 1/1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The other lifebuoy should be subjected to a fire test. A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of 1 cm followed by enough petrol to make a minimum total depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. The lifebuoy should then be moved through flames in an upright, forward, free-hanging position, with the bottom of the lifebuoy 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The lifebuoy should not sustain burning or continue melting after being removed from the flames.	Lifebuoy No. Dimensions test pan: _____x_____x_____cm Water depth:_____cm Depth incl. petrol:_____cm Exposure time:_____seconds Sustain burning or continue melting after being removed from the flame Passed/ Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.8 Flotation test		**Regulations: LSA Code 2.1.1.3; MSC.81(70) 1/1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The two lifebuoys subjected to the above tests should be floated in fresh water with not less than 14.5 kg of iron suspended from each of them and should remain floating for a period of 24 h.	There should be no breaks, cracks or permanent deformation. The lifebuoys should float throughout the 24 h test period.	Lifebuoy no. 1 Lifebuoy no. 2 Suspended mass: kg kg Float duration: min min Intact after this test? Passed/ Failed Float for entire test period? Passed/ Failed Comments/Observations

2.1.1.9 Strength test		**Regulations: LSA Code 1.2.2; MSC.81(70) 1/1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
A lifebuoy body should be suspended by a 50 mm wide strap. A similar strap should be passed around the opposite side of the body with a 90 kg mass suspended from it. After 30 min, the lifebuoy body should be examined.	There should be no breaks, cracks or permanent deformation.	Lifebuoy No. Suspended mass:_____kg Suspension duration:_____min Passed/Failed Comments/Observations

Lifebuoys	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.1.10 Test for operation with a light and smoke signal		**Regulations: LSA Code 2.1.1.7; MSC.81(70) 1/1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The tests should be carried out if the lifebuoy is intended for quick release with a light and smoke signal. The lifebuoy should be arranged in a manner simulating its installation on a ship for release from the navigating bridge. A lifebuoy light and smoke signal should be attached to the lifebuoy in the manner recommended by the manufacturers.	The lifebuoy should be released and should activate both the light and the smoke signal. The weight of the lifebuoy should be at least 4 kg.	Lifebuoy No. Type / description of quick activating arrangement: Type of light and smoke signal: Light activated? Passed/ Failed Smoke activated? Passed/ Failed, Weight of the lifebuoy_____kg Length of the line connected to the lifebuoy _____m Passed _____ Failed _____ Comments/Observations

2.1.2 LIFEBUOY SELF-IGNITING LIGHTS

EVALUATION AND TEST REPORT

Remark: **If a lifebuoy self-igniting light is a combined light/smoke signal it should be treated as a sole lifebuoy self-igniting light.**

2.1.2.0 Quality assurance

2.1.2.1 General information

- 2.1.2.1.1 General data and specifications
- 2.1.2.1.2 Submitted drawings, reports and documents

2.1.2.2 Visual inspection

- 2.1.2.2.1 Approval marking
- 2.1.2.2.2 Expiry marking
- 2.1.2.2.3 Additional markings
- 2.1.2.2.4 Electrical short circuit protection
- 2.1.2.2.5 Construction and materials
- 2.1.2.2.6 Colour of lifebuoy light

2.1.2.3 Temperature cycling test

2.1.2.4 Light tests

2.1.2.5 Chromaticity test

2.1.2.6 Rain test and watertightness test

2.1.2.7 Case resistance test

2.1.2.8 Lens drop test

2.1.2.9 Floatation test

2.1.2.10 Drop test

2.1.2.11 Fitting test

2.1.2.12 Release and operation test

2.1.2.13 Vibration test

2.1.2.14 Mould growth test

2.1.2.15 Corrosion and seawater resistance test

2.1.2.16 Solar radiation test

2.1.2.17 Test for oil resistance

2.1.2.18 Fire test

2.1.2 LIFEBUOY SELF-IGNITING LIGHTS
EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.0 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**	
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual:	Passed/ Failed Passed/ Failed Passed/ Failed

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.1.1 General data and specifications	**Regulations: LSA Code; MSC.81(70)**	
General Information	Lifejacket Lifebuoy Light Dimensions	Lifejacket Lifebuoy Light Weight
TYPE OF SWITCHING FLASHING LIGHT STEADY LIGHT		Details of Bulb, Battery & Voltages: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.1.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.2 Visual Inspection		**Regulations: LSA Code 1.2.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Thirteen lifebuoy self-igniting lights should be examined in detail for the following items: Approval marking	The lifebuoy self-igniting lights should: - be clearly marked with approval information including the Administration which approved it, and any operational restrictions; - be marked with a date of expiry;	Results: PASS: FAIL: PASS: FAIL:
Expiry marking	The Administration should determine the: - period of acceptability, owing to deterioration with age. The established life must be justified by the manufacturer.	Results: PASS: FAIL:
Additional markings	Be provided the following information: precise definition of intended use (e.g. "Lifebuoy self- igniting light"); serial number; identification of the manufacturer; where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER";	Results: PASS: FAIL: PASS: FAIL: PASS: FAIL: PASS: FAIL:
Electrical short circuit protection	- be provided with electrical short circuit protection to prevent damage or injury;	Results: PASS: FAIL: Comments/Observations

2.1.2.2 Visual Inspection (continued)	**Regulations: LSA Code 1.2.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1.2.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
	The lifebuoy self-igniting lights should:	Results:
Construction and materials	- be constructed with proper workmanship and materials.	PASS: FAIL:
Colour of lifebuoy light	- be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea	PASS: FAIL:
		Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Lifebuoy self-igniting light testing flow chart

Visual Inspection (all 13 lights) 2.1.2.1

light 1 temp cycle test 2.1.2.3	then light 1 performs Light test (hot) 2.1.2.4	light 1 then performs Chromaticity Test 2.1.2.5
light 2 temp cycle test 2.1.2.3	then light 2 performs Light test (cold) 2.1.2.4	light 2 then performs Chromaticity Test 2.1.2.5
light 3 temp cycle test 2.1.2.3		
light 4 Case Resistance Test 2.1.2.7		
light 5 Lens Drop Test 2.1.2.8 (if fitted)		
light 6 24 hr Floatation Test 2.1.2.9		
light 7 30 m drop test (x 2) 2.1.2.10	light 7 then performs Fitting Test 2.1.2.11	light 7 then performs Release/Operation Test 2.1.2.12
light 8 Vibration Test 2.1.2.13		
light 9 Mould growth test (may be waived) 2.1.2.14		
light 10 corrosion and sea water resistance test 2.1.2.15		
light 11 Solar radiation test (may be waived) 2.1.2.16		
light 12 Oil resistance test 2.1.2.17		
light 13 Fire test 2.1.2.18		

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.3 Temperature cycling test	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2, 1.2.1, 1.2.2, 10.2, 10.2.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Three lifebuoy self-igniting lights should be alternately subjected to surrounding temperatures - 30°C and at least +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of not less than 10 cycles, is acceptable: 1. an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and 2. the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; 3. an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and 4. the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	The lifebuoy self-igniting lights should not be damaged in stowage throughout the air temperature range -30°C to +65°C. The lifebuoy self-igniting lights should show no sign of loss of rigidity under high temperatures and, after the tests, should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should function after the test.	Results: Attach temperature cycling chart to record times spent at each temperature. PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

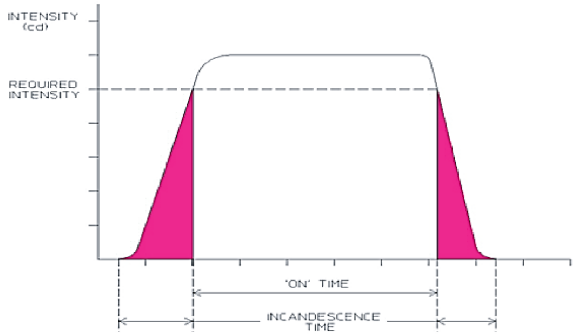
2.1.2.3	**Temperature cycling test – Test data**		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/1.2**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 2	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 3	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 4	Date In: _____ Time In: _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 5	Date In: _____ Time In: _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 6	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In : _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 7	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 8	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 9	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 10	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.4 Light tests		**Regulations: LSA Code 2.1.2/2.1.2.2/2.1.2.3; MSC.81(70) 1/ 10.2.2, 10.4, 10.4.9**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the temperature cycling test should be taken from a stowage temperature of -30°C and then be operated immersed in seawater at a temperature of -1°C, another lifebuoy self-igniting light which has passed the temperature cycling test should be taken from a stowage temperature of +65°C and be operated immersed in seawater at a temperature of +30°C, and a third light should be taken from ordinary room condition and operated immersed in fresh water at ambient temperature. At the end of the first hour of operation the lifebuoy self-igniting lights should be immersed to a depth of 1 m for 1 min. If the voltage at 5 min of operation is lower than the recorded voltage at the end of life it is permissible to use a lamp from the same build standard for the light output test. Using the lowest recorded voltage, a light output test can be carried out as described below. The voltage of the 3 test units should be monitored continuously for 2 h. To make sure that all the test units provide a luminous intensity of not less than 2 cd in all directions of the upper hemisphere for 2 h operation, the following test should be performed:	After immersion, all the lifebuoy self-igniting lights should not be extinguished and should continue operating for at least an hour longer. All of the lights should be of white colour and they should continue to provide a luminous intensity of not less than 2 cd in all directions of the upper hemisphere or, in the case of a flashing light, flash at a rate of not less than 50 flashes and not more than 70 flashes per minute with at least the corresponding effective luminous intensity of not less than 2 cd for at least 2 h. (see formula below to calculate the effective luminous intensity.) The effective luminous intensity is to be found from the formula: $$\left(\frac{\int_{t_1}^{t_2} Idt}{0.2 + (t_2 - t_1)}\right)_{max}$$ where: I is the instantaneous intensity, 0.2 is the Blondel-Rey constant and t_1 and t_2 are time - limits of integration in seconds.	Results: All luminous intensity data is to be attached here. PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.4 Light tests (continued)	**Regulations: LSA Code 2.1.2/2.1.2.2/2.1.2.3; MSC.81(70) 1/ 10.2.2, 10.4, 10.4.9**

Test Procedure	Acceptance Criteria	Significant Test Data
It must be demonstrated that all the test unit lights reach the required luminous intensity in all directions of the upper hemisphere when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No. 70 contains further information.). Luminous intensity of all test unit lights should be measured by a photometer directed at the center of the light source with the test light on a rotating table. Luminous intensity should be measured in a horizontal direction at the level of the center of the light source and continuously recorded through a 360° rotation. The first measurement should be taken at 0° (horizontal) and should continue to be taken in the azimuth angle at 5° intervals to a single measurement at 90° (vertical). Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 180°.	Flashing lights with a flash duration of not less than 0.3 s may be considered as fixed/steady lights for the measurement of their luminous intensity. Such lights should provide the required luminous intensity in all directions of the upper hemisphere. The time interval between switching on and reaching the required luminous intensity (incandescence time) and all time spent below the required luminous intensity when the light switches off should be disregarded (see figure 10.4.1.) Figure 10.4.1 "On-time" measurement diagram  	Passed _____Failed _____ Comments/Observations All lights operated for first one hour and immersed to a depth of 1m for 1 min as mentioned below 1) Light 1, taken from -30°C, immersed in seawater temperature -10°C 2) Light 2, taken from +65°C, immersed in seawater of +30°C 3) Light 3, taken from ordinary temperature, immersed in fresh water at ambient temperature After immersion as mentioned above, all lifebuoy self-igniting lights continue operated for at least an hour longer: Yes/ No Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.5 Chromaticity test		**Regulations: LSA Code 2.1.2.2; MSC.81(70) 1/10.2.2, 10.4, 10.4.10**
Test Procedure	Acceptance Criteria	Significant Test Data
All measured data of luminous intensity and voltage should be documented. One lifebuoy self-igniting light which has passed the light tests should be tested for chromaticity to determine that it lies within the boundaries of the area "white" of the diagram specified for each colour by the International Commission on Illumination (CIE). The chromaticities of the lifebuoy self-igniting light should be measured by means of colorimetric measurement equipment which is calibrated to the appropriate National or State Standards Institute (Note: CIE Publ. No.15.2 contains further information.). Measurement on at least four points of the upper hemisphere should be taken.	The measured chromaticity coordinates should fall within the boundaries of the area of the diagram as per CIE. The boundaries of the area for white lights are given by the following corner coordinates: x 0.500 0.500 0.440 0.300 0.300 0.440 y 0.382 0.440 0.433 0.344 0.278 0.382 (International Standard on Colours of Light Signals, with colour tables to be developed by CIE.)	Results: All chromaticity data is to be attached here. PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.6 Rain test and Watertightness Test	**Regulations: LSA Code 1.2.2.8; MSC.81(70) 1/ 10.2.5, 10.4.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the temperature cycling test should be subjected to the rain test according to IEC 60945:2002, paragraph 8.8. After having passed the rain test, the lifebuoy self- igniting light and its complete power source should be immersed horizontally under not less than 300 mm of fresh water for at least 24 h. After that test, the lifebuoy self-igniting light should be tested for function. After having tested its function, and if it is an electric light, it should be disassembled and examined for the presence of water. Automatic activated version should be prevented from switching during these tests.	The lifebuoy self-igniting light should be rot-proof and, if it is to be used in a seaway, be capable of satisfactory operation in that environment. The lifebuoy self-igniting light should function after immersion under water. The lifebuoy self-igniting light should comply with the requirements of IEC 60945:2002, paragraph 8.8.2. There should be no evidence of water inside the lifebuoy self-igniting light.	<u>Results:</u> PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.7 Case resistance test		**Regulations: MSC.81(70) 1/ 10.2.7**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light should be placed on its side on a rigid surface and a steel sphere having a mass of 500 g should be dropped from a height of 1.3 m on to the case at least three times. The sphere should strike the case near its centre on one drop, approximately 12 mm from one end of the case on another drop and approximately 12 mm from the other end of the case on the third drop.	The case should not break or crack, or be distorted in a way that would affect its watertightness. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.1.2.8 Lens drop test		**Regulations: MSC.81(70) 1/ 10.2.6**
Test Procedure	Acceptance Criteria	Significant Test Data
If a lifebuoy self-igniting light has a lens, it should be subjected to the dome drop test. The lifebuoy self-igniting light should be cooled to -18°C and dropped twice from a height of 1 m on to a rigidly mounted steel plate or concrete surface. The distance should be measured from the top of the lens to the impact surface. The lifebuoy self- igniting light should strike the surface on the top centre of the lens.	The lens should not break or crack. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.1.2.9 Floatation test		**Regulations: LSA Code 1.2.2.8; MSC.81(70) 1/ 10.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light should be subjected to the floatation test. If the unit has an automatic activation, it should be disabled during this test. The lifebuoy self-igniting light should be allowed to float in water in its normal operating position for 24 h. If the lifebuoy self-igniting light is an electric light, it should be disassembled at the end of the tests and examined for the presence of water.	The lifebuoy self-igniting light should be capable of satisfactory operation in a seaway. The lifebuoy self-igniting light should function after the test and there should be no evidence of water inside the lifebuoy self-igniting light.	Results: PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.10 Drop test		**Regulations: LSA Code 2.1.2.4/2.1.1.6; MSC.81(70) 1/ 1.3, 10.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the drop test. The lifebuoy self-igniting light should be subjected to at least two drop tests as follows: The lifebuoy self-igniting light should be dropped into water, such that the lower edge of the light is at a height at which it is intended to be stowed on ships in their lightest sea going condition, or 30 m, whichever is greater. The lifebuoy self-igniting light should be dropped twice, first by itself and then attached to a lifebuoy. On sea activated lights this test should be carried out with the sealing plugs fitted to prevent the ingress of water which will cause the light to operate.	The lifebuoy self-igniting light should withstand this test without impairing either its operating capability or that of its attached components. The lifebuoy self-igniting light should not suffer damage and should operate satisfactorily after each drop.	Results: PASS: FAIL: Comments/Observations

2.1.2.11 Fitting test		**Regulations: MSC.81(70) 1/ 10.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifebuoy self-igniting light which has passed the drop test should be subjected to the fitting test. A force of 225 N should be applied to the fitting and lanyard that attaches the lifebuoy self-igniting light to a lifebuoy. After having passed the fitting test the light should be subjected to the release and operation test.	Neither the fitting and lanyard nor the lifebuoy self-igniting light should be damaged as a result of this test. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.12 Release and operation test		**Regulations: LSA Code 2.1.1.7; MSC.81(70) 1/1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy intended for quick release with the lifebuoy self-igniting light which has passed the fitting test and a smoke signal should be given this test. The chemical material intended to produce the smoke should be substituted by an equivalent non- dangerous material. The lifebuoy should be arranged in a manner simulating its installation on a ship for release from the navigating bridge. The lifebuoy self-igniting light and a smoke signal should be attached to the lifebuoy in the manner recommended by the manufacturer. The lifebuoy should be released.	The lifebuoy should activate the lifebuoy self-igniting light.	Results: PASS: FAIL: Comments/Observations

2.1.2.13 Vibration test		**Regulations: LSA Code 1.2.2.1/1.2.2.8; MSC.81(70) 1/ 10.4, 10.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to a vibration test according to IEC 60945:2002 paragraph 8.7.	The lifebuoy self-igniting light should be constructed with proper workmanship and materials. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.14 Mould growth test	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/10.4, 10.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the mould growth test. The lifebuoy self-igniting light should be inoculated by spraying with an aqueous suspension of mould spores containing all the following cultures: Aspergillus niger; Aspergillus terreus; Aureobasidium pullulans; Paecilomyces variotii; Penicillium funiculosum; Penicillium ochrochloron; Scopulariopsis brevicaulis; and Trichoderma viride. The lifebuoy self-igniting craft light should then be placed in a mould growth chamber which should be maintained at a temperature of 29°C +/- 1°C and a relative humidity of not less than 95 %. The period of incubation should be 28 days. After this period the lifebuoy self-igniting light should be inspected. (Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)	The lifebuoy self-igniting light should be rot-proof and not be unduly affected by fungal attack. There should be no mould growth visible to the naked eye and the lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.15 Corrosion and seawater resistance test	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4, 10.4.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to a corrosion and seawater resistance test according to IEC 60945:2002, paragraph 8.12. (Note: .1 If there are no exposed metal parts the Corrosion and Seawater Resistance Test need not be conducted. .2 The Corrosion and Seawater Resistance Test may be waived where the manufacturer is able to produce evidence that the external metals employed will satisfy the test. .3 Automatic activated version should be prevented from switching during the test.)	The lifebuoy self-igniting light should be corrosion resistant and not be unduly affected by seawater. Furthermore, the lifebuoy self-igniting light should comply with the requirements of IEC 60945:2002, paragraph 8.12.2. There should be no undue deterioration of metal parts and the lifebuoy self-igniting light should function after the test. Where the exposed metal is part of the automatic switch sensor, the function test after the 28-day test cannot be done.	Results: PASS: FAIL: Comments/Observations

2.1.2.16 Solar radiation test	**Regulations: LSA Code 1.2.2.5; MSC.81(70) 1/ 10.4, 10.4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to a solar radiation test according to IEC 60945:2002, paragraph 8.10. (Note: The solar radiation test may be waived where the manufacturer is able to produce evidence that the materials employed will satisfy the test, i.e. UV stabilized.)	The lifebuoy self-igniting light should be resistant to deterioration by sunlight. Furthermore, the mechanical properties and labels should be resistant to harmful deterioration by sunlight and the lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

Lifebuoy self-igniting lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.2.17 Test for oil resistance		**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4, 10.4.6**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to the test for oil resistance according to IEC 60945:2002 paragraph 8.11. Automatic activated version should be prevented from switching during the test.	After this test the lifebuoy self-igniting light should not be unduly affected by oil and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.1.2.18 Fire rest		**Regulations: LSA Code 2.1.1.5; MSC.81(70) 1/ 10.4, 10.4.8**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifebuoy self-igniting light which has passed the visual inspection should be subjected to a fire test. A test pan not less than 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of at least 1 cm followed by enough petrol to make a minimum total depth of not less than 4 cm. The petrol should then be ignited and allowed to burn freely for at least 30 s. The lifebuoy self- igniting light should then be moved through the flames, facing them, with the lifebuoy self-igniting light not more than 25 cm above the top edge of the test pan so that the duration of exposure to the flames is at least 2 s.	The lifebuoy self-igniting light should not sustain burning or continue melting after being totally enveloped in a fire for a period of not less than 2 s and after being removed from the flames. The lifebuoy self-igniting light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.1.3 LIFEBUOY SELF-ACTIVATING SMOKE SIGNALS EVALUATION AND TEST REPORT

2.1.3.1 Submitted drawings, reports and documents
- 2.1.3.1.1 Quality assurance
- 2.1.3.1.2 Visual inspection
- 2.1.3.1.3 General data and specification

2.1.3.2 Temperature cycling test

2.1.3.3 Low temperature conditioning test

2.1.3.4 High temperature conditioning test

2.1.3.5 Ambient temperature conditioning and drop test

2.1.3.6 Humidity conditioning

2.1.3.7 Water and corrosion resistance test
- 2.1.3.7.1 Immersed for 24 h under 1 m
- 2.1.3.7.2 10 cm immersion ready-to-fire for 5 mins. test
- 2.1.3.7.3 Salt spray conditioning

2.1.3.8 Heptane test

2.1.3.9 Laboratory smoke obscuration test

2.1.3.10 Wave test

2.1.3.11 Attachment fitting strength test

2.1.3.12 Safety inspection

2.1.3 LIFEBUOY SELF-ACTIVATING SMOKE SIGNALS

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.1.1 Quality assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - Quality Assurance Procedure: - Quality Assurance Manual: - Description of System. Quality Assurance System acceptable: Yes/No Comments/Observations

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.1.2 Visual inspection	**Regulations: LSA Code I/1.2; MSC.81(70) 1/1.9 and 4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination	Lifebuoy Self-Activating Smoke Signal should: -	
Approval markings	be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions, markings are to be indelible;	Passed _____ Failed _____
Operating instructions.	be provided with brief instructions or diagrams clearly illustrating the use of the lifebuoy self-activating smoke signal printed on the casing also the method of manual operation;	Passed _____ Failed _____
Outer casing.	not depend on adhesive tapes or plastic envelopes for its water-resistant properties	Passed _____ Failed _____
Ignition System.	be fitted with an integral means of ignition;	Passed _____ Failed _____
Fitted with light	if fitted with lights be tested in accordance with the requirements of Lifebuoy Self-Igniting lights, section 10.2.	Passed _____ Failed _____
Acceptable life	The administration should determine the period of acceptability of the unit which are subject to deterioration with age.	Comments/Observations

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.1.3 General data and specifications		**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1 /4.8**
General Information	Dimensions	Weight
Construction Material: Casing: Top cover (If applicable): Bottom Cover (If applicable): Method of Ignition Operational Safety Delay (if Applicable) Number of lights (if Applicable) Type of lens dome Amperage of Bulb Number of Batteries: _____ Voltage of Batteries: _____ Acceptable life of the item: _____ yrs	Dimensions: Length of Casing: _____ Maximum Diameter of Casing: _____ Minimum Diameter of Casing _____	Design Weight: _____ Weight as Tested: _____ Weight of Smoke Material _____ Comments/Observations

LIFEBUOY SELF-ACTIVATING SMOKE SIGNAL CONDITIONING & SEQUENCE TEST CHART

TEST ITEMS CONDITIONING SEQUENCE									**REFERENCES**	**REMARKS**
Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22	**MSC.81(70)**	
Measuring dimensions and mass	A	A	A	A	A	A	A	A		
Temperature cycling test (2.1.3.2)	B	B	B						1.9.1 & 1.2.1.	
Low temperature conditioning (2.1.3.3)	C								1.9.2	
High temperature conditioning (2.1.3.4)		C							1.9.2	
Ambient temperature conditioning (2.1.3.5)			C						1.9.3	
Operate Immersed under 25mm for 10 secs (2.1.3.4)	C	C							1.9.2	
Humidity conditioning (2.1.3.6)				C					1.9.4 & 4.2.4	
1 metre for 24 hours (2.1.3.7.1)					C				1.9.4 & 4.3.1	
Salt water spray (2.1.3.7.2)						C			1.9.4 & 4.3.3	
Safety inspection (2.1.3.12)	D	D	D	D	D	D	D	D	4.5 & 1.9.4	
Operation at ambient temperature			E		E	E	E	E	1.9.3, 4.3.1	

LIFEBUOY SELF-ACTIVATING SMOKE SIGNAL CONDITIONING & SEQUENCE TEST CHART (continued)

Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22	References	Remarks
Operate at conditioning Temperature	E	E		E					1.9.2, 4.2.4	
Heptane test (2.1.3.8)							F		1.9.4 & 4.8.2	
Attachment fitting strength (2.1.3.11)	F	F							10.2.8 & 1.9.6	May be carried out by an independent laboratory acceptable to the administration and report submitted. Use specimens 1 and 4.
Wave height test (2.1.3.10)								F	1.9.5	
30 m drop test (2.1.3.5)			H						1.9.3	
Smoke colour and emission time 15 minutes minimum	G	G	G	G	G	G	G	G	1.9.2 & 1.9.3	
Smoke obscuration (2.1.3.9)									4.8.3 & 1.9.4	May be carried out by an independent laboratory acceptable to the administration and report submitted.

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen lifebuoy self-activating smoke signal.

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.2 Temperature cycling test	**Regulations: LSA Code I/1.2.2; MSC.81(70) I/1.2.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Nine self-activating smoke signals should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: 1. an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and 2. the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; 3. an 8 h exposure at a maximum temperature -30°C to be completed the next day; and 4. the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	After 10 cycles each specimen should be inspected and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties.	Specimen No. 1. Passed _____ Failed _____ 2. Passed _____ Failed _____ 3. Passed _____ Failed _____ 4. Passed _____ Failed _____ 5. Passed _____ Failed _____ 6. Passed _____ Failed _____ 7. Passed _____ Failed _____ 8. Passed _____ Failed _____ 9. Passed _____ Failed _____ Comments/Observations Passed _____ Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.3 Low temperature conditioning test	**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/1.9.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
After at least ten complete temperature cycles the first three smoke signals should be subjected to a temperature of -30°C for at least 48 h, then taken from this stowage temperature be activated and operated in seawater at a temperature of -1°C, and function effectively at that temperature.	The 3 specimens should function effectively. Each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties after completing the -30°C conditioning. The signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time of at least 15 min. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA. After the smoke signals have been emitting smoke for 7 minutes, the smoke-emitting ends of the smoke signals should be immersed to a depth of 25 mm for 10 s. On being released the smoke signals should continue to emit a steady quantity of smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water.	Specimen Number 1 | 2 | 3 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Pass/Fail) | | | Smoke colour (Pass/Fail) | | | Smoke emissions during submergence (Pass/Fail) | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.4 High temperature conditioning test | **Regulations: LSA Code I/1.2.2 and II/2.1.3; MSC.81(70) 1/1.9.2**

Test Procedure	Acceptance Criteria	Significant Test Data
After at least 10 complete temperature cycles, the next three smoke signals should be subjected to a temperature of +65°C for at least 48 h, then taken from this stowage temperature be activated and operated in seawater at a temperature of +30°C, and function effectively at that temperature.	The 3 specimens should function effectively. Each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties after completing the +65°C conditioning. The smoke signal should not ignite explosively or in a manner dangerous to persons close by nor emit any flame during the entire smoke emission time. After the smoke signals have been emitting smoke for 7 minutes, the smoke-emitting ends of the smoke signals should be immersed to a depth of 25 mm for 10 s. On being released the smoke signals should continue to emit a steady quantity of smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen Number 4 | 5 | 6 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Pass/Fail) | | | Smoke colour (Pass/Fail) | | | Smoke emission during submergence (Pass/Fail) | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.5 Ambient Temperature Conditioning & Drop Test	**Regulations: LSA Code I/1.2.2 & II/2.1.1.6; MSC.81(70) 1/1.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
After at least ten complete temperature cycles, the last three smoke signals taken from ordinary room conditions and attached by a line to a lifebuoy having a mass of not more than 4 kg should undergo the drop test into water prescribed in MSC.81(70) 1/1.3. The lifebuoy should have both a smoke signal and a lifebuoy light attached in the manner recommended by the manufacturers and be dropped from a quick-release fitting. The smoke signals should not be damaged and should function for a period of at least 15 min. A lifebuoy and the smoke signal should be dropped each into the water from the height at which they are intended to be stowed on ships in their lightest seagoing condition, or 30 m, whichever is the greater, without suffering damage The lifebuoy and smoke signals should be dropped from a quick release fitting used for housing the signals.	The 3 specimens should function effectively for a period of at least 15 min. Each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties after completing the ordinary room conditions at a temperature of 20°C ± 3°C conditioning. The smoke signal should not ignite explosively or in a manner dangerous to persons close by nor emit any flame during the entire smoke emission time. The smoke signal should not be damaged after the drop test. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No. 7 | 8 | 9 Condition after Conditioning (Pass/Fail) Drop height (metre) Smoke emission time (min/sec) Smoke emission quality (Pass/Fail) Smoke colour (Pass/Fail) Smoke signal damaged after drop test (Pass/Fail) Comments/Observations Passed _____ Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.6 Humidity conditioning	**Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/4.2.4, 1.9.4**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of smoke signals should be subjected to a temperature of +65°C and 90% relative humidity for at least 96 h, followed by ten days at 20°C to 25°C at 65% relative humidity. After the humidity test the specimens should be subjected to the function test at ambient temperature.	The 3 specimens should function effectively. Each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties after completing the temperature of +65°C and 90% relative humidity for at least 96 h, followed by ten days at 20°C to 25°C at 65% relative humidity conditioning. The smoke signal should not ignite explosively or in a manner dangerous to persons close by nor emit any flame during the entire smoke emission time. Each specimen should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No. 10 | 11 | 12 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Continuous/Intermittent) | | | Smoke emission colour: (Passed/Failed) | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.7.1 Immersed for 24 h under 1 m	**Regulations: LSA Code I/1.2.2 and II/2.1.3; MSC.81(70) 1/4.3.1, 1.9.4**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of smoke signal should be immersed horizontally for 24 h under 1 m of water. After this test the specimens should be subjected to the function test at ambient temperature.	The three specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The signals should establish that it can be operated effectively without injury to the operator, or any person in close proximity, during firing or burning. The specimen signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No. 13 | 14 | 15 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Continuous/Intermittent) | | | Smoke emission colour: Passed/Failed | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.7.2 10 cm immersion ready-to-fire for 5 mins. test | **Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/4.3.2**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of smoke signals should be made ready-to-fire, submerged in 10 cm of water for 5 min. The three signals should be activated at ambient temperature in accordance with the manufacturer's operating instructions.	The three specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The signals should establish that it can be operated effectively without injury to the operator, or any person in close proximity, during firing or burning. The specimen signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No 16 | 17 | 18 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Continuous/Intermittent) | | | Smoke emission colour: Passed/Failed | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.7.3 Salt spray conditioning — **Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/1.9.4, 4.3.3**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of smoke signals should be subjected to a salt spray (5% natrium chloride solution) at a temperature of +35±3°C for at least 100 h. The three signals should be activated at ambient temperature in accordance with the manufacturer's operating instructions.	The three specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The signals should establish that it can be operated effectively without injury to the operator, or any person in close proximity, during firing or burning. The specimen signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No 19 | 20 | 21 Condition after Conditioning (Pass/Fail) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Continuous/Intermittent) | | | Smoke emission colour: Passed/Failed | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.8 Heptane test	**Regulations: LSA Code I/1.2.2 & II/2.1.3.1; MSC.81(70) 1/4.8.2, 1.9.4**

Test Procedure	Acceptance Criteria	Significant Test Data
Three smoke signals should function in water covered by 2 mm layer of heptane floating on a layer of water. The smoke signal should be allowed to burn completely.	The three specimens should not ignite the heptane. The specimen signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. They should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when floating in calm water. The colour of the smoke should be orange as defined by sections 34, 48, 49 or 50 of the publication Colour: Universal Language and Dictionary of Names.* *Special Publication 440, National Bureau of Standards, Washington, DC 20402, USA.	Specimen No 22 | 23 | 24 Heptane ignition **(**Passed/Failed) | | | Smoke emission time (min/sec) | | | Smoke emission quality (Continuous/Intermittent) | | | Smoke emission colour: (Passed/Failed) | | | Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.9 Laboratory smoke obscuration test	**Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/4.8.3, 1.9.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
The smoke density and colour of the smoke signal should be determined by laboratory testing conducted at a water temperature of +20°C to +25°C as follows: The smoke should be drawn through an apparatus consisting of a 190 mm diameter duct with a fan capable of producing an entrance air flow of 18.4 m3/min. By means of a light source with at least 10 cd on one side of the tunnel and a photoelectric cell on the other side the density of the passing smoke should be recorded. If the photocell picks up the total emitted light from the light source, then the smoke density is zero percent which means that no smoke is passing through the tunnel. The smoke density is then considered to be 100% when the photocell is not able to pick up any light of the light source through the passing smoke in the tunnel. From the amount of light which the photocell is able to pick up the smoke density should be calculated. Before each measurement, the light intensity of the 100% value should be checked. Each measurement should be recorded.	Smoke density should be at least 70% throughout the minimum emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. The colour comparison chart should have a gloss or matte finish, and consist of a series of at least five orange colour chips, covering the range from reddish orange (Munsell notation 8.75 R 6/14) to yellowish orange (Munsell notation 5 YR MAX) in gradual steps of hue, chroma, and lightness. The colour chips should be secured adjacent to one another, in order of progression from reddish orange to yellowish orange, and extend on at least one side to the edge of the chart. Each colour chip should be at least 50 mm x 100 mm in size. Note 1: A typical acceptable progression would be 8.75 R 6/14; 10 R 6/14; 1.25 YR 6/14; 3.75 YR MAX; 5 YR MAX. Note 2: ASTM D1535-97 specifies a method to convert between Munsell notation and CIE coordinates.	Laboratory Testing Report No. Report acceptable (Yes/No) Smoke obscuration rate achieved at –30°C % Burning time of smoke signal _____ sec Smoke obscuration rate achieved at +20°C to +25°C _____% Burning time of smoke signal _____ sec Smoke obscuration rate achieved at +65°C _____% Burning time of smoke signal _____ sec Colour of smoke achieved Comments/Observations Passed _____ Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.10 Wave test	**Regulations: LSA Code I/1.2.2 & II/2.1.3; MSC.81(70) 1/1.9.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
A smoke signal should be tested in waves at least 300 mm high.	The specimen should function effectively and not be swamped. The smoke signal should not ignite explosively or in a manner dangerous to persons close by, nor emit any flame during the entire smoke emission time. It should emit smoke of a highly visible colour at a uniform rate for a period of not less than 15 minutes when subjected to waves of at least 300 mm high. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. The colour comparison chart should have a gloss or matte finish, and consist of a series of at least five orange colour chips, covering the range from reddish orange (Munsell notation 8.75 R 6/14) to yellowish orange (Munsell notation 5 YR MAX) in gradual steps of hue, chroma, and lightness. The colour chips should be secured adjacent to one another, in order of progression from reddish orange to yellowish orange, and extend on at least one side to the edge of the chart. Each colour chip should be at least 50 mm x 100 mm in size. Note: A typical acceptable progression would be 8.75 R 6/14; 10 R 6/14; 1.25 YR 6/14; 3.75 YR MAX; 5 YR MAX. Note: ASTM D1535-97 specifies a method to convert between Munsell notation and CIE coordinates.	Specimen No. 25 Smoke emission time_____sec Smoke emission quality (Continuous/Intermittent) Smoke emission colour: Passed/Failed Comments/Observations Passed_____Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.11 Attachment fitting strength test		**Regulations: LSA Code I/1.2.2, II/2.1.3 & II/2.1.1.6; MSC.81(70) 1/1.9.6 & 10.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
A force of 225 N should be applied to the fitting that attaches the self-activating smoke signal to the lifebuoy. The test is to be carried out at temperatures of -30°C and +65°C.	The smoke signal or the fitting should not be damaged as a result of the test.	1. Test at -30°C (specimen 1) Load applied to fitting _____ N Strength test Passed _____ Failed_____ 2. Test at +65°C (specimen 4) Load applied to fitting _____ N Strength test Passed _____ Failed _____ Comments/Observations Passed _____ Failed _____

Lifebuoy self-activating smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.12 Safety inspection	**Regulations: LSA Code I/1.2.2, MSC.81(70) 1/ 1.9.4/ 4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by visual inspection that the self-activating smoke signal:		
1. is indelibly marked with clear and precise instructions on how it should be operated and mounted and that the danger end can be identified by day or night;	Clear and precise operating and mounting instructions are marked on the smoke signal.	Markings and identification of signal: Passed_____ Failed_____
2. does not depend on adhesive tapes or plastic envelopes for its water resistant properties; and	Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties.	Water resistant without the use of envelopes or adhesive tape. Passed_____ Failed_____
3. can be indelibly marked with means of determining its age.	Date of manufacturing and date of expiry indelible printed on the outside.	Smoke signal indelible date stamped Passed_____ Failed_____ Comments/Observations

2.2 LIFEJACKETS AND ASSOCIATED EQUIPMENT

2.2.1 INHERENTLY BUOYANT LIFEJACKETS

EVALUATION AND TEST REPORT

2.2.1.1 Submitted drawings, reports and documents

2.2.1.2 Quality assurance

2.2.1.3 Visual inspection

2.2.1.4 General data and specification

2.2.1.5 Temperature cycling test

2.2.1.6 Buoyancy test

2.2.1.7 Fire test

2.2.1.8 Oil resistance test

2.2.1.9 Tests of components other than buoyancy materials

2.2.1.10 Strength tests – Body or lifting loop strength tests

2.2.1.11 Strength tests – Shoulder lift test

2.2.1.12 Tests for lifejacket buoyancy material – Stability under temperature cycling

2.2.1.13 Tests for lifejacket buoyancy material – Compression and water absorption test

2.2.1.14 Tests for lifejacket buoyancy material – Tensile strength test

2.2.1.15 Donning test

2.2.1.16 Water performance tests – Preparation for water performance tests

2.2.1.17 Water performance tests – Righting tests

2.2.1.18 Water performance tests – Static balance measurements

2.2.1.19 Water performance tests – Jump and drop tests

2.2.1.20 Water performance tests – Stability test

2.2.1.21 Water performance tests – Swimming and water emergence test

2.2.1.22 Infant and children's lifejacket – Test subjects selection

2.2.1.23 Infant and children's lifejacket – Water performance tests – Righting test

2.2.1.24 Infant and children's lifejacket – Water performance tests – Static balance measurements

2.2.1.25 Children's lifejacket – Water performance tests – Jump and drop test

2.2.1.26 Infant and children's lifejacket – Water performance tests – Stability test

2.2.1.27 Infant and children's lifejacket – Mobility test

2.2.1 INHERENTLY BUOYANT LIFEJACKETS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.2 Quality assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: _____ Quality Assurance Procedure: _____ Quality Assurance Manual: _____ Description of System. Quality Assurance System acceptable Yes_____ No_____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.3 Visual inspection	**Regulations: LSA Code I/1.2.2.1, 1.2.2.6, 1.2.2.7, 1.2.2.9, 1.2.3; LSA Code II/ 2.2.1.14, 2.2.1.5.3 & 2.2.1.5.5, 2.2.1.10, 2.2.1.13, 2.2.1.16 &2.2.1.17**

Test Procedure	Acceptance Criteria	Significant Test Data
	Inherently buoyant lifejackets should:	
.1 Approval markings	be clearly marked with approval information including the Administration which approved it, date of manufacturer any operational restrictions, and (if an infant or child lifejacket) the appropriate symbol according to resolution A.760(18).	Passed _____ Failed _____
.2 Retro-reflective tape	be fitted with approved patches of retro-reflective material with a total area of at least 400 cm^2 according to resolution A.658(16). In the case of a reversible lifejacket, the arrangement should be complied with no matter which way the lifejacket is put on. Such material should be placed as high on the lifejacket as possible.	Passed _____ Failed _____
.3 Lifejacket light	have provision to be fitted with a light	Passed _____ Failed _____
.4 Donning and comfort	be so constructed that it is capable of being worn inside out or is clearly capable of being worn in one way and, if donned incorrectly, it is not injurious to the wearer. It should also be comfortable to wear;	Passed _____ Failed _____
.5 Whistle	be fitted with a whistle firmly secured by a lanyard to the lifejacket.	Passed _____ Failed _____
.6 Colour of lifejacket	be of international or vivid reddish orange or a comparably highly visible colour.	Passed _____ Failed _____

.7 Buoyant Line & Means to lift the wearer	A lifejacket shall be provided with a releasable buoyant line or other means to secure it to a lifejacket worn by another person in the water. A lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or a rescue boat.	Passed _____ Failed _____
.8 Oversized lifejacket	If an adult lifejacket is not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1,750 mm, suitable accessories shall be available to allow it to be secured to such persons.	Passed _____ Failed _____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.4 General data and specifications	**Regulations: LSA Code / MSC.81(70)**	
Construction Material: Fabric produced by: _____ Type: _____ Buoyant material produced by:_____ _____ Type:_____	**Additional equipment:** Retro reflective material: □ YES □NO Type: _____ Whistle: - □ YES □NO Type: _____ Light (if fitted): □ YES □NO Type: _____	**Donning instructions:** □ YES □NO Passed _____ Failed _____

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.5 Temperature cycling test		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
A lifejacket should be subjected to a temperature cycling test of surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: 1. an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and 2. the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; 3. an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and 4. the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day. The lifejacket should then be externally examined.	The lifejacket material should show no sign of damage such as shrinking, cracking, swelling, dissolution or changes of mechanical qualities.	(See following page for test data) Passed _____ Failed _____ Comments/Observations

2.2.1.5 Temperature cycling test – Test data			**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/2.1**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 2	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 3	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 4	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 5	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 6	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 7	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 8	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 9	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 10	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.6 Buoyancy test		**Regulations: LSA Code II/2.2.1.11; MSC.81(70) 1/2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The two lifejackets subjected to temperature cycling and the hot and cold inflation test should then be used for the buoyancy test. The buoyancy of the two lifejackets should be measured before and after 24 h complete submersion to just below the surface in fresh water. The test to be repeated as many times as necessary to perform the test once with each compartment in the uninflated condition.	The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy.	Buoyancy test method:_____ Start (time):_____ Temperature: _____ Finish (time):_____ Temperature: _____ Buoyancy 1 Buoyancy 2 %difference _____kg _____kg _____% Passed _____ Failed _____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.7 Fire test		**Regulations: LSA Code II/2.2.1.1; MSC.81(70) 1/1.5, 2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put into the bottom of the test pan to a depth of 1 cm followed by enough petrol to make a minimum total depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30s. The lifejacket should then be moved through the flames in an upright, forward, free-hanging position, with the bottom of the lifejacket 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The lifejacket should not sustain burning for more than 6s or continue melting after being removed from the flames.	Passed _____ Failed _____ Comments/Observations

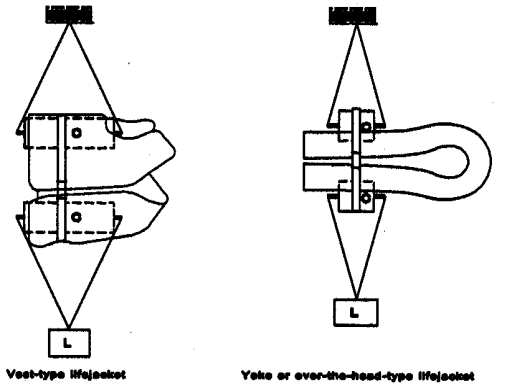
2.2.1.8 Oil resistance test		**Regulations: LSA Code II/1.2.2; MSC.81(70) 1/1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifejacket should be immersed horizontally for a period of 24 h under 100 mm head of diesel oil at normal room temperature.	After this test, the lifejacket should show no signs of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Passed _____ Failed _____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.9 Tests of components other than buoyancy materials (Continued)		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
All the materials, other than buoyancy materials, used in the construction of the lifejacket including the cover, tapes, seams and closures should be tested to establish that they are: .1 rot-proof, .2 colour-fast and .3 resistant to deterioration from exposure to sunlight and that they are not unduly affected by .4 seawater, .5 oil or .6 fungal attack	The results should be acceptable to the International Organization for Standardization, in particular publication ISO 12402-7:2006 Personal Flotation Devices – Part 7: Materials and Components – Safety Requirements and Test Methods (to be published).	Tests: (Specify): _____ Cover: Tapes: Seams: Additional equipment: Tensile strength as received (new material) (N/25 mm width) :_____ _____ _____ _____ Tear strength as received (N) :_____ _N/A__ _N/A____ _____ .1 Tensile strength after microbial exposure Method: _____ Duration:_____ (N/25 mm width) _____ _____ _____ _____ (% retained strength) _____ _____ _____ _____ .2 Resistance to rubbing, wet and dry – (ISO 105-X12:2001 & 105-E02:1994) Cycles:_____ _____:_____ _____ _____ _____ .3 Tensile strength after weathering Weathering Method: _____ Duration: _____ (N/25 mm width) _____ _____ _____ _____ (% retained strength) _____ _____ _____ _____ Acceptable: 1) □ Yes □ No 2) □ Yes □ No 3) □ Yes □ No .4 Tensile strength after exposure to sea water. Method: _____ Duration: _____ (N/25 mm width) _____ _____ _____ _____ (% retained strength) _____ _____ _____ _____

		.5 Tensile strength after exposure to oil Type of oil: _____ Duration: _____ (N/25 mm width) _____ _____ _____ _____ (% retained strength) _____ _____ _____ _____ .6 Tensile strength after fungal attach. Type of oil: _____ Duration: _____ (N/25 mm width) _____ _____ _____ _____ (% retained strength) _____ _____ _____ _____ Acceptable: 4) □ Yes □ No 5) □ Yes □ No 6) □ Yes □ No

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

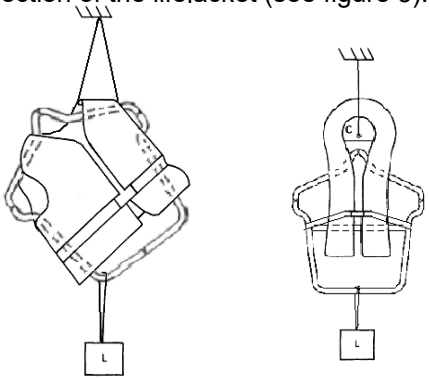
2.2.1.10 Strength tests - Body or lifting loop strength tests	**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.5.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 3,200 N (2,400 N in the case of a child or infant-size lifejacket) should be applied for 30 min to the part of the lifejacket that secures it to the body of the wearer (see figure 1) and separately to the lifting loop of the lifejacket.  Vest-type lifejacket Yoke or over-the-head type lifejacket Figure 1 Body strength test arrangement for lifejackets C– Cylinder 125mm diameter for adult sizes 50mm diameter for Infant and child size L– Test load	The lifejacket should not be damaged as a result of this test. The test should be repeated for each encircling closure.	Body strap Lifting loop Force applied: _____ _____ Time: _____ _____ Slippage: _____ _____ Closure(s) tested: _____ Illustration of lifejacket lifting loop test arrangement if tested: Test results Closure system: Passed_____ Failed_____ Lifting loop: Passed _____ Failed_____

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.11 Strength tests - Shoulder lift test	**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.5.2**

Test Procedure

The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed on a form as shown in figure 2 in the same manner as when it is worn by a person. A force of not less than 900 N (700 N in the case of a child or infant-size lifejacket) should be applied for 30 min across the form and the shoulder section of the lifejacket (see figure 3).



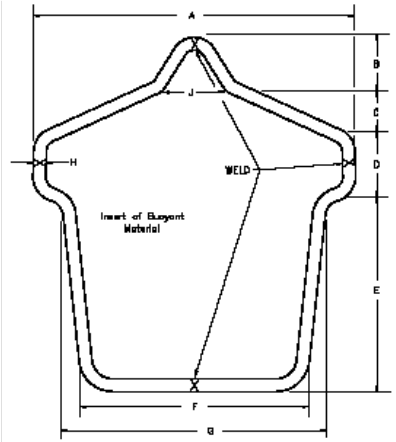
Vest-type lifejacket Yoke or over-the-head-type lifejacket

Figure 3- Shoulder lift test arrangement for lifejackets

C– Cylinder; 125mm diameter for adult sizes
50mm diameter for infant and child sizes
L– Test load

Acceptance Criteria

The lifejacket should not be damaged as a result of this test.
The lifejacket should remain secured on the form during this test.



Size	A	B	C	D	E	F	G	H	J
Adult	610	114	76,2	127	381	432	508	25,4	178
Child	508	102	76,2	102	279	330	406	22,2	152
Infant	305	63,5	38,1	63,5	191	203	241	19,1	76,2

Dimensions in mm

Figure 2 – Test form for shoulder lift test for lifejackets

Significant Test Data

Force applied:_____

Shoulder tested:_____

Test result:

Passed _____ Failed_____

Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.12 Tests for lifejacket buoyancy material – Stability under temperature cycling	**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.1-2.6.4)**

Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out on eight specimens of each lifejacket buoyancy material. A further four specimens of each lifejacket-buoyancy material should be prepared for the tensile strength test in 2.2.1.14. The specimens should be at least 300mm square and be of the same thickness as used in the lifejacket. The specimen should be labelled and the dimension should be recorded prior to the test. In the case of kapok, the entire lifejacket should be subjected to the test. The dimensions should be recorded at the beginning and end of these tests. Where multiple layers of materials are used to achieve the total thickness desired for the lifejacket, the specimens should be of the thinnest material used. ← Six specimens should be subjected to temperature cycling as prescribed in 2.2.1.5. ↑ The dimensions of the specimens (except kapok) should be recorded at the end of the last cycle. The specimens should be carefully examined.	The specimens should not show any sign of internal and external change of structure or of mechanical qualities.	Dimensions prior to test Length Width Height Specimen No. 1 _____ _____ _____ Specimen No. 2 _____ _____ _____ Specimen No. 3 _____ _____ _____ Specimen No. 4 _____ _____ _____ Specimen No. 5 _____ _____ _____ Specimen No. 6 _____ _____ _____ Dimensions after test Length Width Height Specimen No. 1 _____ _____ _____ Specimen No. 2 _____ _____ _____ Specimen No. 3 _____ _____ _____ Specimen No. 4 _____ _____ _____ Specimen No. 5 _____ _____ _____ Specimen No. 6 _____ _____ _____ Passed Failed Specimen No.1 _____ _____ Specimen No.2 _____ _____ Specimen No.3 _____ _____ Specimen No.4 _____ _____ Specimen No.5 _____ _____ Specimen No.6 _____ _____ Mechanical qualities evaluated and procedure used: _____ _____

2.2.1.12 Tests for lifejacket buoyancy material – Stability under temperature cycling		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.1-2.6.4)**
Test Procedure	Acceptance Criteria	Significant Test Data
		↑ Passed _____ Failed _____ → Passed _____ Failed_____ ↓ Passed _____ Failed_____ Comments/Observations (See following page for test data)
→Two of the specimens should be cut open and should be carefully examined. ↓ Four of the specimens should be used for compression and water absorption tests, two of which should be so tested after they have also been subjected to the diesel oil test as prescribed in 2.2.1.8.	The specimens should not show any sign of internal change of structure.	□ Passed _____ Failed _____ □ Passed _____ Failed_____ □ Passed _____ Failed_____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.12 Temperature cycling test – Test data	**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.1**

	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 2	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 3	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 4	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 5	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 6	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 7	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 8	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 9	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 10	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.13 Tests for lifejacket buoyancy material – Compression and water absorption test		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/2.6 (2.6.5-2.6.7)**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out on six specimens of each type of lifejacket buoyancy material. The tests should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The tests should be carried out: .1 on two specimens as supplied; .2 on two specimens which have been subjected to the temperature cycling as prescribed in 2.2.1.12; and .3 on two specimens which have been subjected to the temperature cycling as prescribed in 2.2.1.12 followed by the diesel oil test as prescribed in 2.2.1.8.	The specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The results should state the buoyant force in N, which each specimen exerts when submerged in water after 1 and 7 days immersion. The reduction of buoyancy should not exceed 10% for specimens which have been exposed to the diesel oil conditioning and should not exceed 5% for all specimens.	Test results: (As supplied specimens) After 1 day After 7 days %diff. Test results: (Specimens subjected to temperature cycling) Specimen No. 3 _____ N _____ N %_____ Passed _____ Failed _____ Specimen No. 4 _____ N _____ N %____ Passed _____ Failed _____ Test results: (Specimens subject to temperature cycling and oil exposure) Specimen No. 5_____N _____ N %_____ Passed _____ Failed _____ Specimen No. 6 _____N _____ N % _____ Passed _____ Failed _____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.14 Tests for lifejacket buoyancy material – Tensile strength test		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/ 2.6.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Four specimens of each lifejacket-buoyancy material should be tested. The tensile strength at break of the material should be measured before and after the combined exposure described in 2.6.6.3. of MSC.81(70).	When tested according to an international standard, ISO 12402-7:2006 Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods, acceptable to the Organization, the materials should have a minimum tensile strength of 140 kPa before exposure, which should not be reduced by more than 25% following the combined exposures. In the case of kapok, the protective cover should have a minimum breaking strength of 13 kPa before exposure, which should not be reduced by more than 25% following the combined exposures.	Test Results: (Specimens before exposure) Min. Tensile Strength =140kPa (?) Specimen No 1 Yes _____ No _____ Passed _____ Failed _____ Specimen No 2 Yes_____ No _____ Passed _____ Failed _____ Test Results: (Specimens after combined exposure) Reduction in Tensile Strength ≤25% Specimen No 1 Yes _____ No _____ Passed _____ Failed _____ Specimen No 2 Yes_____ No _____ Passed _____ Failed _____ Test Results: (Protective cover for kapok before exposure) Min. Breaking Strength =13 kPa (?) Specimen No 1 Yes _____ No _____ Passed _____ Failed _____ Specimen No 2 Yes_____ No _____ Passed _____ Failed _____ Test Results: (Protective cover for kapok after combined exposure) Reduction in Breaking Strength ≤ 25 % Specimen No 1 Yes _____ No _____ Passed _____ Failed _____ Specimen No 2 Yes_____ No _____ Passed _____ Failed _____ Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.15 Donning Test	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
To minimize the risk of incorrect donning by uninitiated persons, often in adverse conditions, lifejackets should be examined for the following features and tested as follows: Test subjects The test should be carried out with at least 12 able-bodied persons who are completely unfamiliar with the lifejacket and selected according to the heights and weights in table 2.1 and the following: .1 small test subjects need not be adults; .2 at least 1/3, but not more than 1/2 of test subjects should be females, including at least 1 per height category but excluding the tallest height; .3 at least one male should be from the lowest and highest weight group and one female should be from the lowest weight group and one female should be more than 80 kg and 1.8 m; .4 at least one subject should be selected from each cell containing a "1"; and .5 enough additional subjects should be selected from cells containing a "X" to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.	Fastenings necessary for proper performance should be few and simple and provide quick and positive closure that does not require tying of knots. Adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad. All lifejackets should be capable of being worn inside-out, or clearly in only one way.	

2.2.1.15 Donning Test	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**

Test Procedure	Acceptance Criteria	Significant Test Data

	Weight range - kg							
Height range (m)	40 -43	43 – 60	60 -70	70 – 80	80 – 100	100 – 110	110 – 120	> 120
< 1,5	1	X	X	X				
1,5 – 1,6	X	1	1	X	X			
1,6 – 1,7		X	X	1	X	X		
1,7 -,1,8			X	X	1	X	X	X
1,8 – 1,9			X	X	X	1	1	X
> 1,9					X	X	X	1

Table – Test subject selection for adult lifejackets

Comments/Observations:

Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

2.2.1.15 Donning Test (Continued)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Clothing Each test subject should be tested wearing the clothing specified for the test and appropriate to their size, as follows: .1 *Normal clothing* means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; .2 *Heavy-weather clothing* means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves. Each test should be timed from when the order is given until the test subject declares that donning is complete. *Test without instruction* The test subjects may be tested individually or as a group. Wearing normal clothing, the first attempt should be with no assistance, guidance or prior demonstration. The lifejacket, with closures in the stored condition, should be placed on the floor, face up, in front of the test subject. The instruction provided should be identical for each subject and should be equivalent to the following: "PLEASE DON THIS LIFEJACKET AS QUICKLY AS POSSIBLE AND ADJUST IT TO A SNUG FIT SO YOU CAN ABANDON SHIP."	For assessment purposes donning is considered complete when the subject has donned and securely adjusted all methods of securing the lifejacket to the extent needed to meet the in -water performance requirements, including inflation, if needed. The lifejacket should be capable of being donned by at least 75 % of the subjects, and within 1 minute. If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 of MSC.81(70) and in-water performance tests in 2.8.5 of MSC.81(70) and 2.8.6 of MSC.81(70) should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful.	See following page for test data Total number of subjects: _____ # of subjects successful: _____ # of subjects successful: _____ Pass / Fail

2.2.1.15 Donning Test (Continued)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Test after instruction For each subject whose first attempt exceeds 1 min or is incomplete, after demonstration or instruction to familiarize the subject with the donning procedure, the test subject should then don the lifejacket without assistance while wearing normal clothing, using the same instruction and timing method as above.	Each subject should correctly don the lifejacket within a period of 1 min.	Pass / Fail
Heavy-weather clothing test Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as above.	Each subject should don the lifejacket correctly within a period of 1 min.	Pass / Fail

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.15 Donning Test – Test Data					**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**	
	Test without instruction				Test after instruction	Heavy weather clothing test
Subject	Donning time (sec)	All closures secured? (Y/N)	Jump test (P/F)	In-water test (P/F)	Donning Time (sec)	Donning time (sec)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
Comments/Observations:						

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.16 Water performance tests- Preparation for water performance tests	**Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; MSC.81(70) 1/2.8 to 2.8.4, Annex 1, MSC.1/Circ.1470**

Test Procedure	Acceptance Criteria	Significant Test Data
This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 1 to 3. All tests should be carried out in fresh water under still conditions. Each test for a candidate lifejacket and the relevant RTD should be conducted on the same day. These tests should be carried out with at least 12 persons as mentioned in paragraph 2.2.1.15. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained. The test subjects should wear only swimming costumes. Each test subject should be made familiar with each of the tests in 2.2.1.17 and 2.2.1.18, particularly the requirements regarding relaxing and exhaling in the face-down position. The test subjects should don the lifejacket, unassisted, using only the instructions provided by the manufacturer. Prior to taking measurements, the proper fit, donning, and fastening of the RTD on the subject should be checked and corrected as necessary.	The RTD should be constructed and calibrated according to MSC.81(70), annex 1, and validated according to MSC.1/Circ.1470.	RTD Constructed by: _____ date:_____ Validated by: _____ date:_____ Calibrated by: _____ date:_____ Test subjects same as in 2.2.1.15? If not, describe test subjects:

Subj	**SEX (M/F)**	**HEIGHT (m)**	**WEIGHT (kg)**	**Good Swimmer? (Yes/No)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

<table>
<tr><td colspan="2">2.2.1.16 Water performance tests- Preparation for water performance tests</td><td>Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; MSC.81(70) 1/2.8 to 2.8.4, Annex 1, MSC.1/Circ.1470</td></tr>
<tr><td>Test Procedure</td><td>Acceptance Criteria</td><td>Significant Test Data</td></tr>
<tr><td>After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume.</td><td></td><td><table>
<tr><td>11</td><td></td><td></td><td></td><td></td></tr>
<tr><td>12</td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
</table>

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.17 Water performance tests – Righting test | **Regulations: LSA Code II/ 2.2.1.6.2; MSC.81(70)1/ 2.8.5**

Test Procedure	Acceptance Criteria
Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally. During the relaxation phase, the subject should be maintained in a stable face down position. Immediately after the subject has relaxed, with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released.	The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The test should be conducted a total of six times, and the highest and lowest times discarded. The test should then be conducted a total of six times in the RTD and the highest and lowest times discarded. Turning time: the average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s. The number of "no-turns", if any, should not exceed the number in the RTD.

Significant Test Data

Subj	CANDIDATE DEVICE TIME (sec) TRIAL							REFERENCE VEST TIME (sec) TRIAL						
	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
Average candidate turn time (sec):								**Average RTD turn time (sec):**						
# of candidate no turns (NT):								**# of RTD no turns (NT):**						

(* Delete highest and lowest value)
Average candidate turn time ≤ Average RTD turn time RTD +1s Passed _____ Failed _____
# of candidate no turns (NT): ≤ # of RTD no turns (NT) : Passed _____ Failed _____

Comments/Observations:

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.18 Water performance tests-Static balance measurements | **Regulations: LSA Code II/ 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7**

Test Procedure	Acceptance Criteria	Significant Test Data

At the conclusion of the righting tests, without making any adjustments in body or lifejacket position, the following measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests.

	Freeboard (mm)		Faceplane (deg)		Torso angle (deg)		Light
	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Avg							XXXXX

CLJ – Candidate Lifejacket

RTD – Reference Test Device

2.2.1.18 Water performance tests-Static balance measurements	**Regulations: LSA Code II/ 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
1. Freeboard – The distance measured perpendicularly from the surface of the water to the lowest point of the subject's mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level.	Freeboard: the average freeboard of all the subjects should not be less than the average for the RTD minus 10 mm.	Average freeboard, all subjects ≥ average freeboard for RTD minus 10 mm Passed_____ Failed_____
2. Faceplane angle – The angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and chin.	Faceplane Angles: The average of all subjects' faceplane angles should be not less than the average for the RTD minus 10º.	Average faceplane angle, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
3. Torso angle – The angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis).	Torso Angles: the average of all subjects' torso angles should be not less than the average for the RTD minus 10º.	Average torso angles, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
4. List angle – The angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.	Lifejacket light location: the position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable? Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.19 Water performance tests – Jump and drop tests		**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5 m. When jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test, the lifejacket should be rejected or the test delayed until test from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable. NOTE: JUMP TESTS <u>SHOULD NOT</u> BE REPEATED IN THE RTD.	Following the jump and drop test, the lifejacket should: .1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average determined for the RTD after the turning test in accordance with 2.2.1.18 minus 15 mm; .2 not be dislodged or cause harm to the test subject; .3 have no damage that would affect its in-water performance or buoyance; and .4 have no damage to its attachments.	See following page for test data 1 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.1.18): _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No 4.5 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.1.18) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.19 Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9**

TEST DATA SHEET (1 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.19 Water performance tests – Jump and drop tests (Continued)	**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9**

TEST DATA SHEET (4.5 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.20 Water performance tests – Stability test | **Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.10**

Test Procedure	Acceptance Criteria	Significant Test Data

The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: "place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible."

The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position.

The test should then be conducted with the subject rotated counter-clockwise.

The entire test should then be repeated with the test subject wearing the RTD.

The candidate lifejacket should not roll any subject face down in the water.

$$(a) + (b) = 0$$

The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD.

$$(e) \leq (g)$$

And

$$(f) \leq (h)$$

	Did the subject roll face-down? (Yes/No)				**Did the subject return to a stable face-up position? (Yes/No)**			
	Candidate		**RTD**		**Candidate**		**RTD**	
Subj	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.21 Water performance tests -swimming and water emergence test	**Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.11**

Test Procedure	Acceptance Criteria	Significant Test Data
All test subjects, without wearing the lifejacket, should attempt to swim 25 m and board a liferaft or rigid platform with its surface 300 mm above the water surface. All test subjects who successfully complete this task should perform it again wearing the lifejacket.	At least two-thirds of the subjects who can accomplish the task without the lifejacket should also be able to perform it with the lifejacket. (b) ≥ 2/3 (a)	Apparatus Used: _____ Liferaft or Rigid Platform Record whether test subjects can successfully board liferaft or platform:

Subj	**Without lifejacket**	**With lifejacket**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Total	(a)	(b)

(b) _____
2/3 (a) _____

Passed / Failed

Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.22 Infant and children's lifejacket - Test subjects selection | **Regulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9 – 2.9.1**

Test Procedure

As far as possible, similar tests (to the adult tests) should be applied for approval of lifejackets suitable for infants and children.

For child-size lifejackets, tests should be carried out with at least 9 able-bodied persons, and for infant-size lifejackets, tests should be carried out with at least 5 able-bodied persons.

All test subjects should be selected according to table 2.2 or table 2.3 as follows:

.1 One subject should be selected per each cell containing a "1".

.2 Remaining subjects should be selected from cells containing an "X", without repeating a cell.

.3 At least 40% of the subjects should be male and at least 40% female.

.4 Devices for infants should be tested on infants as small as 6 kg mass.

Acceptance Criteria

Table 2.2 - Selection of Child Test Subjects

Height range (cm)	Weight Range (kg)										
	14 - 17	17 - 20	20 - 22	22 - 25	25 - 28	28 - 30	30 - 33	33 - 36	36 - 38	38 - 41	41 - 43
79-105	1	X									
90-118		X	1								
102-130				1	X						
112-135					X	1					
122-150							1	1	X		
145-165									X	1	1

Significant Test Data

Size: Infant / Child

Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Manikin? (Yes*/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				

*Manikin description: _____

<table>
<tr><th colspan="2">2.2.1.22 Infant and children's lifejacket - Test subjects selection</th><th>Regulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9 – 2.9.1</th></tr>
<tr><th>Test Procedure</th><th>Acceptance Criteria</th><th>Significant Test Data</th></tr>
<tr><td>.5 A manikin or manikins may be substituted for test subjects if the manikin or manikins have been demonstrated to provide representative results compared to human subjects.</td><td>Table 2.3 - Selection of Infant Test Subjects
<table>
<tr><th rowspan="2">Height range (cm)</th><th colspan="3">Weight Range (kg)</th></tr>
<tr><th>Less than 11</th><th>11-14</th><th>14-17</th></tr>
<tr><td>Less than 83</td><td>1</td><td>X</td><td></td></tr>
<tr><td>79-105</td><td>X</td><td>1</td><td>1</td></tr>
<tr><td>90-118</td><td></td><td></td><td>X</td></tr>
</table></td><td></td></tr>
</table>

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.23 Infant and children's lifejacket – Water performance tests – Righting test	**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3**

Test Procedure	Acceptance Criteria	Significant test data
This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 2 to 3. All tests should be carried out in fresh water under still conditions. Each test for a candidate lifejacket and the relevant RTD should be conducted on the same day. The tests may be modified for child test subjects under 12 years of age who are not comfortable in water, so as to ensure their safety and cooperation. Prior to taking measurements, the proper fit, donning, and fastening of the RTD on the subject should be checked and corrected as necessary. After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume.	The RTD should be constructed and calibrated according to resolution MSC.81(70), annex 2 or 3, as applicable to the size.	RTD Size: Infant / Child RTD Constructed by: _____ date:_____ Validated by: _____ date:_____ Calibrated by: _____ date:_____

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.23 Infant and children's lifejacket – Water performance tests – Righting test (Continued)

Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3

Test Procedure	Acceptance Criteria
Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally. During the relaxation phase, the subject should be maintained in a stable face down position.	The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The test should be conducted a total of six times, and the highest and lowest times discarded. The test should then be conducted a total of six times in the RTD and the highest and lowest times discarded. Turning time: the average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s.

Significant Test Data

Subj	CANDIDATE DEVICE TIME (sec) TRIAL							REFERENCE VEST TIME (sec) TRIAL						
	#1	#2	#3	#4	#5	#6	AVG *	#1	#2	#3	#4	#5	#6	AVG *
1														
2														
3														
4														
5														
6														
7														
8														
9														
Average candidate turn time (sec):								**Average RTD turn time (sec):**						
# of candidate no turns (NT):								**# of RTD no turns (NT):**						

(* Delete highest and lowest value)

Average candidate turn time ≤ Average RTD turn time RTD +1s Passed _____ Failed _____

# of candidate no turns (NT): ≤ # of RTD no turns (NT): Passed _____ Failed _____

2.2.1.23 Infant and children's lifejacket – Water performance tests – Righting test (Continued)		**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3**
Test Procedure	Acceptance Criteria	Significant Test Data
Immediately after the subject has relaxed, with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released.	The number of "no-turns", if any, should not exceed the number in the RTD.	Comments/Observations:

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.24 Infant and children's lifejacket – Water performance tests – Static balance measurements

Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, Annex 2 & 3

Test Procedure

At the conclusion of the righting tests, without making any adjustments in body or lifejacket position, the following measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests.

Infant lifejackets should meet the turning time and freeboard requirements, however, the requirements for torso angle, faceplane and mobility may be relaxed if necessary in order to:

.1 contribute to the rescue of the infant by a caretaker;

.2 allow the infant to be fastened to a caretaker and contribute to keeping the infant close to the caretaker;

.3 keep the infant dry, with free respiratory passages;

.4 protect the infant against bumps and jolts during the evacuation; and

.5 allow a caretaker to monitor and control heat loss by the infant.

Significant Test Data

	Freeboard (mm)		Faceplane (deg)		Torso angle (deg)		Light
	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
1							
2							
3							
4							
5							
6							
7							
8							
9							
Avg							XXXXX

CLJ – Candidate Lifejacket

RTD – Reference Test Device

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.24 Infant and children's lifejacket - Water performance tests – Static balance measurements (Continued)	**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, Annex 2 & 3**	
Test Procedure	Acceptance Criteria	Significant Test Data
1. Freeboard – The distance measured perpendicularly from the surface of the water to the lowest point of the subject's mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level.	Freeboard: the average freeboard of all the subjects should not be less than the average for the RTD minus 10 mm	Average freeboard, all subjects ≥ average freeboard for RTD minus 10 mm Passed_____ Failed_____
2. Faceplane angle – The angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and chin.	Faceplane Angles: The average of all subjects' faceplane angles should be not less than the average for the RTD minus 10º	Average faceplane angle, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
3. Torso angle – The angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis).	Torso Angles: the average of all subjects' torso angles should be not less than the average for the RTD minus 10º	Average torso angles, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
4. List angle – The angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.	Lifejacket light location: the position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable? Comments/Observations:

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.25 Children's lifejacket – Water performance tests – Jump and drop test	**Regulations: LSA Code II/2.2.1.8, 2.2.1.5.6; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9**

Test Procedure	Acceptance Criteria	Significant Test Data
Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5m. When jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test, the lifejacket should be rejected or the test delayed until test from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable. <u>NOTE</u>: JUMP AND DROP TESTS <u>SHOULD NOT</u> BE REPEATED IN THE RTD.	Five of the nine subjects should perform the jump and drop test. When conducting water performance tests under 2.8, infant and child-size lifejackets should meet the following requirements for their critical flotation stability characteristics. Following the jump and drop test, the lifejacket should: .1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average determined for the RTD after the turning test in accordance with 2.2.1.23 minus 15 mm; .2 not be dislodged or cause harm to the test subject;	See following page for test data 1 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.18) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No 4.5 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.18) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No

2.2.1.25 Children's lifejacket – Water performance tests – Jump and drop test		**Regulations: LSA Code II/2.2.1.8, 2.2.1.5.6; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Note: Water tests using children should avoid causing distress or risk to the child. Consideration should be taken of their age and ability.	.3 have no damage that would affect its in-water performance or buoyance; and .4 have no damage to its attachments.	Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.25 Children's lifejacket – Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.8, 2.2.1.5.6; MSC.81(70)1/2.9, 2.8.8 and 2.8.9**

TEST DATA SHEET (1 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						

2.2.1.25 Children's lifejacket – Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.8, 2.2.1.5.6; MSC.81(70)1/2.9, 2.8.8 and 2.8.9**

TEST DATA SHEET (4.5 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.26 Infant and children's lifejacket – Water performance tests – Stability test

Regulations: LSA Code II/2.2.1.8, 2.2.1.4; MSC.81(70) 1/2.8.10, 2.9

Test Procedure	Acceptance Criteria	Significant Test Data

The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: "place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible."

The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position.

The test should then be conducted with the subject rotated counter-clockwise.

The entire test should then be repeated with the test subject wearing the RTD.

The candidate lifejacket should not roll any subject face down in the water.

$$(a) + (b) = 0$$

The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD.

$$(e) \leq (g)$$

And

$$(f) \leq (h)$$

	Did the subject roll face-down? (Yes/No)				**Did the subject return to a stable face-up position? (Yes/No)**			
	Candidate		**RTD**		**Candidate**		**RTD**	
Subj	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**
1								
2								
3								
4								
5								
6								
7								
8								
9								
Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Inherently buoyant lifejackets	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.1.27 Infant and children's lifejacket - Mobility test	**Regulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
To be considered in and out of the water. Mobility of the subject both in and out of the water should be given consideration in determining the acceptability of a device for approval and should be compared to mobility when wearing the appropriate size RTD when climbing out of the water, going up and down stairs, picking up an article from the floor, and then drinking from a cup.	Assistance may be given to board a survival craft, but wearer mobility should not be reduced to any greater extent than by the appropriate size RTD.	Does the lifejacket provide for acceptable mobility of the test subjects both in and out of the water and is comparative to the mobility of wearing the RTD? YES □ NO □ Passed _____ Failed_____ Method of evaluation: Comments/Observations

2.2.2 INFLATABLE LIFEJACKETS (ADULTS & CHILD)

EVALUATION AND TEST REPORT

2.2.2.1 Submitted drawings, reports and documents

2.2.2.2 Quality assurance

2.2.2.3 Visual inspection

2.2.2.4 General data and specification

2.2.2.5 Temperature cycling test

- 2.2.2.5.1 Inflation system function
- 2.2.2.5.2 Test data

2.2.2.6 Buoyancy test

2.2.2.7 Fire test

2.2.2.8 Oil resistance test

2.2.2.9 Test of materials for inflatable bladders, inflation systems and components

- 2.2.2.9.1 Coated fabrics test
- 2.2.2.9.2 Operating head load test
- 2.2.2.9.3 Pressure test
- 2.2.2.9.4 Compression test
- 2.2.2.9.5 Test of metallic components
- 2.2.2.9.6 Inadvertent inflation test

2.2.2.10 Strength tests - Body or lifting loop strength test

2.2.2.11 Strength tests - Shoulder lift test

2.2.2.12 Donning test (Uninflated situation)

2.2.2.13 Donning test (Inflated situation)

2.2.2.14 Water performance tests – Preparation for water performance test

2.2.2.15 Water performance tests – Righting test

2.2.2.16 Water performance tests – Static balance measurements

2.2.2.17 Water performance tests – Jump and drop test

2.2.2.18 Water performance tests – Stability test

2.2.2.19 Water performance tests – Swimming and water emergence test

2.2.2.20 Infant and children's lifejacket – Test subjects

2.2.2.21 Infant and children's lifejacket – Water performance tests - Righting test

2.2.2.22 Infant and children's lifejacket – Water performance tests – Static balance measurements

2.2.2.23 Children's lifejacket – Water performance tests – Jump and drop test

2.2.2.24 Infant and children's lifejacket – Water performance tests – Stability test

2.2.2.25 Infant and children's lifejacket – Mobility test

2.2.2 INFLATABLE LIFEJACKETS (ADULTS & CHILD)
EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	
Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.2 Quality assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual: Description of System: Quality Assurance System acceptable Yes/No Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.3 Visual inspection	**Regulations: LSA Code I/1.2.2 & II/2.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
	Inflatable lifejackets should:	
1. Approval markings	be clearly marked with approval information including the Administration which approved it, date of manufacturer and any operational restrictions	Passed _____ Failed _____
2. Retro-reflective tape	be fitted with approved patches of retro-reflective material with a total area of at least 400 cm^2 according to resolution A.658(16). In the case of a reversible lifejacket, the arrangement should be complied with no matter which way the lifejacket is put on. Such material should be placed as high on the lifejacket as possible.	Passed _____ Failed _____
3. Lifejacket light	have provision to be fitted with a light.	Passed _____ Failed _____
4. Donning and comfort	be so constructed that it is capable of being worn inside out or is clearly capable of being worn in one way and, if donned incorrectly, it is not injurious to the wearer. It should also be comfortable to wear;	Passed _____ Failed _____
5. Whistle	be fitted with a whistle firmly secured by a lanyard to the lifejacket.	Passed _____ Failed _____
6. Colour of lifejacket	be of international or vivid reddish orange or a comparably highly visible colour	Passed _____ Failed _____
		Passed _____ Failed _____

7. Buoyant Line & Means to lift the wearer	A lifejacket shall be provided with a releasable buoyant line or other means to secure it to a lifejacket worn by another person in the water. A lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.	Passed _____ Failed _____
8. Oversized lifejacket	If an adult life jacket is not designed to fit persons weighing up to 140 kg and with a chest girth of up to 1750 mm, suitable accessories shall be available to allow it to be secured to such persons.	Passed _____ Failed _____
9. Damaged in stowage and operation	A lifejacket shall not be damaged in stowage throughout the air temperature range -30°C to +65°C and remain operational throughout the air temperature range -15°C to +40°C. (After testing of temperature cycling.)	Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.4 General data and specifications	**Regulations: LSA Code II/2.2; MSC.81(70)**	
Construction Material: Fabric produced by: Type: Inflation system produced by: Type: Cover fabric produced by: Type: Fabric for the inflatable chamber Produced by: Type: Size and type of gas: Means of activating the inflation system:	**Additional equipment:** Retro reflective material: - □ YES □NO Type: Whistle: - □ YES □NO Type: Light (if fitted): □ YES □NO Type: Marked size range: _____ Proper marking for infants and children's lifejacket: □ YES □NO	**Donning instructions:** □ YES □NO Passed _____ Failed _____

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.5 Temperature cycling test	**Regulations: LSA Code I/1.2.2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1**

Test Procedure	Acceptance Criteria	Significant Test Data
Two inflatable lifejackets should be subjected to a temperature cycling test of surrounding temperatures of -30°C and +65°C in the uninflated condition. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: 1. an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and 2. the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; 3. an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and 4. the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day;	Two uninflated inflatable lifejackets after completion of the temperature cycling should be examined externally. The inflatable lifejacket materials should show no signs of damage such as shrinking, cracking, swelling dissolution or changes of mechanical qualities. Temperature test data sheet on next page.	Examination 1. Lifejacket No. 1 Passed _____ Failed _____ 2. Lifejacket No. 2 Passed _____ Failed _____ 3. Cold inflation test, auto inflation Temperature of water ____°C. Time to inflate and relief valves blowing ____ sec. Auto inflation Passed_____Failed 4. Cold inflation test, manual inflation Temperature of water ____°C. Time to inflate and relief valves blowing ____ sec Manual inflation Passed_____Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.5.1 Temperature cycling test - Inflation system function	**Regulations: LSA Code I/1.2.2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1 - 2.10.1.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic and manual inflation systems should each be tested immediately after each temperature cycling test as follows: 1. After a high temperature cycle, the two inflatable lifejackets should be taken from the stowage temperature of + 65ºC. One should be activated using the automatic inflation system by placing it in seawater at a temperature of + 30ºC and the other should be activated using the manual inflation system. 2. After a low temperature cycle, the two inflatable lifejackets should be taken from the stowage temperature of -30ºC. One should be activated using the automatic inflation system by placing it in seawater at a temperature of -1ºC and the other should be activated using the manual inflation system. After exposure to a temperature of -15ºC for a period of at least 8 h, two lifejacket should be activated using the manual inflation system and should fully inflate. After exposure to a temperature of +40 ºC for a period of at least 8 h, two lifejackets should be activated using the manual inflation system and should fully inflate.	The lifejackets should function satisfactorily after these tests. Each should fully inflate. The lifejackets should function satisfactorily after these tests. Each should fully inflate.	.5 Hot inflation test, automatic inflation Temperature of water ____°C. Time to inflate and relief valves blowing _____ sec Automatic inflation Passed_____Failed .6 Hot inflation test, manual inflation Temperature of water _____ºC. Time to inflate and relief valves blowing _____ sec Manual inflation Passed_____Failed .7 Exposure to temperature of -15ºC for 8h Did the two lifejackets fully inflate using the manual inflation system? Passed_____ Failed_____ .8 Exposure to temperature of +40ºC for 8h Did the two lifejackets fully inflate using the manual inflation system? Passed_____ Failed_____

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.5.2 Temperature cycling test – Test data	**Regulations: LSA Code I/1.2.2.2 & 1.2.2.3; MSC.81(70) 1/2.10.1.1**

	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 2	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 3	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 4	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 5	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 6	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 7	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 8	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 9	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 10	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ °C	Date Out: _____ Time Out: _____ Duration: _____ hours

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.6 Buoyancy test	**Regulations: LSA Code II/2.2.2.3, 2.2.2; MSC.81(70) 1/2.2, 2.10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The two lifejackets subjected to temperature cycling and the hot and cold inflation test should then be used for the buoyancy test. The buoyancy of the two lifejackets should be measured before and after 24 h complete submersion to just below the surface in fresh water. The test to be repeated as many times as necessary to perform the test once with each compartment in the uninflated condition. A lifejacket subjected to this test should be inflated automatically with one compartment uninflated, and the test should be repeated until each compartment has been tested in the uninflated condition. (The following equipment and procedure, or suitable alternatives may be used to carry out the buoyancy test of the lifejacket: 1. a mesh basket or tray large enough to contain the lifejacket and adequate weights to overcome the buoyancy of the lifejacket; 2. a tank of fresh water large enough to accommodate the basket or tray and the lifejacket with the uppermost part of the lifejacket 50 mm below the surface of the water; and 3. a spring balance accurate to ± 0.015 kg. 4. water temperature to be recorded at the start of each test and then after 24 hours on completion of each test.)	The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy. The chamber should be fitted with correct gas cylinder.	1. Lifejacket No.1 Weight of the mesh basket with the lifejacket: _____Kg Weight of the mesh basket without the lifejacket:____Kg Buoyancy of front chamber at start _____Kg. Buoyancy of front chamber at 24 hr _____Kg. Difference in buoyancy < 5% _____Kg Buoyancy of back chamber at start _____Kg. Buoyancy of back chamber at 24 hr _____Kg. Difference in buoyancy < 5% _____Kg. Passed _____ Failed 2. Lifejacket No.2. Weight of the mesh basket with the lifejacket: _____Kg Weight of the mesh basket without the lifejacket:____Kg Buoyancy of front chamber at start _____Kg Buoyancy of front chamber at 24 hr _____Kg. Difference in buoyancy < 5% _____Kg Buoyancy of back chamber at start _____Kg. Buoyancy of back chamber at 24 hr _____Kg Difference in buoyancy < 5% _____Kg. Passed _____ Failed_____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.7 Fire test	**Regulations: LSA Code II/2.2.1.1; MSC.81(70) 1/2.3, 2.10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The chamber should be fitted with correct gas cylinder: The two lifejackets subjected to temperature cycling and the hot and cold inflation test should then be used for the fire test. One lifejacket should be inflated and one uninflated during the test. A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put into the bottom of the test pan to a depth of 1 cm followed by enough petrol to make a minimum total depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. The two lifejackets, one inflated the other uninflated, should then be moved through the flames in an upright, forward, free-hanging position, with the bottom of the lifejacket 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The two lifejackets should not sustain burning for more than 6 s or continue melting after being removed from the flame. The inflated lifejacket should not deflate as a result of passing through the flames. The inflated lifejacket should remain inflated after completing this test.	Size of pan _____ x _____ x _____ cm. 1. Lifejacket No.1 Passed _____ Failed _____ 2. Lifejacket No.2 Passed _____ Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.8 Oil resistance test	**Regulations: LSA Code I/1.2.2.4; MSC.81(70) 1/2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Two of the inflatable lifejackets should be subjected to the oil resistance test. The lifejacket should be immersed horizontally for a period of 24 h under 100 mm head of diesel oil at normal room temperature.	After this test the lifejacket should be examined externally and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties.	Condition of Lifejacket No.1 after 24 hours. Passed _____ Failed _____ Condition of Lifejacket No.2 after 24 hours. Passed _____ Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9 Tests of materials for inflatable bladders, inflation systems and components		**Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.4, 2.10.4 - 2.10.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
All the materials used in the construction of the lifejacket, including the cover, tapes, seams and closures, inflatable bladders, inflation systems & components should be tested to establish that they are: .1 rot – proof, .2 colour-fast; and .3 resistant to deterioration from exposure to sunlight, and that they are not unduly affected by .4 seawater; .5 oil; or .6 fungal attack	The results should be acceptable to the International Organization for Standardization, in particular publication ISO 12402-7:2006 Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods. The results should be acceptable to the International Organization for Standardization, in particular publication ISO 12402-7:2006 Personal flotation devices – Part 7: Materials and components – Safety requirements and test methods.	Tests: (Specify _____) Cover: Tapes: Seams: Additional

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.1 Coated fabrics test	**Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.1.1-4**

Test Procedure	Acceptance Criteria	Significant Test Data
Coated fabrics used in the construction of inflatable buoyancy chambers should comply with the following requirements:		
1. Coating adhesion should be tested in accordance with ISO 2411:2000 using the method described at paragraph 5.1 at 100mm/min	(1) After being tested according to ISO 2411:2000, the coating adhesion should not be less than 50 N per 50 mm width.	1. Coating Adhesion (dry) - Test Results in the : Warp _____N, Weft _____N Passed _____ Failed
2. coating adhesion should be tested when wet following ageing according to ISO 188:2007 with an exposure of 336 ± 0.5 h in fresh water at (70.0 ± 1.0) °C following which the method at ISO 2411:2000, paragraph 5.1 should be applied at 100mm/min.	(2) After being tested according to ISO 188:2007, the coating adhesion when wet should not be less than 40 N per 50 mm width.	2. Coating Adhesion (wet) - Test Results in the : Warp _____N, Weft _____N Passed _____ Failed
3. tear strength should be tested in accordance with ISO 4674-1:2003 and ISO 4674-2:1998 using method A1.	(3) After being tested according to ISO 4674-1:2003 and ISO 4674-2:1998, method A1, the tear strength should not be less than 35 N.	3. Tear strength: _____N Passed _____ Failed
4. resistance to flex cracking should be tested in accordance with ISO 7854:1995 method A using 9000 flex cycles.	(4) After being tested according to ISO 7854:1995, method A there should be no visible cracking or deterioration.	4. Flexure Test: Passed _____ Failed Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.1 Coated fabric test (continued)	**Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.1.5-8**	
Test Procedure	Acceptance Criteria	Significant Test Data
5. breaking strength should be tested in accordance with ISO 1421:1998 using the CRE or CRT method, following conditioning for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width.	(5) After being tested according to ISO 1421:1998, the breaking strength should not be less than 200 N per 50 mm width.	5. Break Strength (dry). _____N: Passed _____ Failed _____
6. breaking strength should be tested in accordance with ISO 1421:1998 using the CRE or CRT method, following conditioning immersed in fresh water for 24 ± 0.5 h at room temperature and should not be less than 200 N per 50 mm width.	(6) After being tested according to ISO 1421:1998, the breaking strength when wet should not be less than 200 N per 50 mm width.	6. Break Strength (wet). _____N: Passed _____ Failed _____
7. elongation to break should be tested in accordance with ISO 1421:1998 using the CRE or CRT method following conditioning at room temperature for 24 ± 0.5 h.	(7) After being tested according to ISO 1421:1998, in room temperature the elongation to break should not exceed 60%.	7. Elongation (dry) _____ %: Passed _____ Failed _____
8. elongation to break should be tested in accordance with ISO 1421:1998 using the CRE or CRT method following conditioning immersed in fresh water at room temperature for 24 ± 0.5 h.	(8) After being tested according to ISO 1421:1998, in fresh water at room temperature the elongation to break should not exceed 60%.	8. Elongation (wet) _____ %: Passed _____ Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.1 Coated fabric test (continued)	**Regulations: LSA Code I/1.2.2.1, 1.2.2.1.4 & 1.2.2.1.5; MSC.81(70) 1/2.10.4.1.9-11**

Test Procedure	Acceptance Criteria	Significant Test Data
9. the resistance to exposure to light when tested in accordance with ISO 105-B02: 2013.	(9) After being exposed to light when tested in accordance with ISO 105 – B02:2013, the contrast between the unexposed and exposed samples should not be less than class 5.	9. Accelerated light test Class Passed _____ Failed _____
10. the resistance to wet and dry rubbing when tested in accordance with ISO 105-X12: 2001.	(10) After being wet and dry rubbed in accordance with ISO 105- X12:2001, the staining of the rubbed samples should not be less than class 3.	10. Wet staining after rubbing Class . . Passed _____ Failed _____
11. the resistance to seawater should not be less than class 4 in accordance with ISO 105 EO2: 1994.	(11) After being tested in accordance with ISO 105 EO2:1994, the change in colour of the specimen should not less than class 4.	11. Dry staining after rubbing Class . . Passed _____ Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.2 Operating head load test	**Regulations: LSA Code I/1.2.2.1, 1.2.2.4 & 1.2.2.5; MSC.81(70) 1/2.10.4.2**

Test Procedure	Acceptance Criteria	Significant Test Data
The operating head load test should be carried out using two lifejackets one lifejacket to be conditioned at -30°C for 8 hours and the other at +65°C for 8 hours. After mounting on the manikin or the test form the lifejacket should be inflated, and a steady force of (220±10) N applied to the operating head as near as possible to the point where it enters the buoyancy chamber. This load should be maintained for 5 minutes during which the direction and angle in which it is applied should be continuously varied.	On completion of the test, the lifejacket should remain intact and should hold its pressure for 30 minutes.	1. Security of operating head -30˚C(Jacket 1) Load applied N. 2. Visible damage Passed Failed _____ 3. Security of operating head +65°C (Jacket 2) Load applied N. 4. Visible damage Passed Failed _____ 5. Pressure at the beginning of the test at -30ºC and after 30 min. Jacket 1 at the beginning after 30 min 6. Pressure at the beginning of the test at +65ºC and after 30 min. Jacket 2 _____ at the beginning _____ after 30 min Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.3 Pressure test (1)	**Regulations: LSA Code II/2.2.2.2; MSC.81(70) 1/2.10.4.3.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Overpressure test The inflatable buoyancy chambers should be capable of withstanding an internal over pressure at ambient temperature. All chambers of a lifejacket should be inflated using the manual method of inflation, after inflation the relief valves should be disabled and a fully charged gas cylinder according to the manufacturers recommendation should be fitted to the same inflation device and fired. All fully charged gas cylinders used in this test should be sized according to the markings on lifejacket.	The lifejacket should remain intact and should hold its pressure for 30 minutes. The lifejackets should show no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component.	1. Double charge test. Size of gas bottle _____ grams. Duration of test _____ min. 2. **Chamber 1 -** Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min 3. **Chamber 2 -** Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min 4. **Chambers 3-** Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min 5. **Chamber 4** - Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min 6. Damage to lifejacket Passed _____Failed Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.3 Pressure test (2)	**Regulations: LSA Code; MSC.81(70) 1/2.10.4.3.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Relief valve test With one buoyancy chamber inflated, the operating head on the opposite buoyancy chamber should be fired manually, using a fully charged gas cylinder according to the manufacturer's recommendations. The operation of the relief valves should be noted to ensure that the excess pressure is relieved.	The lifejacket should remain intact and should hold its pressure for 30 minutes. The lifejackets should show no signs of damage such as cracking, swelling or changes of mechanical qualities and that there has been no significant damage to the lifejacket inflation component.	1. **Chamber 1** Size of gas bottle _____ grams. Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min. 2. Relief valve operation. Passed _____ Failed _____ 3. Damage to lifejacket Passed _____ Failed _____ 4. **Chamber 2** Size of gas bottle _____ grams. Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min. 5. Relief valve operation. Passed _____ Failed _____ 6. Damage to lifejacket Passed _____ Failed _____ Comments/Observations

2.2.2.9.3 Pressure test (2) Continued	**Regulations: LSA Code; MSC.81(70) 1/2.10.4.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
		7. **Chamber 3** Size of gas bottle _____ grams. Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min. 8. Relief valve operation. Passed _____ Failed 9. Damage to lifejacket Passed _____ Failed 10. **Chamber 4** Size of gas bottle _____ grams. Pressure at the beginning of the test and after 30 min. _____ at the beginning _____ after 30 min. 11. Relief valve operation. Passed _____ Failed 12. Damage to lifejacket Passed _____ Failed Pressure after the test in each camber: Chamber 1: Chamber 2: Chamber 3: Chamber 4: Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

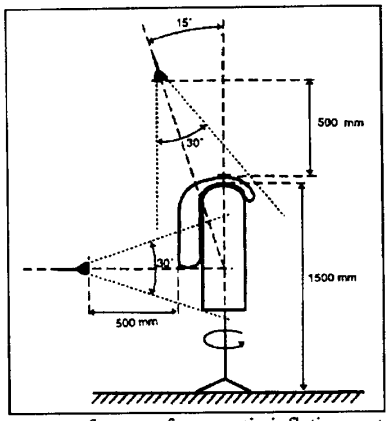
2.2.2.9.3 Pressure test (3)		**Regulations: LSA Code; MSC.81(70) 1/2.10.4.3.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Air retention test One inflation chamber of a lifejacket is filled with air until air escapes from the over-pressure valve or, if the lifejacket does not have an over-pressure valve, until its design pressure, as stated in the plans and specifications, is reached. This test is then repeated as many times as necessary to test a different chamber until each chamber has been tested in this manner. The pressure release valve should be settled when the measurement starts.	After 12 h the drop in pressure should not be greater than 10%.	1. **Air retention test Chamber 1:** Passed _____ Failed _____ 2. Pressure at the beginning of the test and after 12 h. _____ at the beginning _____ after 12 h _____ % drop 1. **Air retention test Chamber 2:** Passed _____ Failed _____ 2. Pressure at the beginning of the test and after 12 h. _____ at the beginning _____ after 12 h _____ % drop 1. **Air retention test Chamber 3:** Passed _____ Failed _____ 2. Pressure at the beginning of the test and after 12 h. _____ at the beginning _____ after 12 h _____ % drop 1. **Air retention test Chamber 4:** Passed _____ Failed _____ 2. Pressure at the beginning of the test and after 12 h. _____ at the beginning _____ after 12 h _____ % drop Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.4 Compression test		**Regulations: LSA Code; MSC.81(70) 1/2.10.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable lifejacket, packed in the normal manner, should be laid on a table. A bag containing 75 kg of sand and having a base of 320 mm diameter should be lowered onto the lifejacket from a height of 150 mm in a time of 1 s. This should be repeated ten times, after which the bag should remain on the jacket for not less than 3 hours.	The lifejacket should be inflated by immersion into water and should inflate fully, the jacket to be inspected to ensure that no swelling or change of mechanical properties has occurred, the jacket should be checked for leaks	Weight of sand bag _____ Kg. Area of sand bag _____ mm Drop Height _____ mm Drop Time _____ sec No. of Drops Length of test _____ hr. Passed _____ Failed _____ Comments/Observations

2.2.2.9.5 Test of metallic components		**Regulations: LSA Code; MSC.81(70) 1/2.10.4.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Metal parts and components of a lifejacket should be corrosion resistant to seawater and should be tested in accordance with ISO 9227:2006 for a period of 96 h. Metal components should not affect a magnetic compass of a type used in small boats by more than 5°, when placed at a distance of 500 mm from it.	The metal components should be inspected and should not be significantly affected by corrosion, or affect any other parts of the lifejacket and should not impair the performance of the lifejacket. The lifejacket should not affect the magnetic compass by more than 5°.	1. Corrosion Test on Components. Passed _____ Failed _____ 2. Magnetic Test on Components. Passed _____ Failed _____ Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.6 Inadvertent inflation test	**Regulations: LSA Code; MSC.81(70) 1/2.10.4.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
The resistance of an automatic inflation device to inadvertent operation should be assessed by exposing the entire lifejacket to sprays of water for fixed period. The lifejacket should be fitted correctly to a free standing manikin of adult size, with a minimum shoulder height of 1500 mm (see figure 5), or alternatively to an appropriately sized form as shown in figure 2. The lifejacket should be deployed in the mode in which it is worn ready for use but not deployed as used in the water (i.e. if it is equipped with a cover which is normally worn closed, then the cover should be closed for the test). Two sprays should be installed so as to spray fresh water onto the lifejacket, as shown in the diagram. One should be positioned 500 mm above the highest point of the lifejacket, and at an angle of 15° from the vertical centre line of the manikin and the bottom line of the lifejacket. The other nozzle should be installed horizontally at a distance of 500 mm from the bottom line of the lifejacket, and be pointed directly at the lifejacket. These nozzles should have a spray cone of 30°, each orifice being 1.5 ± 0.1 mm in diameter, and the total area of the orifice should be 50 ± 5 mm², the orifice being evenly spread over the spray nozzle area.	 Test set-up for test of automatic inflation system Figure 5-Test Set-up	1. Inadvertent Inflation. Passed _____ Failed _____ 2. Auto inflation test. Auto inflation system operable. Passed _____ Failed _____ Comments/Observations

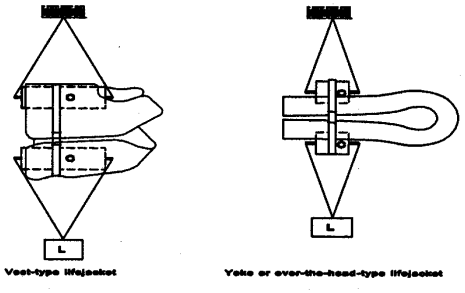
Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.9.6 Inadvertent inflation test (continued)	**Regulations: LSA Code; MSC.81(70) 1/2.10.4.6**

Test Procedure	Acceptance Criteria	Significant Test Data
The air temperature should be 20°C, and water should be supplied to the spray nozzles at a flow of 600 l/h, and at a temperature of 18°C to 20°C. The sprays should be turned on, and the lifejacket should be exposed to the following series of test to assess the ability of the jacket to resist inadvertent inflation: .1 5 minutes with the high spray on the front of the lifejacket; .2 5 minutes with the high spray on the left side of the lifejacket; .3 5 minutes with the high spray on the back of the lifejacket; and .4 5 minutes with the high spray on the right side of the lifejacket. During exposures .1, .2 and .4 the horizontal spray should be applied for 10 periods of 3 sec each to the front, left or right sides (but not back) as with the high spray.	The lifejacket should not inflate during the test After completing this test, the lifejacket should be immersed in water to verify that the auto-inflation system is working.  Figure – Alternative form	1. Inadvertent Inflation. Passed _____ Failed 2. Auto inflation test. Auto inflation system operable. Time to inflate: _____ sec. Passed _____ Failed Comments/Observations Figure Dimensions: Size A B C D E F G H J Adult 610 114 76,2 127 381 432 508 25,4 178 Child 508 102 76,2 102 279 330 406 22,2 152 Infant 305 63,5 38,1 63,5 191 203 241 19,1 76,2

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.10 Strength tests - Body or lifting loop strength test	**Regulations: LSA Code; MSC.81(70) 1/2.5.1, 2.10.1.1**

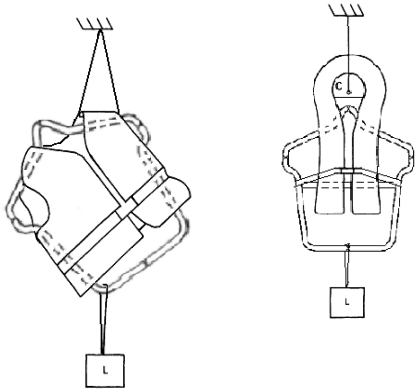
Test Procedure	Acceptance Criteria	Significant Test Data
The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when it is worn by a person. A force of not less than 3,200 N (2,400 N in the case of a child or infant-size lifejacket) should be applied for 30 min to the part of the lifejacket that secures it to the body of the wearer (see figure) and separately to the lifting loop of the lifejacket. The test should be repeated for each encircling closure. The two lifejackets subjected to temperature cycling and the hot and cold inflation test should then be used for the strength test.	The lifejacket or lifting loop should not be damaged as a result of this test.  Vest-type lifejacket Yoke or over-the-head type lifejacket Body strength test arrangement for lifejackets C - Cylinder 125 mm diameter for adult sizes 50 mm diameter for infant and child-sizes L - Test load	Body strap Lifting loop Force applied: _____ _____ Time: _____ _____ Slippage: _____ _____ Closure(s) tested: _____ Illustration of lifejacket lifting loop test arrangement if tested: Test results Closure system: Passed _____ Failed_____ Lifting loop: Passed _____ Failed_____

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.11 Strength tests - Shoulder lift test

Regulations: LSA Code; MSC.81(70) 1/2.5.2, 2.10.1.1

Test Procedure	Acceptance Criteria	Significant Test Data
Two inflatable lifejackets subjected to the tests in 2.2.2.5, 2.2.2.6, 2.2.2.7, 2.2.2.8 and 2.2.2.10 above should be subjected to the shoulder strength test. The lifejacket should be immersed in water for a period of 2 min. It should then be removed from the water and closed on a form as shown in figure 2 in the same manner as when it is worn by a person. A force of not less than 900 N (700 N in the case of a child or infant-size lifejacket) should be applied for 30 min across the form and the shoulder section of the lifejacket. (see figure).	The lifejacket should not be damaged as a result of this test. The lifejacket should remain secured on the form during this test.	Force applied _____N Time force applied _____min Sign of damage Passed _____ Failed _____ Comments/Observations

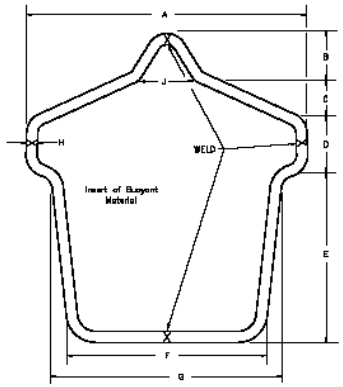


Vest-type lifejacket Yoke or over-the-head-type lifejacket

Figure - Shoulder lift test arrangement for lifejackets

C– Cylinder; 125mm diameter for adult sizes
50mm diameter for infant and child sizes

L– Test load



Dimensions in mm

Figure 2 – Test form for shoulder lift test for lifejackets

Size	A	B	C	D	E	F	G	H	J
Adult	610	114	76,2	127	381	432	508	25,4	178
Child	508	102	76,2	102	279	330	406	22,2	152
Infant	305	63,5	38,1	63,5	191	203	241	19,1	76,2

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.12 Donning Test (Uninflated situation)

Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2

Test Procedure	Acceptance Criteria	Significant Test Data
To minimize the risk of incorrect donning by uninitiated persons, often in adverse conditions, lifejackets should be examined for the following features and tested as follows: The test should be carried out with at least 12 able-bodied persons who are completely unfamiliar with the lifejacket and selected according to the heights and weights in table 2.1 and the following: .1 small test subjects need not be adults; .2 at least 1/3, but not more than 1/2 of test subjects should be females, including at least 1 per height category but excluding the tallest height; .3 at least one male should be from the lowest and highest weight group and one female should be from the lowest weight group and one female should be more than 80 kg and 1.8 m; .4 at least one subject should be selected from each cell containing a "1"; and .5 enough additional subjects should be selected from cells containing a "X" to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.	Fastenings necessary for proper performance should be few and simple and provide quick and positive closure that does not require tying of knots. Adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad. All lifejackets should be capable of being worn inside-out, or clearly in only one way.	Comments/Observations:

Test subject selection for adult lifejackets

	Weight range - kg							
Ht range (m)	40 -43	43 – 60	60 -70	70 – 80	80 – 100	100 – 110	110 – 120	> 120
< 1,5	1	X	X	X				
1,5 – 1,6	X	1	1	X	X			
1,6 – 1,7		X	X	1	X	X		
1,7 -,1,8			X	X	1	X	X	X
1,8 – 1,9			X	X	X	1	1	X
> 1,9					X	X	X	1

Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.12 Donning Test (Uninflated situation)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2**	
Clothing Each test subject should be tested wearing the clothing specified for the test and appropriate to their size, as follows: .1 *Normal clothing* means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; .2 *Heavy-weather clothing* means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves. Each test should be timed from when the order is given until the test subject declares that donning is complete. *Test without instruction* The test subjects may be tested individually or as a group. Wearing normal clothing, the first attempt should be with no assistance, guidance or prior demonstration. The lifejacket, with closures in the stored condition, should be placed on the floor, face up, in front of the test subject. The instruction provided should be identical for each subject and should be equivalent to the following: "PLEASE DON THIS LIFEJACKET AS QUICKLY AS POSSIBLE AND ADJUST IT TO A SNUG FIT SO YOU CAN ABANDON SHIP."	For assessment purposes donning is considered complete when the subject has donned and securely adjusted all methods of securing the lifejacket to the extent needed to meet the in - water performance requirements, including inflation, if needed. The lifejacket should be capable of being donned by at least 75 % of the subjects, and within 1 minute. If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 of MSC.81(70) and in-water performance tests in 2.8.5 of MSC.81(70) and 2.8.6 of MSC.81(70) should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful. Each subject should correctly don the lifejacket within a period of 1 min. Each subject should don the lifejacket correctly within a period of 1 min.	See following page for test data Total number of subjects: _____ # of subjects successful: _____ # of subjects successful: _____ Pass / Fail Pass / Fail

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.12 Donning Test (Uninflated situation)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2**	
Test after instruction For each subject whose first attempt exceeds 1 min or is incomplete, after demonstration or instruction to familiarize the subject with the donning procedure, the test subject should then don the lifejacket without assistance while wearing normal clothing, using the same instruction and timing method as above. *Heavy-weather clothing test* Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as above.		

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.13 Donning Test (Inflated situation)		**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
To minimize the risk of incorrect donning by uninitiated persons, often in adverse conditions, lifejackets should be examined for the following features and tested as follows: The test should be carried out with at least 12 able-bodied persons who are completely unfamiliar with the lifejacket and selected according to the heights and weights in table 2.1 and the following: .1 small test subjects need not be adults; .2 at least 1/3, but not more than 1/2 of test subjects should be females, including at least 1 per height category but excluding the tallest height; .3 at least one male should be from the lowest and highest weight group and one female should be from the lowest weight group and one female should be more than 80 kg and 1.8 m; .4 at least one subject should be selected from each cell containing a "1"; and .5 enough additional subjects should be selected from cells containing a "X" to total the required number of test subjects, with no more than one subject per cell. A uniform distribution across weight ranges should be maintained.	Fastenings necessary for proper performance should be few and simple and provide quick and positive closure that does not require tying of knots. Adult lifejackets should readily fit various sizes of adults, both lightly and heavily clad. All lifejackets should be capable of being worn inside-out, or clearly in only one way.	

Test subject selection for adult lifejackets								
	Weight range - kg							
Ht range (m)	40 -43	43 – 60	60 -70	70 – 80	80 – 100	100 – 110	110 – 120	> 120
< 1,5	1	X	X	X				
1,5 – 1,6	X	1	1	X	X			
1,6 – 1,7		X	X	1	X	X		
1,7 -,1,8			X	X	1	X	X	X
1,8 – 1,9			X	X	X	1	1	X
> 1,9					X	X	X	1

Comments/Observations:

Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Good Swimmer? (Yes/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.13 Donning test (Inflated situation) (Continued)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Clothing Each test subject should be tested wearing the clothing specified for the test and appropriate to their size, as follows: .1 *Normal clothing* means normal indoor clothing, which would not normally interfere with the donning of a lifejacket; .2 *Heavy-weather clothing* means the attire appropriate for a hostile environment, including a hooded arctic parka and warm cotton gloves. Each test should be timed from when the order is given until the test subject declares that donning is complete. *Test without instruction* The test subjects may be tested individually or as a group. Wearing normal clothing, the first attempt should be with no assistance, guidance or prior demonstration. The lifejacket, with closures in the stored condition, should be placed on the floor, face up, in front of the test subject. The instruction provided should be identical for each subject and should be equivalent to the following: "PLEASE DON THIS LIFEJACKET AS QUICKLY AS POSSIBLE AND ADJUST IT TO A SNUG FIT SO YOU CAN ABANDON SHIP."	For assessment purposes donning is considered complete when the subject has donned and securely adjusted all methods of securing the lifejacket to the extent needed to meet the in - water performance requirements, including inflation, if needed. The lifejacket should be capable of being donned by at least 75 % of the subjects, and within 1 minute.	See following page for test data Total number of subjects: _____ # of subjects successful: _____ # of subjects successful: _____

2.2.2.13 Donning test (Inflated situation) (Continued)	**Regulations: LSA Code II/2.2.1.5; MSC.81(70) 1/2.7.1 to 2.7.4.3, 2.10.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Test after instruction For each subject whose first attempt exceeds 1 min or is incomplete, after demonstration or instruction to familiarize the subject with the donning procedure, the test subject should then don the lifejacket without assistance while wearing normal clothing, using the same instruction and timing method as above.	If a subject dons the lifejacket substantially correctly but fails to secure and/or adjust all closures, the jump test in 2.8.8 of MSC.81(70)and in-water performance tests in 2.8.5 of MSC.81(70) and 2.8.6 of MSC.81(70) should be performed with the lifejacket as donned to establish whether the performance is acceptable and the donning is successful.	Pass / Fail
Heavy-weather clothing test Each subject should then don the lifejacket without assistance while wearing heavy-weather clothing, using the same instruction and timing method as above.	Each subject should correctly don the lifejacket within a period of 1 min.	Pass / Fail
	Each subject should don the lifejacket correctly within a period of 1 min.	Pass / Fail

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.12 – 2.2.2.13 Donning Tests – Test Data | **Regulations: LSA Code II/2.2.1.5 – 2.2.1.7; MSC.81(70) 1/2.7.1 to 2.7.4.3**

	Uninflated situation						Inflated situation					
	Test without instruction				Test after instruction	Heavy weather clothing	Test without instruction				Test after instruction	Heavy weather clothing
Subj	Donning time (sec)	All closures secured? (Y/N)	Jump test (P/F)	In-water test (P/F)	Donning Time (sec)	Donning Time (sec)	Donning time (sec)	All closures secured? (Y/N)	Jump test (P/F)	In-water test (P/F)	Donning Time (sec)	Donning Time (sec)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
						Comments/Observations:						

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.14 Water performance tests- Preparation for water performance tests	**Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; MSC.81(70) 1/2.8 to 2.8.4, 2.10.3. Annex 1, MSC.1/Circ.1470**	
Test Procedure	Acceptance Criteria	Significant Test Data
This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 1 to 3. All tests should be carried out in fresh water under still conditions. Each test for a candidate lifejacket and the relevant RTD should be conducted on the same day. These tests should be carried out with at least 12 persons as mentioned in paragraph 2.2.1.15. Only good swimmers should be used, since the ability to relax in the water is rarely otherwise obtained. The test subjects should wear only swimming costumes. Each test subject should be made familiar with each of the tests in 2.2.2.15 and 2.2.2.16, particularly the requirements regarding relaxing and exhaling in the face-down position. The test subjects should don the lifejacket, unassisted, using only the instructions provided by the manufacturer. Prior to taking measurements, the proper fit, donning, and fastening of the RTD on the subject should be checked and corrected as necessary.	The RTD should be constructed and calibrated according to MSC.81(70), annex 1, and validated according to MSC.1/Circ.1470.	RTD Constructed by: _____ date:_____ Validated by: _____ date:_____ Calibrated by: _____ date:_____ Test subjects same as in 2.2.2.12? If not, describe test subjects:

Subj	**SEX (M/F)**	**HEIGHT (m)**	**WEIGHT (kg)**	**Good Swimmer? (Yes/No)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

2.2.2.14 Water performance tests- Preparation for water performance tests	**Regulations: LSA Code II/2.2.1.2.5 & 2.2.1.3 – 2.2.1.4; MSC.81(70) 1/2.8 to 2.8.4, 2.10.3. Annex 1, MSC.1/Circ.1470**					
Test Procedure	Acceptance Criteria	Significant Test Data				
After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume.		**11**				
		12				

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.15 Water performance tests – Righting test	**Regulations: LSA Code II/ 2.2.1.3.2; MSC.81(70)1/ 2.8.5, 2.10.3**

Test Procedure	Acceptance Criteria	Significant Test Data
Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally. During the relaxation phase, the subject should be maintained in a stable face down position. Immediately after the subject has relaxed, with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The test should be conducted a total of six times, and the highest and lowest times discarded. The test should then be conducted a total of six times in the RTD and the highest and lowest times discarded. Turning time: the average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s. The number of "no-turns", if any, should not exceed the number in the RTD. The test should be repeated with one compartment deflated until each compartment has been tested in the uninflated condition.	See following pages for test data. Average candidate turn time $\leq$ Average RTD turn time RTD +1s All Chambers: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #1: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #2: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #3: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #4: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ # of candidate no turns (NT): $\leq$ # of RTD no turns (NT): All Chambers: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #1: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #2: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #3: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #4: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Comments/Observations:

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.15 Water performance tests – Righting test **Regulations: LSA Code II/ 2.2.1.3.2; MSC.81(70)1/ 2.8.5, 2.10.3**

Significant Test Data

	CANDIDATE DEVICE TIME (sec) TRIAL (Automatic inflation)							**CANDIDATE DEVICE TIME (sec) TRIAL (Manual inlflation)**							**REFERENCE VEST TIME (sec) TRIAL**						
Subj	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**AVG ***	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**AVG ***	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**AVG ***
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
	Average candidate turn time (sec):							**Average candidate turn time (sec):**							**Average RTD turn time (sec):**						
	# of candidate no turns (NT):							**# of candidate no turns (NT):**							**# of RTD no turns (NT):**						

(* Delete highest and lowest value)
Average candidate turn time $\leq$ Average RTD turn time RTD +1s Passed _____ Failed _____

# of candidate no turns (NT): $\leq$ # of RTD no turns (NT): Passed _____ Failed _____

Comments/Observations:

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.16 Water performance tests – Static balance measurements	**Regulations: LSA Code II/2.2.2, 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7, 2.10.3**

Test Procedure	Acceptance Criteria	Significant Test Data
At the conclusion of the righting tests, without making any adjustments in body or lifejacket position, the following measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests. 1. Freeboard – The distance measured perpendicularly from the surface of the water to the lowest point of the subject's mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level.	Freeboard: The average freeboard of all the subjects should not be less than the average for the RTD minus 10 mm	See following pages for test data. Average freeboard, all subjects ≥ average freeboard for RTD minus 10 mm All Chambers: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #1: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #2: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #3: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #4: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___
2. Faceplane angle – The angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and chin.	Faceplane angles: The average of all subjects' faceplane angles should be not less than the average for the RTD minus 10º	Average faceplane angle, all subjects ≥ average for RTD minus 10º All Chambers: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #1: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #2: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #3: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #4: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___

2.2.2.16 Water performance tests – Static balance measurements	**Regulations: LSA Code II/2.2.2, 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7, 2.10.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
3. Torso angle – The angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis). 4. List angle – The angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.	Torso angles: the average of all subjects' torso angles should be not less than the average for the RTD minus 10º. Lifejacket light location: the position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Average torso angles, all subjects ≥ average for RTD minus 10º All Chambers: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #1: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #2: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #3: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Chamber #4: Automatic: Passed ___ Failed ___ Manual: Passed ___ Failed ___ Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable? Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.16 Water performance tests-Static balance measurements | **Regulations: LSA Code II/2.2.2, 2.2.1.4; MSC.81(70) 1/ 2.8.6 and 2.8.7, 2.10.3**

Test Procedure

The test should be repeated with one compartment deflated until each compartment has been tested in the uninflated condition.

Significant Test Data

	Automatic Inflation							Manual Inlfation						
	Freeboard (mm)		Faceplane (deg)		Torso angle (deg)		Light	Freeboard (mm)		Faceplane (deg)		Torso angle (deg)		Light
	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
Avg							XXXX							XXXX

CLJ – Candidate Lifejacket

RTD – Reference Test Device

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.17 Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3**

Test Procedure	Acceptance Criteria	Significant Test Data
Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5 m. When jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test, the lifejacket should be rejected or the test delayed until test from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	Following the jump and drop test, the lifejacket should: .1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average determined for the RTD after the turning test in accordance with 2.2.2.16 minus 15 mm; .2 not be dislodged or cause harm to the test subject; .3 have no damage that would affect its in-water performance or buoyance; and .4 have no damage to its attachments. NOTE: JUMP TESTS <u>SHOULD NOT</u> BE REPEATED IN THE RTD.	See following page for test data 1 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.2.16) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No 4.5 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.2.16) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.17 Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3**

TEST DATA SHEET (1 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.17 Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.5.6; MSC.81(70)1/2.8.8 and 2.8.9, 2.10.3**

TEST DATA SHEET (4.5 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/Observations
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.18 Water performance tests – Stability test

Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.10

Test Procedure	Acceptance Criteria	Significant Test Data

The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: "place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible."

The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position.

The test should then be conducted with the subject rotated counter-clockwise.

The entire test should then be repeated with the test subject wearing the RTD.

The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.

The candidate lifejacket should not roll any subject face down in the water.

(a) + (b) = 0

The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD.

(e) ≤ (g)

And

(f) ≤ (h)

	Did the subject roll face-down? (Yes/No)				**Did the subject return to a stable face-up position? (Yes/No)**			
	Candidate		**RTD**		**Candidate**		**RTD**	
Subj	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.19 Water performance tests – Swimming and water emergence test	**Regulations: LSA Code II/2.2.1.4; MSC.81(70) 1/2.8.11**

Test Procedure	Acceptance Criteria	Significant Test Data
All test subjects, without wearing the lifejacket, should attempt to swim 25 m and board a liferaft or rigid platform with its surface 300 mm above the water surface. All test subjects who successfully complete this task should perform it again wearing the lifejacket. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	At least two-thirds of the subjects who can accomplish the task without the lifejacket should also be able to perform it with the lifejacket. (b) ≥ 2/3 (a)	Apparatus Used: _____ Liferaft or Rigid Platform Record whether test subjects can successfully board liferaft or platform:

Subj	Without lifejacket	With lifejacket
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Total	(a)	(b)

(b) _____
2/3 (a) _____

Passed / Failed

Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.20 Infant and children's lifejacket tests – Test subjects | **Regulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9 – 2.9.1, 2.10**

Test Procedure

As far as possible, similar tests (to the adult tests) should be applied for approval of lifejackets suitable for infants and children.

For child-size lifejackets, tests should be carried out with at least 9 able-bodied persons, and for infant-size lifejackets, tests should be carried out with at least 5 able-bodied persons.

All test subjects should be selected according to table 2.2 or table 2.3 as follows:

.1 One subject should be selected per each cell containing a "1".

.2 Remaining subjects should be selected from cells containing an "X", without repeating a cell.

.3 At least 40% of the subjects should be male and at least 40% female.

.4 Devices for infants should be tested on infants as small as 6 kg mass.

.5 A manikin or manikins may be substituted for test subjects if the manikin or manikins have been demonstrated to provide representative results compared to human subjects.

Acceptance Criteria

Table 2.2 - Selection of Child Test Subjects

eight range (cm)	Weight Range (kg)										
	14 - 17	17 - 20	20 - 22	22 - 25	25 - 28	28 - 30	30 - 33	33 - 36	36 - 38	38 - 41	41 - 43
79-105	1	X									
90-118		X	1								
102-130				1	X						
112-135					X	1					
122-150							1	1	X		
145-165									X	1	1

Table 2.3 - Selection of Infant Test Subjects

Height range (cm)	Weight Range (kg)		
	Less than 11	11-14	14-17
Less than 83	1	X	
79-105	X	1	1
90-118			X

Significant Test Data

Size: Infant / Child

Subj	SEX (M/F)	HEIGHT (m)	WEIGHT (kg)	Manikin? (Yes*/No)
1				
2				
3				
4				
5				
6				
7				
8				
9				

*Manikin description: _____

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.21 Infant and children's lifejacket – Water performance tests – Righting test	**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, Annex 2, Annex 3, 2.10.3**

Test Procedure	Acceptance Criteria	Significant test data
This portion of the test is intended to determine the ability of the lifejacket to assist a helpless person or one in an exhausted or unconscious state and to show that the lifejacket does not unduly restrict movement. The in-water performance of a lifejacket is evaluated by comparison to the performance of a suitable size standard reference lifejacket, i.e. Reference Test Device (RTD) as specified in appendices 2 to 3. All tests should be carried out in fresh water under still conditions. Each test for a candidate lifejacket and the relevant RTD should be conducted on the same day. The tests may be modified for child test subjects under 12 years of age who are not comfortable in water, so as to ensure their safety and cooperation. Prior to taking measurements, the proper fit, donning, and fastening of the RTD on the subject should be checked and corrected as necessary. After entering the water, care should be taken to ensure that there is no significant amount of air unintentionally trapped in the lifejacket or swimming costume. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	The RTD should be constructed and calibrated according to MSC.81(70), annex 2 or 3, as applicable to the size.	RTD Size: Infant / Child RTD Constructed by: _____ date:_____ Validated by: _____ date:_____ Calibrated by: _____ date:_____

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.21 Infant and children's lifejacket – Water performance tests – Righting test (Continued)

Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, annex 2, annex 3, 2.10.3

Test Procedure	Acceptance Criteria
Each test subject should assume a prone, face down position in the water, but with the head lifted up so the mouth is out of the water. The subject's feet should be supported, shoulder width apart, with the heels just below the surface of the water. After assuming a starting position with the legs straight and arms along the sides, the subject should then be instructed in the following sequence to allow the body to gradually and completely relax into a natural floating posture: allow the arms and shoulders to relax; allow the legs to relax; and then the spine and neck, letting the head fall into the water while breathing out normally.	The period of time until the mouth of the test subject comes clear of the water should be recorded to the nearest 1/10 of a second, starting from when the subject's feet are released. The test should be conducted a total of six times, and the highest and lowest times discarded. The test should then be conducted a total of six times in the RTD and the highest and lowest times discarded.

Significant Test Data

Subj	**CANDIDATE DEVICE TIME (sec) TRIAL**							**REFERENCE VEST TIME (sec) TRIAL**						
	#1	**#2**	**#3**	**#4**	**#5**	**#6**	**AVG ***	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**AVG ***
1														
2														
3														
4														
5														
6														
7														
8														
9														
Average candidate turn time (sec):								**Average RTD turn time (sec):**						
# of candidate no turns (NT):								**# of RTD no turns (NT):**						

2.2.2.21 Infant and children's lifejacket – Water performance tests – Righting test (Continued)		**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.9.2-2.9.3, annex 2, annex 3, 2.10.3**
Test Procedure	Acceptance Criteria	Significant Test Data
During the relaxation phase, the subject should be maintained in a stable face down position. Immediately after the subject has relaxed, with the face in the water, simulating a state of utter exhaustion, the subject's feet should be released.	Turning time: the average turn time for all subjects in the candidate lifejacket should not exceed the average time in the RTD plus 1 s. The number of "no-turns", if any, should not exceed the number in the RTD.	(* Delete highest and lowest value) Average candidate turn time ≤ Average RTD turn time RTD +1s Passed _____ Failed _____ # of candidate no turns (NT): ≤ # of RTD no turns (NT): Passed _____ Failed _____ Comments/Observations:

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.22 Infant and children's lifejacket - Water performance tests – Static balance measurements	**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, 2.10.3, Annex 2 & 3**

Test Procedure

At the conclusion of the righting tests, without making any adjustments in body or lifejacket position, the following measurements should be made with the subject floating in the relaxed face-up position of static balance resulting from the preceding tests.

Infant lifejackets should meet the turning time and freeboard requirements, however, the requirements for torso angle, faceplane and mobility may be relaxed if necessary in order to:

.1 contribute to the rescue of the infant by a caretaker;

.2 allow the infant to be fastened to a caretaker and contribute to keeping the infant close to the caretaker;

.3 keep the infant dry, with free respiratory passages;

.4 protect the infant against bumps and jolts during the evacuation; and

.5 allow a caretaker to monitor and control heat loss by the infant.

Significant Test Data

	Freeboard (mm)		Faceplane (deg)		Torso angle (deg)		Light
	CLJ	RTD	CLJ	RTD	CLJ	RTD	Visible?
1							
2							
3							
4							
5							
6							
7							
8							
9							
Avg							XXXXX

CLJ – Candidate Lifejacket

RTD – Reference Test Device

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.22 Infant and children's lifejacket - Water performance tests – Static balance measurements (Continued)	**Regulations: LSA Code II/ 2.2.1.8; MSC.81(70)1/ 2.8.6, 2.9.2-2.9.3, 2.10.3, Annex 2 & 3**

Test Procedure	Acceptance Criteria	Significant Test Data
1. Freeboard – The distance measured perpendicularly from the surface of the water to the lowest point of the subject's mouth where respiration may be impeded, if the mouth were not held shut. The lowest side of the mouth should be measured if the left and right sides are not level.	Freeboard: the average freeboard of all the subjects should not be less than the average for the RTD minus 10 mm.	Average freeboard, all subjects ≥ average freeboard for RTD minus 10 mm Passed_____ Failed_____
2. Faceplane angle – The angle, relative to the surface of the water, of the plane formed between the most forward part of the forehead and chin.	Faceplane angles: The average of all subjects' faceplane angles should be not less than the average for the RTD minus 10º.	Average faceplane angle, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
3. Torso angle – The angle, relative to vertical, of the line formed by the forward points of the shoulder and hipbone (ilium portion of the pelvis).	Torso angles: the average of all subjects' torso angles should be not less than the average for the RTD minus 10º.	Average torso angles, all subjects ≥ average for RTD minus 10º Passed_____ Failed_____
4. List angle – The angle relative to the surface of the water and a line between the left and right shoulder or a line through the ears if only the head is tilted.	Lifejacket light location: the position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Does the location of the lifejacket light permit it to be visible over as great a segment of the upper hemisphere as practicable? Comments/Observations:

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.23 Children's lifejacket – Water performance tests – Jump and drop test		**Regulations: LSA Code II/2.2.1.8, 2.2.2.21; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9, 2.10.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 1m while holding the arms over the head. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The test should be repeated from a height of at least 4.5m. When jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. Upon entering the water, the test subject should relax to simulate a state of utter exhaustion. The freeboard to the mouth should be recorded after the test subject comes to rest. The lifejacket and its attachments should be examined for any damage. If injury is believed likely from any jump or drop test, the lifejacket should be rejected or the test delayed until test from a lower height or with additional precautions demonstrate that the risk from the required test is acceptable. <u>NOTE</u>: JUMP AND DROP TESTS <u>SHOULD NOT</u> BE REPEATED IN THE RTD.	Five of the nine subjects should perform the jump and drop test. When conducting water performance tests under 2.8, infant and child-size lifejackets should meet the following requirements for their critical flotation stability characteristics. Following the jump and drop test, the lifejacket should: .1 surface the test subject in a face up position with an average freeboard for all the subjects of not less than the average determined for the RTD after the turning test in accordance with 2.2.1.23 minus 15 mm; .2 not be dislodged or cause harm to the test subject; .3 have no damage that would affect its in-water performance or buoyance;	See following page for test data 1 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.18) : _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No Did the lifejacket have damage to its attachments?: Yes / No 4.5 m Jump Average freeboard, all subjects: _____ mm (A) Average freeboard for RTD (from 2.2.18): _____ mm (B) (B) – (A)= _____ ≤ 15 mm Pass / Fail Did the lifejacket become dislodged or cause harm to the test subject?: Yes / No Did the lifejacket have damage that would affect its in-water performance or buoyance?: Yes / No

2.2.2.23 Children's lifejacket – Water performance tests – Jump and drop test		**Regulations: LSA Code II/2.2.1.8, 2.2.2.21; MSC.81(70) 1/ 2.9, 2.8.8, 2.8.9, 2.10.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Note: Water tests using children should avoid causing distress or risk to the child. Consideration should be taken of their age and ability. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	and .4 have no damage to its attachments.	Did the lifejacket have damage to its attachments?: Yes / No Comments/Observations

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.23 Children's lifejacket – Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.8, 2.1.5.6; MSC.81(70)1/2.9, 2.8.8, 2.8.9and 2.10.3**

TEST DATA SHEET (1 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						

2.2.1.23 Children's lifejacket – Water performance tests – Jump and drop tests	**Regulations: LSA Code II/ 2.2.1.8, 2.2.1.2.5; MSC.81(70)1/2.9, 2.8.8 and 2.8.9**

TEST DATA SHEET (4.5 m Jump)

Subj	Subject surfaced faceup? (Yes/No)	Freeboard (mm)	Lifejacket became dislodged (Yes/No)	Subject was harmed? (Yes/No)	Damage to lifejacket or attachments (Yes/No)	Comments/ Observations
1						
2						
3						
4						
5						

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.24 Infant and children's lifejacket – Water performance tests – stability test

Regulations: LSA Code II/2.2.1.8, 2.2.1.4; MSC.81(70) 1/2.8.10, 2.9.2, 2.10.3

Test Procedure	Acceptance Criteria
The test subject should attain a relaxed face-up position of static balance in the water. The subject should be instructed to assume a foetal position as follows: "place your elbows against your sides, your hands on your stomach, under the lifejacket if possible, and bring your knees up as close to your chest as possible." The subject should be rotated clockwise around the longitudinal axis of the torso by grasping the subject's shoulders or upper areas of the lifejacket so that the subject attains a 55 ± 5 degree list. The subject should then be released. The subject should return to a stable face-up position. The test should then be conducted with the subject rotated counter-clockwise. The entire test should then be repeated with the test subject wearing the RTD. The test should be conducted using lifejackets that have been inflated both automatically and manually, and also with one of the compartments uninflated.	The candidate lifejacket should not roll any subject face down in the water. (a) + (b) = 0 The number of subjects who are returned to the stable face-up foetal position in the candidate lifejacket should be at least equal to the number who are returned to the stable face-up foetal position in the RTD. (e) ≤ (g) And (f) ≤ (h)

Significant Test Data

	Did the subject roll face-down? (Yes/No)				**Did the subject return to a stable face-up position? (Yes/No)**			
	Candidate		**RTD**		**Candidate**		**RTD**	
Subj	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**	**CW**	**CCW**
1								
2								
3								
4								
5								
6								
7								
8								
9								
Total "No"	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

Inflatable lifejackets (Adults & Child)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.2.25 Infant and children's lifejacket - Mobility test	**Regulations: LSA Code II/2.2.1.8; MSC.81(70) 1/2.9.2.5, 2.10.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
To be considered in and out of the water. Mobility of the subject both in and out of the water should be given consideration in determining the acceptability of a device for approval and should be compared to mobility when wearing the appropriate size RTD when climbing out of the water, going up and down stairs, picking up an article from the floor, and then drinking from a cup.	Assistance may be given to board a survival craft, but wearer mobility should not be reduced to any greater extent than by the appropriate size RTD.	Does the lifejacket provide for acceptable mobility of the test subjects both in and out of the water and is comparative to the mobility of wearing the RTD? YES □ NO □ Passed _____ Failed_____ Method of evaluation: Comments/Observations

2.2.3 LIFEJACKET/IMMERSION SUIT LIGHTS

EVALUATION AND TEST REPORT

Remarks: If an immersion suit is designed to be worn without a lifejacket, it should be fitted with a light complying with the requirements for lifejacket lights. The immersion suit light should be treated as a lifejacket light.

2.2.3.1 General information
- 2.2.3.1.1 General data and specifications
- 2.2.3.1.2 Submitted drawings, reports and documents

2.2.3.2 Visual inspection
- 2.2.3.2.1 Approval marking
- 2.2.3.2.2 Expiry marking
- 2.2.3.2.3 Additional markings
- 2.2.3.2.4 Electrical short circuit protection
- 2.2.3.2.5 Visibility when attached to a lifejacket
- 2.2.3.2.6 Construction and materials

2.2.3.3 Temperature cycling test

2.2.3.4 Light tests

2.2.3.5 Chromaticity test

2.2.3.6 Drop test

2.2.3.7 2 m light drop test

2.2.3.8 Switch arrangement test

2.2.3.9 Vibration test

2.2.3.10 Mould growth test

2.2.3.11 Corrosion and seawater resistance test

2.2.3.12 Test for oil resistance

2.2.3.13 Rain test and watertightness test

2.2.3.14 Fire test

2.2.3 LIFEJACKET/IMMERSION SUIT LIGHTS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.1.1 General data and specifications		**Regulations: LSA Code; MSC.81(70)**	
General Information		Lifejacket Light Dimensions	Lifejacket Light Weight
TYPE OF SWITCHING: FLASHING LIGHT STEADY LIGHT	Automatic Manual		Detail of Buld, Battery & Voltages Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.1.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.2 Visual Inspection	**Regulations: LSA Code 1.2.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1.2.3/2.2.3.1.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Twenty lifejacket lights should be examined in detail for the following items:	The lifejacket lights should:	Results:
Approval marking	- be clearly marked with approval information including the Administration which approved it, and any operational restrictions;	PASS: FAIL:
Expiry marking	- be marked with a date of expiry; The Administration should determine the period of acceptability, owing to deterioration with age. The established life must be justified by the manufacturer.	PASS: FAIL: Results: PASS: FAIL:
Additional markings	Be provided with the following information: - precise definition of intended use (e.g. "Lifejacket light"); serial number; identification of the manufacturer; easily understandable symbols for on/off switching; where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE / DO NOT RECHARGE / DO NOT TAMPER".	Results: PASS: FAIL: PASS: FAIL: PASS: FAIL: PASS: FAIL: PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.2 Visual Inspection (continued)		**Regulations: LSA Code 1.2.2.1/1.2.2.6/1.2.2.9/1.2.2.10/1.2.3/2.2.3.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
	The lifejacket lights should:	Results:
Electrical short circuit protection	- be provided with electrical short circuit protection to prevent damage or injury;	PASS: FAIL:
Visibility when attached to a lifejacket	- be visible over as great a segment of the upper hemisphere as is practicable when attached to a lifejacket;	PASS: FAIL:
Construction and materials	- be constructed with proper workmanship and materials; and	PASS: FAIL:
	- if the light is a flashing light, be provided with a manually operated switch;	PASS: FAIL:
Colour of lifejacket light	- be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea.	PASS: FAIL:
		Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Lifejacket and immersion suit light test flow chart

Visual Inspection (all 12 lights) 2.2.3.1

Temperature Cycling (12 lights in groups of 4) 2.2.3.2:

- lights 1 through 4: Light test (hot) 2.2.3.3
- lights 5 through 8: light test (cold) 2.2.3.3
- lights 9 through 12: light test (ambient) 2.2.3.3

Any one of the 12 lights - Chromaticity Test 2.2.3.4

Any one of the 12 lights - 4.5 m drop test 2.2.3.5 → Same light: Light test (ambient) → same light: Chromaticity Test

Any one of the 12 lights -2.0 m drop test 2.2.3.6 → same light: Light test (ambient) → same light: Chromaticity test

Any one of the 12 lights - Switch arrangement test 2.2.3.7 → same light subjected to Vibration test 2.2.3.8

Any one of the 12 lights - 28 day mould growth test (may be waived) 2.2.3.9

Any one of the 12 lights - Corrosion and seawater resistance test (may be waived) 2.2.3.10

Any one of the 12 lights - Oil resistance test 2.2.3.11

Any one of the 12 lights - rain test and watertightness test 2.2.3.12

Any one of the 12 lights - fire test 2.2.3.13

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.3 Temperature cycling test	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.3/10.3.1/10.3.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Twelve lifejacket lights which have passed the visual inspection should be subjected to temperature cycling. The following test should be carried out on twelve lifejacket lights: The lifejacket lights should be alternately subjected to surrounding temperatures of -30°C and at least +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of not less than 10 cycles, is acceptable: .1 8 h exposure at a minimum temperature of +65°C to be completed in 1 day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day. After having passed the temperature cycling test the lights should be subjected next to the light tests.	The lifejacket lights should not be damaged in stowage throughout the air temperature range of -30°C to +65°C. The lifejacket lights should show no sign of loss of rigidity under high temperatures and, after the tests, should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should function after the test.	<u>Results:</u> PASS: FAIL: Attach temperature cycling chart to record times spent at each temperature. Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.3	**Temperature cycling test – Test data**		**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.3/10.3.1/10.3.2**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In : _____ Temperature :_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 2	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 3	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 4	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 5	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 6	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 7	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 8	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 9	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 10	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____°C	Date Out: _____ Time Out: _____ Duration:_____hours

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

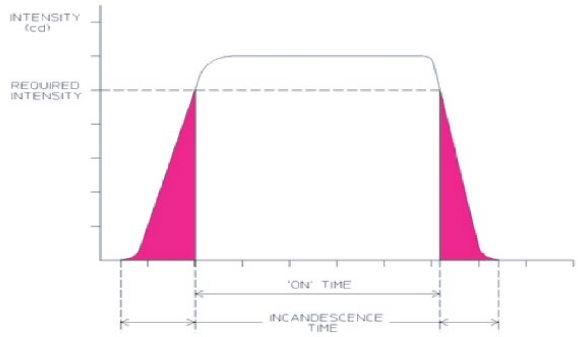
2.2.3.4 Light tests	**Regulations: LSA Code 1.2.2.3/2.2.3.1.1/2.2.3.1.2/2.2.3.2.2; MSC.81(70) 1/ 10.3.2/10.3.5/ 10.3.5.2/10.3.5.3/10.4/10.4.9**

Test Procedure	Acceptance Criteria	Significant Test Data
Four lifejacket lights which have passed the temperature cycling test should be taken from a stowage temperature of -30°C and then be operated immersed in seawater at a temperature of -1°C, four lifejacket lights which have passed the temperature cycling test should be taken from a stowage temperature of +65°C and be operated immersed in seawater at a temperature of +30°C, and four lifejacket lights which have passed the temperature cycling test should be taken from ordinary room conditions and be operated immersed in freshwater at ambient temperature. If the voltage at 5 min of operation is lower than the recorded voltage at the end of life it is permissible to use a lamp from the same build standard for the light output test. Using the lowest recorded voltage a light output test can be carried out as described below. The voltage of all 12 test units should be monitored continuously for 8 h. To make sure that all test units provide a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere for 8 h operation, the following test should be performed.	Water-activated lifejacket lights should commence functioning within 2 min and have reached a luminous intensity of not less than 0.75 cd within 5 min in seawater. In freshwater a luminous intensity of not less than 0.75 cd should have been attained within 10 min. At least 11 out of the 12 lifejacket lights should continue to provide a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere for a period of at least 8 h. In the case of a flashing light it should be established that the rate of flashing for the 8 h operative period is not less than 50 flashes and not more than 70 flashes per minute and that the effective luminous intensity is at least 0.75 cd in all directions of the upper hemisphere. (See formula below to calculate the effective luminous intensity).	Results: All luminous intensity data is to be attached here. PASS: FAIL: Recorded voltage at the end of life: Voltage at 5 min of operation: Lowest recorded voltage: Details of three lights selected for light output test: Al luminous intensity, hours of operation, flash detai8ls, color of light and Voltage data is to be attached here for each light a) Taken form -30°C: b) Taken from +65°C: c) Taken from ordinary room conditions: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.4 Light tests (continued)	**Regulations: LSA Code 1.2.2.3/2.2.3.1.1/2.2.3.1.2/2.2.3.2.2; MSC.81(70) 1/ 10.3.2/10.3.5/ 10.3.5.2/10.3.5.3/10.4/10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
It must be demonstrated that at least one light from each of the specified temperature ranges reaches the required luminous intensity in all directions of the upper hemisphere when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No.70 contains further information.). The lowest voltage light of the cold temperature test sample lot, the highest voltage light of the high temperature test sample lot and the mean voltage light of the ambient temperature sample lot should be selected. These three lights must be used for the light output tests. In the event that a lamp filament burns out during the light output test, a second light from the same performance test lot may be used. Luminous intensity should be measured by a photometer directed at the center of the light source with the test light on a rotating table. Luminous intensity should be measured in a horizontal direction at the level of the center of the light source and continuously recorded through a 360° rotation.	The effective luminous intensity is to be found from the formula: $$\left[\frac{\int_{t_1}^{t_2} Idt}{0.2+(t_2-t_1)}\right]_{max}$$ where: I is the instantaneous intensity, 0.2 is the Blondel-Rey constant and t_1 and t_2 are time limits of integration in seconds.	Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.4 Light tests (continued)	**Regulations: LSA Code 1.2.2.3/2.2.3.1.1/2.2.3.1.2/2.2.3.2.2; MSC.81(70) 1/ 10.3.2/10.3.5/ 10.3.5.2/10.3.5.3/10.4/10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
The first measurement should be taken at 0° (horizontal) and should continue to be taken in azimuth angle at 5° intervals to a single measurement at 90° (vertical). Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 180°. All measured data of luminous intensity and voltage should be documented. After having passed the light tests one light should be subjected to the chromaticity test.	Flashing lights with a flash duration of not less than 0.3 s, may be considered as fixed/steady lights for the measurement of their luminous intensity. Such lights should provide the required luminous intensity in all directions of the upper hemisphere. The time interval between switching on and reaching the required luminous intensity (incandescence time) and all time spent below the required luminous intensity when the light switches off should be disregarded (see figure 10.4.1.) Figure 10.4.1 "On time" measurement diagram  	Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.5 Chromaticity test	**Regulations: LSA Code 2.2.3.1.4; MSC.81(70) 1/ 10.3.2/10.4/10.4.10**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the light tests should be tested for chromaticity to determine that it lies within the boundaries of the area "white" of the diagram specified for each colour by the International Commission on Illumination (CIE). The chromaticities of the lifejacket light should be measured by means of colorimetric measurement equipment which is calibrated to the appropriate National or State Standards Institute (Note: CIE Publ. No.15.2 contains further information). Measurement on at least four points of the upper hemisphere should be taken.	The measured chromaticity coordinates should fall within the boundaries of the area of the diagram as per CIE. The boundaries of the area for white lights are given by the following corner coordinates: x 0.500 0.500 0.440 0.300 0.300 0.440 y 0.382 0.440 0.433 0.344 0.278 0.382 (International Standard on Colours of Light Signals, with colour tables to be developed by CIE.).	Results: All chromaticity data is to be attached here. PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.6 Drop test	**Regulations: LSA Code 2.2.1.5.6; MSC.81(70) 1/**	**10.3.3**

Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be attached to a lifejacket and then be subjected to a drop test as follows: Without readjusting the lifejacket, the test subject should jump vertically into the water, feet first, from a height of at least 4.5 m. When jumping into the water, the test subject should hold on to the lifejacket during water entry to avoid possible injury. For the approval of the lifejacket light, the test result obtained from the participating subject should be acceptable except as provided otherwise. After this drop test the light should be taken from ordinary room conditions and operate immersed in freshwater at ambient temperature. The light should then be subjected to the light tests (see 2.2.3.3).	The lifejacket light should not suffer damage, should not be dislodged from the lifejacket, should not injure the wearer, and should be switched on and seen to be illuminated and conspicuous whilst the test subject is still in the water. Water-activated lights should commence functioning within 2 min and have reached a luminous intensity of not less than 0.75cd within 5 min in seawater. In freshwater a luminous intensity of not less than 0.75 cd should have been attained within 10 min. The light should continue to provide a luminous intensity of not less than 0.75 cd in all directions of the upper hemisphere for a period of at least 8 h. (For further details see Light Tests).	Results: PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.7 2 m light drop test		**Regulations: MSC.81(70) 1/ 10.3.4**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be dropped from a height of 2 m onto a rigidly mounted steel plate or concrete surface. After this test the light should be taken from ordinary room conditions and operate immersed in freshwater at ambient temperature. The light should be subjected next to the light tests (see 2.2.3.3).	The lifejacket light should not suffer damage and should be capable of providing a luminous intensity of not less than 0.75 cd for a period of at least 8 h when operated immersed in freshwater at ambient temperature. (For further details see Light Tests at 2.2.3.3).	Results: PASS: FAIL: Comments/Observations

2.2.3.8 Switch arrangement test		**Regulations: MSC.81(70) 1/ 10.3.5/10.3.5.1/10.4/10.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
If a manual switch is fitted, the switch arrangement test should be carried out. One lifejacket light which has passed the visual inspection should be subjected to the switch arrangement test. A test person wearing immersion suit gloves, must be able to switch the lifejacket light in its normal operational position on and off three times. After having passed the switch arrangement test the light should be subjected next to the vibration test.	The light must function properly.	Results: PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.9 Vibration test		**Regulations: LSA Code 1.2.2.1/1.2.2.8; MSC.81(70) 1/ 10.4/10.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifejacket light which has passed the switch arrangement test should be subjected to a vibration test according to IEC 60945:2002, paragraph 8.7.	The lifejacket light should be constructed with proper workmanship and materials The lifejacket light should function after the test.	Results: PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.10 Mould growth test	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to the mould growth test. The lifejacket light should be inoculated by spraying with an aqueous suspension of mould spores containing all the following cultures: Aspergillus niger; Aspergillus terreus; Aureobasidium pullulans; Paecilomyces variotii; Penicillium funiculosum, Penicillium ochro- chloron; Scopulariopsis brevicaulis; and Trichoderma viride. The lifejacket light should then be placed in a mould growth chamber which should be maintained at a temperature of 29^0C +/- 1^0C and a relative humidity of not less than 95 %. The period of incubation should be 28 days. After this period the lifejacket light should be inspected. (Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)	The lifejacket light should be rot-proof and not be unduly affected by fungal attack. There should be no mould growth visible to the naked eye and the lifejacket light should function after the test.	<u>Results:</u> PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.11 Corrosion and seawater resistance test	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to a corrosion and seawater resistance test according to IEC 60945:2002, paragraph 8.12. (Note: .1 If there are no exposed metal parts the Corrosion and Seawater Resistance Test need not be conducted. .2 The Corrosion and Seawater Resistance Test may be waived where the manufacturer is able to produce evidence that the external metals employed will satisfy the test. .3 Automatic activated version should be prevented from switching during the test.) .4 Where the exposed metal is part of the automatic switch sensor, the function test after the 28-day test cannot be done.	The lifejacket light should be corrosion resistant and not be unduly affected by seawater. Furthermore, the lifejacket light should comply with the requirements of IEC 60945:2002 paragraph 8.12.2. There should be no undue deterioration of metal parts and the lifejacket light should function after the test.	<u>Results:</u> PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.12 Test for oil resistance		**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.6**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to the test for oil resistance according to IEC 60945:2002, paragraph 8.11. Automatic activated version should be prevented from switching during the test.	After this test the lifejacket light should not be unduly affected by oil and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The lifejacket light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.2.3.13 Rain test and watertightness test		**Regulations: LSA Code 1.2.2.4/1.2.2.8; MSC.81(70) 1/ 10.4/10.4.7**
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to a rain test according to IEC 60945:2002, paragraph 8.8. After having passed the rain test the lifejacket light and the complete power source should be immersed horizontally under not less than 300 mm of fresh water for at least 24 h. Automatic activated version should be prevented from switching during the test.	The lifejacket light should be rot-proof The lifejacket light should comply with the requirements of IEC 60945:2002, paragraph 8.8.2 and should function after the rain test. After the water-tightness test the lifejacket light should function and there should be no evidence of water inside the lifejacket light.	Results: PASS: FAIL: Comments/Observations

Lifejacket/immersion suit lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.3.14 Fire Test	**Regulations: LSA Code 2.2.1.1; MSC.81(70) 1/ 10.4/10.4.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
One lifejacket light which has passed the visual inspection should be subjected to a fire test. A test pan not less than 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of at least 1 cm followed by enough petrol to make a minimum total depth of not less than 4 cm. The petrol should then be ignited and allowed to burn freely for at least 30 s. The lifejacket light should then be moved through the flames, facing them, with the lifejacket light not more than 25 cm above the top edge of the test pan so that the duration of exposure to the flames is at least 2s.	The lifejacket light should not sustain burning or continue melting after being totally enveloped in a fire for a period of at least 2 s and after being removed from the flames. The lifejacket light should function after the test.	Results: PASS: FAIL: Comments/Observations

2.2.4 REFERENCE TEST DEVICE (RTD)

CONSTRUCTION VALIDATION AND CALIBRATION

2.2.4.1 Adult Lifejacket RTD

2.2.4.1.1 Buoyancy calibration
2.2.4.1.2 Construction validation – General
2.2.4.1.3 Construction Validation – Fabric and Webbing measurements

2.2.4.2 Child Lifejacket RTD

2.2.4.2.1 Buoyancy calibration

2.2.4.3 Infant Lifejacket RTD

2.2.4.3.1 Buoyancy calibration

2.2.4 REFERENCE TEST DEVICE (RTD)
CONSTRUCTION VALIDATION AND CALIBRATION

Manufacturer	
Serial number	
Size (Adult/Child/Infant)	
Date of construction	
Place of construction	
Date of validation/calibration	
Place of validation/calibration	
Signature	

Reference test device (RTD)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.4.1.1 Buoyancy calibration

Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 1, Appendix

Test Procedure	Acceptance Criteria	Significant Test Data

To achieve repeatability in human subject testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD must be maintained within a tight tolerance.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTDs with buoyancies within tolerance should be used for certification testing.

At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, thin layers of foam ("make -up" inserts) may have been inserted between the front and inside front foam inserts. The test house may need to increase the size of these make-up inserts from time to time to keep these parameters within tolerance, or may need to add buoyancy to the back or collar inserts (or trim buoyancy, if the back insert has not shrunk as anticipated).

	Design	Max	Min
Front Buoyancy[1]	103 N	107 N	100 N
Back Buoyancy	46 N	48 N	45 N
Total Buoyancy	149 N	155 N	145 N
Buoyancy Distribution[2]	69% in front	70.5% in front	67.5% in front

[1] values at or corrected to standard temperature and pressure

[2] buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy

After a full sheet of 6.5 mm thick foam is required in any one of the four major areas, an inside front or back insert probably needs to be replaced. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained.

Left front buoyancy: _____ N

Right front buoyancy: _____ N

Total front buoyancy: _____ N

Total back buoyancy: _____ N

Total buoyancy: _____ N

Buoyancy distribution: _____ % in front

Make-up inserts added/removed:

Foam inserts replaced:

Comments:

Reference test device (RTD)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.4.1.2 Construction validation – General	**Regulations: LSA Code 2.2.1.4; MSC.81(70), annex 1, table A.4; MSC.1/Circ.1470, 2.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Spot check foam inserts. While it is not necessary to conduct a full check of all the dimensions of the foam, a spot check of one out of every five RTDs should be made of a representative sampling of foam pieces against the dimensions in the appropriate annex to the Revised recommendation on testing of life-saving appliances (resolution MSC.81(70)).	The values should be within ± 6 mm.	a. Front foam insert (figure A.27) Pass Fail b. Inside front foam insert (figure A.28) Pass Fail c. Collar foam insert (figure A.29) Pass Fail d. Back foam insert (figure A.30) Pass Fail Comments/observations:

Reference test device (RTD)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.4.1.3 Construction Validation – Fabric and Webbing measurements	**Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3**

Test Procedure	Acceptance Criteria	Significant Test Data
Establish reference point on the shoulder seam. Place a small mark on the shoulder seam 44.5 mm from the inside edge of the neck seam.	This mark will be the reference point for measuring distances on the front and back panels.	
Vertical webbing. Measure from the reference point to the vertical webbing.	The vertical webbing should be within ± 6.5 mm of this point.	Vertical webbing distance: _____ mm Pass Fail
Shoulder loop. Measure the distance from the reference point to the location where the inside edge of the yellow webbing first passes under the black shoulder loop.	This distance should be 73 ± 6 mm.	Shoulder loop distance: _____ mm Pass Fail
Chest strap. Measure the distance from the reference point to the top of the chest strap.	This distance should be 168 ± 6 mm.	Chest strap distance: _____ mm Pass Fail
Waist belt. Measure the distance from the reference point to the top of the waist belt.	This distance should be 416 ± 3 mm.	Waist belt distance: _____ mm Pass Fail
Front panel length. Measure the distance from the reference point to the bottom of the foam.	This distance should be 489 ± 6 mm.	Front panel length. _____ mm Pass Fail
Back panel length. Measure the distance from the reference point to the bottom of the back panel.	This distance should be 550 ± 6 mm.	Back panel length. _____ mm Pass Fail

2.2.4.1.3 Construction Validation – Fabric and Webbing measurements		**Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3**
Test Procedure	Acceptance Criteria	Significant Test Data
Collar attachment location. To check the collar attachment location, hold the RTD by the collar, keeping the collar level so the RTD hangs freely. Measure from the top back edge of the foam down to the centre of the neck seam.	This distance should be 342 ± 6 mm.	Collar attachment location: _____ mm Pass Fail
Webbing attachment to collar. To check the location of the vertical webbing attachment to the collar, measure the distance from the edge of the foam (at the end opposite from the zipper) to the front seams of the box-X stitching.	This distance should be 111 ± 6 mm.	Webbing attachment to collar location: _____ mm Pass Fail
Webbing length (chest strap to collar attachment). To check the length of the vertical webbing from the top of the chest strap to the attachment at the collar, measure the inside distance between the box-X stitches located on the chest strap (front panel) and on the underside of the collar.	This distance should be 263 ± 6 mm.	Webbing length: _____ mm Pass Fail
Finished waist belt assembly length. To check the finished length of the waist belt assembly, measure the overall length with the buckle unfastened and the adjustments in the full open position (maximum length). Lay the RTD on a flat surface and measure the fully extended length of the assembly. For consistency, measure the distance from where the snap hook fastens in the D-Ring.	This distance should be 1700 ± 12 mm.	Finished waist belt assembly length: _____ mm Pass Fail

2.2.4.1.3 Construction Validation – Fabric and Webbing measurements	**Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 1; MSC.1/Circ.1470, 3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Finished neck size. A suitably sized cone (such as a traffic cone) should be used to check the finished neck size. The cone should be rigid, have a slope of 8.5° ± 1.5°, and be tall enough to allow the RTD to fit snugly. If a flexible cone (such as a plastic traffic safety cone) is used it should be filled with rigid foam, concrete, or similar substance to make it rigid. With both chest and waist belt buckles fastened and the waist belt adjusted to the full open position, place the RTD on the cone with just enough force so it will fit snug to the cone, but not forcing it down. Place a mark on both sides of the cone where the shoulder seam contacts the cone. This mark may be used to facilitate subsequent validations. Measure the circumference around the cone at the mark.	The circumference should be 395 ± 6 mm.	Finished neck size: _____ mm Pass Fail

Reference test device (RTD)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.4.2.1 Buoyancy calibration

Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 3, Appendix

Test Procedure	Acceptance Criteria	Significant Test Data

To achieve repeatability in human subject testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD must be maintained within a tight tolerance.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTDs with buoyancies within tolerance should be used for certification testing.

To check buoyancy tolerances, foam inserts need to be removed from the device. Take care that all trapped air is removed when checking buoyancy and that layers are maintained in their proper sequence when reinstalled (considerable effort would be needed to remove entrapped air if testing the intact device).

	Design	Max	Min
Front Buoyancy[1]	63 N	65.4 N	60.6 N
Back Buoyancy	25 N	26.2 N	23.8 N
Total Buoyancy	88 N	91.6 N	84.4 N
Buoyancy Distribution[2]	71.5% in front	73% in front	70% in front

[1] values at or corrected to standard temperature and pressure

[2] buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy

At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, the layers were individually selected to achieve the cumulative insert buoyancy. If buoyancy of a new device exceeds the upper limits, one layer per compartment may be altered or replaced to bring the unit into compliance. The test house may need to add make -up layers from time to time to maintain the front-to-back and side-to-side insert tolerances. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1. 3 N difference) between the right and left front panels can be maintained.

Left front buoyancy: _____ N

Right front buoyancy: _____ N

Total front buoyancy: _____ N

Total back buoyancy: _____ N

Total buoyancy: _____ N

Buoyancy distribution: _____ % in front

Make-up inserts added/removed:

Foam inserts replaced:

Comments:

Infant Lifejacket Reference test device (RTD)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.2.4.3.1 Buoyancy calibration	**Regulations: LSA Code 2.2.1.4; MSC.81(70) Annex 3, Appendix**

Test Procedure

To achieve repeatability in human subject testing, the overall buoyancy and distribution of buoyancy between the front and back of the RTD must be maintained within a tight tolerance.

The buoyancy of a new RTD may exceed the allowable tolerance range until the normal shrinkage or compression of the foam inserts stabilizes. Until the buoyancies of the foam inserts have stabilized, buoyancy and distribution should be checked at regular intervals (perhaps weekly), and then at least monthly thereafter or whenever used for testing, whichever is longer (frequent use may require more frequent checks). Only RTDs with buoyancies within tolerance should be used for certification testing.

To check buoyancy tolerances, foam inserts need to be removed from the device. Take care that all trapped air is removed when checking buoyancy and that layers are maintained in their proper sequence when reinstalled (considerable effort would be needed to remove entrapped air if testing the intact device).

Acceptance Criteria

	Design	Max	Min
Front Buoyancy[1]	42 N	44.4 N	39.6 N
Back Buoyancy	29 N	30.2 N	27.8 N
Total Buoyancy	71 N	74.6 N	67.4 N
Buoyancy Distribution[2]	59.2 % in front	60.7 % in front	57.7 % in front

[1] values at or corrected to standard temperature and pressure

[2] buoyancy distribution is calculated by dividing the front buoyancy by the total buoyancy

At the time of manufacture the left-to-right distribution of buoyancy in the front inserts was adjusted to be within 1.3 N of each other. To achieve this tolerance, the layers were individually selected to achieve the cumulative insert buoyancy. If buoyancy of a new device exceeds the upper limits, one layer per compartment may be altered or replaced to bring the unit into compliance. The test house may need to add make -up layers from time to time to maintain the front-to-back and side -to-side insert tolerances. If the front buoyancy is under the minimum value, measure the buoyancy of the right and left sides so that the proper distribution of buoyancy (no more than a 1.3 N difference) between the right and left front panels can be maintained.

Significant Test Data

Left front buoyancy: _____ N

Right front buoyancy: _____ N

Total front buoyancy: _____ N

Total back buoyancy: _____ N

Total buoyancy: _____ N

Buoyancy distribution: _____ % in front

Make-up inserts added/removed:

Foam inserts replaced:
Comments:

2.3 IMMERSION SUITS AND ASSOCIATED EQUIPMENT

2.3.1 IMMERSION SUITS (NON-INSULATED) EVALUATION AND TEST REPORT

2.3.1.1 General data and specifications

2.3.1.2 Submitted drawings, reports and documents

2.3.1.3 Quality assurance

2.3.1.4 Visual inspection

2.3.1.5 Test subjects

2.3.1.6 Test with a lifejacket

2.3.1.7 Test clothing

2.3.1.8 Donning tests 1 & 2

2.3.1.9 Ergonomic test

2.3.1.10 Field of vision test

2.3.1.11 Flotation test

2.3.1.12 Righting test

2.3.1.13 Water ingress and jump test

2.3.1.14 Jump test

2.3.1.15 Leak test

2.3.1.16 Swimming and water emergence test

2.3.1.17 Oil resistance test

2.3.1.18 Alternative oil resistance test

2.3.1.19 Fire test

2.3.1.20 Temperature cycling test

2.3.1.21 Temperature cycling test – Test data

2.3.1.22 Buoyancy test

2.3.1.23 Strength test

2.3.1.24 Thermal protective test (General)

2.3.1.25 Thermal protective test (Continued)

2.3.1.26 Test sheets for temperatures during immersion tests

2.3.1 IMMERSION SUITS (NON-INSULATED) EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.1 General data and specifications	**Regulations: LSA Code II/2.3; MSC.81(70) I/3.1 & 3.2**

Construction Material:	**Additional equipment:**	**Donning instructions:**
Fabric produced by: _____ Type: _____ Buoyant material produced by: _____ Type: _____	Retro reflective material produced by: _____ Type: _____ Whistle produced by (if fitted): _____ Type: _____ Life-line produced by (if fitted): _____ Type _____ Light produced by (if fitted): _____ Type: _____	□ YES □ NO

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.3 Quality assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life- saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: _____ Quality Assurance Procedure: _____ Quality Assurance Manual: _____ Description of System: Quality Assurance System acceptable Yes_____ No_____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.4 Visual inspection	**Regulations: LSA Code I/1.2.2, II/2.3.1.1.3 & 2.3.1.1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Non-insulated immersion suit should: .1 be clearly marked with approval information including the Administration which approved it, date of manufacturer and any operational restrictions; .2 be provided with labels giving operating instructions, general information and manufacturers details as appropriate; and .3 be fitted with approved patches of retro-reflective material with a total area of at least 400 cm^2 and with 100 cm^2 on the back if the suit does not automatically turn the wearer face up according to resolution A.658(16).		Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.4 Visual inspection (Continued)	**Regulations: LSA Code I/1.2.2, II/2.3.1.1.3 & 2.3.1.1.4, 2.3.1.4, 2.3.1.5, 2.13.1.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
Does the non-insulated immersion suit cover the whole body with the exception of the face?	Be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea.	Passed _____ Failed _____
Are the hands covered, or is the non-insulated immersion suit equipped with permanently attached gloves?		Passed _____ Failed_____
Are their arrangements to prevent excessive free air in the legs?		Passed _____ Failed _____
Is the non-insulated immersion suit of highly visible colour?		Passed _____ Failed _____
Is the non-insulated immersion suit designed to be worn without a lifejacket? If yes Is the non-insulated immersion suit fitted with a light complying with paragraph 2.2.3 of the LSA Code?		Passed _____ Failed _____
Is the non-insulated immersion suit fitted with a whistle complying with paragraph 2.2.1.14 of the LSA Code?		Passed _____ Failed _____
Fitted with releasable buoyant lifeline or other means to secure it to a suit worn by another person in the water and provided with a suitable means to allow rescuer to lift the wearer from the water into survival or rescue craft.		Passed _____ Failed _____
		Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.5 Test subjects	**Regulations: LSA Code II/2.3.1.1.5, 2.3.1.3.1 - .4; MSC.81(70) 1/3.1.1 & 2.8.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
At least six able-bodied persons both male and females of the following heights and weights should be used. At least one and not more than two of the persons should be females with not more than one female in the same height range.	Height / Weight 1.4m - 1.6m; 1 person under 60kg 1 person over 60kg 1.6m - 1.8m 1 person under 70kg 1 person over 70kg over 1.8m 1 person under 80kg 1 person over 80kg	Male/Female / Height / Weight Subject No.1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.6 Test with a lifejacket	**Regulations: LSA Code II/2.3.1.5; MSC.81(70) 1/3.1.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
If the suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn over the suit for the tests prescribed in 2.3.1.8 to 2.3.1.16.		Manufacturer of lifejacket: _____ Type: _____ Manufacturer of lifejacket: _____ Type: _____ Manufacturer of lifejacket: _____ Type: _____ Comments/Observations

2.3.1.7 Test clothing	**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.2.6 to 3.2.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen, and .4 woollen socks .5 in addition to the clothing the test subject should wear two woollen pullovers during the thermal protective tests. .6 If suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective tests.		Did all test subject use the specified test clothing □ YES □ NO Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.8 Donning test (1)	**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Following a demonstration, each test subject should be able to unpack, don and secure the immersion suit over their test clothing without assistance in less than 2 min. This time should include the time to don any associated clothing, inflate any orally inflated chambers if fitted and don a lifejacket, if such is to be worn in conjunction with the immersion suit, and the test subjects should be able to don such lifejacket without assistance.	Each test subjects should be able to unpack, don and secure the immersion suit over their test clothing (see 2.3.1.7) without assistance in less than 2 min. This time should include the time to don any associated clothing, inflate any orally inflated chambers if fitted, and don a lifejacket, if such is to be worn in conjunction with the immersion suit.	Donning time Time Pass Fail Subject No.1_____sec Subject No.2_____sec Subject No.3_____sec Subject No.4_____sec Subject No.5_____sec Subject No.6_____sec Comments/Observations

2.3.1.8 Donning test (2)	**Regulations: LSA Code I/2.3.1.1.1; MSC.81(70) 1/3.1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
The immersion suit should be capable of being donned in 5 min at an ambient temperature as low as -30° C. Before the donning test the packed immersion suit should be kept in a refrigerated chamber at a temperature of -30° C for 24 h.	The test subject should be able to complete this task in 5 min.	Donning time at - 30°C Time Passed Failed Subject No.1_____sec Subject No.2_____sec Subject No.3_____sec Subject No.4_____sec Subject No.5_____sec Subject No.6_____sec Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.9 Ergonomic Test		**Regulations: LSA Code II/2.3.1.3.1, 2.3.1.3.2; MSC.81(70) 1/3.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
When wearing the immersion suit, the test subjects should be able to: .1 climb up and down a vertical ladder of at least 5 m in length; .2 perform all duties associated with abandonment; and .3 to pick up a pencil and write.	There should be no restriction in walking, bending over or arm movement. The diameter of the pencil should be 8-10 mm.	Restriction in walking, bending over or arm movement: ☐YES ☐ NO All the test subjects were able to pick up a pencil and write: ☐YES ☐ NO All the test subjects were able to put on the lifejacket without assistance: ☐YES ☐ NO All the test subjects were able to perform all duties associated with abandonment, assist others and operate a rescue boat: ☐YES ☐ NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: ☐YES ☐ NO Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.10 Field of vision test	**Regulations: LSA Code II/2.3.1.1.3; MSC.81(70) 1/3.1.6**			
Test Procedure	Acceptance Criteria	Significant Test Data		
Each test subject should be seated with the head in a fixed position, and the lateral field of vision measured.	The lateral field of vision should be at least 120°.	Field of vision angle: ≥ 120°		
			Passed	Failed
		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6		
		Comments/Observations		

2.3.1.11 Flotation test	**Regulations: LSA Code II/2.3.1.1; MSC.81(70) 1/3.1.7**			
Test Procedure	Acceptance Criteria	Significant Test Data		
With the test subject floating at rest, wearing the suit in conjunction with a lifejacket if required, the freeboard should be measured from the water surface to the nose or mouth.	The test subject should float face-up with their mouths clear of the water by at least 120mm and be stable in that position. The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.		Mouth Freeboard	Nose Freeboard	Light Postion ok? (Y/N)
		Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6			
		Comments/Observations			

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.12 Righting test	**Regulations: LSA Code II/2.3.1.2; MSC.81(70) 1/3.1.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects in fresh water wearing either a non-insulated immersion suit or a non-insulated immersion suit with a lifejacket should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s.	Except where it has been demonstrated that the non-insulated immersion suit will right the test subjects within 5 s, the test subjects should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s.	Passed Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.3.1.13 Water ingress and jump test	**Regulations: MSC.81(70) 1/3.1.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should pre-wet their non-insulated immersion suit and then be weighed. Following a jump into the water from a height sufficient to totally immerse the body, each test subject should be weighed again. Weighing should be performed on a machine accurate to ± 100g.	The difference in the combined mass of the test subject and the suit should not exceed 500 g.	Mass difference ≤ 500g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.14 Jump test		**Regulations: LSA Code II/2.3.1.3.3; MSC.81(70) 1/3.1.10**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should jump with the suit and lifejacket if required from a height of 4.5m vertically into the water. After the jump, the suit and its attachments should be examined for damage or dislodging, and the test subject should be questioned concerning whether the suit caused any injury to the wearer.	The suit and its attachments should not be damaged or dislodged in any way. The test subject should not be injured by the suit.	Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.3.1.15 Leak test		**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.11**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subject should pre-wet the immersion suit and be weighed. The test subject should then be instructed to do one of the following: .1 a period of flotation in calm water of 1h; or .2 swimming for 20 min for a distance of at least 200 m The test subject should be weighed again after the task. The weighing machine should be accurate to ± 100g.	The ingress of water into the pre-wetted suit should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.16 Swimming and water emergence test	**Regulations: LSA Code II/2.3.1.3.4; MSC.81(70) 1/3.1.12**

Test Procedure	Acceptance Criteria	Significant Test Data
All test subjects, each wearing a lifejacket but not the suit, should attempt to swim 25 m and board a liferaft or rigid platform with its surface 300 mm above the water surface. Test subjects who successfully complete this task should also perform it wearing the suit. If designed to be used with a lifejacket, then non-insulated immersion suit should be tested with the subject also wearing a lifejacket.	All qualified test subjects should be able to board the liferaft or platform while wearing the non-insulated immersion suit.	1) 25m swim and boarding without lifejacket. Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ 2) 25 m swim and boarding with suit Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ 3) 25 m swim and boarding with suit and a lifejacket, if required Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.17 Oil resistance test	**Regulations: LSA Code; MSC.81(70) 1/3.1.13**	
Test Procedure	Acceptance Criteria	Significant Test Data
After all its apertures have been sealed a non- insulated immersion suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature. The surface oil should then be wiped off and the immersion suit subjected to the test prescribed in 2.3.1.15.	The ingress of water should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Passed Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.18 Alternative oil resistance test	**Regulations: LSA Code; MSC.81(70) 1/3.1.14.1 & .2**	
Test Procedure	Acceptance Criteria	Significant Test Data
In lieu of the test for oil resistance prescribed in 2.3.1.17 either of the following tests may be conducted. After all apertures have been sealed, the non-insulated immersion suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature if necessary using weights to keep suit submerged. Any surface oil should then be wiped off and the non-insulated immersion suit turned inside out. The suit should then be laid on a table suitable for collecting and draining off any leakage and be supported at the neck aperture by a suitable designed hanger. The suit should then be filled with water to neck level which should be 300mm above the table. Representative samples of the exterior fabric and seams should be immersed under 100mm head of diesel oil for 24 h. After removal from the oil the samples should be wiped off before being subjected to the following tests: .1 a hydrostatic test of a 1m water head; and .2 a tensile test of representative seams.	After 1h in this position there should be no leakage exceeding a mass of 200g The seam strength should be not less than 150 N The samples should successfully support 1 m head of water	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Passed Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Strength > 150N Passed _____ Failed _____ Passed _____ Failed _____ The samples should support a 1 m head of water. Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.19 Fire test		**Regulations: LSA Code II/2.3.1.1.2; MSC.81(70) 1/3.1.15**
Test Procedure	Acceptance Criteria	Significant Test Data
A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to make a minimum total depth of 1 cm followed by enough petrol to make a minimum depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. If necessary the immersion suit should be draped over a hanger to ensure the whole of the suit is enveloped in the flames, with the bottom of the suit 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The non-insulated immersion suit should not sustain burning for more than 6 s or continue melting after being removed from exposure to the flames.	Did the immersion suit sustain burning for more than 6 s or continue melting after being removed from the flames? ☐YES ☐NO Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

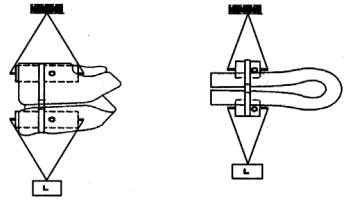
2.3.1.20 Temperature cycling test		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/3.1.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The following test should be carried out on two immersion suits The non-insulated immersion suits should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	The non-insulated immersion suits should show no signs of damage such as shrinking, swelling dissolution or changes of mechanical qualities.	(See following page for test data) Passed_____ Failed _____ Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.21 Temperature cycling test - Test Data			**Regulations: LSA Code I/1.2.1; MSC.81(70) 1/3.1.16**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 2	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 3	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 4	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 5	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 6	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 7	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 8	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 9	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 10	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.22 Buoyancy test		**Regulations: LSA Code II/2.3.1.8; MSC.81(70) 1/3.1.17**
Test Procedure	Acceptance Criteria	Significant Test Data
The buoyancy of a non-insulated immersion suit designed to be worn without a lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water. The buoyancy shall not depend on the use of loose granulated materials	The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy	Buoyancy 1 Buoyancy 2 %difference _____kg _____kg _____% Passed_____ Failed Comments/Observations

2.3.1.23 Strength test		**Regulations: LSA Code II; MSC.81(70) 1/3.1.18**
Test Procedure	Acceptance Criteria	Significant Test Data
The non-insulated immersion suit should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when worn by a person A force of not less than 3200 N should be applied to the lifting loop and a force of not less than 1350 N should be applied to the parts other than the lifting loop for 30 min. The non-inflated immersion suit may be cut if necessary to accommodate to the test device.	The non-insulated immersion suit should not be damaged as a result of this test.  Vest-type lifejacket Yoke or over-the-head type lifejacket	Passed_____ Failed Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.24 Thermal protective test (General)		**Regulations: LSA Code II/2.3.2.1; MSC.81(70) 1/3.2.1 – 3.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The thermal protective qualities may be measured using a thermal manikin, when such a method is required by an Administration and has been demonstrated to provide test results which correlate satisfactorily in all aspects to test results using human subjects. If human subjects are used, they should be medically examined before being accepted for the tests. Each design of immersion suit is to be tested by test subjects specified in 2.3.1.5 Where human subjects are used, the tests should always be conducted under the supervision of physician. Emergency resuscitation equipment should be available during all tests. For safety reasons, ECG should be monitored during every test. Testing should be stopped at the wish of the test subjects, or if the skin temperature of hand, foot or lumbar region should fall below 10° C, or if the attending physician considers it advisable. When testing with human subjects, continuous body core temperature (rectal temperature) and skin temperature of lumbar region, both hands, calves, foot (foot instep) and heels, should be measured. The accuracy of the measuring system should be ±0.2°C. Appropriate corresponding measurements should be taken if a manikin is used in lieu of human subjects.		Comments/Observations

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.1.25 Thermal Protective test (Continued)		**Regulations: LSA Code II/2.3.2.1.2; MSC.81(70) 1/3.2.9 & 3.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
Prior to tests, the same amount of water resulting from the water ingress and jump test in 2.3.1.13 should be poured into the dry suit worn over the dry test clothing specified in 2.3.1.7 by the test subject lying down. Each test subject should wear a non-insulated immersion suit previously subjected to the jump test in 2.3.1.14. Following a 1 h period of immersion, with hands gloved, in circulating calm water at + 5° C, each test subject's body core temperature should not fall more than 2° C below the normal level of the subject's temperature. The non-insulated immersion suit should provide sufficient thermal protection to ensure that immediately on leaving the water after completion of the test prescribed above each test subject can pick up a pencil as specified in 2.3.1.9 and write.	Following immersion each test subject's body core temperature should not fall more than 2°C below the normal level of the subject's temperature.	Same amount of water resulting from the water ingress and jump test in paragraph 2.3.1.13 should be poured into the dry suit. Beginning of test / End of test / normal temperature Subject No.1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Passed _____ Failed _____ Pick up a pencil and write after 1 h period of immersion: Subject No 1 □YES □NO Subject No 2 □YES □NO Subject No 3 □YES □NO Subject No 4 □YES □NO Subject No 5 □YES □NO Subject No 6 □YES □NO Passed _____ Failed_____ Comments/Observations See attached test sheets for temperatures during the immersion tests.

Immersion suits (non-isolated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.1.3.26 Test sheets for temperatures during immersion tests	**Regulations: LSA Code II/2.3.2.1.2; MSC.81(70) 1/3.2.9 & 3.2.10**

SUBJECT 1	**SUBJECT 2**	**SUBJECT 3**	**SUBJECT 4**	**SUBJECT 5**	**SUBJECT 6**
Rectal temp after 1 hr:____ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____	Rectal temp after 1 hr:_ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____	Rectal temp after 1 hr:____ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____	Rectal temp after 1 hr:____ Skin temp at lumbar region after 1 hr: _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:_____ Skin temp at right foot (foot instep) after 1 hr:_____ Skin temp at left heel after 1 hr:_____

2.3.2 IMMERSION SUITS (INSULATED)

EVALUATION AND TEST REPORT

2.3.2.1 General data and specifications

2.3.2.2 Submitted drawings, reports and documents

2.3.2.3 Quality assurance

2.3.2.4 Visual inspection

2.3.2.5 Test subjects

2.3.2.6 Test with a lifejacket

2.3.2.7 Test clothing

2.3.2.8 Donning tests 1 & 2

2.3.2.9 Ergonomic test

2.3.2.10 Field of vision test

2.3.2.11 Flotation test

2.3.2.12 Righting test

2.3.2.13 Water ingress and jump test

2.3.2.14 Jump test

2.3.2.15 Leak test

2.3.2.16 Swimming and water emergence test

2.3.2.17 Oil resistance test

2.3.2.18 Alternative oil resistance test

2.3.2.19 Fire test

2.3.2.20 Temperature cycling test

2.3.2.21 Temperature cycling test - Test data

2.3.2.22 Buoyancy test

2.3.2.23 Strength test

2.3.2.24 Thermal protective test (General)

2.3.2.25 Thermal protective test (Continued)

2.3.2.26 Test sheets for temperatures during immersion tests

2.3.2 IMMERSION SUITS (INSULATED)

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.1 General data and specifications	**Regulations: LSA Code 2.3; MSC.81(70) 1/3.1 & 3.2**

Construction Material:	**Additional equipment:**	**Donning instructions:**
Fabric produced by: _____ Type: _____ Buoyant material produced by: _____ Type: _____	Retro reflective material produced by: _____ Type: _____ Whistle produced by (if fitted): _____ Type: _____ Life-line produced by (if fitted): _____ Type _____ Light produced by (if fitted): _____ Type: _____	☐ YES ☐ NO

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life- saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - Quality Assurance Procedure: - Quality Assurance Manual: - Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.4 Visual inspection		**Regulations: LSA Code I/1.2.2, & II/2.3.1.1.3 & 2.3.1.1.4**
Insulated Immersion suit should: .1 be clearly marked with approval information including the Administration which approved it, date of manufacturer and any operational restrictions; .2 be provided with labels giving operating instructions, general information and manufacturers details as appropriate; and .3 be fitted with approved patches of retro-reflective material with a total area of at least 400 cm^2 and with 100 cm^2 on the back if the suit does not automatically turn the wearer face up according to resolution A.658(16).		Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.4 Visual Inspection (continued)		**Regulations: LSA Code I/1.2.2, & II/2.3.1.1.3 & 2.3.1.1.4, 2.3.1.4-6**
Test Procedure	Acceptance Criteria	Significant Test Data
Does the immersion suit cover the whole body with the exception of the face?	Be of an international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea.	Passed _____ Failed _____
Are the hands covered, or is the immersion suit equipped with permanently attached gloves?		Passed _____ Failed _____
Are their arrangements to prevent excessive free air in the legs?		Passed _____ Failed _____
Is the immersion suit of highly visible colour?		Passed _____ Failed _____
Is the immersion suit designed to be worn without a lifejacket?		Passed _____ Failed _____
If yes,		
Is the immersion suit fitted with a light complying with paragraph 2.2.3?		Passed _____ Failed _____
Is the immersion suit fitted with a whistle complying with paragraph 2.2.1.14 of LSA Code?		Passed _____ Failed _____
Fitted with releasable buoyant lifeline or other means to secure it to a suit worn by another person in the water & provided with a suitable means to allow rescuer to lift the wearer from the water into survival or rescue craft.		Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.5 Test subjects		**Regulations: LSA Code I/; MSC.81(70) 1/3.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
At least six able-bodied persons both male and females of the following heights and weights should be used. At least one and not more than two of the persons should be females with not more than one female in the same height range.	Height / Weight 1.4 m - 1.6 m; 1 person under 60kg 1 person over 60kg 1.6 m - 1.8 m 1 person under 70kg 1 person over 70kg over 1.8 m 1 person under 80kg 1 person over 80kg	Male/Female Height Weight Subject No.1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Comments/Observations

2.3.2.6 Test with a lifejacket		**Regulations: LSA Code 2.3.1.7; MSC.81(70) 1/3.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
If the suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn over the suit for the tests prescribed in 2.3.2.8 to 2.3.2.16.		Manufacturer of lifejacket:_____ Type: _____ Manufacturer of lifejacket:_____ Type: _____ Manufacturer of lifejacket:_____ Type: _____

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.7 Test clothing	**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.2.6, 3.2.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt(long sleeved) .3 trousers(not woollen, and .4 woollen socks .5 If suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective tests.		Did all test subject use the specified test clothing? YES NO Comments/Observations

2.3.2.8 Donning test (1)	**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Following a demonstration, each test subject should be able to unpack, don and secure the suit over their test clothing without assistance in less than 2 min. This time should include the time to don any associated clothing, inflate any orally inflated chambers if fitted, and don a lifejacket, if such is to be worn in conjunction with the suit, and the test subjects should be able to don such lifejacket without assistance.	Each test subjects should be able to unpack, don and secure the immersion suit over their test clothing (see 2.3.2.7) without assistance in less than 2 min. This time should include the time to don any associated clothing, and a lifejacket, if such is to be worn in conjunction with the immersion suit.	Donning time normal clothing Time Pass Fail Subject No.1_____sec Subject No.2_____sec Subject No.3_____sec Subject No.4_____sec Subject No.5_____sec Subject No.6_____sec Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.8 Donning test (2)		**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The immersion suit should be capable of being donned in 5 min at an ambient temperature as low as -30° C. Before the donning test the packed immersion suit should be kept in a refrigerated chamber at a temperature of -30° C for 24 h.	The test subject should be able to complete this task in 5 min.	Donning time at - 30°C Time Pass Fail Subject No.1_____sec Subject No.2_____sec Subject No.3_____sec Subject No.4_____sec Subject No.5_____sec Subject No.6_____sec Comments/Observations

2.3.2.9 Ergonomic Test		**Regulations: LSA Code II/2.3.1.3.2; MSC.81(70) 1/3.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
When wearing the immersion suit, the test subjects should be able to: .1 Climb up and down a vertical ladder of at least 5 m in length; .2 Perform all duties associated with abandonment; and .3 To pick up a pencil and write. The diameter of the pencil should be 8-10 mm.	There should be no restriction in walking, bending over or arm movement.	Restriction in walking, bending over or arm movement: ☐YES ☐NO All the test subjects were able to pick up a pencil and write: ☐YES ☐NO All the test subjects were able to put on the lifejacket without assistance: ☐YES ☐NO All the test subjects were able to perform all duties associated with abandonment, assist others and operate a rescue boat: ☐YES ☐NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: ☐YES ☐NO Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.10 Field of vision test		**Regulations: LSA Code II/2.3.1.1.3; MSC.81(70) 1/3.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Each test subject should be seated with the head in a fixed position, and the lateral field of vision measured.	The lateral field of vision should be at least 120°.	Field of vision angle 120° Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.3.2.11 Flotation test		**Regulations: LSA Code II/2. 3.1.1; MSC.81(70) 1/3.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
With the test subject floating at rest, wearing the suit in conjunction with a lifejacket if required, the freeboard should be measured from the water surface to the nose or mouth.	The test subject should float face-up with their mouths clear of the water by at least 120mm and be stable in that position. For a buoyant insulated immersion suit worn without a lifejacket, an auxiliary means of buoyancy such as an orally inflated bladder behind the wearer's head may be used to obtain this freeboard, provided that the freeboard obtained without the auxiliary means of buoyancy is at least 50 mm. The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	Mouth Freeboard =↓ / Nose Freeboard = ↓ Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.12 Righting test	**Regulations: LSA Code II/2.3.1.2; MSC.81(70) 1/3.1.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects, in fresh water wearing either an immersion suit or an immersion suit with lifejacket, should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s.	Except where it has been demonstrated that the insulated immersion suit will right the test subjects within 5 s, the test subjects should each demonstrate that they can turn themselves from a face-down to a face-up position in not more than 5 s.	Righting time = ≤ 5 s Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.3.2.13 Water ingress and jump test	**Regulations: MSC.81(70) 1/3.1.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should pre-wet their immersion suit and then be weighed. Following a jump into the water from a height sufficient to totally immerse the body, each test subject should be weighed again. Weighing should be performed on a machine accurate to ± 100g.	The difference in the combined mass of the test subject and the suit should not exceed 500 g.	Mass difference ≤ 500g Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.14 Jump test	**Regulations: LSA Code II/2.3.1.3.3; MSC.81(70) 1/3.1.10**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should jump with the suit and lifejacket if required from a height of 4.5m vertically into the water. After the jump, the immersion suit and its attachments should be examined for damage or dislodging, and the test subject should be questioned concerning whether the suit caused any injury to the wearer.	The immersion suit and its attachments should not be damaged or dislodged in any way. The test subject should not be injured by the suit.	Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.3.2.15 Leak test	**Regulations: LSA Code II/2.3.1.1.1; MSC.81(70) 1/3.1.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subject should pre-wet the immersion suit and be weighed. The test subject should then be instructed to do one of the following: .1 a period of flotation in calm water of 1h; or .2 swimming for 20 min for a distance of at least 200 m The test subject should be weighed again after the task. The weighing machine should be accurate to ± 100g.	The ingress of water into the pre-wetted suit should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Passed / Failed Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.16 Swimming and water emergence test	**Regulations: LSA Code II/2.3.1.3.4; MSC.81(70) 1/3.1.12**	
Test Procedure	Acceptance Criteria	Significant Test Data
All test subjects, each wearing a lifejacket but not the immersion suit, should attempt to swim 25 m and board a liferaft or rigid platform with its surface 300 mm above the water surface. Test subjects who successfully complete this task should also perform it wearing the immersion suit. If designed to be used with a lifejacket, then immersion suit should be tested with the subject also wearing a lifejacket.	All qualified test subjects should be able to board the liferaft or platform while wearing the immersion suit.	1) 25m swim and boarding without lifejacket. Pass / Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ 2) 25 m swim and boarding with immersion suit Pass / Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.17 Oil resistance test	**Regulations: LSA Code; MSC.81(70) 1/3.1.13**

Test Procedure	Acceptance Criteria	Significant Test Data
After all its apertures have been sealed an immersion suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature. The surface oil should then be wiped off and the immersion suit subjected to the test prescribed in 2.3.1.15.	The ingress of water should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.18 Alternative oil resistance test	**Regulations: LSA Code; MSC.81(70) 1/3.1.14**

Test Procedure	Acceptance Criteria	Significant Test Data
In lieu of the test for oil resistance prescribed in 2.3.2.17 either of the following tests may be conducted. After all apertures have been sealed, the immersion suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature if necessary using weights to keep suit submerged. Any surface oil should then be wiped off and the immersion suit turned inside out. The suit should then be laid on a table suitable for collecting and draining off any leakage and be supported at the neck aperture by a suitable designed hanger. The suit should then be filled with water to neck level which should be 300mm above the table. Representative samples of the exterior fabric and seams should be immersed under 100mm head of diesel oil for 24 h. After removal from the oil the samples should be wiped off before being subjected to the following tests: .1 a hydrostatic test of a 1m water head and .2 a tensile test of representative seams	After 1h in this position there should be no leakage exceeding a mass of 200g. The samples should successfully support 1 m head of water. The seam strength should be not less than 150 N.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Strength > 150N Pass Fail The samples should support a 1 m head of water Pass _____ Fail _____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.19 Fire test		**Regulations: LSA Code II/2.3.1.1.2; MSC.81(70) 1/3.1.15**
Test Procedure	Acceptance Criteria	Significant Test Data
A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to make a minimum total depth of 1 cm followed by enough petrol to make a minimum depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. If necessary, the immersion suit should be draped over a hanger to ensure the whole of the suit is enveloped in the flames, with the bottom of the suit 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The immersion suit should not sustain burning for more than 6 s or continue melting after being removed from exposure to the flames.	Did the immersion suit continue to burn for more than 6 s or continue melting after being removed from the flames? ☐YES ☐NO Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.20 Temperature cycling test		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/3.1.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The following test should be carried out on two immersion suits. The immersion suits should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	The immersion suits should show no signs of damage such as shrinking, swelling dissolution or changes of mechanical qualities.	(See following page for test data) Passed_____ Failed _____ Comments/Observations

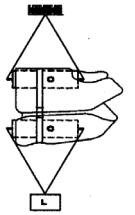
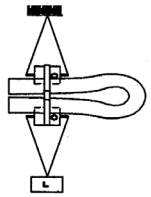
Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.21 Temperature cycling test - Test data | **Regulations: LSA Code I/1.2.1.2; MSC.81(70) 1/3.1.16**

	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 2	Date In: _____ Time In : _____ Temperature :_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 3	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 4	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 5	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 6	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 7	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 8	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration :_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 9	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 10	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.22 Buoyancy test		**Regulations: LSA Code II/2.3.1.8; MSC.81(70) 1/3.1.17**
Test Procedure	Acceptance Criteria	Significant Test Data
The buoyancy of an immersion suit designed to be worn without a lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water.	The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy	Buoyancy 1 Buoyancy 2 %difference _____kg _____kg _____% Passed_____ Failed Comments/Observations

2.3.2.23 Strength test		**Regulations: LSA Code; MSC.81(70) 1/3.1.18**
Test Procedure	Acceptance Criteria	Significant Test Data
The immersion suit should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when worn by a person. A force of not less than 3200 N should be applied to the lifting loop and a force of not less than 1350N should be applied to the parts other than the lifting loop for 30 min. The immersion suit may be cut if necessary to accommodate to the test device.	The immersion suit should not be damaged as a result of this test.  Vest-type lifejacket  Yoke or over-the-head type lifejacket	Passed_____ Failed_____ Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.24 Thermal protective test (General)	**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/3.2.1 – 3.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The thermal protective qualities may be measured using a thermal manikin, when such a method is required by an Administration and has been demonstrated to provide test results which correlate satisfactorily in all aspects to test results using human subjects. If human subjects are used, they should be medically examined before being accepted for the tests. Each design of immersion suit is to be tested by test subjects specified in 2.3.2.5. Where human subjects are used, the tests should always be conducted under the supervision of physician. Emergency resuscitation equipment should be available during all tests. For safety reasons, ECG should be monitored during every test. Testing should be stopped at the wish of the test subjects, if the falling rate of the core temperature is more than 1.5ºC per hour after the first half hour, if the skin temperature of the hand, foot or lumbar region should fall below 10º C, or if the attending physician considers it advisable. When testing with human subjects, continuous body core temperature (rectal temperature) and skin temperature of lumbar region, both hands, calves, foot (foot instep) and heels, should be measured. The accuracy of the measuring system should be ±0.2°C. Appropriate corresponding measurements should be taken if a manikin is used in lieu of human subjects.		Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.25 Thermal Protective test (Continued)		**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12**
Test Procedure	Acceptance Criteria	Significant Test Data
Prior to tests, the same amount of water resulting from the water ingress and jump test in paragraph 2.3.2.13 should be poured into the dry suit worn over the dry test clothing specified in 2.3.2.7 by the test subject lying down. Each test subject wearing an immersion suit previously subjected to the jump test in paragraph 2.3.2.14. Following a 6 h period of immersion, with hands gloved, in circulating calm water at between 0°C and +2°C, each test subject's body core temperature should not fall more than 2°C below the normal level of the subject's temperature. The immersion suit should provide sufficient thermal protection to ensure that immediately on leaving the water after a 1 hr period of immersion, with gloved hands, in water circulating at +5°C each test subject can pick up a pencil as specified in paragraph 2.3.2.9 and write. Alternatively, at the manufacturers' option, the ability to pick up a pencil and write as specified in paragraph 2.3.2.9 above may be demonstrated immediately after leaving the water upon completion of the above (6 hr) test.	Same mass of water which was the result from test 2.3.2.13, should be poured into the immersion suit. Following immersion each test subject's body core temperature should not fall more than 2°C below the normal level of the subject's temperature. The test subjects should be able to pick up a pencil and write. See attached test sheets for temperatures during the immersion tests: Comments/Observations	Same mass of water which was the result from test 2.3.2.13, should be poured into the immersion suit Beginning of test / End of test / normal temperature Subject No 1 Subject No.2 Subject No.3 Subject No.4 Subject No.5 Subject No.6 Passed _____ Failed _____ Pick up a pencil and write after 1 h period of immersion: Subject No 1 □YES □NO Subject No 2 □YES □NO Subject No 3 □YES □NO Subject No 4 □YES □NO Subject No 5 □YES □NO Subject No 6 □YES □NO Passed _____ Failed _____ Pick up a pencil and write after 6 h period of immersion: Subject No 1 □YES □NO Subject No 2 □YES □NO Subject No 3 □YES □NO Subject No 4 □YES □NO Subject No 5 □YES □NO Subject No 6 □YES □NO Passed _____ Failed _____

2.3.2.25 Thermal Protective test (Continued)	**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12**	
Test Procedure	Acceptance Criteria	Significant Test Data
		See attached test sheets for temperatures during the immersion tests: Comments/Observations

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.26 Test sheets for temperatures during immersion tests			**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12**			
Subject 1	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr:_____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot (foot instep) after 2 hr:____ Skin temp at left heel after 2 hr:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot(foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_____ Skin temp at left foot (foot instep) after 4 hr:__ Skin temp at right foot(foot instep) after 4 hr:_____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr:_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot (foot instep) after 5 hr:___ Skin temp at right foot(foot instep) after 5 hr:_____ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot (foot instep) after 6 hr:___ Skin temp at left heel after 6 hr:_____
Subject 2	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr :_____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot (foot instep) after 2 hr:____ Skin temp at left heel after 2hr:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot (foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_____ Skin temp at left foot (foot instep) after 4 hr:___ Skin temp at right foot (foot instep) after 4 hr:_____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr :_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot(foot instep) after 5 hr:_____ Skin temp at right foot (foot instep) after 5 hr:___ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot (foot instep) after 6 hr:___ Skin temp at left heel after 6 hr:_____

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.26 Test sheets for temperatures during immersion tests (continued)			**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12**			
Subject 3	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr :_____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot (foot instep) after 2 hr:____ Skin temp at left heel after 2 r:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot (foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_____ Skin temp at left foot (foot instep) after 4 hr:____ Skin temp at right foot(foot instep) after 4 hr: _____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr :_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot (foot instep) after 5 hr:___ Skin temp at right foot(foot instep) after 5 hr:_____ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot(foot instep) after 6 hr:_____ Skin temp at left heel after 6 hr:_____
Subject 4	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr :_____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot (foot instep) after 2 hr:____ Skin temp at left heel after 2hr:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot(foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_____ Skin temp at left foot (foot instep) after 4 hr:____ Skin temp at right foot(foot instep) after 4 hr:_____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr :_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot (foot instep) after 5 hr:___ Skin temp at right foot(foot instep) after 5 hr:_____ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot(foot instep) after 6 hr:_____ Skin temp at left heel after 6 hr:_____

Immersion suits (insulated)	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.3.2.26 Test sheets for temperatures during immersion tests (continued)			**Regulations: LSA Code II/2.3.2.2; MSC.81(70) 1/, 3.2.11 & 3.2.12**			
Subject 5	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr : _____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot(foot instep) after 2 hr:____ Skin temp at left heel after 2 hr:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot (foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_____ Skin temp at left foot(foot instep) after 4 hr:__ Skin temp at right foot(foot instep) after 4 hr:_____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr :_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot (foot instep) after 5 hr:___ Skin temp at right foot(foot instep) after 5 hr:_____ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot (foot instep) after 6 hr:___ Skin temp at left heel after 6 hr:_____
Subject 6	Rectal temp after 1 hr:___ Skin temp at lumbar region after 1 hr : _____ Skin temp at left hand after 1 hr:_____ Skin temp at right hand after 1 hr:_____ Skin temp at calves after 1 hr:_____ Skin temp at left foot (foot instep) after 1 hr:___ Skin temp at right foot (foot instep) after 1 hr:___ Skin temp at left heel after 1 hr:_____	Rectal temp after 2 hr:_____ Skin temp at lumbar region after 2 hr: _____ Skin temp at left hand after 2 hr:_____ Skin temp at right hand after 2 hr:_____ Skin temp at calves after 2 hr:_____ Skin temp at left foot (foot instep) after 2 hr:_____ Skin temp at right foot (foot instep) after 2 hr:____ Skin temp at left heel after 2hr:_____	Rectal temp after 3 hr:_____ Skin temp at lumbar region after 3 hr :_____ Skin temp at left hand after 3 hr:_____ Skin temp at right hand after 3 hr:_____ Skin temp at calves after 3 hr:_____ Skin temp at left foot (foot instep) after 3 hr:_____ Skin temp at right foot (foot instep) after 3 hr:_____ Skin temp at left heel after 3 hr:_____	Rectal temp after 4 hr:___ Skin temp at lumbar region after 4 hr :_____ Skin temp at left hand after 4 hr:_____ Skin temp at right hand after 4 hr:_____ Skin temp at calves after 4 hr:_ Skin temp at left foot (foot instep) after 4 hr:__ Skin temp at right foot(foot instep) after 4 hr:_____ Skin temp at left heel after 4 hr:_____	Rectal temp after 5 hr:__ Skin temp at lumbar region after 5 hr :_____ Skin temp at left hand after 5 hr:_____ Skin temp at right hand after 5 hr:_____ Skin temp at calves after 5 hr:_____ Skin temp at left foot (foot instep) after 5 hr:___ Skin temp at right foot(foot instep) after 6 hr:_____ Skin temp at left heel after 5 hr:_____	Rectal temp after 6 hr:__ Skin temp at lumbar region after 6 hr :_____ Skin temp at left hand after 6 hr:_____ Skin temp at right hand after 6 hr:_____ Skin temp at calves after 6 hr:_____ Skin temp at left foot (foot instep) after 6 hr:___ Skin temp at right foot(foot instep) after 6 hr:_____ Skin temp at left heel after 6 hr:_____

2.4 ANTI-EXPOSURE SUITS

EVALUATION AND TEST REPORT

2.4.1	General data and specifications
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2.4.15	Leak test
2.4.16	Swimming and water emergency test
2.4.17	Oil resistance test
2.4.18	Alternative oil resistance test
2.4.19	Fire test
2.4.20	Temperature cycling test
2.4.21	Temperature cycling test – Test data
2.4.22	Buoyancy test
2.4.23	Strength test
2.4.24	Thermal protective test (General)
2.4.25	Thermal protective test (Continued)
2.4.26	Test sheets for temperatures during immersion tests

2.4 ANTI-EXPOSURE SUITS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.1 General data and specifications	**Regulations: LSA Code 2.3; MSC.81(70);**

Construction Material: Fabric produced by: _____ Type: _____ Buoyant material produced by: _____ Type: _____	**Additional equipment:** Retro reflective material: □YES □ NO Whistle produced: □YES □ NO Life-line: □YES □ NO Light: □YES □ NO	**Donning instructions:** □YES □ NO

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.3 Quality assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - _____ Quality Assurance Procedure: - _____ Quality Assurance Manual: - _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.4 Visual inspection	**Regulations: LSA Code I/1.2.2, II/2.4.1.1.3 & 2.4.1.1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Anti-Exposure suit should: Be clearly marked with approval information including the Administration which approved it, date of manufacturer and any operational restrictions. Be provided with labels giving servicing details and intervals between servicing, operating instructions, general information and manufacturers details. Be fitted with approved patches of retro-reflective material with a total area of at least 400 cm^2 and with 100 cm^2 on the back if the suit does not automatically turn the wearer face up according to resolution A.658(16).		Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

2.4.4 Visual Inspection (continued)		**Regulations: LSA Code I/1.2.2, II/2.4.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Is the anti-exposure suit of highly visible colour?	Covers the whole body except where the Administration so permits, the feet; covering for the hands and head may be provided by separate gloves and a hood, both of which shall be permanently attached to the suit.	Passed _____ Failed _____
Is the anti-exposure suit designed to be worn without a lifejacket?		Passed _____ Failed _____
If yes,	Be of international or vivid reddish orange, or a comparably highly visible colour on all parts where this will assist detection at sea.	
Is the anti-exposure suit fitted with a light complying with paragraph 2.2.3 of LSA Code?		Passed _____ Failed _____
Is the anti-exposure suit fitted with a whistle complying with paragraph 2.2.1.14 of LSA Code?		☐YES ☐NO
Is the anti-exposure suit specified as must be worn in conjunction with a lifejacket?		Passed _____ Failed _____
Is the anti-exposure suit equipped with a pocket for a portable VHF telephone?		Passed _____ Failed _____
		Passed _____ Failed _____
		Passed _____ Failed _____
		Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.5 Test subjects		**Regulations: LSA Code II/2.3.1.1.5 & 2.3.1.3.1 - .4; MSC.81(70) 1/3.1.1 & 2.8.2**
Test Procedure	Acceptance Criteria	Significant Test Data
At least six able-bodied persons both male and females of the following heights and weights should be used. At least one and not more than two of the persons should be females with not more than one female in the same height range.	<u>Height</u> <u>Weight</u> 1.40m - 1.60m; 1 person under 60kg 1 person over 60kg 1.60m - 1.80m 1 person under 70kg 1 person over 70kg over 1.80m 1 person under 80kg 1 person over 80kg	Male/Female Height Weight Subject No.1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Comments/Observations

2.4.6 Test with a lifejacket		**Regulations: LSA Code II/2.3.1.5; MSC.81(70) 1/3.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
If the anti-exposure suit is to be worn in conjunction with a lifejacket, the lifejacket should be worn over the anti-exposure suit for the tests prescribed in 2.4.8 to 2.4.16.		Manufacturer of lifejacket: _____ Type: _____ Manufacturer of lifejacket: _____ Type: _____ Manufacturer of lifejacket: _____ Type: _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.7 Test clothing		**Regulations: LSA Code II/; MSC.81(70) 1/3.2.6 & 3.2.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen, and .4 woollen socks .5 if suits to be worn in conjunction with a lifejacket, the lifejacket should be worn during the thermal protective test.		Did all test subject use the specified test clothing ☐YES ☐NO Comments/Observations

2.4.8 Donning test (1)		**Regulations: LSA Code II/2.4.1.1.4; MSC.81(70) 1/3.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It can be unpacked and donned without assistance within 2 min, taking into account test clothing 2.4.7 and a lifejacket if the anti-exposure suit is to be worn in conjunction with a lifejacket.	Following a demonstration, the test subjects should be able to unpack, don and secure the anti-exposure suit over their test clothing (see 2.4.7) without assistance in less than 2 min. This time should include the time to don any associated clothing, inflate any orally inflated chambers if fitted, and don a lifejacket, if such is to be worn in conjunction with the anti-exposure suit.	<u>Donning time with normal clothing</u> Time Pass Fail Subject No.1_____ sec _____ _____ Subject No.2_____ sec _____ _____ Subject No.3_____ sec _____ _____ Subject No.4_____ sec _____ _____ Subject No.5_____ sec _____ _____ Subject No.6_____ sec _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.8 Donning test (2)	**Regulations: LSA Code I/2.4.1.1.4; MSC.81(70) 1/3.1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should be able to unpack and don in 5 mins the anti-exposure suit in ambient temperature of -30° C. Before the donning test the anti-exposure suit should be kept in a refrigerated chamber at a temperature of -30°C for 24 h.	The test subject should be able to complete this task in 5 min.	Donning time at - 30^0C Time Pass Fail Subject No.1_____ sec _____ _____ Subject No.2_____ sec _____ _____ Subject No.3_____ sec _____ _____ Subject No.4_____ sec _____ _____ Subject No.5_____ sec _____ _____ Subject No.6_____ sec _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.9 Ergonomic test		**Regulations: LSA Code II/2.4.1.2; MSC.81(70) 1/3.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
When wearing the anti-exposure suit, the test subjects should be able to: .1 climb up and down a vertical ladder of at least 5 m in length; .2 perform all duties associated with abandonment, assist other and operate a rescue boat; and .3 pick up a pencil and write. The diameter of the pencil should be 8-10 mm.	There should be no restriction in walking, bending over or arm movement. The diameter of the pencil should be 8-10 mm.	Restriction in walking, bending over or arm movement: ☐YES ☐NO All the test subjects were able to pick up a pencil and write: ☐YES ☐NO All the test subjects were able to put on the lifejacket without assistance: ☐YES ☐NO All the test subjects were able to perform all duties associated with abandonment, assist others and operate a rescue boat: ☐YES ☐NO All the test subjects were able to climb up and down a vertical ladder of 5 meter in length: ☐YES ☐NO Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.10 Field of vision test		**Regulations: LSA Code II/2.4.1.7; MSC.81(70) 1/3.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Each test subject should be seated with the head in a fixed position, and the lateral field of vision measured.	The lateral field of vision should be at least 120°.	Field of vision angle ≥ 120° Angle(degs.) Pass Fail Subject No.1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Comments/Observations

2.4.11 Flotation test		**Regulations: LSA Code; MSC.81(70) 1/3.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
	When wearing the anti-exposure suit, in conjunction with a lifejacket if required, the test subject should float face-up with their mouths clear of the water by at least 120mm and be stable in that position. The freeboard should be measured from the water surface to the nose and mouth with the test subject at rest. The freeboard of the anti-exposure suit without a lifejacket should be at least 50 mm. The position of the lifejacket light should permit it to be visible over as great a segment of the upper hemisphere as is practicable.	With lifejacket Without lifejacket Freeboard Mouth (mm) Nose (mm) Mouth (mm) Nose (mm) Subject No.1 _____ _____ _____ _____ Subject No.2 _____ _____ _____ _____ Subject No.3 _____ _____ _____ _____ Subject No.4 _____ _____ _____ _____ Subject No.5 _____ _____ _____ _____ Subject No.6 _____ _____ _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.12 Righting test		**Regulations: LSA Code II/2.4.3; MSC.81(70) 1/3.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Test subjects in fresh water wearing an anti-exposure suit complying with the requirements of this section should be able to turn from a face-down to a face-up position in not more than 5 s and should be stable face-up. The suit should have no tendency to turn the wearer face-down in moderate sea condition.	Except where it has been demonstrated that the anti-exposure suit will right the test subjects within 5 s.	Righting time = ≤ 5 s Time (s) Pass Fail Subject No.1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Comments/Observations

2.4.13 Water ingress and jump test		**Regulations: MSC.81(70) 1/3.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should pre-wet their Anti-Exposure suit and then be weighed. Following a jump into the water from a height sufficient to totally immerse the body, each test subject should be weighed again. Weighing should be performed on a machine accurate to ± 100g.	The difference in the combined mass of the test subject and the suit should not exceed 500 g.	Mass difference ≤ 500g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.14 Jump test		**Regulations: LSA Code II/2.4.1.1.2; MSC.81(70) 1/3.1.10**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should jump with the Anti-Exposure suit and lifejacket if required from a height of 4.5m vertically into the water. After the jump, the anti-exposure suit and its attachments should be examined for damage or dislodging, and the test subject should be questioned concerning whether the suit caused any injury to the wearer.	The Anti - Exposure suit and its attachments should not be damaged or dislodged in any way. The test subject should not be injured by the suit. The light, if fitted, should not injure the test subject.	Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

2.4.15 Leak test		**Regulations: LSA Code II/2.4.1.1; MSC.81(70) 1/3.1.11**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subject should pre-wet the anti-exposure suit and be weighed. The test subject should then be instructed to do one of the following: .1 a period of flotation in calm water of 1h; or .2 swimming for 20 min for a distance of at least 200 m The test subject should be weighed again after the task. The weighing machine should be accurate to ± 100g.	The ingress of water into the pre-wetted suit should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.16 Swimming and water emergent test	**Regulations: LSA Code II/2.4.1.2.3 MSC.81(70) 1/3.1.12**

Test Procedure	Acceptance Criteria	Significant Test Data
All test subjects, each wearing a lifejacket but not the anti-exposure suit, should attempt to swim 25 m and board a liferaft or rigid platform with its surface 300 mm above the water surface. Test subjects who successfully complete this task should also perform it wearing the anti-exposure suit. If designed to be used with a lifejacket, then anti-exposure suit should be tested with the subject also wearing a lifejacket.	All qualified test subjects should be able to board the liferaft or platform while wearing the anti-exposure suit.	1) 25m swim and boarding without lifejacket. Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ 2) 25 m swim and boarding with immersion suit Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.17 Oil resistance test	**Regulations: LSA Code; MSC.81(70) 1/3.1.13**	
Test Procedure	Acceptance Criteria	Significant Test Data
After all its apertures have been sealed an anti-exposure suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature. The surface oil should then be wiped off and the suit subjected to the test prescribed in 2.4.15.	The ingress of water should not exceed a mass of 200g.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.18 Alternative oil resistance test		**Regulations: LSA Code; MSC.81(70) 1/3.1.14**
Test Procedure	Acceptance Criteria	Significant Test Data
In lieu of the test for oil resistance prescribed in 2.4.17 either of the following tests may be conducted. After all apertures have been sealed, the anti-exposure suit should be immersed for a period of 24 h under 100 mm head of diesel oil at normal room temperature if necessary, using weights to keep suit submerged. Any surface oil should then be wiped off and the anti-exposure suit turned inside out. The suit should then be laid on a table suitable for collecting and draining off any leakage and be supported at the neck aperture by a suitable designed hanger. The suit should then be filled with water to neck level which should be 300mm above the table. Representative samples of the exterior fabric and seams should be immersed under 100mm head of diesel oil for 24 h. After removal from the oil the samples should be wiped off before being subjected to the following tests: - .1 a hydrostatic test of a 1m water head and .2 a tensile test of representative seams	After 1h in this position there should be no leakage exceeding a mass of 200g. The seam strength should be not less than 150 N. The samples should successfully support 1 m head of water.	Indicate which alternative is used. ☐Alternative 1 ☐Alternative 2 Water ingress ≤ 200g Pass Fail Subject No.1 _____ _____ Subject No.2 _____ _____ Subject No.3 _____ _____ Subject No.4 _____ _____ Subject No.5 _____ _____ Subject No.6 _____ _____ Strength > 150N Pass _____ Fail _____ The samples should support a 1 m head of water Pass _____ Fail _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.19 Fire test		**Regulations: LSA Code II/2.4.1.1.5; MSC.81(70) 1/3.1.15**
Test Procedure	Acceptance Criteria	Significant Test Data
A test pan 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to make a minimum total depth of 1 cm followed by enough petrol to make a minimum depth of 4 cm. The petrol should then be ignited and allowed to burn freely for 30 s. If necessary the anti-exposure suit should be draped over a hanger to ensure the whole of the suit is enveloped in the flames , with the bottom of the suit 25 cm above the top edge of the test pan so that the duration of exposure to the flames is 2 s.	The anti-exposure suit should not sustain burning for more than 6 s or continue melting after being removed from the flames.	Did the anti-exposure suit continue to burn for more than 6 s or continue melting after being removed from the flames? ☐ YES ☐ NO Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.20 Temperature cycling test		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/3.1.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The following test should be carried out on two immersion suits The anti-exposure suits should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C	The anti-exposure suit's should show no signs of damage such as shrinking, swelling dissolution or changes of mechanical qualities.	(See following page for test data) Passed_____Failed_____ Comments/Observations

± 3°C until the next day.		

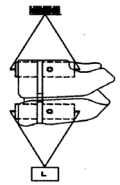
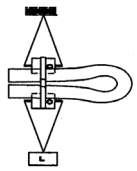
Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.21	**Temperature cycling test – Test Data**		**Regulations: LSA Code I/1.2.1; MSC.81(70) 1/3.1.16**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 2	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 3	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 4	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 5	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 6	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 7	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 8	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
Cycle 9	Date In: _____ Time In : _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours	Date In: _____ Time In: _____ Temperature:_____ ^{0}C	Date Out: _____ Time Out: _____ Duration:_____hours
	Date In: _____	Date Out: _____	Date In: _____	Date Out: _____

Cycle 10	Time In: _____ Temperature:_____ ^{0}C	Time Out: _____ Duration:_____hours	Time In: _____ Temperature:_____ ^{0}C	Time Out: _____ Duration:_____hours

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.22 Buoyancy test		**Regulations: LSA Code II/2.4.1.1.1; MSC.81(70) 1/3.1.17**
Test Procedure	Acceptance Criteria	Significant Test Data
The Anti-exposure suit should have inherent buoyancy of at least 70 N The buoyancy of an anti-exposure suit designed to be worn without a lifejacket should be measured before and after 24 h complete submersion to just below the surface in fresh water.	The difference between the initial buoyancy and the final buoyancy should not exceed 5% of the initial buoyancy.	Buoyancy 1 _____kg Buoyancy 2 _____kg %difference _____% Passed _____Failed _____ Comments/Observations

2.4.23 Strength test		**Regulations: LSA Code II; MSC.81(70) 1/3.1.18**
Test Procedure	Acceptance Criteria	Significant Test Data
The anti-exposure suit should be immersed in water for a period of 2 min. It should then be removed from the water and closed in the same manner as when worn by a person. A force of not less than 3200 N should be applied to the lifting loop and a force of not less than 1350 N should be applied to the parts other than the lifting loop for 30 min. The anti-exposure suit may be cut if necessary to accommodate the test device.	The anti-exposure suit should not be damaged as a result of this test.  Vest-type lifejacket  Yoke or over-the-head type lifejacket	Passed_____Failed _____ Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.24 Thermal protective test (General)	**Regulations: LSA Code II/2.4.2; MSC.81(70) 1/3.2.1 – 3.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The thermal protective qualities may be measured using a thermal manikin, when such a method is required by an Administration and has been demonstrated to provide test results which correlate satisfactorily in all aspects to test results using human subjects. If human subjects are used, they should be medically examined before being accepted for the tests. Each design of immersion suit is to be tested by test subjects specified in 2.4.5 Where human subjects are used, the tests should always be conducted under the supervision of physician. Emergency resuscitation equipment should be available during all tests. For safety reasons, ECG should be monitored during every test. Testing should be stopped at the wish of the test subjects, if the falling rate of the core temperature is more than 1.5° C per hour after the first half hour. or if the skin temperature of hand, foot or lumbar region should fall below 10° C, or if the attending physician considers it advisable. When testing with human subjects, continuous body core temperature (rectal temperature) and skin temperature of lumbar region, both hands, calves, foot (foot instep) and heels, should be measured. The accuracy of the measuring system should be +/- 0.2°C. Appropriate corresponding measurements should be taken if a manikin is used in lieu of human subjects. Prior to tests, the same amount of water resulting from the jump test in paragraph 2.4.15 should be poured into the dry suit worn over the dry test clothing specified in 2.4.7 by the test subject lying down.		Comments/Observations

Anti-exposure suits	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.4.25 Thermal Protective test (Continued)		**Regulations: LSA Code II/2.4.2; MSC.81(70) 1/3.2.13, 3.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
Each test subject should wear an anti-exposure suit previously subjected to the water ingress and jump test in paragraph 2.4.13. Following a 1 h period of immersion, with hands gloved and hood donned, in circulating calm water at + 5°C, each test subject's body core temperature should not fall more than 2°C below the normal level of the subject's temperature. Immediately on leaving the water after completion of the test prescribed in 2.4.24 each test subject should be able to pick up a pencil as specified in paragraph 2.4.9 and write. The anti-exposure suit should be so constructed, that when worn as marked, the suit continues to provide sufficient thermal protection following one jump into the water which totally submerges the test subject and should ensure that when it is worn in calm water at a temperature of 5°C, the test subject's body core temperature does not fall at a rate of more than 1.5°C per hour, after the first 0.5 h.	Same mass of water which was the result from test 2.4.15, should be poured into the immersion suit. See attached test sheets for temperatures during the immersion tests: Comments/Observations	Same mass of water which was the result from test 2.4.15, should be poured into the immersion suit Beginning of test / End of test / Normal temperature Subject No 1 _____ _____ _____ Subject No.2 _____ _____ _____ Subject No.3 _____ _____ _____ Subject No.4 _____ _____ _____ Subject No.5 _____ _____ _____ Subject No.6 _____ _____ _____ Passed _____ Failed _____ Pick up a pencil and write after 1 h period of immersion: Subject No 1 □YES □NO Subject No 2 □YES □NO Subject No 3 □YES □NO Subject No 4 □YES □NO Subject No 5 □YES □NO Subject No 6 □YES □NO Passed _____ Failed _____ Pick up a pencil and write after 6 h period of immersion: Subject No 1 □YES □NO Subject No 2 □YES □NO Subject No 3 □YES □NO Subject No 4 □YES □NO Subject No 5 □YES □NO Subject No 6 □YES □NO

2.4.25 Thermal Protective test (Continued)		**Regulations: LSA Code II/2.4.2; MSC.81(70) 1/3.2.13, 3.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
		Passed _____ Failed _____ See attached test sheets for temperatures during the immersion tests: Comments/Observations

Anti-exposure suits	Manufacturer: ______ Model: ______ Lot/Serial Number: ______	Date: ______ Time: ______ Surveyor: ______ Organization: ______
2.4.26 Test sheets for temperatures during immersion tests	**Regulations: LSA Code II/2.4.2.1.2; MSC.81(70) 1/3.2.13 & 3.2.14**	

SUBJECT 1	**SUBJECT 2**	**SUBJECT 3**	**SUBJECT 4**	**SUBJECT 5**	**SUBJECT 6**
Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:________________ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:________________ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:______ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:________________ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:________________ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No	Rectal temp after 1 hr:__ Skin temp at lumbar region after 1 hr : ______ Skin temp at left hand after 1 hr:________________ Skin temp at right hand after 1 hr:________________ Skin temp at calves after 1 hr:________________ Skin temp at left foot (foot instep) after 1 hr:__ Skin temp at right foot (foot instep) after 1 hr:__ Skin temp at left heel after 1 hr:________________ Did the wearer's body core temperature fall at a rate more than 1,5ºC per hour, after the first 0,5 h? ☐ Yes ☐ No

2.5 THERMAL PROTECTIVE AIDS

EVALUATION AND TEST REPORT

2.5.1	General data and specifications
2.5.2	Submitted drawings, reports and documents
2.5.3	Quality assurance
2.5.4	Visual inspection
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2.5.6	Fabric test – Thermal conductance
2.5.7	Temperature cycling test
2.5.8	Test subjects
2.5.9	Test clothing
2.5.10	Donning test 1
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2.5.12	Discarding test
2.5.13	Oil resistance test

2.5 THERMAL PROTECTIVE AIDS
EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.1 General data and specifications		**Regulations: LSA Code II/2.5; MSC.81(70) 1/ 3.3**
General Information		
Construction Material: Fabric manufactured by:_____ Type: _____ Is the TPA of highly visible colour?		**Donning instructions:** ☐YES ☐ NO ☐YES ☐ NO

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.3 Quality Assurance	**Regulations: - MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by Chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, of the international Life-Saving Appliances (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: - Quality Assurance Procedure: - Quality Assurance Manual: - Description of System. Quality Assurance System acceptable: Yes/No Comments/Observations

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.4 Visual Inspection	**Regulations: LSA Code I/1.2.2, II/2.5; MSC. 81(70);**	
Test Procedure	Acceptance Criteria	Significant Test Data
Is the thermal protection aid of high visible colour?	Be of an international or vivid reddish orange, or a comparably high visible colour on all parts where this will assist detection at sea.	□Yes □No
Does the thermal protection aid cover the whole body of the wearer with the exception of the face?	Cover the whole body of persons of all sizes wearing a lifejacket with the exception of the face.	□Yes □No
If provided with arms, are the hand covered, or are permanently attached gloves provided?		□Yes □No
Be clearly marked with approval information including the Administration which approved it, date of manufacture and any operational restrictions. Be provided with labels giving servicing details and intervals between servicing, operating instructions, general information and manufacturer's details.		

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.5 Fabric Test - Water resistance		**Regulations: LSA Code ; MSC.81(70) 1/3.3.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The fabric from which the thermal protective aid is constructed should be tested to determine its resistance to penetration by a 2m head of water.	The fabric should maintain its watertight integrity when supporting a column of water 2 m high.	Does the material support a column of water of 2 m high □YES □ NO Test method used:_____ Comments/Observations

2.5.6 Fabric test - Thermal conductance		**Regulations: LSA Code II/2.5.1; MSC.81(70) 1/3.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The thermal conductance of the fabric of which the thermal protective aid is manufactured should be measured.	The fabric should have a thermal conductance of not more than 7800 W/m²K and shall be so constructed that, when used to enclose a person, it shall reduce both the convective and evaporative heat loss from the wearer's body.	Passed _____ Failed _____ All data is to be attached here. Comments/Observations

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.7 Temperature cycling test		**Regulations: LSA Code II/1.2.2.2; MSC.81(70) 1/3.3.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A thermal protective aid should be subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day;	The thermal protective aid should show no signs of damage such as shrinking, swelling dissolution or changes of mechanical qualities	See following page for test data. Passed _____Failed _____ Comments/Observations

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.7	**Temperature cycling test – Test data**		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/3.3.3**	
	HOT CYCLE		***COLD CYCLE***	
Cycle 1	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 2	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 3	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 4	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 5	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 6	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 7	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 8	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 9	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours
Cycle 10	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours	Date In: _____ Time In: _____ Temperature: _____ ^{0}C	Date Out: _____ Time Out: _____ Duration: _____ hours

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.8 Test subjects		**Regulations: LSA Code II/2.5.2; MSC.81(70) 1/3.3.4**
Test Procedure	Acceptance Criteria	Significant Test Data
For these tests a group of at least six test subjects of different ages, both male and female in the large, medium and small size range should be selected.	Test subject range: Height / Weight 1.4 m – 1.6 m: 1 person under 60 kg; 1 person over 60 kg 1.6 m – 1.8 m: 1 person under 70 kg; 1 person over 70 kg over 1.8 m: 1 person under 80 kg; 1 person over 80 kg	Comments/Observations Male/Female Height Weight Subject 1 _____ _____ _____ Subject 2 _____ _____ _____ Subject 3 _____ _____ _____ Subject 4 _____ _____ _____ Subject 5 _____ _____ _____ Subject 6 _____ _____ _____

2.5.9 Test clothing		**Regulations: LSA Code II/2.5; MSC.81(70) 1/3.3.5, 3.2.6 & 3.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The test subjects should wear a standard range clothing consisting of .1 underwear (short sleeved, short legged) .2 shirt (long sleeved) .3 trousers (not woollen, and woollen socks .4 in addition to the clothing the test subjects should wear two woollen pullovers during the tests prescribed in 2.5.10; 2.5.11 and 2.5.12.		Did all test subject use the specified test clothing □YES □NO Comments/Observations

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.10 Donning test (1)		**Regulations: LSA Code II/2.5.2.; MSC.81(70) 1/3.3.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Following a demonstration, the test subjects should be able to unpack and don the thermal protection aids over a lifejacket when seated in a survival craft or a rescue boat.	The test subjects should be able to unpack and don the thermal protection aid.	TimePassed Failed Subject No.1_____ sec _____ _____ Subject No.2_____ sec _____ _____ Subject No.3_____ sec _____ _____ Subject No.4_____ sec _____ _____ Subject No.5_____ sec _____ _____ Subject No.6_____ sec _____ _____ Comments/Observations

2.5.11 Donning test (2) at low temperature		**Regulations: LSA Code II/2.5.3; MSC.81(70) 1/3.3.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The thermal protective aid should be capable of being unpacked and donned at an ambient temperature of -30° C. Before the donning test the thermal protective aid should be kept in a refrigerated chamber at a temperature of -30°C for 24 h.	The test subjects should be able to successfully unpack and don the thermal protective aid without assistance in a survival craft or rescue boat. The thermal protective aid shall function properly throughout an air temperature range of -30°C to +20°C.	TimePassed Failed Subject No.1_____ sec _____ _____ Subject No.2_____ sec _____ _____ Subject No.3_____ sec _____ _____ Subject No.4_____ sec _____ _____ Subject No.5_____ sec _____ _____ Subject No.6 _____ sec _____ _____ Comments/Observations

Thermal protective aids	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

2.5.12 Discarding Test		**Regulations: LSA Code II/2.5; MSC.81(70) 1/3.3.8**
Test Procedure	Acceptance Criteria	Significant Test Data
If the thermal protective aid impairs the ability of the test subjects to swim, it should be demonstrated that it can be discarded by the test subjects, when immersed in water, in not more than 2 min.	The test subject should be able to complete this task in less than 2 min.	TimePassed Failed Subject No.1_____ sec _____ _____ Subject No.2_____ sec _____ _____ Subject No.3_____ sec _____ _____ Subject No.4_____ sec _____ _____ Subject No.5_____ sec _____ _____ Subject No.6_____ sec _____ _____ Comments/Observations

2.5.13 Oil resistance test		**Regulations: LSA Code I/1.2.2.4; MSC.81(70) 1/3.3.9**
Test Procedure	Acceptance Criteria	Significant Test Data
After all its apertures have been sealed, a thermal protective aid should be immersed under 100 mm head of diesel oil for 24 h. The surface oil should then be wiped off and it should be established the thermal conductance of the material.	After this test the thermal protective aid should show no signs of damage, such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The thermal conductance should be not more than 7800 W/m² K.	Is the thermal conductance of the thermal protective aid not more than 7800 W/m² K? □YES □NO Is there any sign of damage, such as shrinking, cracking, swelling, dissolution or change of mechanical qualities? □YES □NO Comments/Observations

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MSC.1/Circ.1629
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (VISUAL SIGNALS)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter III of the LSA Code, i.e. visual signals (rocket parachute flares, hand flares and buoyant smoke signals).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed, revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (VISUAL SIGNALS)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and the Revised recommendation, as amended. In the case of inconsistency between the forms and the LSA Code or the Revised recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customising the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or the Revised recommendation have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (VISUAL SIGNALS)

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3.1 ROCKET PARACHUTE FLARES

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.1.1 Quality assurance	**Regulations: MSC.81(70) 2/1.2, 1.1**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual: Description of System: Quality Assurance System acceptable Yes/No Comments/Observations

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.1.2 Visual inspection		**Regulations: LSA Code I/1.2.2 & III/3.1, 1.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination: 1. Approval markings. 2. Operating instructions. 3. Outer casing. 4. Comfort. 5. Operation. 6. Ignition System. Lifetime	Rocket Parachute Flares should: 1. be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions, markings are to be indelible; 2. be provided with brief instructions or diagrams clearly illustrating the use of the rocket parachute flare printed on the casing; 3. not depend on adhesive tapes or plastic envelopes for its water-resistant properties; 4. be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturers' operating instructions; 5. be so constructed that the end from which the rocket is ejected can be positively identified by day or night; and 6. be fitted with an integral means of ignition. The Administration should determine the period of acceptability of the unit which are subject to deterioration with age.	1. Approval markings: Pass/Fail 2. Operating Instructions: Pass/Fail 3. Outer casing: Pass/Fail 4. Comfort: Pass/Fail 5. Operation: Pass/Fail 6. Ignition system: Pass/Fail Period of acceptability: Comments/Observations

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.1.3 General data and specifications		**Regulations: LSA Code 1.2; MSC.81(70) Pt 1/4.6**
General Information	**Dimensions**	**Weight**
Construction Material: Casing: _____ Top cover (if applicable): _____ Bottom cover (if applicable): _____ Method of Ignition _____ Operational Safety Delay (if applicable): _____ Parachute Material _____ Acceptable life of the item yrs	Dimensions: Length of Casing: _____ Diameter of Casing: _____ Parachute Dimensions: Number of attachment Cords: _____ Diameter of Line: _____	Design Weight: _____ Weight as Tested: _____ Weight of Flare Material: _____ Weight of Rocket Charge: _____ Comments/Observations

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS CONDITIONING SEQUENCE	**SPECIMEN NUMBER**									**REFERENCES**	**REMARKS**
Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-28	MSC81(70)	
Measuring dimensions and mass	A	A	A	A	A	A	A	A	A		
Temperature cycling test (3.1.2)	B									4.2.1	
Low temperature conditioning (3.1.3)		B								4.2.2	
High temperature conditioning (3.1.4)			B							4.2.3	
Humidity conditioning (3.1.5)				B						4.2.4	
1 m immersion for 24 hours (3.1.6.1)					B					4.3.1	
100 mm for 5 minutes (3.1.6.2)						B				4.3.2	
Salt water spray (3.1.6.3)							B			4.3.3	
2 m Drop Test (3.1.7.1)								B		4.4.1	
Safety inspection (3.1.9)	C	C	C	C	C	C	C	C		4.5	
Operation at ambient temperature	D				D	D	D	D		4.2.1, 4.3.1, 4.3.2, 4.3.3 & 4.4.1	

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-28	References	Remarks
Operate at conditioning Temperature		D	D	D						4.2.2, 4.2.3 & 4.2.4	
Operational test using immersion suit glove (3.1.7.2)	E				E			E		/4.4.2	Use specimens #2, #14 and #23.
Vertical firing height, descent speed, burn time. (Note 1)			E		E	E	E			4.6.1	
45° firing to horizontal. (Note 2)	E	E		E				E		4.6.3	
Rocket recoil test for hand-held only. (Note 3)	E	E	E	E	E	E	E	E		4.6.4	
Flare material test colour and luminosity (3.1.8)										4.6.2	Additional flares may be used to measure the luminous intensity and may be carried out by an independent laboratory acceptable to the administration and report submitted.
Chute examination after recovery. (Note 4)	F	F	F	F	F	F	F	F		LSA. Code Chapter III/ 3.1.2.5	
Liferaft Drop Test (4.2.4)									G	LSA Code Chapter IV/ 4.1.1.2	The liferaft manufacturer should complete this form.

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen Rocket Parachute Flare.
Note 1. Not all samples marked need to be fired at 90°. A representative sample of at least 18 specimens should be so assessed, so that a representative descent rate can be found.
Note 2. Not all samples marked need to be fired at 45°. A representative sample of at least 3 specimens should be so assessed.
Note 3. Not all samples need to be recoil tested. A representative sample of at least 3 rockets should be so assessed by hand firing.
Note 4. It is accepted that all parachutes may not be recoverable - as many as possible should be recovered and inspected for damage.

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.2 Temperature cycling test — **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/1.2.1, 4.2 & 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data
The three specimens of parachute rocket flares should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day. The three parachute rockets after completing temperature cycling should function effectively at ambient temperature Samples 1 and 2 should be fired vertically. Sample 3 should be fired at an angle of 45°.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. .1 It should be established by means of accurate measuring instruments that the parachute flares of specimens 1 and 2 are ejected at a height of not less than 300 m. .2 The height of which the flare burns out and the burning period should also be measured. .3 It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. .4 Specimen 3 should function efficiently but need not reach a height of 300 metres. .5 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. .6 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	1 | 2 | 3 Condition after conditioning (Pass/Fail) | | | Ejection height of flare (metres) Operation 90° | | N/A Burn out height of flare (metres) | | N/A Burn time of flare (sec) | | | Descent rate of flare (m/s) | | N/A Operation at 45° (Pass/Fail) N/A | N/A | | Height reached (metres) | | N/A Parachute condition (Pass/Fail) | | | Recoil minimal (Pass/Fail) | | | Comments/Observations Passed_____Failed _____

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.3 Low temperature conditioning test		**Regulations: LSA Code I/1.2 & .III/3.1; MSC.81(70) 1/4.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data

Three parachute rockets should be subjected to a temperature of -30°C for at least 48 h and then function effectively immediately upon removal from the cold chamber.

Specimen 4 and 5 should be fired vertically. Specimen 6 should be fired at an angle of 45°.

After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively immediately.

.1 It should be established by means of accurate measuring instruments that the parachute flares of specimen 4 and 5 are ejected at a height of not less than 300 m.

.2 The height of which the flare burns out and the burning period should also be measured.

.3 It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s.

.4 Specimen 6 should function efficiently but need not reach a height of 300 metres.

.5 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal.

.6 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.

4	5	6
Condition after conditioning (Pass/Fail)		
Ejection height of flare (metres) Operation 90°		
		N/A
Burn out height of flare (metres)		
		N/A
Burn time of flare (sec)		
Descent rate of flare (m/s)		
		N/A
Operation at 45° (Pass/Fail)		
N/A	N/A	
Height reached (metres)		
		N/A
Parachute condition (Pass/Fail)		
Recoil minimal (Pass/Fail)		
Comments/Observations		
Passed_____Failed _____		

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.4 High temperature conditioning test	**Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.2.3, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three parachute rockets should be subjected to a temperature of +65°C for at least 48 h and then function effectively immediately upon removal from the hot chamber. The three rockets should be fired vertically.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively immediately. 1. It should be established by means of accurate measuring instruments that the parachute flares of the three rockets are ejected at a height of not less than 300 m. 2. The height of which the flare burns out and the burning period should also be measured. 3. It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. 4. If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. 5. It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	7	8	9
		Condition after conditioning (Pass/Fail)		
		Ejection height of flare (metres) Operation 90°		
		Burn out height of flare (metres)		
		Burn time of flare (sec)		
		Descent rate of flare (m/s)		
		Parachute condition (Pass/Fail)		
		Recoil minimal (Pass/Fail)		
		Comments/Observations Passed_____Failed_____		

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.5 Humidity conditioning test | **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.2.4**

Test Procedure	Acceptance Criteria	Significant Test Data		
		10	11	12
Three specimens of parachute rockets should be subjected to a temperature of +65°C and 90% relative humidity for at least 96 h, followed by 10 days at 20°C to 25°C at 65% relative humidity. Specimen 10 and 11 should be fired vertically. Specimen 12 should be fired at an angle of 45°.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. .1 It should be established be by means of accurate measuring instruments that the parachute flares of specimens 10 and 11 are ejected at a height of not less than 300 m. .2 The height of which the flare burns out and the burning period should also be measured. .3 It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. .4 Specimen 12 should function efficiently but need not reach a height of 300 metres. .5 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. .6 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	Condition after conditioning (Pass/Fail)		
		Ejection height of flare (metres) Operation 90°		
				N/A
		Burn out height of flare (metres)		
				N/A
		Burn time of flare (sec)		
		Descent rate of flare (m/s)		
				N/A
		Operation at 45° (Pass/Fail)		
		N/A	N/A	
		Height reached (metres)		
				N/A
		Parachute condition (Pass/Fail)		
		Recoil minimal (Pass/Fail)		
		Comments/Observations Passed_____Failed _____		

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.6.1 1 m immersion for 24 hours test | **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.3.1, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data		
		13	14	15
Three parachute rockets should be immersed horizontally for 24 h under 1 m of water. The three rockets should be fired vertically.	After the test, each rocket should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. 1. It should be established by means of accurate measuring instruments that the parachute flares of the three rockets are ejected at a height of not less than 300 m. 2. The height of which the flare burns out and the burning period should also be measured. 3. It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. 4. If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. 5. It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	Condition after conditioning (Pass/Fail)		
		Ejection height of flare (metres) Operation 90°		
		Burn out height of flare (metres)		
		Burn time of flare (sec)		
		Descent rate of flare (m/s)		
		Parachute condition (Pass/Fail)		
		Recoil minimal (Pass/Fail)		
		Comments/Observations Passed_____Failed _____		

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.6.2 10 cm immersion for 5 min test | **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.3.2, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data

Three parachute rockets should be immersed in the ready to fire condition for 5 min under 10 cm of water.

The three rockets should be fired vertically.

After the test, each rocket should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature.

.1 It should be established by means of accurate measuring instruments that the parachute flares of the three rockets are ejected at a height of not less than 300 m. The height of which the flare burns out and the burning period should also be measured. It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s.

.2 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal.

.3 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.

	16	17	18
Condition after conditioning (Pass/Fail)			
Ejection height of flare (metres) Operation 90°			
Burn out height of flare (metres)			
Burn time of flare (sec)			
Descent rate of flare (m/s)			
Parachute condition (Pass/Fail)			
Recoil minimal (Pass/Fail)			

Comments/Observations

Passed_____Failed_____

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.6.3 Salt spray test — **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.3.3, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of parachute rockets should be subjected to a salt spray (5% Natrium Chloride solution) at a temperature of +35±3°C for at least 100 h. The three rockets should be fired vertically. Note: Natrium and Sodium are the same	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. 1. It should be established by means of accurate measuring instruments that the parachute flares of the three rockets are ejected at a height of not less than 300 m. 2. The height of which the flare burns out and the burning period should also be measured. 3. It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. 4. If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. 5. It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	19 / 20 / 21 Condition after conditioning (Pass/Fail) Ejection height of flare (metres) Operation 90° Burn out height of flare (metres) Burn time of flare (sec) Descent rate of flare (m/s) Parachute condition (Pass/Fail) Recoil minimal (Pass/Fail) Comments/Observations Passed_____Failed _____

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.7.1 2 m drop test — **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.4.1, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data

Three parachute rockets should be dropped in turn end-on and horizontally from a height of 2 m on to a steel plate about 6 mm thick cemented on to a concrete floor. They should remain in a safe condition after this test.

Specimen 22 and 23 should be fired vertically. Specimen 24 should be fired at an angle of 45°.

After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature.

.1 It should be established by means of accurate measuring instruments that the parachute flares of specimens 22 and 23 are ejected at a height of not less than 300 m.

.2 The height of which the flare burns out and the burning period should also be measured.

.3 It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s.

.4 Specimen 24 should function efficiently but need not reach a height of 300 metres.

.5 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal.

.6 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.

22	23	24
Condition after conditioning (Pass/Fail)		
Ejection height of flare (metres) Operation 90°		
		N/A
Burn out height of flare (metres)		
		N/A
Burn time of flare (sec)		
Descent rate of flare (m/s)		
		N/A
Operation at 45° (Pass/Fail)		
N/A	N/A	
Height reached (metres)		
		N/A
Parachute condition (Pass/Fail)		
Recoil minimal (Pass/Fail)		
Comments/Observations Passed_____Failed _____		

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.7.2 Immersion suit glove test | **Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.4.2, 4.6**

Test Procedure	Acceptance Criteria	Significant Test Data
Three parachute rockets should be activated in accordance with the manufacturer's operating instructions by an operator wearing an insulated buoyant immersion suit or the gloves taken from an insulated buoyant immersion suit to establish that they can be operated effectively without injury to the operator, or any person in close proximity during firing or burning. The three rockets should be fired vertically.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. .1 It should be established by means of accurate measuring instruments that the parachute flares of the three rockets are ejected at a height of not less than 300 m. .2 The height of which the flare burns out and the burning period should also be measured. .3 It should be established from these measurements that the rate of descent is not more than 5 m/s and the burning period is not less than 40 s. .4 If the rocket is hand-held when operated, it should be demonstrated that its recoil is minimal. .5 It should be determined by examination that the flare has not damaged its parachute or attachments whilst it was burning.	2 | 14 | 23 Condition after conditioning (Pass/Fail) Ejection height of flare (metres) Operation 90° Burn out height of flare (metres) Burn time of flare (sec) Descent rate of flare (m/s) Parachute condition (Pass/Fail) Recoil minimal (Pass/Fail) Comments/Observations Passed_____Failed _____

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.8 Luminous intensity test	**Regulations: LSA Code I/1.2 & III/3.1.2; MSC.81(70) 1/4.6.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Laboratory testing of the rocket parachute flare should establish that it will burn with the required luminous intensity and colour.	Laboratory testing of the flare material should establish: .1 that it will burn uniformly with an average luminous intensity of not less than 30,000 cd for a period of not less than 40 seconds, at temperatures from -30°C to +65°C; and .2 that the colour of the flame is a vivid red with CIE coordinates x = 0.61 to 0.69 and y = 0.3 to 0.39, or computed from these coordinates: a wavelength of 608 + 11 nm. The measured chromaticity coordinates should be within the boundaries of the area of the diagram as per CIE.	Laboratory Testing report Report acceptable (Yes/No) Luminous intensity levels at -30°C: _____ KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Luminous intensity levels at +20°C:_____ KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Luminous intensity levels at +65°C _____ KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Comments/Observations. Passed_____Failed _____

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.9 Safety inspection	**Regulations: LSA Code I/1.2 & III/3.1; MSC.81(70) 1/4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by visual inspection that the rocket parachute flare:		
.1 is indelibly marked with clear and precise instructions on how it should be operated and that the danger end can be identified by day or night;	Clear and precise operating instructions are marked on the parachute rocket flare and the parachute rocket flare clearly identifies the danger end.	Markings and identification of ends acceptable Passed_____Failed _____
.2 can, if hand operated, be operated from the bottom (safe end) or that it contains an operational safety delay of 2 seconds;	If operated from the top the time delay is not to be less than 2 s.	Time delay if operated from the top_____sec
.3 has a simple and integral means of ignition which requires the minimum of preparation and can be readily operated in adverse conditions without external aid and with wet, cold or gloved hands;	It has a simple and integral means of ignition and can be operated by cold, wet and gloved hands.	Operation of specimen when wet, cold and gloved hands. Passed_____Failed _____
.4 does not depend on adhesive tapes or plastic envelopes for its water-resistant properties; and	Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties.	Water resistant without the use of envelopes or adhesive tape. Passed_____Failed _____
.5 can be indelibly marked with means of determining its age.	Date of manufacturing and date of expiry indelible printed on the outside.	Indelible date stamped Passed_____Failed _____ Comments/Observations

Rocket parachute flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.1.10 Liferaft drop test — **Regulations: LSA Code 1.2 & 4.1.1.2, MSC.81(70) I/5.1.2**

Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft in the operationally packed condition should be suspended and then dropped from a height of 18 m into the water. If the liferaft is to be stowed at a height greater than 18 m above the waterline in the lightest seagoing condition, it should be dropped from the height at which it is to be stowed. Note: This test sheet should be completed by the liferaft manufacturer. Reference should be made to the test sheet 4.2.4.	Damage to any item of equipment is acceptable subject to the administration being satisfied that the operational efficiency has not been impaired. After the test, each rocket parachute flare should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	25 | 26 | 27 | 28 Condition of units (Pass/Fail) Passed_____ Failed _____ Comments/Observations

3.2 HAND FLARES

EVALUATION AND TEST REPORT

3.2.1 Submitted drawings, reports and documents

- 3.2.1.1 Quality assurance
- 3.2.1.2 Visual inspection
- 3.2.1.3 General data and specifications

3.2.2 Temperature cycling test

3.2.3 Low temperature conditioning test

3.2.4 High temperature conditioning test

3.2.5 Humidity conditioning test

3.2.6 Water and corrosion resistance test

- 3.2.6.1 1 metre immersion for 24 hours test
- 3.2.6.2 100 mm immersion for 5 minutes test
- 3.2.6.3 Salt spray test

3.2.7 Handling safety

- 3.2.7.1 2 m drop test
- 3.2.7.2 Immersion suit glove test
- 3.2.7.3 Handling safety immersion test

3.2.8 Heptane test

3.2.9 Luminous intensity test

3.2.10 Liferaft drop test

3.2.11 Safety inspection

3.2 HAND FLARES

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.1.1 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: _____ Quality Assurance Procedure: _____ Quality Assurance Manual: _____ Description of System. Quality Assurance System acceptable Yes/No Comments/Observations

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.1.2 Visual inspection		**Regulations: LSA Code I/1.2.2, 1.2.3 & III/3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination:	Red hand flares should:	
Approval markings	.1 be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions, markings are to be indelible;	Passed _____ Failed _____
Operating instructions	.2 be provided with brief instructions or diagrams clearly illustrating the use of the hand flare printed on the casing;	Passed _____ Failed _____
Outer casing	.3 not depend on adhesive tapes or plastic envelopes for its water-resistant properties;	Passed _____Failed _____
Comfort	.4 be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturers' operating instructions;	Passed _____ Failed _____
Operation	.5 be so constructed that the end from which the flare is burning can be positively identified by day or night; and	Passed _____ Failed _____
Ignition System	.6 be fitted with an integral means of ignition.	Passed _____ Failed _____
Life of Hand Flare	The Administration should determine the period of acceptability of the unit which are subject to deterioration with age.	Passed _____ Failed _____
		Comments/Observations

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.1.3 General data and specifications	**Regulations: LSA Code 1.2; MSC.81(70) 1/4.7**

General Information	**Dimensions**	**Weight**
Construction Material: Casing: _____ Top cover (if applicable): _____ Bottom Cover (if applicable): _____ Method of Ignition _____ Operational Safety Delay (if applicable) _____ Acceptable life of the item yrs	Dimensions: Length of Casing: _____ Diameter of Casing: _____	Design Weight: _____ Weight as Tested: _____ Weight of Flare Material _____ Comments/Observations

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS CONDITIONING SEQUENCE	**SPECIMEN NUMBER**									**REFERENCES**	**REMARKS**
Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	MSC81(70)	
Measuring dimensions and mass	A	A	A	A	A	A	A	A			
Temperature cycling test (3.2.2)	B									4.2.1	
Low temperature conditioning (3.2.3)		B								4.2.2	
High temperature conditioning (3.2.4)			B							4.2.3	
Humidity conditioning (3.2.5)				B						4.2.4	
1 metre immersion for 24 hours (3.2.7.1)					B					4.3.1	
100 mm for 5 min (3.2.7.2)						B				4.3.2	
Salt water spray (3.2.7.3)							B			4.3.3	
2 m Drop Test (3.2.8.1)								B		4.4.1	
Safety inspection (3.2.12)	C	C	C	C	C	C	C	C	C	4.5	
Operation at ambient temperature	D				D	D	D	D	D	4.2.1, 4.3.1, 4.3.2, 4.3.3 & 4.4.1	

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-30	References	Remarks
Operate at conditioning Temperature		D	D	D						4.2.2, 4.2.3 & 4.2.4	
Operational test using immersion suit glove (3.2.8.2)								E		/4.4.2	
Burning time of flare	E	E	E	E	E	E	E	E		4.7.1	
Flare immersion test under water (3.2.8.3)			E							4.7.1	
Heptane test (3.2.9)								E		4.7.3	
Flare material test Colour and luminosity (3.2.10)									F	4.7.2	May be carried out by an independent laboratory acceptable to the Administration & report submitted. Use specimens 29 to 30.
Liferaft Drop Test (3.2.11)									G	LSA Code Chapter IV/4.1.1.2	The liferaft manufacturer should complete this form.

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen Hand Flare.

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.2 Temperature cycling test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/1.2.1 & 4.2.1**

Test Procedure	Acceptance Criteria	Significant Test Data
The three specimens of hand flares should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day. The three hand flares after completing temperature cycling should function effectively at ambient temperature.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	1 / 2 / 3 Condition (Pass/Fail) Burn time (sec) Time delay (if applicable) (sec) Comments/Observations Passed _____ Failed _____

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.3 Low temperature conditioning test		**Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.2.2**		
Test Procedure	Acceptance Criteria	Significant Test Data		
Three specimens of hand flare should be subjected to a temperature of -30°C for at least 48 h and should then function immediately upon removal from the cold chamber.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively immediately. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	4	5	6
		Condition (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.4 High temperature conditioning test		**Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of hand flares should be subjected to a temperature of +65°C for at least 48 h and then function effectively immediately upon removal from the hot chamber.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively immediately. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	7 | 8 | 9 Condition (Pass/Fail) | | | Burn time (sec) | | | Time delay (if applicable) (sec) | | | Comments/Observations Passed_____ Failed _____

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.5 Humidity conditioning test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.2.4**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of hand flares should be subjected to a temperature of +65°C and 90% relative humidity for at least 96 h, followed by 10 days at 20°C to 25°C at 65% relative humidity.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	10 | 11 | 12 Condition (Pass/Fail) Burn time (sec) Time delay (if applicable) (sec) Comments/Observations Passed_____ Failed _____

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.6.1 1 metre immersion for 24 hours test | **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.3.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three specimens of hand flares should be immersed horizontally for 24 h under 1 m of water.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	13	14	15
		Condition (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.6.2 100 mm immersion for 5 min test | **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.3.2**

Test Procedure	Acceptance Criteria	Significant Test Data		
		16	17	18
Three specimens of hand flares should be immersed horizontally in the ready to fire condition for 5 min under 100 mm of water.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function at ambient temperature. The three flares should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	Condition (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.6.3 Salt spray test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.3.3**

Test Procedure	Acceptance Criteria	Significant Test Data		
		19	20	21
Three specimens of hand flares should be subjected to a salt spray (5% natrium chloride solution) at a temperature of +35±3°C for at least 100 h.	After the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should then function effectively.	Condition (Pass/Fail)		
		Burn time (sec)		
	The three flares should burn for a period of not less than 1 minute.			
		Time delay (if applicable) (sec)		
	The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	Comments/Observations		
Note: Natrium and Sodium are the same compound		Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.7.1 2 m drop test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.4.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three specimens of hand flare should be dropped in turn on both ends and horizontally from a height of 2 m on to a steel plate about 6 mm thick cemented on to a concrete floor.	After the test each hand flare should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and remain operable and should subsequently be operated and function effectively. They should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	22	23	24
		Condition (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.7.2 Immersion suit glove test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.2.2**

Test Procedure	Acceptance Criteria	Significant Test Data
Three specimens of hand flare should be activated in accordance with the manufacturer's operating instructions by an operator wearing an insulated buoyant immersion suit or the gloves taken from an insulated buoyant immersion suit.	The three specimens should be capable of being operated effectively without injury to the operator, or any person in close proximity during firing or burning, they must burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	19 | 20 | 21 Operation using glove (Pass/Fail) Burn time (sec) Time delay (if applicable) (sec) Type of Glove used _____ Comments/Observations Passed_____ Failed _____

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.7.3 Handling safety immersion test | **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.7.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
		7	8	9
Three hand flares should be activated and should burn for a period of not less than 1 min. After burning for 30 s each flare should be immersed horizontally under 100 mm of water for a period of 10 s and should continue to burn for at least a further 20 s.	The three specimens should operate effectively under water without injury to the operator for a period of 10 s, the flare should burn for a period of not less than 1 min. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	Under-water operation (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.8 Heptane test — **Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.7.3**

Test Procedure	Acceptance Criteria	Significant Test Data		
		22	23	24
Three hand flares should be activated at 1.2 m above a test pan 1 m square containing 2 litres of heptane floating on a layer of water. The test should be conducted at an ambient temperature of +20°C to +25°C. The flare should be allowed to burn completely.	The three specimens should not ignite the heptane. The flare should burn for a period of not less than 1 minute. The hand flare should not cause discomfort to the person holding the casing and not endanger the survival craft by burning or glowing residues when used in accordance with the manufacturer's operating instructions.	Heptane ignition (Pass/Fail)		
		Burn time (sec)		
		Time delay (if applicable) (sec)		
		Comments/Observations		
		Passed_____ Failed _____		

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.9 Luminous intensity test		**Regulations: LSA Code I/1.2 & III/3.2.2; MSC.81(70) 1/4.7.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Laboratory testing of the flare should establish that it will burn with the required luminous intensity and colour.	Laboratory testing of the flare material should establish: .1 that it will burn with an average luminous intensity of at least 15,000 cd for a period of not less than 1 minute, at temperatures from -30°C to +65°C; and .2 that the colour of the flame is vivid red with CIE coordinates x = 0.61 to 0.69 and y = 0.3 to 0.39, or computed from these coordinates: a wavelength of 608 + 11 nm. The testing laboratory report should confirm that the average luminous intensity of the flare is at least 15,000 Cd. The measured chromaticity coordinates should be within the boundaries of the area of the diagram as per CIE.	Laboratory Testing report No.:_____ Report acceptable (Yes/No):_____ Luminous intensity levels at -30°C_____KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Luminous intensity levels at +20°C_____KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Luminous intensity levels at + 65°C _____KCd Burning time of Flare_____sec Colour coordinates: x.....y..... Comments/Observations Passed_____ Failed _____

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.10 Liferaft drop test		**Regulations: LSA Code 1.2 & 4.1.1.2, MSC.81(70) I/5.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft in the operationally packed condition should be suspended and then dropped from a height of 18 m into the water. If the liferaft is to be stowed at a height greater than 18 m above the waterline in the lightest seagoing condition, it should be dropped from the height at which it is to be stowed. Note: This test sheet should be completed by the liferaft manufacturer. Reference should be made to the test sheet 4.2.4.	Damage to any item of equipment is acceptable subject to the administration being satisfied that the operational efficiency has not been impaired. After the test, each hand flare should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	25 | 26 | 27 | 28 Condition of units (Pass/Fail) | | | | Comments/Observations

Hand flares	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.2.11 Safety inspection		**Regulations: LSA Code I/1.2 & III/3.2; MSC.81(70) 1/4.5**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by visual inspection that the hand flare:		
.1 is indelibly marked with clear and precise instructions on how it should be operated and that the danger end can be identified by day or night;	Clear and precise operating instructions are marked on the hand flare and the hand flare clearly identifies the danger end.	Markings and identification of ends acceptable Passed _____ Failed _____
.2 can, if hand operated, be operated from the bottom (safe end) or that it contains an operational safety delay of 2 seconds;	If operated from the top the time delay is not to be less than 2 s.	Time delay if operated from the top_____sec Operation of specimen when wet, cold and gloved hands. Passed_____Failed _____
.3 has a simple and integral means of ignition which requires the minimum of preparation and can be readily operated in adverse conditions without external aid and with wet, cold or gloved hands;	It has a simple and integral means of ignition and can be operated by cold, wet and gloved hands.	Water resistant without the use of envelopes or adhesive tape. Passed_____Failed _____
.4 does not depend on adhesive tapes or plastic envelopes for its water-resistant properties; and	Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties.	Hand flare indelible date stamped. Passed_____Failed _____
.5 can be indelibly marked with means of determining its age.	Date of manufacturing and date of expiry indelible printed on the outside.	Comments/Observations

3.3 BUOYANT SMOKE SIGNALS

EVALUATION AND TEST REPORT

3.3.1 Submitted drawings, reports and documents

- 3.3.1.1 Quality assurance
- 3.3.1.2 Visual inspection
- 3.3.1.3 General data and specifications

3.3.2 Temperature cycling test

3.3.3 Low temperature conditioning test

3.3.4 High temperature conditioning test

3.3.5 Ambient temperature conditioning test

3.3.6 Humidity conditioning test

3.3.7 Water and corrosion resistance test

- 3.3.7.1 1 metre immersion for 24 hours test
- 3.3.7.2 100 mm immersion for 5 min test
- 3.3.7.3 Salt spray test

3.3.8 Handling safety

- 3.3.8.1 2 m drop test
- 3.3.8.2 Immersion suit glove test

3.3.9 Heptane test

3.3.10 Laboratory smoke obscuration test

3.3.11 Wave test

3.3.12 Liferaft drop test

3.3.13 Safety inspection

3.3 BUOYANT SMOKE SIGNALS

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.1.1 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality Assurance Standard Used: Quality Assurance Procedure: Quality Assurance Manual: Description of System: Quality Assurance System acceptable Yes/No Comments/Observations

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.1.2 Visual inspection	**Regulations: LSA Code I/1.2.2, 1.2.3 & III/3.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination:	Buoyant Smoke Signals should:	
Approval markings	.1 be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions, markings are to be indelible;	Passed _____ Failed _____
Operating instructions	.2 be provided with brief instructions or diagrams clearly illustrating the use of the buoyant smoke signal printed on the casing;	Passed _____ Failed _____
Outer casing	.3 not depend on adhesive tapes or plastic envelopes for its water-resistant properties;	Passed _____ Failed _____
Comfort	.4 be so designed not to ignite explosively when used in accordance with the manufacturers' operating instructions;	Passed _____ Failed _____
Operation	.5 be so constructed that the end from which the smoke is emitted can be positively identified by day or night, it should not emit flame during the entire emission time or be swamped in a seaway; and	Passed _____ Failed _____
Ignition System	.6 has a simple means of ignition which requires the minimum of preparation.	Passed _____ Failed _____
Life of Smoke Signal	The Administration should determine the period of acceptability of the unit which are subject to deterioration with age.	Comments/Observations

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.1.3 General data and specifications		**Regulations: LSA Code 1.2; MSC.81(70) 1/4.5**
General Information	**Dimensions**	**Weight**
Construction Material: Casing: _____ Top cover (if applicable): _____ Bottom cover (if applicable): _____ Method of Ignition _____ Operational Safety Delay (if applicable) _____ Acceptable life of the item yrs	Dimensions: Length of Casing: _____ Diameter of Casing: _____	Design Weight: _____ Weight as Tested: _____ Weight of smoke-generating Material _____ Comments/Observations

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS **CONDITIONING** **SEQUENCE**	**SPECIMEN NUMBER**									**REFERENCES**	**REMARKS**
Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	MSC81(70)	
Measuring dimensions and mass	A	A	A	A	A	A	A	A	A		
Temperature cycling test (3.3.2)	B	B	B							4.8.1	
Low temperature conditioning (3.3.3)	C									4.8.1	
High temperature conditioning (3.3.4)		C								4.8.1	
Ambient temperature conditioning. (3.3.5)			C							4.8.1	
Humidity conditioning (3.3.6)				C						4.2.4	
1 metre immersion for 24 hours (3.2.7.1)					C					4.3.1	
100 mm for 5 minutes (3.2.7.2)						C				4.3.2	
Salt water spray (3.2.7.3)							C			4.3.3	
2 m Drop Test (3.3.8.1)								C		4.4.1	
Safety inspection (3.3.13)	D	D	D	D	D	D	D	D		4.5	

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Specimen No. ->	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-26	References	Remarks
Operation at ambient temperature			E		E	E	E	E		4.3.1, 4.3.2, 4.3.3 & 4.4.1, 4.8.1	
Operate at conditioning Temperature	E	E		E						4.2.4 4.8.1	
Operational test using immersion suit glove (3.3.8.2)							F			4.4.2	
Heptane test (3.3.9)								F		4.8.2	
Smoke material test Smoke obscuration (3.3.10)										4.8.3	Additional smoke signals may be submitted to an independent laboratory acceptable to the Administration and report submitted.
Wave height test (3.3.11)				G						4.8.4	
Smoke emission time: 3 min minimum, Smoke colour	H	H	H	H	H	H	H	H		4.8.1	
Drop Test (3.3.12) & (4.2.4)									I	LSA Code Chapter IV/ 4.1.1.2	The liferaft manufacturer should complete this form.

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen Buoyant Smoke Signal.

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.2 Temperature cycling test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/1.2.1 & 4.8.1**

Test Procedure	Acceptance Criteria	Significant Test Data
The 9 specimens of smoke signals should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in one day; .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day.	After 10 alternating cycles each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties and should function effectively immediately.	1 | 2 | 3 Condition (Pass/Fail) | | | 4 | 5 | 6 Condition (Pass/Fail) | | | 7 | 8 | 9 Condition (Pass/Fail) | | | Comments/Observations Passed_____ Failed _____

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.3 Low temperature conditioning test		**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.1**		
Test Procedure	Acceptance Criteria	Significant Test Data		
		1	2	3
Three smoke signals that have undergone temperature cycling should be taken from a stowage temperature of -30°C, be activated and operate in seawater at a temperature of -1°C.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The 3 specimens of smoke signals should function effectively, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10 Acceptance Criteria.	Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission quality (Continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.4 High temperature conditioning test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
		4	5	6
Three smoke signals that have undergone temperature cycling should be taken from a stowage temperature of +65°C, be activated and operate in seawater at a temperature of +30°C.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The 3 specimens of smoke signals function effectively, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturers' operating instructions, not emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10 Acceptance Criteria.	Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission quality (Continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.5 Ambient temperature conditioning test | **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
		7	8	9
Three smoke signals that have undergone temperature cycling should be taken from ordinary room conditions and activated. After emitting smoke for 1 minute they should be fully submerged for a period of not less than 10 seconds.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The 3 specimens of smoke signals should function effectively, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, not emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission during submerge test (Pass/Fail)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.6 Humidity conditioning test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.2.4**

Test Procedure	Acceptance Criteria	Significant Test Data		
		10	11	12
Three specimens of smoke signals should be subjected to a temperature of +65°C and 90% relative humidity for at least 96 h, followed by ten days at 20°C to 25°C at 65% relative humidity.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The 3 specimens should function effectively, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturers' operating instructions, not emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour(Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission quality (continuous/intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.7.1 1 metre immersion for 24 hours test	**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.3.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three specimens of smoke signals should be immersed horizontally for 24 h under 1 m of water and then subjected to the function test at ambient temperature.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The three specimens should function effectively, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, not emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	13	14	15
		Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission (Continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.7.2 100 mm immersion for 5 min test | **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.3.2**

Test Procedure	Acceptance Criteria	Significant Test Data		
		16	17	18
Three specimens of smoke signals should be immersed in the ready to fire condition for 5 minutes under 10 cm of water and then subjected to the function test at ambient temperature.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The three specimens should function correctly, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturers' operating instructions, not emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	Condition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission (continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.7.3 Salt spray test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.3.3, 4.4.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
		19	20	21
Three specimens of smoke signal should be subjected to a salt spray (5% natrium* chloride solution) at a temperature of +35±3°C for at least 100 h and then subjected to the function test at ambient temperature.	After conditioning each specimen should no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties.	Condition (Pass/Fail)		
	The three specimens should function correctly, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water.	Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
	The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time.	Time delay (if applicable) (sec)		
		Smoke emission (Continuous/Intermittent)		
	The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	Comments/Observations		
*Note: Natrium and sodium are the same compound.		Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.8.1 2 m drop test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.4.1**

Test Procedure	Acceptance Criteria	Significant Test Data

Three specimens of buoyant smoke signal should be dropped in turn end-on and horizontally from a height of 2 m on to a steel plate about 6 mm thick cemented on to a concrete floor.

The three specimens should remain in a safe condition after the 2 m Drop Test and should function effectively.

The three specimens should function correctly, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water.

The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time.

The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.

	22	23	24
Condition (Pass/Fail)			
Smoke emission time (min/sec)			
Smoke colour (Pass/Fail)			
Time delay (if applicable) (sec)			
Smoke emission (Continuous/Intermittent)			

Comments/Observations

Passed_____ Failed _____

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.8.2 Immersion suit glove test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.4.2**

Test Procedure	Acceptance Criteria	Significant Test Data		
		19	20	21
Three specimens of buoyant smoke signals should be activated in accordance with the manufacturer's operating instructions by an operator wearing an insulated buoyant immersion suit or the gloves taken from an insulated buoyant suit.	The three specimens should be capable of being operated effectively without injury to the operator, or any person in close proximity, during firing or burning. The three specimens should function correctly, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	Condition (Pass/Fail)		
		Glove operation (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission (Continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.9 Heptane test — **Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.2**

Test Procedure	Acceptance Criteria	Significant Test Data		
		22	23	24
Three smoke signals should function in water covered by 2 mm layer of heptane.	The three specimens should not ignite the heptane, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes when floating in calm water. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.			
		Heptane ignition (Pass/Fail)		
		Smoke emission time (min/sec)		
		Smoke colour (Pass/Fail)		
		Time delay (if applicable) (sec)		
		Smoke emission (continuous/Intermittent)		
		Comments/Observations Passed_____ Failed _____		

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.10 Laboratory smoke obscuration test		**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Three additional specimens from the same lot should be used. The smoke density and colour of the smoke signal should be determined by laboratory testing conducted at a water temperature of +20°C to +25°C as follows: The smoke should be drawn through an apparatus consisting of a 190 mm diameter duct with a fan capable of producing an entrance air flow of 18.4 m^3/min. By means of a light source with at least 10 cd on one side of the tunnel and a photoelectric cell on the other side the density of the passing smoke should be recorded. If the photocell picks up the total emitted light from the light source, then the smoke density is zero percent which means that no smoke is passing through the tunnel. The smoke density is then considered to be 100% when the photocell is not able to pick up any light of the light source through the passing smoke in the tunnel. From the amount of light which the photocell is able to pick up the smoke density should be calculated. Before each measurement, the light intensity of the 100% value should be checked. Each measurement should be recorded.	Smoke density should be at least 70% throughout the minimum emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. The colour comparison chart should have a gloss or matte finish, and consist of a series of at least five orange colour chips, covering the range from reddish orange (Munsell notation 8.75 R 6/14) to yellowish orange (Munsell notation 5 YR MAX) in gradual steps of hue, chroma, and lightness. The colour chips should be secured adjacent to one another, in order of progression from reddish orange to yellowish orange, and extend on at least one side to the edge of the chart. Each colour chip should be at least 50 mm x 100 mm in size. Note: 1. A typical acceptable progression would be 8.75 R 6/14; 10 R 6/14; 1.25 YR 6/14; 3.75 YR MAX; 5 YR MAX. 2. ASTM D1535-97 specifies a method to convert between Munsell notation and CIE coordinates.	Laboratory Testing Report No. Report acceptable (Yes/No) Smoke obscuration rate achieved at –30°C_____% Burning time of smoke signal_____sec Smoke obscuration rate achieved at +20°C to +25°C_____% Burning time of smoke signal_____sec Smoke obscuration rate achieved at +65°C: _____% Burning time of smoke signal _____ sec Comments/Observations Passed_____Failed _____

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.11 Wave test	**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.8.4**

Test Procedure	Acceptance Criteria	Significant Test Data
A smoke signal should be tested in waves at least 300 mm high and should be allowed to burn completely.	The three specimens should function correctly, they should emit smoke of a highly visible colour at a uniform rate for a period of not less than 3 minutes. The buoyant smoke signal should not ignite explosively when used in accordance with the manufacturer's operating instructions, nor emit any flame during the entire smoke emission time. The colour of the orange smoke should be evaluated by means of visual comparison, in daylight, to a colour comparison chart containing the range of acceptable orange colours. Refer to the acceptance criteria on test form 3.3.10.	10 | 11 | 12 Smoke emission time (min/sec) Smoke colour (Pass/Fail) Time delay (if applicable) (sec) Smoke emission (continuous/Intermittent) Comments/Observations Passed_____ Failed _____

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.12 Liferaft drop test		**Regulations: LSA Code 1.2 & 4.1.1.2, MSC.81(70) I/5.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft in the operationally packed condition should be suspended and then dropped from a height of 18 m into the water. If the liferaft is to be stowed at a height greater than 18 m above the waterline in the lightest seagoing condition, it should be dropped from the height at which it is to be stowed. Note: This test sheet should be completed by the liferaft manufacturer. Reference should be made to the test sheet 4.2.4.	Damage to any item of equipment is acceptable subject to the administration being satisfied that the operational efficiency has not been impaired. After the test, each buoyant smoke signal should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	25 | 26 | | Condition of units (Pass/Fail) | | | Comments/Observations

Buoyant smoke signals	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

3.3.13 Safety inspection	**Regulations: LSA Code I/1.2 & III/3.3; MSC.81(70) 1/4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by visual inspection that the buoyant smoke signal:		
.1 is indelibly marked with clear and precise instructions on how it should be operated and that the danger end can be identified by day or night;	Clear and precise operating instructions are marked on the buoyant smoke signal and the buoyant smoke signal clearly identifies the danger end.	Markings and identification of ends acceptable Passed _____ Failed _____
.2 can, if hand operated, be operated from the bottom (safe end) or that it contains an operational safety delay of 2 seconds;	It operated from the top the time delay is not to be less than 2 s.	Time delay if operated from the top _____ sec
.3 has a simple means of ignition which requires the minimum of preparation and can be readily operated in adverse conditions without external aid and with wet, cold or gloved hands;	It has a simple means of ignition and can be operated by cold, wet and gloved hands.	Operation of specimen when wet, cold and gloved hands. Passed _____ Failed _____
.4 does not depend on adhesive tapes or plastic envelopes for its water-resistant properties; and	Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties.	Water resistant without the use of envelopes or adhesive tape. Passed _____ Failed _____
5. can be indelibly marked with means of determining its age.	Date of manufacturing and date of expiry indelible printed on the outside.	Buoyant smoke signal indelible date stamped. Passed _____ Failed _____ Comments/Observations

_____

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MSC.1/Circ.1630
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (SURVIVAL CRAFT)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter IV of the LSA Code, i.e. survival craft (inflatable liferafts; rigid liferafts; components for survival craft; davit-launched lifeboats; and free-fall lifeboats).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed, revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

DRAFT REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (SURVIVAL CRAFT)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and the Revised recommendation, as amended. In the case of inconsistency between the forms and the LSA Code or the Revised recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customizing the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or the Revised recommendation have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (SURVIVAL CRAFT)

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4.1 INFLATABLE LIFERAFTS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.1.1 General data and specifications	**Regulations: -**
Cylinder:	
Release head:	
Fabric:	

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.2 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable: Yes/No Comments/Observations:

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.3 Visual inspection		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a thorough visual inspection. The following items should be confirmed during the inspection: - proper workmanship - suitable materials - rot proof, corrosion resistant - not affected by seawater, oil or fungal attack - resistant to sunlight - highly visible colour - retro reflective tape to be as per resolution A.658(16) - safely used in a seaway - certification - whether the light is activated when carrying out insulation test	All materials should be properly certificated Be of an international or vivid reddish orange, or at a comparably highly visible colour on all parts where this will assist detection at sea	Passed_____ Failed _____ Comments/Observations

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.4 Drop test		**Regulations: LSA Code IV/4.1.1.2; MSC.81(70) 1/5.1.1 – 5.1.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Each type of liferaft should be subjected to a minimum of two drop tests. Where the liferaft in its operational condition is packed in a container or valise, one such test should be carried out with the liferaft packed in each type of container or valise in which the manufacturer proposes to mark it. The liferaft, in the operational packed condition, should be suspended and then dropped from a height of 18 m into the water. If it is to be stowed at a height greater than 18 m, it should be dropped from the height at which it is to be stowed. The free end of the painter should be attached to the point of suspension so that it pays out as the liferaft drops, thus simulating actual conditions. The liferaft should be left floating for 30 min. It should then be inflated. The liferaft should be lifted from the water to permit thorough inspection of the liferaft, the contents of the equipment container and, where applicable, the container or valise.	The liferaft should inflate upright and in the time prescribed in 4.1.21. Damage to the container or valise, if the liferaft is normally within it when launched, is acceptable provided the Administration is satisfied that it would not be a hazard to the liferaft. Damage to any item of equipment is acceptable subject to the Administration being satisfied that the operational efficiency has not been impaired. Damage to freshwater receptacles may be accepted provided they do not leak. However, for drop tests from heights exceeding 18 m leakage from up to 5% of the receptacles may be accepted provided that: the equipment list for the liferaft specifies the carriage of 5% excess water or means of desalination adequate to produce an equivalent amount; or the water receptacles are contained in a waterproof overwrap. * If any additional equipment was placed in the liferaft for this test, e.g. SART, state type and condition of the equipment after the test. Unless the liferaft is a davit-launched type or to be fitted on a passenger ship, does the sea anchor deploy automatically upon inflation?	Container details: - Type of emergency pack Inflation system details: Height of drop _____ m Painter length _____ m Floating position: Inflation times: Container open after_____ sec Boardable after _____ sec Relief valves venting: _____ sec Internal lights activate after _____ sec External lights activate after _____ sec Condition: Container Liferaft *Equipment Passed _____ Failed _____ NA Comments/Observations

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.5 Jump test		**Regulations: LSA Code IV/4.1.1.3; MSC.81(70) 1/5.2.1 - 5.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a person can jump on to the liferaft, with and without the canopy erected, from a height above the floor of at least 4.5 m without damaging the liferaft. The test subject should weigh not less than 82.5 kg and should be wearing hard bottom shoes with smooth soles and no protruding nails. The number of jumps performed should be equal to the total number of persons for which the liferaft is to be approved. The jump test may be simulated by dropping a suitable and equivalent mass, arranged so as to impact the liferaft with shoes as described in the above paragraph. Unless the configurations of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	There should be no torn fabric, or damage to seams as a result of the test.	Number of jumps _____ Height of jump _____ Weight of dummy _____ Condition of raft during and after test: Tested both sides? Yes _____ No _____ Comments/Observations Passed _____ Failed _____

4.1.6 Weight test		**Regulations: LSA Code IV/4.1.2.2; MSC.81(70) 1/5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully packed liferaft container should be weighed to determine whether its mass exceeds 185 kg. The weight test should be performed on the heaviest variation of the liferaft, considering different containers and equipment packs, which may be used. If the mass exceeds 185 kg, the different combinations of containers and equipment packs should be weighed to determine which will and which will not exceed 185 kg.		Type A Type B Emergency pack type: _____ _____ Measured liferaft weight _____ _____kg Comments/Observations

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.7 Towing test		**Regulations: LSA Code IV/4.1.1.4; MSC.81(70) 1/5.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by towing that the fully loaded and equipped liferaft is capable of being satisfactorily towed at speeds of up to 3 knots in calm water. Towing should be by a line attached to the liferaft's towing connection. The sea anchor should be streamed while the liferaft is towed. The liferaft should be towed for a distance of at least 1 km. Record the towing strain at 2 knots and 3 knots and include on the Type Approval certificate.	It should be shown that the liferaft can be satisfactorily towed at a speed of up to 3 knots with the anchor streamed without significant damage.	Speed during test _____knots Sea anchor streamed: Yes_____ No _____ Raft towing connections: Distance covered: Total Load in raft: Towing strain at 2 knots _____ kN Towing strain at 3 knots _____ kN Sea state _____ Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.8 Mooring out tests		**Regulations: LSA Code IV/4.1.1.1; MSC.81(70) 1/5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The liferaft should remain afloat in that location for 30 days. In the case of an inflatable liferaft, the pressure may be topped up once a day using the manual pump; however, during any 24 h period the liferaft should retain its shape.	The liferaft should not sustain any damage that would impair its performance. After this test, the inflatable liferaft should be subjected to the pressure test prescribed in 4.1.22.	Location _____ Mooring out period _____ days Number of times pressure topped up and dates:_____ Condition of liferaft: Pressure test results: Comments/Observations Pressure test results: _____ Passed _____ Failed _____

4.1.9 Liferaft painter system test		**Regulations: LSA Code IV/4.1.6.1, 4.1.3.2; MSC.81(70) 1/5.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The painter system including attachments should be tensile tested.	Liferaft painter system and attachments should have a breaking strain as follows: - Not less than 7.5 kN for liferafts to carry up to 8 persons Not less than 10.0 kN for liferafts to carry 9 to 25 persons Not less than 15.0 kN for liferafts to carry 26 persons or more	Number of persons: - Testing strain on painter system: Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.10 Weak link strength test		**Regulations: LSA Code IV/4.1.6.2; MSC.81(70) 1/5.15**
Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be tensile tested.	A weak link in the painter system should have a breaking strain of 2.2 ± 0.4 kN and not be broken by the force required to pull the painter from the liferaft container. (Refer to HRU test form 4.3.1.11.) If applicable, be of sufficient strength to permit the inflation of the liferaft.	Measured breaking strain of weak link: _____ kN Comments/Observations Passed _____ Failed _____

4.1.11 Loading and seating test		**Regulations: LSA Code IV/4.2.3; MSC.81(70) 1/5.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the liferaft in the light condition, including its full equipment but no personnel, should be recorded. The freeboard of the liferaft should again be recorded when the number of persons for which the liferaft is to be approved, having an average mass of 82.5 kg, and each wearing immersion suit and a lifejacket, have boarded and are seated. It should be established that all the seated persons have sufficient space and headroom and it should be demonstrated that the various items of equipment can be used within the life raft in this condition and, in the case of an inflated liferaft, with the floor inflated. Unless the configurations of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	All the seated persons should have sufficient space and headroom and the various items of equipment can be used within the liferaft in this condition and, in the case of an inflated liferaft, with the floor inflated. The freeboard, when loaded with the mass of the number of persons for which it is to be approved and its equipment, with the liferaft on an even keel and, in the case of an inflatable liferaft, with the floor not inflated, should not be less than 300 mm.	Type of lifejackets used? Inherent buoyancy_____ Inflatable _____ Immersion suits used? Insulated _____ Uninsulated _____ Freeboards: Light 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Loaded 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Number of persons seated _____ Equipment accessible and usable? YES_____ NO_____ Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.12 Boarding test		**Regulations: LSA Code IV/4.2.4; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be carried out in a swimming pool by a team of not more than four persons who should be of mature age and of differing physiques as determined by the Administration. Preferably they should not be strong swimmers. For this test they should be clothed in shirt and trousers or a boiler suit and should wear approved lifejackets suitable for an adult. They must each swim about 100 m before reaching the liferaft for boarding. There must be no rest period between the swim and the boarding attempt. Boarding should be attempted by each person individually with no assistance from other swimmers or persons already in the liferaft. The water should be of a depth sufficient to prevent any external assistance when boarding the liferaft. If the liferaft is of the canopied reversible type, then both sides should be tested, unless the configuration of both sides are identical.	The arrangements will be considered satisfactory if three of the persons board the liferaft unaided and the fourth boards with the assistance of any of the others.	Record particulars of persons: Age Height Weight P1 _____Y _____m_____kg P2 _____Y _____m_____kg P3 _____Y _____m_____kg P4 _____Y _____m_____kg Boarded unaided: _____ persons Boarded aided: _____ persons Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.13 Closing arrangement test		**Regulations: LSA Code IV/4.1.1.5.3; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be repeated with persons clothed in immersion suits and lifejackets. After the boarding test a person clothed in approved immersion suit should demonstrate that the entrance can be easily and quickly closed in 1 minute and can be easily and quickly opened from inside and outside in 1 minute. If the liferaft is of the canopied reversible type, then both sides should be tested, unless the configuration of both sides are identical.	3 out of 4 persons wearing immersion suit and lifejackets must board the liferaft unaided. The entrance should be easily closed in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from inside in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from outside in less than 1 min. by a person wearing an approved immersion suit.	Record particulars of persons: Age Height Weight P1 _____Y _____m _____kg P2 _____Y _____m_____kg P3 _____Y _____m_____kg P4 _____Y_____m_____kg Boarded unaided: _____ persons Boarded aided: _____ persons Closing time: _____ sec Open time inside: _____ sec Open time outside: _____ sec Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.14 Stability test		**Regulations: LSA Code IV/4.2.5; MSC.81(70) 1/5.9.1 & .2**
Test Procedure	Acceptance Criteria	Significant Test Data
.1 The number of persons for which the liferaft is to be approved should be accommodated on one side and then at one end and in each case the freeboard should be recorded. Under these conditions the freeboard should be such that there is no danger of the liferaft being swamped. .2 The stability of the liferaft during boarding may be ascertained as follows: two persons each wearing approved lifejackets should board the empty liferaft. It should then be demonstrated that the two persons in the liferaft can readily assist from the water a third person who is required to feign unconsciousness. The third person must have his back towards the entrance so that he cannot assist the rescuers.	Each freeboard measurement should be taken from the waterline to the top surface of the uppermost main buoyancy tube at its lowest point. It should be demonstrated that the water pockets adequately counteract the upsetting moment on the liferaft and there is no danger of the liferaft capsizing.	Freeboards with all persons on one side: 12 o'clock_____mm 3 o'clock_____mm 6 o'clock_____mm 9 o'clock_____mm Observations when boarding: persons: _____ unconscious person:_____ Effect of water pockets: Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.15 Manoeuvrability test		**Regulations: LSA Code IV/4.1.5.1.6; MSC.81(70) 1/5.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that with the paddles provided, the liferaft is capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	The liferaft should be capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	Distance manoeuvred:_____m Comments/Observations Passed _____ Failed _____

4.1.16 Swamp test		**Regulations: LSA Code; MSC.81(70) 1/5.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the liferaft, when fully swamped, is capable of supporting its full equipment and the number of persons for which it is to be approved. During this test self-draining arrangements fitted in the floor of the liferaft are to be closed to prevent the ingress of water.	The liferaft when fully swamped, should be capable of supporting its full equipment and the number of persons for which it is to be approved. The liferaft should not seriously deform in this condition. Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	Loaded liferaft swamped Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Deformation _____ If self-bailing, time to self-bail: _____ min Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.17 Canopy closure test		**Regulations: LSA Code IV/4.1.1.5; MSC.81(70) 1/5.12**
Test Procedure	Acceptance Criteria	Significant Test Data
To ensure the effectiveness of the canopy closures in preventing water entering the liferaft, the efficiency of the closed entrances should be demonstrated by means of a hose test or by any other equally effective method. The requirement for the hose test is that about 2,300 l of water per minute be directed at and around the entrances through a 63.5 mm hose from a point 3.5 m away and 1.5 m above the level of the buoyancy tubes for a period of 5 min.	The accumulation of water inside the liferaft should not exceed 4 l. Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft.	Capacity of water hose____l/min Condition of canopy during test: Liters of water accumulated Comments/Observations Passed _____ Failed _____

4.1.18 Buoyancy of float-free liferafts test		**Regulations: LSA Code; MSC.81(70) 1/5.13**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the liferafts packed in containers, which are float-free, have sufficient inherent buoyancy to inflate the liferaft by means of the actuating line in the event of the ship sinking. The combination of equipment and container or valise should be that which produces the maximum packed weight.	The liferaft packed in container should have sufficient inherent buoyancy to inflate the liferaft by means of the actuating line in the event of the ship sinking.	Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.19 Damage test		**Regulations: LSA Code; MSC.81(70) 1/5.17.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that, in the event of any one of the buoyancy compartments being damaged or failing to inflate, the intact compartment or compartments should support, with positive freeboard over the liferaft's periphery, the number of persons for which the liferaft is to be approved. This can be demonstrated with persons each having a mass of 82.5 kg and seated in their normal positions or by an equally distributed mass.	The intact compartments should support, with positive freeboard over the liferaft's periphery, the number of persons for which the liferaft is to be approved, with any one of the buoyancy compartments deflated. _____=> Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm	Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.20 Righting test (conventional liferaft)		**Regulations: LSA Code IV/4.2.5.2; MSC.81(70) 1/5.17.2.1 - .4**
Test Procedure	Acceptance Criteria	Significant Test Data
For this test the liferaft should be inverted so as to simulate inverted inflation. .1 The inflatable liferaft should be loaded with its heaviest equipment pack. All of the entrances, ports, and other openings in the liferaft canopy should be open in order to allow the infiltration of water into the canopy when capsized. .2 The canopy of the liferaft should then be completely filled with water, if necessary, by partially collapsing the canopy support, or alternatively the uninflated liferaft should be flaked out onto the surface of the water upside down and inflation initiated. An automatically self-righting liferaft should self-right in this condition and should become boardable in the upright position within 1 min after the start of the test. If the inflatable liferaft, other than automatically self-righting liferafts, does not self-right, it should be allowed to remain in an inverted position for at least 10 min before righting is attempted.	The righting arrangements will be considered satisfactory if each person rights the liferaft unaided. There should be no damage to the structure of the inflatable liferaft, and the equipment pack should remain secured in its place. (See form 4.1.31 for self-righting)	

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.20 Righting test (conventional liferaft) (continued)		**Regulations: LSA Code IV/4.2.5.2; MSC.81(70) 1/5.17.2.1 - .4**
Test Procedure	Acceptance Criteria	Significant Test Data
.3 The righting test should be carried out by the same team of persons required for the boarding test similarly clothed and wearing lifejackets and after completing the swim required in 4.1.12. At least one of the persons righting the inflatable liferaft should weigh less than 82.5 kg. Each person should attempt to right the liferaft unaided. The water should be of sufficient depth to give no external assistance to the swimmers when mounting the inverted liferaft.	The righting arrangements will be considered satisfactory if each person rights the liferaft unaided. There should be no damage to the structure of the inflatable liferaft, and the equipment pack should remain secured in its place. (See form 4.1.31 for self-righting)	1st person righting test _____ 2nd person righting test _____ 3rd person righting test _____ 4th person righting test _____ results with pack A and B Damage to raft _____ Details of persons Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.21 Inflation test		**Regulations: LSA Code; MSC.81(70) 1/ 5.17.3 to 5.17.6**
Test Procedure	Acceptance Criteria	Significant Test Data
A liferaft, packed in each type of container, should be inflated by pulling the painter and the time recorded: - .1 for it to become boardable, i.e. when buoyancy tubes are inflated to full shape and diameter. .2 for the cover to be erect; and .3 for the liferaft to reach its full operational pressure when tested: .1 at an ambient temperature of between 18°C and 20°C; .2 at a temperature of -30°C; and .3 at a temperature of +65°C. For the inflation test at -30°C the packed liferaft should be kept at room temperature for at least 24 h, then placed in a refrigerated chamber at a temperature of -30°C for 24 h prior to inflation by pulling the painter. Two liferafts should be subject to an inflation test at this temperature.	When inflated in an ambient temperature of between 18°C and 20°C it should achieve total inflation in not more than 1 min. In the case of automatic self-righting liferaft, the liferaft should achieve total inflation and be boardable in the upright position in not more than 1 min, regardless of the orientation in which the liferaft inflates. When inflated at -30°C the liferaft should reach working pressure in 3 min. There should be no seam slippage, cracking, or other defect in the liferaft and it should be ready for use after the tests. When inflated at +65°C the gas pressure relief valves must be of sufficient capacity to prevent damage to the liferaft by excess pressure and to prevent the maximum pressure during the inflation from reaching twice the re-seat pressure of the release valve. There must be no seam slippage, cracking or other defect in the liferaft. The force to pull out the painter should not be more than 150 N.	1) Force to pull the painter _____ N Inflation times: Air temperature _____°C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____ MPa 2) Cold temperature _____°C Hours: _____ h Inflation times: - Raft 1 Raft 2 Air temperature _____°C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____ MPa 3) Hot temperature _____°C Hours: _____ h Inflation times: - Air temperature _____°C Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec

4.1.21 Inflation test	**Regulations: LSA Code; MSC.81(70) 1/ 5.17.3 to 5.17.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
		Lights int./ext. _____/_____sec Working Pressure _____ Mpa Peak pressure _____ Mpa Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.21 Inflation test (continued)		**Regulations: LSA Code; MSC.81(70) 1/5.17.4 - .6**
Test Procedure	Acceptance Criteria	Significant Test Data
For the inflation test at +65°C the packed liferaft should be kept at room temperature for at least 24 h, then placed in a heating chamber at a temperature of +65°C for not less than 7 h prior to inflation by pulling the painter. Force to pull out painter should be measured at ambient temperature.		Hot temperature: _____ °C Hours:_h Inflation times: - Air temperature__°C Container open__sec Boardable: _____ sec Relief valves: Upper open: _____sec Lower open: _____ sec Lights int./ext.___/ sec Working Pressure: _____ Mpa Peak pressure: _____ Mpa Comments/Observations: Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.22 Pressure test		**Regulations: LSA Code; MSC.81(70) 1/5.17.7 & 5.17.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Each inflatable compartment in the liferaft should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable liferaft and the inflation source removed. The test should continue for at least 30 min. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completely stretched due to the inflation pressure and achieved equilibrium. The term "operational pressure" has the same meaning as the term "working pressure"; i.e. the pressure determined by the designed reseat pressure of the relief valves, if fitted, except that, if the actual reseat pressure of the relief valves, determined by testing, exceeds the designed reseat pressure by more than 15%, the higher figure should be used.	The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defects in the liferaft.	Design WP _____ Design temp _____°C Design atmos. _____bar 3 times WP _____ Pressure drop after 30 min _____ Above should cover each compartments 1, 2 3, etc. Damage recorded: _____ _____ Floor: Design pressure _____ Pressure drop after 1 hour _____ Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.23 Detailed inspection		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a detailed inspection to verify that it complies with to requirements of the LSA-code.	The liferaft should comply with the requirements of the LSA Code in all respects including: interior not to cause discomfort to occupants at least one viewing port means for collection rainwater sufficient headroom 8 persons at least two entrances equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content at least one boarding ramp means to assist a person to pull themselves into the liferaft container markings marking on raft.	If provided, boarding ladders: interior not to cause discomfort to occupants _____ at least one viewing port _____ means for collection rainwater _____ sufficient headroom _____ 8 persons at least two entrances _____ equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content _____ at least one boarding ramp _____ means to assist a person to pull themselves into the liferaft _____ container markings _____ marking on raft _____ means to change ship's name & Port of Registry without opening containers? YES/NO Comments/Observations Passed _____ Failed _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.24 Lifting components strength test		**Regulations: LSA Code IV/4.2.8; MSC.81(70) 1/5.16.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The breaking strength of the webbing or rope and the attachments to the liferaft used for the lifting bridle should be established by tests on three separate pieces of each different item.	The combined strength of the lifting bridle components should be at least six times the mass of the liferaft when loaded with the number of persons for which it is to be approved and its equipment.	Combined strength of lifting bridle components: Mass of liferaft when loaded with the number of persons for which it is to be approved: _____ kg Calculated safety factor: _____ Method of determining safety factor: Comments/Observations Passed: _____ Failed: _____

4.1.25 Impact test		**Regulations: LSA Code; MSC.81(70) 1/5.16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment. With the liferaft in a free hanging position it should be pulled laterally to a position so that when released it will strike a rigid vertical surface at a velocity of 3.5 m/s. The liferaft should then be released to impact against the rigid vertical surface. Note: The liferaft should be lifted up 650 mm.	After this test the liferaft should show no signs of damage which would affect its efficient functioning.	Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.26 Drop test		**Regulations: LSA Code; MSC.81(70) 1/5.16.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft, loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment, should be suspended from an on-load release at a height of 3 m above the water, be released and allowed to fall freely into the water. The liferaft should then be examined.	The liferaft should sustain no damage, which would affect its efficient functioning.	Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.27 Davit-launched liferaft boarding test		**Regulations: LSA Code; MSC.81(70) 1/5.16.4**
Test Procedure	Acceptance Criteria	Significant Test Data
A davit-launched liferaft should, in addition to the boarding test prescribed in 4.1.12, be subjected to the following test. The liferaft, hanging from a launching appliance or from a crane with a head sheave of similar height and bowsed into the ship's side or simulated ship's side. The liferaft should then be boarded by the number of persons for which it is to be approved of average mass 82.5 kg. There should be no undue distortion of the liferaft. The bowsing should then be released and the liferaft left hanging for 5 min. It should then be lowered to the sea or floor and unloaded. At least three tests are required in succession, with the hook of the lowering appliance so positioned that its distance from the ship's side is: .1 half the beam of the liferaft +150 mm; .2 half the beam of the liferaft; and .3 half the beam of the liferaft -150 mm. The boarding, which is intended to simulate actual shipboard conditions, should be timed and the time recorded.	There should be no undue distortion of the liferaft. The boarding should be timed and the time recorded.	Test 1: Boarding time: Distortion: Test 2: Boarding time: Distortion: Test 3: Boarding time: Distortion: Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.28 Davit-launched inflatable liferafts – Strength test		**Regulations: LSA Code; MSC.81(70) 1/5.17.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by an overload test on the liferaft hanging from its centre support that the bridle system has an adequate factor of safety as follows: .1 the liferaft should be placed in a temperature of 20±3°C for a period of at least 6 h; .2 following this period of conditioning, the liferaft should be suspended from its lifting hook or bridle and the buoyancy chambers (not including an inflatable floor) inflated; .3 when fully inflated and when the relief valves have re-seated themselves, all relief valves should be made inoperative; .4 the liferaft should then be lowered and loaded with a distributed mass equivalent to four times the mass of the number of persons for which it is to be approved and its equipment, the mass of each person being taken as 82.5 kg; .5 the liferaft should then be raised and remain suspended for at least 5 min; .6 the pressure before and after the test after the weight is removed and while it remains suspended, should be recorded; and .7 any dimensional deflections or distortions of the liferaft should be recorded.	During the test and after its completion, the inflatable liferaft should remain suitable for its intended use.	Conditioning: temperature: _____ °C time in temperature: ____ h number of persons: _____ load: _____ kg time suspended: _____ min pressure before loading: _____ pressure suspended/loaded: _____ pressure after test after unloading: _____ dimensional deflections or distortions: Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.29 Cold overload test		**Regulations: LSA Code; MSC/Circ.809 Annex3; MSC.81(70) 1/5.17.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated, after a period of 6 h in a chamber at a temperature of -30°C, that the liferaft will support a load of 1.1 times the number of persons for which it is to be approved and its equipment with all relief valves operative. The liferaft should be loaded with the test weight in the refrigerated chamber. The floor should not be inflated. The loaded inflatable liferaft should remain suspended for at least 5 min. If the inflatable liferaft must be removed from the chamber in order to suspend it, the inflatable liferaft should be suspended immediately upon removal from the chamber.	During the test and after it its completion, the inflatable liferaft should remain suitable for its intended use.	Conditioning: time in cold chamber: temperature in cold chamber: _____ °C number of persons: test weight: _____ kg (Relief valves operative/floor not inflated) time suspended: _____ min. Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.30 Lowering abrasion test		**Regulations: LSA Code; MSC/Circ.809 Annex3; MSC.81(70) 1/5.17.12**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable liferaft should be loaded with a weight equal to the mass of its heaviest equipment pack and the number of persons for which it is to be approved, the mass of each person being taken as 82.5 kg. Except for the floor, which should not be inflated, the inflatable liferaft should be fully inflated with all relief valves operative. A liferaft should be lowered for a distance of at least 4.5 m in continuous contact against a structure erected to represent the side of a ship having a 20° adverse list. The height of the point from which the hook is suspended should be comparable to that of a shipboard launching appliance	During the test and after its completion, the liferaft should not sustain damage or distortion, or assume a position, which would render it unsuitable for its intended purpose.	Number of persons Load: _____ kg Height of the head sheave: _____ mm Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.31 Self-righting test (self-righting liferafts only) | **Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.18**

Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the liferaft about a longitudinal axis to any angle of heel in calm water and then release it. The liferaft should be fully inflated and fully equipped, with no one on board, with entrances and openings in the as-packed condition and, in the case of an inflatable liferaft, fully inflated. The liferaft should be incrementally rotated to angles of heel up to and including 180° and should be released.	After release the liferaft should automatically return to the upright position without assistance. Righting action should be positive and continuous, and complete righting should occur within the time difference between the liferaft reaching boardable shape, as determined by 4.1.21 at ambient temperature and at 1 minute.	The liferaft returned to upright position from the following angles of heel: + 45° ____ - 45° ____ + 90° ____ - 90° ____ + 135° ____ - 135° ____ + 180° ____ Comments/Observations Righting action: Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.32 Submergence test (self-righting liferafts only)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.19**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft in its packed condition, should be submerged to a depth of at least 4 m. A rigid liferaft should be released at this depth, and, if an inflatable liferaft, initiate inflation at this depth, so as to simulate automatic float-free operation. The liferaft should float to the surface and come to its designed operational condition ready to be boarded from the sea in a sea state of at least 2 metres significant wave height in association with a wind force of Beaufort force 6.	The liferaft should float to the surface and come to its designed operational condition ready to be boarded.	Significant wave height Method of determining Significant wave height: wind force: _____ Beaufort depth submerged: _____ Comments/Observations Passed: _____ Failed: _____

4.1.33 Wind velocity test		**Regulations: MSC/Circ.809 Annex 3; MSC.81(70) 1/5.20.1 & .2**
Test Procedure	Acceptance Criteria	Significant Test Data
The Administration should from a range of liferafts require at least: one liferaft from a range of 6 to 25 persons capacity provided the material construction arrangements are similar; and each liferaft greater than 25 persons capacity, except in the case where it can be shown that the material and construction arrangements deem this unnecessary: To be tested under the conditions of wind velocity given in following paragraphs. The liferaft or liferafts in the packed condition with the entrance so arranged that it will be open on inflation, but without the container, be inflated in a wind velocity of 30 m/s and should be left in this condition for 10 minutes.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test.	Passed: _____ Failed: _____ Continued/…

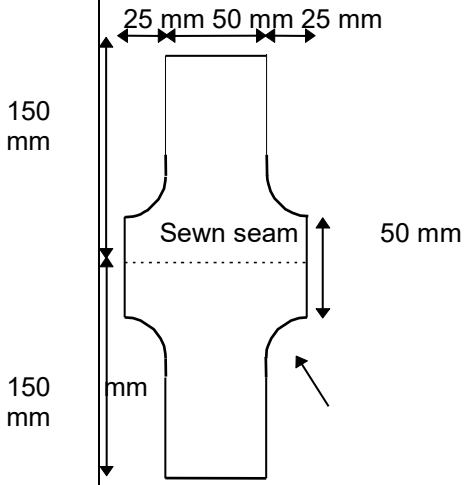
Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.33 Wind velocity test (continued)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.20.3 to 5.20.5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
During the above-mentioned conditions, whenever practicable, the liferaft or liferafts should be swung over approximately 30° to starboard, from that position to approximately 30° to port and return to the starting position. On completion of these first stage tests there should be no detachment of the arch support or canopy from the upper buoyancy tube or other damage which affects the efficient function of the liferaft. Then the liferaft or liferafts should be exposed to the above-mentioned wind velocity for 5 minutes in each of the following conditions: .1 with the entrance to the wind open and the other closed, if there is more than one entrance; .2 with the entrance to the wind closed and the other entrances open, if there is more than one entrance; and .3 with all entrances closed.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test.	Wind velocity measured:_____m/s Time in high winds: _____ sec Comments/Observations 1 Passed: _____ Failed: _____ 2 Passed: _____ Failed: _____ 3 Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.34 Self draining test (self-righting liferafts only)		**Regulations: MSC.81(70) 1/5.21**
Test Procedure	Acceptance Criteria	Significant Test Data
Water should be pumped into the interior of the liferaft, while it is afloat, at a rate of 2300 l per minute for 1 min. If a liferaft is divided into separate areas, by thwarts or other means, each such area should be subjected to the test.	After the water has been shut off and has drained, there should be no appreciable accumulation of water in the liferaft.	Hose delivery rate: l/min Period of delivery of water: min Area of liferaft: _____ m^2 Area of drainage point: _____ m^2 Draining area sufficient to remove water: YES/NO: _____ Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.35 Seam strength test	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.9.1 & 5.17.9.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Seam Strength Test  Fig.1 Sample specification for sewn canopy .1 Samples of all types of sewing used in production to be tested. .2 Seam constructions in both warp and weft direction should be tested. .3 The test specimens should be cut out from pre-sewn samples of fabric-and no locking of thread ends take place.	.1 It should be demonstrated that sample seams, prepared in the same condition as in production, can withstand a test load equal to the minimum specified liferaft fabric tensile strength. Sewn seams on outer canopy fabric should withstand a test load of at least 70% of the minimum specified fabric tensile strength when tested by the method described in ISO 1421:1998 and by using test samples as shown in fig.1 below. .2 Weld strength 1.1 When tested by the method prescribed below, the load required to initiate failure of the weld should be not less than 175 N; 2.2 Specimens should be prepared and tested as given in .3.3 below:	Fabric minimum specified liferaft tensile: strength _____ N/50 mm. Seam strength _____ N/50 mm. Outer canopy minimum specified tensile: strength _____ N/50 mm. Seam strength _____ N/50 mm. Weld strength _____ N Comments/Observations Passed: _____ Failed: _____

Inflatable liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.1.35 Seam strength test (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.3 Hydrolysis tests should be conducted on sample welded seams where thermoplastic-coated materials are to be used. The tests should be conducted as follows: 3.1 When tested by the method prescribed below, the weld strength of the sample seam should achieve 125 N/25 mm minimum. 3.2 Test method: .1 Store the test specimens for 12 weeks over water in a closed container at 93°C ± 2°C. .2 After the conditioning as above, dry the specimens for 1 h at 80 ± 2°C and condition at 20 ± 2°C, 65% RH for 24 h. 3.3 Welded test samples should be prepared as follows: Two samples of fabric 300 mm x 200 mm, cut with the short side parallel to the warp direction, should be superimposed face to back for double coated fabrics, or coated face to coated face for single or asymmetrically coated fabrics. They should be welded with a tool 10± 1 mm width of convenient length. 25 mm wide test specimens should be cut transversely to the line of the weld. The test samples should be mounted in a test machine as in ISO 1421:1998. The maximum peel load should be recorded.	Weld strength:_____N Comments/Observations Passed: _____ Failed: _____

4.2 RIGID LIFERAFTS

EVALUATION AND TEST REPORT

4.2.1 Submitted drawings, reports and documents
4.2.1.1 General data and specifications

4.2.2 Quality assurance

4.2.3 Visual inspection

4.2.4 Drop test

4.2.5 Jump test

4.2.6 Weight test

4.2.7 Towing test

4.2.8 Mooring out tests

4.2.9 Liferaft painter system test

4.2.10 Loading and seating test

4.2.11 Boarding test

4.2.12 Closing arrangement test

4.2.13 Stability test

4.2.14 Manoeuvrability test

4.2.15 Swamp test

4.2.16 Canopy closure test

4.2.17 Detailed inspection

4.2.18 Weak link strength test

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4.2.20 Impact test

4.2.21 Drop test

4.2.22 Davit-launched liferaft boarding test

4.2.23 Self-righting test (self-righting liferafts only)

4.2.24 Submergence test (self-righting liferafts only)

4.2.25 Wind velocity test

4.2.26 Self-draining test (self-righting liferafts only)

4.2.27 Inherently buoyant material

4.2 RIGID LIFERAFTS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.1.1 General data and specifications	**Regulations: -**
Cylinder:	
Release head:	
Fabric:	

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: _____ Quality assurance System acceptable Yes/No Comments/Observations

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.3 Visual inspection	**Regulations: LSA Code I/1.2, IV/4.3; MSC.81(70)**	
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a thorough visual inspection. The following items should be confirmed during the inspection: - proper workmanship - suitable materials - rot proof, corrosion resistant - not affected by seawater, oil or fungal attack - resistant to sunlight - highly visible colour - retro-reflective tape to be as per resolution A.658(16) safely used in a seaway	Be of an international or vivid reddish orange, or at a comparably highly visible colour on all parts where this will assist detection at sea	Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.4 Drop test		**Regulations: LSA Code IV/4.1.1.2; MSC.81(70) 1/5.1**
Test Procedure	Acceptance Criteria	Significant Test Data
(Overload test) Each type of liferaft should be subjected to a minimum of two drop tests. Where the liferaft in its operational condition is packed in a container or valise, one such test should be carried out with the liferaft packed in each type of container or valise in which the manufacturer proposes to mark it. The liferaft, in the operational packed condition, should be suspended and then dropped from a height of 18 m into the water. If it is to be stowed at a height greater than 18 m, it should be dropped from the height at which it is to be stowed. The free end of the painter should be attached to the point of suspension so that it pays out as the liferaft drops, thus simulating actual conditions. The liferaft should be left floating for 30 min. The liferaft should be lifted from the water to permit thorough inspection of the liferaft, the contents of the equipment container and, where applicable, the container or valise.	Damage to the container or valise, if the liferaft is normally within it when launched, is acceptable provided the Administration is satisfied that it would not be a hazard to the liferaft. Damage to any item of equipment is acceptable subject to the Administration being satisfied that the operational efficiency has not been impaired. Damage to freshwater receptacles may be accepted provided they do not leak. However, for drop tests from heights exceeding 18 m, leakage from up to 5% of the receptacles may be accepted provided that: .1 the equipment list for the liferaft specifies the carriage of 5% excess water or means of desalination adequate to produce an equivalent amount; or .2 the water receptacles are contained in a waterproof overwrap. *If any additional equipment was placed in the liferaft for this test, e.g. SART, state type and condition of the equipment after the test.	Container details: Type of emergency pack Height of drop _____m Painter length _____m Floating position: Condition: Container Liferaft *Equipment Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.5 Jump test		**Regulations: LSA Code IV/4.1.1.3; MSC.81(70) 1/5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a person can jump on to the liferaft, with and without the canopy erected, from a height above the floor of at least 4.5 m without damaging the liferaft. The test subject should weigh not less than 82.5 kg and should be wearing hard bottom shoes with smooth soles and no protruding nails. The number of jumps performed should be equal to the total number of persons for which the liferaft is to be approved. The jump test may be simulated by dropping a suitable and equivalent mass, arranged so as to impact the liferaft with shoes as described in the above paragraph.	There should be no torn fabric, or damage to seams as a result of the test.	Number of jumps: _____ Height of jump: _____ m Comments/Observations Passed: _____ Failed: _____

4.2.6 Weight test		**Regulations: LSA Code IV/4.1.2.2; MSC.81(70) 1/5.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully packed liferaft container should be weighed to determine whether its mass exceeds 185 kg. The weight test should be performed on the heaviest variation of the liferaft, considering different containers and equipment packs, which may be used. If the mass exceeds 185 kg, the different combinations of containers and equipment packs should be weighed to determine which will and which will not exceed 185 kg.		Emergency pack type: _____ Measured liferaft weight___kg Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.7 Towing test		**Regulations: LSA Code IV/4.1.1.4; MSC.81(70) 1/5.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by towing that the fully loaded and equipped liferaft is capable of being satisfactorily towed at speeds of up to 3 knots in calm water. Towing should be by a line attached to the liferaft's towing connection. The sea anchor should be streamed while the liferaft is towed. The liferaft should be towed for a distance of at least 1 km. Record the towing strain of 2 knots and at 3 knots and record also on the Type Approval certificate.	It should be shown that the liferaft can be satisfactorily towed at a speed of up to 3 knots with the anchor streamed without significant damage.	Speed during test _____knots Raft towing connections: Distance covered: Total Load in raft: Towing strain at 2 knots _____ kN Towing strain at 3 knots _____ kN Comments/Observations Passed _____ Failed _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.8 Mooring out tests		**Regulations: LSA Code IV/4.1.1.1; MSC.81(70) 1/5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The liferaft should remain afloat in that location for 30 days. The liferaft should not sustain any damage that would impair its performance.	The liferaft should not sustain any damage that would impair its performance.	Location _____ Mooring out period days Condition of liferaft: Comments/Observations Passed: _____ Failed: _____

4.2.9 Liferaft painter system test		**Regulations: LSA Code IV/4.1.6.1, 4.1.3.2/; MSC.81(70) 1/5.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The painter system including attachments should be tensile tested.	Liferaft painter system and attachments should have a breaking strain as follows: 7.5 kN for liferafts to carry up to 8 persons 10.0 kN for liferafts to carry 9 to 25 persons 15.0 kN for liferafts to carry 26 persons or more	Number of persons: Breaking strain of painter system: Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.10 Loading and seating test		**Regulations: LSA Code IV/4.3.3; MSC.81(70) 1/5.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the liferaft in the light condition, including its full equipment but no personnel, should be recorded. The freeboard of the liferaft should again be recorded when the number of persons for which the liferaft is to be approved, having an average mass of 82.5 kg, and each wearing immersion suit and a lifejacket, have boarded and are seated. It should be established that all the seated persons have sufficient space and headroom and it should be demonstrated that the various items of equipment can be used within the liferaft in this condition.	All the seated persons should have sufficient space and headroom and the various items of equipment can be used within the liferaft in this condition. The freeboard, when loaded with the mass of the number of persons for which it is to be approved and its equipment, with the liferaft on an even keel, should not be less than 300 mm.	Lifejackets used? YES_____ NO_____ Immersion suits used? YES_____ NO_____ Freeboards: Light 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Loaded 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Number of persons seated _____ Equipment accessible/usable? YES_____ NO_____ Comments/Observations

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.11 Boarding test		**Regulations: LSA Code IV/4.3.4; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be carried out in a swimming pool by a team of not more than four persons who should be of mature age and of differing physiques as determined by the Administration. Preferably they should not be strong swimmers. For this test they should be clothed in shirt and trousers or a boiler suit and should wear approved lifejackets suitable for an adult. They must each swim about 100 m before reaching the liferaft for boarding. There must be no rest period between the swim and the boarding attempt. Boarding should be attempted by each person individually with no assistance from other swimmers or persons already in the liferaft. The water should be of a depth sufficient to prevent any external assistance when boarding the liferaft.	The arrangements will be considered satisfactory if three of the persons board the liferaft unaided and the fourth boards with the assistance of any of the others.	Record particulars of persons: Age Height Weight P1 _____Y _____m_____kg P2 _____Y _____m_____kg P3 _____Y _____m_____kg P4 _____Y _____m_____kg Boarded unaided__persons Boarded aided _____persons Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.12 Closing arrangement test		**Regulations: LSA Code IV/4.1.1.5.3; MSC.81(70) 1/5.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The boarding test should be repeated with persons clothed in immersion suits and lifejackets. After the boarding test a person clothed in approved immersion suit should demonstrate that the entrance can be easily and quickly closed in 1 minute and can be easily and quickly opened from inside and outside in 1 minute.	3 out of 4 persons wearing immersion suit and lifejackets must board the liferaft unaided. The entrance should be easily closed in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from inside in less than 1 min. by a person wearing an approved immersion suit. The entrance should be easily opened from outside in less than 1 min. by a person wearing an approved immersion suit.	Record particulars of persons: Age Height Weight P1 _____Y _____m_____kg P2 _____Y _____m_____kg P3 _____Y _____m_____kg P4 _____Y _____m_____kg Boarded unaided _____persons Boarded aided _____Persons Closing time _____sec Open time inside___sec Open time outside___sec Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.13 Stability test		**Regulations: LSA Code IV/4.3.5; MSC.81(70) 1/5.9**
Test Procedure	Acceptance Criteria	Significant Test Data
.1 The number of persons for which the liferaft is to be approved should be accommodated on one side and then at one end and in each case the freeboard should be recorded. Under these conditions the freeboard should be such that there is no danger of the liferaft being swamped. .2 The stability of the liferaft during boarding may be ascertained as follows: Two persons each wearing approved lifejackets should board the empty liferaft. It should then be demonstrated that the two persons in the liferaft can readily assist from the water a third person who is required to feign unconsciousness. The third person must have his back towards the entrance so that he cannot assist the rescuers.	Each freeboard measurement should be taken from the waterline to the top surface at its lowest point. It should be demonstrated that the water pockets adequately counteract the upsetting moment on the liferaft and there is no danger of the liferaft capsizing.	Freeboards with all persons on one side: 12 o'clock_____mm 3 o'clock_____mm 6 o'clock_____mm 9 o'clock_____mm Observations when boarding: persons: _____ unconscious person: _____ Effect of water pockets: Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.14 Manoeuvrability test		**Regulations: LSA Code IV/4.1.5.1.6; MSC.81(70) 1/5.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that with the paddles provided, the liferaft is capable of being propelled when fully laden in calm conditions over a distance of at least 25 m.	The liferaft should be capable of being propelled when fully laden in calm conditions over a distance of at least 25 m within a reasonable timescale.	Distance manoeuvred:_____m Approx. speed: _____knots Comments/Observations Passed: _____ Failed: _____

4.2.15 Swamp test		**Regulations: LSA Code; MSC.81(70) 1/5.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the liferaft, when fully swamped, is capable of supporting its full equipment and the number of persons for which it is to be approved. The liferaft should not seriously deform in this condition.	The liferaft when fully swamped, should be capable of supporting its full equipment and the number of persons for which it is to be approved. The liferaft should not seriously deform in this condition. During this test self-draining arrangements fitted in the floor of the liferaft are to be closed to prevent the ingress of water	Loaded liferaft swamped Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Maximum depth of water measured inside the liferaft: _____ mm Deformation _____ If self-bailing, time to self-bail: _____ min Comments/Observations Passed _____ Failed _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.16 Canopy closure test		**Regulations: LSA Code IV/4.1.1.5; MSC.81(70) 1/5.12**
Test Procedure	Acceptance Criteria	Significant Test Data
To ensure the effectiveness of the canopy closures in preventing water entering the liferaft, the efficiency of the closed entrances should be demonstrated by means of a hose test or by any other equally effective method. The requirement for the hose test is that about 2,300 l of water per minute be directed at and around the entrances through a 63.5 mm hose from a point 3.5 m away and 1.5 m above the level of the buoyancy tubes for a period of 5 min.	The accumulation of water inside the liferaft should not exceed 4 l.	Capacity of water hose_____l/min Condition of canopy during test _____ _____ _____ Liters of water accumulated _____ _____ _____ Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.17 Detailed inspection		**Regulations: LSA Code; MSC.81(70) 1/5.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be subjected to a detailed inspection to verify that it complies with to requirements of the LSA-code.	The liferaft should comply with the requirements of the LSA Code in all respects including: • interior not to cause discomfort to occupants • at least one viewing port • means for collection rainwater • sufficient headroom • 8 persons- at least two entrances • equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content • at least one boarding ramp • means to assist a person to pull themselves into the liferaft • container markings • marking on raft	.1 Interior not to cause discomfort to occupants: ____ .2 At least one viewing port: ____ .3 Means for collection rainwater: ____ .4 Sufficient headroom: ____ .5 8 persons at least two entrances: ____ .6 Equipment to be stowed inside liferaft, but capable of floating at least 30 minutes in water without damage to content: ____ .7 At least one boarding ramp: ____ .8 Means to assist a person to pull themselves into the liferaft: ____ .9 Container markings: ____ .10 Marking on raft: ____ Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.18 Weak link strength test		**Regulations: LSA Code IV/4.1.6.2; MSC.81(70) 1/5.15**
Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be tensile tested.	A weak link in the painter system should have a breaking strain of 2.2 ±0.4 kN It should be expected that the force required to pull the painter from the liferaft container will not break the weak link. (Refer to HRU test form 4.3.1.11) if applicable, be of sufficient strength to permit the inflation of the liferaft,	Measured breaking strain of weak link: kN Comments/Observations Passed: _____ Failed: _____

4.2.19 Lifting components strength test		**Regulations: LSA Code IV/4.3.7 ; MSC.81(70) 1/5.16.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The breaking strength of the webbing or rope and the attachments to the liferaft used for the lifting bridle should be established by tests on three separate pieces of each different item.	The combined strength of the lifting bridle components should be at least six times the mass of the liferaft when loaded with the number of persons for which it is to be approved and its equipment.	Combined strength of lifting bridle components: Mass of liferaft when loaded with the number of persons for which it is to be approved: _____ kg Calculated safety factor: _____ Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.20 Impact test		**Regulations: LSA Code; MSC.81(70) 1/5.16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment. With the liferaft in a free hanging position it should be pulled laterally to a position so that when released it will strike a rigid vertical surface at a velocity of 3.5 m/s. The liferaft should then be released to impact against the rigid vertical surface. Note: The liferaft should be lifted up 650 mm.	After this test the liferaft should show no signs of damage which would affect its efficient functioning.	Comments/Observations Passed: _____ Failed: _____

4.2.21 Drop test		**Regulations: LSA Code; MSC.81(70) 1/5.16.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft, loaded as prescribed in 4.2.20, should be suspended from an on-load release at a height of 3 m above the water, be released and allowed to fall freely into the water. The liferaft should then be examined.	The liferaft should sustain no damage, which would affect its efficient functioning.	Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.22 Davit-launched liferaft boarding test		**Regulations: LSA Code; MSC.81(70) 1/5.16.4**
Test Procedure	Acceptance Criteria	Significant Test Data
A davit-launched liferaft should, in addition to the boarding test prescribed in 4.2.11, be subjected to the following test. The liferaft, hanging from a launching appliance, or from a crane with a head sheave of similar height and bowsed into the ship's side or simulated ship's side, the liferaft should be boarded by the number of persons for which it is to be approved of average mass 82.5 kg. There should be no undue distortion of the liferaft. The bowsing should then be released and the liferaft left hanging for 5 min. It should then be lowered to the sea or floor and unloaded. At least three tests are required in succession, with the hook of the lowering appliance so positioned that its distance from the ship's side is: .1 half the beam of the liferaft +150 mm; .2 half the beam of the liferaft; and .3 half the beam of the liferaft -150 mm. The boarding, which is intended to simulate actual shipboard conditions, should be timed and the time recorded.	There should be no undue distortion of the liferaft. The boarding should be timed and the time recorded.	Boarding time 1: Distortion test 1: Boarding time2: Distortion test 2: Boarding time 3: Distortion test 3: Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.23 Self-righting test (self-righting liferafts only)	**Regulations: LSA Code 4.3.5.1; MSC.81(70) 1V/5.18**

Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the liferaft about a longitudinal axis to any angle of heel in calm water and then release it. The liferaft should be fully equipped, with no one on board, with entrances and openings in the as-packed condition. The liferaft should be incrementally rotated to angles of hull up to and including 180° and should be released.	After release the liferaft should automatically return to the upright position without assistance. Righting action should be positive and continuous.	The liferaft returned to upright position from the following angles of heel:

+ 10°		- 10°	
+ 20°		- 20°	
+ 30°		- 30°	
+ 40°		- 40°	
+ 50°		- 50°	
+ 60°		- 60°	
+ 70°		- 70°	
+ 80°		- 80°	
+ 90°		- 90°	
+ 100°		- 100°	
+ 110°		- 110°	
+ 120°		- 120°	
+ 130°		- 130°	
+ 140°		- 140°	
+ 150°		- 150°	
+ 160°		- 160°	
+ 170°		- 170°	
+ 180°		- 180°	

Comments/Observations

Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.24 Submergence test (self-righting liferafts only)		**Regulations: MSC/Circ.809 Annex3; MSC.81(70) 1/5.19**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be submerged to a depth of at least 4 m. A rigid liferaft should be released at this depth, and, if an inflatable liferaft, initiate inflation at this depth, so as to simulate automatic float-free operation. The liferaft should float to the surface and come to its designed operational condition ready to be boarded from the sea in a sea state of at least 2 metres significant wave height in association with a wind force of Beaufort force 6.	The liferaft should float to the surface and come to its designed operational condition ready to be boarded.	Significant wave height: _____ Method of determining Significant wave height: wind force: _____ Beaufort depth submerged: _____ m Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.25 Wind velocity test		**Regulations: LSA Code; MSC.81(70) 1/5.20**
Test Procedure	Acceptance Criteria	Significant Test Data
The Administration should from a range of liferafts require at least: one liferaft from a range of 6 to 25 persons capacity provided the material construction arrangements are similar; and each liferaft greater than 25 persons capacity, except in the case where it can be shown that the material and construction arrangements deem this unnecessary: to be tested under the conditions of wind velocity given in the following paragraphs. The liferaft or liferafts in the packed condition with the entrance so arranged that it will be open, but without the container, in a wind velocity of 30 m/s and should be left in this condition for 10 minutes. During the above-mentioned conditions, whenever practicable, the liferaft or liferafts should be swung over approximately 30° to starboard, from that position to approximately 30° to port and return to the starting position.	The liferaft or liferafts should show no sign of damage affecting its efficient function as a result of this test. On completion of these first stage tests there should be no detachment of the arch support or canopy from the upper buoyancy tube or other damage which affects the efficient function of the liferaft.	Comments/Observations Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Continued/…

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.25 Wind velocity test (continued)		**Regulations: LSA Code; MSC.81(70) 1/5.20**
Test Procedure	Acceptance Criteria	Significant Test Data
Then the liferaft or liferafts should be exposed to the above-mentioned wind velocity for 5 minutes in each of the following conditions: .1 with the entrance to the wind open and the other closed, if there is more than one entrance; .2 with the entrance to the wind closed and the other entrances open, if there is more than one entrance; and .3 with all entrances closed.	The liferaft or liferafts should show no sign of damage affecting its efficient function because of this test.	Wind velocity measured: _____ m/s Time in high winds: _____ sec Comments/Observations Passed: _____ Failed: _____

Rigid liferafts	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.2.26 Self draining test (self-righting liferafts only)		**Regulations: MSC.81(70) 1/5.21**
Test Procedure	Acceptance Criteria	Significant Test Data
Water should be pumped into the interior of the liferaft, while it is afloat, at a rate of 2300 l per minute for 1 min. If a liferaft is divided into separate areas, by thwarts or other means, each such area should be subjected to the test.	After the water has been shut off and has drained, there should be no appreciable accumulation of water in the liferaft.	Hose delivery rate: _____ l/min Period of delivery of water: _____ min Area of liferaft: _____ m^2 Area of drainage point: _____ m^2 Draining area sufficient to remove water: YES/NO: _____ Comments/Observations Passed: _____ Failed: _____

4.2.27 Inherently Buoyant Material		**Regulations: LSA Code 4.3.2.1; MSC.81(70) 1/6.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The buoyancy of the rigid liferaft should be by inherently buoyant material tested according to the tests in form 4.3.3 except the tensile strength test.		Comments/Observations Passed: _____ Failed: _____

4.3 COMPONENTS FOR SURVIVAL CRAFT

4.3.3 LIFEBOAT BUOYANT MATERIAL

4.3.1 HYDROSTATIC RELEASE UNITS

EVALUATION AND TEST REPORT

4.3.1.1 Submitted drawings, reports and documents

4.3.1.2 Quality assurance

4.3.1.3 Visual and dimensional examination

4.3.1.4 Corrosion resistance test

4.3.1.5 Temperature tests

4.3.1.6 Submergence and manual release test

4.3.1.7 Strength test

4.3.1.8 Technical tests on the membrane – 1

4.3.1.9 Technical tests on the membrane – 2

4.3.1.10 Solar radiation test

4.3.1.11 Performance test

4.3.1.12 Weak link test

4.3.1 HYDROSTATIC RELEASE UNITS

EVALUATION AND TEST REPORT

Manufacturer	
Type (serviceable/disposable)	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.2 Quality assurance	**Regulations:** MSC.81(70) 2/1.1, 1.2
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974.3, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations:

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.3 Visual and dimensional examination	**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1/11.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Two samples of hydrostatic release units should be given a visual and dimensional examination. If the devices conform to the manufacturer's drawings and specifications, they should be accepted and assembled for further testing under the technical and performance tests as prescribed below. The examination should include proper markings, clear instructions (indelible), expiry date and confirmation that the materials are: .1 compatible; and .2 not galvanized or otherwise metallic coated. The lifespan should be determined.	The units should be examined and must conform to the manufacturer's drawings and specifications. Each hydrostatic release unit should undergo all the following technical tests shown in forms 4.3.1.4 to 4.3.1.10. No parts should be renewed or repaired between the tests. The tests should be conducted in the sequence of the forms.	Comments/Observations Lifespan: _____ Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.4 Corrosion resistance test		**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1/11.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
A hydrostatic release unit should be exposed to a salt water spray test (5% natrium chloride solution) at a temperature of 35±3°C for 160 h without interruption. (not stated)	After completion of the test the hydrostatic release unit should show no corrosion which could affect its efficient functioning. The Hydrostatic Release Unit should be next subjected to the Temperature test of 4.3.1.5.	Salt water solution: _____ Time exposed to spray: _____ hrs Comments/Observations Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.5 Temperature tests		**Regulations: LSA Code I/1.2.2.2; MSC.81(70) 1/11.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The hydrostatic release units should then be subjected to the temperature-cycling test. The units should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of + 65°C to be completed in one day; .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day.	The hydrostatic release unit should not be damaged in stowage throughout the air temperature range -30°C to +65°C. There should be no sign of loss of rigidity under high temperatures and after the tests, the unit should show no sign of damage such as shrinking cracking swelling dissolution or change of mechanical qualities, and it should operate as before the test. Following temperature cycling: One HRU should be taken from a stowage temperature of -30°C and should then operate in seawater at a temperature of -11°C. The other HRU should be taken from a stowage temperature of +65°C and should then operate at a temperature of +30°C. The hydrostatic release unit should then next be subjected to the Submergence and manual release test of 4.3.1.6.	Comments/Observations Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.6 Submergence and manual release test		**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1/11.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hydrostatic release unit should then be tested by applying a buoyant load equal to its designed capacity while the device is submerged in a water or in a water-filled pressure testing tank. It should release at a depth of not more than 4 m. On completion of these tests and resetting, the hydrostatic release unit should be capable of being released manually if it is designed to allow manual release of the unit.	The unit should release the buoyant load at a depth of not more than 4 m. After being reset the unit should be capable of being manually released if it is designed for manual release. It should be opened for inspection and should show no significant signs of corrosion or degradation. The Hydrostatic Release Unit should then next be subjected to the Strength Test of 4.3.1.7	Comments/Observations Depth of release: _____ Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.7 Strength test		**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1/11.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The unit should be subjected to a tensile test of at least 10 kN for a period of 30 minutes. (15 kN if fitted to a raft for more than 25 persons).	If it is designed to allow manual release of the unit it should then be capable of being operated manually. There should be no change of mechanical properties. The Hydrostatic Release Unit should then next be subjected to Technical tests on the membrane of 4.3.1.8.	Tensile test load: _____ kN Tensile test time: _____ minutes. Operated manually: ____ yes/____ no Comments/Observations Passed: _____ Failed: _____

4.3.1.8 Technical tests on the membrane - 1		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/11.2.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Resistance to cold: Number of specimens 2 membranes Temperature -30°C Exposure time 30 min Flex testing: 180° with both inside and outside stretched. **Resistance to heat:** Number of specimens 2 membranes Temperature +65°C Exposure time 7 days	Resistance to cold: The membranes should show no visible cracking. Resistance to heat: The membranes should show no visible cracking.	Comments/Observations (Cold): Passed: _____ Failed: _____ Comments/Observations (Heat): Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.9 Technical tests on the membrane - 2		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/11.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Test for surface resistance to oil: .1 Number of specimens: 2 membranes .2 Temperature: +18°C to +20°C .3 Type of oil: A mineral oil meeting the following requirements: .a Aniline point: 120°±5°C Flashpoint: minimum 240°C .b Viscosity: 10-25 cSt at 99.0°C .4 The following oils may be used: ASTM Oil No.1, ASTM Oil No.5, and ISO Oil No. 1 .5 Testing Period: 3 h on each side	Test for surface resistance to oil: The material should show no deterioration.	Comments/Observations (**oil**) Passed: _____ Failed: _____ Comments/Observations (**seawater**) Passed: _____ Failed: _____
Resistance to natrium Chloride: Two membranes should be immersed for 7 days in 5% natrium chloride solution at a test temperature of +18°C to +20°C.	Resistance to seawater: The material should show no deterioration.	Comments/Observations (**detergents**)
Resistance to detergents: Two membranes should be immersed for 7 days in detergents commonly used on board ships at least temperature of +18°C to +20°C.	Resistance to detergents: The membranes should not be affected by the detergents. The Hydrostatic Release Unit should then next be subjected to the Solar radiation test of 4.3.1.10.	Types used: - Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.10 Solar radiation test		**Regulations: LSA Code I/1.2.2; MSC.81(70) 1/11.2.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Solar radiation test: One unit should be subjected to a solar radiation test to paragraph 8.10 of standard IEC 60945:2002. Note: The solar radiation test may be waived where the manufacturer is able to produce evidence that the materials employed will satisfy the test, i.e. UV stabilized.	Solar radiation test:	Comments/Observations (Solar radiation) Passed: _____ Failed: _____

Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.1.11 Performance test		**Regulations: LSA Code IV/4.1.6.3; MSC.81(70) 1/11.3.1 & 11.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
This test should be performed using the smallest and the largest liferafts with which the hydrostatic release unit may be used. If the occupant range between the smallest and largest liferaft exceeds 25 persons, then the intermediate size liferaft should also be tested. The liferaft should be placed horizontally on a rack or platform of sufficient weight to submerge the liferaft. The hydrostatic release unit and painter should be installed as aboard a ship. The following tests should be carried out in a suitable depth of water. The platform should be lowered into the water as follows: .1 Raft horizontal. .2 Raft tilted 45° with the HRU at the lower side. .3 Raft tilted 100° with the HRU at the lower side. .4 Raft tilted 45° with the HRU at the upper side. .5 Raft tilted 100° with the HRU at the upper side. .6 Raft vertically.	In all tests the hydrostatic release unit should release the liferaft at a depth of less than 4.0 m.	Release in the following positions: .1 Raft horizontal: Passed/Failed .2 Raft tilted 45° with the HRU at the lower side: Passed/Failed .3 Raft tilted 100° with the HRU at the lower side: Passed/Failed .4 Raft tilted 45° with the HRU at the upper side: Passed/Failed .5 Raft tilted 100° with the HRU at the upper side: Passed/Failed .6 Raft vertically: Passed/Failed Comments/Observations Passed: _____ Failed: _____

4.3.1.12 Weak link test		**Regulations: LSA Code IV/4.1.6.2; MSC.81(70) 1/5.15**
Hydrostatic release units	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

Test Procedure	Acceptance Criteria	Significant Test Data
The weak link should be strength tested (if not tested together with the liferaft painter system).	A weak link in the painter system should have a breaking strain of 2.2 ±0.4kN. The weak link should not be broken by the force required to pull the painter from the liferaft container If applicable, the weak link should be of sufficient strength to permit the inflation of the liferaft.	Measured breaking strain: _____ Comments/Observations Passed:_____ Failed: _____

4.3.2 LIFEBOAT AND RESCUE BOAT INBOARD ENGINES

EVALUATION AND TEST REPORT

4.3.2.1 Submitted drawings, reports and documents

4.3.2.2 Quality assurance

4.3.2.3 Cold engine starting test

4.3.2.4 Engine-out-of-water test

4.3.2.5 Submerged engine test

4.3.2.6 Engine inversion test

4.3.2 LIFEBOAT AND RESCUE BOAT INBOARD ENGINES

EVALUATION AND TEST REPORT

Manufacturer	
Engine type	
Serial number	
Fuel type	
Design power output (kW)	
Propeller diameter and pitch	
Gear box type and No.	
Required battery capacity	
Starting aids	
Date	
Place	
Name and signature of surveyor	
Approval Organization	

Lifeboat and rescue boat inboard engines	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Lifeboat and rescue boat inboard engines	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.2.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1 and 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations:

Lifeboat and rescue boat inboard engines	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.2.3 Cold engine starting test		**Regulations: LSA Code 4.4.6.2; MSC.81(70) 1/6.10.2 - 6.10.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine may be removed from the lifeboat for this test, however, it should be equipped with accessories and the transmission that will be used in the lifeboat. The engine, along with its fuel and coolant and starting power sources and any necessary starting aids should also be provided and should be placed in a chamber at a temperature of -15°C. The temperature of the fuel, lubricating oil and cooling fluid (if any) should be measured at the beginning of this test and should not be higher than -15°C. Samples of each fluid at this temperature should be collected in a container for observation. The engine should be started three times. The first two times, the engine should be allowed to operate long enough to demonstrate that it runs at operating speed. After the first two starts the engine should be allowed to stand until all parts have again reached chamber temperature. After the third start, the engine should be allowed to continue to run for a least 10 min and during this period the transmission should be operated through its gear positions.	The engine should be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. The engine starting systems and starting aids should start the engine at an ambient temperature of -15°C within 2 min of commencing the start procedure unless, in the opinion of the Administration having regard to the particular voyages in which the ship carrying the lifeboat is constantly engaged, a different temperature is appropriate.	Starting power source: Starting aids used: Measured temperatures: • Chamber: _____ °C • Fuel: _____ °C • Lubricant oil: _____ °C • Cooling fluid: _____ °C Number of starts:__times Duration of first run: _____ min. Duration of second run:_____min. Duration of last run: _____ min. Required capacity and Cold Cranking Amps of starting battery? Administration's limit on operating temperature range? Passed/Failed Comments/Observations

Lifeboat and rescue boat inboard engines	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.2.4 Engine-out-of-water test		**Regulations: LSA Code 4.4.6.3; MSC.81(70) 1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should be capable of operating for not less than 5 min after starting from cold with the lifeboat out of the water. The engine should not be damaged as a result of this test.	Temperature of storage location: _____ °C Type of Impeller (If applicable): _____ Duration: _____ min Any damage after this test? Passed/Failed For engines with "wet" exhaust system: Impeller damaged after test: Y/N Comments/Observations

4.3.2.5 Submerged engine test		**Regulations: LSA Code 4.4.6.4; MSC.81(70) 1/6.10.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min while submerged in water to the level of the centreline of the crankshaft with the engine in a horizontal position.	The engine should be capable of operating when the lifeboat is flooded up to the centreline of the crankshaft. The engine should not be damaged as a result of this test.	Engine flooded up to centreline of crankshaft? Yes / No Duration: _____min Any damage after this test? Passed/Failed Condition of engine oil? Passed/Failed Comments/Observations

4.3.2.6 Engine inversion test	**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat. A pan should be located under the engine to collect any oil which may leak from the engine so that the quantity of such oil can be measured. The following procedure should be followed during this test: .1 start the engine and run it at full speed for 5 min; .2 stop the engine and rotate it in a clockwise direction through 360°; .3 restart the engine and run it at full speed for 10 min; .4 stop the engine and rotate it in a counter- clockwise direction through 360°; .5 restart the engine, run it at full speed for 10 min, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 min;	The engine and engine installation should be capable of running in any position during capsize and continue to run after the lifeboat returns to the upright or should automatically stop on capsizing and be easily restarted after the lifeboat returns to the upright. The design of the fuel and lubricating systems should prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize. During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear. Note: These tests are only applicable for self-righting totally enclosed lifeboats and fast rescue boats.	Passed: _____ Failed: _____ Comments/Observations:

Lifeboat and rescue boat inboard engines	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.2.6 Engine inversion test (cont'd)	**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The following procedure should be followed during this test (Continued): .8 slowly rotate the running engine in a clockwise direction through 180°, hold at the 180° position for 10 s, and then rotate it 180° further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 min; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counterclockwise direction; .13 restart the engine and run it at full speed for 5 min; .14 rotate the engine in a clockwise direction through 180° and stop the engine. Rotate it 180° further to complete a full clockwise revolution; .15 restart the engine and run it at full speed for 10 min; .16 repeat the procedure in .14 above, turning the engine counterclockwise; .17 restart the engine, run it at full speed for 10 min and then shut it down; and .18 dismantle the engine for examination.	During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Are all the tests carried out according to the procedure as prescribed? Passed/Failed Does the engine stop when turned in either direction? Passed/Failed If it stops, does it easily restart? Passed/Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/ Failed Amount of oil lost from engine during each inversion: .2: _____ ml .4: _____ ml .8: _____ ml .12: _____ ml .14: _____ ml .16: _____ ml Total amount of oil lost from engine: _____ml Evidence of overheating or excessive wear? Passed/ Failed Amount of oil lost from engine: _____ ml Comments/Observations

EVALUATION AND TEST REPORT

4.3.3.1 Submitted drawings, reports and documents

4.3.3.1.1 Quality assurance

4.3.3.2 Measure dimensions

4.3.3.3 Temperature cycling test

4.3.3.4 Examination of internal structure

4.3.3.5 Temperature cycling and water absorption test

4.3.3.6 Temperature cycling, high octane petroleum spirit and water absorption test

4.3.3.7 Tests for water absorption

4.3.3.8 Crude oil test

4.3.3.9 Marine fuel oil test (Grade C)

4.3.3.10 Diesel oil test (Grade A)

4.3.3.11 High octane petroleum spirit test

4.3.3.12 Kerosene test

4.3.3 LIFEBOAT BUOYANT MATERIAL

EVALUATION AND TEST REPORT

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.1.1 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS CONDITIONING SEQUENCE	**REFERENCES**									**REMARKS**	
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	MSC 70/23/Add.1	
Measure dimensions (4.3.3.2)	A	A	A	A	A	A	A	A	A		
Temperature cycling test (4.3.3.3)	B	B	B								
Measure dimensions at end of temperature cycling test. (4.3.3.3)	C	C	C								
Examination of internal structure (4.3.3.4)	D										
Measure initial buoyancy		D	D	D	D	D	D	D	D		
High octane petroleum spirit (4.3.3.6) & (4.3.3.11)			E					E			
Crude oil (4.3.3.8)					E						
Marine fuel oil (Grade C) (4.3.3.9)						E					
Diesel oil (Grade A) (4.3.3.10)							E				
Kerosene (4.3.3.12)									E		
Measure dimensions			F		F	F	F	F	F		
Fresh water absorption test (4.3.3.5) & (4.5.2.7)		G	G	G	G	G	G	G	G		
Measure dimensions		H	H	H	H	H	H	H	H		
Measure final buoyancy		I	I	I	I	I	I	I	I		

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.2 Measure dimensions		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2 and 2.6**	
Test Procedure	Acceptance Criteria	Significant Test Data	
Measure the dimensions of the specimens The specimens should be at least 300 mm square and be of the same thickness as used in the lifejacket.		1_____X_____X _____ 2_____X_____X _____ 3_____X_____X _____ 4_____X_____X _____ 5_____X_____X _____ 6_____X_____X _____ 7_____X_____X _____ 8_____X_____X _____ 9_____X_____X _____ 10_____X_____X _____	11_____X_____X _____ 12_____X_____X _____ 13_____X_____X _____ 14_____X_____X _____ 15_____X_____X _____ 16_____X_____X _____ 17_____X_____X _____ 18_____X_____X _____ 19_____X_____X _____ 20_____X_____X _____
		Passed: _____ Failed: _____ Comments/Observations:	

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.3 Temperature cycling test		**Regulations: LSA Code 1.2; MSC.81(70) 1 /1.2.1, 6.2.2 and 2.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Six specimens should be subjected for 8 hours to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for ten cycles is acceptable: .1 An 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day; .3 an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day.	The dimensions of the specimens should be recorded at the end of the ten-cycle period. The specimens should be carefully examined and should not show any sign of external change of structure or of mechanical qualities.	Dimensions before test Dimensions after test 1 ___ X ___X ___ ___ X ___X ___ 2 ___ X ___X ___ ___ X ___X ___ 3 ___ X ___X ___ ___ X ___X ___ 4 ___ X ___X ___ ___ X ___X ___ 5 ___ X ___X ___ ___ X ___X ___ 6 ___ X ___X ___ ___ X ___X ___ Passed: _____ Failed: _____ Comments/Observations

4.3.3.4 Examination of internal structure		**Regulations: LSA Code 1.2; MSC.81(70) 1/2.6.1 and 2.6.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Following the temperature cycling test, two of the specimens should be cut open and examined.	Neither of the two specimens cut open should show any sign of internal change of structure.	Specimen No. 1 Internal condition (Passed/Failed) Specimen No. 2 Internal condition (Passed/Failed) Comments/Observations

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.5 Temperature cycling and water absorption test	**Regulations: LSA Code 1.2; MSC.81(70) 1/2.6.7 & 6.2.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens which have been subjected to the temperature cycling test. The test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 5%. The specimens should show no signs of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 3 ___ X ___ X ___ ___ X ___ X ___ 4 ___ X ___ X ___ ___ X ___ X ___ % change in dimensions 3 _____ % 4 _____ % Buoyancy after 1 day Buoyancy after 7 days 3 _____ _____ 4 _____ _____ % change in buoyancy 3 _____% 4 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.6 Temperature cycling, high octane petroleum spirit and water absorption test	**Regulations: LSA Code 1.2; MSC.81(70) 1/2.6.1, 2.6.6.3, 6.2.2 & 6.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens which have been subjected to the temperature cycling test followed by being immersed horizontally for a period of 24 h under 100 mm head of high-octane petroleum spirit at normal room temperature. After completing the above the test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The dimensions should be recorded at the beginning and end of these tests. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 16%. The specimens should show no sign of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 5_____X_____X_____ _____X_____X _____ 6_____X_____X_____ _____X_____X _____ % change in dimensions 5 _____% 6 _____% Buoyancy after 1 day Buoyancy after 7 days 5 _____ _____ 6 _____ _____ % change in buoyancy 5 _____% 6 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.7 Tests for water absorption		**Regulations: LSA Code 1.2; MSC.81(70) 1/2.6.5, 2.6.6, 6.2.2 & 6.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The test should be carried out on two specimens as supplied. The dimensions should be recorded at the beginning and end of these tests. The test should be carried out in fresh water and the specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy should not exceed 5%. The specimens should show no sign of damage such as shrinking, cracking swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 7_____X_____X_____ _____X_____X _____ 8_____X_____X_____ _____X_____X _____ % change in dimensions 7 _____% 8 _____% Buoyancy after 1 day Buoyancy after 7 days 7 _____ _____ 8 _____ _____ % change in buoyancy 7 _____% 8 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.8 Crude oil test		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2.2, 6.2.3.1, 6.2.7 & 2.6.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in crude oil for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion, the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. The two specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 9_____X_____X_____ _____X_____X _____ 10_____X_____X_____ _____X_____X _____ % change in dimensions 9 _____% 10 _____% Buoyancy after 1 day Buoyancy after 7 days 9 _____ _____ 10 _____ _____ % change in buoyancy 9 _____% 10 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.9 Marine fuel oil test (Grade C)*		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2.2, 6.2.3.2, 6.2.7 & 2.6.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in marine fuel oil (grade C) for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion, the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority). * Refer to ISO standards ISO 8216 and ISO 8217– Petroleum products.	The reduction of buoyancy must not exceed 5%. The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 11_____X_____X_____ _____X_____X_____ 12_____X_____X_____ _____X_____X_____ % change in dimensions 11 _____% 12 _____% Buoyancy after 1 day Buoyancy after 7 days 11 _____ _____ 12 _____ _____ % change in buoyancy 11 _____% 12 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.10 Diesel oil test (Grade A)*		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2.2, 6.2.3.3, 6.2.7 & 2.6.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in diesel oil (grade A) for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C) After completing the above immersion, the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority). * Refer to ISO standards ISO 8216 and ISO 8217– Petroleum products.	The reduction of buoyancy must not exceed 5% The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 13_____X_____X_____ _____X_____X _____ 14_____X_____X_____ _____X_____X _____ % change in dimensions 13 _____% 14 _____% Buoyancy after 1 day Buoyancy after 7 days 13 _____ _____ 14 _____ _____ % change in buoyancy 13 _____% 14 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.11 High octane petroleum spirit test		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2.2, 6.2.3.4, 6.2.7 & 2.6.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in high octane petroleum spirit for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion, the two specimens should be immersed for a period of seven days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 15_____X_____X_____ _____X_____X _____ 16_____X_____X_____ _____X_____X _____ % change in dimensions 15 _____% 16 _____% Buoyancy after 1 day Buoyancy after 7 days 15 _____ _____ 16 _____ _____ % change in buoyancy 15 _____% 16 _____% Comments/Observations Passed: _____ Failed: _____

Lifeboat buoyant material	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.3.12 Kerosene test		**Regulations: LSA Code 1.2; MSC.81(70) 1/6.2.2, 6.2.3.5, 6.2.7 & 2.6.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Two specimens of the material should be immersed in kerosene for a period of 14 days under a 100 mm head. The specimens should be tested as supplied by the manufacturer and at normal room temperature (approximately 18°C). After completing the above immersion, the two specimens should be immersed for a period of 7 days under a 1.25 m head of water. The results should state the buoyant force in N which each specimen could support out of the water after 1 and 7 days immersion (the selection of a test method suitable for obtaining this result directly or indirectly is left to the discretion of the testing authority).	The reduction of buoyancy must not exceed 5%. Specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities.	Dimensions before test Dimensions after test 17_____X_____X_____ _____X_____X _____ 18_____X_____X_____ _____X_____X _____ % change in dimensions 17 _____% 18 _____% Buoyancy after 1 day Buoyancy after 7 days 17 _____ _____ 18 _____ _____ % change in buoyancy 17 _____% 18 _____% Comments/Observations Passed: _____ Failed: _____

4.3.4 INFLATABLE LIFERAFT MATERIALS

EVALUATION AND TEST REPORT

4.3.4.0 Submitted drawings, reports and documents

4.3.4.1 Quality assurance

4.3.4.2 Fabric marking and selection

4.3.4.3 Tensile strength

4.3.4.4 Tear strength

4.3.4.5 Surface receptiveness and adhesion of surface coating

4.3.4.6 Effects of ageing

4.3.4.7 Low temperature flexing

4.3.4.8 Flex cracking

4.3.4.9 Porosity

4.3.4.10 Oil resistance

4.3.4.11 Weft distortion

4.3.4.12 Resistance to blocking

4.3.4.13 Hydrolysis resistance for thermoplastic coated materials only

4.3.4.14 Ozone resistance

4.3.4.15 Tensile strength (Fabrics used for outer canopies)

4.3.4.16 Tear strength (Fabrics used for outer canopies)

4.3.4.17 Low temperature flexing (Fabrics used for outer canopies)

4.3.4.18 Waterproofness (Fabrics used for outer/inner canopies)

4.3.4.19 Surface receptiveness and adhesion of surface coating (Fabrics used for outer canopies)

4.3.4.20 Colour (Fabrics used for outer canopies)

4.3.4.21 Effect of ageing (Fabrics used for outer canopies)

4.3.4.22 Tensile strength (Fabrics used for inner canopies)

4.3.4.23 Porosity (Fabrics used for inner canopies)

4.3.4 INFLATABLE LIFERAFT MATERIALS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.0 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.1 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, or the International Life-Saving Appliance (LSA) Code, as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.2 Fabric Marking & Selection		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.1**
Test Procedure	Acceptance Criteria	Significant Test Data
	The fabric should be marked in such a manner as to allow traceability of the fabric manufacturer and production LOT number.	Is the fabric marked? YES_NO Marking Schedule: _____ Comments/Observations Passed: _____ Failed: _____

4.3.4.3 Tensile Strength		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength ISO 1421:1998	When tested by the method described in ISO 1421:1998 the tensile strength should be a minimum of 2255 N/50 mm width for warp and weft. Maximum elongation, for the above should be 30% over a 200 mm gauge length, the elongation should be expressed as a percentage of the initial test length between the jaws. Where two layers of floor fabric are provided to form an inflatable floor, the main floor should be as specified. The inner/outer layer may have a minimum tensile strength of 1470 N/50 mm widths in warp and weft direction.	Warp tensile strength _____N/50mm Weft tensile strength _____ N/50mm Warp elongation _____ % Weft elongation _____ % The floor inner/outer layer tensile strength: Warp _____ N/50mm Weft _____ N/50mm Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.4 Tear Strength		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Tear Strength ISO 1421:1998	When tested with the apparatus described in ISO 1421:1998, the tear strength should be: Minimum warp and weft 1030 N. Where two layers of the floor fabric are provided to form an inflatable floor, the main floor should be as specified. The inner/outer layer may have a minimum tear strength of 735 N in warp and weft direction The preparation of the test specimens should be as follows: .1 from the test sample cut 3 specimens each in warp and weft directions, 76 mm ±1 mm wide and 400 mm long, with the length closely parallel to the warp and weft yarns. Space the selection across the full length and width of the sample. Make a 12.5 mm cut across the middle of each specimen at right angles to the length. .2 grip the specimen under test securely and evenly in the grips, which should be 200 mm apart, so that the specimen length is closely in the direction of the pull. Operate the machine in accordance with ISO 1421:1998. The maximum load sustained is recorded as the wound tear strength, and the average for the 3 specimens is calculated.	<u>Tear strength</u> Warp _____N Weft _____N (record for samples 1,2, 3 and average) <u>The floor inner/outer layer tear strength</u> Warp _____N Weft _____N (record for samples 1, 2, 3 and average) Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.5 Surface Receptiveness and Adhesion of Surface Coating	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Surface Receptiveness and Adhesion of Surface Coating ISO 2411:2000	.1 When tested by the method described in ISO 2411:2000 the Surface Receptiveness on either face should not be less than 75 N/50 mm width. .2 For dry Surface Coating Adhesion a minimum of 75 N/50 mm is required. .3 For wet Surface Coating Adhesion as described in 4.3.4.5.8 below a minimum of 50 N/50 mm is required. .4 Each coated face should be tested. The specimens should be made up as in ISO 2411:2000 bonding like-coated face to like-coated face. .5 The bonding used and the method of application should be agreed between the liferaft manufacturer and the finished fabric manufacturer, and should be the same as those used during the manufacture of the liferaft. .6 On each test specimen the bonding between the adhesive or weld and the coating should be initially measured to determine the surface receptivity. .7 The adhesion of the coating to the base textile is then measured by cutting through one coating layer to initiate the required mode of separation. .8 After testing in .4 above for adhesion of coating to the base textile the specimen should be immersed for 24 hours in a 3% aqueous solution of sodium chloride at 20°C ±2°C. At the end of the immersion period the specimen should be removed from the solution and, while still wet, tested by the method specified in ISO 2411:2000.	Surface receptiveness Face 1 _____ N/50 mm Face 2 _____ N/50 mm Dry surface-coating adhesion _____ N/50 mm Wet surface-coating adhesion _____ N/50 mm Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.6 Effects of Ageing		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Effects of Ageing ISO 4892-4:2004	.1 **Folding Test** – when tested as prescribed below there should be no cracks, separation of plies or brittleness visible when the samples are inspected under a magnification of 4.3.4.6.2. .2 **Tensile Test** – when tested as prescribed below the tensile strength after ageing should be not less than 90% of the original tensile strength before ageing. .3 **Ultra-Violet Resistance** – (**option 1**) this test should be performed in accordance with the methods specified in ISO 4892-4:2004 - Open-flame carbon- arc lamps, as follows: .a Expose the conditioned samples to an enclosed carbon arc lamp without "Corex D" filters for 100 h. The carbons should be Copper Clad Sunshine Arc Type, No. 22 for the upper pair and No. 13 for the lower pair, or equivalent. Only the intended outside surface of the fabric is to be exposed to the arc in the testing apparatus. The specimens should be exposed to water spray, with the apparatus operated so that the specimens are exposed to successive cycles of 102 min of light without spray and 18 min of light with spray. The black panel temperature should be 80°C ±5°C. The total exposure time should be 100 h. .b Test the tensile strength of the material after exposure following the procedure in 4.3.4.3. The tensile strength should be not less than 90% of the original tensile strength before ageing. .c The exposed material should be bent, more heavily coated side out, around a 3.2 mm mandrel and examined visually for cracking. There should be no cracking.	Folding test: Were there cracks, separation of plies or brittleness visible YES/ NO Tensile test: Tensile strength after ageing _____ %. Dimensional stability Air _____ % Over water _____ % Comments/Observations % change: - Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

<table>
<tr><td colspan="2">4.3.4.6 Effects of Ageing (continued)</td><td colspan="5">Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4</td></tr>
<tr><td>Test Procedure</td><td colspan="5">Acceptance Criteria</td><td>Significant Test Data</td></tr>
<tr><td rowspan="11"></td><td colspan="5">.3 Ultra-Violet Resistance – (option 2) Alternatively, this test may be performed in accordance with the methods specified in ISO 4892-2:2006 with amendment 1:2009 – Xenon Arc type testing. The specimens should be exposed under conditions specified below, using a controlled irradiance water-cooled Xenon Arc apparatus for a total exposure time of 150 h.</td><td rowspan="11">Inspect for:

Stickiness/cracks? YES/NO

Separation of piles? YES/NO

Brittleness? YES/NO

Sample: 1 2 Average

Dry aged specimen

Wet aged specimen

Tensile strength after exposure _____ %

Were there cracks in material? YES/NO</td></tr>
<tr><td>Exposure conditions</td><td>Dark cycle (1 hour)</td><td colspan="3">Light cycle (2 hours)</td></tr>
<tr><td>Automatic irradiance (Filter Q/B)</td><td>Nil</td><td colspan="3">0.55 W/m² -nm at 340 nm</td></tr>
<tr><td>Black panel temperature</td><td>38°C ± 2°C</td><td colspan="3">70°C ± 2°C</td></tr>
<tr><td>Dry bulb temperature</td><td>38°C ± 2°C</td><td colspan="3">47°C ± 2°C</td></tr>
<tr><td>Relative humidity</td><td>95 ± 5%</td><td colspan="3">50 ± 5%</td></tr>
<tr><td>Conditioning water</td><td>40°C ± 4°C</td><td colspan="3">45°C ± 4°C</td></tr>
<tr><td rowspan="2">Water spray</td><td rowspan="2">60 min on front and back of specimen</td><td>40 min</td><td>20 min</td><td>60 min</td></tr>
<tr><td>Nil</td><td>Front of specimen only</td><td>Nil</td></tr>
<tr><td colspan="5">Only the intended outside surface of the fabric should be exposed to the arc. The tensile strength of the material should be tested after exposure following the procedure in 4.3.4.3. The tensile strength should be not less than 90% of the original strength before ageing. The exposed material should be bent, with heavily coated side out, around a 3.2 mm mandrel and each coated face examined visually for cracking. There should be no cracking during this examination.</td></tr>
</table>

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.6 Effects of Ageing (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
	The performance requirements specified in this subparagraph relate to the behaviour of individual specimens under particular conditions of test. As the spectrum of light from the Carbon Arc differs from that of the Xenon Arc, caution should be exercised in interpreting the test results of both methods. .4 Three separate specimens should be tested as follows: .a Dimensional Stability .b Folding and .c Tensile Strength For 4.3.4.6.4.1 and 4.3.4.6.4.2 cut from the test sample 4 specimens at least 100 mm square with the sides closely parallel to the warp and weft threads. Measure the dimensions of two specimens accurately for 4.3.4.6.4.1. For 4.3.4.6.4.3 cut two sets of specimens as in 4.3.4.3. .5 When tested as below the difference in dimensions of the sample before and after ageing should not differ by more than 2%. .6 Ageing of specimens test procedure: .a Freely suspend one specimen each for 4.3.4.6.4.1 and 4.3.4.6.4.2, and one set of specimens for 4.3.4.6.4.3 in air for 7 days at 70°C ± 2°C. Suspend the other specimens above water in a loosely closed vessel for 7 days at 70°C ±2°C. .b Remove the two measured specimens from the ageing oven. After 15 min at room temperature measure the dimensions and report the percentage changes in warp and weft directions.	% change: Inspect for: Stickiness/cracks? YES/NO Separation of piles? YES/NO Brittleness? YES/NO Sample: 1 2 Average Dry aged specimen Wet aged specimen Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.6 Effects of Ageing (continued)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.c Remove the other two specimens. After 15 min at room temperature fold the specimens consecutively in two directions parallel to the edges at right angles to each other so as to reduce the exposed area of each specimen to one quarter of its original size. Unfold and refold along the same creases but with each fold reversed in direction. After each folding, press the fold by rubbing fingers and thumb along it: inspect the specimens for cracks, separation of plies, stickiness or brittleness. .d For the Tensile Strength Test remove the two sets of specimens from the ageing oven. Dry the wet aged specimens for 1 h in air at 70°C ±2°C, and then condition both sets for 24 h. Test in accordance with paragraph 4.3.4.3.	

4.3.4.7 Low Temperature Flexing	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Low Temperature Flexing ISO 4675:1990	.1 When tested at a temperature not higher than -50°C by the method prescribed below, there should be no visible cracking of the sample when inspected under a magnification of 2. The test should be independently applied to each face of the coated fabric. .2 The apparatus, preparation of test specimens and test procedure should be as described in ISO 4675:1990, except that: .a when tested at the specified low temperature no specimen should show cracks; and .b there should be 6 test specimens, 3 cut with the long side closely parallel to the warp and 3 cut with the long side closely parallel to the weft direction.	Was there any visible cracking under a magnification of x2: YES/NO Specimen No. Pass ____ Fail: ____ Pass ____ Fail: ____ Pass ____ Fail: ____ Pass ____ Fail: ____ Pass ____ Fail: ____ Pass ____ Fail: ____ Pass ____ Fail: ____ Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.8 Flex Cracking		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Flex Cracking ISO 7854:1995	After the specimen has been conditioned by exposing the outer face to a 3% aqueous solution of sodium chloride for seven days at 20°C ±2°C, it should be tested as described in ISO 7854:1995. After 200,000 flexings no cracking or delamination should be visible when inspected under a magnification of 2.	After flexing was there any cracking or delamination under a magnification of 2? YES/NO Comments/Observations Passed: _____ Failed: _____

4.3.4.9 Porosity		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Porosity ISO TR 6065	When tested by the method described below and with a pressure of 27.5 kPa applied and maintained beneath the fabric, there should be no signs of any leakage over a minimum period of 5 min. .1 Test for porosity A specimen of the fabric should be prepared and tested in accordance with ISO TR 6065 paragraph A.2.10.2.	Was there any leakage? YES/NO Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.10 Oil resistance	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.8.1 - .3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Oil resistance ISO TR 6065	.1 When tested by the method prescribed below, after exposing the outer surface to oil ASTM No. 1, for 2 h at 20°C ± 2°C, there should be no separation of coating from textile and no residual tackiness when two exposed faces are pressed together. The coating should not smear when rubbed with a single pass of the finger. .2 The test should be carried out not less than 16 h after vulcanization or curing. .3 The apparatus, preparation of specimens and test procedure should be in accordance with ISO TR 6065, paragraph A.2.5. Each coated face should be tested.	Was there any separation of coating or residual tackiness YES/NO (Face 1) YES/NO (Face 2) Comments/Observations Passed: _____ Failed: _____

4.3.4.11 Weft Distortion	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Weft Distortion	The weft distortion should be not more than the equivalent of 100 mm maximum over a fabric width of 1.5 m. A line should be drawn across the fabric at right angles to the selvedge. The weft distortion, skew and/or bow should be measured.	Weft distortion _____ mm. Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.12 Resistance to Blocking		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
Resistance to Blocking ISO 5978:1990	.1 When tested by the method prescribed below the fabric should exhibit no blocking. .2 The preparation of specimens and test procedure should be in accordance with ISO 5978:1990 except that the duration of time under load should be 7 days.	Was the weight lifted? YES/NO Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.13 Hydrolysis Resistance for Thermoplastic Coated Materials only	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.2.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Hydrolysis Resistance for Thermoplastic Coated Materials only	.1 When tested by the methods prescribed below, the following performance values should be achieved: .a Coating adhesion 50 N/50 mm minimum .b Blocking resistance 100 g maximum .c Folding test – No cracks, delamination or visual deterioration .2 The following test requirements apply to fabrics or test specimens, which have been stored for 12 weeks over water in a closed container at 93°C. .3 The following test should be performed after drying the specimens for 1 h at 80°C ±2°C, and conditioning at 20°C ±2°C, 65% RH for 24 h. .4 The coating adhesion of the stored material specimen should be made up and tested in accordance with 4.3.4.5 after the requirements of 4.3.4.13.2 above have been carried out. .5 The blocking resistance should be tested in accordance with 4.3.4.12. .6 Two test samples 100 mm ±2 mm square should be cut from the stored material. The samples should be folded as defined in 4.3.4.6.6.3 and examined for evidence of cracks, ply separation, stickiness or brittleness.	Coating adhesion _____ N/50 mm. Blocking Test: Was the weight lifted? YES/NO Folding Test: Were there any cracks, delamination or visual deterioration after folding test? YES/NO Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.14 Ozone resistance	**Regulations: LSA Code IV/4.2 MSC.81(70) 1/5.17.13.2.2.12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Ozone resistance ISO 3011:1997	.1 When tested by the method prescribed below, no cracks should be visible at a magnification of 5. .2 The preparation of samples and test procedure should be in accordance with specification ISO 3011:1997. The following conditions should apply: .1 Ozone concentration: 50 ppm .2 Temperature: 20°C ±2°C .3 Exposure time: 8 h .4 Mandrel diameter: 6 x sample thickness	Were there any cracks visible at a magnification of 5? YES/ NO Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.15 Tensile Strength (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength	When tested by the method prescribed in 4.3.4.3, the tensile strength should be: Minimum: For warp and weft 930N/50mm of width	Tensile strength: - Warp: _____N/50 mm Weft: _____ N/50 mm Comments/Observations Passed: _____ Failed: _____

4.3.4.16 Tear Strength (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Tear Strength	When tested by the method prescribed in paragraph 4.3.4.4, the tear strength should be: Minimum: For warp and weft 490 N	Tear strength Warp: _____N Weft:_____N Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.17 Low Temperature Flexing (Fabrics used for outer canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Low Temperature Flexing	When tested at a temperature not higher than -30°C by the method prescribed in 4.3.4.7, there should be no visible cracking of the sample when inspected under a magnification of 2. The test should be independently applied to each face of the coated fabric.	Was there visible cracking of the sample? YES/NO (Face 1) YES/NO (Face 2) Comments/Observations Passed: _____ Failed: _____

4.3.4.18 Waterproofness (Fabrics used for outer/inner canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
Waterproofness	.1 When tested by the method prescribed below, no water should pass through the cone within 30 min. The coated fabric should not contain any material that is known to be injurious to a survivor drinking rainwater collected from the canopy. Fabrics may be coated on one or both sides. .2 The test specimen should be cut to a size of 300 mm x 300 mm and tested in accordance with the following procedure: Fold the specimen twice at right angles and open it out into the form of a cone. Secure the cone with a paper clip and insert it into a suitable funnel supported on a flask. Pour 500 ml of water into the cone. Record any penetration of water to the outside of the cone after 30 min.	Did water pass through the cone? YES/NO Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.19 Surface Receptiveness and Adhesion of Surface Coating (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Surface Receptiveness and Adhesion of Surface	When tested by the method prescribed in 4.3.4.5, the surface receptiveness on either face should not be less than 25N/50 mm width surface. For coating adhesion, a minimum of 25N/50 mm is required.	Surface receptiveness on each face? YES/ NO Face 1: _____ N/50 mm Face 2: _____ N/50 mm Coating adhesion: _____ N/50 mm Comments/Observations Passed: _____ Failed: _____

4.3.4.20 Colour (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Colour	The liferaft canopy should be evaluated after the mooring out test in 4.18 or an equivalent method using artificial light to determine whether the coating is sufficiently colour fast.	Reference should be made to mooring out test. Comments/Observations: Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.21 Effects of Ageing (Fabrics used for outer canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.3.7**
Test Procedure	Acceptance Criteria	Significant Test Data
Effects of Ageing	.1 Folding Test – when tested by the method prescribed in 4.3.4.6.1 there should be no cracks, separation of plies or brittleness visible when the samples are inspected under a magnification of 2. .2 Tensile Test – when tested by the method prescribed in 4.3.4.6.2 at least 90% of the original tensile strength should be retained in both warp and weft direction.	Were there any cracks, separation of plies or brittleness visible? YES/ NO Tensile strength after ageing: ____ % Warp _____ % Weft Comments/Observations Passed: _____ Failed: _____

4.3.4.22 Tensile Strength (Fabrics used for inner canopies)		**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Tensile Strength	When tested by the method prescribed in 4.3.4.3 should be: - Minimum: Warp and weft 100N/50 mm of width	Tensile strength Warp: _____ N/50 mm Weft: _____ N/50 mm Comments/Observations Passed: _____ Failed: _____

Inflatable liferaft materials	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.4.23 Porosity (Fabrics used for inner canopies)	**Regulations: LSA Code IV/4.2; MSC.81(70) 1/5.17.13.2.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
	As the inner canopy serves as a barrier to provide a static layer of air, it should either be of a close weave construction or have a low porosity to air.	Comments/Observations Passed: _____ Failed: _____

4.3.5 SEARCHLIGHTS FOR LIFEBOATS AND RESCUE BOATS

EVALUATION AND TEST REPORT

4.3.5.0 General information
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4.3.5 SEARCHLIGHTS FOR LIFEBOATS AND RESCUE BOATS EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.0.1 General data and specifications		**Regulations: LSA Code/Res. MSC.81(70)**
General Information	**Search Light Dimensions**	**Search Light Weight**

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.0.3 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____	Date: _____ Time: _____ Surveyor: _____

	Lot/Serial Number: _____	Organization: _____

4.3.5.1 Visual Inspection	**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.4.6.11; MSC.81(70) 1/ 13.1/13.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
One search light should be examined in detail for the following items: Approval marking Manufacturer's label Additional markings Electrical short circuit protection	The search light should: .1 be clearly marked with approval information including the Administration which approved it, and any operational restrictions; .2 be marked with the voltage and power consumption; .3 provide the following information: - serial number; - identification of the manufacturer; - easily understandable symbols for on/off switching; - where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE/ DO NOT RECHARGE/DO NOT TAMPER"; and .4 where applicable, be provided with electrical short circuit protection to prevent damage or injury.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.1 Visual Inspection (continued)		**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.4.6.11; MSC.81(70) 1 13.1/13.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Construction and materials	Search lights should: .1 be constructed with proper workmanship and materials and in such a way that the accumulation of condensed water in hazardous quantities is avoided;	Passed: _____ Failed: _____
	.2 be designed in such a way that the illuminant is safely fitted in the search light without using screwed sockets and can easily be replaced also in darkness;	Passed: _____ Failed: _____
	.3 be made of non-magnetic material;	Passed: _____ Failed: _____
	.4 be constructed to avoid accidental access to dangerous voltages;	Passed: _____ Failed: _____
Operational controls	.5 be constructed in such a way that outer parts do not reach temperatures during operation which restrict their manual use; and	Passed: _____ Failed: _____
After having passed the visual inspection the searchlight should be subjected next to the temperature tests.	.6 have operational controls in compliance with A.694(17) paragraph 3, IEC 60447:2004, and IEC 60945:2002 paragraphs 4.2.1.2, 4.2.1.3 and 4.2.1.4.	Passed: _____ Failed: _____ Comments/Observations

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.2 Temperature Tests		**Regulations: LSA Code I/1.2.2.1, 1.2.2.2; MSC.81(70) 1/ 13.2/13.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the visual inspection should be subjected to a dry heat test according to IEC 60945:2002, paragraph 8.2, followed by a damp heat test (8.3), a low temperature test (8.4), and thermal shock (8.5). After having passed the temperature tests the searchlight should be subjected next to the vibration test.	The searchlight should not be damaged in stowage throughout the air temperature range of -30° to +65°C. After these tests, the search light should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should be capable of being operated.	Results: Comments/Observations Passed: _____ Failed: _____

4.3.5.3 Vibration Test		**Regulations: LSA Code I/1.2.2.1, 1.2.2.8; MSC.81(70) 1/13.2/13.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the temperature tests, should be subjected to a vibration test according to IEC 60945:2002, paragraph 8.7. After having passed the vibration test the searchlight should be subjected next to the corrosion and rain test.	The searchlight should be constructed with proper workmanship and materials. The searchlight should function after the test.	Results: Comments/Observations Passed: _____ Failed: _____

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.4 Corrosion and Rain Test		**Regulations: LSA Code 1.2.2.1/1.2.2.4; MSC.81(70) 1/ 13.2/13.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the vibration test should, where applicable, be subjected to a corrosion test according to IEC 60945:2002, paragraph 8.12, and a rain test according to IEC 60945:2002, paragraph 8.8. After having passed the corrosion and rain test the searchlight should be subjected next to the interference test.	The searchlight should be constructed with proper workmanship and materials, and, where applicable, be rot-proof, corrosion resistant and not be unduly affected by seawater. After the tests, the searchlight should show no sign of damage and should be capable of being operated.	Results: Comments/Observations Passed: _____ Failed: _____

4.3.5.5 Interference Test		**Regulations: MSC.81(70) 1/ 13.2/13.2.4;**
Test Procedure	Acceptance Criteria	Significant Test Data
The search light which has passed the corrosion and rain test should be subjected to the interference test for unwanted electromagnetic emission according to resolution A. 694(17) and IEC 60945:2002, paragraph 9. After having passed the interference test the searchlight should be subjected next to the power supply test.	The search light should not radiate unwanted electromagnetic emission according to IEC 60945:2002, paragraph 9 to ensure electromagnetic compatibility between search light and other radiocommunication and navigational equipment carried on board.	Results: Comments/Observations Passed: _____ Failed: _____

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.6 Power Supply Test		**Regulations: MSC.81(70) 1/ 13.2/13.2.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the interference test, should be subjected to the power supply test. The search light should be operated with 12 V or 24 V and should be tested for extreme power supply according to resolution A. 694(17) and IEC 60945:2002, paragraph 7.1 and excessive conditions according to paragraph 7.2. After having passed the power supply test the searchlight should be subjected next to the light tests.	The search light should continue to operate also in the presence of variations of the power supply according to IEC 60945:2002, paragraphs 7.1 and 7.2. Means should be incorporated for the protection of the search light from the effects of excessive current and voltage, transient and accidental reversal of power supply polarity or phase sequence according to IEC 60945:2002, paragraph 7.2. If provision is made for operating the search light from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the searchlight.	Results: Comments/Observations Passed: _____ Failed: _____

Searchlights for lifeboats and rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.5.7 Light Tests	**Regulations: LSA Code 4.4.8.29/5.1.2.2.11; MSC.81(70) 1/ 10.4.9/13.4/13.4.1/13.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
The searchlight, which has passed the power supply test, should be subjected to light tests. The voltage of the test unit should be monitored continuously for the specific time. To make sure that the test unit provides a light distribution and a luminous intensity of not less than the specified luminous intensity after the specified time of operation, the following test should be performed: It must be demonstrated that the light reaches the light distribution and the required luminous intensity when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No. 70 contains further information). Luminous intensity should be measured by a photometer directed at the center of the light source with the test light on a rotating table. Luminous intensity should be measured in a horizontal direction at the level of the center of the light source and continuously recorded through a 360° rotation. These measurements should be taken in the azimuth angle at 0.5° intervals above the horizon up to 3°. Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 6°.	The luminous intensity of the searchlight should be at least 2.5×10^3 cd. The axial luminous intensity should be at least 90 % of the maximum luminous intensity. The luminous intensity should be at a maximum in the center of the luminous intensity distribution. A homogenous luminous intensity distribution should be ensured. The effective light emission sector should be circular and reach vertically and horizontally at least 6°. The searchlight should be suitable for a permanent operation of not less than 3 h. During this period the requirements of light distribution and luminous intensity should be fulfilled.	Results: All measured data of luminous intensity and voltage should be documented. Comments/Observations Passed: _____ Failed: _____

4.3.6 SURVIVAL CRAFT POSITION INDICATING LIGHTS EVALUATION AND TEST REPORT

Definitions:
Survival craft lights are liferaft lights and lifeboat lights.
Survival craft exterior lights are liferaft exterior lights (liferaft canopy lights) and lifeboat exterior lights (lifeboat enclosure lights or lifeboat cover lights).
Survival craft interior lights are liferaft interior lights and lifeboat interior lights.

Remark:

Rescue boat exterior lights should be treated as lifeboat exterior lights.

4.3.6.0	General information	
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4.3.6.7	Mould growth test	
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4.3.6.9	Solar radiation test (not for survival craft interior lights)	
4.3.6.10	Test for oil resistance (not for survival craft interior lights)	
4.3.6.11	Rain test and watertightness test	
4.3.6.12	Fire test (not for survival craft interior lights)	

4.3.6 SURVIVAL CRAFT POSITION INDICATING LIGHTS EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.0.1 General data and specifications		**Regulations: LSA Code/Res. MSC.81(70)**
General Information	Survival Craft Light Dimensions	Survival Craft Light Weight
TYPE OF SWITCHING: Automatic/Manual FLASHING LIGHT or STEADY LIGHT		Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.0.3 Quality assurance	**Regulations: - MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.1 Visual Inspection	**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.1.3.4/4.4.7.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Nineteen survival craft exterior or sixteen interior lights (as the case may be) should be detailed examined for the following items:		Results:
Approval marking	The survival craft lights should be clearly marked with approval information including the Administration which approved it, and any operational restrictions;	Approval marking: PASS/FAIL
Expiry marking	Be marked with the date of expiry; the Administration should determine the period of acceptability, due to deterioration with age. The established life must be justified by the manufacturer.	Expiry marking: PASS/FAIL
Additional markings	Provide the following information: .1 precise definition of intended use (e.g. "Exterior light for inflatable liferafts"); .2 serial number; .3 identification of the manufacturer; .4 easily understandable symbols for on/off switching; and .5 where applicable, information on proper battery disposal by the words: "DO NOT INCINERATE/DO NOT RECHARGE/DO NOT TAMPER".	Additional marking: PASS/FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____	Date: _____ Time: _____

	Model: _____ Lot/Serial Number: _____	Surveyor: _____ Organization: _____

4.3.6.1 Visual Inspection (continued)	**Regulations: LSA Code 1.2.2.1/1.2.2.9/1.2.2.10/1.2.3/4.1.3.4/4.4.7.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Nineteen survival craft exterior or sixteen interior lights (as the case may be) should be detailed examined for the following items (continued):		Results:
Electrical short circuit protection	The survival craft lights should be provided with electrical short circuit protection to prevent damage or injury;	Short circuit protection: PASS/FAIL
Construction and materials	Be constructed with proper workmanship and materials.	Construction: PASS/FAIL
Fitting	Survival craft interior lights should: .1 be fitted inside the survival craft: .2 be fitted to the top of the survival craft to ensure a light emission in all directions of the upper hemisphere.	Fitting: PASS/FAIL
Lights	Should only be electric lights.	Lights: PASS/FAIL Comments/Observations

SURVIVAL CRAFT INTERNAL AND EXTERNAL LIGHTS FLOWCHART

Visual Inspection (all 19 external lights and 16 internal lights) 4.3.6.1

Temperature Cycling (12 internal and 12 external lights in groups of 4) 4.3.6.2:

- lights 1 through 4: Light test (hot) 4.3.6.3
- lights 5 through 8: light test (cold) 4.3.6.3
- lights 9 through 12: light test (ambient) 4.3.6.3

Any one of the 12 external lights that has passed the Light test - Chromaticity Test 4.3.6.4

Light 13 (Internal and External) – Switch arrangement test 4.3.6.5 — same lights subjected to Vibration test 4.3.6.6

Light 14 (Internal and External) - 28 day mould growth test (may be waived) 4.3.6.7

Light 15 (Internal and External) - Corrosion and seawater resistance test (may be waived) 4.3.6.8

Light 16 (External Light Only) - Solar Radiation (may be waived) 4.3.6.9

Light 17 (External Light only) - Oil resistance test 4.3.6.10

Light 18 (External Light and Light 16 Internal Light) - rain test and watertightness test 4.3.6.11

Light 19 (External Light only)– fire test 4.3.6.12

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.2 Temperature cycling test	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Twelve survival craft exterior or interior lights (as the case may be) which have passed the visual inspection should be subjected to temperature cycling. The following test should be carried out on twelve survival craft lights: The survival craft lights should be alternately subjected to surrounding temperatures of not less than -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of not less than 10 cycles, is acceptable: .1 at least an 8 h exposure at a minimum temperature of +65°C to be completed in one day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day; .3 at least an 8 h exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ±3°C until the next day.	The survival craft lights should not be damaged in stowage throughout the air temperature range of -30°C to +65°C. The survival craft lights should show no sign of loss of rigidity under high temperatures and, after the tests, should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities and should function after the test.	Results: Attach temperature cycling chart to record times spent at each temperature PASS/FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.2 Temperature cycling test (continued)	**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
If the lifeboat enclosure light, lifeboat cover light or lifeboat interior light is connected to the lifeboat's electrical network and can be supplied with electrical power from any of the lifeboat's batteries as well as from the lifeboat's engine-driven generator set, the light should only be subjected to the test as far as practicable. After having passed the temperature cycling test the lights should be subjected next to the light tests.		Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.2 Temperature cycling test – Test data			**Regulations: LSA Code 1.2.2.2; MSC.81(70) 1/ 1.2/1.2.1/1.2.2/10.1/10.1.1**	
	HOT CYCLE		**COLD CYCLE**	
Cycle 1	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 2	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 3	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 4	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 5	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 6	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 7	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 8	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 9	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C
Cycle 10	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C	Date In: Time In: Temperature: ____°C	Date Out: Time Out: Temperature: ____°C

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.3 Light tests	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.1.2, 10.1.3, 10.1.4, 10.4, 10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
In the case of seawater cell power sources, four survival craft lights which have passed the temperature cycling test should be taken from a stowage temperature of -30°C and be operated immersed in seawater at a temperature of -1°C; four survival craft lights which have passed the temperature cycling test should be taken from a stowage temperature of +65°C and be operated immersed in seawater at a temperature of +30°C; and four survival craft lights which have passed the temperature cycling test should be taken from ordinary room conditions and be operated immersed in fresh water at ambient temperature. In the case of dry cell power sources, provided that they will not come into contact with seawater, four survival craft lights which have passed the temperature cycling test should be operated at an air temperature of -30°C, four survival craft lights which have passed the temperature cycling test should be operated at an air temperature of +65°C, and four survival craft lights which have passed the temperature cycling test should be operated at ambient temperature. If the voltage at 5 min of operation is lower than the recorded voltage at the end of life it is permissible to use a lamp from the same build standard for the light output test.	Survival craft lights should continue to provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for a period of not less than 12 h. In the case of a flashing light, it should be established that the rate of flashing for the 12 h operative period is not less than 50 flashes and not more than 70 flashes per minute and that the effective luminous intensity is at least 4.3 cd in all directions of the upper hemisphere. (See formula below to calculate the effective luminous intensity). The interior lights should provide an arithmetic mean luminous intensity of not less than 0.5 cd when measured over the entire upper hemisphere to permit reading of survival instructions and equipment instructions for a period of not less than 12 h.	Results: All luminous intensity data is to be attached here. PASS/ FAIL Results: PASS/FAIL: Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.3 Light tests (continued)	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.1.2, 10.1.3, 10.1.4, 10.4, 10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Using the lowest recorded voltage, a light output test can be carried out as described below. The voltage of the 12 test units should be monitored continuously for 12 h. To make sure that all these test units provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for 12 h operation, the following test should be performed: It must be demonstrated that at least one light from each of the specified temperature ranges reaches the required luminous intensity in all directions of the upper hemisphere when using a photometer which is calibrated to the photometric standards of the appropriate National or State Standard Institute (Note: CIE Publ. No. 70 contains further information.). The lowest voltage light of the cold temperature test sample lot, the highest voltage light of the high temperature test sample lot and the mean voltage light of the ambient temperature sample lot should be selected. These three lights must be used for the light output tests. In the event that a lamp filament burns out during the light output test, a second light from the same performance test lot may be used. Luminous intensity should be measured by a photometer directed at the center of the light source with the test light on a rotating table.	The effective luminous intensity is to be found from the formula: $\left(\frac{\int_{t_1}^{t_2} I dt}{0.2 + (t_2 - t_1)} \right)_{max}$ where: I is the instantaneous intensity, 0.2 is the Blondel-Rey constant and t_1 and t_2 are time limits of integration in seconds. Flashing lights with a flash duration of not less than 0.3 s may be considered as fixed/steady lights for the measurement of their luminous intensity. Such lights should provide the required luminous intensity in all directions of the upper hemisphere. The time interval between switching on and reaching the required luminous intensity (incandescence time) and all time spent below the required luminous intensity when the light switches off should be disregarded (see figure 10.4.1.)	Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.3 Light tests (continued)	**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.1.2, 10.1.3, 10.1.4, 10.4, 10.4.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Luminous intensity should be measured in a horizontal direction at the level of center of the light source and continuously recorded through a 360° rotation. The first measurements should be taken at 0° (horizontal) and should continue to be taken in the azimuth angle at 5° intervals to a single measurement at 90° (vertical). Luminous intensity should be measured in a vertical direction, beginning at the center of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 180°. All measured data of luminous intensity and voltage should be documented. After having passed the light tests, one external light should be subjected next to the chromaticity test.		Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.4 Chromaticity test		**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.4/10.4.10**
Test Procedure	Acceptance Criteria	Significant Test Data
One external light which has passed the light tests should be tested for chromaticity to determine that it lies within the boundaries of the area "white" of the diagram specified for each colour by the International Commission on Illumination (CIE). The chromaticities of the survival craft lights should be measured by means of colorimetric measurement equipment which is calibrated to the appropriate National or State Standards Institute (Note: CIE Publ. No. 15.2 contains further information). Measurement on at least four points of the upper hemisphere should be taken.	The measured chromaticity coordinates should fall within the boundaries of the area of the diagram as per CIE. The boundaries of the area for white lights are given by the following corner coordinates: x 0.500 0.500 0.440 0.300 0.300 0.440 y 0.382 0.440 0.433 0.344 0.278 0.382 (International Standard on Colours of Light Signals, with colour tables to be developed by CIE.)	Results: All chromaticity data is to be attached here. PASS/FAIL Comments/Observations

4.3.6.5 Switch arrangement test		**Regulations: LSA Code 4.1.3.3/4.1.3.4/4.4.7.10/4.4.7.11/5.1.1.1; MSC.81(70) 1/10.4/10.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to the switch arrangement test. A test person, wearing immersion suit gloves, must be able to switch the survival craft light in its normal operational position on and off three times. After having passed the switch arrangement test the light should be subjected next to the vibration test.	The survival craft exterior or interior light (as the case may be) must function properly.	Results: PASS/ FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.6 Vibration test		**Regulations: LSA Code 1.2.2.1/1.2.2.8; MSC.81(70) 1/10.4/10.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The survival craft exterior or interior light (as the case may be) which has passed the switch arrangement test should be subjected to a vibration test according to IEC 60945:2002, paragraph 8.7.	The survival craft light should be constructed with proper workmanship and materials, The survival craft light should function after the test.	Results: PASS/FAIL Comments/Observations

4.3.6.7 Mould growth test		**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/10.4/10.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to the mould growth test. The survival craft light should be inoculated by spraying with an aqueous suspension of mould spores containing all the following cultures: Aspergillus niger; Aspergillus terreus; Aureobasidium pullulans; Paecilomyces variotii; Penicillium funiculosum; Penicillium ochro- chloron; Scopulariopsis brevicaulis; and Trichoderma viride. The survival craft light should then be placed in a mould growth chamber which should be maintained at a temperature of 29°C +/- 1°C and a relative humidity of not less than 95%. The period of incubation should be 28 days. After this period the survival craft light should be inspected. (Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)	The survival craft light should be rot-proof and not be unduly affected by fungal attack. There should be no mould growth visible to the naked eye and the survival craft light should function after the test.	Results: PASS/ FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.8 Corrosion and seawater resistance test	**Regulations: LSA Code 1.2.2.4/4.1.3.3/4.1.3.4; MSC.81(70) 1/10.4/10.4.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection should be subjected to a corrosion and seawater resistance test according to IEC 60945:2002, paragraph 8.12. Note: .1 If there are no exposed metal parts the Corrosion and Seawater Resistance Test need not be conducted. .2 The Corrosion and Seawater Resistance Test may be waived where the Manufacturer is able to produce evidence that the external metal parts employed will satisfy the test. .3 Automatic activated version should be prevented from switching during the test.	The survival craft light should be corrosion resistant and not be unduly affected by seawater. In a stowed condition, batteries should be of a type that does not deteriorate due to dampness or humidity. Furthermore, the survival craft light should comply with the requirements of IEC 60945:2002, paragraph 8.12.2. There should be no undue deterioration of metal parts and the survival craft light should function after the test. Where the exposed metal is part of the automatic switch sensor, the function test after the 28-day test cannot be done.	Results: PASS/ FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.9 Solar radiation test (not for survival craft interior lights)	**Regulations: LSA Code 1.2.2.5; MSC.81(70) 1/10.4/10.4.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to a solar radiation test according to IEC 60945:2002, paragraph 8.10. (Note: The Solar Radiation Test may be waived where the manufacturer is able to produce evidence that the materials employed will satisfy the test, i.e. UV stabilized.)	The survival craft exterior light should be resistant to deterioration by sunlight. Furthermore, the mechanical properties and labels should be resistant to harmful deterioration by sunlight and the survival craft exterior light should function after the test.	Results: PASS/FAIL Comments/Observations

4.3.6.10 Test for oil resistance (not for survival craft interior lights)	**Regulations: LSA Code 1.2.2.4; MSC.81(70) 1/ 10.4/10.4.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to the test for oil resistance according to IEC 60945:2002, paragraph 8.11. Automatic activated version should be prevented from switching during the test.	After this test the survival craft exterior light should not be unduly affected by oil and should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The survival craft exterior light should function after the test.	Results: PASS/ FAIL Comments/Observations

Survival craft position indicating lights	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.3.6.11 Rain test and watertightness test	**Regulations: LSA Code 1.2.2.4/1.2.2.8/4.1.3.3/4.1.3.4; MSC.81(70) 1/ 10.4/10.4.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior or interior light (as the case may be) which has passed the visual inspection, including its complete power source should be subjected to a rain test according to IEC 60945:2002, paragraph 8.8. After having passed the rain test the survival craft light, including its complete power source, should be immersed horizontally under not less than 300 mm of fresh water for at least 24 h. Automatic activated version should be prevented from switching during the test.	The survival craft light should be rot-proof. The survival craft light should comply with the requirements of IEC 60945:2002, paragraph 8.8.2 and should function after the rain test. Additionally, after the water-tightness test the survival craft light should function and there should be no evidence of water inside the survival craft light.	Results: PASS: FAIL: Comments/Observations

4.3.6.12 Fire test (not for survival craft interior lights)	**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 10.4/10.4.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
One survival craft exterior light which has passed the visual inspection should be subjected to a fire test. A test pan not less than 30 cm x 35 cm x 6 cm should be placed in an essentially draught-free area. Water should be put in the bottom of the test pan to a depth of at least 1 cm followed by enough petrol to make a minimum total depth of not less than 4 cm. The petrol should then be ignited and allowed to burn freely for at least 30 s. The survival craft exterior light should then be moved through the flames, facing them, with the survival craft exterior light not more than 25 cm above the top edge of the test pan so that the duration of exposure to the flames is at least 2 s.	The survival craft exterior light should not sustain burning or continue melting after being totally enveloped in a fire for a period of at least 2 s and after being removed from the flames. The survival craft exterior light should function after the test.	Results: PASS: FAIL: Comments/Observations

4.4 DAVIT-LAUNCHED LIFEBOATS

EVALUATION AND TEST REPORT

4.4.0 General Information
- 4.4.0.1 General data and specifications
- 4.4.0.2 Submitted drawings, reports and documents
- 4.4.0.3 Quality assurance

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- 4.4.1.4 Steering mechanism
- 4.4.1.5 Release mechanism
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- 4.4.2.1 Flooded stability test
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- 4.4.2.4 Flooded capsizing test (totally enclosed lifeboats)

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4.4.6 Towing and painter tests
- 4.4.6.1 Towing test
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4.4.7 Strength tests
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4.4 DAVIT-LAUNCHED LIFEBOATS
EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.0.1 General data and specifications		**Regulations: LSA Code 4.4, 4.5, 4.6, 4.8 & 4.9**
General Information	Lifeboat Dimensions	Lifeboat Weight
Construction Material: Hull Canopy: Lifeboat Inherent Buoyancy Material: Weight: Volume: Engine Installed: Manufacturer: Type: Power: Gear Ratio: Propeller: Release Mechanism: Manufacturer: Type: SWL: Service: Passenger ship/Cargo ship Occupancy (150 max.): Persons (75 kg each): Or Persons (82.5 kg each): (150 max.)	**Molded Dimensions:** Length: Breadth: Depth:	**Design Weight**: Unloaded Boat: Loose Equipment: Food: Water: Fuel: Persons: **Calculated Loaded Weight:** Fully Equipped: With Persons: **Weight as Tested:** Fully Equipped: Comments/Observations Passed: _____ Failed: _____

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.0.3 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.1 Occupant space		**Regulations: LSA Code 4.4.1.8, 4.4.2.2/3, 4.4.3.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Interior Floor to Canopy Height** Over 50% of the floor area the height should be not less than 1.3 m for lifeboats carrying 9 or fever persons and 1.7 m for lifeboats carrying 24 or more persons. Linear interpolation for occupancy between 9 and 24 persons is permitted. **Seating Space** • Width – at least 430 mm • Depth – at least 100 mm each side of a point 215mm from the back • Knee Space (Seating on seats) at least 635 mm from the back • Knee Width – at least 250 mm • Leg Space (Seating on floor) – at least 1190 mm from the back • Overlapping Seat Vertical Separation – at least 350 mm • Seat Horizontal Overlap – 150 mm maximum • Each seating position should be clearly indicated. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Height: _____ m Typically: Width: _____ mm Depth: _____ mm Knee Space: _____mm Knee Width: _____ mm Leg Space: _____ mm Vert. Separation: _____ mm Overlap: _____ mm Position Indication: Passed/Failed Number of seats provided: _____ Non-Skid Surface: Passed/Failed Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.2 Fittings, provisions and ladders (1 of 4)	**Regulations: LSA Code 4.4.7.3/4/5/8/10/11/12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Fittings and Provisions** .1 Suitable handholds or buoyant lifeline becketed around the lifeboat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller. .2 On other than self-righting lifeboats, handholds on the underside arranged to break away without damaging the lifeboat when subjected to a sufficient impact. .3 Sufficient watertight lockers, compartments or arrangements to provide for storage of the small items of equipment water and provision. .4 Means provided for collecting rainwater. .5 Means provided for storing collected water. .6 Means provided for siting and securing antenna in operating position (if required). .7 Approved position-indicating lights with 12 h capacity provided. .8 Approved light with 12 h capacity sufficient for reading provided inside. .9 Adequate view on all sides for safe launching and maneuvering. .10 Each lifeboat shall be fitted with a permanently affixed approval plate, endorsed by the Administration or its representative containing at least the following items: manufacturer's name and address, lifeboat model and serial number, month and year of manufacturer, number of persons the lifeboat is approved to carry, and the approval information required under paragraph 1.2.2.9.	.1 Passed: _____ Failed: _____ .2 Passed: _____ Failed: _____ Not Applicable .3 Passed: _____ Failed: _____ .4 Passed: _____ Failed: _____ .5 Passed: _____ Failed: _____ .6 Passed: _____ Failed: _____ .7 Passed: _____ Failed: _____ .8 Passed: _____ Failed: _____ .9 Passed: _____ Failed: _____ .10 Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.2 Fittings, provisions and ladders (2 of 4)	**Regulations: LSA Code 4.4.8, 4.5.2.1/4, 4.5.2/3/4, 4.6.2.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.11 The lifeboat is of a highly visible colour where it will assist detection. .12 Sufficient buoyant oars to make headway in calm seas. .13 Provided with a manual pump suitable for effective bailing or be automatically self-bailing. **Partially enclosed lifeboats** .14 Provided with permanently attached rigid covers extending over not less than 20% of the length of the lifeboat from the stem and not less than 20% of the length of the lifeboat from the after-most part of the lifeboat. .15 Fitted with permanently attached foldable canopy which together with the rigid covers completely encloses the occupants of the lifeboat in a weatherproof shelter and protects them from exposure. .16 Entrances at both ends and on each side are provided. .17 Entrances in the rigid covers should be weather tight when closed. .18 Exterior of the lifeboat is of a highly visible color and its interior of a color which does not cause discomfort for the occupants. .19 The canopy should be so arranged that: .a it is provided with adequate rigid sections or battens to permit erection of the canopy;	Colour of canopy: _____ Colour of hull: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Function test:_____ Number and execution:_____ Passed _____Failed _____ N/A (lifeboats with 2 redundant engines) Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.2 Fittings, provisions and ladders (3 of 4)	**Regulations: LSA Code 4.5.2.3/5/6/8, 4.5.4, 4.6.2.2/3/4/5**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.b it is insulated to protect the occupants against heat and cold by means of not less than two layers of material separated by an air gap or other equally efficient means; means should be provided to prevent accumulation of water in the air gap;	Passed: _____ Failed: _____
	.c entrances in the canopy are provided with efficient adjustable closing arrangements which can be easily and quickly opened and closed from inside or outside so as to permit ventilation but exclude seawater, wind and cold; means should be provided for holding the entrances securely in the open and closed position;	Passed: _____ Failed: _____
	.d with the entrances closed, it admits sufficient air for the occupants at all times; and	
	.e the occupants can escape in the event of the lifeboat capsizing.	Passed: _____ Failed: _____
		Passed: _____ Failed: _____
	If the lifeboat is intended to have a fixed two-way VHF radiotelephone apparatus, the lifeboat should either have a cabin large enough to accommodate both the equipment and the person using it, or else the construction of the lifeboat must provide a sheltered space.	Passed: _____ Failed: _____
	Totally Enclosed Lifeboats	
	The enclosures should be so arranged that:	Passed: _____ Failed: _____
	.1 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight;	Passed: _____ Failed: _____
	.2 hatches are positioned so as to allow launching and recovery operations to be performed without any occupant having to leave the enclosure;	
	a. access hatches can be opened and closed from both inside and outside the lifeboat; and	Passed: _____ Failed: _____
	b. access hatches have means to hold them securely in the open position.	Comments/Observations:

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.2 Fittings, provisions and ladders (4 of 4)	**Regulations: LSA Code 4.4.4, 4.6.2.7/9/10, 4.6.3.1/3, 4.6.4.1/3**	
Test Procedure	Acceptance Criteria	Significant Test Data
	.3 it is possible to row the lifeboat;	Passed: _____ Failed: _____
	.4 handrails provide a secure handhold for persons moving about the exterior of the lifeboat, and aid embarkation and disembarkation;	Passed: _____ Failed: _____
	.5 persons have access to their seats from an entrance without having to climb over thwarts or other obstructions;	Passed: _____ Failed: _____
	.6 windows or translucent panels to make artificial light unnecessary in day light; and	Passed: _____ Failed: _____
	.7 its exterior is of a highly visible colour and its interior of a light colour which does not cause discomfort to the occupants.	Passed: _____ Failed: _____
	Each seating space is fitted with a safety belt.	Passed: _____ Failed: _____
	The safety belt is of a color contrasting with the belts for seats immediately adjacent and with the seat on which it is fitted	Passed: _____ Failed: _____
	Engine and transmission are controlled from the helmsman position	Passed: _____ Failed: _____
	Air-cooled engines have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. Manually operated dampers provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat.	
	Lifeboat Ladders Ladders that can be used at any boarding entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed: _____ Failed: _____
	Other Provisions No buoyant material should be installed external to the hull of the lifeboat except in addition to buoyant material required to float the flooded lifeboat.	Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.3 Engine and starting system	**Regulations: LSA Code 4.4.6.2/5/6/7/9/11/12**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Type of starting system .1 Two independent rechargeable energy sources available for power starting systems. .2 Any required starting aids provided .3 Starting system is not impeded by engine casing, thwarts, or other obstructions. .4 Propeller arranged to be disengaged from the engine. .5 Provision for ahead and astern propulsion. .6 Exhaust arranged to prevent water from entering engine in normal operation. .7 The lifeboat is designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris. .8 Engine casing made of fire-retardant material or other suitable arrangements providing similar protection. .9 Personnel are protected from hot and moving parts. .10 Shouted order can be heard with engine running at speed necessary for 6 knot operation. .11 Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for necessary gas venting. .12 Means for recharging engine starting, radio, and searchlight batteries provided by solar charge or ships power supply. .13 Radio batteries not used to provide power for engine starting. .14 Recharging means provided for lifeboat batteries (not exceeding 50 V) from ship's power supply can be disconnected at the lifeboat embarkation station. .15 Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls.	Manual/Power YES/NO/NOT APPLICABLE Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Fire retardant materials used: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.4 Steering mechanism	**Regulations: LSA Code 4.4.7.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	• A tiller should be capable of controlling the rudder • Rudder permanently attached to the lifeboat • Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock • Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.5 Release mechanism	**Regulations: LSA Code 4.4.7.6.2.2, 4.4.7.6.3/5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Clear operating instructions Suitably worded danger sign for on load release **On-load release:** • The mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery of the boat • On-load release mechanism needs deliberate and sustained action by the operator • Mechanical protection provided beyond that normally required for off load release • Release control marked in a color that contrasts with the surroundings **Where a single fall system is provided:** **Off-load release:** • Where a single fall and hook system is used for launching a lifeboat or rescue boat in combination with a suitable painter, the requirements of onload release capability need not be applicable; in such an arrangement a single capability to release the lifeboat or rescue boat, only when it is fully waterborne, will be adequate.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ N/A _____ Passed: _____ Failed: _____ N/A _____ Passed: _____ Failed: _____ N/A _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ N/A _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.1.6 Drain valve		**Regulations: LSA Code 4.4.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required. (Not applicable for self-bailing boats.)	• Fitted near lowest point on the hull • Automatically opens to drain water from the hull when the boat is not waterborne and closes to prevent entry of water when the boat is waterborne • Cap or plug attached to the boat by a lanyard, chain or other suitable means • Readily accessible from inside the lifeboat • Position clearly indicated	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.2.1 Flooded stability test		**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) 1/6.8.1, 6.8.2,6.8.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Lifeboats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments, which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons who would be in the water when the lifeboat is flooded (water level more than 500 mm above the seat pan) may be omitted. Weights representing persons who would not be in the water when the lifeboat is flooded (water level less than 500 mm above seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm³ (for example water ballast containers) to represent a volume similar to a human body.	When loaded as specified, the lifeboat should have positive stability when filled with water to represent flooding which would occur when the lifeboat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage. In case of totally enclosed lifeboats, water level measured along each seatback in stable flooded condition is not more than 500 mm above the seat pan at any occupant seating position.	Passed: _____ Failed: _____ Trim: _____ List: _____ Max water level above seat pan: _____ mm Passed (Y/N): _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.2.2 Freeboard test		**Regulations: LSA Code 4.4.5.1/2.1/2; MSC.81(70) 1/ 6.8.4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the lifeboat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side.	Each lifeboat with side openings near the gunwale should have a freeboard measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboat's length or 100 mm, whichever is the greater; and Each lifeboat without side openings near the gunwale should not exceed an angle of heel of 20° and should have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater.	Measured Freeboard:_____mm 1.5% of Boat's Length:_____mm Angle of heel, if applicable:_____Deg. Passed: _____ Failed: _____ Comments/Observations

4.4.2.3 Self-Righting Test (Totally Enclosed Lifeboats)		**Regulations: LSA Code 4.6.3.2/4, 4.6.4.2; MSC.81(70) 1/ 6.14.1/1.1/1.2/2/2.1/2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the lifeboat about a longitudinal axis to any angle of heel and then release it. The lifeboat, in the enclosed condition, should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the lifeboat with its engine is loaded in the normal position with properly secured weights representing the fully equipped lifeboat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 82.5 kg, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seat pan so as to have the same effect on stability as when the lifeboat is loaded with the number of persons for which it is to be approved; and .2 when the lifeboat is in the light condition.	After release, the lifeboat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run when inverted and for 30 min after the lifeboat has returned to the upright position; and .2 if the engine is arranged to stop automatically when inverted, it should be easily restarted and run for 30 min after the lifeboat has returned to the upright position. Water does not enter the engine.	**Loaded:** Passed _____ Failed _____ **Light:** Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.2.4 Flooded capsizing test (totally enclosed lifeboats)		**Regulations: LSA Code 4.1.6.3; MSC.81(70) 1/6.14.3-5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be placed in the water and fully flooded until the lifeboat can contain no additional water. All entrances and openings should be secured to remain open during the test. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the lifeboat in the normal operating position. Using a suitable means, the lifeboat should be rotated about a longitudinal axis to a heel angle of 180° and then released.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants. *Note*: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

4.4.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5.1; MSC.81(70) 1/ 6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the lifeboat. For a totally enclosed lifeboat, the seat belts should be demonstrated to be capable of holding a person with a mass of 100 kg securely in place with the lifeboat in the capsized position. This test may be conducted in connection with the righting test.	The seating should be able to support this loading without any permanent or damage. The seat belts should hold a mass of 100 kg securely in place with the lifeboat in the capsized position.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.3.2 Seating space test		**Regulations: LSA Code 4.4.2.2.1, 4.4.3.1/2; MSC.81(70) 1/ 6.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be fitted with its engine and its equipment. The number of persons for which the lifeboat is to be approved, having an average mass of 75 kg for a lifeboat intended for a passenger ship or 82.5 kg for a lifeboat intended for a cargo ship and wearing a lifejacket and any other essential equipment should board the lifeboat as quickly as possible. The lifeboat should then be maneuvered and all equipment on board tested by an individual to demonstrate that the equipment can be operated without difficulty and without interference with the occupants.	The number of persons should be able to board the lifeboat and be properly seated within a period of 3 min in the case of a lifeboat intended for a cargo ship and within a period of 10 min in the case of a lifeboat intended for a passenger ship. Rapid disembarkation should also be possible. The boat can be manoeuvered and all equipment can be operated without difficulty or interference with the occupants.	**Cargo Ship:** Boarding Time:_____min Passed: _____ Failed: _____ **Passenger Ship:** Passed: _____ Failed: _____ N/A _____ Passed: _____ Failed: _____ SOLAS inherently buoyancy lifejacket worn: Yes/No Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, 4.4.7.6.1/2/2.1/2.2/5; MSC.81(70) 1/ 6.9.1, 6.9.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Every lifeboat to be launched by fall or falls, with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The lifeboat should be loaded so that the total mass equals 1.1 times the mass of the lifeboat, all its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat release control should be activated. The test should be repeated with the lifeboat waterborne in the light condition and in a 10% overload condition.	It should be confirmed that the lifeboat will simultaneously release from each fall which it is connected without binding or damage to any part of the lifeboat or the release mechanism. It should be confirmed that the lifeboat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition. Single fall systems not intended for on-load operation are exempt from this test.	1.1 x Loaded Weight:_____N **On load release:** 1.1 load Passed: _____ Failed: _____ **Waterborne release:** 1.1 load: Passed: _____ Failed: _____ Light condition: Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.2 Towing release test	**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the lifeboat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the lifeboat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plan view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The lifeboat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The lifeboat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. the lifeboat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the lifeboat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated. Single fall systems not intended for on-load operation are exempt from this test.	Working Load:_____N Force Applied:_____N Cable Length: _____m Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, whilst disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs. Single fall systems not intended for on-load operation are exempt from this test.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed: _____ Failed:_____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the lifeboat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the lifeboat. The release mechanism is deemed to have passed the testing in 4.4.4.3, 4.4.4.4 and 4.4.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs. Single fall systems not intended for on-load operation are exempt from this test.	Actuation Force: _____ N Cable Length: _____m Passed: _____ Failed:_____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.4.6 Second release mechanism tests - actuation force and tensile strength	**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.5.1, 6.9.5.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. .2 The release mechanism does not fail. Single fall systems not intended for on-load operation are exempt from this test.	Actuation Force: _____ N Cable Length: _____m Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed:_____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.5.1 Manoeuvring		**Regulations: LSA Code 1.2.2.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The engine should be started and the lifeboat manoeuvred for a period of at least 4 h to demonstrate satisfactory operation.	The lifeboat should manoeuvre and operate satisfactorily.	Passed _____ Failed _____ Comments/Observations

4.4.5.2 Liferaft Towing		**Regulations: LSA Code 4.4.6.8; MSC.81(70) I/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The maximum towing force of the lifeboat should then be determined. This information should be used to determine the largest fully loaded liferaft the lifeboat can tow at 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a towrope. The engine should be operated ahead at full speed for a period of at least 2 minutes, and the towing force measured and recorded.	The maximum towing force of the lifeboat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Bollard Pull:_____N (To be recorded on type approval certificate) Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.5.3 Endurance, speed and fuel consumption		**Regulations: LSA Code 4.4.6.8; MSC.81(70) 1/6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat should be run at a speed of not less than 6 knots for a period, which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity.	The speed of a lifeboat when proceeding ahead in calm water when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, should be at least 6 knots. Sufficient fuel, suitable for use thought out the temperature ranged expected in the area in which the ship operates, should be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.	Measured Speed (without spray system): _____ knots Measured Speed (with spray system): _____ knots Passed: _____ Failed: _____ Consumption: ____ L/h Tank Capacity: _____ L Endurance: _____ hrs Sufficient tank capacity: Passed/Failed Comments/Observations

4.4.5.4 Engine Out of Water		**Regulations: LSA Code 4.4.6.3; MSC.81(70) I/ 6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should not be damaged as a result of this test.	Passed: _____ Failed: _____ For engines with "wet" exhaust system: Type of impeller, if applicable: _____ Impeller damaged after test: Y/N Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.5.5 Compass test		**Regulations: LSA Code 4.4.8.5; MSC.81(70) I/ 6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the lifeboat.	The compass operates satisfactorily.	Compass Type: _____ Passed: _____ Failed: _____ Comments/Observations

4.4.5.6 Helpless person recovery		**Regulations: LSA Code 4.4.3.4; MSC.81(70) I/ 6.10.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the lifeboat from the sea.	Helpless people can be brought on board the lifeboat from the sea.	Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.6.1 Towing test		**Regulations: LSA Code 4.4.7.7; MSC.81(70) I/ 6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped lifeboat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel.	The lifeboat should not exhibit unsafe or unstable characteristics. There should be no damage to the lifeboat or its equipment as a result of this test.	Passed: _____ Failed: _____ Comments/Observations

4.4.6.2 Painter release test	Regulations: LSA Code 4.4.7.7; MSC.81(70) I/ 6.11.1,6.11.2,6.11.3	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded lifeboat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the lifeboat. The directions specified in test 4.4.4.2 should be used if possible.	The painter should release and there should be no damage to the lifeboat or its equipment as a result of this test.	Passed _____ Failed _____ Test Direction Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.1 Impact test (1 of 3)	**Regulations: LSA Code 4.4.1.7, 4.6.5; MSC.81(70) I/ 6.4.1/2, 6.4.5, 6.4.7.1/2/3/4/5, 6.17**	
Test Procedure	Acceptance Criteria	Significant Test Data
In case of lifeboats launched by falls; The fully equipped lifeboat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the lifeboat is to be approved. The weights should be distributed to represent the normal loading in the lifeboat. Skates or fenders, if required, should be in position. The lifeboat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s (keel is raised 0.624 m above the free hanging position). The boat should be released to impact against the rigid vertical surface. In the case of totally enclosed lifeboats, the acceleration forces should be measured and evaluated at different positions within the prototype lifeboat to determine the most severe occupant exposure to acceleration considering the effects of fenders, lifeboat elasticity, and seating arrangement. In case of totally enclosed lifeboats, representative safety belts and fastenings which will experience high loads as a result of the impact should be secured about weights equal to 100 kg to simulate holding a person during the test.	The impact test should be considered successful if: .1 no damage has been sustained that would affect the lifeboat's efficient functioning; .2 machinery and other equipment has operated to full satisfaction; .3 no significant ingress of seawater has occurred; and .4 accelerations measured during the impact and subsequent rebound, if required during the impact test, are in compliance with the criteria of the "Emergency Limits" specified in table 2 or table 3, respectively.	CDRR Index: _____ N/A CAR Index: _____ N/A Final Evaluation: Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.1 Impact test (2 of 3)	**Regulations: LSA Code 4.6.5; MSC.81(70) 1/6.17.1 to 6.17.14**
Measuring and Evaluating Acceleration Forces Selection, placement and mounting of accelerometers The accelerometers used to measure the acceleration forces in the lifeboat should: .1 have adequate frequency response for the test in which they are to be used but the frequency response should at least be in the range of 0 to 200 Hz; .2 have adequate capacity for the acceleration forces that will occur during the tests; and .3 have an accuracy of ±5%. Accelerometers should be placed in the lifeboat, parallel to the principal axes of the lifeboat, at those locations necessary to determine the worst occupant exposure to acceleration. The accelerometers should be mounted on a rigid part of the interior of the lifeboat in a manner to minimize vibration and slipping. A sufficient number of accelerometers should be used at each location at which acceleration forces are measured so that all likely acceleration forces at that location can be measured. The selection, placement, and mounting of the accelerometers should be to the satisfaction of the Administration. **Recording method and rate** The measured acceleration forces may be recorded on magnetic media as either an analog or a digital signal or a paper plot of the acceleration signal may be produced. If acceleration forces are to be recorded and stored as a digital signal, the sampling rate should be at least 500 samples per second. Whenever an analogue acceleration signal is converted to a digital signal, the sampling rate should be at least 500 samples per second.	**Evaluation with the dynamic response model** The dynamic response model is the preferred method to evaluate potential for the occupant in a lifeboat to be injured by exposure to acceleration forces. In the dynamic response model, the human body is idealized as a single-degree-of-freedom, spring-mass acting in each coordinate direction as shown in figure 1. The response of the body mass relative to the seat support, which is excited by the measured accelerations, can be evaluated using a procedure acceptable to the Administration. The parameters to be used in the analysis are shown in table 1 for each coordinate direction. Before performing the dynamic response analysis, the measured accelerations should be oriented to the primary axes of the seat. The desired outcome from the dynamic response analysis is the displacement time-history of the body mass relative to the seat support in each coordinate direction. At all times, the following expression should be satisfied: $$CDRR = \sqrt{\left(\frac{d_x}{S_x}\right)^2 + \left(\frac{d_y}{S_y}\right)^2 + \left(\frac{d_z}{S_z}\right)^2} \leq 1$$ where d_X, d_Y and d_Z are the concurrent relative displacements of body mass with respect to the seat support, in the *x*, *y* and *z* body axes, as computed from the dynamic response analysis and S_X, S_Y, and S_Z, are relative displacements which are presented in table 2 for the appropriate launch condition. **Evaluation using the SRSS method** In lieu of the evaluation with the dynamic response model, the potential for an occupant in a lifeboat to become injured by an acceleration can be evaluated using the SRSS method. Before performing the SRSS analysis, the measured accelerations should be oriented to the primary axes of the seat.

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.1 Impact test (3 of 3)

Figure 1 - Independent Single Degree-of-Freedom Representation of the Human Body

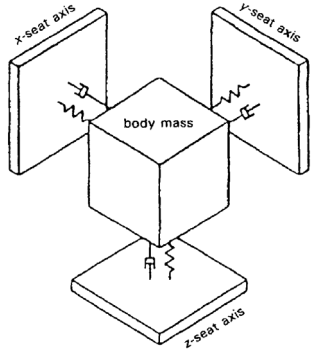

Table 1 – Parameters of the Dynamic Response Model

Coordinate Axis	Natural Frequency (rad/s)	Damping Ratio
X	62.8	0.100
Y	58.0	0.090
Z	52.9	0.224

Table 2 – Suggested Displacements Limits for Lifeboats

Acceleration direction	Displacement (cm)	
	Training	Emergency
+X = Eyeballs In	6.96	8.71
-X = Eyeballs Out	6.96	8.71
+Y = Eyeballs Right	4.09	4.95
-Y = Eyeballs Left	4.09	4.95
+Z = Eyeballs Down	5.33	6.33
-Z = Eyeballs Up	3.15	4.22

Regulations: - LSA Code 4.6.5; MSC.81(70) 1/ 6.17.9 to 6.17.17

Full-scale acceleration data should be filtered with no less than the equivalent of a 20 Hz low-pass filter. Any filtering procedure acceptable to the Administration may be used.

Acceleration data measured on a model should be filtered with a low-pass filter having a frequency not less than that obtained with the following expression:

$$f_{model} = \frac{20}{\sqrt{\frac{L_{model}}{L_{prototype}}}}$$

Where f_{model} is the frequency of the filter to be used, L_{model} is the length of the model lifeboat, and $L_{\text{prototype}}$ is the length of the prototype lifeboat.

At all times, the following expression should be satisfied:

$$CAR = \sqrt{\left(\frac{g_x}{G_x}\right)^2 + \left(\frac{g_y}{G_y}\right)^2 + \left(\frac{g_z}{G_z}\right)^2} \leq 1$$

where g_X, g_Y, and g_Z are the concurrent accelerations in the x, y and z seat axes, and G_X, G_Y, and G_Z are allowable accelerations, which are presented in table 3 for the appropriate launch condition.

Table 3 – SRSS Acceleration Limits for Lifeboats

Acceleration direction	Acceleration	
	Training	Emergency
+X = Eyeballs In	15.0	18.0
-X = Eyeballs Out	15.0	18.0
+Y = Eyeballs Right	7.0	7.0
-Y = Eyeballs Left	7.0	7.0
+Z = Eyeballs Down	7.0	7.0
-Z = Eyeballs Up	7.0	7.0

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.2 Drop test		**Regulations: LSA Code 4.4.1.7; MSC.81(70) 1/6.4.3/4/5, 6.4.7.1/2/3/4**
Test Procedure	Acceptance Criteria	Significant Test Data
The fully equipped lifeboat, with its engine, should be loaded with weights equal to the mass of the maximum number of persons for which the lifeboat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The remainder of the weights should be distributed to represent the normal loading condition but need not be placed 300 mm above the seat pan. The lifeboat should then be suspended above the water so that the distance from the lowest point of the lifeboat to the water is 3 m. The lifeboat should then be released so that it falls freely into the water. The drop test should be conducted with the lifeboat that was used in the impact test.	The drop test should be considered successful if: .1 no damage has been sustained that would affect the lifeboat's efficient functioning; .2 the damage caused by the drop tests has not increased significantly as a result of the test 4.5.7.3; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.3 Operation after drop and impact test		**Regulations: LSA Code 4.4.1.7; MSC.81(70) 1f/ 6.4.5, 6.4.7.2, 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
After the impact and drop tests, the lifeboat should be carefully examined to detect the position and extent of damage that may have occurred as a result of these tests, and an operational test should be conducted in accordance with 4.4.5.3 Then the lifeboat should be unloaded, cleaned and carefully examined to detect the position and extent of additional damage that may have occurred as a result of the drop and impact tests.	The damage caused by the impact and drop tests has not increased significantly as a result of the operational test.	Passed: _____ Failed: _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.4 Overload test (1 of 3)		**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) 1/6.3.1/2/3/4/4.1/4.2/4.3/4.4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
In case of lifeboat's launched by falls; The unloaded lifeboat should be placed on blocks or suspended from the lifting hooks and sights should be erected for measuring keel sag. The following measurements should then be made: .1 deflection of keel amidships (ΔK); .2 change in length as measured between the top of stem and stern posts (ΔL); .3 change in breadth over the gunwale at the quarter length forward (ΔB1), amidships (ΔB 2) and the quarter length aft (ΔB3); and .4 change in depth measured from gunwale to keel (ΔD). The lifeboat should then be loaded with properly distributed weights to represent the fully equipped lifeboat loaded with the full complement of persons for the type of ship for which it is to be approved. The measurements should again be made. Additional weights should then be added so that the suspended load is 25%, 50%, 75% and 100% greater than the weight of the fully equipped and loaded lifeboat. In the case of metal lifeboats, the testing should stop at 25% overload.	The keel deflection amidships and change in breadth over the gunwale at the quarter length forward, amidships and aft should not exceed 1/400th of the lifeboat's length when the lifeboat is subjected to 25% overload.	Unloaded (Initial measurement): K _____ L_____L/400 _____ B1 _____ B2 _____ B3 _____ D _____ Full Load: K_____ΔK _____ L_____ΔL _____ ΔB1_____ ΔB2_____ ΔB3 _____ D_____♦D _____ 25% Overload: K_____ΔK _ L/400 ≥ ΔK? YES (Pass)_____NO (Fail) _____ L_____ ΔL __ B_____ ΔB __ D_____ ΔD __ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.4 Overload test (2 of 3)		**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) 1/ 6.3.3/4/5/6**
Test Procedure	Acceptance Criteria	Significant Test Data
The weights for the various overload conditions should be distributed in proportion to the loading of the lifeboat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seat pan. Testing by filling the lifeboat with water should not be accepted as this method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage to it, in which case weights should be added to the lifeboat to compensate for the removal of such machinery. At each incremental overload, the measurements should be made. The weights should then be removed and the dimensions of the lifeboat checked. If the lifeboat is made of GRP, such measurement should be taken after a lapse of time sufficient to permit the GRP to recover its original form (approximately 18 h).	The results at 100% overload, if required, should be approximately in proportion to those obtained at 25% overload. No significant residual deflection should result. Any permanent deflection as a result of these tests should be recorded.	50% Overload: K_____ΔK ____ L_____ΔL ____ B_____ΔB ____ D_____ΔD ____ 75% Overload: K_____ΔK ____ L_____ΔL ____ B_____ΔB ____ D_____ΔD ____ 100% Overload: K_____ΔK ____ ♦K 100% ≤ ≈ 4 x ΔK 25% Passed _____ Failed _____ L_____ΔL _____ ♦L 100% ≤ ≈ 4 x ΔL 25% Passed _____ Failed _____ B_____ΔB _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.7.4 Overload test (3 of 3)		**Regulations: LSA Code 4.4.1.6/6.2; MSC.81(70) 1/ 6.4.5**
Test Procedure	Acceptance Criteria	Significant Test Data
		♦B100% ≤ ≈ 4 x ΔB 25% Passed_____ Failed _____ D ΔD ♦D100% ≤ ≈ 4 x ΔD 25% Passed _____ Failed _____ Unloaded (Final measurement): K ΔK K (Initial) ≈ K(Final) Passed _____ Failed _____ L ΔL L (Initial) = ≈ L (Final) Passed _____ Failed _____ B ΔB B (Initial) ≈ B (Final) Passed _____ Failed _____ D ♦D D (Initial) ≈ D (Final)? Passed _____ Failed _____ Final measurement taken h/min after removal of the weights Passed _____ Failed _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.8.1 Air supply test		**Regulations: LSA Code 4.8; MSC.81(70) 1/6.15**
Test Procedure	Acceptance Criteria	Significant Test Data
All entrances and openings of the lifeboat should be closed, and the air supply to the inside of the lifeboat turned on to the design air pressure. The engine should then be run at revolutions necessary to achieve full speed with the fully loaded boat including all persons and with the sprinkler system in use for a period of 5 min, stopped for 30 s, then restarted for a total running time of 10 min.	During the 10-minute running time, the atmospheric pressure within the enclosure should be continuously monitored to ascertain that a small positive air pressure is maintained within the lifeboat and to confirm that noxious gases cannot enter. The internal air pressure should never fall below the outside atmospheric pressure, nor should it exceed outside atmospheric pressure by more than 20 hPa during the test. It should be ascertained, by starting the engine with air supply turned off, that when the air supply is depleted, automatic means are activated to prevent a dangerous underpressure of more than 20 hPa being developed within the lifeboat. The system should have visual indicators to indicate the pressure of the air supply at all times.	Test Duration with Positive Air Pressure: min Engine stopped; Overpressure: hPa Air Supply depleted Underpressure: hPa Passed _____ Failed _____ Passed _____ Failed _____ Air System:_____ engine rev at test: _____rpm Nominal max. pressure:_____bar total air bottle volume: _____l Bottle pressure at srart: _____bar Bottle pressure after 10 min _____bar Total required air vollume= Pressure at start Pressure after 10') x total air bottle volume=_____ l Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.8.2 Fire test (1 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 6.16.1/2/3/4/4.1/4.2/4.3/7**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be moored in the centre of an area which is not less than five times the maximum projected plan area of the lifeboat. Sufficient kerosene should be floated on the water within the area so that when ignited it will sustain a fire, which completely envelops the lifeboat for 8 min. The boundary of the area should be capable of completely retaining the fuel. The engine should be run at full speed; however, the propeller need not be turning. The gas and fire-protective systems should be in operation throughout the fire test. The kerosene should be ignited. It should continue to burn and envelop the lifeboat for 8 min. During the fire test, the temperature should be measured and recorded as a minimum at the following locations: .1 at not less than 10 positions on the inside surface of the lifeboat; .2 at not less than 5 positions inside the lifeboat at locations normally taken by occupants and away from the inside surface; and .3 on the external surface of the lifeboat. The positions of such temperature recorders should be to the satisfaction of the Administration. The method of temperature measurement should allow the maximum temperature to be recorded.	At the conclusion of the fire test, the condition of the lifeboat should be such that it could continue to be used in the fully loaded condition.	Temperatures inside surface of the lifeboat: 1 _____ 6 _____ 2 _____ 7 _____ 3 _____ 8 _____ 4 _____ 9 _____ 5 _____ 10 _____ Temperatures inside the lifeboat at locations normally taken by occupants and away from the inside surface: 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ Temperature on the external surface Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.8.2 Fire test (2 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 6.16.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The atmosphere inside the lifeboat should be continuously sampled and representative retained samples should be analysed for the presence and quantity of essential, toxic, and injurious gases or substances. The analysis should cover the range of anticipated gases or substances that may be produced and which can vary according to the materials and fabrication techniques used to manufacture the lifeboat.	The analysis of gases should indicate that there is sufficient oxygen and no dangerous levels of toxic or injurious gases or substances.	Analysis of gasses Gas Level Acceptable Oxygen _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ Comments/Observations Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.8.2 Fire test (3 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 6.16.6/7**
Test Procedure	Acceptance Criteria	Significant Test Data
The pressure inside the lifeboat should be continuously recorded to confirm that a positive pressure is being maintained inside the lifeboat. The protective system should be as effective as that of the lifeboat tested. The water delivery rate and film thickness at various locations around the hull and canopy should be equal to or exceed the measurements made on the lifeboat originally fire tested. *Note*: The Administration may waive this test for any totally enclosed lifeboat which is identical in construction to another lifeboat which has successfully completed this test, provided the lifeboat differs only in size, and retains essentially the same form.	A positive pressure should be maintained inside the lifeboat.	Internal pressure range Min._____ Max. ___ Passed_____ Failed _____ Comments/Observations Reference to previous test, if applicable;

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.8.3 Water spray test		**Regulations: LSA Code 4.9.2/2.1/2.2/2.3; MSC.81(70) 1 / 6.16.8/8.1/8.2/9/10**
Test Procedure	Acceptance Criteria	Significant Test Data
Start the engine and the spray pump. With the engine running at its designed output, the following should be measured to obtain the rated value and speed: .1 the rpm of the engine and the pump to obtain the rated speed; .2 the pressure at the suction and delivery side of the pump to obtain the rated water pressure. With the lifeboat in an upright position, on an even keel and in the light condition, run the pump at the rated speed. Measure the delivery rate of water or the thickness of the sprayed water film at the external surface of the lifeboat. Successively trim the lifeboat 5° by the head and 5° by the stern, and heel it 5° to port and 5° to starboard.	Water for the system should be drawn from the sea by a self-priming motor pump. It should be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat. The seawater intake should be so arranged as to prevent the intake of flammable liquids from the sea surface. The system should be arranged for flushing with fresh water and allowing complete drainage. The delivery rate of water or the sprayed water film thickness over the lifeboat should be to the satisfaction of the Administration. In each condition the sprayed water film should cover the whole surface of the lifeboat.	Engine RPM: _____ Pump RPM: _____ Delivery Pressure: _____ Pa Film Thickness acceptable:_____ Y/N? Delivery Rate acceptable: ____ Y/N? Rate recorded _____ L/h Trim or Heel Water Film Covering Surface 5° Head Passed _____ Failed _____ 5° Stern Passed _____ Failed _____ 5° Port Passed _____ Failed _____ 5° Starboard Passed _____ Failed _____ Comments/Observations

Davit-launched lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.4.9.1 Canopy closure test		**Regulations: LSA Code 4.5.2.2; MSC.81(70) 1/ 6.13.1/2**
Test Procedure	Acceptance Criteria	Significant Test Data
This test is required only for partially enclosed lifeboats. During the test the lifeboat should be loaded with the number of persons for which it is to be approved. It should be demonstrated that the canopy can be easily erected by not more than two persons.	The canopy can be easily erected by not more than two persons.	Passed: _____ Failed: _____ Comments/Observations

4.5 FREE-FALL LIFEBOATS

EVALUATION AND TEST REPORT

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- 4.5.0.2 Submitted drawings, reports and documents
- 4.5.0.3 Quality assurance

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4.5 FREE-FALL LIFEBOATS

EVALUATION AND TEST REPORT

Manufacturer	
Date	
Type	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.0.1 General data and specifications		**Regulations: LSA Code 4.4, 4.5, 4.6, 4.8 & 4.9**
General Information	Lifeboat Dimensions	Lifeboat Weight
Construction Material: Hull: Canopy: Lifeboat Inherent Buoyancy Material: Weight: Volume: Engine Installed: Manufacturer: Type: Power: Gear Ratio: Propeller: Release Mechanism: Manufacturer: Type: SWL: Service: Cargo only Occupancy (150 max.): Persons (82.5 kg each):	**Molded Dimensions:** Length: Breadth: Depth: Free-Fall Certification Characteristics: Free-Fall Height: _____ Launch Angle: ___ Minimum ramp length:_____ Tested angle of list, if exceeding 20°:	Design Weight: Unloaded Boat: Loose Equipment: Food: Water: Fuel: Persons: Calculated Loaded Weight: Fully Equipped: With Persons: Weight As Tested: Fully Equipped: Comments/Observations Passed: _____ Failed: _____

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.0.3 Quality assurance	**Regulations: MSC.81(70)2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable? Yes/No Comments/Observations:

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.1 Occupant space		**Regulations: LSA Code 4.4.1.8, 4.4.2.2/3, 4.4.3.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Interior Floor to Canopy Height** Over 50% of the floor area the height should be not less than 1.3 m for lifeboats carrying 9 or fever persons and 1.7 m for lifeboats carrying 24 or more persons. Linear interpolation for occupancy between 9 and 24 persons is permitted. **Seating Space** Width – at least 480 mm Free clearance in front of the backrest at least 650 mm The backrest should extend at least 1075 mm above the seat pan. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Height: _____ m Typical: Width: _____ mm Free clearance:_____mm Extend of backrest:_____mm Number of seats provided: Non-Skid Surface: Passed: ____ Failed: ____ Comments/Observations Passed: ____ Failed: ____

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.2 Fittings, provisions and ladders (1 of 2)		**Regulations: LSA Code 4.4.7.3/5/8/10/11/12, 4.4.8.25**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	**Fittings and Provisions** .1 Suitable handholds or buoyant lifeline becketed around the lifeboat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller. .2 Sufficient watertight lockers, compartments or arrangements to provide for storage of the small items of equipment water and provision. .3 Means provided for collecting rainwater. .4 Means provided for storing collected water. .5 Means provided for siting and securing antenna in operating position (if required). .6 Approved position-indicating lights light with 12 h capacity provided. .7 Approved light with 12 h capacity sufficient for reading provided inside. .8 Adequate view on all sides for safe launching and maneuvering. .9 Provided with a manual pump suitable for effective bailing or be automatically self-bailing. .10 Windows or translucent panels to make artificial light unnecessary in daylight.	.1 Passed_____ Failed _____ .2 Passed_____ Failed _____ Not Applicable .3 Passed_____ Failed _____ .4 Passed_____ Failed _____ .5 Passed_____ Failed _____ .6 Passed_____ Failed _____ .7 Passed_____ Failed _____ .8 Passed_____ Failed _____ .9 Passed_____ Failed _____ .10 Passed_____ Failed _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.2 Fittings, provisions and ladders (2 of 2)	**Regulations: LSA Code 4.4.3.3, 4.4.4, 4.6.2.1/2/4/7/8/9/10, 4.6.3.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
	Exterior of the of the lifeboat enclosure (i.e., canopy) is of a highly visible color and its interior of a color, which does not cause discomfort to the occupants.	Colour of canopy:_____ Colour of hull:_____ Colour of interior:_____
	Handrails for persons moving about exterior of lifeboat and to aid embarkation and disembarkation The enclosures should be so arranged that:	Passed: _____ Failed: _____
	.1 access to the lifeboat is provided by hatches which can be closed to make the lifeboat watertight; 1.1 access hatches can be opened and closed from both inside and outside the lifeboat. 1.2 access hatches have means to hold them securely in the open position. .2 persons have access to their seats from an entrance without having to climb over thwarts or other obstructions;	Passed: _____ Failed: _____
	Each seat is fitted with a safety harness.	Passed: _____ Failed: _____
	The adjacent safety harnesses are to be of contrasting color.	Passed: _____ Failed: _____
	Lifeboat Ladders Ladders that can be used at any boarding entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed: _____ Failed: _____
	Other Provisions No buoyant material should be installed external to the hull of the lifeboat except in addition to buoyant material required to float the flooded lifeboat.	Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6.2, 4.4.6.5/6/7/9/11/12, 4.6.4.1/3**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	Type of starting system .1 Two independent rechargeable energy sources available for power starting systems .2 Any required starting aids provided .3 Starting system is not impeded by engine casing, thwarts, or other obstructions .4 Propeller arranged to be disengaged from the engine .5 Provision for ahead and astern propulsion .6 Exhaust arranged to prevent water from entering engine in normal operation .7 The lifeboat is designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris .8 Engine casing made of fire-retardant material or other suitable .9 Arrangements providing similar protection .10 Personnel are protected from hot and moving parts .11 Shouted order can be heard with engine running at speed necessary for 6 knot operation .12 Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for necessary gas venting .13 Means for recharging engine starting, radio, and searchlight batteries provided by solar charge or ships power supply .14 Radio batteries not used to provide power for engine starting .15 Recharging means provided for lifeboat batteries (not exceeding 50 V) from ship's power supply can be disconnected at the lifeboat embarkation station .16 Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls batteries with a tightly fitting top which provides for necessary gas venting	Manual/ Power YES/NO/NOT APPLICABLE Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Fire retardant materials used: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.4 Steering mechanism		**Regulations: LSA Code 4.4.7.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	• Air-cooled engines have a duct system to take in cooling air from, and exhaust it to, the outside of the lifeboat. • Manually operated dampers provided to enable cooling air to be taken in from, and exhausted to, the interior of the lifeboat. • A tiller should be capable of controlling the rudder. • Rudder permanently attached to the lifeboat. • Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock. • Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.1.5 Release mechanism		**Regulations: LSA Code 4.7.6.1/3/4**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the lifeboat. Conduct measurements and verify clearances as required.	General • Has two independent activation systems for the release mechanism which may only be operated from the inside the lifeboat. • Release control marked in a color that contrasts with the surroundings. • Release capability is adequately protected against accidental and premature use. • Designed to test the release system without launching the lifeboat.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.2.1 Flooded stability test		**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) 1/6.8.1, 6.8.2, 6.8.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Lifeboats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments, which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons who would be in the water when the lifeboat is flooded (water level more than 500 mm above the seat pan) may be omitted. Weights representing persons who would not be in the water when the lifeboat is flooded (water level less than 500 mm above seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm³ (for example water ballast containers) to represent a volume similar to a human body. *Note*: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	The lifeboat should have positive stability when filled with water to represent flooding which would occur when the lifeboat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage. The water level measured along each seatback in stable flooded condition is not more than 500 mm above the seat pan at any occupant seating position.	Passed: _____ Failed: _____ Max water level above seat pan: _____ mm Passed (Y/N): _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.2.2 Freeboard test		**Regulations: LSA Code 4.4.5.1/2.1/2; MSC.81(70) 1/ 6.8.4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the lifeboat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side.	Each lifeboat with side openings near the gunwale should have a freeboard measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboat's length or 100 mm, whichever is the greater; and Each lifeboat without side openings near the gunwale should not exceed an angle of heel of 20° and should have a freeboard, measured from the waterline to the lowest opening through which the lifeboat may become flooded, of at least 1.5% of the lifeboats length or 100 mm, whichever is the greater.	Measured Freeboard: _____ mm 1.5% of Boat's Length:_____mm Angle of heel, if applicable:_____Deg. Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.2.3 Self-righting test		**Regulations: LSA Code 4.6.3.2/4, 4.6.4.2; MSC.81(70) 1/6.14.1/1.1/1.2/2/2.1/2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the lifeboat about a longitudinal axis to any angle of heel and then release it. The lifeboat, in the enclosed condition, should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the lifeboat with its engine is loaded in the normal position with properly secured weights representing the fully equipped lifeboat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 82.5 kg, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seat pan so as to have the same effect on stability as when the lifeboat is loaded with the number of persons for which it is to be approved; and .2 when the lifeboat is in the light condition.	After release, the lifeboat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run when inverted and for 30 min after the lifeboat has returned to the upright position; and .2 if the engine is arranged to stop automatically when inverted, it should be easily restarted and run for 30 min after the lifeboat has returned to the upright position. Water does not enter the engine.	Loaded: Passed: _____ Failed: _____ <u>Light:</u> Passed: _____ Failed: _____ Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations Passed: _____ Failed: _____

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.2.4 Flooded capsizing test		**Regulations: LSA Code 4.4.1.1, 4.6.3.3; MSC.81(70) 1/ 6.14.3/4/5**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be placed in the water and fully flooded until the lifeboat can contain no additional water. All entrances and openings should be secured to remain open during the test. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the lifeboat in the normal operating position. Using a suitable means, the lifeboat should be rotated about a longitudinal axis to a heel angle of 180° and then released.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants. In case of totally enclosed lifeboats, water level measured along each seatback in stable flooded condition is not more than 500 mm above the seat pan at any occupant seating position.	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5.3, 4.6.3.1; MSC.81(70) 1/ 6.6.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The seats experiencing the highest acceleration forces, and those seats which are supported in a manner different from the other seats in the lifeboat, should be loaded with a mass of 100 kg. The load should be arranged in the seat so that both the seatback and the seat pan are affected.	The seating should be able to support this load during a free-fall launch from a height of 1.3 times the approved height without any permanent deformation or damage.	Passed: _____ Failed: _____
This test may be conducted as part of the free-fall lifeboat overload test.	The seat belts should hold a mass of 100 kg securely in place with the lifeboat in the capsized position.	Passed: _____ Failed: _____
For a totally enclosed lifeboat, the seat belts should be demonstrated to be capable of holding a person with a mass of 100 kg securely in place with the lifeboat in the capsized position. This test may be conducted in connection with the righting test.		Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.3.2 Seating space test		**Regulations: LSA Code 4.4.2.2.1, 4.4.3.1/2; MSC.81(70) 1/6.7.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be fitted with its engine and its equipment. The number of persons for which the lifeboat is to be approved, having an average mass of 82.5 kg and wearing a lifejacket and any other essential equipment should board the lifeboat as quickly as possible. The lifeboat should then be maneuvered and all equipment on board tested by an individual to demonstrate that the equipment can be operated without difficulty and without interference with the occupants.	The number of persons should be able to board the lifeboat and be properly seated within a period of 3 min in the case of a lifeboat intended for a cargo ship and as rapidly as possible in the case of a lifeboat intended for a passenger ship. The boat can be manoeuvered and the equipment can be operated without interference with the occupants.	Cargo Ship: Boarding Time:_____min Passed: _____ Failed: _____ Passed: _____ Failed: _____ SOLAS inherently buoyancy lifejacket worn: Yes/No Comments/Observations

4.5.4.1 Release test		**Regulations: LSA Code 4.7.6.2; MSC.81(70) 1/6.9.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The free-fall release mechanism should be loaded with a force equal to at least 200% of the normal load caused by the fully equipped lifeboat when loaded with the number of persons for which it is to be approved.	It should be demonstrated that the free-fall release mechanism should operate effectively when loaded as described in the procedure.	Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.4.2 Load test		**Regulations: LSA Code 4.7.6.5; MSC.81(70) 1 /6.9.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism. (Testing to failure is suggested, but not required.)	The release mechanism should not fail at load less than or equal to six times the working load. (If tested to failure, working load may be taken as 1/6 the failure load.)	Working Load:_____N Force Applied:____N Passed: _____ Failed: _____ Comments/Observations

4.5.5.1 Manoeuvring		**Regulations: LSA Code 1.2.2.8; MSC.81(70) 1/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The engine should be started and the lifeboat manoeuvred for a period of at least 4 h to demonstrate satisfactory operation.	The lifeboat should manoeuvre and operate satisfactorily.	Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.5.2 Liferaft towing		**Regulations: LSA Code 4.4.6.8; MSC.81(70) 1/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The maximum towing force of the lifeboat should then be determined.	The lifeboat can successfully tow the liferaft as described in the procedure.	
This information should be used to determine the largest fully loaded liferaft the lifeboat can tow at 2 knots.	The maximum towing force of the lifeboat should be recorded on the type approval certificate.	Bollard Pull:_____N (to be recorded on the type approval certificate)
The fitting designated for towing other craft should be secured to a stationary object by a towrope. The engine should be operated ahead at full speed for a period of at least 2 minutes, and the towing force measured and recorded.	There should be no damage to the towing fitting or its supporting structure.	Passed: _____ Failed: _____ Comments/Observations

4.5.5.3 Endurance, speed and fuel consumption		**Regulations: LSA Code 4.4.6.8; MSC.81(70) 1/ 6.10.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be loaded with weights equal to the mass of its equipment and the number of persons for which the lifeboat is to be approved. The lifeboat should be run at a speed of not less than 6 knots for a period, which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity.	The speed of a lifeboat when proceeding ahead in calm water when loaded with its full complement of persons and equipment and with all engine-powered auxiliary equipment in operation, should be at least 6 knots. Sufficient fuel, suitable for use thought out the temperature ranged expected in the area in which the ship operates, should be provided to run the fully loaded lifeboat at 6 knots for a period of not less than 24 h.	Measured Speed (without spray system): _____knots Measured Speed (with spray system): knots Passed: _____ Failed: _____ Consumption:_____L/h Tank Capacity:_____L Endurance:_____hrs Sufficient tank capacity: Passed: _____ Failed: _____ Comments/Observations

4.5.5.4 Engine out of water		**Regulations: LSA Code 4.4.6.3; MSC.81(70) 1 / 6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should not be damaged as a result of this test.	Passed: _____ Failed: _____ Normal storage angle tested:_____ _____deg. Comments/Observations
4.5.5.5 Compass test		**Regulations: LSA Code 4.4.8.5; MSC.81(70) 1/ 6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the lifeboat.	The compass operates satisfactorily.	Passed: _____ Failed: _____ Comments/Observations

4.5.5.6 Helpless person recovery	**Regulations: LSA Code 4.4.3.4; MSC.81(70) 1/ 6.10.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the lifeboat from the sea.	Helpless people can be brought on board the lifeboat from the sea.	Passed: _____ Failed: _____ Comments/Observations
4.5.6 Towing test	**Regulations: LSA Code 4.4.7.7; MSC.81(70) 1/ 6.11.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped lifeboat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel.	The lifeboat should not exhibit unsafe or unstable characteristics. There should be no damage to the lifeboat or its equipment as a result of this test	Passed: _____ Failed: _____ Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.1 Free-fall test (1 of 4)		**Regulations: LSA Code 4.7.5; MSC.81(70) 1/ 6.5.1/2/3/3.1/3.2/3.3/3.4/4/4.1/4.2/4.3, 6.17**
Test Procedure	Acceptance Criteria	Significant Test Data
A lifeboat design for free-fall launching should be subjected to test launches conducted from the height at which the lifeboat is intended to be stowed taking into account conditions of unfavourable list and trim, unfavourable locations of the centre of gravity, and extreme conditions of load. During the free-fall launches required in this section, acceleration forces should be measured and the data evaluated in accordance with tables 2 and 3 at different locations in the lifeboat to determine the worst occupant exposure to acceleration taking into consideration the seating arrangement. The tests required in this section may be conducted with correctly scaled models that are at least 1m in length. As a minimum, the dimensions and mass of the lifeboat, the location of its centre of gravity, and its second moment of mass, must be scaled in a reasonable manner. Depending on the construction and behavior of the free-fall lifeboat, other parameters may also have to be reasonably scaled to effect correct behavior of the model. If models are used, sufficient full-scale tests should be conducted to verify the accuracy of the model measurements. (continued)	The free-fall tests required in this section should be considered acceptable if: .1 the acceleration are in compliance with the "Training" condition specified in tables 2 and 3 during the launch, free- fall, and subsequent water entry for those tests with the ship on even keel; .2 the acceleration forces are in compliance with the "Emergency" condition specified in tables 2 and 3 during the launch, free-fall, and subsequent water entry for those tests with the ship under unfavourable conditions of list and trim; and .3 the lifeboat makes positive headway immediately after water entry.	Complete data for this test are to be recorded on the form provided. Summary of Test Data: Free-Fall Height:__m Maximum CDRR:__N/A, OR Maximum CAR:_____N/A Was Model Used: YES NO Which Tests: _____ Model Scale: _____ Weight:__kg Radius of Gyration: **%** Loa Free-Fall Height:_____m Positive Headway: Pass___Fail Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.1 Free-fall test (1 of 4) *continued*	**Regulations: LSA Code 4.7.5; MSC.81(70) 1/ 6.5.1/2/3/3.1/3.2/3.3/3.4/4/4.1/4.2/4.3, 6.17**	
Test Procedure	Acceptance Criteria	Significant Test Data
As a minimum, the following full-scale tests should be conducted with the ship on an even keel using the same type of launching arrangement as the production lifeboat and from the height for which the lifeboat is to be approved: .1 lifeboat fully loaded; .2 lifeboat loaded with its required equipment and minimum launching crew only; .3 lifeboat loaded with its required equipment and one half of the full complement of persons distributed in the forward half of the seating positions of the lifeboat; and .4 lifeboat loaded with its required equipment and one half of the full complement of persons seated in the after half of the seating positions of the lifeboat.		Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.1 Free-fall test (2 of 4)	**Regulations: LSA Code 4.7.5; MSC.81(70) 1/ 6.17.1 to 6.17.14**
Measuring and Evaluating Acceleration Forces Selection, placement and mounting of accelerometers The accelerometers used to measure the acceleration forces in the lifeboat should: .1 have adequate frequency response for the test in which they are to be used but the frequency response should at least be in the range of 0 to 200 Hz; .2 have adequate capacity for the acceleration forces that will occur during the tests; and .3 have an accuracy of ±5%. Accelerometers should be placed in the lifeboat, parallel to the principal axes of the lifeboat, at those locations necessary to determine the worst occupant exposure to acceleration. The accelerometers should be mounted on a rigid part of the interior of the lifeboat in a manner to minimize vibration and slipping. A sufficient number of accelerometers should be used at each location at which acceleration forces are measured so that all likely acceleration forces at that location can be measured. The selection, placement, and mounting of the accelerometers should be to the satisfaction of the Administration. **Recording method and rate** The measured acceleration forces may be recorded on magnetic media as either an analog or a digital signal or a paper plot of the acceleration signal may be produced. If acceleration forces are to be recorded and stored as a digital signal, the sampling rate should be at least 500 samples per second. Whenever an analogue acceleration signal is converted to a digital signal, the sampling rate should be at least 500 samples per second.	**Evaluation with the dynamic response model** The dynamic response model is the preferred method to evaluate potential for the occupant in a lifeboat to be injured by exposure to acceleration forces. In the dynamic response model, the human body is idealized as a single-degree-of-freedom, spring-mass acting in each coordinate direction as shown in figure 1. The response of the body mass relative to the seat support, which is excited by the measured accelerations, can be evaluated using a procedure acceptable to the Administration. The parameters to be used in the analysis are shown in table 1 for each coordinate direction. Before performing the dynamic response analysis, the measured accelerations should be oriented to the primary axes of the seat. The desired outcome from the dynamic response analysis is the displacement time-history of the body mass relative to the seat support in each coordinate direction. At all times, the following expression should be satisfied: $$CDRR = \sqrt{\left(\frac{d_x}{S_x}\right)^2 + \left(\frac{d_y}{S_y}\right)^2 + \left(\frac{d_z}{S_z}\right)^2} \leq 1$$ where d_x, d_y and d_z are the concurrent relative displacements of body mass with respect to the seat support, in the *x*, *y* and *z* body axes, as computed from the dynamic response analysis and S_x, S_y, and S_z, are relative displacements which are presented in table 2 for the appropriate launch condition. **Evaluation using the SRSS method** In lieu of the evaluation with the dynamic response model, the potential for an occupant in a lifeboat to become injured by an acceleration can be evaluated using the SRSS method. Before performing the SRSS analysis, the measured accelerations should be oriented to the primary axes of the seat.

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.1 Free-fall test (3 of 4)

Figure 1 – Independent Single Degree-of-Freedom Representation of the Human Body

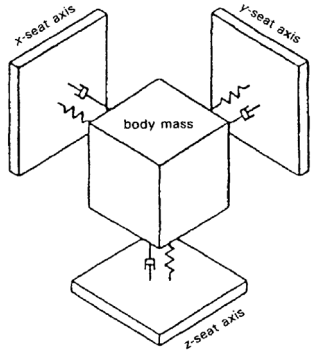

Table 1 – Parameters of the Dynamic Response Model

Coordinate Axis	Natural Frequency (rad/s)	Damping Ratio
X	62.8	0.100
Y	58.0	0.090
Z	52.9	0.224

Table 2 – Suggested Displacements Limits for Lifeboats

Acceleration direction	Displacement (cm)	
	Training	Emergency
+X = Eyeballs In	6.96	8.71
-X = Eyeballs Out	6.96	8.71
+Y = Eyeballs Right	4.09	4.95
-Y = Eyeballs Left	4.09	4.95
+Z = Eyeballs Down	5.33	6.33
-Z = Eyeballs Up	3.15	4.22

Regulations: LSA Code 4.7.5; MSC.81(70) 1/ 6.17.9 to 6.17.17

Full-scale acceleration data should be filtered with no less than the equivalent of a 20 Hz low-pass filter. Any filtering procedure acceptable to the Administration may be used.

Acceleration data measured on a model should be filtered with a low-pass filter having a frequency not less than that obtained with the following expression:

$$f_{model} = \frac{20}{\sqrt{\frac{L_{model}}{L_{prototype}}}}$$

Where f_{model} is the frequency of the filter to be used, L_{model} is the length of the model lifeboat, and $L_{\text{prototype}}$ is the length of the prototype lifeboat.

At all times, the following expression should be satisfied:

$$CAR = \sqrt{\left(\frac{g_x}{G_x}\right)^2 + \left(\frac{g_y}{G_y}\right)^2 + \left(\frac{g_z}{G_z}\right)^2} \leq 1$$

where g_X, g_Y, and g_Z are the concurrent accelerations in the x, y and z seat axes, and G_X, G_Y, and G_Z are allowable accelerations, which are presented in table 3 for the appropriate launch condition.

Table 3 – SRSS Acceleration Limits for Lifeboats

Acceleration direction	Acceleration	
	Training	Emergency
+X = Eyeballs In	15.0	18.0
-X = Eyeballs Out	15.0	18.0
+Y = Eyeballs Right	7.0	7.0
-Y = Eyeballs Left	7.0	7.0
+Z = Eyeballs Down	7.0	7.0
-Z = Eyeballs Up	7.0	7.0

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.1 Free-fall test (4 of 4) **Regulations: LSA Code 4.7.5; MSC.81(70) I/ 6.17.9/12/13/14/15/16/17**

Launch	Load	List/Trim	CDRR	CAR	Headway	Launch	Load	List/Trim	CDRR	CAR	Headway
Full 1	Total	0/0				5	50% Fwd	20/+10 *			
Full 2	50% Fwd	0/0				6	50% Fwd	20/-10 *			
Full 3	50% Aft	0/0				7	50% Aft	0/0			
Full 4	Op Crew	0/0				8	50% Aft	20/+10 *			
1	Total	0/0				9	50% Aft	20/-10 *			
2	Total	20/+10 *				10	Op Crew	0/0			
3	Total	20/-10 *				11	Op Crew	20/+10 *			
4	50% Fwd	0/0				12	Op Crew	20/-10 *			

* If the free fall lifeboat is tested to larger angle of list than the SOLAS minimum requirement (20°): Tested list:_

Comments/Observations

NOTE: Tests Full-1, Full-2, Full-3, and Full-4 must be conducted with the full-scale lifeboat. The other tests can be conducted either with a properly constructed model or with the full-scale lifeboat

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.7.2 Overload test		**Regulations: LSA Code 4.7.4; MSC.81(70) 1/ 6.3.7/8/9, 6.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the lifeboat has sufficient strength to withstand the forces acting upon it when loaded with a distributed mass equal to the mass of the number of persons for which it is to be approved and its equipment when free-fall launched from a height of 1.3 times the height for which it is to be approved. If the lifeboat is normally ramp-launched, and a ramp is not available, this test may be conducted by dropping the lifeboat vertically with the keel at the same angle that normally occurs during water entry. After this test the lifeboat should be unloaded, cleaned and carefully examined to detect the position and extent of damage that may have occurred as a result of this test. An operational test should then be conducted in accordance with 4.6.5.3. After this test the lifeboat should again be unloaded, cleaned, and inspected for possible damage.	This test should be considered successful if the lifeboat passes the operational test to the satisfaction of the Administration; no damage has been sustained that would affect the lifeboat's efficient functioning; and any deflections of the hull or canopy as measured during the test would not cause injury to lifeboat occupants.	Passed: _____ Failed: _____ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.8.1 Air supply test		**Regulations: LSA Code 4.8; MSC.81(70) 1/ 6.15**
Test Procedure	Acceptance Criteria	Significant Test Data
All entrances and openings of the lifeboat should be closed, and the air supply to the inside of the lifeboat turned on to the design air pressure. The engine should then be run at revolutions necessary to achieve full speed with the fully loaded boat including all persons and with the sprinkler system in use for a period of 5 min, stopped for 30 s, then restarted for a total running time of 10 min.	During the 10-minute running time, the atmospheric pressure within the enclosure should be continuously monitored to ascertain that a small positive air pressure is maintained within the lifeboat and to confirm that noxious gases cannot enter. The internal air pressure should never fall below the outside atmospheric pressure nor should it exceed outside atmospheric pressure by more than 20 hPa during the test. It should be ascertained, by starting the engine with air supply turned off, that when the air supply is depleted, automatic means are activated to prevent a dangerous underpressure of more than 20 hPa being developed within the lifeboat. The system should have visual indicators to indicate the pressure of the air supply at all times.	Test duration with positive air pressure:_____ _____min Engine stopped; Overpressure:_____ _____hPa Air supply depleted; Underpressure:__ _____hPa Passed: _____ Failed: _____ Passed: _____ Failed: _____ Air System:_____ engine rev at test: _____rpm Nominal max. pressure:_____bar total air bottle volume: _____l Bottle pressure at start: _____bar Bottle pressure after 10 min _____bar Total required air volume= (Pressure at start-Pressure after 10') x total air bottle volume= _____ l Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.8.2 Fire test (1 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 6.16.1/2/3/4/4.1/4.2/4.3/7**
Test Procedure	Acceptance Criteria	Significant Test Data
The lifeboat should be moored in the centre of an area which is not less than five times the maximum projected plan area of the lifeboat. Sufficient kerosene should be floated on the water within the area so that when ignited it will sustain a fire, which completely envelops the lifeboat for 8 min. The boundary of the area should be capable of completely retaining the fuel. The engine should be run at full speed; however, the propeller need not be turning. The gas and fire-protective systems should be in operation throughout the fire test. The kerosene should be ignited. It should continue to burn and envelop the lifeboat for 8 min. During the fire test, the temperature should be measured and recorded as a minimum at the following locations: .1 at no less than 10 positions on the inside surface of the lifeboat; .2 at not less than 5 positions inside the lifeboat at locations normally taken by occupants and away from the inside surface; and .3 on the external surface of the lifeboat. The positions of such temperature recorders should be to the satisfaction of the Administration. The method of temperature measurement should allow the maximum temperature to be recorded.	At the conclusion of the fire test, the condition of the lifeboat should be such that it could continue to be used in the fully loaded condition.	Temperatures inside surface of the lifeboat: 1 _____ 6 _____ 2 _____ 7 _____ 3 _____ 8 _____ 4 _____ 9 _____ 5 _____ 10 _____ Temperatures inside the lifeboat at locations normally taken by occupants and away from the inside surface: 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ Temperature on the external surface Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.8.2 Fire test (2 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1 / 6.16.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The atmosphere inside the lifeboat should be continuously sampled and representative retained samples should be analysed for the presence and quantity of essential, toxic, and injurious gases or substances. The analysis should cover the range of anticipated gases or substances that may be produced and which can vary according to the materials and fabrication techniques used to manufacture the lifeboat.	The analysis of gases should indicate that there is sufficient oxygen and no dangerous levels of toxic or injurious gases or substances.	Analysis of gasses Gas Level Acceptable Oxygen _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ _____ _____ Passed ___ Failed ___ Comments/Observations

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.8.2 Fire test (3 of 3)		**Regulations: LSA Code 4.9.1; MSC.81(70) 1/ 6.16.6/7**
Test Procedure	Acceptance Criteria	Significant Test Data
The pressure inside the lifeboat should be continuously recorded to confirm that a positive pressure is being maintained inside the lifeboat. The protective system should be as effective as that of the lifeboat tested. The water delivery rate and film thickness at various locations around the hull and canopy should be equal to or exceed the measurements made on the lifeboat originally fire tested. *Note*: The Administration may waive this test for any totally enclosed lifeboat which is identical in construction to another lifeboat which has successfully completed this test, provided the lifeboat differs only in size, and retains essentially the same form.	A positive pressure should be maintained inside the lifeboat.	Internal pressure range Min.____ Max. ___ Passed: _____ Failed: _____ Comments/Observations Reference to previous test, if applicable;_____

Free-fall lifeboats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

4.5.8.3 Water spray test		**Regulations: LSA Code 4.9.2/2.1/2.2/2.3; MSC.81(70) 1/ 6.16.8/8.1/8.2/9/10**
Test Procedure	Acceptance Criteria	Significant Test Data
Start the engine and the spray pump. With the engine running at its designed output, the following should be measured to obtain the rated value and speed: .1 the rpm of the engine and the pump to obtain the rated speed; and .2 the pressure at the suction and delivery side of the pump to obtain the rated water pressure. With the lifeboat in an upright position, on an even keel and in the light condition, run the pump at the rated speed. Measure the delivery rate of water or the thickness of the sprayed water film at the external surface of the lifeboat. Successively trim the lifeboat 5° by the head and 5° by the stern, and heel it 5° to port and 5° to starboard.	Water for the system should be drawn from the sea by a self-priming motor pump. It should be possible to turn "on" and turn "off" the flow of water over the exterior of the lifeboat. The seawater intake should be so arranged as to prevent the intake of flammable liquids from the sea surface. The system should be arranged for flushing with fresh water and allowing complete drainage. The delivery rate of water or the sprayed water film thickness over the lifeboat should be to the satisfaction of the Administration. In each condition the sprayed water film should cover the whole surface of the lifeboat.	Engine RPM: _____ Pump RPM: _____ Suction Pressure:_Pa Delivery Pressure:_Pa Film Thickness:_____mm Delivery Rate:_____L/h Trim or Heel Water Film Covering Surface 5° Head Passed: _____ Failed: _____ 5° Stern Passed: _____ Failed: _____ 5° Port Passed: _____ Failed: _____ 5° Starboard Passed: _____ Failed: _____ Comments/Observations

_____

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MSC.1/Circ.1631
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (RESCUE BOATS)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter V of the LSA Code, i.e. rescue boats (outboard engines for rescue boats; rigid rescue boats; inflated rescue boats; rigid/inflated rescue boats; rigid fast rescue boats; inflated fast rescue boats; and rigid/inflated fast rescue boats).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed, revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (RESCUE BOATS)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and the Revised recommendation, as amended. In the case of inconsistency between the forms and the LSA Code or the Revised recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customizing the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or the Revised recommendation have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (RESCUE BOATS)

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5.1 OUTBOARD ENGINES FOR RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Engine type	
Serial number	
Fuel type	
Design power output (kW)	
Propeller diameter and pitch	
Required battery capacity	
Starting aids	
Date	
Place	
Name and signature of surveyor	
Approving organization	

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & Date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of repot / document**	
		Maintenance Manual -	
		Operations Manual -	

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.3 Visual inspection	**Regulations: LSA Code 1.2, 4.4.6; MSC.81(70) 1 /7.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the engine. Conduct measurements and verify equipment as required.	The engine should be provided with either a manual starting system, or a power starting system with two independent rechargeable energy sources. Any necessary starting aids should be provided. Propeller protection should be in place during test.	Passed_____Failed _____ Passed_____Failed _____ Passed_____Failed _____ Comments/Observations

5.1.4 Power test	**Regulations: LSA Code 5.1.1.8; MSC.81(70) 1 /7.7.2 - 7.7.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
The motor, fitted with a suitable propeller, should be placed in a test rig such that the propeller is completely submerged in a water tank, simulating service conditions. Propeller protection should be in place during the test. The motor should be run at the maximum continuous rated speed using the maximum power obtainable for 20 min.	The rigid means of rescue should not show any permanent damage from such a loading The motor should not overheat or be damaged.	Protection of propeller in place Passed_____ Failed _____ Duration :_____min Any significant damage? Passed_____ Failed _____ Overheating? Passed_____ Failed _____ Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.5 Water drench test		**Regulations: LSA Code 5.1.1.8; MSC.81(70) 1 /7.7.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The motor protective cover should be removed and the motor thoroughly drenched with water, by hose, except for the intake to the carburetor. The motor should be started and run at speed for at least 5 min while it is still being drenched.	The motor should not falter or be damaged by this test.	Duration :_____min Any significant damage? Passed_____ Failed _____ Comments/Observations
5.1.6 Hot start test		**Regulations: LSA Code 5.1.1.8; MSC.81(70) 1 /7.7.5**
Test Procedure	Acceptance Criteria	Significant Test Data
While still in the test rig referred to in 5.1.4 (Power Test) 7.7.2, the motor should be run at idling speed in order to heat up the cylinder block. At the maximum temperature achievable, the motor should be stopped and immediately restarted. This test should be carried out at least twice.	The motor should not fail to restart.	Test carried out :_____times Restarts Passed_____ Failed _____ Any significant damage? Passed_____ Failed _____ Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.7 Manual start test	**Regulations: LSA Code 5.1.1.8; MSC.81(70) 1 /7.7.6 - 7.7.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
The motor should be started at ambient temperature by manual means. The means should be either a manual automatic-rewind system or a pull cord round the top flywheel of the motor. The motor should be started twice within 2 minutes of commencement of the start procedure. The motor should be run until normal operating temperatures are reached, then it should be stopped and started manually twice within 2 minutes, by means of a manual automatic-rewind system or a pull cord round the top flywheel of the motor.	The motor should not fail to start within 2 minutes on any try.	Ambient temperature test carried out :_____times Does the motor start twice within 2 min? Passed_____ Failed _____ Operating temperature Does the motor start twice within 2 min? Passed_____ Failed _____ Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.8 Cold start test		**Regulations: LSA Code 4.4.6.2; MSC.81(70) 1 /7.7.8 - 7.7.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The motor, together with the fuel, fuel lines and battery, should be placed in a chamber at a temperature of –15°C and allowed to remain until the temperature of all parts has reached the temperature of the chamber. The temperature of the fuel, battery and motor should be measured for this test. The motor should be started twice, within 2 min of commencement of the start procedure, and allowed to run long enough to demonstrate that it runs at operating speed. It is recommended that this period should not exceed 15 s. Where lower temperature service is intended, that lower temperature should be substituted for –15°C in the above-mentioned test.	The engine starting systems and starting aids should start the engine at an ambient temperature of –15°C within 2 min of commencing the start procedure unless, in the opinion of the Administration having regard to the particular voyages in which the ship carrying the rescue boat is constantly engaged, a different temperature is appropriate. The engine must start at the specified temperatures.	Starting power Source: Starting aids used: Measured temperatures Chamber: °C Fuel: °C Lubricant oil: °C Cooling fluid: °C Number of starts: Duration of first run: seconds Duration of second run: seconds Duration of last run: seconds Type of battery: Required capacity of starting battery: Passed_____ Failed _____ Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.9 Engine-out-of-water test		**Regulations: LSA Code 4.4.6.2; MSC.81(70) 1 /7.7.10**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 min at idling speed under conditions simulating normal storage.	The engine should be capable of operating for not less than 5 min after starting from cold with the rescue boat out of the water. The engine should not be damaged as a result of this test.	Cooling water supplied during test? Yes/ No If so, by what method? Duration_____min Any damage after this test? Passed_____ Failed _____ Comments/Observations

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.10 Extra test for outboard engine for fast rescue boats	**Regulations: LSA Code 5.1.4.8; MSC.81(70) 1/7.7.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Engine inversion test: The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat at the height of the boat transom. The propeller should be in a water basin to the height of the cavitation plate. The engine should then be subjected to the following test procedures, and then dismantled for examination: .1 start the engine and run it at full speed for 5 min; .2 stop the engine and rotate it in a clockwise direction through 360°; .3 restart the engine and run it at full speed for 10 min; .4 stop the engine and rotate it in a counter- clockwise direction through 360°; .5 restart the engine, run it at full speed for 10 min, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 min;		Means of stopping the engine in case of capsizing: Capable of restarting after re-righting: Amount of loss: ml Passed_____ Failed _____ Comments/Observations Are all the tests carried out according to the procedure as prescribed? Passed/ Failed Does the engine stop when turned in either direction? Passed/Failed If it stops, does it easily restart? Passed/Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/Failed

Outboard engines for rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.1.10 Extra test for outboard engine for fast rescue boats (continued)	**Regulations: LSA Code 5.1.4.8; MSC.81(70) 1/7.7.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Engine inversion test (continued): .8 slowly rotate the running engine in a clockwise direction through 180°, hold at the 180° position for 10 s, and then rotate it 180° further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 min; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counter-clockwise direction; .13 restart the engine and run it at full speed for 5 min;	With regard to step .9, the engine should be stopped automatically or by the helmsman's emergency release switch when inverted. When the rescue boat has righted each engine or motor should be capable of being restarted, provided the helmsman's emergency release, if fitted, has been reset. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system should the rescue boat capsize. The engine should not overheat or fail to operate. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Amount of oil lost from engine during each inversion: .2 : ml .4 : ml .8 : ml .12 : ml Total amount of oil lost from engine: ml Evidence of overheating or excessive wear? Passed/ Failed Comments/Observations

5.2 RIGID RESCUE BOATS

EVALUATION AND TEST REPORT

5.2.0 General information

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- 5.2.0.2 Submitted drawings, reports and documents
- 5.2.0.3 Quality assurance

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- 5.2.1.2 Fittings, provisions and ladders
- 5.2.1.3 Engine and starting system
- 5.2.1.4 Steering mechanism and fuel tank
- 5.2.1.5 Release mechanism
- 5.2.1.6 Drain valve

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- 5.2.2.1 Flooded stability test
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- 5.2.2.3 Righting test (for non self-righting rescue boats)

5.2.3 Seating strength and space tests

- 5.2.3.1 Seating strength test
- 5.2.3.2 Seating space test

5.2.4 Release mechanism tests

- 5.2.4.1 Simultaneous release
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5.2.6 Towing and painter tests

- 5.2.6.1 Towing test
- 5.2.6.2 Painter release test

5.2.7 Strength tests

- 5.2.7.1 Impact, drop and operation after impact and drop test
- 5.2.7.2 Overload test

5.2 RIGID RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.0.1 General data and specifications	**Regulations: LSA Code 4.4, 5.1, MSC.81(70) 1/7.1.9**

General Information	Rescue boat Dimensions	Rescue boat Weight
Construction Material: Hull: _____ Canopy: _____ Fire-retardancy documentation:_____ Rescue Boat Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer:_____ Type: _____ Power: _____ Gear ratio (inboard engine):_____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ Moulded Depth: Provision for securing hanging-off pendant (if applicable):_____	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard used: Quality assurance procedure: Quality assurance manual: Description of system: Quality assurance system acceptable Yes/No Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.1 Occupant space		**Regulations: LSA Code 4.4.2.2, 4.4.3.5, 5.1, MSC.81(70) 1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 3.8 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:_____x____mm Location:_____ Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 4.4.3, 4.4.7, 5.1, MSC.81(70) 1/7.1.9**		
Test Procedure	Acceptance Criteria	Significant Test Data		
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Fittings and Provisions** Suitable handholds or buoyant lifeline becketed around the outside rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed_____	Failed _____	
	On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat	Passed_____	Failed _____	
	Weathertight stowage for small items of equipment	Passed_____	Failed_____	N/A
	Approved position indicating light provided at highest point	Passed_____	Failed _____	
	Provided with effective means of bailing or be automatically self-bailing.	Passed_____	Failed _____	
	Ladders Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed_____	Failed _____	

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 4.4.3, 4.4.7, 5.1, MSC.81(70) 1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual Inspection-Fittings, provisions and ladders (continued)	**Other Provisions** Buoyant material may be installed external to the hull of the boat, provided it is adequately protected against damage and is capable of withstanding exposure when stowed on an open deck on a ship at sea and for 30 days afloat in all sea condition. **Colour** The boat is of a highly visible colour where it will assist detection.	Lowest step_____m below waterline YES NO N/A Passed_____ Failed _____ Highly visible colour: Passed_____Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems - Required starting aids provided - Starting system is not impeded by engine casing, thwarts, or other obstructions - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion - Exhaust arranged to prevent water from entering engine in normal operation - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection - Personnel are protected from hot and moving parts - Shouted order can be heard with engine running at speed necessary for 6 knot operation - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply - Radio batteries not used to provide power for engine starting	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual Inspection-Engine and starting system (continued)	- Recharging for engine batteries provided by ship's power supply does not exceed 50 v - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls - Towing arrangements for marshalling liferafts	Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.4 Steering mechanism and fuel tank		**Regulations: LSA Code 4.4.7.2, 5.1.1.8, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor). Rudder permanently attached to the rescue boat. Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock. Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller. **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion.	Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.5 Release mechanism		**Regulations: LSA Code 4.4.7, 5.1, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Clear operating instructions Release control marked in a colour that contrasts with the surroundings For on-load release mechanisms: Suitably worded danger sign for on load release Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery On-load release mechanism needs deliberate and continued action by the operator Mechanical protection provided beyond that normally required for off load release For a single fall and hook system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate. NOTE: Such single fall hook systems may be attached to the boat or to the davit fall wire.	Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____ N/A ___ Passed_____ Failed_____ N/A ___ Passed_____ Failed_____ N/A ___ Passed_____ Failed_____ N/A ___ Comments/Observations Passed_____ Failed_____ N/A ___ release mechanism type (if installed in boat): _____ Approval:_____

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.1.6 Drain valve		**Regulations: LSA Code 4.4.7.1, 5.1, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required (not applicable for self-bailing boats)	Fitted near lowest point on the hull. Automatically opens when the boat is not waterborne and closes to prevent water entry when the boat is waterborne. Cap or plug attached to the boat by a lanyard, chain or equivalent. Readily accessible from inside the rescue boat. Position clearly marked.	Passed _____ Failed_____ Passed _____ Failed_____ Passed _____ Failed_____ Passed _____ Failed_____ Passed _____ Failed_____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.2.1 Flooded stability test		**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Rescue boats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons (of 82.5kg mass) who would be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) may be omitted.	When loaded as specified, the rescue boat should have positive stability when filled with water to represent flooding which would occur when the rescue boat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Comments/Observations Passed_____ Failed _____

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.2.1 Flooded stability test	**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
Flooding Stability test (continued): Weights representing persons who would not be in the water when the rescue boat is flooded (water level less than 500 mm above seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm³ (for example water ballast containers) to represent a volume similar to a human body. Note: Several tests may have to be conducted if holes in different areas would create different flooding conditions.		

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.2.2 Freeboard test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.8.4-.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the rescue boat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side. The freeboard of the boat should be taken in the loading condition with all equipment, engine and fuel, or equivalent mass positioned to represent engine and fuel.	This test should be considered successful, if the measured freeboard, on the low side, is not less than 1.5% of the rescue boat's length or 100 mm, whichever is greater.	Measured Freeboard _____mm 1.5% of Boat's Length:_____mm Passed_____ Failed _____ Comments/Observations

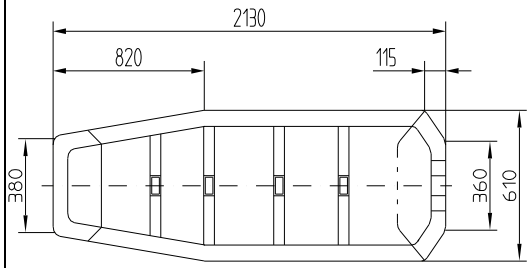
Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.2.3 Righting test (for non self-righting rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. For rescue boats with inboard engines, the test without engine and fuel is not applicable. This test is not required if the righting test in 4.4.2.3 or 4.5.2.3 has been performed.	The rescue boat is capable of being righted by not more than two persons if it is inverted on the water.	Is the boat self-righting? YES NO (If YES, refer to lifeboat report 4.5.2.3 and 4.4.2.3) Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.2.7.1.)	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____N/A___ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rigid rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure and the others should be properly seated in the rescue boat. The rigid rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions (mm)	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least five persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms to the leg space requirements of test form 5.2.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed_____Failed _____ Lifejacket and immersion suit used during the test: Lifejacket– Inflatable/Inherently Buoyant _____ Immersion suit– Uninsulated/Buoyant Insulated

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition. There should be no damage to the release gear or its connection to the boat.	Light condition Passed_____ Failed_____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed_____ Failed_____N/A (N/A – Single fall, off-load only) Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.2 Towing release test		**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plan view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied:_____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed:_____ Failed: _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.2.4.3, 5.2.4.4 and 5.2.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.4.6 Second release mechanism test - actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed: _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70) 1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 min. and the maximum force recorded. (For rescue boats equipped with outboard motor, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ _____ Bollard pull: N _____ _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code 4.4.6.8, 5.1.1.6, MSC.81(70)1/7.1.5, 1/7.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after the impact and drop tests in 5.2.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 hours to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 6 knots for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-h operation. The fuel tank should have sufficient capacity to operate at a speed of 6 knots for a period of 4 hours in calm water.	Smallest Engine Largest Engine Make/model: _____ _____ Engine Speed: rpm _____ _____ Boat Speed: kts _____ _____ Consumption: L/h _____ _____ Fuel Tank Capacity: _____ L Endurance: hrs _____ _____ Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.2.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

5.2.5.5 Helpless person recovery		**Regulations: LSA Code 4.4.3.4, 5.1.1.7, MSC.81(70)1/6.10.8, 7.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the rescue boat from the sea.	Helpless people can be brought on board the rescue boat from the sea.	Method of recovery: _____ Number of Persons required and any special equipment used:_____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.5.6 Manoeuvrability with paddles or oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time Required:_____s Calculated speed:_____m/s = _____ knots Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____ Passed_____ Failed _____ Comments/Observations

5.2.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.6.2 Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.2.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.7.1 Impact, drop and operation after impact and drop test	**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 6.4.3, 6.4.5, 6.4.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The remainder of the weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan.) Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s. The boat should be released to impact against the rigid vertical surface. .2 The same rescue boat with its engine, loaded as described above, should then be suspended above the water so that the distance from the lowest point of the rescue boat to the water is 3 m. The rescue boat should then be released so that it falls freely into the water. .3 After the impact and drop tests, the boat should be examined to detect the position and extent of damage that may have occurred as a result of the tests, and an operational test should then be conducted in accordance with 5.2.5.2. .4 After the operational test, the rescue boat should be unloaded, cleaned, and carefully examined to detect the position and extent of damage that may have occurred as a result of the tests.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the rescue boat's efficient functioning; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.2.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested:_____ Final Evaluation: Passed _____ Failed _____ Comments/Observations

Rigid rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.2.7.2 Overload test		**Regulations: MSC.81(70)1/7.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a properly distributed load of four times the weight to represent the equipment and full complement of persons each weighing 82.5 kg for which it is to be approved and suspended for 5 minutes from its bridle or hooks. The weights should be distributed in proportion to the loading of the boat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seat pan. The boat and bridle or hooks and fastening device should be examined after the test has been conducted. Testing by filling the boat with water should not be accepted. This method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage, in which case weights should be added to the boat to compensate for the removal of such machinery. The rescue boat and its bridle or hooks (release mechanism) and fastening device should be examined after the test for any signs of damage.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Load in boat:_____kg Comments/Observations Passed_____ Failed _____

5.2.8 INFLATED RESCUE BOATS

EVALUATION AND TEST REPORT

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5.3 INFLATED RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.0.1 General data and specifications	**Regulations: LSA Code 5.1**

General Information	Rescue boat Dimensions	Rescue boat Weight
Construction Material: Hull: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer: Type: _____ Power: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer: Type: _____ SWL: _____ Propeller:_____	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Gunwale: _____ Length to transom: Length of hull: _____ (insert diagram of hull for reference) Provision for securing hanging-off pendant (if applicable):	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1,1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.1 Occupant space		**Regulations: LSA Code 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 3.8 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:_____x____mm Location:_____ Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed_____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 4.4.3.3, 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Colour: The boat is of international or vivid reddish orange, or a highly visible colour where it will assist detection.**	Passed_____ Failed _____
	Buoyancy compartments fitted with:	Passed_____ Failed _____
	Non-return valve for manual inflation	Passed_____ Failed_____N/A
	Means for deflation	Passed_____ Failed _____
	Safety relief valve unless waived by Administration	Passed_____ Failed _____
	Suitable patches for securing painters fore and aft	
	Fittings and Provisions Suitable handholds or buoyant lifeline becketed around the outside of the rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed_____ Failed_____N/A
	On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat	Passed_____Failed _____
	Weathertight stowage for small items of equipment	Passed_____Failed _____
	Approved position indicating light provided at highest point	Passed_____Failed _____
	Rubbing strips on bottom and vulnerable places on the outside	Passed_____Failed _____
	Transom, if fitted, not inset by more than 20% of overall length	

5.3.1.2 Fittings, provisions and ladders (cont'd)	**Regulations: LSA Code 4.4.3.3, 5.1.3, MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Provided with effective means of bailing or be automatically self-bailing. **Ladders** Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline.	Passed_____ Failed _____ Comments/Observations YES NO N/A Lowest step_____m below waterline Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems - Required starting aids provided - Starting system is not impeded by engine casing, thwarts or other obstructions - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion - Exhaust arranged to prevent water from entering engine in normal operation - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection - Personnel are protected from hot and moving parts - Shouted order can be heard with engine running at speed necessary for 6 knot operation - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply - Radio batteries not used to provide power for engine starting - Towing arrangement for marshalling liferafts	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual Inspection-Engine and starting system (continued)	- Recharging for engine batteries provided by ship's power supply does not exceed 50 v - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls	Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.4 Steering mechanism and fuel tank		**Regulations: LSA Code 4.4.7.2, 5.1.1.8, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor) Rudder permanently attached to the rescue boat Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion	Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.5 Release mechanism	**Regulations: LSA Code 4.4.7, 5.1, MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required	Clear operating instructions Release control marked in a colour that contrasts with the surroundings For on-load release mechanisms: Suitably worded danger sign for on load release Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery On-load release mechanism needs deliberate and continued action by the operator Mechanical protection provided beyond that normally required for off load release For a single fall and hook system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate NOTE: Such single fall hook systems may be attached to the boat or to the davit fall wire	Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____ N/A _____ Passed_____ Failed_____ N/A _____ Passed_____ Failed_____ N/A _____ Passed_____ Failed_____ N/A _____ Passed_____ Failed_____ N/A _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.1.6 Drain valve		**Regulations: LSA Code 4.4.7.1, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat Conduct measurements and verify clearances as required (not applicable for self-bailing boats)	Fitted near lowest point on the hull Automatically opens when the boat is not waterborne and closes to prevent water entry when the boat is waterborne Cap or plug attached to the boat by a lanyard, chain or equivalent Readily accessible from inside the rescue boat Position clearly marked	Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

5.3.2.1 Damage test		**Regulations: LSA Code 5.1.3.5, MSC.81(70)1/7.2.8-.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with the inflated rescue boat loaded with the number of persons (of 82.5 kg mass) for which it is to be approved both with and without engine and fuel or an equivalent mass in the position of the engine and fuel tank: .1 with forward buoyancy compartment deflated; .2 with the entire buoyancy on one side of the rescue boat deflated; and .3 with the entire buoyancy on one side and the bow compartment deflated.	In each of the conditions prescribed, the full number of persons for which the rescue boat is to be approved should be supported within the rescue boat.	Comments/Observations 1 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 2 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 3 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.2.2 Stability test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.10.8, 7.2.6-.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with engine and fuel or an equivalent mass in place of the engine and fuel tanks: .1 the number of persons for which the inflated rescue boat is to be approved should be crowded to one side with half this complement seated on the buoyancy tube, and then to one end. In each case the freeboard should be recorded; and .2 the stability of the rescue boat during boarding should be ascertained by two persons in the rescue boat demonstrating that they can readily assist from the water a third person who is required to feign unconsciousness. The third person should have his back towards the side of the rescue boat so that he cannot assist the rescuers. All persons should wear approved lifejackets. These stability tests may be carried out with the rescue boat floating in still water.	.1 Under these conditions the freeboard should be everywhere positive. .2 The rescue boat should be stable.	1 Freeboard crowded to one side_____mm To bow:_____mm To stern:_____mm Passed_____Failed _____ 2 Stability observations during recovery of unconscious person: Clothing/Suits on helpless person: _____ Method of recovery: _____ Number of persons required and any special equipment used: _____ Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.2.3 Loading test		**Regulations: MSC.81(70)1/7.2.4-.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the inflated rescue boat should be taken in the various loading conditions as follows: .1 rescue boat with all its equipment; .2 rescue boat with all its equipment, engine and fuel, or an equivalent mass positioned to represent engine and fuel; .3 rescue boat with all its equipment and the number of persons for which it is to be approved having an average mass of 82.5 kg so arranged that a uniform freeboard is achieved at the side buoyancy tubes; and .4 rescue boat with the number of persons for which it is to be approved and all its equipment, engine and fuel or an equivalent mass to represent engine and fuel and the rescue boat being re-trimmed as necessary.	In each condition the minimum freeboard should be not less than 300 mm at the buoyancy tubes and not less than 250 mm from the lowest part of the transom.	.1 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .2 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .3 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .4 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm Passed_____ Failed _____ Comments/Observations

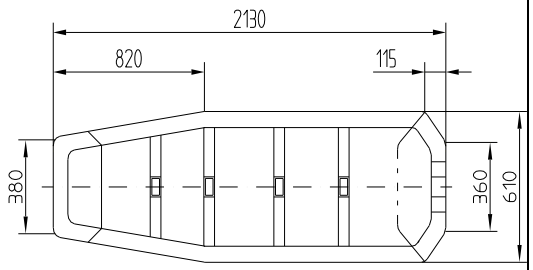
5.3.2.4 Swamp test		**Regulations: MSC.81(70)1/7.2.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat, when fully swamped, is capable of supporting its full equipment, the number of persons each weighing 82.5 kg for which it is to be approved and a mass equivalent to its engine and fully filled fuel tank. It should also be demonstrated that the rescue boat does not seriously deform in this condition.	The rescue boat should be capable of supporting the full load and should not seriously deform.	Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.2.5 Righting test (for non self-righting rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. For rescue boats with inboard engines, the test without engine and fuel is not applicable. Test without engine is only applicable for outboard engines.	The rescue boat should be capable of being righted by not more than two persons if it is inverted on the water.	Is the boat self-righting? YES NO (If YES, refer to lifeboat report 4.5.2.3) Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

5.3.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.3.7.1.)	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rigid rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure and the others should be properly seated in the rescue boat. The rigid rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions (mm)	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least 5 persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms with the leg space requirements of test form 5.3.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed _____ Failed _____ Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.1 Simultaneous release test		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. (Single fall systems not intended for on-load operation are exempt from this test.)	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition.	Light condition Passed_____Failed_____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed _____ Failed_____ N/A (N/A – Single fall, off-load only) Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.2 Towing release test		**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plain view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied:_____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed: _____ Failed: _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.3.4.3, 5.3.4.4 and 5.3.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.4.6 Second release mechanism tests- actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: 1. the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and 2. the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed: _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70)1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 minutes and the maximum force recorded. (For rescue boats equipped with outboard motor, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ _____ Bollard pull: N _____ _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code 5.1.1.6, MSC.81(70)1/7.1.5, 1/7.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after impact and drop tests in 5.3.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 h to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 6 knots for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-h operation. The fuel tank should have sufficient capacity to operate at a speed of 6 knots for a period of 4 hours in calm water.	Smallest Engine Largest Engine Make/model: _____ _____ Engine Speed: rpm _____ _____ Boat Speed: kts _____ _____ Consumption: L/h _____ _____ Fuel Tank Capacity: _____ L Endurance: hrs _____ _____ Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.3.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.5.5 Manoeuvrability with paddles or oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time Required:_____s Calculated speed:_____m/s = _____ knots Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____ Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.5.6 Heavy weather/seas test		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
To simulate use in heavy weather the inflated rescue boat should be fitted with a larger powered engine than is intended to be fitted and driven hard in a wind of force 4 or 5 or equivalent rough water for at least 30 minutes. For boats with inboard engines the power does not need to be greater than that intended to be used.	The rescue boat should not show undue flexing or permanent strain nor have lost more than minimal pressure.	Tube pressure before test:_____mbar Pressure relief valves open/closed?_____ Wave height _____ m Wind Speed_____ m/s Tube pressure after test:_____mbar Passed_____ Failed _____ Comments/Observations

5.3.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.6.2 Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.3.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.7.1 Impact, drop and operation after impact and drop tests		**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 7.2.2. & 7.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan.) Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s (keel is raised 0.624 m above the free hanging position). The boat should be released to impact against the rigid vertical surface. .2 The rescue boat complete with all its equipment and with a mass equivalent to its engine and fuel in the position of its engine and fuel tank should be dropped three times from a height of at least 3 m on to water. The drops should be from the 45-degree bow-down, level trim, and 45-degree stern-down attitudes. .3 On completion of these tests the rescue boat and its equipment should be carefully examined.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the efficient functioning of the rescue boat and its equipment; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.3.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested:_____ Final Evaluation: Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.7.2 Ambient overload test		**Regulations: LSA Code 5.1.3.2.2, MSC.81(70)1/7.2.12**
Test Procedure	Acceptance Criteria	Significant Test Data
With all relief valves inoperative, the inflated rescue boat should be loaded with four times the mass of the full complement of persons and equipment for which it is to be approved and suspended for 5 minutes from its bridle at an ambient temperature of +20 ± 3°C. The rescue boat and its bridle should be examined after the test is conducted.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Passed_____ Failed _____ Comments/Observations

5.3.7.3 Cold overload test		**Regulations: LSA Code 5.1.3.2.3, MSC.81(70)1/7.2.13**
Test Procedure	Acceptance Criteria	Significant Test Data
With all relief valves operative, after 6 hours conditioning at a temperature of -30°C, the inflated rescue boat should be loaded with 1.1 times the mass of the full complement of persons and equipment for which it is to be approved and suspended for 5 minutes from its bridle. The rescue boat and bridle should be examined after the test is conducted.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.7.4 Mooring out test		**Regulations: LSA Code 5.1.3.3, MSC.81(70)1/7.2.15, 5.5, 5.17.7-.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The rescue boat should remain afloat in that location for 30 days. The pressure may be topped up once a day using the manual pump; however, during any 24-hour period the rescue boat should retain its shape. Each inflatable compartment in the rescue boat should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable rescue boat and the inflation source removed. The test should continue for at least 30 minutes. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completed stretching due to the inflation pressure and achieved equilibrium.	The rescue boat should not sustain any damage that would impair its performance. The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the rescue boat.	Compartment 1 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 2 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 3 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 4 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 5 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Passed_____ Failed _____ Comments/Observations

Inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.3.8.1 Inflation chamber characteristics tests	**Regulations: LSA Code 1.2.2, MSC.81(70)1/7.2.14**	
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable compartment materials used to construct the rescue boat should be tested for the following characteristics: .1 tensile strength .2 tear strength .3 heat resistance .4 cold resistance .5 heat ageing .6 weathering .7 flex cracking .8 abrasion .9 coating adhesion .10 oil resistance .11 elongation at break .12 piercing strength .13 ozone resistance .14 gas permeability .15 seam strength .16 ultraviolet light resistance	The material characteristics should comply with ISO 15372:2000.	.1 tensile strength_____N/50 mm width .2 tear strength_____N .3 heat resistance – Blocking _____ .4 cold resistance – Cracking _____ .5 heat ageing_____% retained strength N/50 mm width .6 weathering_____% retained strength N/50 mm width .7 flex cracking – Cracking or deterioration _____ .8 abrasion _____mg/rev.; Base fabric not visible .9 coating adhesion _____N/50 mm width .10 oil resistance – Tackiness or other deterioration .11 elongation at break_____% .12 piercing strength _____ .13 ozone resistance -Visible cracking _____ .14 gas permeability _____bubbles/min or l/m^2/hr of _____ .15 seam strength _____N/50 mm width .16 ultraviolet light resistance_____% retained strength N/50 mm width Cracking _____ SATISFACTORY UNSATISFACTORY Comments/Observations

5.4 RIGID/INFLATED RESCUE BOATS

EVALUATION AND TEST REPORT

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- 5.4.0.2 Submitted drawings, reports and documents
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- 5.4.1.2 Fittings, provisions and ladders
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5.4.2 Stability, damage and loading tests
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- 5.4.2.2 Stability test
- 5.4.2.3 Loading test
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5.4.5 Operational tests
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5.4.8 Materials tests
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5.4 RIGID/INFLATED RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.0.1 General data and specifications	**Regulations: LSA Code 4.4, 5.1, MSC.81(70)1/7.2.16**

General Information	Rescue boat Dimensions	Rescue boat Weight
Construction Material: Hull: _____ Canopy: _____ Fire-retardancy documentation:_____ Rescue Boat Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer:_____ Type: _____ Power: _____ Gear ratio (inboard engine):_____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ _____ Moulded Depth: Provision for securing hanging-off pendant (if applicable):_____	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.1 Occupant space	**Regulations: LSA Code 4.4.2.2, 4.4.3.5, 5.1, MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 3.8 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:_____x____mm Location:_____ Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Buoyancy compartments** fitted with: Non-return valve for manual inflation Means for deflation Safety relief valve unless waived by Administration Suitable patches for securing painters fore and aft **Fittings and Provisions** Suitable handholds or buoyant lifeline becketed around the outside of rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat Weathertight stowage for small items of equipment Approved position indicating light provided at highest point Provided with effective means of bailing or be automatically self-bailing	Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____Failed _____ Passed_____Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.2 Fittings, provisions and ladders (cont'd)		**Regulations: LSA Code 4.4.3.3, 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Ladders** Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline. **Other Provisions** Buoyant material may be installed external to the hull of the boat, provided it is adequately protected against damage and is capable of withstanding exposure when stowed on an open deck on a ship at sea and for 30 days afloat in all sea condition. **Colour** The boat should be of a highly visible colour where it will assist detection.	Passed_____ Failed _____ Lowest step_____m below waterline YES NO N/A Passed_____ Failed _____ Highly visible colour: Passed____Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems. - Required starting aids provided. - Starting system is not impeded by engine casing, thwarts or other obstructions. - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion. - Exhaust arranged to prevent water from entering engine in normal operation. - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris. - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection. - Personnel are protected from hot and moving parts. - Shouted order can be heard with engine running at speed necessary for 6 knot operation. - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting. - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply. - Radio batteries not used to provide power for engine starting. - Towing arrangements for marshalling liferafts.	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.3 Engine and starting system		**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual Inspection-Engine and starting system (continued)	- Recharging for engine batteries provided by ship's power supply does not exceed 50 v. - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station. - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls.	Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.4 Steering mechanism and fuel tank		**Regulations: LSA Code 4.4.7.2, 5.1.1.8, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor) Rudder permanently attached to the rescue boat Except when remote steering is provided, the tiller is permanently attached or linked to the rudder stock Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion	Passed _____ Failed _____ Passed _____ Failed_____ N/A Passed _____ Failed_____ N/A Passed _____ Failed _____ Passed _____ Failed_____ N/A Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.5 Release mechanism		**Regulations: LSA Code 4.4.7.6.5, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Clear operating instructions Release control marked in a colour that contrasts with the surroundings For on-load release mechanisms: Suitably worded danger sign for on load release Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery On-load release mechanism needs deliberate and continued action by the operator Mechanical protection provided beyond that normally required for off load release For a single fall system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate NOTE: Such single fall hook systems may be attached to the boat or to the davit fall wire	Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.1.6 Drain valve		**Regulations: LSA Code 4.4.7.1, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required (not applicable for self-bailing boats).	Fitted near lowest point on the hull. Automatically opens when the boat is not waterborne and closes to prevent water entry when the boat is waterborne. Cap or plug attached to the boat by a lanyard, chain or equivalent. Readily accessible from inside the rescue boat. Position clearly marked.	Passed_____Failed _____ Passed_____Failed _____ Passed_____Failed _____ Passed_____Failed _____ Passed_____Failed _____ Comments/Observations

5.4.2.1 Damage test (Does not apply if waterline is below lower side of inflated tube)		**Regulations: LSA Code 5.1.3.5, MSC.81(70)1/7.2.8-.9, 7.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with the rigid inflated rescue boat loaded with the number of persons (of 82.5 kg mass) for which it is to be approved both with and without engine and fuel or an equivalent mass in the position of the engine and fuel tank: .1 with forward buoyancy compartment deflated; .2 with the entire buoyancy on one side of the rescue boat deflated; and .3 with the entire buoyancy on one side and the bow compartment deflated.	In each of the conditions prescribed, the full number of persons for which the rescue boat is to be approved should be supported within the rescue boat.	Comments/Observations 1 With engine and fuel: Passed _____ Failed_____ Without engine and fuel Passed_____ Failed _____ 2 With engine and fuel: Passed _____ Failed_____ Without engine and fuel Passed_____ Failed _____ 3 With engine and fuel: Passed _____ Failed_____ Without engine and fuel Passed_____ Failed

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.2.2 Stability test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.10.8, 7.2.6-.7,**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with engine and fuel or an equivalent mass in place of the engine and fuel tanks: .1 the number of persons for which the rigid/inflated rescue boat is to be approved should be crowded to one side with half this complement seated on the buoyancy tube, and then to one end. In each case the freeboard should be recorded; and .2 the stability of the rescue boat during boarding should be ascertained by two persons in the rescue boat demonstrating that they can readily assist from the water a third person who is required to feign unconsciousness. The third person should have his back towards the side of the rescue boat so that he cannot assist the rescuers. All persons should wear approved lifejackets. These stability tests may be carried out with the rescue boat floating in still water.	.1 Under these conditions the freeboard should be everywhere positive. .2 The rescue boat should be stable.	.1 Freeboard crowded to one side_____mm To bow:_____mm To stern:_____mm Passed_____Failed _____ .2 Stability observations during recovery of unconscious person: Clothing/Suits on helpless person: _____ Method of recovery: _____ Number of persons required and any special equipment used: _____ Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.2.3 Loading test	**Regulations: LSA Code 5.1.3.6, MSC.81(70)1/7.2.4-.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the rescue boat should be taken in the various loading conditions as follows: .1 rescue boat with all its equipment; .2 rescue boat with all its equipment, engine and fuel, or an equivalent mass positioned to represent engine and fuel; .3 rescue boat with all its equipment and the number of persons for which it is to be approved having an average mass of 82.5 kg so arranged that a uniform freeboard is achieved at the side buoyancy tubes; and .4 rescue boat with the number of persons for which it is to be approved and all its equipment, engine and fuel or an equivalent mass to represent engine and fuel and the rescue boat being retrimmed as necessary.	In each condition the minimum freeboard should be not less than 300 mm at the buoyancy tubes and not less than 250 mm from the lowest part of the transom.	.1 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .2 Freeboard at Buoyancy Tubes:__mm Freeboard at Transom:_____mm .3 Freeboard at Buoyancy Tubes:__mm Freeboard at Transom:_____mm .4 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm Passed_____ Failed _____ Comments/Observations

5.4.2.4 Swamp test	**Regulations: MSC.81(70)1/7.2.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat, when fully swamped, is capable of supporting its full equipment, the number of persons each weighing 82.5 kg for which it is to be approved and a mass equivalent to its engine and fully filled fuel tank. It should also be demonstrated that the rescue boat does not seriously deform in this condition.	The rescue boat should be capable of supporting the full load and should not seriously deform.	Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.2.5 Flooded stability test (Required only when waterline is below lower side of inflated tube)		**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Rescue boats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons (of 82.5 kg mass) who would be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) may be omitted.	When loaded as specified, the rescue boat should have positive stability when filled with water to represent flooding which would occur when the rescue boat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.2.5 Flooded stability test (Required only when waterline is below lower side of inflated tube) (cont'd)		**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Weights representing persons who would not be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm^3 (for example water ballast containers) to represent a volume similar to a human body. Note: Several tests may have to be conducted if holes in different areas would create different flooding conditions.		

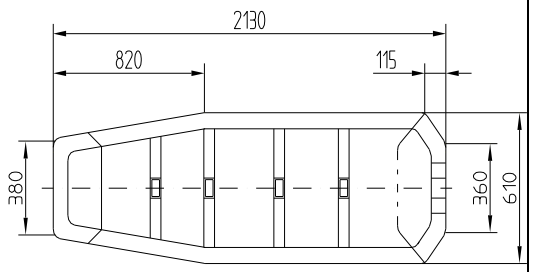
Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.2.6 Righting test (for non-self-righting rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. For rescue boats with inboard engines, the test without engine and fuel is not applicable. Note: Test without engine is only applicable for outboard engines.	The rescue boat should be capable of being righted by not more than two persons if it is inverted on the water.	Is the boat self-righting? YES NO (If YES, refer to lifeboat report 4.5.2.3) Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.4.7.1)	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____ _____N/A Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure below and the others should be properly seated in the rescue boat. The rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions in mm	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least 5 persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms with the leg space requirements of test form 5.4.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed_____Failed _____ Lifejacket and immersion suit used during the test: Lifejacket– Inflatable/Inherently Buoyant _____ Immersion suit– Uninsulated/Buoyant Insulated

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. (Single fall systems not intended for on-load operation are exempt from this test.)	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition.	Light condition Passed_____ Failed _____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed_____ Failed _____N/A (N/A – Single fall, off-load only) Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.2 Towing release test	**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plan view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied:_____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed: _____ Failed:_____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.4.4.3, 5.4.4.4 and 5.4.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.4.6 Second release mechanism tests- actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed:_____ Failed: _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70)1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft which the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 minutes and the maximum force recorded. (For rescue boats equipped with outboard motor, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ _____ Bollard pull: N _____ _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code 5.1.1.6,MSC.81(70)1/7.1.5, 1/7.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after impact and drop tests in 5.4.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 hours to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 6 knots for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-h operation. The fuel tank should have sufficient capacity to operate at a speed of 6 knots for a period of 4 hours in calm water.	Smallest Engine Largest Engine Make/model: _____ _____ Engine Speed: rpm _____ _____ Boat Speed: kts _____ _____ Consumption: L/h _____ _____ Fuel Tank Capacity: _____ L Endurance: hrs _____ _____ Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.4.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.5.5 Manoeuvrability with paddles or oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved. For boats with inboard engines the power does not need to be greater than that intended to be used.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time Required:_____s Calculated speed:_____m/s = _____ knots Lifejacket and immersion suit used during the test: Lifejacket - Inflatable/Inherently Buoyant _____ Immersion suit - Uninsulated/Buoyant Insulated _____ Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.5.6 Heavy weather/seas test		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
To simulate use in heavy weather the rescue boat should be fitted with a larger powered engine than is intended to be fitted and driven hard in a wind of force 4 or 5 or equivalent rough water for at least 30 minutes.	The rescue boat should not show undue flexing or permanent strain nor have lost more than minimal pressure.	Tube pressure before test:_____mbar Pressure relief valves open/closed?_____ Wave height _____ m Wind Speed_____ m/s Tube pressure after test:_____mbar Passed_____ Failed _____ Comments/Observations

5.4.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.6.2 Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.4.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.7.1 Impact, drop and operation after impact and drop test	**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 7.2.2, 7.2.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan.) Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s. The boat should be released to impact against the rigid vertical surface. .2 The rescue boat complete with all its equipment and with a mass equivalent to its engine and fuel in the position of its engine and fuel tank should be dropped three times from a height of at least 3 m on to water. The drops should be from the 45-degree bow-down, level trim, and 45-degree stern-down attitudes. .3 On completion of these tests the rescue boat and its equipment should be carefully examined.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the efficient functioning of the rescue boat and its equipment; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.4.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested:_____ Final Evaluation: Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.7.2 Overload test	**Regulations: MSC.81(70)1/7.1.4**	
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a properly distributed load of four times the weight to represent the equipment and full complement of persons each weighing 82.5 kg for which it is to be approved and suspended for 5 minutes from its bridle or hooks. The weights should be distributed in proportion to the loading of the boat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seat pan. The boat and bridle or hooks and fastening device should be examined after the test has been conducted. Testing by filling the boat with water should not be accepted. This method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage, in which case weights should be added to the boat to compensate for the removal of such machinery. The rescue boat and its bridle or hooks (release mechanism) and fastening device should be examined after the test for any signs of damage.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Load in boat:_____kg Comments/Observations Passed_____ Failed _____

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.7.3 Mooring out test (Does not apply if waterline is below lower side of inflated tube)	**Regulations: LSA Code 5.1.3.3, MSC.81(70)1/7.2.15, 5.5, 5.17.7-.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The rescue boat should remain afloat in that location for 30 days. The pressure may be topped up once a day using the manual pump; however, during any 24-hour period the rescue boat should retain its shape. Each inflatable compartment in the rescue boat should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative; compressed air should be used to inflate the inflatable rescue boat and the inflation source removed. The test should continue for at least 30 minutes. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completed stretching due to the inflation pressure and achieved equilibrium.	The rescue boat should not sustain any damage that would impair its performance. The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the rescue boat.	Compartment 1 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 2 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 3 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 4 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 5 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Passed_____ Failed _____ Comments/Observations

Rigid/inflated rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.4.8.1 Inflation chamber characteristics tests		**Regulations: LSA Code 1.2.2, MSC.81(70)1/7.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable compartment materials used to construct the rescue boat should be tested for the following characteristics: .1 tensile strength .2 tear strength .3 heat resistance .4 cold resistance .5 heat ageing .6 weathering .7 flex cracking .8 abrasion .9 coating adhesion .10 oil resistance .11 elongation at break .12 piercing strength .13 ozone resistance .14 gas permeability .15 seam strength .16 ultraviolet light resistance	The material characteristics should comply with ISO 15372:2000.	.1 tensile strength_____N/50 mm width .2 tear strength_____N .3 heat resistance – Blocking _____ .4 cold resistance – Cracking _____ .5 heat ageing_____% retained strength N/50 mm width .6 weathering_____% retained strength N/50 mm width .7 flex cracking – Cracking or deterioration _____ .8 abrasion _____mg/rev.; Base fabric not visible .9 coating adhesion _____N/50 mm width .10 oil resistance – Tackiness or other deterioration .11 elongation at break_____% .12 piercing strength _____ .13 ozone resistance -Visible cracking _____ .14 gas permeability _____bubbles/min or l/m^2/hr of _____ .15 seam strength _____N/50 mm width .16 ultraviolet light resistance_____% retained strength N/50 mm width Cracking _____ SATISFACTORY UNSATISFACTORY Comments/Observations

5.5 RIGID FAST RESCUE BOATS

EVALUATION AND TEST REPORT

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5.5 RIGID FAST RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.0.1 General data and specifications	**Regulations: LSA Code 4.4, 5.1, MSC.81(70)1/7.1.9**

General Information	Rescue boat Dimensions	Rescue boat Weight
Construction Material: Hull: _____ Canopy: _____ Fire-retardancy documentation:_____ Rescue Boat Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer:_____ Type: _____ Power: _____ Gear ratio (inboard engine):_____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____ Propeller_____	Dimensions: LOA (including fixed fenders, if any): _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ Moulded Depth: _____ Provision for securing hanging-off pendant (if applicable):_ _____ _____	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.1.1 Occupant space	**Regulations: LSA Code 4.4.2.2, 4.4.3.5, 5.1, MSC.81(70)1/7.1.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 6.0 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:____x _____mm Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.1.2 Fittings, provisions and ladders	**Regulations: LSA Code 4.4.3, 4.4.7, 5.1, MSC.81(70)1/7.1.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Fittings and Provisions** Suitable handholds or buoyant lifeline becketed around the outside of rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller. On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat. Weathertight stowage for small items of equipment. Approved position-indicating light provided at highest point. Automatically self-bailing or capable of rapidly clearing water. **Ladders** Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline. **Other Provisions** Buoyant material may be installed external to the hull of the boat, provided it is adequately protected against damage and is capable of withstanding exposure when stowed on an open deck on a ship at sea and for 30 days afloat in all sea condition. **Colour** The boat is of a highly visible colour where it will assist detection.	Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____N/A YES NO N/A Lowest step_____m below waterline Passed_____ Failed _____ Highly visible colour: Passed ____ Failed _____ Comments/observations:

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.1.3 Engine and starting system	**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.1.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems. - Required starting aids provided. - Starting system is not impeded by engine casing, thwarts, or other obstructions. - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion. - Exhaust arranged to prevent water from entering engine in normal. operation. - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection. - Personnel are protected from hot and moving parts - Shouted order can be heard with engine running at speed necessary for 6 knot operation - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting. - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply. - Radio batteries not used to provide power for engine starting. - Recharging for engine batteries provided by ship's power supply does not exceed 50 v. - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station. - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls. - Towing arrangements for marshalling liferafts.	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.1.4 Steering mechanism and fuel tank		**Regulations: LSA Code 4.4.7.2, 5.1.1.8, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor) Rudder permanently attached to the rescue boat Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller Steered by wheel at helmsman's position Has emergency steering system providing direct control of rudder, water jet or outboard motor Hands-free, watertight VHF radio provided **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion	Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____ N/A Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.1.5 Release mechanism		**Regulations: LSA Code 4.4.7, 5.1, MSC.81(70)1/7.1.9**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required	Clear operating instructions Release control marked in a colour that contrasts with the surroundings For on-load release mechanisms: Suitably worded danger sign for on load release Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery On-load release mechanism needs deliberate and continued action by the operator Mechanical protection provided beyond that normally required for off load release For a single fall system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate This capability to release the boat may be attached to the boat or to the davit	Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Passed_____ Failed_____N/A Comments/Observations release mechanism type: _____ Approval:_____

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.1 Flooded stability test		**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Rescue boats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons (of 82.5 kg mass) who would be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) may be omitted. Weights representing persons who would not be in the water when the rescue boat is flooded (water level less than 500 mm above seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm³ (for example water ballast containers) to represent a volume similar to a human body. Note: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	When loaded as specified, the rescue boat should have positive stability when filled with water to represent flooding which would occur when the rescue boat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Comments/Observations Passed_____ Failed _____

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.2 Freeboard test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.8.4-.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat with its engine should be loaded with a mass equal to that of all the equipment. One half of the number of persons for which the rescue boat is to be approved should be seated in a proper seating position on one side of the centreline. The freeboard should then be measured on the low side. The freeboard of the boat should be taken in the loading condition with all equipment, engine and fuel, or equivalent mass positioned to represent engine and fuel.	This test should be considered successful, if the measured freeboard, on the low side, is not less than 1.5% of the rescue boat's length or 100 mm, whichever is greater.	Measured Freeboard:____mm 1.5% of Boat's Length:_____mm Passed_____ Failed _____ Comments/Observations

5.5.2.3 Righting test (for non self-righting fast rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. The engine should be running in neutral position and, after stopping automatically or by the helmsman's emergency release switch when inverted, it should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. For rescue boats with inboard engines, the test without engine and fuel is not applicable. (This test is not required if the righting test in 5.5.2.4 has been performed.)	The rescue boat should be capable of being righted by not more than two persons if it is inverted on the water. When the rescue boat has righted, each engine or motor should be capable of being restarted, provided the helmsman's emergency release, if fitted, has been reset. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.4 Self-Righting test (for self-righting fast rescue boats only)		**Regulations: MSC/Circ.809, Annex, 4.1.5, 4.1.8; MSC.81(70)1/6.14**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the rescue boat about a longitudinal axis to any angle of heel and then release it. The rescue boat should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the rescue boat with its engine is loaded in the normal position with properly secured weights representing the fully equipped rescue boat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 82.5 kg, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seatpan so as to have the same effect on stability as when the rescue boat is loaded with the number of persons for which it is to be approved; and .2 when the rescue boat is in the light condition. In the case of open fast rescue boats, the self-righting test should only be done in the light condition.	After release, the rescue boat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run until stopped by the helmsman's emergency release switch; and .2 after resetting the helmsman's emergency release, if necessary, the engine should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. Water should not enter the engine. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Angle of Heel — Righting Moment: Loaded / Light 45^0 _____ _____ 90^0 _____ _____ 135^0 _____ _____ 180^0 _____ _____ Result: PASSED FAILED PASSED FAILED Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.5 Flooded capsizing test (for self-righting fully enclosed fast rescue boats only)		**Regulations: MSC.81(70) 1/6.14.3, 6.14.4, 6.14.5, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Perform the following for fast rescue boats with a closable canopy. This test is not applicable to open fast rescue boats. The rescue boat should be placed in the water and fully flooded until the rescue boat can contain no additional water. All entrances and openings should be secured to remain open during the test. Using a suitable means, the rescue boat should be rotated about a longitudinal axis to a heel angle of 180° and then released. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the rescue boat in the normal operating position.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants.	Result: PASSED FAILED Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.6 Engine inversion test (inboard) (for self-righting fast rescue boats only)		**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat. A pan should be located under the engine to collect any oil which may leak from the engine so that the quantity of such oil can be measured. The following procedure should be followed during this test: .1 start the engine and run it at full speed for 5 minutes; .2 stop the engine and rotate it in a clockwise direction through 360°; .3 restart the engine and run it at full speed for 10 minutes; .4 stop the engine and rotate it in a counter-clockwise direction through 360°; .5 restart the engine, run it at full speed for 10 minutes, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 minutes;	The engine and engine installation should be capable of running in any position during capsize and continue to run after the rescue boat returns to the upright or should automatically stop on capsizing and be easily restarted after the rescue boat returns to the upright. The design of the fuel and lubricating systems should prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize. During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Passed _____Failed _____ Comments/Observations

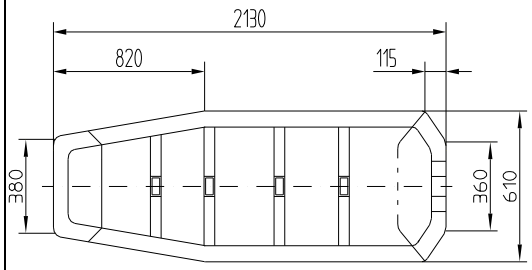
Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.2.6 Engine inversion test (inboard) (continued)	**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The following procedure should be followed during this test (Continued): .8 slowly rotate the running engine in a clockwise direction through 180°, hold at the 180° position for 10 s, and then rotate it 180° further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 minutes; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counter-clockwise direction; .13 restart the engine and run it at full speed for 5 minutes; .14 rotate the engine in a clockwise direction through 180° and stop the engine. Rotate it 180° further to complete a full clockwise revolution; .15 restart the engine and run it at full speed for 10 minutes; .16 repeat the procedure in .14 above, turning the engine counter-clockwise; .17 restart the engine, run it at full speed for 10 minutes and then shut it down; and .18 dismantle the engine for examination.	During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Are all the tests carried out according to the procedure as prescribed? Passed/Failed Does the engine stop when turned in either direction? Passed/ Failed If it stops, does it easily restart? Passed/Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/ Failed Amount of oil lost from engine during each inversion: .2 : ml .4 : ml .8 : ml .12 : ml .14 : ml .16 : ml Total amount of oil lost from engine: ml Evidence of overheating or excessive wear? Passed/ Failed Amount of oil lost from engine _____ ml Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.5.7.1).	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rigid rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure and the others should be properly seated in the rescue boat. The rigid rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions (mm)	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least 5 persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms with the leg space requirements of test form 5.5.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed_____Failed _____ Lifejacket and immersion suit used during the test: Lifejacket– Inflatable/Inherently Buoyant _____ Immersion suit– Uninsulated/Buoyant Insulated Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition. There should be no damage to the release gear or its connection to the boat.	Light condition Passed_____ Failed _____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed_____ Failed_____ _____N/A (N/A – Single fall, off-load only) type of release system:_____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.2 Towing release test	**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**	
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plain view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied: _____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed: _____ Failed: _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.5.4.3, 5.5.4.4 and 5.5.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.4.6 Second release mechanism tests- actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed: _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70)1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 minutes and the maximum force recorded. (For rescue boats equipped with outboard motors, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ Bollard pull: N _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed_____ Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code 4.4.6.8, 5.1.1.6 MSC.81(70)1/7.1.6, 7.4.2.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after the impact and drop tests in 5.5.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 hours to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 8 knots with a full complement of persons and equipment and 20 knots with a crew of 3 persons for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-hour operation. The fuel tank should have sufficient capacity to operate at a speed of 8 knots for a period of 4 hours with its full complement of persons and equipment. The fuel tank should have sufficient capacity to operate at a speed of 20 knots for a period of 4 hours with a crew of 3 persons.	Smallest Engine Largest Engine Make/model: _____ _____ Fuel Tank Capacity: _____ L Propeller: Pitch: _____ _____ Diameter: _____ _____ @8 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ @20 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations
5.5.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.5.5 Helpless Person Recovery		**Regulations: LSA Code 4.4.3.4, 5.1.1.7, MSC.81(70)1/6.10.8, 7.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by test that it is possible to bring helpless people on board the rescue boat from the sea.	Helpless people can be brought on board the rescue boat from the sea.	Number of Persons required and any special equipment used: _____ Passed_____ Failed _____ Comments/Observations

5.5.5.6 Maneuverability With Paddles Or Oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time Required:_____s Calculated speed:_____m/s = _____ knots Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____ Passed_____ Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.5.6.2 Towing & Painter Tests—Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.5.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.7.1 Impact, drop and operation after impact and drop test	**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 6.4.3, 6.4.5, 6.4.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The remainder of the weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan). Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s. The boat should be released to impact against the rigid vertical surface. .2 The same rescue boat with its engine, loaded as described above, should then be suspended above the water so that the distance from the lowest point of the rescue boat to the water is 3 m. The rescue boat should then be released so that it falls freely into the water. .3 After the impact and drop tests, the boat should be examined to detect the position and extent of damage that may have occurred as a result of the tests, and an operational test should then be conducted in accordance with 5.5.5.2. .4 After the operational test, the rescue boat should be unloaded, cleaned, and carefully examined to detect the position and extent of damage that may have occurred as a result of the tests.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the rescue boat's efficient functioning; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.5.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: YES NO Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested: Final Evaluation: Passed_____ Failed _____ Comments/Observations

Rigid fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.5.7.2 Overload test		**Regulations: MSC.81(70)1/7.1.4**
Test Procedure	Acceptance Criteria	Test Procedure
The rescue boat should be loaded with a properly distributed load of four times the weight to represent the equipment and full complement of persons each weighing 82.5 kg for which it is to be approved and suspended for five minutes from its bridle or hooks. The weights should be distributed in proportion to the loading of the boat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seat pan. The boat and bridle or hooks and fastening device should be examined after the test has been conducted. Testing by filling the boat with water should not be accepted. This method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage, in which case weights should be added to the boat to compensate for the removal of such machinery. The rescue boat and its bridle or hooks (release mechanism) and fastening device should be examined after the test for any signs of damage.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Load in boat:_____kg Comments/Observations Passed_____ Failed _____

5.6 INFLATED FAST RESCUE BOATS

EVALUATION AND TEST REPORT

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5.6 INFLATED FAST RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.0.1 General data and specifications		**Regulations: LSA Code 4.4, 5.1, MSC.81(70) 1/7.2**
General Information	Rescue boat dimensions	Rescue boat weight
Construction Material: Hull: _____ Canopy: _____ Rescue Boat Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer:_____ Type: _____ Power: _____ Gear ratio (inboard engine):_____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____ Propeller:	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ Moulded Depth: Provision for securing hanging-off pendant (if applicable):_____	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight As Tested: Fully Equipped: _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual:_____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.1 Occupant space		**Regulations: LSA Code 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 6.0 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:____x _____mm Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed_____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Buoyancy compartments** fitted with: Non-return valve for manual inflation	Passed_____ Failed _____
	Means for deflation	Passed_____ Failed _____
	Safety relief valve unless waived by Administration	Passed_____ Failed_____N/A
	Suitable patches for securing painters fore and aft	Passed_____ Failed _____
	Fittings and Provisions Suitable handholds or buoyant lifeline becketed around the outside of rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed_____ Failed _____
	On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat	Passed_____ Failed_____N/A
	Weathertight stowage for small items of equipment	Passed_____Failed _____
	Approved position indicating light provided at highest point	Passed_____Failed _____
	Rubbing strips on bottom and vulnerable places on the outside	Passed_____Failed _____
	Transom, if fitted, not inset by more than 20% of overall length	Passed_____Failed _____
	Automatically self-bailing or capable of rapidly clearing water	Passed_____Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.2 Fittings, provisions and ladders (cont'd)		**Regulations: LSA Code 4.4.3.3, 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Ladders** Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline. **Colour** The boat should be of a highly visible colour where it will assist detection.	Passed_____ Failed _____ Lowest step_____m below waterline Highly visible colour: Passed_____Failed_____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.3 Engine and starting system	**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems - Required starting aids provided - Starting system is not impeded by engine casing, thwarts, or other obstructions - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion - Exhaust arranged to prevent water from entering engine in normal operation - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection - Personnel are protected from hot and moving parts - Shouted order can be heard with engine running at speed necessary for 6 knot operation - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply - Radio batteries not used to provide power for engine starting - Recharging for engine batteries provided by ship's power supply does not exceed 50 v - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls - Towing arrangement for marshalling liferafts	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.4 Steering mechanism and fuel tank		**Regulations: LSA Code 4.4.7.2, 5.1.1.8, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor) Rudder permanently attached to the rescue boat Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller Steered by wheel at helmsman's position Has emergency steering system providing direct control of rudder, water jet or outboard motor Hands-free, watertight VHF radio provided **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion	Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed_____N/A Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed _____N/A Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.1.5 Release mechanism		**Regulations: LSA Code 4.4.7,.6.5, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Clear operating instructions	Passed_____ Failed _____
	Release control marked in a colour that contrasts with the surroundings	Passed_____ Failed _____
	For on-load release mechanisms:	
	Suitably worded danger sign for on load release	Passed_____ Failed_____N/A
	Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery	Passed_____ Failed_____N/A
	On-load release mechanism needs deliberate and continued action by the operator	Passed_____ Failed_____N/A
	Mechanical protection provided beyond that normally required for off load release	Passed_____ Failed_____N/A
	For a single fall system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate.	Passed_____ Failed_____N/A Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.1 Damage test		**Regulations: LSA Code 5.1.3.5, MSC.81(70)1/7.2.8-.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with the inflated rescue boat loaded with the number of persons (of 82.5kg mass) for which it is to be approved both with and without engine and fuel or an equivalent mass in the position of the engine and fuel tank: .1 with forward buoyancy compartment deflated; .2 with the entire buoyancy on one side of the rescue boat deflated; and .3 with the entire buoyancy on one side and the bow compartment deflated.	In each of the conditions prescribed, the full number of persons for which the rescue boat is to be approved should be supported within the rescue boat.	Comments/Observations 1 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 2 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 3 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.2 Stability test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.10.8, 7.2.6-.7**
Test Procedure	Acceptance Criteria	Test Procedure
The following tests should be carried out with engine and fuel or an equivalent mass in place of the engine and fuel tanks: .1 the number of persons for which the inflated rescue boat is to be approved should be crowded to one side with half this complement seated on the buoyancy tube, and then to one end. In each case the freeboard should be recorded; and .2 the stability of the rescue boat during boarding should be ascertained by two persons in the rescue boat demonstrating that they can readily assist from the water a third person who is required to feign unconsciousness. The third person should have his back towards the side of the rescue boat so that he cannot assist the rescuers. All persons should wear approved lifejackets. These stability tests may be carried out with the rescue boat floating in still water.	.1 Under these conditions the freeboard should be everywhere positive. .2 The rescue boat should be stable.	.1 Freeboard crowded to one side_____mm To bow:_____mm .2 To stern:_____mm Passed_____Failed _____ .3 Stability observations during recovery of unconscious person: Clothing/Suits on helpless person: _____ Method of recovery: _____ Number of persons required and any special equipment used: _____ Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.3 Loading test		**Regulations: MSC.81(70)1/7.2.4-.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the inflated rescue boat should be taken in the various loading conditions as follows: .1 rescue boat with all its equipment; .2 rescue boat with all its equipment, engine and fuel, or an equivalent mass positioned to represent engine and fuel; .3 rescue boat with all its equipment and the number of persons for which it is to be approved having an average mass of 82.5 kg so arranged that a uniform freeboard is achieved at the side buoyancy tubes; and .4 rescue boat with the number of persons for which it is to be approved and all its equipment, engine and fuel or an equivalent mass to represent engine and fuel and the rescue boat being re-trimmed as necessary.	In each condition the minimum freeboard should be not less than 300 mm at the buoyancy tubes and not less than 250 mm from the lowest part of the transom.	.1 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .2 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .3 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .4 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm Passed_____ Failed _____ Comments/Observations

5.6.2.4 Swamp test		**Regulations: MSC.81(70)1/7.2.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat, when fully swamped, is capable of supporting its full equipment, the number of persons each weighing 82.5 kg for which it is to be approved and a mass equivalent to its engine and fully filled fuel tank. It should also be demonstrated that the rescue boat does not seriously deform in this condition.	The rescue boat should be capable of supporting the full load and should not seriously deform.	Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.5 Righting test (for non self-righting fast rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. The engine should be running in neutral position and, after stopping automatically or by the helmsman's emergency release switch when inverted, it should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. For rescue boats with inboard engines, the test without engine and fuel is not applicable. (This test is not required if the righting test in 5.6.2.6 has been performed.)	The rescue boat should be capable of being righted by not more than two persons if it is inverted on the water. When the rescue boat has righted, each engine or motor should be capable of being restarted, provided the helmsman's emergency release, if fitted, has been reset. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.6 Self-righting test (for self-righting fast rescue boats only)		**Regulations: MSC.81(70)1/6.14**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the rescue boat about a longitudinal axis to any angle of heel and then release it. The rescue boat should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the rescue boat with its engine is loaded in the normal position with properly secured weights representing the fully equipped rescue boat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 82.5 kg, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seatpan so as to have the same effect on stability as when the rescue boat is loaded with the number of persons for which it is to be approved; and .2 when the rescue boat is in the light condition. In the case of open fast rescue boats, the self-righting test should only be done in the light condition.	After release, the rescue boat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run until stopped by the helmsman's emergency release switch; and .2 after resetting the helmsman's emergency release, if necessary, the engine should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. Water should not enter the engine. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Angle of Heel / Righting Moment Loaded / Righting Moment Light 45^0 _____ _____ 90^0 _____ _____ 135^0 _____ _____ 180^0 _____ _____ Result : PASSED FAILED PASSED FAILED Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.7 Flooded capsizing test (for self-righting fully enclosed fast rescue boats only)		**Regulations: MSC.81(70) 1/6.14.3, 6.14.4, 6.14.5, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Perform the following for fully enclosed rigid fast rescue boats. This test is not applicable to open fast rescue boats. The rescue boat should be placed in the water and fully flooded until the rescue boat can contain no additional water. All entrances and openings should be secured to remain open during the test. Using a suitable means, the rescue boat should be rotated about a longitudinal axis to a heel angle of 180° and then released. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the rescue boat in the normal operating position.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants.	Result: PASSED FAILED Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.8 Engine inversion test (for self-righting fast rescue boats only)	**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat. A pan should be located under the engine to collect any oil which may leak from the engine so that the quantity of such oil can be measured. The following procedure should be followed during this test: .1 start the engine and run it at full speed for 5 minutes; .2 stop the engine and rotate it in a clockwise direction through 360°; .3 restart the engine and run it at full speed for 10 minutes; .4 stop the engine and rotate it in a counter- clockwise direction through 360°; .5 restart the engine, run it at full speed for 10 minutes, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 minutes;	The engine and engine installation should be capable of running in any position during capsize and continue to run after the rescue boat returns to the upright or should automatically stop on capsizing and be easily restarted after the rescue boat returns to the upright. The design of the fuel and lubricating systems should prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize. During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Passed _____ Failed _____ Comments/Observations

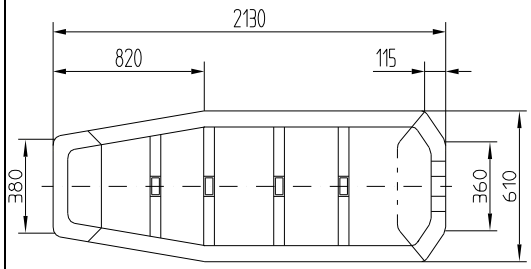
Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.2.8 Engine inversion test (continued)	**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
The following procedure should be followed during this test (Continued): .8 slowly rotate the running engine in a clockwise direction through 180°, hold at the 180° position for 10 s, and then rotate it 180° further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 minutes; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counter-clockwise direction; .13 restart the engine and run it at full speed for 5 minutes; .14 rotate the engine in a clockwise direction through 180° and stop the engine. Rotate it 180° further to complete a full clockwise revolution; .15 restart the engine and run it at full speed for 10 minutes; .16 repeat the procedure in .14 above, turning the engine counter-clockwise; .17 restart the engine, run it at full speed for 10 minutes and then shut it down; and .18 dismantle the engine for examination.	During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Are all the tests carried out according to the procedure as prescribed? Passed/Failed Does the engine stop when turned in either direction? Passed/Failed If it stops, does it easily restart? Passed/Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/Failed Amount of oil lost from engine during each inversion: .2 : ml .4 : ml .8 : ml .12 : ml .14 : ml .16 : ml Total amount of oil lost from engine: ml Evidence of overheating or excessive wear? Passed/Failed Amount of oil lost from engine _____ ml Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.6.7.1).	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rigid rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure and the others should be properly seated in the rescue boat. The rigid rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions (mm)	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least 5 persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms with the leg space requirements of test form 5.6.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed_____Failed _____ Lifejacket and immersion suit used during the test: Lifejacket– Inflatable/Inherently Buoyant _____ Immersion suit– Uninsulated/Buoyant Insulated Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. (Single fall systems not intended for on-load operation are exempt from this test.)	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition.	Light condition Passed_____ Failed_____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed_____ Failed_____N/A (N/A – Single fall, off-load only) Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.2 Towing release test		**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plain view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied:_____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied:_____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed: _____ Failed: _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.6.4.3, 5.6.4.4 and 5.6.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.4.6 Second release mechanism tests- actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	.1 The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed: _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70)1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 minutes and the maximum force recorded. (For rescue boats equipped with outboard motors, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ _____ Bollard pull: N _____ _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code MSC.81(70)1/7.1.6, 7.4.2.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after the impact and drop tests in 5.6.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 hours to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 8 knots with a full complement of persons and equipment and 20 knots with a crew of 3 persons for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-hour operation. The fuel tank should have sufficient capacity to operate at a speed of 8 knots for a period of 4 hours with its full complement of persons and equipment. The fuel tank should have sufficient capacity to operate at a speed of 20 knots for a period of 4 hours with a crew of 3 persons.	Smallest Engine Largest Engine Make/model: _____ _____ Fuel Tank Capacity: _____ L Propeller: Pitch: _____ _____ Diameter: _____ _____ @8 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ @20 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.6.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.5.5 Manoeuvrability with paddles or oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time required:_____s Calculated speed:_____m/s =_____ knots Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____ Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.5.6 Heavy weather/seas test		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
To simulate use in heavy weather the inflated rescue boat should be fitted with a larger powered engine than is intended to be fitted and driven hard in a wind of force 4 or 5 or equivalent rough water for at least 30 minutes. For boats with inboard engines the power does not need to be greater than that intended to be used.	The rescue boat should not show undue flexing or permanent strain nor have lost more than minimal pressure.	Tube pressure before test:_____mbar Pressure relief valves open/closed?_____ Wave height _____ m Wind Speed_____ m/s Tube pressure after test:_____mbar Passed_____ Failed _____ Comments/Observations

5.6.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.6.2 Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.6.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.7.1 Impact, drop and operation after impact and drop test		**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 7.2.2 & 7.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan.) Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s. The boat should be released to impact against the rigid vertical surface. .2 The rescue boat complete with all its equipment and with a mass equivalent to its engine and fuel in the position of its engine and fuel tank should be dropped three times from a height of at least 3 m on to water. The drops should be from the 45-degree bow-down, level trim, and 45-degree stern-down attitudes. .3 On completion of these tests the rescue boat and its equipment should be carefully examined.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the efficient functioning of the rescue boat and its equipment; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.6.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested:_____ Final Evaluation: Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.7.2 Ambient overload test		**Regulations: LSA Code 5.1.3.2.2, MSC.81(70)1/7.2.12**
Test Procedure	Acceptance Criteria	Significant Test Data
With all relief valves inoperative, the inflated rescue boat should be loaded with four times the mass of the full complement of persons and equipment for which it is to be approved and suspended for 5 minutes from its bridle at an ambient temperature of +20 ± 3°C. The rescue boat and its bridle should be examined after the test is conducted.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Passed_____ Failed _____ Comments/Observations

5.6.7.3 Cold overload test		**Regulations: LSA Code 5.1.3.2.3, MSC.81(70)1/7.2.13**
Test Procedure	Acceptance Criteria	Significant Test Data
With all relief valves operative, after 6 h conditioning at a temperature of -30°C, the inflated rescue boat should be loaded with 1.1 times the mass of the full complement of persons and equipment for which it is to be approved and suspended for five minutes from its bridle. The rescue boat and bridle should be examined after the test is conducted.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.7.4 Mooring out test	**Regulations: LSA Code 5.1.3.3, MSC.81(70)1/7.2.15, 5.5, 5.17.7-.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The rescue boat should remain afloat in that location for 30 days. The pressure may be topped up once a day using the manual pump; however, during any 24-hour period the rescue boat should retain its shape. Each inflatable compartment in the rescue boat should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable rescue boat and the inflation source removed. The test should continue for at least 30 minutes. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completed stretching due to the inflation pressure and achieved equilibrium.	The rescue boat should not sustain any damage that would impair its performance. The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the rescue boat.	Compartment 1 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 2 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 3 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 4 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 5 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Passed_____ Failed _____ Comments/Observations

Inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.6.8.1 Inflation chamber characteristics tests		**Regulations: LSA Code 1.2.2, MSC.81(70)1/7.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable compartment materials used to construct the rescue boat should be tested for the following characteristics: .1 tensile strength .2 tear strength .3 heat resistance .4 cold resistance .5 heat ageing .6 weathering .7 flex cracking .8 abrasion .9 coating adhesion .10 oil resistance .11 elongation at break .12 piercing strength .13 ozone resistance .14 gas permeability .15 seam strength .16 ultraviolet light resistance	The material characteristics should comply with ISO 15372:2000.	.1 tensile strength_____N/50 mm width .2 tear strength_____N .3 heat resistance – Blocking _____ .4 cold resistance – Cracking _____ .5 heat ageing_____% retained strength N/50 mm width .6 weathering_____% retained strength N/50 mm width .7 flex cracking – Cracking or deterioration _____ .8 abrasion _____mg/rev.; Base fabric not visible .9 coating adhesion _____N/50 mm width .10 oil resistance – Tackiness or other deterioration .11 elongation at break_____% .12 piercing strength _____ .13 ozone resistance -Visible cracking _____ .14 gas permeability _____bubbles/min or l/m^2/hr of _____ .15 seam strength _____N/50 mm width .16 ultraviolet light resistance_____% retained strength N/50 mm width Cracking _____ SATISFACTORY UNSATISFACTORY Comments/Observations

5.7 RIGID/INFLATED FAST RESCUE BOATS

EVALUATION AND TEST REPORT

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- 5.7.2.2 Stability test
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- 5.7.2.4 Swamp test
- 5.7.2.5 Flooded stability test
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5.7.7 Strength tests
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5.7 RIGID/INFLATED FAST RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.0.1 General data and specifications		**Regulations: LSA Code 4.4, 5.1, MSC.81(70)1/7.2.16**
General Information	Rescue boat Dimensions	Rescue boat Weight
Construction Material: Hull: _____ Canopy: _____ Fire-retardancy documentation:_____ Rescue Boat Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Engine(s) Installed: 1 2 Type App by: _____ Manufacturer:_____ Type: _____ Power: _____ Gear ratio (inboard engine):_____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ Moulded Depth: Provision for securing hanging-off pendant (if applicable):_____	Design Weight: Unloaded Boat: _____ Loose Equipment: _____ Fuel: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.0.2 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report / document**	
		Maintenance Manual -	
		Operations Manual -	

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.0.3 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.1 Occupant space		**Regulations: LSA Code 4.4.2.2, 4.4.3.5, 5.1, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**General** Unless the rescue boat has adequate sheer, it should be provided with a bow cover extending for not less than 15% of its length. Length is at least 6.0 m and not over 8.5 m. **Seating Space** Width – at least 430 mm Depth – at least 100 mm each side of a point 215 mm from the back Knee Space (Seating on seats) at least 635 mm from the back Knee Width – at least 250 mm Leg Space (Seating on floor) – at least 1190 mm from the back Overlapping Seat Vertical Separation – at least 350 mm Seat Horizontal Overlap – 150 mm maximum Each seating position should be clearly indicated. **Stretcher(s) space:** Rescue boats should be capable of carrying at least five seated persons and a person lying on a stretcher of minimum 2130 x 610 mm. **Walkway Surfaces** The surfaces on which persons might walk should have a non-skid finish.	Passed_____ Failed _____ Passed_____ Failed _____ Width:_____mm Depth:_____mm Knee Space:_____mm Knee Width:_____mm Leg Space:_____mm Vert. Separation:_____mm Overlap:_____mm Position Indication: PASSED FAILED Stretcher space:_____x____mm Location:_____ Passed_____ Failed _____ Non-Skid Surface: Passed_____Failed_____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.2 Fittings, provisions and ladders		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Buoyancy compartments** fitted with: Non-return valve for manual inflation	Passed_____ Failed _____
	Means for deflation	Passed_____ Failed _____
	Safety relief valve unless waived by Administration	Passed_____ Failed_____N/A
	Suitable patches for securing painters fore and aft	Passed_____ Failed _____
	Fittings and Provisions	
	Suitable handholds or buoyant lifeline becketed around the outside of rescue boat above the waterline and within reach of a person in the water, except in the vicinity of the rudder and propeller	Passed_____ Failed _____
	On other than self-righting rescue boats, handholds on the underside arranged to break away without damaging the rescue boat	Passed_____ Failed _____
	Weathertight stowage for small items of equipment	Passed_____ Failed_____N/A
	Approved position indicating light provided at highest point	
	Provided with effective means of bailing or be automatically self-bailing	Passed_____Failed _____ Passed_____Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.2 Fittings, provisions and ladders (cont'd)		**Regulations: LSA Code 4.4.3.3, 5.1.3, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Ladders** Ladders that can be used at any entrance should be on board and the lowest step when in place should not be less than 0.4 m below the light waterline. **Other Provisions** Buoyant material may be installed external to the hull of the boat, provided it is adequately protected against damage and is capable of withstanding exposure when stowed on an open deck on a ship at sea and for 30 days afloat in all sea condition. **Colour** The boat should be of a highly visible colour where it will assist detection.	Passed_____ Failed _____ Lowest step_____m below waterline YES NO N/A Passed_____ Failed _____ Highly visible colour: Passed____Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.3 Engine and starting system	**Regulations: LSA Code 4.4.6, 5.1, MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Type of starting system - Two independent rechargeable energy sources provided for power starting systems - Required starting aids provided. - Starting system is not impeded by engine casing, thwarts, or other obstructions - Propeller arranged to be disengaged from the engine and provision for ahead and astern propulsion - Exhaust arranged to prevent water from entering engine in normal operation. - System designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system from floating debris - Engine casing made of fire-retardant material or other suitable arrangements providing similar protection. - Personnel are protected from hot and moving parts - Shouted order can be heard with engine running at speed necessary for 6 knot operation - Watertight casing around bottom and sides of starter batteries with a tightly fitting top which provides for gas venting. - Means for recharging engine starting, radio, and searchlight batteries provided by solar charger or ship's power supply. - Radio batteries not used to provide power for engine starting. - Recharging for engine batteries provided by ship's power supply does not exceed 50 v - Recharging means for engine batteries can be disconnected at the rescue boat embarkation station - Instructions for starting and operating engine are water resistant and mounted in a conspicuous place near the engine starting controls - Towing arrangement for marshalling liferafts	Manual Power YES NO N/A Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____ Passed_____Failed_____

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.4 Steering mechanism and fuel tank	**Regulations: LSA Code 4.4.7.2, 5.1.1.8, , MSC.81(70)1/7.2.16**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	**Steering** A tiller should be capable of controlling the rudder (rudder and tiller may form part of outboard motor) Rudder permanently attached to the rescue boat Rudder and tiller arranged so as not to be damaged by operation of the release mechanism or propeller Steered by wheel at helmsman's position Has emergency steering system providing direct control of rudder, water jet or outboard motor Hands-free, watertight VHF radio provided **Fuel Tank** If fitted with petrol-driven outboard motor, the fuel tank(s) should be specially protected against fire and explosion.	Passed_____ Failed _____ Passed_____ Failed_____N/A _____ Passed_____ Failed _____ Passed_____ Failed_____N/A _____ Passed_____ Failed _____ Passed_____ Failed _____ Passed_____ Failed_____ N/A Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.1.5 Release mechanism		**Regulations: LSA Code 4.4.7.6.5, MSC.81(70)1/7.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
Visually inspect the rescue boat. Conduct measurements and verify clearances as required.	Clear operating instructions	Passed_____ Failed _____
	Release control marked in a colour that contrasts with the surroundings	Passed_____ Failed _____
	For on-load release mechanisms:	
	Suitably worded danger sign for on load release	Passed_____ Failed_____N/A
	Mechanical protection (interlock) engages only when mechanism is completely and properly reset, to prevent accidental release during recovery	Passed_____ Failed_____N/A
	On-load release mechanism needs deliberate and continued action by the operator	Passed_____ Failed_____N/A
	Mechanical protection provided beyond that normally required for off load release	Passed_____ Failed_____N/A
	For a single fall system with suitable painter, on-load release capability is not required; in such an arrangement a single capability to release the boat only when it is fully waterborne will be adequate.	Passed_____ Failed_____N/A
		Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.1 Damage test (Does not apply if waterline is below lower side of inflated tube)		**Regulations: LSA Code 5.1.3.5, MSC.81(70)1/7.2.8-.9, 7.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with the inflated rescue boat loaded with the number of persons (of 82.5 kg mass) for which it is to be approved both with and without engine and fuel or an equivalent mass in the position of the engine and fuel tank: with forward buoyancy compartment deflated; .1 with the entire buoyancy on one side of the rescue boat deflated; and .2 with the entire buoyancy on one side and the bow compartment deflated.	In each of the conditions prescribed, the full number of persons for which the rescue boat is to be approved should be supported within the rescue boat.	1 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 2 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ 3 With engine and fuel: Passed _____ Failed _____ Without engine and fuel Passed _____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.2 Stability test		**Regulations: LSA Code 4.4.5, MSC.81(70)1/6.10.8, 7.2.6-.7**
Test Procedure	Acceptance Criteria	Significant Test Data
The following tests should be carried out with engine and fuel or an equivalent mass in place of the engine and fuel tanks: .1 the number of persons for which the inflated rescue boat is to be approved should be crowded to one side with half this complement seated on the buoyancy tube, and then to one end. In each case the freeboard should be recorded; and .2 the stability of the rescue boat during boarding should be ascertained by two persons in the rescue boat demonstrating that they can readily assist from the water a third person who is required to feign unconsciousness. The third person should have his back towards the side of the rescue boat so that he cannot assist the rescuers. All persons should wear approved lifejackets. These stability tests may be carried out with the rescue boat floating in still water.	.1 Under these conditions the freeboard should be everywhere positive. .2 The rescue boat should be stable.	1 Freeboard crowded to one side_____mm To bow:_____mm To stern:_____mm Passed_____Failed _____ 2 Stability observations during recovery of unconscious person: Clothing/Suits on helpless person: _____ Method of recovery: _____ Number of persons required and any special equipment used: _____ Passed _____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.3 Loading test		**Regulations: MSC.81(70)1/7.2.4-.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The freeboard of the inflated rescue boat should be taken in the various loading conditions as follows: .1 rescue boat with all its equipment; .2 rescue boat with all its equipment, engine and fuel, or an equivalent mass positioned to represent engine and fuel; .3 rescue boat with all its equipment and the number of persons for which it is to be approved having an average mass of 82.5 kg so arranged that a uniform freeboard is achieved at the side buoyancy tubes; and .4 rescue boat with the number of persons for which it is to be approved and all its equipment, engine and fuel or an equivalent mass to represent engine and fuel and the rescue boat being re-trimmed as necessary.	In each condition the minimum freeboard should be not less than 300 mm at the buoyancy tubes and not less than 250 mm from the lowest part of the transom.	.1 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .2 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .3 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm .4 Freeboard at Buoyancy Tubes:_____mm Freeboard at Transom:_____mm Passed_____ Failed _____ Comments/Observations

5.7.2.4 Swamp test		**Regulations: MSC.81(70)1/7.2.11**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat, when fully swamped, is capable of supporting its full equipment, the number of persons each weighing 82.5 kg for which it is to be approved and a mass equivalent to its engine and fully filled fuel tank. It should also be demonstrated that the rescue boat does not seriously deform in this condition.	The rescue boat should be capable of supporting the full load and should not seriously deform.	Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.5 Flooded stability test (Required only when waterline is below lower side of inflated tube)		**Regulations: LSA Code 4.4.1.1, MSC.81(70)1/6.8.1-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with its equipment. If provision lockers, water tanks and fuel tanks cannot be removed, they should be flooded or filled to the final waterline resulting from this test. Rescue boats fitted with watertight stowage compartments to accommodate individual drinking water containers should have these containers aboard and placed in the stowage compartments which should be sealed watertight during the flooding tests. Ballast of equivalent weight and density should be substituted for the engine and any other installed equipment that can be damaged by water. Weights representing persons (of 82.5 kg mass) who would be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) may be omitted. Weights representing persons who would not be in the water when the rescue boat is flooded (water level more than 500 mm above the seat pan) should be placed in the normal seating positions of such persons with their centre of gravity approximately 300 mm above the seat pan. Weights representing persons who would be partly submerged in the water when the lifeboat is flooded (water level between 0 and 500 mm above the seat pan) should additionally have an approximate density of 1 kg/dm^3 (for example water ballast containers) to represent a volume similar to a human body. Note: Several tests may have to be conducted if holes in different areas would create different flooding conditions.	When loaded as specified, the rescue boat should have positive stability when filled with water to represent flooding which would occur when the rescue boat is holed in any one location below the waterline assuming no loss of buoyancy material and no other damage.	Comments/Observations Passed_____ Failed _____

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.6 Righting test (for non-self-righting fast rescue boats)		**Regulations: MSC.81(70)1/7.1.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that both with and without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rescue boat is capable of being righted by not more than two persons if it is inverted on the water. The engine should be running in neutral position and, after stopping automatically or by the helmsman's emergency release switch when inverted, it should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. For rescue boats with inboard engines, the test without engine and fuel is not applicable. (This test is not required if the righting test in 5.7.2.7 has been performed.)	The rescue boat should be capable of being righted by not more than two persons if it is inverted on the water. When the rescue boat has righted, each engine or motor should be capable of being restarted, provided the helmsman's emergency release, if fitted, has been reset. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Can the boat be righted by 2 persons? With engine and fuel: Passed_____ Failed _____ Without engine and fuel: Passed_____ Failed _____ Method used to right boat: _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.7 Self-righting test (for self-righting fast rescue boats only)		**Regulations: MSC.81(70)1/6.14**
Test Procedure	Acceptance Criteria	Significant Test Data
A suitable means should be provided to rotate the rescue boat about a longitudinal axis to any angle of heel and then release it. The rescue boat should be incrementally rotated to angles of heel up to and including 180° and should be released. These tests should be conducted in the following conditions of load: .1 when the rescue boat with its engine is loaded in the normal position with properly secured weights representing the fully equipped rescue boat with a full complement of persons on board. The weight used to represent each person, assumed to have an average mass of 82.5 kg, should be secured at each seat location and have its centre of gravity approximately 300 mm above the seatpan so as to have the same effect on stability as when the rescue boat is loaded with the number of persons for which it is to be approved; and .2 when the rescue boat is in the light condition. In the case of open fast rescue boats, the self-righting test should only be done in the light condition.	After release, the rescue boat should always return to the upright position without the assistance of the occupants. At the beginning of these tests, the engine should be running in neutral position and: .1 unless arranged to stop automatically when inverted, the engine should continue to run until stopped by the helmsman's emergency release switch; and .2 after resetting the helmsman's emergency release, if necessary, the engine should be easily restarted and run for 30 minutes after the rescue boat has returned to the upright position. Water should not enter the engine. The design of the fuel and lubricating systems should prevent the loss of more than 250 ml of fuel or lubricating oil from the propulsion system.	Angle of Heel / Righting Moment Loaded / Righting Moment Light 45^0 _____ _____ 90^0 _____ _____ 135^0 _____ _____ 180^0 _____ _____ Result: PASSED FAILED PASSED FAILED Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.8 Flooded capsizing test (for self-righting fully enclosed fast rescue boats only)		**Regulations: MSC.81(70) 1/6.14.3, 6.14.4, 6.14.5, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Perform the following for fully enclosed rigid fast rescue boats. This test is not applicable to open fast rescue boats. The rescue boat should be placed in the water and fully flooded until the rescue boat can contain no additional water. All entrances and openings should be secured to remain open during the test. Using a suitable means, the rescue boat should be rotated about a longitudinal axis to a heel angle of 180° and then released. For the purpose of this test, the mass and distribution of the occupants may be disregarded. However, the equipment, or equivalent mass, should be secured in the rescue boat in the normal operating position.	After release, the lifeboat should attain a position that provides an above-water escape for the occupants.	Result: PASSED FAILED Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.9 Engine inversion test (for self-righting fast rescue boats only)		**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine and its fuel tank should be mounted on a frame that is arranged to rotate about an axis equivalent to the longitudinal axis of the boat. A pan should be located under the engine to collect any oil which may leak from the engine so that the quantity of such oil can be measured. The following procedure should be followed during this test: .1 start the engine and run it at full speed for 5 minutes; .2 stop the engine and rotate it in a clockwise direction through 360°; .3 restart the engine and run it at full speed for 10 minutes; .4 stop the engine and rotate it in a counter- clockwise direction through 360°; .5 restart the engine, run it at full speed for 10 minutes, and then stop the engine; .6 allow the engine to cool; .7 restart the engine and run it at full speed for 5 minutes;	The engine and engine installation should be capable of running in any position during capsize and continue to run after the rescue boat returns to the upright or should automatically stop on capsizing and be easily restarted after the rescue boat returns to the upright. The design of the fuel and lubricating systems should prevent the loss of fuel and the loss of more than 250 ml of lubricating oil from the engine during capsize. During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Passed _____Failed _____ Comments/Observations

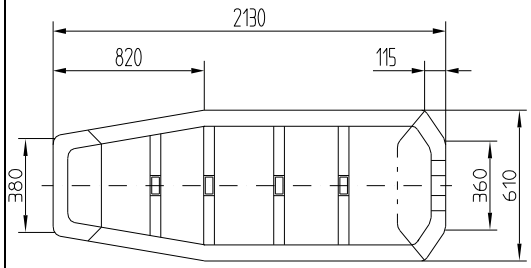
Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.2.9 Engine inversion test (continued)		**Regulations: LSA Code 4.6.4.2; MSC.81(70) 1/6.14.6 - 6.14.8, 7.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The following procedure should be followed during this test (Continued): .8 slowly rotate the running engine in a clockwise direction through 180°, hold at the 180° position for 10 s, and then rotate it 180° further in a clockwise direction to complete one revolution; .9 if the engine is arranged to stop automatically when inverted, restart it; .10 allow the engine to continue to run at full speed for 10 minutes; .11 shut the engine down and allow it to cool; .12 repeat the procedure in .7 through .11 above, except that the engine should be turned in a counter-clockwise direction; .13 restart the engine and run it at full speed for 5 minutes; .14 rotate the engine in a clockwise direction through 180° and stop the engine. Rotate it 180° further to complete a full clockwise revolution; .15 restart the engine and run it at full speed for 10 minutes; .16 repeat the procedure in .14 above, turning the engine counter-clockwise; .17 restart the engine, run it at full speed for 10 minutes and then shut it down; and .18 dismantle the engine for examination.	During these tests, the engine should not overheat, fail to operate or leak more than 250 ml of oil during any one inversion. When examined after being dismantled the engine should show no evidence of overheating or excessive wear.	Are all the tests carried out according to the procedure as prescribed? Passed/Failed Does the engine stop when turned in either direction? Passed/Failed If it stops, does it easily restart? Passed/Failed Does the engine fulfil the requirements after the tests have been carried out according to the procedure? Passed/Failed Amount of oil lost from engine during each inversion: .2 : ml .4 : ml .8 : ml .12 : ml .14 : ml .16 : ml Total amount of oil lost from engine: ml Evidence of overheating or excessive wear? Passed/ Failed Amount of oil lost from engine _____ ml Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.3.1 Seating strength test		**Regulations: LSA Code 4.4.1.5, MSC.81(70)1/6.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The seating should be loaded with a mass of 100 kg in each position allocated for a person to sit in the rescue boat. In the case of a rescue boat launched by falls, each type of seat should be loaded with a mass of 100 kg in any single seat location when dropped into the water from height of at least 3 m. (This test may be performed in conjunction with the Drop Test in 5.7.7.1.)	The seating should be able to support this loading without any permanent deformation or damage. The seating should be capable of supporting this loading. No damage should be sustained that would affect the seat's efficient functioning.	Observed damage Passed_____ Failed _____ Passed_____ Failed_____N/A Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.3.2 Seating space test		**Regulations: LSA Code 5.1.1.3.2, MSC.81(70)1/7.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The rigid rescue boat should be fitted with its engine and all its equipment. The number of persons for which the rescue boat is to be approved, having an average mass of at least 82.5 kg, and all wearing lifejackets and immersion suits and any other essential equipment required, should then board; one person should lie down on a stretcher of similar dimensions to those shown in the figure and the others should be properly seated in the rescue boat. The rigid rescue boat should then be manoeuvred and all equipment on board tested to demonstrate that it can be operated without difficulty or interference with the occupants.  Stretcher dimensions (mm)	Equipment can be operated without interference with the occupants. The rescue boat must be capable of carrying at least 5 persons and a person lying down on a stretcher. Except the helmsmen, persons may be seated on the floor, provided the space used conforms with the leg space requirements of test form 5.7.1.1. No seating is on the gunwale, transom, or buoyancy chambers on the sides of the boat.	Equipment operated: YES NO Number of persons carried: Seated on seats _____ Seated on floor _____ Lying on a stretcher _____ Total _____ Passed_____Failed _____ Lifejacket and immersion suit used during the test: Lifejacket– Inflatable/Inherently Buoyant _____ Immersion suit– Uninsulated/Buoyant Insulated Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.1 Simultaneous release		**Regulations: LSA Code 4.4.7.6, MSC.81(70)1/6.9.1-.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rescue boats launched by fall or falls, the rescue boat with its engine fitted should be suspended from the release mechanism just clear of the ground or the water. The rescue boat should be loaded so that the total mass equals 1.1 times the mass of the rescue boat, all its equipment and the number of persons for which the rescue boat is to be approved. The rescue boat should be released simultaneously from each fall to which it is connected without binding or damage to any part of the rescue boat or the release mechanism. (Single fall systems not intended for on-load operation are exempt from this test.)	It should be confirmed that the rescue boat will simultaneously release from each fall which it is connected without binding or damage to any part of the rescue boat or the release mechanism. It should be confirmed that the rescue boat will simultaneously release from each fall to which it is connected when fully waterborne in the light condition and in a 10% overload condition.	Light condition Passed_____ Failed_____N/A (N/A – Single fall, off-load only) 1.1 x Loaded Mass:_____kg Passed_____ Failed _____N/A (N/A – Single fall, off-load only) Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.2 Towing release test		**Regulations: LSA Code 4.4.7.6.5; MSC.81(70) 1/6.9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
With the operating mechanism disconnected it should be demonstrated when the rescue boat is loaded with its full complement of persons and equipment and towed at speeds of 5 knots that the moveable hook component stays closed. Furthermore, with the operating mechanism connected, it should be demonstrated that the rescue boat when loaded with its full complement of persons and equipment when towed at speeds of 5 knots can be released. Both of the above should be demonstrated as follows: .1 a force equal to 25% of the safe working load of the hook should be applied to the hook in the lengthwise direction of the boat at an angle of 45° to the vertical. This test should be conducted in the aftward as well as the forward direction; .2 a force equal to the safe working load of the hook should be applied to the hook in an athwartships direction at an angle of 20° to the vertical. This test should be conducted on both sides; and .3 a force equal to the safe working load of the hook should be applied to the hook in a direction halfway between the positions of tests 1 and 2 (i.e. 45° to the longitudinal axis of the boat in plan view) at an angle of 33° to the vertical. This test should be conducted in four positions.	There should be no damage as a result of these tests. The rescue boat is released satisfactorily by the release mechanism. Single fall systems not intended for on-load operation are exempt from this test.	Operating mechanism disconnected and boat towed at 5 kts: _____Pass _____ Fail <u>Operating mechanism connected tests</u>. Test 1: 25% SWL, lengthwise to the boat at 45° to the vertical: Force Applied: _____ N. Forward direction: _____Pass _____ Fail Aft direction: _____Pass _____ Fail Test 2: 100% SWL, athwartships at 20° to the vertical: Force Applied: _____ N. Starboard: _____Pass _____ Fail Port: _____Pass _____ Fail Test 3: 100% SWL, 45° to the longitudinal axis of the boat in plan view at an angle of 33° to the vertical. Force Applied: _____ N. Position 1: _____Pass _____ Fail Position 2: _____Pass _____ Fail Position 3: _____Pass _____ Fail Position 4: _____Pass _____ Fail Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.3 Load and release test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.1, 6.9.4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A release mechanism should be conditioned and tested as follows: The rescue boat release and retrieval system and the longest used connection cable/linkage associated with the system should be mounted and adjusted according to instructions from the original equipment manufacturer and then loaded to 100% of its safe working load and released. Load and release should be repeated 50 times. The rescue boat release and retrieval system should then be disassembled, the parts examined and wear recorded. The release and retrieval system should then be reassembled.	During the 50 releases, the rescue boat release and retrieval system should be released simultaneously from each fall to which it is connected without any binding or damage to any part of the lifeboat release and retrieval system. The system should be considered as "failed" if any failure during the conditioning or unintended release occurs when load is applied but the system has not yet been operated.	Working Load:_____N Force Applied:_____N Check the box for each release: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ 11: ☐ 12: ☐ 13: ☐ 14: ☐ 15: ☐ 16: ☐ 17: ☐ 18: ☐ 19: ☐ 20: ☐ 21: ☐ 22: ☐ 23: ☐ 24: ☐ 25: ☐ 26: ☐ 27: ☐ 28: ☐ 29: ☐ 30: ☐ 31: ☐ 32: ☐ 33: ☐ 34: ☐ 35: ☐ 36: ☐ 37: ☐ 38: ☐ 39: ☐ 40: ☐ 41: ☐ 42: ☐ 43: ☐ 44: ☐ 45: ☐ 46: ☐ 47: ☐ 48: ☐ 49: ☐ 50: ☐ Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.4 Cyclic loading test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook assembly, while disconnected from the operating mechanism, should be tested 10 times with cyclic loading from zero load to 1.1 times the safe working load, at a nominal 10 seconds per cycle; unless the release mechanism has been specifically designed to operate as an off-load hook with on-load capability using the weight of the boat to close the hook, in this case the cyclic load should be from no more than 1% to 1.1 times the SWL. For cam-type designs, the test should be carried out at an initial cam rotation of 0º (fully reset position), and repeated at 45º in either direction, or 45º in one direction if restricted by design.	The specimen should remain closed during the test. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Working Load:_____N Force Applied: _____N Check the box for each release and/or strike out the cam rotation if no applicable: Cam rotation 0°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation +45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Cam rotation -45°: 1: ☐ 2: ☐ 3: ☐ 4: ☐ 5: ☐ 6: ☐ 7: ☐ 8: ☐ 9: ☐ 10: ☐ Passed:_____ Failed: _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.5 Actuation force test		**Regulations: LSA Code 4.4.7.6.4; MSC.81(70) 1/6.9.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The cable and operating mechanism should then be reconnected to the hook assembly; and the rescue boat release and retrieval system should then be demonstrated to operate satisfactorily under its safe working load. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer.	The actuation force should be no less than 100 N and no more than 300 N, if a cable is used it should be the maximum length specified by the manufacturer, and secures in the same manner it would be secured in the rescue boat. The release mechanism is deemed to have passed the testing in 5.7.4.3, 5.7.4.4 and 5.7.4.5 when the tests have been conducted successfully. The system should be considered as "failed" if any failure during this test or any unintended release or opening occurs.	Actuation Force: _____ N Passed: _____ Failed: _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.4.6 Second release mechanism tests- actuation force and tensile strength		**Regulations: LSA Code 4.4.7.6.4, MSC.81(70)1/6.9.5.1, 6.9.5.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A second release mechanism should be tested as follows: .1 the actuation force of the release mechanism should be measured loaded with 100% of its safe working load. If a cable is used, it should be of the maximum length specified by the manufacturer, and secured in the same manner it would be secured in a lifeboat. The demonstration should verify that any interlocks, indicators and handles are still functioning and are correctly positioned in accordance with the operation and safety instruction from the original equipment manufacturer; and .2 the release mechanism should be mounted on a tensile strength testing device. The load should be increased to at least six times the working load of the release mechanism.	1. The actuation force should be no less than 100 N and no more than 300 N. The release mechanism does not fail.	Actuation Force: _____ N Tensile strength @ 6xSWL. Force applied: _____ N. Passed: _____ Failed: _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.5.1 Liferaft towing		**Regulations: LSA Code 4.4.6.8, 5.1.1.7, 5.1.1.9, MSC.81(70)1/7.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The maximum towing force of the rescue boat should then be determined. This information should be used to determine the largest size of fully loaded liferaft the rescue boat can tow at a speed of at least 2 knots. The fitting designated for towing other craft should be secured to a stationary object by a tow rope fitted with a means to measure bollard pull. The engine should be operated ahead at full speed for a period of at least 2 minutes and the maximum force recorded. (For rescue boats equipped with outboard motors, bollard pull trials may be carried out with engines of various powers to assess the rescue boat's performance.)	The maximum towing force of the rescue boat should be recorded on the type approval certificate. There should be no damage to the towing fitting or its supporting structure.	Smallest Engine Largest Engine Make/model: _____ _____ Bollard pull: N _____ _____ (Record on type approval certificate) Observed damage: Propeller: Pitch: _____ Diameter: _____ Passed _____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.5.2 Endurance, speed and fuel consumption		**Regulations: LSA Code 5.1.1.6,MSC.81(70)1/7.1.5, 1/7.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
(Note: Run this test after the impact and drop tests in 5.7.7.1.) The rescue boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the rescue boat is to be approved. The engine should be started and the boat manoeuvred for a period of at least 4 hours to demonstrate satisfactory operation. The rescue boat should be run at a speed of not less than 8 knots with a full complement of persons and equipment and 20 knots with a crew of 3 persons for a period which is sufficient to ascertain the fuel consumption and to establish that the fuel tank has the required capacity. (This determination may be made during the 4-hour period of operation.) For rescue boats equipped with outboard motor, speed and manoeuvring trials should be carried out with engines of various powers to assess the rescue boat's performance.	The boat should operate satisfactorily throughout the 4-hour operation. The fuel tank should have sufficient capacity to operate at a speed of 8 knots for a period of 4 hours with its full complement of persons and equipment. The fuel tank should have sufficient capacity to operate at a speed of 20 knots for a period of 4 hours with a crew of 3 persons.	Smallest Engine Largest Engine Make/model: _____ _____ Fuel Tank Capacity: _____ L Propeller: Pitch: _____ _____ Diameter: _____ _____ @8 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ @20 knots: Engine speed (RPM):_____ _____ Boat speed (kts) _____ _____ Consumption (L/h) _____ _____ Endurance (hrs.) _____ _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.5.3 Engine out of water		**Regulations: LSA Code 4.4.6.3, MSC.81(70)1/6.10.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The engine should be operated for at least 5 minutes at idling speed under conditions simulating normal storage. Note: If a water flushing device is intended to be used for this purpose, it should be fitted during the test.	The engine should not be damaged as a result of this test.	Passed_____ Failed _____ Comments/Observations

5.7.5.4 Compass test		**Regulations: LSA Code 5.1.2.2.3, MSC.81(70)1/6.10.7**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be determined that the compass performance is satisfactory and that it is not unduly affected by magnetic fittings and equipment in the rescue boat.	The compass operates satisfactorily.	Compass Make: _____ Compass Model: _____ Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.5.5 Manoeuvrability with paddles or oars		**Regulations: LSA Code 5.1.2.2.1, MSC.81(70)1/7.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the rescue boat can be propelled and manoeuvred by its oars or paddles in calm water conditions at a speed of at least 0.5 knots over a distance of at least 25 m. when laden with the number of persons, all wearing lifejackets and immersion suits, for which it is to be approved.	The rescue boat should be capable of being satisfactorily paddled and manoeuvred.	Distance travelled:_____m Time Required:_____s Calculated speed:_____m/s = ___ knots Lifejacket and immersion suit used during the test: Lifejacket – Inflatable/Inherently Buoyant _____ Immersion suit – Uninsulated/Buoyant Insulated _____ Passed_____ Failed_____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.5.6 Heavy weather/seas test		**Regulations: LSA Code 5.1.3, MSC.81(70)1/7.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
To simulate use in heavy weather the inflated rescue boat should be fitted with a larger powered engine than is intended to be fitted and driven hard in a wind of force 4 or 5 or equivalent rough water for at least 30 minutes. For boats with inboard engines the power does not need to be greater than that intended to be used.	The rescue boat should not show undue flexing or permanent strain nor have lost more than minimal pressure.	Tube pressure before test:_____mbar Pressure relief valves open/closed?_____ Wave height _____ m Wind Speed_____ m/s Tube pressure after test:_____mbar Passed_____ Failed _____ Comments/Observations

5.7.6.1 Towing test		**Regulations: LSA Code 4.4.1.3.2, 4.4.7.7, MSC.81(70)1/6.11.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the fully equipped rescue boat, loaded with a properly distributed mass equal to the mass of the number of persons for which it is to be approved, can be towed at a speed of not less than 5 knots in calm water and on an even keel using the rescue boat's painter securing device.	The rescue boat should not exhibit unsafe or unstable characteristics. There should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.6.2 Painter release test		**Regulations: LSA Code 4.4.7.7, MSC.81(70)1/6.11.2-.3**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the painter release mechanism can release the painter on a fully equipped and loaded rescue boat that is being towed at a speed of not less than 5 knots in calm water. The painter release mechanism should be tested in several distinct directions of the upper hemisphere not obstructed by the canopy or other constructions in the rescue boat. The directions specified in test 5.7.4.2 should be used if possible.	The painter should release and there should be no damage to the rescue boat or its equipment as a result of this test.	Passed_____ Failed _____ Test Direction _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ _____ Passed_____Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.7.1 Impact, drop and operation after impact and drop test		**Regulations: LSA Code 4.4.1.7, MSC.81(70)1/6.4.1, 7.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
.1 For boats launched by fall or falls, the fully equipped rescue boat, including its engine, should be loaded with weights equal to the mass of the number of persons for which the rescue boat is to be approved. Included in this loading should be a weight of 100 kg loaded in one of each type of seat installed in the lifeboat. The weights should be distributed to represent the normal loading in the rescue boat. (These weights need not be placed 300 mm above the seatpan.) Skates or fenders, if required, should be in position. The rescue boat, in a free hanging position, should be pulled laterally to a position so that when released it will strike a fixed rigid vertical surface at a velocity of 3.5 m/s. The boat should be released to impact against the rigid vertical surface. .2 The rescue boat complete with all its equipment and with a mass equivalent to its engine and fuel in the position of its engine and fuel tank should be dropped three times from a height of at least 3 m on to water. The drops should be from the 45-degree bow-down, level trim, and 45-degree stern-down attitudes. .3 On completion of these tests the rescue boat and its equipment should be carefully examined.	The impact and drop tests should be considered successful if: .1 no damage has been sustained that would affect the efficient functioning of the rescue boat and its equipment; .2 the damage caused by the impact and drop tests has not increased significantly as a result of the operational test in 5.7.5.2; .3 machinery and other equipment has operated to full satisfaction; and .4 no significant ingress of seawater has occurred.	Load in boat:_____kg Observed Damage: Increased Damage: YES NO Satisfactory Operation: YES NO Ingress of Water: YES NO Weight of heaviest engine tested:_____ Final Evaluation: Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.7.2 Overload test		**Regulations: MSC.81(70)1/7.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a properly distributed load of four times the weight to represent the equipment and full complement of persons each weighing 82.5 kg for which it is to be approved and suspended for 5 minutes from its bridle or hooks. The weights should be distributed in proportion to the loading of the boat in its service condition, but the weights used to represent the persons need not be placed 300 mm above the seat pan. The boat and bridle or hooks and fastening device should be examined after the test has been conducted. Testing by filling the boat with water should not be accepted. This method of loading does not give the proper distribution of weight. Machinery may be removed in order to avoid damage, in which case weights should be added to the boat to compensate for the removal of such machinery. The rescue boat and its bridle or hooks (release mechanism) and fastening device should be examined after the test for any signs of damage.	The rescue boat and its bridle or release mechanism should not show any signs of damage.	Load in boat:_____kg Comments/Observations Passed_____ Failed _____

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.7.3	**Mooring out test (Does not apply if waterline is below lower side of inflated tube)**	**Regulations: LSA Code 5.1.3.3, MSC.81(70)1/7.2.15, 5.5, 5.17.7-.8**

Test Procedure	Acceptance Criteria	Significant Test Data
The rescue boat should be loaded with a mass equal to the mass of the total number of persons for which it is to be approved and its equipment and moored in a location at sea or in a seawater harbour. The rescue boat should remain afloat in that location for 30 days. The pressure may be topped up once a day using the manual pump; however, during any 24-hour period the rescue boat should retain its shape. Each inflatable compartment in the rescue boat should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable rescue boat and the inflation source removed. The test should continue for at least 30 minutes. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completed stretching due to the inflation pressure and achieved equilibrium.	The rescue boat should not sustain any damage that would impair its performance. The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the rescue boat.	Compartment 1 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 2 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 3 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 4 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Compartment 5 Initial Pressure:_____mbar Final Pressure:_____mbar Calculated Decrease:_____Percent Passed_____ Failed _____ Comments/Observations

Rigid/inflated fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

5.7.8.1 Inflation chamber characteristics tests		**Regulations: LSA Code 1.2.2, MSC.81(70)1/7.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The inflatable compartment materials used to construct the rescue boat should be tested for the following characteristics: .1 tensile strength .2 tear strength .3 heat resistance .4 cold resistance .5 heat ageing .6 weathering .7 flex cracking .8 abrasion .9 coating adhesion .10 oil resistance .11 elongation at break .12 piercing strength .13 ozone resistance .14 gas permeability .15 seam strength .16 ultraviolet light resistance	The material characteristics should comply with ISO 15372:2000.	.1 tensile strength_____N/50 mm width .2 tear strength_____N .3 heat resistance – Blocking _____ .4 cold resistance – Cracking _____ .5 heat ageing_____% retained strength N/50 mm width .6 weathering_____% retained strength N/50 mm width .7 flex cracking – Cracking or deterioration _____ .8 abrasion _____mg/rev.; Base fabric not visible .9 coating adhesion _____N/50 mm width .10 oil resistance – Tackiness or other deterioration .11 elongation at break_____% .12 piercing strength _____ .13 ozone resistance -Visible cracking _____ .14 gas permeability _____bubbles/min or l/m²/hr of _____ .15 seam strength _____N/50 mm width .16 ultraviolet light resistance_____% retained strength N/50 mm width Cracking _____ SATISFACTORY UNSATISFACTORY Comments/Observations

_____

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MSC.1/Circ.1632
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (LAUNCHING AND EMBARKATION APPLIANCES)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter VI of the LSA Code, i.e. launching and embarkation appliances (launching and embarkation appliances; marine evacuation systems; and means of rescue).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed, revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (LAUNCHING AND EMBARKATION APPLIANCES)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), *the Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised Recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and the Revised Recommendation, as amended. In the case of inconsistency between the forms and the LSA Code or the Revised Recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customising the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or the Revised Recommendation have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (LAUNCHING AND EMBARKATION APPLIANCES)

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6.1.1 LAUNCHING AND RECOVERY APPLIANCES

EVALUATION AND TEST REPORT

Manufacturer	
System type	
Serial Number	
Maximum Working Load	
Maximum Turning Moment	
Winch type	
Serial number	
Date	
Place	
Name and signature of surveyor	
Approval Organization	

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	
Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual	
		Operations Manual	

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1 and 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual: _____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.3 Visual inspection		**Regulations: LSA Code 6.1; SOLAS III, 16**
Test Procedure	Acceptance Criteria	Significant Test Data
Confirm that installation has been manufactured to approved drawings.	Amount of maintenance should be restricted to a minimum.	Passed/Failed
Visually inspect the appliance. Conduct measurements and verify clearances as required.	Parts which require maintenance should be easily accessible and easily maintained.	Passed/Failed
	Effectiveness under icing conditions.	Passed/Failed
	The launching mechanism should be so arranged that it may be actuated by one person from a position within the survival craft or rescue boat.	Passed/Failed
Remote control	Manual brakes should be so arranged that the brake is always applied, unless the operator or a mechanism activated by operator holds the brake control in the "off" position.	Type:
Limit switches	Where davit arms are recovered by power, safety devices should be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent over-stressing the falls or davits, unless the motor is designed to prevent such over-stressing.	Type:
Provisions for hanging off pendants	There should be provisions for hanging-off the lifeboat to free the release gear for maintenance.	Passed/Failed continued

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.3 Visual inspection (continued)		**Regulations: LSA Code 6.1.1.6; SOLAS III, 16**
Test Procedure	Acceptance Criteria	Significant Test Data
	Structural members and all blocks, falls, pad eyes, links, fastenings and all other fittings used in connection with launching equipment should be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strengths of the materials used for construction. A minimum factor of safety of 4.5 should be applied to all structural members including winch structural components and a minimum factor of safety of 6 should be applied to falls, suspension chains, links and blocks.	Passed/Failed Comments/Observations

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.4 Static proof load test		**Regulations: LSA Code 6.1.1.5 - 6.1.1.6; MSC.81(70) 1/8.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
For lifeboats other than free-fall lifeboats, davits and launching appliances, except winches, should be subjected to a static proof load of 2.2 times their maximum working load. With the load at the full outboard position, the load should be swung through an arc of approximately 10^0 to each side of vertical in the intended fore and aft plane. The test should be done first in the upright position, followed by tests simulating a shipboard condition of list of 20^0 both inboard and outboard.	The launching appliance and its attachments other than winches should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. There should be no evidence of significant deformation or other damage as a result of this test.	MWL: ..... kN Test load (2.2 x MWL): ..... kN There should be no evidence of significant deformation or other damage Passed/Failed Upright Passed/ Failed 20^0 inboard list Passed/ Failed 20^0 outboard list Passed/ Failed

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.5 Operational load test	**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1 /8.1.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
For lifeboats other than free-fall lifeboats, a mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the upright position. The load should be moved from the full inboard to the full outboard position using the means of operation that is used on the ship. The test should be repeated with the launching appliance positioned to simulate a combined 20^0 inboard list and 10^0 trim. All the tests should be repeated with a mass equal to that of a fully equipped lifeboat, without persons, or the lightest survival craft intended for the use with the davit to ensure the satisfactory functioning of the davit under very light load conditions.	The appliance should successfully lower the load under all of the conditions, and there should be no evidence of significant deformation or other damage as a result of the tests. Each launching appliance together with all its lowering and recovery gear should be so arranged that the fully equipped survival craft or rescue boat it serves can be safely lowered against a trim of up to 10^0 and a list of up to 20^0 either way: When boarded, as required by regulation III/23 or III/33, by its full complement of persons; and Without persons in the survival craft or rescue boat.	weight of the lightest lifeboat / rescue boat ** intended for use: LWL: ..... kN MWL: …..... kN Test load (1.1 x MWL): ..... kN clear of davit horn?** Passed/ Failed Does the appliance successfully lower the load under these conditions without evidence of significant deformation or damage? Passed/Failed upright (1,1x MWL) Passed/Failed 20^0 inboard list + 10^0 trim (1.1xMWL) Passed/Failed 20^0 inboard list + 10^0 trim (LWL) Passed/Failed ** if applicable continued

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.5 Operational load test (continued)		**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1 /8.1.2**
Test Procedure	Acceptance Criteria	Test Procedure
Note: Notwithstanding the 10^0 trim and 20^0 list requirements, lifeboat launching appliances for oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20^0 should be capable of operating at the final angle of heel on the lower side of the ship, taking into consideration the final damaged waterline of the ship.	A launching appliance should not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.	Stored power Passed/Failed Start pressure: k Pa Min. pressure: k Pa Pressure drop after one movement: k Pa Time from inboard to outboard: sec ** if applicable

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.6 Turning in test		**Regulations: LSA Code 6.1.1.3; MSC.81(70) 1 /8.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the full upright position. The load should be moved from the full inboard position to the full outboard using the means of operation that is used on the ship.	The appliance should successfully move the maximum designed hoisting load from the outboard to the inboard position without causing permanent deformation or other damage.	maximum designed hoisting load: kN Does the launching appliance successfully move the load from outboard to inboard? Passed/Failed Does the launching appliance show any evidence of significant deformation or other damage as a result of this test? Passed/Failed

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.7 Winch brake test		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Winch drums should be wound to the maximum number of turns permitted and a static test load of 1.5 times the maximum working load should be applied and held by the brake. This load should then be lowered for at least one complete revolution of the barrel shaft. A test load of 1.1 times the maximum working load should then be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand brake sharply. This test should be repeated a number of times. If the winch design incorporates an exposed brake, one of these tests should be carried out with the brake wetted but in this case the stopping distance may be exceeded. The various tests should achieve a cumulative lowering distance of at least 150 m. Operation of the winch with a load of a mass equal to that of a fully equipped lifeboat, without persons, or the lightest survival craft intended for use with the winch should also be demonstrated.	The test load should drop no more than 1 m when the brake is applied (except that the stopping distance may be exceeded if an exposed brake is wetted). The launching appliance should successfully lower a mass equal to that of a fully equipped lifeboat, without persons, or the lightest craft (or rescue boat) intended for use with the winch.	weight of the lightest lifeboat/rescue boat***** : ..... kN MWL: ..... kN Test 1: Static test load (1.5 x MWL): ..... kN Does the brake test hold the test load (1.5x MWL)? pass/fail MWM: kNm Drum diam mm Wire diam. mm Number of turns Max. lowering speed m/s Test 2 Dynamic Test load (1,1 x MWL): kN brake test carried out after > 3m with max lowering speed Stop within 1 metre? Passed/Failed * delete as appropriate continued

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.7 Winch brake test (continued)		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Following completion of these test (and 6.1.1.8, 6.1.1.9), the winch should be stripped for inspection.	Inspection of the stripped winch should reveal no significant damage or undue wear.	1st stop > 3m 2nd stop: m 3rd stop: m 4th stop: m 5th stop: m Total lowering distance > 150 m Passed/ Failed Test 3 (if applicable) Winch design incorporates an exposed brake? Yes / No Wet stopping distance m Passed/ Failed Test 4 Test load (LWL) kN Lowering test with LWL satisfactory? Passed/ Failed Does the inspection of the stripped winch reveal any significant damage or undue wear? Passed/ Failed Remarks:

Launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.1.8 Rescue boat launching appliance recovery speed test	**Regulations: LSA Code 6.1.1.9; MSC.81(70) 1 /8.1.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a winch intended for use with a rescue boat is capable of recovering the rescue boat with the number of persons for which it is to be approved and its equipment or an equivalent mass at a rate of not less than 0.3 m/s.	Each rescue boat launching appliance should be fitted with a powered winch motor capable of raising the rescue boat from the water with its full rescue boat complement of persons and equipment at a rate of not less than 0.3 m/s.	Hoisting load: measured recovering speed of the boat: m/s

6.1.1.9 Hand operation test	**Regulations: LSA Code 6.1.2.6; MSC.81(70) 1 /8.1.6**	
Test Procedure	Acceptance Criteria	Significant Test Data
The hand operation of the winch should be demonstrated. If the winch is designed for quick recovery by hand with no load, this should be demonstrated with a load of 1.5 times the mass of the empty lifting arrangements.	An efficient hand gear should be provided for recovery of each survival craft and rescue boat. Hand gear handles or wheels should not be rotated by moving parts of the winch when the survival craft or rescue boat is being lowered or when it is being hoisted by power.	Hoisting load: Test 1: Test load (1 x hoisting load): winch can be operated satisfactorily by hand? Passed/ Failed Arrangement provided for protection against moving parts and rotating handles? Passed/ Failed Type: Test 2: Only for quick recovery Test load (1.5 x weight of empty lifting arrangement): kN Is quick recovery satisfactory? Passed/ Failed

6.1.2 FREE-FALL LAUNCHING AND RECOVERY APPLIANCES

EVALUATION AND TEST REPORT

6.1.2.1 Submitted drawings, reports and documents

6.1.2.2 Quality assurance

6.1.2.3 Visual inspection

6.1.2.4 Static proof load test

6.1.2.5 Operational load test (secondary means of launching)

6.1.2.6 Turning in test

6.1.2.7 Winch brake test

6.1.2 FREE-FALL LAUNCHING AND RECOVERY APPLIANCES

EVALUATION AND TEST REPORT

Manufacturer	
System type Serial number	
Maximum Working Load	
Maximum Turning Moment	
Winch type	
Serial number	
Date	
Place	
Name and signature of surveyor	
Approval Organization	

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.1 Submitted drawings, reports and documents

Submitted drawings and documents			
Drawing No.	**Revision No. & date**	**Title of drawing**	**Status**

Submitted reports and documents			
Report/Document No.	**Revision No. & date**	**Title of report/document**	**Status**
		Maintenance Manual	
		Operations Manual	

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1 and 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.3 Visual inspection		**Regulations: LSA Code 6.1.1.6, 6.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Confirm that installation has been manufactured to approved drawings. Visually inspect the launching appliance. Conduct measurements and verify clearance as required. Limit switches Arrangements for simulated launching	Amount of maintenance to be restricted to minimum. Parts which require maintenance should be easily accessible and easily maintained. Effectiveness under icing conditions. Where davit arms are recovered by power, safety devices should be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent over-stressing the falls or davits, unless the motor is designed to prevent such over-stressing. Arrangements for simulated launching should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. Structural members and all blocks, falls, pad eyes, links, fastenings and all other fittings used in connection with launching equipment should be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strengths of the materials used for construction. A minimum factor of safety of 4.5 should be applied to all structural members including winch structural components and a minimum factor of safety of 6 should be applied to falls, suspension chains, links and blocks.	Passed/Failed Passed/Failed Passed/Failed Type Passed/Failed Type Comments/Observations

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.4 Static proof load test		**Regulations: LSA Code 6.1.1.5 - 6.1.1.6; MSC.81(70) 1 /8.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The launching appliances for lowering a free-fall lifeboat by falls, except winches, should be subjected to a static proof load of 2.2 times the maximum working load at the full outboard position. The launching ramp and its connection to the release mechanism should also be subjected to a static proof load of 2.2 times the maximum working load.	The launching appliance and its attachments other than winches should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. There should be no evidence of significant deformation or other damage as a result of this test.	MWL : ..... kN test load (2.2 x MWL) ..…….... kN There should be no evidence of significant deformation or other damage Passed/Failed Comments/Observations

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.5 Operational load test (secondary means of launching)		**Regulations: LSA Code 6.1.4.7; MSC.81(70) 1 /8.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lifting points. The load should be moved from the full inboard to the full outboard position using the means of operation that is to be used on the ship. The test should be repeated with the launching appliance positioned to simulate a combined 5 degree list either way and 2 degrees bow down trim. The test should be repeated with a mass equal to that of the fully equipped lifeboat, without persons, to ensure the satisfactory functioning of the appliance under light load conditions.	The appliance should successfully lower the load under all of the specified conditions and there should be no evidence of significant deformation or other damage as a result of the tests.	MWL: ..... kN LWL (MWL - number of persons): kN Test 1 Test load (1.1 x MWL): ..... kN Upright full inboard full outboard.... Passed/Failed Test 2 Test load (1.1 x MWL) kN 5° list, 2° bow down trim Passed/Failed Test 3 LWL: kN Passed/ Failed Does the appliance successfully lower the load under these conditions without evidence of significant deformation or damage? Passed/Failed Comments/Observations

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.6 Turning in test		**Regulations: LSA Code 6.1.1.3; MSC.81(70) 1 /8.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the appliance in the full upright position, the maximum design hoisting load should be moved from the full outboard to the full inboard position using the means of operation that is used on the ship.	The appliance should successfully move the maximum designed hoisting load from the outboard to the inboard position without causing permanent deformation or other damage.	Hoisting load: ..... kN Does the launching appliance successfully move the load from outboard to inboard? Passed/failed Does the launching appliance show any evidence of significant deformation or other damage as a result of the test? Passed/Failed Comments/Observations

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.7 Winch brake test		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Winch drums should be wound to the maximum number of turns permitted and a static test load of 1.5 times the maximum working load should be applied and held by the brake. This load should then be lowered for at least one complete revolution of the barrel shaft. A test load of 1.1 times the maximum working load should then be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand brake sharply. This test should be repeated a number of times. If the winch design incorporates an exposed brake, one of these tests should be carried out with the brake wetted but in this case the stopping distance may be exceeded. The various tests should achieve a cumulative lowering distance of at least 150 m. Operation of the winch with a load of a mass equal to that of a fully equipped lifeboat, without persons, or the lightest survival craft intended for use with the winch should also be demonstrated.	The test load should drop no more than 1 m when the brake is applied (except that the stopping distance may be exceeded if an exposed brake is wetted). The launching appliance should successfully lower a mass equal to that of a fully equipped lifeboat, without persons, or the lightest craft (or rescue boat) intended for use with the winch.	Weight of the lightest lifeboat / rescue boat* kN MWL : .....kN Test 1: Static test load (1.5 x MWL): ..... kN Does the brake test hold the test load (1.5x MWL)? Passed/ Failed MWM: kNm Drum diam mm Wire diam. mm Number of turns Max. lowering speed m/s Test 2 Dynamic Test load (1.1 x MWL): kN Brake test carried out after > 3m with max lowering speed Stop within 1 metre? Passed/Failed Comments/Observations * delete as appropriate continued

Free-fall launching and recovery appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.2.7 Winch brake test (continued)		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Following completion of these test (and 6.1.1.8, as applicable), the winch should be stripped for inspection.	Inspection of the stripped winch should reveal no significant damage or undue wear.	1st stop > 3m 2nd stop: m 3rd stop: m 4th stop: m 5th stop: m Total lowering distance > 150 m Passed/ Failed Test 3 (if applicable) Winch design incorporates an exposed brake? Yes/No Wet stopping distance m Passed/ Failed Test 4 Test load (LWL) kN Lowering test with LWL satisfactory? Passed/ Failed Does the inspection of the stripped winch reveal any significant damage or undue wear? Passed/Failed Comments/Observations

6.13 DAVIT-LAUNCHED LIFERAFT AUTOMATIC RELEASE HOOKS

EVALUATION AND TEST REPORT

6.1.3.1 Submitted drawings, reports and documents

6.1.3.2 Quality assurance

6.1.3.3 Visual inspection

6.1.3.4 Corrosion resistance test

6.1.3.5 Maximum load for automatic release test

6.1.3.6 Dynamic forces release tests

6.1.3.7 Actuating force test

6.1.3.8 Securing force test

6.1.3.9 Manual release force test

6.1.3.10 Holding test, loaded

6.1.3.11 Holding test, light

6.1.3.12 Inertia test

6.1.3.13 Automatic release test

6.1.3.14 Automatic release test – overloaded

6.1.3.15 Endurance test

6.1.3.16 Compatibility of liferaft and release hook test

6.1.3.17 Proof load test

6.1.3.18 Inadvertent release tests

6.1.3.19 Icing test

6.1.3.20 Impact test

6.1.3 DAVIT-LAUNCHED LIFERAFT AUTOMATIC RELEASE HOOKS

EVALUATION AND TEST REPORT

Manufacturer	
System Type	
Serial Number	
Maximum Working Load	
Maximum Turning Moment	
Winch type	
Serial Number	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			
Drawing No.	**Revision No. & date**	**Title of drawing**	**Status**
Submitted reports and documents			
Report/Document No.	**Revision No. & date**	**Title of report/document**	**Status**
		Maintenance Manual	
		Operations Manual	

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.2 Quality assurance	**Regulations: MSC.81(70) 2/1.2 MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the international Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.3 Visual inspection		**Regulations: MSC.81(70) 1/8.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The hooks complete in every respect should be given a visual and dimensional examination to verify that they conform to the approved drawings and specifications.	The hooks must conform with the manufacturer's drawings and specifications.	Hook 1 Passed_____Failed _____ Hook 2 Passed_____Failed_____ Comments/Observations

6.1.3.4 Corrosion Resistance Test		**Regulations: MSC.81(70) 1/8.2.3, 8.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Two hooks should be submitted to a corrosion resistance test which should be made in a salt mist chamber in accordance with the standard ISO 9227:2006 – Corrosion tests in artificial atmospheres – Salt spray tests for 1,000 hours or equivalent national standard. Both hooks should be subjected five times to the tests required by 6.1.3.5 to 6.1.3.20, except 6.1.3.16.	The hook should pass the test without failure.	Any corrosion effects and other damage to the hooks should be recorded: Hook 1: Hook 2:

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.5 Maximum Load for Automatic Release Test		**Regulations: MSC.81(70) 1/8.2.5**
Test Procedure	Acceptance Criteria	Significant Test Data
The maximum load on the hook to allow for automatic release should be determined as follows: .1 the hook should be loaded with a mass of 200 kg and the actuating mechanism set; .2 the load should be reduced gradually in stages until the hook releases automatically, but at not more than 30 kg, to establish load "F"; and .3 the load "F" should be measured and recorded. The test should be repeated five times with each hook.	The minimum allowable "F" is the minimum obtained at release which should not be less than 5 kg or not more than 30 kg. Record the maximum load "F" (5 tests).	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.6 Dynamic Forces Release Tests		**Regulations: MSC.81(70) 1/8.2.6 –7**
Test Procedure	Acceptance Criteria	Significant Test Data
The load limit for automatic release, using dynamic loads, should be determined using both the following methods: .1 The hook should be loaded with a mass of 200 kg and the actuating mechanism set. The hook should then be subjected to cyclic loading between 30 kg and 200 kg using a frequency of 1 ±0.2 Hz. The hook should not release before 300 cycles. The number of cycles at which the hook opened or whether the test was discontinued at 300 cycles should be recorded. .2 The hook should then be reloaded to 200 kg and the actuating mechanism set. The hook should be subjected to a cyclic loading, the upper limit of which is +200 kg, and the lower limit being "F1" using a frequency of 1 ±0.2 Hz. The automatic release should operate within 3 cycles. The number of cycles at which the hook opened or whether the test was discontinued after three cycles should be recorded. "F1" is to be taken as the minimum load on the hook to allow for automatic release, as established in paragraph 6.1.3.5 reduced by 2 kg.	.1 The hook should not release before 300 cyclic loads. .2 The automatic release should operate within three cycles.	Record the number of cycles before hook released or test was discontinued (5 tests) Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.7 Actuating force test		**Regulations: LSA Code 4.1.1.2; MSC.81(70) 1/8.2.11**
Test Procedure	Acceptance Criteria	Significant Test Data
The actuating force for automatic release should be determined in the following way: .1 The hook should be loaded to 0%, 25%, 50%, 75% and 100% of the SWL of the hook; .2 At each load level the actuating force required at the actuation mechanism should be measured and recorded.	The actuating force should in all tests be between 150 N and 250 N if lanyard operated, or the action required to set the actuating mechanism should be readily performed by a single person without difficulty.	Record actuating force (5 tests) when loaded to: Hook 1 Hook 2 0% _____ _____ 25% _____ _____ 50% _____ _____ 75% _____ _____ 100% _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

6.1.3.8 Securing force test		**Regulations: MSC.81(70) 1/8.2.12**
Test Procedure	Acceptance Criteria	Significant Test Data
The securing force should be determined with an unloaded hook. The securing force should be recorded.	The securing force should be less than 120N. Record measured securing force (five tests).	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.9 Manual Release Force Test		**Regulations: MSC.81(70) 1/8.2.13**
Test Procedure	Acceptance Criteria	Significant Test Data
The manual release force should be determined as follows: .1 the hook should be loaded with a mass of 150 kg; .2 the actuating mechanism should be set for automatic release; .3 the force required to release the hook manually should be established and recorded; and .4 the manual release force for a load of 150 kg on the hook should be at least 600 N but not more than 700 N for lanyard-operated designs. Alternative designs should be demonstrated to the satisfaction of the Participating Authority to provide adequate protection from inadvertent release under load.	For a load of 150 kg, the manual release force should be at least 600N but not more than 700 N for lanyard operated designs. Other designs should provide adequate protection from inadvertent release under load. Record measured release force (five tests).	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.10 Holding Test, loaded		**Regulations: MSC.81(70) 1/8.2.10**
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic release hook should be attached to a test load of 1.1 times its maximum working load using an approved launching appliance. The load should be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand break sharply. This test should be conducted twice, once with the release mechanism set for automatic release, and again with the mechanism set to closed.	The release mechanism should not open in either test.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

6.1.3.11 Holding test, light		**Regulations: MSC.81(70) 1/8.2.14**
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic release hook should be attached to a test load equal to the mass of the lightest liferaft for which the automatic release hook is to be approved, with the actuating mechanism in the locked position (i.e. not set for automatic release). The load should then be raised so that it is clear of the ground. The actuating mechanism should then be set to automatic release.	This should be easily accomplished by a single person and should not release the load.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.12 Inertia test		**Regulations: MSC.81(70) 1/8.2.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook should be attached to a short wire rope fall, approximately 1.5 m, and loaded with a mass of 10 kg. It should be secured and then lifted 1 m. From this position it should be released to perform a free fall before it is abruptly stopped by the wire rope fall.	The hook should not release as a result of this test.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

6.1.3.13 Automatic release test		**Regulations: MSC.81(70) 1/8.2.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic release hook should be attached to a test load equal to 1.1 times the SWL, with the actuating mechanism in the locked position. The load should be raised to a height of at least 6 m and then be lowered at a speed of 0.6 m/sec. When the load is 1.5 m above the ground or water surface, the actuating mechanism should be set for automatic release, and the lowering completed.	The automatic release hook should release the load when it strikes the ground or water surface.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.14 Automatic release test - overloaded		**Regulations: MSC.81(70) 1/8.2.9**
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic release hook should be attached to a test load equal to 2.2 times the SWL, with the actuating mechanism in the locked position. The load should be raised to a height of at least 6 m and then be lowered at a speed of 0.6 m/sec. When the load is 1.5 m above the ground or water surface, the actuating mechanism should be set for automatic release, and the lowering completed.	There should be no evidence of permanent deformation and the hook should function after the test.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

6.1.3.15 Endurance test		**Regulations: MSC.81(70) 1/8.2.15**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook should be released 100 times without failure by each of its modes of release using the maximum load permitting release for that mode. It should then be disassembled and the parts examined.	There should be no evidence of excessive wear on any part.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations Passed _____ Failed _____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.16 Compatibility of liferaft and release hook test		**Regulations: MSC.81(70) 1/8.2.18**
Test Procedure	Acceptance Criteria	Significant Test Data
Where automatic release hooks are supplied for use with liferafts made by different manufacturers, operational tests with each type and size of lifting or attachment fitting used by the different manufacturers of the liferafts should be carried out before the particular combination of liferaft and release hook is accepted by the Administration.	The hook must be found to be compatible with each of the different lifting or attachment fittings used by the manufacturers for whom the hook is approved.	The hook can be used for rings with the following minimum and maximum diameter: Min. hole: _____mm Max. material ϕ: _____ mm (optionally fill in attached list) Comments/Observations

6.1.3.17 Proof load test		**Regulations: Res. A.689 1/8.2.11 (missing in MSC.81(70) by mistake)**
Test Procedure	Acceptance Criteria	Significant Test Data
The automatic release hook should be proof loaded to 6 times the SWL and this load held for at least 5 min. After the removal of the load, the hook should be dismantled and examined for damage.	Under the test load of 6xSWL for 5 min, the release mechanism should not fail.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations Passed _____Failed _____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.18 Inadvertent release tests		**Regulations: MSC.81(70) 1/8.2.13.4**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated to the satisfaction of the Administration, that the automatic release hook cannot be inadvertently released while under load.	It must not be possible to inadvertently release the hook.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations

6.1.3.19 Icing test		**Regulations: MSC.81(70) 1/8.2.16**
Test Procedure	Acceptance Criteria	Significant Test Data
The hook should be arranged in a cold store at -30°C to simulate operational readiness and loaded with 25 kg. A 3.5 cm thick uniform layer of icing should be built onto it by spraying cold water from angles above 45° from horizontal, with intermittent pauses to let icing form. The hook should then be actuated and as a result release the load without failure.	As a result of this test the hook should release the load without failure.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook 1: Passed_____ Failed_____ Hook 2: Passed_____ Failed_____ Comments/Observations Passed _____Failed _____ Comments/Observations

Davit-launched liferaft automatic release hooks	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.3.20 Impact test		**Regulations: MSC.81(70) 1/8.2.17**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that the hook is not damaged as a result of 10 impacts at a horizontal speed of 3.5 m/s on to a structure resembling a vertical ship's side. As far as practical all sides of the hook, especially areas with exposed controls, should impact the structure.	The hook must not sustain any damage which will interfere with the normal function of the hook.	Hook 1 Hook 2 Test 1 _____ _____ Test 2 _____ _____ Test 3 _____ _____ Test 4 _____ _____ Test 5 _____ _____ Hook1: Passed_____ Failed_____ Hook2: Passed_____ Failed_____ Comments/Observations

List of davit-launched liferafts for which the hook is approved:

Manufacturer:	Type:

6.1.4 LAUNCHING AND RECOVERY APPLIANCES FOR FAST RESCUE BOATS

EVALUATION AND TEST REPORT

6.1.4.1 Submitted drawings, reports and documents

6.1.4.2 Quality assurance

6.1.4.3 Visual inspection

6.1.4.4 Static proof load test

6.1.4.5 Operational load test

6.1.4.6 Turning in test

6.1.4.7 Winch brake test

6.1.4.8 Rescue boat launching appliance recovery speed test

6.1.4.9 Hand operation test

6.1.4.10 Sea state test

6.1.4 LAUNCHING AND RECOVERY APPLIANCES FOR FAST RESCUE BOATS

EVALUATION AND TEST REPORT

Manufacturer	
System type	
Serial number	
Maximum Working Load	
Maximum Turning Moment	
Winch type	
Serial number	
Date	
Place	
Name and signature of surveyor	
Approval Organization	

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.1 Submitted drawings, reports and documents

Submitted drawings and documents			
Drawing No.	**Revision No. & date**	**Title of drawing**	**Status**

Submitted reports and documents			
Report/Document No.	**Revision No. & date**	**Title of report/document**	**Status**
		Maintenance Manual	
		Operations Manual	

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1 and 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspection of manufacturers to ensure that the quality of life-saving appliances and the materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.3 Visual inspection		**Regulations: LSA Code 6.1; III, 16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Confirm that installation has been manufactured to approved drawings. Visually inspect the appliance. Conduct measurements and verify clearances as required. Provisions for hanging off pendants Remote control Limit switches	Amount of maintenance should be restricted to a minimum. Parts which require maintenance should be easily accessible and easily maintained. Effectiveness under icing conditions. There should be provisions for hanging-off the fast rescue boat to free the release gear for maintenance. The launching mechanism should be so arranged that it may be actuated by one person from a position within the survival craft or rescue boat. Manual brakes should be so arranged that the brake is always applied, unless the operator or a mechanism activated by the operator holds the brake control in the "off" position. Where davit arms are recovered by power, safety devices should be fitted which will automatically cut off the power before the davit arms reach the stops in order to prevent over-stressing the falls or davits, unless the motor is designed to prevent such over-stressing.	 Passed/Failed Passed/Failed Passed/Failed Passed/Failed Passed/Failed Type:

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.3 Visual inspection (continued)	**Regulations: LSA Code 6.1.1.6; III, 16.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
	Structural members and all blocks, falls, pad eyes, links, fastenings and all other fittings used in connection with launching equipment should be designed with a factor of safety on the basis of the maximum working load assigned and the ultimate strengths of the materials used for construction. A minimum factor of safety of 4.5 should be applied to all structural members including winch structural components and a minimum factor of safety of 6 should be applied to falls, suspension chains, links and blocks.	Passed/Failed Type: Comments/Observations

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.4 Static proof load test		**Regulations: LSA Code 6.1.1.5 - 6.1.1.6; MSC.81(70) 1/- 8.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
For fast rescue boats, davits and launching appliances, except winches, should be subjected to a static proof load of 2.2 times their maximum working load. With the load at the full outboard position, the load should be swung through an arc of approximately 10^0 to each side of vertical in the intended fore and aft plane. The test should be done first in the upright position, followed by tests simulating a shipboard condition of list of 20^0 both inboard and outboard.	The launching appliance and its attachments other than winches should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. There should be no evidence of significant deformation or other damage as a result of this test.	MWL: ..... kN Test load (2.2 x MWL): ..... kN There should be no evidence of significant deformation or other damage Passed/Failed Upright Passed/Failed 20^0 inboard list Passed/Failed 20^0 outboard list Passed/Failed Comments/Observations

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.5 Operational load test		**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1 /8.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For fast rescue boats, a mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the upright position. The load should be moved from the full inboard to the full outboard position using the means of operation that is used on the ship. The test should be repeated with the launching appliance positioned to simulate a combined 20^0 inboard list and 10^0 trim. All the tests should be repeated with a mass equal to that of a fully fast rescue boat, without persons, or the lightest fast rescue boat intended for the use with the davit to ensure the satisfactory functioning of the davit under very light load conditions.	The appliance should successfully lower the load under all of the conditions, and there should be no evidence of significant deformation or other damage as a result of the tests. Each launching appliance together with all its lowering and recovery gear should be so arranged that the fully equipped fast rescue boat it serves can be safely lowered against a trim of up to 10^0 and a list of up to 20^0 either way: When boarded, as required by regulation III/23 or III/33, by its full complement of persons; -without persons in the fast rescue boat.	Weight of the lightest fast rescue boat intended for use: LWL: ..... kN MW: ..... kN Test load (1.1 x MWL): ..... kN Clear of davit horn?* Passed/ Failed Does the appliance successfully lower the load under these conditions without evidence of significant deformation or damage? Passed/Failed Upright (1.1x MWL) Passed/Failed 20^0 inboard list +10^0 trim (1.1xMWL) Passed/Failed 20^0 inboard list +10^0 trim (LWL) Passed/Failed * if applicable continued

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.5 Operational load test (continued)		**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1 /8.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
	A launching appliance should not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the fast rescue boat it serves in the fully loaded and equipped condition and also in the light condition.	Stored power Passed/Failed Start pressure: k Pa Min. pressure: k Pa Pressure drop after one movement: k Pa Time from inboard to outboard: sec Comments/Observations * if applicable

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.6 Turning in test		**Regulations: LSA Code 6.1.1.3; MSC.81(70) 1 /8.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the appliance in the full upright position, the maximum design hoisting load should be moved from the full outboard to the full inboard position using the means of operation that is used on the ship.	The appliance should successfully move the maximum designed hoisting load from the outboard to the inboard position without causing permanent deformation or other damage.	Maximum designed hoisting load: kN Does the launching appliance successfully move the load from outboard to inboard? Passed/Failed Does the launching appliance show any evidence of significant deformation or other damage as a result of this test? Passed/Failed Comments/Observations

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.7 Winch brake test		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Winch drums should be wound to the maximum number of turns permitted and a static test load of 1.5 times the maximum working load should be applied and held by the brake. This load should then be lowered for at least one complete revolution of the barrel shaft. A test load of 1.1 times the maximum working load should then be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand brake sharply. This test should be repeated a number of times. If the winch design incorporates an exposed brake, one of these tests should be carried out with the brake wetted but in this case the stopping distance may be exceeded. The various tests should achieve a cumulative lowering distance of at least 150 m. Operation of the winch with a load of a mass equal to that of a fully equipped fast rescue boat without persons, or the lightest fast rescue boat intended for use with the winch should also be demonstrated.	The test load should drop no more than 1 m when the brake is applied (except that the stopping distance may be exceeded if an exposed brake is wetted). The launching appliance should successfully lower a mass equal to that of a fully equipped fast rescue boat, without persons, or the lightest fast rescue boat intended for use with the winch. Inspection of the stripped winch should reveal no significant damage or undue wear.	Weight of the lightest fast rescue boat* : …..... kN MWL : …..... kN Test 1: Static test load (1.5 x MWL): ..... kN Does the brake test hold the test load (1.5x MWL)? Passed/Failed MWM: kNm Drum diam. mm Wire diam. mm Number of turns Max. lowering speed m/s Test 2 Dynamic test load (1.1 x MWL): ..... kN Brake test carried out after > 3m with max lowering speed Stop within 1 metre? Passed/Failed Comments/Observations * delete as appropriate continued

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.7 Winch brake test (continued)		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1 /8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Following completion of these test (and 6.1.4.8, 6.1.4.9, 6.1.4.10), the winch should be stripped for inspection.		1st stop: > 3m 2nd stop: m 3rd stop: m 4th stop: m 5th stop: m Total lowering distance > 150 m Passed/ Failed Test 3 (if applicable) Winch design incorporates an exposed brake? Yes / No Wet stopping distance m Passed/ Failed Test 4 Test load (LWL) kN Lowering test with LWL satisfactory? Passed/Failed Does the inspection of the stripped winch reveal any significant damage or undue wear? Passed/Failed Comments/Observations

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.8 Rescue boat launching appliance recovery speed test		**Regulations: MSC/Circ.809 4.2.5; MSC.81(70) 1 /8.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Fast rescue boat loaded with six persons to be hoisted. Demonstrate also the recovery of the fast rescue boat with the maximum number of persons that can be accommodated in the boat as calculated under par. 4.4.2 of the LSA code.	Notwithstanding 6.1.4.9 launching appliances should be capable of hoisting the fully equipped fast rescue boat loaded with six persons with a speed not less than 0.8 m/s. The appliance should be capable of hoisting the fast rescue boat with the maximum number of persons that can be accommodated in the boat as calculated under par. 4.4.2 of the LSA code.	Maximum load to be hoisted with a speed of at least 0.8 m/s: kN Appliance is able to hoist the fast rescue boat with maximum number of persons? Passed/ Failed Comments/Observations
6.1.4.9 Hand operation test		**Regulations: LSA Code 6.1.2.6; MSC.81(70) 1 /8.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The hand operation of the winch should be demonstrated. If the winch is designed for quick recovery by hand with no load, this should be demonstrated with a load of 1.5 times the mass of the empty lifting arrangements.	An efficient hand gear should be provided for recovery of each fast rescue boat. Hand gear handles or wheels should not be rotated by moving parts of the winch when the fast rescue boat is being lowered or when it is being hoisted by power.	Hoisting load: Test 1: Test load (1 x hoisting load): winch can be operated satisfactorily by hand? Passed/ Failed Arrangement provided for protection against moving parts and rotating handles? Passed/ Failed Type: Test 2: Only for quick recovery Test load (1.5 x weight of empty lifting arrangement): kN Is quick recovery satisfactory? Passed/ Failed

Launching and recovery appliances for fast rescue boats	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.1.4.10 Sea state test		**Regulations: LSA Code 6.1; MSC.81(70) 1 /8.1.8**
Test Procedure	Acceptance Criteria	Significant Test Data
The fast rescue boat launching appliance should be demonstrated in a sea state associated with a force 6 wind on the Beaufort scale, in association with a significant wave height of at least 3 m. The test should include launching and recovery of a fast rescue boat and demonstrate: .1 satisfactory operation of the device to dampen forces and oscillations due to interaction with the waves; .2 satisfactory operation of the winch brake. The additional dynamic force induced in the wire due to retardation should be measured; and .3 satisfactory operation of the tensioning device.	.1 The launching appliance should be fitted with a device to dampen the forces due to interaction with the waves when the fast rescue boat is launched or recovered. The device should include a flexible element to soften shock forces and a damping element to minimize oscillations. .2 The winch should be fitted with an automatic high-speed tensioning device which prevents the wire from going slack in all sea state conditions in which the fast rescue boat is intended to operate. .3 The winch brake should have a gradual action. When the fast rescue boat is lowered at full speed and the brakes are applied sharply, the additional dynamical force induced in the wire due to retardation should not exceed 0.5 times the working load of the launching appliance.	Wind speed: Significant wave height: Method of determination: MWL (= test load) kN Working of dampening device satisfactory? Passed/ Failed Working of winch brake satisfactory? Passed/ Failed Gradual action? Passed/ Failed Additional dynamic force in wire kN < 0.5 x MWL? Passed/ Failed Tensioning device operation satisfactory? Passed/ Failed Wire prevented from going slack? Passed/ Failed Comments/Observations

6.2 MARINE EVACUATION SYSTEMS

EVALUATION AND TEST REPORTS

6.2.1 General information
- 6.2.1.1 Submitted drawings, reports and documents
- 6.2.1.2 Quality assurance
- 6.2.1.3 General data and specifications
- 6.2.1.4 Platform carrying capacity
- 6.2.1.5 Markings on container
- 6.2.1.6 Markings on passage
- 6.2.1.7 Visual inspection

Test procedures

6.2.2 Material test

6.2.3 Deployment instructions

6.2.4 Container static load test
- 6.2.4.1 Container door hose test
- 6.2.4.2 Container door dry release test
- 6.2.4.3 Container door trim release test

Inclined inflated passages

6.2.5 Passage load test
- 6.2.5.1 Dry sliding test
- 6.2.5.2 Loss of pressure test
- 6.2.5.3 Load test of passage to container
- 6.2.5.4 Cold inflation test
- 6.2.5.5 Hot inflation test
- 6.2.5.6 Wet sliding test
- 6.2.5.7 Three times pressure test

Vertical descent passages

6.2.6 Two times sliding test
- 6.2.6.1 Load test of passage to container
- 6.2.6.2 Cold passage test
- 6.2.6.3 Wet descent test

Platform (if fitted)

6.2.7 Platform carrying capacity
- 6.2.7.1 Loaded freeboard and 50% buoyancy loss loaded test
- 6.2.7.2 Self-draining test
- 6.2.7.3 Cold inflation test
- 6.2.7.4 Hot inflation test
- 6.2.7.5 Three times overpressure test

Associated liferafts

6.2.8 Liferaft construction
6.2.8.1 Liferaft release from stowage position
6.2.8.2 Liferaft release from passage

Evacuation Trials

6.2.9 Timed evacuation test

Sea trails

6.2.10 Heavy weather sea trial
6.2.10.1 Heavy weather sea trial (Phase 1)
6.2.10.2 Heavy weather sea trial (Phase 2)
6.2.10.3 Heavy weather sea trial (Phase 3)
6.2.10.4 Heavy weather sea trial (Phase 4)

Data recording sheets

6.2.11 Evacuation trial timings (MES with platform and liferafts)
6.2.12 Evacuation trial timings (MES straight into liferafts)

6.2 MARINE EVACUATION SYSTEMS

EVALUATION AND TEST REPORTS

Manufacturer	
Type/Model	
Date of Approval	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & date**	**Title of report/document**	
		Maintenance Manual	
		Operations Manual	

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.2 Quality assurance	**Regulations: SOLAS III/4; MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, or the International Life-Saving Appliance (LSA) Code as amended, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.3 General data and specifications		**Regulations: LSA Code I/1.2 & VI/6.2**
General Information	Dimensions	Weight
The MES, complete in all respects, in its fully inflated condition should be subject to a detailed inspection in the manufacturers' works to ensure that all requirements are complied with. Strength and construction of the passage and platform should be to the satisfaction of the administration The platform if fitted should be: .1 Such that sufficient buoyancy will be provided for the working load. In the case of an inflatable platform, the main buoyancy chambers, which for this purpose should include thwarts or floor inflatable structure members, are to meet the requirements of section 4.4.3 based upon the platform capacity, except that the capacity should be obtained by dividing by 0.25 the usable area given in 6.2.0.4.	Length of passage: Vertical System _____ m Inclined System _____ m Installation Height of System _____ m Diameter of Platform _____ m (if applicable) Carrying Capacity of Platform _____ Number of passages _____ Angle of Slide Path _____	Weight of complete system _____kg Weight of associated liferafts _____kg continued

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.3 General data and specifications (continued)	**Regulations: LSA Code I/1.2 & VI/ 6.2**	
General Information	Dimensions	Weight
.2 The angle of the slide to the horizontal should be within the range of 30^0 to 35^0 when the ship is upright and in the lightest seagoing condition. In the case of a passenger ship, a maximum of 55^0 in the final stage of flooding set by the requirements in regulation II-I/8. .3 The term "operational pressure" has the same meaning as the term "working pressure"; i.e. the pressure determined by the designed reseat pressure of the relief valves, if fitted, except that, if the actual reseat pressure of the relief valve, determined by testing, exceeds the designed reseat pressure by more than 15%, the higher figure should be used.	Angle of Slide Path Inclined Slide: PRV lifting pressure k Pa PRV re-seat pressure k Pa	

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.4 Platform carrying capacity		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform (if fitted) should be such that sufficient buoyancy will be provided for the working load. The number of persons which the platform should be permitted to accommodate should be equal to the lesser of: The greatest whole number obtained by dividing by 0.096 the volume, measured in cubic metres of the main buoyancy tubes, including any thwarts or floor inflatable structures when inflated; or The greatest whole number obtained by dividing by 0.25 the inner usable cross-sectional area of the platform measured in square metres (which for this purpose may include the thwart or thwarts, if fitted) measured to the innermost edge of the buoyancy tubes. However, Administrations may approve alternative arrangements which are demonstrated to comply with all of the prescribed performance requirements.	This usable platform area should be at least equal to: (20% of total number of persons that the System is certified for)/4 m^2; or 10 m^2 whichever is the greater.	No. of persons platform is designed for _____ .1 Capacity of platform using buoyancy _____ .2 Capacity of platform using area _____ Lesser of 1 and 2 above _____ .3 Usable area requirement for platform. .4 Number of persons platform can actually carry. Comment/Observation Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.5 Markings on container		**Regulations:LSA Code I/1.2 & VI/6.2.4.2 & 6.2.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The container should be marked with; Maker's name or trademark; Serial number; Name of approval authority and the capacity of the system; (6.2.0.2) SOLAS; Date of manufacture (month and year); Date and place of last service; Maximum permitted height of stowage above waterline; and Stowage position on board. Launching and operating instructions should be marked on or in the vicinity of the container.	All instructions and markings to be indelible.	Indicate markings on container below: Passed _____ Failed _____

6.2.1.6 Markings on passage		**Regulations: LSA Code I/1.2 & VI/ 6.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The marine evacuation system should be marked with: .1 maker's name or trademark; .2 serial number; .3 date of manufacture (month and year); .4 name of approving authority; .5 name and place of servicing station where it was last serviced, along with the date of servicing; and .6 the capacity of the system.	All instructions & markings to be indelible.	Indicate markings on container below: Passed _____Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.1.7 Visual inspection		**Regulations: Chapter III/13.4; LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.5.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Liferaft Release From Passage Inflatable liferafts associated with marine evacuation systems Any inflatable liferaft used in conjunction with the marine evacuation system should be provided with pre-connected or easily connected retrieving lines to the platform.	If the passage is to give direct access to the liferaft(s), it should be demonstrated that it can be easily and quickly detached.	.1 Are liferafts launched with passage Yes/No .2 Method of connection of liferafts to passage .3 Method of release from passage .4 Method of release acceptable? Yes/No Comments/observations Passed _____Failed _____

6.2.2 Material test		**Regulations:LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 5.17.13 & 12.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Inflated materials used in the construction of marine evacuation systems are to be tested to the standards laid down in test report 4.3.4.	Fabric must be type approved in accordance with Test Report 4.3.4, Material Tests for Liferafts.	Fabric Complies Yes No Comments/Observation Passed _____Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.3 Deployment instructions		**Regulations:LSA Code I/1.2 & VI/6.2.2.1; MSC.81(70) 1/12.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine evacuation system container; It should be demonstrated that the passage and platform if fitted, or liferafts in any other case, can be deployed from the container by one person in a sequence prescribed in the manufacturer's instruction. If more than one action is necessary to operate the system means should be provided to prevent incorrect operation.	The deployment of the system by one person and instructions to be acceptable to the administration.	.1 Number of sequences required to deploy system _____ .2 Instruction adequate Yes _____ No _____ .3 Can system be deployed by one person? Yes/No. .4 If more than one operation Number of operations to deploy system _____ Comments/Observations Passed _____ Failed _____

6.2.4 Container static load test		**Regulations: LSA Code I/ 1.2 & VI/6.2; MSC.81(70) 1/ 12.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine evacuation system container. A static load of 2.2 times the maximum load on the system applied to its structural attachment to the ship for a period of 30 minutes. This static load is to be equivalent to the calculated load imposed by the maximum number and size of fully loaded liferafts for which the system is designed, attached to the loaded platform with the ship moving through the water at 3 knots against a head wind of force 10 on the Beaufort scale.	There should be no evidence of significant deformation or other damage as a result of this factory test.	.1 Calculated static load _____tonnes .2 2.2 x calculated load _____tonnes .3 Period of test load _____min Method used to calculate static load test Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.4.1 Container door hose test		**Regulations:LSA Code I/1.2 & VI/6.2; MSC8.1(70) 1/ 5.12 & 12.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine evacuation system container; To ensure the effectiveness of the closures in preventing water entering the container, the efficiency of the sealing arrangements should be demonstrated by means of a hose test or by any other equally effective method. The requirement for the hose test is that about 2,300 l of water per minute be directed at and around the sealing arrangements through a 63.5 mm hose from a point 3.5 m away and 1.5 m above for a period of 5 min. Alternatively, when hose testing is required to verify the tightness of the structures the minimum pressure in the hose, at least equal to 2 bar, is to be applied at a maximum distance of 1.5 m. The nozzle diameter should not be less than 12 mm. (Note:- If the system is installed internally in the ship and the door is not part of the ships structure then this test is not required to be carried out).	The container to remain reasonably weathertight to prevent the ingress of water and there should be no significant accumulation of water inside the container. The accumulation of water inside the liferaft should not exceed 4 l.	.1 Capacity of water hose _____l/min Diameter of hose _____mm .2 Ingress of water in container_____litres .3 Drainage adequate Yes/No .4 Diameter of drain holes _____mm .5 Number of drain holes _____ Comment/Observations Passed_____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.4.2 Container door dry release test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 12.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation System Container; After completing the test in the release and securing arrangements for any internal or external doors are to be satisfactorily tested by 5 dry release operations carried out consecutively.	The door should operate satisfactory and not be damaged as a result of this test.	Door operation: .1 Pass/Fail .2 Pass/Fail .3 Pass/Fail .4 Pass/Fail .5 Pass/Fail Comments/Observations. Passed_____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.4.3 Container door trim release test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 12.2.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine evacuation system container; It should be demonstrated by 2 dry deployments of the system, with the container angled back to simulate an unfavourable trim of up to 10^0 and list of up to 20^0 either way, that outer door, the passage and platform (if fitted), will not suffer damage which will render it unusable for its intended purpose.	There should be no damage to the outer door, passage and platform if fitted which will render the system unusable. The door of the container should open fully and the system deploy without interference.	.1 Height of deployment m .2 Adverse trim and list 10^0 trim 20^0 list (low side) Operation of system Passed _____ Failed_____ .3 Adverse trim and list 10^0 trim 20^0 list (high side) Operation of system Passed _____ Failed _____ Comments/Observation. Passed _____ Failed _____

6.2.5 Passage load test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 12.3.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage A fully inflated passage should be arranged on solid base at the height at which it is to be stowed on board. Each single path should be loaded with 150 kg weight at mid length.	Slide path must be usable and not become unduly distorted.	.1 Height of slide above ground m .2 Length of slide m .3 Number of slide paths .4 Angle of slide path ^{0} Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.1 Dry sliding test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; A fully inflated passage should be subjected to individual sliding operations twice the number for which it is to be certificated. For this test actual persons of varied physique and weight should be used.	On completion the passage path should remain in a serviceable condition.	.1 Number of slide paths .2 Number of persons passage is certified for .3 Number of sliding operations Comments/Observations. Passed_____Failed _____

6.2.5.2 Loss of pressure test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; It should be demonstrated using actual persons that the loss of pressure in any one section of the passage will not limit its use as a means of evacuation.	Passage should remain usable throughout with the relevant section of the slide depressurized.	.1 Height of slide above ground _____m. .2 No. of persons using system _____ .3 Sequence of deflation of slide tubes; Section deflated 1. 2. 3. 4. .4 Angle of passage__° Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.3 Load test of passage to container		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 12.2.2 & 12.3.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; A static load of 2.2 times the maximum load to which the system is to be designed should be applied for a period of 30 minutes to the connection between the passage and the container. This static load is to be equivalent to the calculated load imposed by the maximum number and size of fully loaded liferafts for which the system is designed, attached to the loaded platform with the ship moving through the water at 3 knots against a head wind of force 10 on the Beaufort scale.	On completion there must be no signs of any fracture or stranding of its connections, or other damage as a result of this factory test.	.1 Calculated static load _____tonnes .2 2.2 x calc. load _____tonnes .3 Period of test load _____min .4 Calculated breaking load of connection_____T. .5 Method used to calculate static load test Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.4 Cold inflation test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; The uninflated passage with its gas cylinders should be placed in a cold chamber at a temperature of - 30^0C. After a period of not less than 24 hours at this temperature the passage should reach its working pressure within 5 minutes.	The passage and components must show no sign of cracking, seam slippage or other defects. The gas inflation system should show no sign of cracking or other defects.	.1 Cold Chamber temperature _____ ^{0}C Time in _____ Time out _____ Hours in chamber _____ @ -30^0C .2 Design WP _____ kPa .3 System usable in _____ secs .4 Time to reach working pressure _____ secs .5 Relief valves blowing at: .6 Passage reached working pressure in 5 Min Yes/No Gas Inflation System Acceptable Yes/No .7 Details of gas inflation system .1 Slide - No. of cylinders Weight of cylinders _____ kg. Gas charge_____ kgCO_2, _____ kg N_2 Bottle details .2 Platform – No. of cylinders Weight of cylinders _____ kg. Gas charge_____ kg CO_2, _____ kg N_2 Bottle details

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.4 Cold inflation test (continued)		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
	Continued:	.8 Details of high-pressure hose .1 Material of hose .2 Pressure rating of hose .9 Details of Cylinder valve .10 Details of Operating Head .11 Details of Inflation Valve .12 Details of Pressure Relief Valve .1 Lifting pressure .2 Reseat pressure .13 Additional Inflatable Structures associated with passage and platform: Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.5 Hot inflation test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; The uninflated passage with its gas cylinders should be placed in a hot chamber at a temperature of +65^{0}C for not less than 7 hours.	On inflation the pressure relief valves on the passage should be of sufficient capacity to prevent pressure in excess of twice the designed working pressure. The passage and components should show no sign of cracking, seam slippage or other defects. (The inflation system should be identical to the system described in 6.2.4.4 above)	.1 Hot chamber temperature _____^{0}C Time in_____Time out_____ Hours in chamber_____@ +65^{0}C .2 Design WP _____kPa .3 System usable in _____secs .4 Time to reach working pressure_____secs .5 Maximum pressure reached during inflation _____kPa .6 Relief valves blowing at: Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.5.6 Wet sliding test	**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.1.7**	
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; It should be demonstrated with at least 10 sliding operations on a slide path thoroughly wetted with water to simulate wet weather conditions.	The speed of descent should not be considered excessive or dangerous.	.1 Height of slide above ground_____m .2 Angle of slide path to horizontal_____^{0} .3 No. of persons sliding Comments/Observation Passed _____ Failed _____

6.2.5.7 Three times pressure test	**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 12.3.1.8, 5.17.7 & 5.17.8**	
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Inclined Inflated Passage; Each inflatable compartment in the passage should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the passage and the inflation source removed. The test should continue for at least 30 min. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has completed stretching due to the inflation pressure and achieved equilibrium.	The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the passage.	1. Passage .1 Design Working Pressure_____kpa .2 3 x working pressure_____kPa .3 Pressure at start _____kPa .4 Calculated 5% pressure drop maximum _____kPa .5 Pressure drop after 30 minutes ___kPa .6 Percentage drop_____% Comment/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.6 Two times sliding test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Vertical Passage The vertical passage should be subjected to individual descent operations twice the number for which it is to be certificated. For this test actual persons of varied physique and weight should be used.	On completion the passage path should remain in a serviceable condition.	.1 Number of vertical passages_____. .2 Number of sliding operations per passage _____. .3 Passage remains in serviceable condition Yes/No _____. Comments/observations. Passed _____ Failed _____

6.2.6.1 Load test of passage to container		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Vertical Passage; A static load of 2.2 times the maximum to which the system is to be designed should be applied for a period of 30 minutes to the connection between the passage and the container. This static load is to be equivalent to the calculated load imposed by the maximum number and size of fully loaded liferafts for which the system is designed, attached to the loaded platform with the ship moving through the water at 3 knots against a head wind of force 10 on the Beaufort scale.	On completion there must be no signs of any fracture or stranding of its connections, or other damage as a result of this factory test.	1. Calculated static load _____tonnes 2. 2.2 x calc. load _____tonnes 3. Period of test load _____min 4. Calculated breaking load of connection__T. Method used to calculate static load test Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.6.2 Cold passage test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Vertical Passage. The stowed passage should be placed in a cold chamber at a temperature of -30^{0}C for a period of 24 hours.	At this temperature the passage should show no signs of cracking or other defects.	Cold chamber temperature _^{0}C Time in_____Time out _____ Total time in chamber _____hr Total time to deploy _____secs Does passage show signs of cracking or other defects Yes/No _____ Comments/observations. Passed _____ Failed _____

6.2.6.3 Wet descent test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.3.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Vertical Passage. It should be demonstrated with at least 10 descent operations, in the case of open vertical passages with the path thoroughly wetted with water to simulate wet weather conditions.	The speed of descent should not be considered excessive or dangerous.	.1 Height of vertical passage above ground_____m. .2 No of persons sliding_____. Comments/Observation Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.1 Loaded freeboard and 50% buoyancy loss loaded test	**Regulations: LSA Code I/1.2 & VI/6.2.1.3.3; MSC.81(70) 1/12.4.1, 12.4.2**	
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform, if fitted The platform should be inflated and loaded with the number of persons carried in accordance with form 6.2.1.4. Freeboards should be measured all round all wearing an approved lifejacket. It should then be demonstrated that in the event of the loss of 50% of the buoyancy in the tubes, the platform should be capable of supporting the number of persons specified, all wearing approved lifejacket.	Freeboard should be measured all round, and should not be less than 300 mm. and should have a positive freeboard.	No. of persons on platform Freeboard in undamaged condition Freeboard recorded Positive Negative 12 o'clock_____mm _____ _____ 3 o'clock_____mm _____ _____ 6 o'clock_____mm _____ _____ 9 o'clock_____mm _____ _____ Buoyancy tube deflated Upper/Lower Freeboard recorded Positive Negative 12 o'clock_____mm _____ _____ 3 o'clock_____mm _____ _____ 6 o'clock_____mm _____ _____ 9 o'clock_____mm _____ _____ Comments/observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.2 Self-draining test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.4.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform, if fitted Water should be pumped into the interior of the platform, while it is afloat, at a rate of 2300 l per minute for 1 minute, the water should then be shut off. If the platform is divided into separate areas, by thwarts or other means, each such area should be subjected to the test.	There should be no appreciable accumulation of water on the platform. The platform should remain stable and usable during this test.	.1 Hose delivery rate_____ l/min .2 Period of delivery of water _____ min .3 Area of platform _____ m² .4 Area of drainage point _____ m² .5 Drainage area sufficient to remove water Yes/No Comments/observations. Passed _____ Failed_____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.3 Cold inflation test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform, if fitted; The uninflated platform with its inflation system should be placed in a cold chamber at a temperature of -30^{0}C. After a period of not less than 24 hours at this temperature the platform on being inflated should reach its working pressure within 5 minutes.	The passage and components must show no sign of cracking, seam slippage or other defects. The gas inflation system should show no sign of cracking or other defects. The Pressure Relief Valves should be monitored to ensure that they operate satisfactorily after inflation and during the warming up of the liferaft.	.1 Cold temperature _____^{0}C Time in _____ Time out _____ Hours in chamber _____ @ -30^{0}C .2 Design WP _____ kPa .3 System usable in _____ min .4 Time to reach working pressure _____ min .5 Relief valves blowing at: Gas Inflation System Acceptable to Administration Yes/No .6 Details of gas inflation system .1 Platform - No. of cylinders Weight of cylinders _____ Kg. Gas charge_____ kg CO_2, _____ kg N_2 Bottle details .7 Details of high pressure hose _____ .1 Material of Hose _____ .2 Pressure rating of hose _____ continued…

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.3 Cold inflation test (continued)		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.4.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Continued:	Continued:	.8 Details of Cylinder valve .9 Details of Operating Head .10 Details of Inflation Valve _____ .11 Details of Pressure Relief Valve _____ _____ .1 Lifting pressure _____ .2 Reseat pressure _____ .12 Additional Inflatable Structures associated with platform Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.4 Hot inflation test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.4.5**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform, if fitted: The platform with its inflation system should be placed in a hot chamber at a temperature of +65^{0}C for not less than 7 hours.	On being inflated the pressure relief valves on the platform should be of sufficient capacity to prevent pressure in excess of twice the designed working pressure. The passage and components should show no sign of cracking, seam slippage or other defects. The maximum pressure achieved during the hot should align with the Pressure Relief Valves Lifting and Re-seat pressures. (The inflation system should be identical to the system described in 6.2.6.3 above)	.1 Hot temperature _____ ^{0}C Time in_____Time out _____ Hours in chamber_____@ +65^{0}C .2 Design WP _____ 2 x Design WP _____ .3 System usable_____min .4 Time to reach working pressure .5 Pressure relief valves blowing at: .6 Max Pressures reached in buoyancy tubes and time. Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.7.5 Three times overpressure test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/ 5.17.7, 5.17.8 & 12.4.6**
Test Procedure	Acceptance Criteria	Significant Test Data
Marine Evacuation Platform, if fitted; Each inflatable compartment in the platform should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the platform and the inflation source removed. The test should continue for at least 30 minutes. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has completed stretching due to inflation pressure and achieved equilibrium.	The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defect in the platform.	.1 Passage .1 Design Working Pressure _____ kPa .2 PRV lifting pressure_____kPa .3 PRV reseat pressure_____kPa .4 3 x working pressure_____kPa .5 Pressure at start_____kPa .6 Calculated 5% pressure drop maximum__kPa .7 Pressure drop after 30 minutes_____kPa .8 Percentage drop_____% Comment/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.8 Liferaft construction		**Regulations: LSA Code I/1.2 IV/4.2 & VI/6.2; MSC.81(70) 1/12.5.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Inflatable liferafts associated with marine evacuation systems Any inflatable liferaft used in conjunction with the marine evacuation system should conform with the requirements of the LSA Code section 4.2.	Liferafts used in conjunction with the marine evacuation system should conform and be prototype tested to the requirements of section 4.2.	Type approval certifications confirms compliance with LSA Code section 4.2 and liferafts testing consistent with section 4.1 of the Survival Craft Evaluation and Test Report Forms Conforms to LSA Code section 4.2? Yes/No Testing consistent with Test Reports in Section 4.1 Inflatable liferafts? Yes/No Comments/observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.8.1 Liferaft release from stowage position		**Regulations: Chapter III/ 13.4; LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.5.2, 12.5.3, 12.5.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Inflatable liferafts associated with marine evacuation systems Any inflatable liferaft used in conjunction with the marine evacuation system should, where applicable; .1 be sited close to the system container but be capable of dropping clear of the deployed system and boarding platform. .2 be capable of release one at a time from its stowage rack with arrangements which will enable it to be moored alongside the platform. .3 be provided with pre-connected or easily connected retrieving lines to the platform.	It should be demonstrated that the liferafts can be deployed from their stowage position, and moored alongside the platform, if fitted, before being inflated, and bowsed in ready for boarding. It should be demonstrated that the liferafts can be deployed from their stowed positions independently of the marine evacuation system. It should be demonstrated that the liferafts will float free from their stowage positions, inflate and then break free in the event of the ship sinking.	.1 Height of stowage position in lightest seagoing condition_____m. .2 Certified drop height of liferaft_____m. .3 Operation carried out successfully Yes/No .4 Method of release automatic _____manual_____ .5 Description of release method _____ .6 Liferafts launched independently of the MES Yes/No _____ Comments/observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.8.2 Liferaft release from passage	**Regulations:-Chapter III/13.4; LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.5.5**	
Test Procedure	Acceptance Criteria	Significant Test Data
Inflatable liferafts associated with marine evacuation systems Any inflatable liferaft used in conjunction with the marine evacuation system should be provided with pre-connected or easily connected retrieving lines to the platform.	If the passage is to give direct access to the liferaft(s), it should be demonstrated that it can be easily and quickly detached.	.1 Are liferafts launched with passage Yes/No _____ .2 Method of connection of liferafts to passage _____ .3 Method of release from passage _____ .4 Method of release acceptable Yes/No _____ Comments/observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.9 Timed evacuation test		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.6.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Performance of the marine evacuation system A marine evacuation system should be evaluated for capacity by mean of timed evacuation deployments conducted in harbour. It should be demonstrated in harbour by a full deployment of a system, including the launching and inflation of all the associated liferafts, that the system will provide a satisfactory means of evacuation. For this trial the number of persons to be used should be that for which the system is to be certificated. The various stages of this trial should be timed so as to permit the calculation of the number of persons that can be evacuated in any specified period, a representative composition of persons with normal health, height and weight should be used in the demonstration, and should consist of different sexes and ages so far as it is practicable and reasonable. Time Trial Sheets Attached to be completed	The passage of the marine evacuation system should provide for safe decent of persons of various ages, sizes and physical capabilities, wearing approved lifejackets, from the embarkation station to the floating platform or survival craft.	No. of persons system is certificated for_____ No. of platform crew _____ Number evacuated after 10 min (cargo vessel) _____ Number evacuated after 30 min (passenger vessel) _____ Number actually evacuated _____ Time taken _____ No. of associated liferafts _____ Carrying capacity of liferafts _____ Height of embarkation deck above water_____ m Weather conditions: _____ Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.10.1 Heavy weather sea trial (Phase 1)		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.6.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Conditions during the heavy weather sea trial should not fall below a sea state associated with a wind of force 6 on the Beaufort scale. It should be demonstrated at sea by a full deployment of a system, including the launching and inflation of the associated liferafts, that the system will provide a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale, and in association with a significant wave height of at least 3 m. During the sea trial, a spectrum analysis of the recorded wave height should be performed. The signal should be high-pass filtered at 0.08 Hz to exclude any contributions from swell. The significant wave height should be calculated based on filtered spectrum and should not be less than 3.0 m. The demonstration should be carried out in accordance with the following procedures: Phase 1 – Initial deployment of system. .1 with the vessel in a simulated "dead ship" condition, and the bow into the wind the system (passage and platform or any other configuration) should be deployed in its normal design manner; and .2 The platform and passage are to be observed from the ship to verify in this condition that it forms a stable evacuation system for the platform crew to descend and carry out their initial duties in preparation for evacuation;	System to remain usable throughout the trials and should not suffer damage to the platform, passage, or liferafts, or other defects. System capable of providing a 3 metres significant wave height satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale.	.1 Position of vessel during trials _____ Weather conditions at start_____BF; Weather conditions at end of trials_____BF. Wind speed at start_____m/s Wind speed at end_____m/s Significant wave height____m Maximum wave height_____m Method of measuring wave height _____ Average drift of ship during trial_____m/s Time taken for system to become usable_____min Weather conditions remained with test limits Yes/No Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.10.2 Heavy weather sea trial (Phase 2)		**Regulations: LSA Code I/1.2 & VI/6.2 ; MSC.81(70) 1/12.6.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
Conditions during the heavy weather sea trial should not fall below a sea state associated with a wind of force 6 on the Beaufort scale. Phase 2 – Lee Side Trial .1 the ship to be manoeuvred to place the system on the lee side and then allowed to freely drift; .2 where the system employs a platform, the nominated number of the platform crew are to descend via the passage and retrieve at least two liferafts which have been launched separately; .3 where the system employs a passage giving direct access to the liferaft, the nominated number of liferaft boarding crew are to descend via the passage. If additional liferafts are employed with the system, then they should be launched separately and be retrieved by the liferaft crew; and .4 after the liferafts have been satisfactorily deployed, dependant upon safety considerations 20 persons in suitable protective clothing are to evacuate to the liferafts through the passage.	System to remain usable throughout the trials and should not suffer damage to the platform, passage, or liferafts, or other defects. System capable of providing a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale. (The design of marine evacuation systems may vary, such that the configuration of the arrangement of the liferafts as described in the test procedure may not be applicable. The Heavy weather sea trial should be based upon the manufacturers design concept, for the system, for evacuating the number of persons in the required time.)	.2 Number of platform crew _____ Number of liferafts deployed _____ Safe to evacuate 20 persons to liferafts Yes/No ____ .3 Evacuation satisfactory Yes/No _____ Comments/Observations. Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.10.3 Heavy weather sea trial (Phase 3)		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.6.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
Conditions during the heavy weather sea trial should not fall below a sea state associated with a wind of force 6 on the Beaufort scale. Phase 3 – Loaded trial lee side The platform, if fitted, and the required number of liferafts are to be loaded to their certified capacity with weights representing 75 kg/person. When loaded with the required weights the system is to be observed for a period of 30 minutes, with the vessel free to drift. Vessel allowed to drift for a minimum period of 30 minutes.	System to remain usable throughout the trials and should not suffer damage to the platform, passage, liferafts, or other defects. System capable of providing a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale. The system should continue to provide a safe and stable evacuation system.	Number of persons platform can carry Platform weight loaded = _____ persons X 75 kg = _____ kg Number of liferafts inflated _____ Carrying capacity of liferaft _____ Liferaft weight loaded = _____ persons X 75 kg = _____kg Method of loading liferafts _____ Average drift speed during trial _____m/s Length of loaded trial lee side _____min Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.10.4 Heavy weather sea trial (Phase 4)		**Regulations: LSA Code I/1.2 & VI/6.2; MSC.81(70) 1/12.6.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Conditions during the heavy weather sea trial should not fall below a sea state associated with a wind of force 6 on the Beaufort scale. Phase 4 – Loaded trial weather side The platform, if fitted, and the required number of liferafts are to be loaded to their certified capacity with weights representing 75 kg/person. The trials of phase 2 and 3 should be repeated with the system deployed on the weather side of the ship. The lee side trials and the weather side trials may be conducted in any convenient order. Where ship manoeuvres are required to place the system on any one side, any damage or failure sustained during this manoeuvre should not constitute a failure of the system. Vessel allowed to drift for a minimum period of 30 minutes.	System to remain usable throughout the trials and should not suffer damage to the platform, passage, liferafts, or other defects. System capable of providing a satisfactory means of evacuation in a sea state associated with a wind of force 6 on the Beaufort scale. The system should be tested, as far as practicable, on a vessel having similar characteristics to the types of ships the equipment is to be fitted to.	Number of persons platform can carry Platform weight loaded = _____ persons X 75 kg = _____ kg Number of liferafts inflated Carrying capacity of liferaft Liferaft weight loaded = _____ persons X 75 kg = _____ kg Method of loading liferafts _____ Average drift speed during trial _____ m/s Length of loaded trial weather side _____ min Comments/Observations Passed _____ Failed _____

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.11 Evacuation trial timings (MES with platform and liferafts)	**Regulations: Chapter III/15; LSA Code I/1.2 & VI/6.2; MSC81(70) 1/6.1.5**
	TIMINGS
1 MES door open	
2 MES in water	
3 MES slide/platform inflated	
4 4 platform crew on platform	
5 Signal to release liferafts given	
6 **1ST LIFERAFT LAUNCHED**	
6.1 ILR container bowsed in	
6.2 ILR boardable	
6.3 1st person descends system	
6.4 Last person in liferaft No 1	
6.5 Liferaft marshalled clear	
7 **2ND LIFERAFT LAUNCHED**	
7.1 ILR container bowsed in	
7.2 ILR boardable	
7.3 1st person descends system	
7.4 Last person in liferaft No 2	
7.5 Liferaft marshalled clear	

Continued…..

(Continued)	**TIMINGS**
8 **3RD LIFERAFT LAUNCHED**	
8.1 ILR container bowsed in	
8.2 ILR boardable	
8.3 1st person descends system	
8.4 last person in liferaft No 3	
8.5 Liferaft marshalled clear	
9 **4TH LIFERAFT LAUNCHED**	
9.1 ILR container bowsed in	
9.2 ILR boardable	
9.3 1st person descends system	
9.4 Last person in liferaft No 4	
9.5 Liferaft marshalled clear	
10 **5TH LIFERAFT LAUNCHED**	
10.1 ILR container bowsed in	
10.2 ILR boardable	
10.3 1st person descends system	
10.4 Last person in liferaft No 5	
10.5 Liferaft marshalled clear	

Continued…..

(Continued)	**TIMINGS**
11 **6TH LIFERAFT LAUNCHED**	
11.1 ILR container bowsed in	
11.2 ILR boardable	
11.3 1st person descends system	
11.4 Last person in liferaft No 6	
11.5 Liferaft marshalled clear	
12 **7TH LIFERAFT LAUNCHED**	
12.1 ILR container bowsed in	
12.2 ILR boardable	
12.3 1st person descends system	
12.4 Last person in liferaft No 7	
12.5 Liferaft marshalled clear	
13 **8TH LIFERAFT LAUNCHED**	
13.1 ILR container bowsed in	
13.2 ILR boardable	
13.3 1st person descends system	
13.4 Last person in liferaft No 8	
13.5 Liferaft marshalled clear	
Evacuation trial completed at hr . . . . . min . . . . . sec Total Time for Evacuation……hr . . . . . min	

Marine evacuation systems	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.2.12 Evacuation trial timings (MES straight into liferafts)	**Regulations: Chapter III/15; LSA Code I/1.2 & VI/6.2; MSC81(70) 1/6.1.5**
	TIMINGS
1 MES door open	
2 MES in water	
3 MES passage, liferafts inflated and boardable	
4 MES crew descend	
4.1 Additional liferaft launched (if required)	
4.2 ILR container bowsed in	
4.3 ILR boardable	
5 Signal to receive passengers given	
6 **1ST PERSON DESCENDS** (liferaft No 1)	
6.1 Last person in liferaft No 1	
6.2 Liferaft marshalled clear	
7 **1ST PERSON DESCENDS** (liferaft No 2)	
7.1 Last person in liferaft No 2	
7.2 Liferaft marshalled clear	
8 **1ST PERSON DESCENDS** (liferaft No 3)	
8.1 Last person in liferaft No 3	
8.2 Liferaft marshalled clear	

Continued…..

Continued	**TIMINGS**
9 **1ST PERSON DESCENDS** (liferaft No 4)	
9.1 Last person in liferaft No 4	
9.2 Liferaft marshalled clear	
10 **1ST PERSON DESCENDS** (liferaft No 5)	
10.1 Last person in liferaft No 5	
10.2 Liferaft marshalled clear	
11 **1ST PERSON DESCENDS** (liferaft No 6)	
11.1 Last person in liferaft No 6	
11.2 Liferaft marshalled clear	
12 **1ST PERSON DESCENDS** (liferaft No 7)	
12.1 Last person in liferaft No 7	
12.2 Liferaft marshalled clear	
13 **1ST PERSON DESCENDS** (liferaft No 8)	
13.1 Last person in liferaft No 8	
13.2 Liferaft marshalled clear	
Evacuation trial completed at hr . . . . . min . . . . . sec Total Time for Evacuation hr . . . . . min	

6.3 MEANS OF RESCUE

EVALUATION AND TEST REPORT

6.3.1 Submitted drawings, reports and documents
- 6.3.1.1 General data and specifications
- 6.3.1.2 Quality assurance
- 6.3.1.3 Visual inspection

6.3.2 Means of rescue – Marine evacuation systems
- 6.3.2.1 Visual inspection of means of rescue types
- 6.3.2.2 Means to ascend to the deck
  - 6.3.2.2.1 Visual inspection of means to ascend to the deck
  - 6.3.2.2.2 Handholds on inclined MESs
  - 6.3.2.2.3 Visual inspection of ladders (or equivalents)
- 6.3.2.3 Mechanical hoist
  - 6.3.2.3.1 Static proof load test of safety hoist
  - 6.3.2.3.2 Operational load test
  - 6.3.2.3.3 Turning in test
  - 6.3.2.3.4 Winch brake test
  - 6.3.2.3.5 Safety hoist recovery speed test
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6.3.3 Means of rescue – Davit launching system
- 6.3.3.1 Visual inspection of davit-launched means of rescue
- 6.3.3.2 Markings on davit-launched means of rescue
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  - 6.3.3.4.4 Strength test
- 6.3.3.5 Rigid means of rescue
  - 6.3.3.5.1 Construction of rigid means of rescue
  - 6.3.3.5.2 Strength of rigid means of rescue
- 6.3.3.6 Means of rescue launching appliance
  - 6.3.3.6.1 Static proof load test
  - 6.3.3.6.2 Operational load test
  - 6.3.3.6.3 Turning in test
  - 6.3.3.6.4 Winch brake test
  - 6.3.3.6.5 Means of rescue recovery speed test
  - 6.3.3.6.6 Hand operation test

6.3 MEANS OF RESCUE

EVALUATION AND TEST REPORT

Manufacturer	
System Type	
Serial Number	
Maximum Working Load	
Maximum Turning Moment	
Winch type	
Serial Number	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.1 Submitted drawings, reports and documents

Submitted drawings and documents			
Drawing No.	**Revision No. & date**	**Title of drawing**	**Status**

Submitted reports and documents			
Report/Document No.	**Revision No. & date**	**Title of report/document**	**Status**
		Maintenance Manual	
		Operations Manual	

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.1.1 General data and specifications		**Regulations: LSA Code IV/4.4, V/5.1; MSC.81(70)1/7.2.16**
General Information	MOR Dimensions	MOR Weight
Construction Material: Hull: _____ Canopy: _____ Fire retardancy documentation:_____ Inflated chambers:_____ MOR Inherent Buoyancy (Type App.) Material: _____ Weight: _____ Occupancy: Persons (82.5 kg each): _____ Additional rigid or inflatable buoyancy: _____ Release mechanism(s) (if applicable) 1 2 Manufacturer:_____ Type: _____ SWL: _____	Dimensions: LOA: _____ Breadth Maximum: _____ Depth to Sill: _____ Depth to Gunwale: _____ Moulded Breadth: _____ Moulded Depth: _____ (Insert diagram of hull for reference)	Design Weight: Unloaded: _____ Loose Equipment: _____ Persons: _____ Calculated Loaded Weight: Fully Equipped: _____ With Persons: _____ Weight As Tested: Fully Equipped: _____ Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.1.2 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of lifesaving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: Quality assurance Procedure: Quality assurance Manual: Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.1.3 Visual inspection	**Regulations:SOLAS III/26.4; LSA Code I/1.2.2.9; MSC/Circ.810-2.2, 2.4.2.1, 2.4.2.4, 2.4.2.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination. .1 Approval markings	The means of rescue should: Be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions;	Passed _____ Failed _____
	Markings are to be indelible;	Passed _____ Failed _____
	Be conspicuously marked with the maximum number of persons the means of rescue is permitted to take;	Passed _____ Failed _____
	Be conspicuously marked to prevent confusion with liferafts and, if applicable to a marine evacuation system, unless these also form part of the means of rescue; and	Passed _____ Failed _____
.2 Operating instructions	Be provided with brief instructions or diagrams clearly illustrating the use of the means of rescue.	Passed _____ Failed _____ Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.1 Visual inspection of means of rescue types		**Regulations: SOLAS III/26.4; LSA Code 1.2.2.9; MSC/Circ.810-2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
The means of rescue should be one of the following: .1 A marine evacuation system complying with the requirements of section 6.2 of the LSA Code providing a suitable floating platform, with a ladder or other means to ascend to the deck for able-bodied persons, and a mechanically powered means to safely hoist persons lying down. .2 A device complying with the requirements for davit-launched liferafts in paragraphs 4.1.3.1, 4.1.4.1, 4.1.5.1.1, and in the case of an inflatable device, 4.2.2, 4.2.2.1, 4.2.2.3, 4.2.2.4, 4.2.7, 4.2.8.1, 4.2.8.2 (if fitted) and 4.2.9.1, or in the case of a rigid device, 4.3.1, 4.3.2, 4.3.6.2, 4.3.6.3, 4.3.6.4, 4.3.6.6, 4.3.6.9, 4.3.6.10 and 4.3.7 of the LSA Code, to provide a suitable floating platform. The device should be used with a launching appliance, meeting the requirements of 6.1 or equivalent. A safety device should be fitted to prevent over stressing the launching appliance.	Is the MES Type Approved in accordance with Section 6.2. above? Is a suitable floating platform provided? Is a ladder or other means of ascending to the deck provided? Is a mechanical hoist provided? Is the device designed to comply with the requirements of a davit-launched liferaft? Is the Means of Rescue an inflatable device or rigid device?	Yes/No Yes/No Yes/No Yes/No Yes/No Inflatable/Rigid Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.2.1 Visual inspection of means to ascend to the deck		**Regulations: MSC/Circ.810 –2.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The MES is to be provided with means for able-bodied persons to ascend to the deck. In the case of a vertical MES, this can either be a ladder or by other means. For inclined MESs, this can be either by providing suitable handholds or by portable ladders with steps having an efficient non-slip surface. Visually inspect the appliance. Conduct measurements and verify clearance as required.	A means of ascending to the deck is to be provided and corresponds to the approved drawings. The amount of maintenance should be restricted to a minimum. Parts which require maintenance should be easily accessible and easily maintained.	Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations Means provided to ascend to the deck:

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.2.2 Handholds on Inclined MESs		**Regulations: MSC/Circ. 810 –2.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
Materials used for handholds are to be suitable for the intended purpose.	Are handholds fitted? The material and its means of attachment used for the handholds is to be of sufficient strength to accommodate the expected use.	Yes/No Passed _____ Failed _____ Comments/Observation

6.3.2.2.3 Visual inspection of ladders (or equivalents)		**Regulations: MSC/Circ. 810 –2.4.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The steps of the ladder (or its equivalent) should be suitable for the intended purpose.	The construction of the ladder and its means of attachment are to be of sufficient strength to accommodate the expected use.	Passed _____ Failed _____ Comments/Observation

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.1 Static proof load test of Safety Hoist		**Regulations: LSA Code 6.1.1.5 - 6.1.1.6; MSC.81(70) 1/8.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
For safety hoist and launching appliances, except winches, should be subjected to a static proof load of 2.2 times their maximum working load. With the load at the full outboard position, the load should be swung through an arc of approximately 10^0 to each side of vertical in the intended fore and aft plane. The test should be done first in the upright position, followed by tests simulating a shipboard condition of list of 20^0 both inboard and outboard.	The launching appliance and its attachments other than winches should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. There should be no evidence of significant deformation or other damage as a result of this test.	MWL: ..... kN Test load (2.2 x MWL): ..... kN There should be no evidence of significant deformation or other damage Passed/Failed Upright Passed/ Failed 20^0 inboard list Passed/ Failed 20^0 outboard list Passed/ Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.2 Operational load test		**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1/8.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For safety hoist a mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the upright position. The load should be moved from the full inboard to the full outboard position using the means of operation that is used on the ship. The test should be repeated with the launching appliance positioned to simulate a combined 20^0 inboard list and 10^0 trim. All the tests should be repeated with a mass equal to that of a fully equipped safety hoist, without persons, or the safety hoist intended for the use with the davit to ensure the satisfactory functioning of the davit under very light load conditions.	The appliance should successfully lower the load under all of the conditions, and there should be no evidence of significant deformation or other damage as a result of the tests. Each launching appliance together with all its lowering and recovery gear should be so arranged that the fully equipped safety hoist it serves can be safely lowered against a trim of up to 10^0 and a list of up to 20^0 either way: When boarded, as required by regulation III/23 or III/33, by its full complement of persons; and Without persons in the safety hoist.	Weight of the lightest safety hoist intended for use: LWL: ..... kN MWL: ..... kN Test load (1.1 x MWL) : ..... kN Clear of davit horn?* Passed/Failed Does the appliance successfully lower the load under these conditions without evidence of significant deformation or damage? Passed/Failed Upright (1.1x MWL) Passed/Failed 20^0 inboard list +10° trim (1.1xMWL)Passed/Failed 20^0 inboard list +10° trim (LWL) Passed/Failed Stored power Passed/Failed Start pressure: k Pa Min. pressure: k Pa Pressure drop after one movement: k Pa Time from inboard to outboard: sec Comments/Observations **if applicable*

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.3 Turning in test		**Regulations: LSA Code 6.1.1.3; MSC.81(70) 1/8.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the upright position. With the appliance in the full upright position the maximum design hoisting load should be moved from the full outboard to the full inboard position using the means of operation that is used on the ship.	The appliance should successfully move the maximum designed hoisting load from the outboard to the inboard position without causing permanent deformation or other damage.	maximum designed hoisting load: _____ kN Does the launching appliance successfully move the load from outboard to inboard? Passed/ Failed Does the launching appliance show any evidence of significant deformation or other damage as a result of this test? Passed/ Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.4 Winch brake test		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1/8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Winch drums should be wound to the maximum number of turns permitted and a static test load of 1.5 times the maximum working load should be applied and held by the brake. This load should then be lowered for at least one complete revolution of the barrel shaft. A test load of 1.1 times the maximum working load should then be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand brake sharply. This test should be repeated a number of times. If the winch design incorporates an exposed brake, one of these tests should be carried out with the brake wetted but in this case the stopping distance may be exceeded. The various tests should achieve a cumulative lowering distance of at least 150 m. Operation of the winch with a load of a mass equal to that of a fully equipped safety hoist, without persons, or the lightest safety hoist intended for use with the winch should also be demonstrated.	The test load should drop no more than 1 m when the brake is applied (except that the stopping distance may be exceeded if an exposed brake is wetted). The launching appliance should successfully lower a mass equal to that of a fully equipped safety hoist, without persons, or the lightest safety hoist intended for use with the winch. Inspection of the stripped winch should reveal no significant damage or undue wear.	Weight of the lightest safety hoist * : ..... kN MWL : …..... kN Test 1: Static test load (1.5 x MWL): ..... kN Does the brake test hold the test load (1.5x MWL)? Passed/Failed MWM: kNm Drum diam. mm Wire diam. mm Number of turns Max. lowering speed m/s Test 2 Dynamic Test load (1.1 x MWL): ……..... kN Brake test carried out after > 3m with max lowering speed Stop within 1 metre? Passed/Failed Comments/Observations * delete as appropriate continued

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.4 Winch brake test (continued)		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1/8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Following completion of these test (and 6.3.2.3.5 and 6.3.2.3.6), the winch should be stripped for inspection.		1st stop > 3m 2nd stop: m 3rd stop: m 4th stop: m 5th stop: m Total lowering distance > 150 m Passed/ Failed Test 3 (if applicable) Winch design incorporates an exposed brake? Yes / No Wet stopping distance m Passed/ Failed Test 4 Test load (LWL) kN Lowering test with LWL satisfactory? Passed/ Failed Does the inspection of the stripped winch reveal any significant damage or undue wear? Passed/ Failed Remarks:

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.5 Safety hoist recovery speed test		**Regulations: LSA Code 6.1.1.9; MSC.81(70) 1/8.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a winch intended for use with a safety hoist is capable of recovering the safety hoist with the number of persons for which it is to be approved and its equipment or an equivalent mass at a rate of not less than 0.3 m/s.	Each safety hoist launching appliance should be fitted with a powered winch motor capable of raising the safety hoist from the water with its full safety hoist complement of persons and equipment at a rate of not less than 0.3 m/s.	Hoisting load: Measured recovering speed of the safety hoist: _____m/s Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.2.3.6 Hand operation test		**Regulations: LSA Code 6.1.2.6; MSC.81(70) 1/8.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The hand operation of the winch should be demonstrated. If the winch is designed for quick recovery by hand with no load, this should be demonstrated with a load of 1.5 times the mass of the empty lifting arrangements.	An efficient hand gear should be provided for recovery of each safety hoist. Hand gear handles or wheels should not be rotated by moving parts of the winch when the safety hoist is being lowered or when it is being hoisted by power.	Hoisting load: Test 1: Test load (1 x hoisting load): winch can be operated satisfactorily by hand? Passed/ Failed Arrangement provided for protection against moving parts and rotating handles? Passed/ Failed Type: Test 2: Only for quick recovery Test load (1.5 x weight of empty lifting arrangement): kN Is quick recovery satisfactory? Passed/ Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.1 Visual inspection of davit-launched means of rescue (continued)	**Regulations: LSA Code - 1.2.2.9 MSC/Circular.810 -2.2, 2.4.2.1, 2.4.2.4, 2.4.2.9**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination.	The means of rescue should:	
.1 Approval markings	Be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions,	Passed _____ Failed _____
	Markings are to be indelible;	Passed _____ Failed _____
	Be conspicuously marked with the maximum number of persons the means of rescue is permitted to take;	Passed _____ Failed _____
.2 Operating instructions	Be conspicuously marked to prevent confusion with liferafts and, if applicable marine evacuation system, unless these form part of the means of rescue:	Passed _____ Failed _____
.3 Landing Area at water level	Be provided with brief instructions or diagrams clearly illustrating the use of the means of rescue:	Passed _____ Failed _____
.4 Colour	The means of rescue is to have at least $9m^2$ for receiving rescued persons:	Passed _____ Failed _____
.5 Protection	Be of a highly visible colour:	Passed _____ Failed _____
	Be protected against damage when moving against the ship's side;	Passed _____ Failed _____ N/A _____
	Offer protection to the rescued person from injury by the launching appliance;	Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.1 Visual inspection of davit-launched means of rescue (continued)	**Regulations: MSC/Circular.810 -2.4.2.1, 2.4.2.2, 2.4.2.5 to 2.4.2.8 & 2.4.2.11**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination (cont.)	The means of rescue should (cont.):	Passed _____ Failed _____
.5 Protection (cont.)	Prevent occupants from falling from the means of rescue should it come into contact with an object like the ship's side;	Passed _____ Failed _____
	Be arranged such that the rescued persons do not need to traverse any gaps between the means of rescue and the platform and/or the ship's deck:	Passed _____ Failed _____
.6 Self-draining floor	The floor is to be self-draining:	Passed _____ Failed _____
.7 Means provided for bowsing	Be provided with means of bowsing the means of rescue against the ship's side:	Passed _____ Failed _____ N/A _____
.8 Equipment	Be provided with one knife, in accordance with 4.1.5.1.2 of the LSA Code, at each bowsing point:	Passed _____ Failed _____ N/A _____
.9 Controls	The inflation system controls; if of an inflatable type, are to be manual controlled:	Passed _____ Failed _____ N/A _____
.10 Retro-reflective material	Be fitted with retro-reflective tape in accordance IMO Resolution A.658(16), annex 1, section 4.	Passed _____ Failed _____ N/A _____
.11 Boarding ramps	Be fitted with at least two boarding ramps.	

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.1 Visual inspection of davit-launched means of rescue (continued)	**Regulations: LSA Code – 4.1.3.1 and 4.1.5.1.1**	
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination (cont.) .12 Lifelines should be securely becketed around the inside and outside of the means of rescue. .13 A buoyant rescue quoit, attached to not less than 30m of buoyant line. .14 Means are to be provided such that the container of the means of rescue or parts of it are prevented from falling into the sea during inflation and/or launching of the means of rescue. .15 Every inflatable means of rescue is to be provided with at least one repair outfit for repairing punctures in buoyancy compartments. .16 Every inflatable means of rescue is to be provided with at least one topping-up pump or a pair of bellows.	The means of rescue should (cont.): Lifelines provided and securely fitted. A buoyant rescue quoit, attached to not less than 30m of buoyant line is provided. Fixing arrangements are provided which are of adequate strength. A puncture repair kit is provided. One topping-up pump or pair of bellows is provided.	Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.2 Markings on davit-launched means of rescue		**Regulations: LSA Code I/1.2 and 4.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The means of rescue should be marked with: Maker's name or trademark; Serial number; Name of approval authority and the capacity of the system; SOLAS; Date of manufacture (month and year); Date and place of last service; Maximum permitted height of stowage above waterline; and The maximum number of persons the means of rescue is permitted to accommodate. Launching and operating instructions should be marked on or in the vicinity of the container.	The means of rescue should be either packed in a container or stowed such that it is so constructed as to withstand hard wear under conditions encountered at sea and as far as practicable weathertight, except for drain holes in the container bottom. All instructions and markings to be indelible.	Makers name: _____ Serial No.: _____ Approval authority: _____ _____ Date of manufacture: _____ Date and place last serviced: _____ Maximum permitted height: _____ Maximum number of persons: _____ Launching & operating instructions acceptable? YES/NO _____ Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.3 Impact test		**Regulations: LSA Code IV/4.1.4.1.1; MSC.81(70) 5.16.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The liferaft should be loaded with a mass equal to the mass of the number of persons for which it is to be approved and its equipment. With the liferaft in a free hanging position it should be pulled laterally to a position so that when released it will strike a rigid vertical surface at a velocity of 3.5 m/s. The Means of Rescue should then be released to impact against the rigid vertical surface.	After this test the means of rescue should show no signs of damage which would affect its efficient functioning.	Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.4.1 Damage test of inflatable means of rescue		**Regulations: LSA Code IV/4.2.2.1; MSC.81(70) 5.17.1**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that, in the event of any one of the buoyancy compartments being damaged or failing to inflate, the intact compartment or compartments should support, with positive freeboard over the means of rescue's periphery, the number of persons for which the means of rescue is to be approved. This can be demonstrated with persons each having a mass of 82.5 kg and seated in their normal positions or by an equally distributed mass.	The intact compartments should support, with positive freeboard over the means of rescue's periphery, the number of persons for which the means of rescue is to be approved, with any one of the buoyancy compartments deflated. _____=> Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm	Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Compartment deflated: _____ Freeboards: 12 o'clock _____ mm 3 o'clock _____ mm 6 o'clock _____ mm 9 o'clock _____ mm Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.4.2 Inflation test		**Regulations: LSA Code IV/4.2.2.3; MSC.81(70) 5.17.3 to 5.17.6**
Test Procedure	Acceptance Criteria	Significant Test Data
An inflatable means of rescue, packed in each type of container, should be inflated by pulling the painter and the time recorded: .1 for it to become boardable, i.e. when buoyancy tubes are inflated to full shape and diameter. .2 for the cover to be erect; and .3 for the means of rescue to reach its full operational pressure when tested: .1 at an ambient temperature of between 18^{0}C and 20^{0}C; .2 at a temperature of -30^{0}C; and .3 at a temperature of +65^{0}C. For the inflation test at -30^{0}C the packed means of rescue should be kept at room temperature for at least 24 h, then placed in a refrigerated chamber at a temperature of –30^{0}C for 24 h prior to inflation by pulling the painter. Two means of rescue should be subject to an inflation test at this temperature. For the inflation test at +65^{0}C the packed means of rescue should be kept at room temperature for at least 24 h, then placed in a heating chamber at a temperature of +65^{0}C for not less than 7 h prior to inflation by pulling the painter. Force to pull out painter should be measured at ambient temperature.	When inflated in an ambient temperature of between 18^{0}C and 20^{0}C it should achieve total inflation in not more than 1 min. When inflated at -30^{0}C the means of rescue should reach working pressure in 3 min. There should be no seam slippage, cracking, or other defect in the means of rescue and it should be ready for use after the tests. When inflated at +65^{0}C the gas pressure relief valves must be of sufficient capacity to prevent damage to the means of rescue by excess pressure and to prevent the maximum pressure during the inflation from reaching twice the re-seat pressure of the release valve. There must be no seam slippage, cracking or other defect in the means of rescue. The force to pull out the painter should not be more than 150 N.	1) Force to pull the painter _____ N Inflation times: Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____ MPa 2) Cold temperature _____ ^{0}C Hours: _____ h Inflation times: Raft 1 Raft 2 Container open _____sec Boardable _____sec Relief valves: Upper open _____sec Lower open _____sec Lights int./ext. _____/_____sec Working Pressure _____ MPa 3) Hot temperature _____ ^{0}C Hours: _____ h Inflation times: Container open _____ sec Boardable _____ sec Relief valves: Upper open _____ sec Lower open _____ sec Lights int./ext. _____/_____sec Working Pressure _____ MPa Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.4.3 Pressure test		**Regulations: LSA Code IV/4.2.2.4; MSC.81(70) 5.17.7 to 5.17.8**
Test Procedure	Acceptance Criteria	Significant Test Data
Each inflatable compartment in the means of rescue should be tested to a pressure equal to three times the working pressure. Each pressure relief valve should be made inoperative, compressed air should be used to inflate the inflatable means of rescue and the inflation source removed. The test should continue for at least 30 min. The measurement of pressure drop due to leakage can be started when it has been assumed that compartment material has been completed stretching due to the inflation pressure and achieved equilibrium. The term "operational pressure" has the same meaning as the term "working pressure"; i.e. the pressure determined by the designed re-seat pressure of the relief valves, if fitted, except that, if the actual re-seat pressure of the relief valves, determined by testing, exceeds the designed re-seat pressure by more than 15%, the higher figure should be used.	The pressure should not decrease by more than 5% as determined without compensating for temperature and atmospheric pressure changes, and there should be no seam slippage, cracking or other defects in the means of rescue.	Design WP _____ Design temp _____ ^{0}C Design atmos. _____bar 3 times WP _____ Pressure drop after 30 min _____ The above should cover each compartments 1, 2 3, etc. Damage recorded: _____ Floor: Design pressure _____ Pressure drop after 1 hour _____ Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.4.4 Strength test		**Regulations: LSA Code IV/4.2.8.1.1; MSC.81(70) 5.17.10**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated by an overload test on the means of rescue hanging from its centre support that the bridle system has an adequate factor of safety as follows: .1 the liferaft should be placed in a temperature of 20±3^{0}C for a period of at least 6 h; .2 following this period of conditioning, the liferaft should be suspended from its lifting hook or bridle and the buoyancy chambers (not including an inflatable floor) inflated; .3 when fully inflated and when the relief valves have re-seated themselves, all relief valves should be made inoperative; .4 the liferaft should then be lowered and loaded with a distributed mass equivalent to four times the mass of the number of persons for which it is to be approved and its equipment, the mass of each person being taken as 82.5 kg. .5 the liferaft should then be raised and remain suspended for at least 5 min; .6 the pressure before and after the test after the weight is removed and while it remains suspended, should be recorded; and .7 any dimensional deflections or distortions of the liferaft should be recorded.	During the test and after its completion, the inflatable means of rescue should remain suitable for its intended use.	Conditioning: Temperature:_____^{0}C Time in temperature _____h Number of persons _____ Load _____kg Time suspended _____min Pressure before loading Pressure suspended/loaded Pressure after test after unloading Dimensional deflections or distortions: Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.5.1 Construction of rigid means of rescue		**Regulations: LSA Code IV/4.3.2**
Test Procedure	Acceptance Criteria	Significant Test Data
The buoyancy of the means of rescue should be provided by approved inherently buoyant material placed as near as possible to the periphery of the liferaft. The buoyant material should be fire-retardant or be protected by a fire-retardant covering. The floor of the means of rescue should prevent the ingress of water and should effectively support the occupants out of the water and insulate them from cold.	Material to be certified as being fire retardant. The rigid means of rescue is to prevent the ingress of water. The rigid means of rescue is to support the occupant out of the water.	Passed _____ Failed _____ Passed _____ Failed _____ Passed _____ Failed _____ Comments/Observations Passed _____ Failed _____

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.5.2 Strength of rigid means of rescue		**Regulations: LSA Code IV/4.3.7**
Test Procedure	Acceptance Criteria	Significant Test Data
In addition to the above requirements, a rigid liferaft for use with an approved launching appliance should, when suspended from its lifting hook or bridle, withstand a load of four times the mass of its full complement of persons and equipment.	The rigid means of rescue should no show any permanent damage from such a loading.	Passed _____ Failed _____ Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.1 Static proof load test		**Regulations: LSA Code 6.1.1.5 - 6.1.1.6; MSC.81(70) 1/8.1.1**
Test Procedure	Acceptance Criteria	Significant Test Data
For rigid means of rescue davits and launching appliances, except winches, should be subjected to a static proof load of 2.2 times their maximum working load. With the load at the full outboard position, the load should be swung through an arc of approximately 10^0 to each side of vertical in the intended fore and aft plane. The test should be done first in the upright position, followed by tests simulating a shipboard condition of list of 20^0 both inboard and outboard.	The launching appliance and its attachments other than winches should be of sufficient strength to withstand a static proof load on test of not less than 2.2 times the maximum working load. There should be no evidence of significant deformation or other damage as a result of this test.	MWL : ..... kN Test load (2.2 x MWL): ..... kN There should be no evidence of significant deformation or other damage Passed/Failed Upright Passed/Failed 20^0 inboard list Passed/Failed 20^0 outboard list Passed/Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.2 Operational load test		**Regulations: LSA Code 6.1.1.1 - 6.1.1.3; MSC.81(70) 1/8.1.2**
Test Procedure	Acceptance Criteria	Significant Test Data
For rigid means of rescue a mass equal to 1.1 times the maximum working load should be suspended from the lifting points with the launching appliance in the upright position. The load should be moved from the full inboard to the full outboard position using the means of operation that is used on the ship. The test should be repeated with the launching appliance positioned to simulate a combined 20^0 inboard list and 10^0 trim. All the tests should be repeated with a mass equal to that of a fully equipped lifeboat, without persons, or the lightest survival craft intended for the use with the davit to ensure the satisfactory functioning of the davit under very light load conditions. Note: Notwithstanding the 10^0 trim and 20^0 list requirements, lifeboat launching appliances for oil tankers, chemical tankers and gas carriers with a final angle of heel greater than 20^0 should be capable of operating at the final angle of heel on the lower side of the ship, taking into consideration the final damaged waterline of the ship.	The appliance should successfully lower the load under all of the conditions, and there should be no evidence of significant deformation or other damage as a result of the tests. Each launching appliance together with all its lowering and recovery gear should be so arranged that the fully equipped survival craft or rescue boat it serves can be safely lowered against a trim of up to 10^0 and a list of up to 20^0 either way: when boarded, as required by regulation III/23 or III/33, by its full complement of persons; and without persons in the survival craft or rescue boat. A launching appliance should not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition.	Weight of the means of rescue intended for use: LWL ..... kN MWL: ..... kN Test load (1.1 x MWL) : ..... kN Clear of davit horn?** Passed/ Failed Does the appliance successfully lower the load under these conditions without evidence of significant deformation or damage? Passed/Failed Upright (1.1x MWL) Passed/Failed 20^0 inboard list +10° trim (1.1xMWL) Passed/Failed 20^0 inboard list +10° trim (LWL) Passed/Failed Stored power Passed/Failed Start pressure: k Pa Min. pressure: k Pa Pressure drop after one movement: k Pa Time from inboard to outboard: sec Comments/Observations ** if applicable

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.3 Turning in test		**Regulations: LSA Code 6.1.1.3; MSC.81(70) 1/8.1.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A mass equal to 1.1 times the maximum working load should be suspended from the lfiting points with the launching appliance in the upright position. With the appliance in the full upright position the maximum design hoisting load should be moved from the full outboard to the full inboard position using the means of operation that is used on the ship.	The appliance should successfully move the maximum designed hoisting load from the outboard to the inboard position without causing permanent deformation or other damage.	maximum designed hoisting load: ..... kN Does the launching appliance successfully move the load from outboard to inboard? Passed/ Failed Does the launching appliance show any evidence of significant deformation or other damage as a result of this test? Passed/ Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.4 Winch brake test		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1/8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Winch drums should be wound to the maximum number of turns permitted and a static test load of 1.5 times the maximum working load should be applied and held by the brake. This load should then be lowered for at least one complete revolution of the barrel shaft. A test load of 1.1 times the maximum working load should then be lowered at maximum lowering speed through a distance of at least 3 m and stopped by applying the hand brake sharply. This test should be repeated a number of times. If the winch design incorporates an exposed brake, one of these tests should be carried out with the brake wetted but in this case the stopping distance may be exceeded. The various tests should achieve a cumulative lowering distance of at least 150 m. Operation of the winch with a load of a mass equal to that of a fully equipped safety hoist, without persons, or the lightest safety hoist intended for use with the winch should also be demonstrated.	The test load should drop no more than 1 m when the brake is applied (except that the stopping distance may be exceeded if an exposed brake is wetted). The launching appliance should successfully lower a mass equal to that of a fully equipped safety hoist, without persons, or the lightest safety hoist intended for use with the winch. Inspection of the stripped winch should reveal no significant damage or undue wear.	Weight of the lightest safety hoist : ..... kN MWL : ..... kN Test 1: Static test load (1.5 x MWL): ..... kN Does the brake test hold the test load (1.5x MWL)? Passed/Failed MWM: kNm Drum diam. mm Wire diam. mm Number of turns Max. lowering speed m/s Test 2 Dynamic Test load (1.1 x MWL): ……..... kN Brake test carried out after > 3m with max lowering speed Stop within 1 metre? Passed/Failed *continued*

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.4 Winch brake test (continued)		**Regulations: LSA Code 6.1.2.5; MSC.81(70) 1/8.1.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Following completion of these test (and 6.3.3.6.5 and 6.3.3.6.6), the winch should be stripped for inspection.		1st stop > 3m 2nd stop: m 3rd stop: m 4th stop: m 5th stop: m Total lowering distance > 150 m Passed/Failed Test 3 (if applicable) Winch design incorporates an exposed brake? Yes/No Wet stopping distance m Passed/Failed Test 4 Test load (LWL) kN Lowering test with LWL satisfactory? Passed/ Failed Does the inspection of the stripped winch reveal any significant damage or undue wear? Passed/Failed Comments/Observations

Means of rescue	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

6.3.3.6.5 Means of rescue recovery speed test		**Regulations: LSA Code 6.1.1.9; MSC.81(70) 1/8.1.5**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be demonstrated that a winch intended for use with a means of rescue is capable of recovering the means of rescue with the number of persons for which it is to be approved and its equipment or an equivalent mass at a rate of not less than 0.3 m/s.	Each means of rescue launching appliance should be fitted with a powered winch motor capable of raising the means of rescue from the water with its full complement of persons and equipment at a rate of not less than 0.3 m/s.	Hoisting load: Measured recovering speed of the boat: m/s Comments/Observations
6.3.3.6.6 Hand operation test		**Regulations: LSA Code 6.1.2.6; MSC.81(70) 1/8.1.6**
Test Procedure	Acceptance Criteria	Significant Test Data
The hand operation of the winch should be demonstrated. If the winch is designed for quick recovery by hand with no load, this should be demonstrated with a load of 1.5 times the mass of the empty lifting arrangements.	An efficient hand gear should be provided for recovery of each means of rescue. Hand gear handles or wheels should not be rotated by moving parts of the winch when the means of rescue is being lowered or when it is being hoisted by power.	Hoisting load: Test 1: Test load (1 x hoisting load): winch can be operated satisfactorily by hand? Passed/Failed Arrangement provided for protection against moving parts and rotating handles? Passed/Failed. Type: Test 2: Only for quick recovery Test load (1.5 x weight of empty lifting arrangement): kN Is quick recovery satisfactory? Passed/Failed Comments/Observations

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MSC.1/Circ.1633
14 December 2020

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (OTHER LIFE-SAVING APPLIANCES)

1 The Maritime Safety Committee, at its 102nd session (4 to 11 November 2020), approved the *Revised standardized life-saving appliance evaluation and test report forms*.

2 The original forms, as set forth in the *Standardized life-saving appliance evaluation and test report forms* (MSC/Circ.980) and its addenda, were developed on the basis of the requirements of the International Life-Saving Appliance (LSA) Code and the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)) by the Maritime Safety Committee, at its seventy-third session in 2001, with a view to providing guidance on how to conduct tests, record test data and verify tests. The Committee has since adopted seven amendments to the LSA Code and eight amendments to resolution MSC.81(70). These amendments have been incorporated in the original forms which, due to their volume, are now presented in six separate circulars, i.e. MSC.1/Circ.1628, MSC.1/Circ.1629, MSC.1/Circ.1630, MSC.1/Circ.1631, MSC.1/Circ.1632 and MSC.1/Circ.1633, pertaining to the equipment addressed in chapters II to VII of the LSA Code, respectively. The forms annexed to this circular apply to the equipment addressed in chapter VII of the LSA Code, i.e. other life-saving appliances (line-throwing appliances).

3 The use of the revised forms will continue to be of benefit to Administrations and other parties, such as manufacturers, test facilities, owners and surveyors, and will be a major help in mutually accepting the type approval of appliances approved by other Administrations.

4 Member Governments are invited to bring the annexed, revised forms to the attention of all parties concerned with approving, manufacturing and testing life-saving appliances and to encourage them to use the forms.

5 This circular supersedes MSC/Circ.980.

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ANNEX

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (OTHER LIFE-SAVING APPLIANCES)

INTRODUCTION

Reference

These standardized life-saving appliance evaluation and test report forms have been revised on the basis of the requirements of the International Life-Saving Appliance (LSA) Code, as amended through resolution MSC.425(98), the *Revised recommendation on testing of life-saving appliances* (resolution MSC.81(70)), as amended through resolution MSC.427(98), and the *Recommendation on means of rescue on ro-ro passenger ships* (MSC/Circ.810).

Status

In general, the tests described in the Revised Recommendation (resolution MSC.81(70)) constitute the test procedures and the LSA Code sets the acceptance criteria. The evaluation and test report forms are guidelines on how to conduct tests, record test data and verify tests. These forms are not intended to change the standards given in the LSA Code and the Revised Recommendation, as amended. In the case of inconsistency between the forms and the LSA Code or the Revised Recommendation, the text of the Code/resolution should prevail over that of the forms.

Layout

Each Administration may use electronically distributed evaluation and test report forms as the basis for customising the layout to reflect the profile of the approving body, without changing the original contents.

Internal references

The evaluation and test report forms should be stand-alone documents. Therefore, all internal references in the original text from the LSA Code or the Revised Recommendation have been replaced by either the full-length text or a reference to other relevant evaluation and test report forms. However, in some of the forms, external references are kept for updating purposes.

Documentation of tests

For approval purposes, all detailed records of test data are to be enclosed with the report forms.

Verification of tests

Each test is to be verified passed or failed by an Administration representative's initials (e.g. recognized organization or surveyor) and date of testing. Each page is to be verified on completion by the Administration representative's signature and its date of completion.

Reporting of type approval

To facilitate unified reporting procedures, the completed evaluation and test report forms are to be seen as a documented verification of required type approval tests for each type of equipment. When documentation of type approval is required by a third party, the verified evaluation and test report forms should constitute the complete documentation of the type approval together with the relevant approval certificates.

REVISED STANDARDIZED LIFE-SAVING APPLIANCE EVALUATION AND TEST REPORT FORMS (OTHER LIFE-SAVING APPLIANCES)

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7.1 LINE-THROWING APPLIANCES

EVALUATION AND TEST REPORT

Manufacturer	
Type	
Date	
Place	
Name Surveyor printed	
Signature	
Approving Organization	

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.1 Submitted drawings, reports and documents

Submitted drawings and documents			**Status**
Drawing No.	**Revision No. & date**	**Title of drawing**	

Submitted reports and documents			**Status**
Report/Document No.	**Revision No. & Date**	**Title of report/document**	
		Maintenance Manual -	
		Operations Manual -	

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.1.1 Quality assurance	**Regulations: MSC.81(70) 2/1.1, 1.2**
Except where all appliances of a particular type are required by chapter III of the International Convention for the Safety of Life at Sea, 1974, as amended, or the International Life-Saving Appliance (LSA) Code, to be inspected, representatives of the Administration should make random inspections of manufacturers to ensure that the quality of life-saving appliances and materials used comply with the specification of the approved prototype life-saving appliance. Manufacturers should be required to institute a quality control procedure to ensure that life-saving appliances are produced to the same standard as the prototype life-saving appliance approved by the Administration and to keep records of any production tests carried out in accordance with the Administration's instructions.	Quality assurance Standard Used: _____ Quality assurance Procedure: _____ Quality assurance Manual:_____ Description of System: Quality assurance System acceptable Yes/No Comments/Observations

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.1.2 Visual inspection		**Regulations: LSA Code Chapter I/1.2 and MSC.81(70) 1/ 9.4**
Test Procedure	Acceptance Criteria	Significant Test Data
Visual examination:	Line-Throwing Appliance should:	
Approval markings	Be clearly marked with approval information including the Administration which approved it, date of manufacture and expiry and operational restrictions, markings are to be indelible;	Passed _____ Failed _____
Operating instructions	Be provided with clear and precise instructions or diagrams printed on the casing clearly illustrating the use of the line-throwing appliance;	Passed _____ Failed _____
Outer casing	Be so designed as not to cause discomfort to the person holding the casing when used in accordance with the manufacturer's instructions; does not depend on adhesive tapes or plastic envelopes for its water-resistant properties;	Passed _____ Failed _____
Comfort	Be so constructed that the end from which the rocket is ejected can be positively identified by day or night and be capable of throwing a line with reasonable accuracy;	Passed _____ Failed _____
Ignition System	be in the case of a pistol-fired rocket, or the assembly, in the case of an integral rocket and line, contained in a water-resistant casing. In addition, in the case of a pistol-fired rocket, the line and rockets together with the means of ignition should be stowed in a container, which provides protection from the weather.	Comments/Observations

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.1.3 General Data and Specifications	**Regulations: LSA Code 1.2; MSC.81(70) 1 /9.1**	
General Information	Line-Thrower Dimensions	Line-Thrower Weight
Construction Material: Rocket Casing:_____ Outer Casing (If applicable): _____ Line Material:	Dimensions: Length of Rocket: _____ Diameter of Rocket: _____ Length of Line: _____ Number of Strands:_____ Diameter of Line: _____	Design Weight: Rocket: _____ Weight as Tested: Fully Equipped: _____ Comments/Observations

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS CONDITIONING SEQUENCE	**SPECIMEN NUMBER**								**REFERENCES**	**REMARKS**
Specimen No. >>	1-3	4	5	6	7-9	10-12	13-15	16	**MSC.81(70)**	
Measuring dimensions and mass	A	A	A	A	A	A	A	A	LSA Code 1.2	
Temp cycling test (7.1.2)	B								1.2.1, 4.2.1	
Low temp cond. (7.1.3)		B							9.5, 4.2.2	
High temp cond. (7.1.4)			B						9.5, 4.2.3	
Humidity conditioning (7.1.5)				B					9.5, 4.2.4	
1 m for 24 hours (7.1.6.1)					B				9.1, 4.3.1	
Salt water spray (7.6.1.2)						B			9.1, 4.3.3	
Drop test (7.1.7.1)							B		9.5, 4.4.1	
Safety inspection (7.1.10)	C	C	C	C	C	C	C	C	9.1, 4.5.1, 4.5.5, 4.5.6	
Visual inspection (7.1.1.2)	C	C	C	C	C	C	C	C	9.4	
Operation at ambient temp.	D				D	D	D		9.5, 1.2.1, 4.2, 1.9.1,4.3.1, 4.3.3, 4.4.1	
Operate at conditioning temp.		D	D	D					9.5, 4.2.2, 4.2.3,.4.2.4	

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

TEST ITEMS CONDITIONING SEQUENCE	**SPECIMEN NUMBER**								**REFERENCES**	**REMARKS**
Specimen No. >>	1-3	4	5	6	7 - 9	10-12	13-15	16	**MSC.81(70)**	
Operational test using immersion suit (7.1.7.2)							E		9.1, 4.4.2	May be carried out with any specimen and the number recorded on the test sheet.
Function test Line firing	E	E	E	E	E	E	E	E	9.2	
Double charge firing test (7.1.8)								F	9.2	
Line tensile test (7.1.9)		G	G	G					9.3	May be carried out by an independent laboratory acceptable to the Administration and report submitted.

Note: The letters in the above 'boxes' refer to the sequence of testing of each specimen Line-Throwing Appliance Projectile.

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.2 Temperature cycling test		**Regulations: LSA Code 1.2 and 7.1; MSC.81(70) 1/9.5 & 4.2.1**
Test Procedure	Acceptance Criteria	Significant Test Data
The three specimens of projectiles should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable: .1 an 8 h exposure at a minimum temperature of +65°C to be completed in 1 day; and .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day; .3 an exposure at a maximum temperature of -30°C to be completed the next day; and .4 the specimen removed from the cold chamber that same day and left exposed under ordinary room conditions at a temperature of 20°C ± 3°C until the next day. The three projectiles should be fired connected to a line and should then function effectively.	Each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical properties. The projectiles should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	1 | 2 | 3 Condition after conditioning (Pass/Fail) | | | Distance travelled by line (metres) | | | Lateral deflection (%) | | | Comments/Observations Passed_____ Failed_____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.3 Low temperature conditioning test		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.5 & 4.2.2**
Test Procedure	Acceptance Criteria	Significant Test Data
A line-throwing appliance unit, consisting of projectiles, firing system and line should be subject to a temperature of -30°C for at least 48 h. and should then function effectively at that temperature.	The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The specimen should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	Specimen 4 Condition after conditioning (Pass/Fail) Distance travelled by line (metres)_____ Lateral deflection (%)_____ Comments/Observations Passed _____ Failed _____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.4 High temperature conditioning test		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.5 & 4.2.3**
Test Procedure	Acceptance Criteria	Significant Test Data
A line-throwing appliance unit consisting of projectiles, firing system and line should be subject to a temperature of +65°C for at least 48 h. The specimens should function effectively at that temperature.	The specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The specimen should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	Specimen 5 Condition after conditioning (Pass/Fail) Distance travelled by line (metres)_____ Lateral deflection (%)_____ Comments/Observations Passed_____ Failed _____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.5 Humidity conditioning		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.5 & 4.2.4**
Test Procedure	Acceptance Criteria	Significant Test Data
One individual line-throwing appliance unit consisting of projectiles, firing system and line should subjected to a temperature of +65°C and 90% relative humidity for at least 96 h, followed by 10 days at 20°C to 25°C at 65% relative humidity and should then function effectively at that temperature. The specimen should be fired connected to a line.	The specimen of line thrower should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The specimen should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	Specimen 6 Condition after conditioning (Pass/Fail) Distance travelled by line (metres)_____ Lateral deflection (%)_____ Comments/Observations Passed_____ Failed _____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.6.1 1 m immersion for 24 hours test — **Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.1 & 4.3.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three rockets used in the line-throwing appliance units, should be immersed horizontally for 24 h under 1 m of water. The specimens should be fired connected to a line and should function efficiently at that temperature.	The three specimens should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The three specimens should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	7	8	9
		Condition after conditioning (Pass/Fail)		
		Distance travelled by line (metres)		
		Lateral deflection (%)		
		Comments/Observations		
		Passed_____	Failed _____	

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.6.2 Salt spray test — **Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.1 & 4.3.3**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three rockets used in line-throwing appliance units, should be subjected to a salt spray (5% natrium chloride solution) at a temperature of +35±3°C for at least 100 h. The specimens should be fired connected to a line and should function correctly at ambient temperature. Note: Natrium and sodium are the same compound.	The three specimens should be inspected after the test, each specimen should show no sign of damage such as shrinking, cracking, swelling, dissolution or change of mechanical qualities. The three specimens should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	10	11	12
		Condition after conditioning (Pass/Fail)		
		Distance travelled by line (metres)		
		Lateral deflection (%)		
		Comments/Observations Passed_____ Failed _____		

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.7.1 2 m drop test — **Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.1 & 4.4.1**

Test Procedure	Acceptance Criteria	Significant Test Data		
Three line-throwing appliances rockets should be dropped in turn end-on and horizontally from a height of 2 m on to a steel plate about 6 mm thick cemented on to a concrete floor. The specimens should be fired connected to a line.	The three specimens should remain in a safe condition after the drop test and should show no sign of damage such as cracking, swelling, dissolution or change of mechanical qualities. The three specimens should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	13	14	15
		Condition after conditioning (Pass/Fail)		
		Distance travelled by line (metres)		
		Lateral deflection (%)		
		Comments/Observations Passed_____ Failed _____		

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.7.2 Immersion suit glove test — **Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.1 & 4.4.2**

Test Procedure	Acceptance Criteria	Significant Test Data		
		13	14	15
Three specimens of line-throwing appliance rockets should be activated in accordance with the manufacturer's operating instructions by an operator wearing an insulated buoyant immersion suit or the gloves taken from an insulated buoyant immersion suit. The specimens should be fired connected to a line.	The three specimens should be capable of being operated effectively without injury to the operator, or any person in close proximity during firing. The three specimens should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	Condition after conditioning (Pass/Fail)		
		Distance travelled by line (metres)		
		Lateral deflection (%)		
		Operation using immersion suit glove (Pass/fail)		
		Comments/Observations		
		Passed_____ Failed _____		

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.8 Double charge test		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.2**
Test Procedure	Acceptance Criteria	Significant Test Data
If the line-throwing appliance projectile is fired using an explosive charge, then one of the projectiles should be fired using double the normal charge. The specimen should be fired connected to a line.	The launcher should remain in a safe condition after the double charge test. This test should establish that it can be operated with a double charge effectively without injury to the operator, or any person in close proximity during firing or burning. The specimen should carry the line at least 230 m in calm conditions. The lateral deflection from the line of firing should not exceed 10% of the length of flight of the projectile.	Specimen 16 Normal weight of charge (grams)_____ Double weight of charge (grams) _____ Double charge test (Pass/Fail) Launcher remaining in safe condition after double charge test (Pass/Fail) Distance travelled by line (metres)_____ Lateral deflection (%) _____ Comments/Observations Passed_____ Failed _____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.9 Line tensile test		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 9.3**
Test Procedure	Acceptance Criteria	Significant Test Data
The fired lines from specimen 4, 5 and 6 with a knot in the middle of the test length should be subjected to a tensile test.	The line should have a breaking strain of not less than 2 kN.	Line manufacturer Diameter of line_____mm Number of strands _____ Breaking strain_____kN. Line acceptable (Pass/Fail) Comments/Observations Passed_____Failed _____

Line-throwing appliances	Manufacturer: _____ Model: _____ Lot/Serial Number: _____	Date: _____ Time: _____ Surveyor: _____ Organization: _____

7.1.10 Safety inspection		**Regulations: LSA Code 1.2 & 7.1; MSC.81(70) 1/ 4.5.1, 4.5.5 & 4.5.6**
Test Procedure	Acceptance Criteria	Significant Test Data
It should be established by visual inspection that the line-throwing appliance: .1 is indelibly marked with clear and precise instructions on how it should be operated and that the danger end can be identified by day or night; .2 does not depend on adhesive tapes or plastic envelopes for its water-resistant properties; and .3 can be indelibly marked with means of determining its age.	Clear and precise operating instructions are marked on the line-throwing appliance clearly identifies the danger end. Adhesive tapes or plastic envelopes are not used to maintain water-resistant properties. Date of manufacturing and date of expiry indelible printed on the outside.	Markings and identification of ends acceptable. (Pass/Fail) _____ Water resistant without the use of envelopes or adhesive tape. (Pass/Fail) _____ Line-throwing appliance rocket and striker unit indelible date stamped. (Pass/Fail) _____ Comments/Observation Passed _____ Failed _____

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