

Guideline No.: L-03(202109)



L-03

INFLATABLE LIFERAFTS

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Foreword

CCS Product Inspection and Testing Guideline (hereinafter referred to as this Guideline) contains the technical requirements, inspection and testing criteria related to classification and statutory survey of marine products to be applied for CCS approval/inspection.

This Guideline frees the users to adopt other test methods and requirements which are equivalent to or are stricter than this Guideline.

This Guideline is published and updated by CCS, and is released at <http://www.ccs.org.cn>. Your comments or suggestions are welcomed and may be sent to our email addressed mp@ccs.org.cn.

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Main changes:

1. 1.2.1 (5) is changed to: IMO Resolution MSC.481(102) Revised Recommendation on the Use and Fitting of Retro-reflective Materials on Life-saving Appliances;

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INFLATABLE LIFERAFTS

1 Application

1.1 This Guideline applies to the approval and inspection of the liferafts provided onboard ships engaged on international voyages and as required in the International Code of Safety for High-speed Craft, 2000.

2 Normative references

2.1 For the purpose of this Guideline, the following documents apply:

- (1) Chapter III of the International Convention for the Safety of Life at Sea, 1974;
- (2) MSC.48(66), Chapters I and IV of the International Life-saving Appliances Code (LSA Code), and MSC.218(82), MSC.293(87);
- (3) MSC.97(73), Annex 11 of the International Code of Safety for High-speed Craft, (2000);
- (4) MSC.81(70), Recommendation on Testing of Life-saving Appliances, and MSC.226(82), MSC.295(87), MSC.323(89);
- (5) IMO RESOLUTION MSC.481(102) REVISED RECOMMENDATION ON THE USE AND FITTING OF RETRO-REFLECTIVE MATERIALS ON LIFE-SAVING APPLIANCES;
- (6) IMO Resolution A.760(18), Symbols Related to Life-saving Appliances and Arrangements, and any subsequent amendments.

3 Definitions

3.1 Open reversible inflatable liferaft means an inflatable liferaft as required in Annex 11 of the International Code of Safety for High-speed Craft, 2000, which is not a SOLAS liferaft.

3.2 Canopied reversible inflatable liferaft means a canopied reversible liferaft which is substitutable for a self-righting inflatable liferaft complying with the International Convention for the Safety of Life at Sea, 1974 and its amendments as well as the International Life-saving Appliances Code.

4 Plans and documents

4.1 The following documents are to be submitted to CCS for approval when applying for products approval:

- (1) structural plan;
- (2) arrangement plan;
- (3) inflation system plan;
- (4) construction plan of main valves (relief valves, inlet valves, safety valves, platform non-return valves, canopy pillar non-return valves, exhaust valves);
- (5) technical specifications (or manufacturer's standards) of the product
- (6) calculations: volume of main buoyancy tubes, raft bottom area, water pockets capacity, freeboard, stability, inflation system volume, lifting system strength;
- (7) type test program.

4.2 The following documents are to be submitted to CCS for information when applying for products approval:

- (1) structural plan of vessels and technical requirements (or to submit approval certificate);
- (2) material technical requirements and acceptance or test methods;
- (3) manufacturing techniques(The specific adhesive bonding techniques should be included);
- (4) acceptance procedures of and requirements for product survey (relevant tables of records);
- (5) a list of attachments;
- (6) instruction manual;
- (7) a list of suppliers.

5 Materials and components

5.1 Materials and components are to comply with relevant requirements of CCS Rules.

5.2 The body of the life boat, or the floating tire, should not be manufactured at a different location without approval.

6 Design and technical requirements

6.1 The design and manufacturing of the liferafts are to at least comply with the applicable requirements of 2.1(1), (2), (3), (4) and (5) of this Guideline.

7 Type test

7.1 Selection of samples

7.1.1 In type approval, each type and model of the liferafts is to be selected for type test.

7.2 Type test items

7.2.1 The test items of inflatable liferaft, davit-launched liferaft, self-righting liferaft and canopied reversible liferaft, and the corresponding technical requirements and test methods are given in Table 7.2.1.

Table 7.2.1

No.	Test items	Technical requirements and test methods
1	Drop test	Paragraph 5.1, PART 1 of MSC.81(70) and Paragraph 4.1.5.1.5, Chapter IV, Annex of MSC.48(66)
2	Jump test	Paragraph 5.2, PART 1 of MSC.81(70), and MSC.295(87)
3	Weight test	Paragraph 5.3, PART 1 of MSC.81(70)
4	Towing test	Paragraph 5.4, PART 1 of MSC.81(70) and Paragraph 4.1.5.1.5, Chapter IV, Annex of MSC.48(66), and MSC.295(87)
5	Mooring test	Paragraph 5.5, PART 1 of MSC.81(70) and Paragraph 4.1.1.1, Chapter IV, Annex of MSC.48(66), and MSC.295(87)
6	Liferaft painter system test	Paragraph 5.6, PART 1 of MSC.81(70)
7	Loading and seating test	Paragraph 5.7, PART 1 of MSC.81(70), and MSC.295(87)
8	Boarding and closing arrangement test	Paragraph 5.8, PART 1 of MSC.81(70)
9	Stability test	Paragraph 5.9, PART 1 of MSC.81(70), and MSC.295(87)
10	Maneuverability test	Paragraph 5.10, PART 1 of MSC.81(70), and MSC.295(87)
11	Swamp test	Paragraph 5.11, PART 1 of MSC.81(70), MSC.295(87) and MSC.323(89)
12	Canopy closure test	Paragraph 5.12, PART 1 of MSC.81(70), and MSC.226(82)

Continued Table 7.2.1

No.	Test items	Technical requirements and test methods
13	Buoyancy of float-free liferafts	Paragraph 5.13, PART 1 of MSC.81(70)
14	Detailed inspection	Paragraph 5.14, PART 1 of MSC.81(70)
15	Weak link test	Paragraph 5.15, PART 1 of MSC.81(70) and Paragraph 4.1.6.2, Chapter IV, Annex of MSC.48(66)
16.1	● Lifting component strength test	Paragraph 5.16.1, PART 1 of Resolution MSC.81(70), and MSC.295(87)
16.2	● Impact test	Paragraph 5.16.2, PART 1 of MSC.81(70), and MSC.295(87)
16.3	● Drop test	Paragraph 5.16.3, PART 1 of MSC.81(70), and MSC.295(87)
16.4	● Davit-launched liferaft boarding test	Paragraph 5.16.4, PART 1 of MSC.81(70), and MSC.295(87)
17	Additional tests	
17.1	Damage test	Paragraph 5.17.1, PART 1 of MSC.81(70), and MSC.295(87)
17.2	*Righting test	Paragraph 5.17.2, PART 1 of MSC.81(70), and MSC.295(87)
17.3	Inflation test	
17.3.1	*Normal temperature inflation test	Paragraphs 5.17.3 and 5.17.4, PART 1; Paragraph 5.1.2, PART 2 of MSC.81(70)
17.3.2	Low temperature inflation test	Paragraphs 5.17.3 and 5.17.5, PART 1 of MSC.81(70)
17.3.3	High temperature inflation test	Paragraphs 5.17.3 and 5.17.6, PART 1 of MSC.81(70)
17.3.4	Test of three times working pressure	Paragraphs 5.17.7, 5.17.8, PART 1 of MSC.81(70), and paragraph 15 of MSC.226(82)
17.3.5	Seam strength test	Paragraphs 5.17.9.1 and 5.17.9.2, PART 1 of MSC.81(70), and MSC.323(89)
17.4	● Overload suspension test	Paragraph 5.17.10, PART 1 of MSC.81(70), and MSC.295(87)
17.5	● Low temperature suspension test	Paragraph 5.17.11, PART 1 of MSC.81(70), and MSC.295(87)
17.6	● Simulated lowering test	Paragraph 5.17.12, PART 1 of MSC.81(70), and MSC.295(87)
17.7	Material test	Paragraph 5.17.13, PART 1 of MSC.81(70), paragraph 16 and 17 of MSC.226(82), MSC.323(89) (This test should comply with the addendum, "Technical Specification for Rubber Fabric")
18	*Righting tests (additional tests applicable to automatically self-righting liferafts only)	Paragraph 5.18.2, PART 1 of MSC.81(70) (not applicable to canopied reversible liferaft)
19	*Submergence test (additional tests for automatically self-righting and canopied reversible liferafts)	Paragraph 5.19, PART 1 of MSC.81(70)
20	Wind velocity test	Paragraph 5.20, PART 1 of MSC.81(70)
21	*Self-draining test (additional tests for automatically self-righting and canopied reversible liferafts)	Paragraph 5.21, PART 1 of MSC.81(70)
22	Dimension inspection	Paragraph 5.1.3, PART 2 of MSC.81(70)
23	Test of twice working pressure and relief valve sensitivity	Paragraphs 5.1.4 and 5.1.7, PART 2 of MSC.81(70)

Continued Table 7.2.1

No.	Test items	Technical requirements and test methods
24	Gas-tightness inspection	Paragraphs 5.1.5 and 5.1.6, PART 2 of MSC.81(70)
25	• Normal temperature suspension test	Paragraph 5.2, PART 2 of MSC.81(70), and MSC.295(87)
26	Boarding ramp strength test	Paragraph 4.2.4.1, Chapter IV of MSC.48(66), and paragraph 11 of MSC.218(82)
27	Water pockets test	Paragraph 4.2.5.4, Chapter IV of MSC.48(66)
28	Inflation system test	Paragraph 4.2.2.3, Chapter IV of MSC.48(66) and paragraph 10 of MSC.218(82)
29	Visual inspection	Paragraph 4.2, Chapter IV of MSC.48(66) and paragraphs 9, 12 of MSC.218(82)

Note: “•” indicates additional tests for davit-launched liferafts;

“*” indicates additional tests for automatically self-righting liferafts (or inclusive).

7.2.2 The test items of open reversible inflatable liferafts, and the corresponding technical requirements and test methods are given in Table 7.2.2.

Table 7.2.2

No.	Test items	Technical requirements and test methods
1	Drop test	Paragraph 5.1, PART 1 of MSC.81(70); Paragraph 2.1, Annex 10 of Resolution MSC.36(63)
2	Jump test	Paragraph 5.2, PART 1 of MSC.81(70); Paragraph 2.2, Annex 10 of Resolution MSC.36(63)
3	Weight test	Paragraph 5.3, PART 1 of MSC.81(70)
4	Towing test	Paragraph 5.3, PART 1 of MSC.81(70); Paragraph 2.3, Annex 10 of Resolution MSC.36(63); MSC.295(87)
5	Liferaft painter system test	Paragraph 5.6, PART 1 of MSC.81(70); Paragraph 3.3, Annex 10, Resolution MSC.36(63)
6	Loading and seating test	Paragraph 5.7, PART 1 of MSC.81(70); MSC.295(87)
7	Boarding test	Paragraph 5.8, PART 1 of MSC.81(70); Paragraphs 2.4 and 3.4, Annex 10 of MSC.36(63)
8	Stability test	Paragraph 5.9, PART 1 of MSC.81(70); MSC.295(87)
9	Maneuverability test	Paragraph 5.10, PART 1 of MSC.81(70); MSC.295(87)
10	Swamp test	Paragraph 5.11, PART 1 of MSC.81(70); MSC.295(87) and MSC.323(89)
11	Buoyancy of float-free liferafts	Paragraph 5.13, PART 1 of MSC.81(70)
12	Detailed inspection Visual and dimensional inspection	Paragraph 5.14, PART 1 of MSC.81(70); Paragraphs 2.9 and 2.10, Annex 10 of Resolution MSC.36(63)
13	Weak link test	Paragraph 5.15, PART 1 of MSC.81(70); Paragraph 4.1.6.2, Chapter IV of MSC.48(66)

Continued Table 7.2.2

No.	Test items	Technical requirements and test methods
14	Damage test	Paragraph 5.17.1, PART 1 of MSC.81(70); MSC.295(87); Paragraph 2.5, Annex 10 of Resolution MSC.36(63)
15	Normal temperature inflation test	Paragraphs 5.17.3 and 5.17.4, PART 1 of MSC.81(70); Paragraph 2.7, Annex 10 of Resolution MSC.36(63)
16	Low temperature inflation test	Paragraphs 5.17.3 and 5.17.5, PART 1 of MSC.81(70); Paragraph 2.7, Annex 10 of Resolution MSC.36(63)
17	High temperature inflation test	Paragraphs 5.17.3 and 5.17.6, PART 1 of MSC.81(70); Paragraphs 1.1.3 and 2.8, Annex 10 of Resolution MSC.36(63)
18	Test of 3 times working pressure	Paragraphs 5.17.7 and 5.17.8, PART 1 of MSC.81(70); Paragraph 15 of MSC.226(82); Paragraph 2.8, Annex 10 of Resolution MSC.36(63)
19	Seam strength test	Paragraphs 5.17.9.1 and 5.17.9.2, PART 1 of MSC.81(70); MSC.323(89)
20	Material test	Paragraph 5.17.13, PART 1 of MSC.81(70); Paragraphs 16 and 17 of MSC.226(82); MSC.323(89) (This test should comply with the addendum, "Technical Specification for Rubber Fabric")
21	Water-proof test of liferaft floor	Paragraph 2.6, Annex 10 of Resolution MSC.36(63)
22	Self-draining test	Paragraph 5.21, PART 1 of MSC.81(70); Paragraph 3.7, Annex 10 of Resolution MSC.36(63)
23	Water pockets test	Paragraph 3.5, Annex 10 of Resolution MSC.36(63)
24	Floating test of attachments	Paragraph 3.10, Annex 10 of Resolution MSC.36(63)
25	Boarding ramp strength test	Paragraph 4.2.4.1, Chapter IV of MSC.48(66); Paragraph 3.4, Annex 10 of Resolution MSC.36(63); Paragraph 11 of MSC.218(82)
26	Submergence test	Paragraph 5.19, PART 1 of MSC.81(70) (This test should be conducted along with the Swamp test.)

8 Unit/batch inspection

8.1 Ratio of sampling

8.1.1 One sample from each type and model of liferafts is to be taken among the satisfactorily inspected products of the manufacturer.

8.2 Inspection and test items

8.2.1 Each batch of liferafts is subject to visual examination, normal temperature inflation test, twice working pressure test, inspection and test for tightness and relief valves commissioning.

8.2.2 Additional test items may be required where deemed necessary by the Surveyor.

8.2.3 The certificates of materials and components as specified in 3.5 are to be examined.

8.2.4 The identifications of liferafts are to be inspected in accordance with 1.2.2.9, 4.1.5.2, 4.2.6.3, 4.2.7.1 and 4.2.7.2 of LSA Code.

Addendum:**Technical Specification for Rubber Fabric**

No	Item	Requirement specification	Testing method
1.Dimensions:			
1.1	Thickness	Enterprise technical conditions	ISO 2286-3 or Equivalent Standard
1.2	Weighth/m2	Enterprise Technical Conditions	ISO 2286-2 or Equivalent Standard
1.3	Width	Enterprise Technical Conditions	Mesured by Rules
2.Material Specitifications:			
2.1	Fabric type	Enterprise Technical Conditions	
2.2	Rubber Material	Enterprise Technical Conditions	
3. Surface Specifications			
3.1	Surface receptiveness	Dry: ≥ 75 N/50 mm	MSC.81(70)/5.17.13.2.2.3 ISO 2411
3.2	Adhesion of surface coating	Dry Surface: ≥ 100 N/50 mm Wet Surface: ≥ 50 N/50 mm; After 48 h from wet to dry Surface: ≥ 75 N/50mm	MSC.81(70)/5.17.13.2.2.3 ISO 2411(Wet Surface will be advised as follow: Immersed for 168h in a 3% aqueous solution of sodium chloride at $70 \pm 2^{\circ}\text{C}$)
3.3	Resistance of blocking	The 100 g weight should not be lifted.	MSC.81(70)/5.17.13.2.2.10 ISO 5978, MSC.226(82)
4. Environmental Specifications			
4.1	Effect of ageing: Folding test	No cracks	MSC.81(70)/5.17.13.2.2.4.1
4.2	Effect of ageing: Tensile test	Not less than 90 % of the original strength before ageing	MSC.81(70)/5.17.13.2.2.4.2 ISO 1421
4.3	Effect of ageing: UV-resistance	No cracks	MSC.81(70)/5.17.13.2.2.4.3 ISO 4892-4 or ISO 4892-2
4.4	Effect of ageing: Dimensional stability	Not differ more than 2%	MSC.81(70)/5.17.13.2.2.4-5

Continued Table

No	Item	Requirement specification	Testing method
5. Mechanical Specifications			
5.1	Tensile Strength in warp and weft direction	≥ 2255 N/50mm	MSC.81(70)/5.17.13.2.2.1 ISO 1421
5.2	Elongation at 2255 N/50 mm in warp and weft	$\leq 30\%$	MSC.81(70)/5.17.13.2.2.1 ISO 1421
5.3	Tear strength in warp and weft direction	≥ 1030 N	MSC.81(70)/5.17.13.2.2.2 ISO 1421
5.4	Sample seam as in life raft production	≥ 2255 N/50mm	MSC.81(70)/5.17.9.1 ISO 1421
5.5	Low Temperature bend test at - 50 °C	No cracks	MSC.81(70)/5.17.13.2.2.5 ISO 4675
5.6	Flex cracking	No cracks	MSC.81(70)/5.17.13.2.2.6 ISO 7854
5.7	Porosity	No bubbles visible within 5 minutes at the start of the test.	MSC.81(70)/5.17.13.2.2.7 ISO TR6065
5.8	Oil Resistance	No separation of coating, no residual tackiness. The coating should not smear.	MSC.81(70)/5.17.13.2.2.8 ISO TR6065
5.9	Ozone resistance	No cracks should be visible at magnification of 5.	MSC.81(70)/5.17.13.2.2.12 ISO 3011
5.10	Weft distortion	Max. 100 mm per running 1500 mm	MSC.81(70)/5.17.13.2.2.12 ISO 3011
5.11	Abrasion	Enterprise Technical Conditions	Enterprise Technical Conditions
6. Marking Specifications:			
6.1	Marking of fabric for Traceability: On the outside (side 1) for each and every meter.	Name/Batch No./ Week/Year/Roll No.	MSC.81(70)/5.17.13.1
6.2	Marking of faults	All surface defects must be marked in the edge of the roll, and also the defect spot itself. Any defects must be worked out and insert in the label of the roll.	