Guideline No.: L-03(202307）

# L-03

# INFLATABLE LIFERAFTS

Issued date:, July 14，–2023

Foreword

China Classification Society (hereinafter refferred to as 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.

Historical versions and release date : L-03(201510) October 20, 2015

L-03(201610) October 28, 2016

L-03(202109) September 02, 2021

Main changes:

1. Inspection Items Table 7.2.1 17.7, Table 7.2.2 20 Added MSC.488 (103)

2. 8.1.1 is changed to: In principle, one sample should be taken from different types of life rafts among the products that pass the factory inspection.

3. Quality requirements for attachment adhesive table 5.7 ISO TR6060 changed to ISO 15372:2000 6.2.9.2

4. Quality requirements for attachment adhesive table 5.8 ISO TR6060 changed to ISO 15372:2000/Amd 1:2021 6.2.5

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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),MSC.488(103);

(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 Terms and 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 Drawings 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 Technical requirements

5.1 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.

**6~~5~~ Materials and components**

6~~5~~.1 Materials and components are to comply with relevant requirements of CCS Rules.

6~~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) ,MSC.488(103); (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<br>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), MSC.488(103); (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

In principle, one sample should be taken from different types of life rafts among the products that pass the factory inspection.

~~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 | Weigth/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：≥75N/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±2℃) |
| 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 | ≤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 ℃ | 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)/5.17.13.2.2.7.1 ISO 15372:2000 6.2.9.2~~ISO TR6065~~ |
| 5.8 | Oil Resistance | No separation of coating, no residual tackiness. Thecoating should not smear. | MSC.81(70)/5.17.13.2.2.8 ISO 15372:2000/Amd 1:2021 6.2.5~~ISO TR6065~~ |
| 5.9 | Ozone resistance | No cracks should be visible at amagnification 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. | |