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MSC/Circ.809  
30 June 1997

Ref. T1/3.02

**RECOMMENDATION FOR CANOPIED REVERSIBLE LIFERAFTS,  
AUTOMATICALLY SELF-RIGHTING LIFERAFTS AND  
FAST RESCUE BOATS, INCLUDING TESTING,  
ON RO-RO PASSENGER SHIPS**

1 The Maritime Safety Committee, at its sixty-eighth session (28 May to 6 June 1997), noted that the 1995 SOLAS Conference, in adopting amendments to the 1974 SOLAS Convention concerning the safety of ro-ro passenger ships, also adopted Conference resolution 7 - Development of requirements, guidelines and performance standards, whereby the Committee was requested to develop relevant requirements, guidelines and performance standards to assist in the implementation of the amendments adopted by the Conference.

2 The Committee, having considered recommendations made by the Sub-Committee on Ship Design and Equipment (DE), at its fortieth session, approved the Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including testing, on ro-ro passenger ships, set out in the annex.

3 Member Governments are invited to bring the annexed Recommendation to the attention of those concerned and use the provisions contained therein, as appropriate, in conjunction with the relevant requirements of the 1974 SOLAS Convention, as amended.

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## ANNEX

### RECOMMENDATION FOR CANOPIED REVERSIBLE LIFERAFTS, AUTOMATICALLY SELF-RIGHTING LIFERAFTS AND FAST RESCUE BOATS, INCLUDING TESTING, ON RO-RO PASSENGER SHIPS

#### 1 APPLICATION

This recommendation should apply to canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats required by SOLAS regulation III/24-1.\*

#### 2 CANOPIED REVERSIBLE LIFERAFTS

2.1 Except as provided in this section, all canopied reversible liferafts should comply with the requirements of paragraph 4.1,\*\* and if an inflatable liferaft, paragraph 4.2, or if a rigid liferaft, with the requirements of paragraph 4.3.

2.2 The requirements of paragraphs 4.2.5.2 and 4.2.6.2 do not apply to inflatable canopied reversible liferafts and the requirements of paragraph 4.3.5.1 do not apply to rigid canopied reversible liferafts.

2.3 The floating canopied reversible liferaft should be fitted with self-draining arrangements. The liferafts should be capable of being safely used at all times by untrained persons.

2.4 The canopied reversible liferaft should be capable of operating safely whichever way up it is floating. The liferaft should have a canopy on both sides of the main body, if applicable, of the liferaft, which should be set in place when the liferaft is launched and waterborne. Both canopies should meet the requirements of paragraphs 4.1.1.5, 4.1.3.3 and 4.1.3.4.

2.5 The equipment required under paragraph 4.1.5 should be readily accessible whichever way up the canopied reversible liferaft is floating, either by use of an equipment container which is accessible from either side, or by duplication of equipment on each side of the liferaft.

2.6 The fully equipped canopied reversible liferaft should float in a stable upright position in a seaway at all times, regardless of the conditions of loading.

2.7 The canopied reversible liferafts do not need to be arranged for easy side-to-side transfer, and are therefore, not subject to the 185 kg mass limitation of paragraph 4.1.2.2.

2.8 On ro-ro passenger ships operating on fixed routes in shallow water, the requirements that liferafts be arranged so as to ensure that the liferafts are not dragged under the sinking ship, can be achieved by using a liferaft painter with a length of at least the maximum depth of the water plus an additional 20%.

#### 3 AUTOMATICALLY SELF-RIGHTING LIFERAFTS

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\*This regulation has been included as regulation 26 in new SOLAS chapter III adopted by resolution MSC.47(66), which is expected to enter into force on 1 July 1998.

\*\*Unless indicated otherwise, paragraphs referred to in this recommendation are those of the International Life-Saving Appliance (LSA) Code (resolution MSC.48(66)).

3.1 Except as provided in this section, all automatically self-righting liferafts should comply with the requirements of paragraph 4.1 and, if an inflatable liferaft, with the requirements of paragraph 4.2 or, if a rigid liferaft, with the requirements of paragraph 4.3.

3.2 The requirements of paragraphs 4.2.5.2 and 4.2.6.2 do not apply to inflatable automatically self-righting liferafts. The requirements of 4.3.5.1 do not apply to rigid automatically self-righting liferafts.

3.3 The fully equipped liferaft should automatically turn from a capsized position to an upright position on the surface of the water, regardless of whether it inflates in the inverted position underwater or on the surface of the water or capsizes for any reason following inflation.

3.4 The floating automatically self-righting liferaft should be fitted with self-draining arrangements. The liferaft should be capable of being safely used at all times by untrained persons.

3.5 The automatically self-righting liferafts do not need to be arranged for easy side-to-side transfer, and are, therefore, not subject to the 185 kg mass limitation of paragraph 4.1.2.2.

3.6 On ro-ro passenger ships operating on fixed routes in shallow water, the requirement that liferafts be arranged so as to ensure that the liferafts are not dragged under the sinking ship, can be achieved by using a liferaft painter with a length of at least the maximum depth of the water plus an additional 20%.

## **4 FAST RESCUE BOATS**

The provisions of this section should apply to fast rescue boats in lieu of provisions of the Guidelines on fast rescue boats (resolution A.656(16)).

### **4.1 Requirements for fast rescue boats**

4.1.1 The fast rescue boat and its launching appliances should be such as to enable it to be safely launched and retrieved under adverse weather and sea conditions.

4.1.2 Except as provided in this section, all fast rescue boats should comply with the requirements of section 5.1, except for paragraphs 4.4.1.5.3, 4.4.1.6, 4.4.6.8, 4.4.7.2, 5.1.1.6 and 5.1.1.10.

4.1.3 Notwithstanding paragraph 5.1.1.3.1, fast rescue boats should have a hull length of not less than 6 m and not more than 8.5 m, including inflated structures.

4.1.4 Fully equipped fast rescue boats should be capable of manoeuvring for at least 4 h at a speed of at least 20 knots in calm water with a crew of 3 persons and at least 8 knots with a full complement of persons and equipment.

4.1.5 Fast rescue boats should be self-righting or capable of being readily righted by not more than two of their crew.

4.1.6 Fast rescue boats should be self-bailing or be capable of being rapidly cleared of water.

4.1.7 Fast rescue boats should be steered by a wheel at a helmsman's position remote from the tiller. An emergency steering system providing direct control of the rudder, water jet or outboard motor should also be provided.

4.1.8 Engines in fast rescue boats should stop automatically or be stopped by the helmsman's emergency release switch should the rescue boat capsize. 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.

4.1.9 Fast rescue boats should, if possible, be equipped with an easily and safely operated fixed single-point suspension arrangement or equivalent.

4.1.10 A rigid fast rescue boat should be constructed in such a way that, when suspended by its lifting point it is of sufficient strength to withstand a load without residual deflection on removal of load of 4 times the mass of its full complement of persons and equipment.

4.1.11 The normal equipment of the fast rescue boat should include a hands free and watertight VHF radiocommunication set.

4.1.12 The crew of the fast rescue boat should consist of at least the helmsman and two crew members trained and drilled regularly having regard to the Seafarers' Training, Certification and Watchkeeping (STCW) Code and recommendations adopted by the Organization.\*

## **4.2 Fast rescue boat launching appliances**

4.2.1 Every fast rescue boat launching appliance should comply with the requirements of paragraphs 6.1.1 and 6.1.2 except 6.1.2.10.

4.2.2 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.

4.2.3 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.

4.2.4 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.

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\*Refer to the Recommendations on training requirements for crews of fast rescue boats, adopted by the Organization by resolution A.771(18) and section A-VI/2, table A-VI/2-2 "Specification of the minimum standard of competence in fast rescue boats" of the Seafarers' Training, Certification and Watchkeeping (STCW) Code.

4.2.5 The lowering speed for a fully equipped fast rescue boat with its full complement of persons on board should not exceed 1 m/s. Notwithstanding the requirements of paragraph 6.1.1.9, launching appliances should be capable of hoisting the fully equipped rescue boat loaded with 6 persons at a speed of not less than 0.8 m/s. The appliance should also be capable of lifting the rescue boat with the maximum number of persons that can be accommodated in the rescue boat as calculated under paragraph 4.4.2.

4.2.6 At least three turns of wire should remain on the winch after the fast rescue boat is lowered to the sea with the ship at its lightest seagoing condition, a trim of up to 10° and a list of up to 20°, either way.

## **5 TESTING OF CANOPIED REVERSIBLE LIFERAFTS, AUTOMATICALLY SELF-RIGHTING LIFERAFTS AND FAST RESCUE BOATS**

The testing of canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats should be carried out in accordance with the provisions of the Recommendation on testing of canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, set out in the appendix.

## **APPENDIX**

### **RECOMMENDATION ON TESTING OF CANOPIED REVERSIBLE LIFERAFTS, AUTOMATICALLY SELF-RIGHTING LIFERAFTS AND FAST RESCUE BOATS ON RO-RO PASSENGER SHIPS**

The canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats on ro-ro passenger ships should be tested in accordance with the provisions of the Recommendation on Testing of Life-Saving Appliances (resolution A.689(17)) modified as indicated below.

- 1 Add at end of paragraph 5.2 the following:  
  
"Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft."
- 2 Add at the end of paragraph 5.7 the following:  
  
"Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft."
- 3 Add at the end of paragraph 5.8 the following:  
  
"Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft."
- 4 Add at the end of paragraph 5.11 the following:  
  
"Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft."
- 5 Add at end of paragraph 5.12 the following:  
  
"Unless the configuration of both sides of a canopied reversible liferaft are identical, this test should be repeated for both sides of the liferaft."
- 6 Add at the beginning of paragraph 5.17.2 the following:  
  
"5.17.2 This test is not required for a canopied reversible liferaft. For this test the liferaft should be inverted so as to simulate inverted inflation."
- 7 Replace paragraph 5.17.2.2 with the following:  
  
".2 the canopy of the liferaft should then be completely filled with water. Except for an automatically self-righting liferaft, this may be accomplished, if necessary by partially collapsing the canopy support. An automatically self-righting liferaft should self-right in this condition. If the inflatable liferaft, other than an automatically self-righting liferaft, does not self-right, it should be allowed to remain in an inverted position for at least 10 min before righting is attempted."

- 8 Replace the existing text of paragraph 5.17.13 by the following:

"5.17.13 The materials when tested should meet the following requirements:

- .1 The fabric should be marked in such a manner as to allow traceability of the fabric manufacturer and production lot number.
- .2 Tests and performance criteria
  - .2.1 Test samples should be randomly selected, and test pieces cut from each sample as required by the relevant ISO standard or as otherwise prescribed for each individual test.
  - .2.2 Fabric used for manufacture of buoyancy tubes, inflatable supports for canopies and floors should meet the following requirements:

.2.2.1 *Tensile strength*

When tested by the method described in ISO 1421 the minimum tensile strength should be 2255 N/50 mm width in warp and weft directions. 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 width in warp and weft directions.

.2.2.2 *Tear strength*

When tested with the apparatus described in ISO 1421, the minimum tear strength should be 1030 N in warp and weft directions.

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 directions.

The preparation of the test specimens should be as follows:

- .1 from the test sample cut 3 specimens each in warp and weft directions,  $76 \pm 1$  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; and
- .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. The maximum load sustained is recorded as the wound tear strength, and the average for the 3 specimens is calculated.

.2.2.3 *Surface receptiveness and adhesion of surface coating*

- .1 When tested by the method described in ISO 2411, 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 2.2.3.8, 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 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 for adhesion of coating to the base textile, the specimen should be immersed for 24 h in a 3% aqueous solution of sodium chloride at  $20 \pm 2^{\circ}\text{C}$ . 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.

#### .2.2.4 *Effects of ageing*

- .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 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.
- .3.1 Ultra-violet resistance. This test should be performed in accordance with the methods specified in ISO 4892-4:1994 - Open-flame carbon-arc lamps, as follows:



- .1 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 should 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  $80 \pm 5^\circ\text{C}$ . The total exposure time should be 100 h.
  - .2 Test the tensile strength of the material after exposure following the procedure in .2.2.1. The tensile strength should be not less than 90% of the original tensile strength before ageing.
  - .3 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.
- .3.2 Alternatively, this test may be performed in accordance with the methods specified in ISO 4892-2 - 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.

| Exposure conditions               | Dark cycle (1 h)                     | Light cycle (2 h)                                               |
|-----------------------------------|--------------------------------------|-----------------------------------------------------------------|
| Automatic irradiance (Filter Q/B) | Nil                                  | 0.55 W/m <sup>2</sup> - at a wavelength of 340 nm               |
| Black panel temperature           | $38 \pm 2^\circ\text{C}$             | $70 \pm 2^\circ\text{C}$                                        |
| Dry bulb temperature              | $38 \pm 2^\circ\text{C}$             | $47 \pm 2^\circ\text{C}$                                        |
| Relative humidity                 | $95 \pm 5\%$                         | $50 \pm 5\%$                                                    |
| Conditioning water                | $40 \pm 4^\circ\text{C}$             | $45 \pm 4^\circ\text{C}$                                        |
| Water spray                       | 60 min on front and back of specimen | 40 min - Nil<br>20 min - Front of specimen only<br>60 min - Nil |

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 .2.2.1. 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.

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:

- .1 dimensional stability;
- .2 folding; and
- .3 tensile strength.

For .1 and .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 .1. For .3, cut two sets of specimens as in .2.2.1.

.5 When tested as prescribed 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:

- .1 Freely suspend one specimen each for .2.2.4.4.1 and .2.2.4.4.2, and one set of specimens for 2.2.4.4.3 in air for seven days at  $70 \pm 2^\circ\text{C}$ . Suspend the other specimens above water in a loosely closed vessel for seven days at  $70 \pm 2^\circ\text{C}$ .
- .2 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.
- .3 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.
- .4 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  $70 \pm 2^\circ\text{C}$ , and then condition both sets for 24 h. Test in accordance with .2.2.1.

.2.2.5 *Low temperature flexing*

- .1 When tested at a temperature no higher than  $-50^\circ\text{C}$  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, except that:

- .1 when tested at the specified low temperature, no specimen should show cracks; and
- .2 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.

.2.2.6 *Flex cracking*

After the specimen has been conditioned by exposing the outer face to a 3% aqueous solution of sodium chloride for seven days at  $20 \pm 2^\circ\text{C}$ , it should be tested as described in ISO 7854. After 200,000 flexings, no cracking or delamination should be visible when inspected under a magnification of 2.

.2.2.7 *Porosity*

When tested by the method prescribed 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.

.2.2.8 *Oil resistance*

- .1 When tested by the method prescribed below, after exposing the outer surface to oil ASTM No. 1, for 2 h at  $20 \pm 2^\circ\text{C}$ , 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 vulcanisation 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.

.2.2.9 *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.

.2.2.10 *Resistance to blocking*

- .1 When tested by the method prescribed below, the 100 g weight should not be lifted.
- .2 The preparation of specimens and test procedure should be in accordance with ISO 5978 except that the temperature of test should be  $70 \pm 2^\circ\text{C}$  and the duration of time under load should be seven days.

.2.2.11 *Hydrolysis resistance for thermoplastic coated materials only*

- .1 When tested by the methods prescribed below, the following performance values should be achieved:
  - .1 Coating adhesion 50 N/50 mm minimum
  - .2 Blocking resistance 100 g maximum
  - .3 Folding test No cracks, delamination or visual deterioration.
- .2 The following test requirements should apply to fabrics or test specimens which have been stored for 12 weeks over water in a closed container at  $93^\circ\text{C}$ .
- .3 The following test should be performed after drying the specimens for 1 h at  $80 \pm 2^\circ\text{C}$ , and conditioning at  $20 \pm 2^\circ\text{C}$ , 65% RH for 24 h.
- .4 The coating adhesion of the stored material specimen should be made up and tested in accordance with .2.2.3 after the requirements of .2.2.11.2 above have been carried out.
- .5 The blocking resistance should be tested in accordance with .2.2.10.
- .6 Two test samples  $100 \pm 2$  mm square should be cut from the stored material. The samples should be folded as defined in .2.2.4.6.3 and examined for evidence of cracks, ply separation, stickiness or brittleness.

.2.2.12 *Ozone resistance*

- .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.

The following conditions should apply:

- .1 Ozone concentration 50 pphm
- .2 Temperature  $20 \pm 2^\circ\text{C}$
- .3 Exposure time 8 h
- .4 Mandrel diameter 6 x sample thickness.

.2.3 Fabric used for the manufacture of outer canopies should meet the following requirements:

.2.3.1 *Tensile strength*

When tested by the method prescribed in .2.2.1, the minimum tensile strength should be 930N/50 mm of width in warp and weft directions.

.2.3.2 *Tear strength*

When tested by the method prescribed in .2.2.2, the minimum tear strength should be 490 N in warp and weft directions.

.2.3.3 *Low temperature flexing*

When tested at a temperature not higher than -30°C by the method prescribed in .2.2.5, 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.

.2.3.4 *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.

.2.3.5 *Surface receptiveness and adhesion of surface coating*

When tested by the method prescribed in .2.2.3, the surface receptiveness on either face should not be less than 25 N/50 mm width surface.

For coating adhesion a minimum of 25 N/50 mm is required.

.2.3.6 *Colour*

The liferaft canopy should be evaluated after the mooring out test in 5.5 or an equivalent method using artificial light to determine whether the coating is sufficiently colour fast.

.2.3.7 *Effects of ageing*

- .1 Folding test. When tested by the method prescribed in .2.2.4, 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 .2.2.4, at least 90% of the original tensile strength should be retained in both warp and weft directions.

.2.4 Fabric used for the manufacture of inner canopies should meet the following requirements:

.2.4.1 *Tensile strength*

When tested by the method prescribed in .2.2.1, the minimum tensile strength should be 100 N/50 mm of width in warp and weft directions.

.2.4.2 *Porosity*

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."

9 The existing text of paragraph 5.17.9 and its title are replaced by the following:

"Seam strength test

- .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;

.2 *Weld strength*

.2.1 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:

- .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  $93 \pm 2^\circ\text{C}$ .
- .2 After the conditioning as above, dry the specimens for 1 h at  $80 \pm 2^\circ\text{C}$  and condition at  $20 \pm 2^\circ\text{C}$ , 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. The maximum peel load should be recorded."

10 Add new sections 5.18, 5.19, 5.20 and 5.21 as follows:

**"5.18 Additional tests applicable to automatic self-righting liferafts only**

5.18.1 Rigid automatic self-righting liferafts should be tested to the righting test in 5.17.2.1 and 5.17.2.2.

5.18.2 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 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 always return to the upright position without any assistance.

**5.19 Submergence test for automatic self-righting and canopied reversible liferafts**

The liferaft and, if inflatable 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. 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 m significant wave height in association with a wind force of Beaufort force 6.

**5.20 Wind velocity tests**

5.20.1 The Administration should from a range of liferafts require at least:

- .1 one liferaft from a range 6 to 25 persons capacity, provided the material and construction arrangements are similar; and
- .2 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.

5.20.2 The liferaft or liferafts in the packed condition with the entrance so arranged that it will be open on inflation, but without the container, should be inflated in a wind velocity of 30 m/s and should be left in this condition for 10 min.

5.20.3 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.

5.20.4 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.

5.20.5 Then the liferaft or liferafts should be exposed to the above-mentioned wind velocity for 5 min in each of the following conditions:

- .1 with the entrance to the wind open and the other entrances 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/their efficient function as a result of this test.

#### **5.21 Test for self-draining of floors of canopied reversible liferafts and automatically self-righting liferafts**

5.21.1 Water should be pumped into the interior of the liferaft, while it is afloat, at a rate of 2300 litres per minute for 1 min.

5.21.2 After the water has been shut off and has drained, there should be no appreciable accumulation of water in the liferaft.

5.21.3 If a liferaft is divided into separate areas, by thwarts or other means, each such area should be subjected to the test."

11 Add new sections 7.4, 7.5 and 7.6 as follows:\*

#### **"7.4 Rigid fast rescue boats**

Rigid fast rescue boats should be subjected to the tests prescribed in 6.2 to 6.13 (except 6.4, 6.5.2, 6.6, 6.7.2, 6.8.1, 6.10.5, 6.10.6, 6.11.1), 6.15 (if a rigid fast rescue boat is self-righting), 7.1.3, 7.2.4.2, 7.2.10, 7.2.11 (if a rigid fast rescue boat is equipped with outboard motor) and 7.2.13 (except that a larger engine is not required in the case of a boat equipped with an inboard engine.)

##### **7.4.1 Overload test**

7.4.1.1 The boat, when suspended by its lifting point, should be loaded with properly distributed load of 4 times the weights to represent the equipment and full complement of persons for which it is to be approved. 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.

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\*Paragraph referred to in new sections 7.4, 7.5 and 7.6 are those of the International Life-Saving Appliance (LSA) Code (resolution MSC.48(66)).



7.4.1.2 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.

7.4.1.3 The boat and bridle or hook and fastening device should be examined after the test has been conducted and should not show any signs of damage.

#### 7.4.2 Operation tests

##### Operation of engine and fuel consumption test

7.4.2.1 The boat should be loaded with weights equal to the mass of its equipment and the number of persons for which the 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. It should be demonstrated that the boat can tow the largest of the ship's liferafts loaded with the number of persons for which it is to be approved and its equipment at a speed of 2 knots.

7.4.2.2 The 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.

#### 7.4.3 Righting test (if rigid fast rescue boat is not self-righting)

It should be demonstrated that both with and, in the case of an outboard engine, without engine and fuel or an equivalent mass in place of the engine and fuel tank, the rigid fast rescue boat is capable of being righted by not more than two members of its crew if it is inverted on the water.

## 7.5 Inflated fast rescue boats

Inflated fast rescue boats should be subjected to the tests prescribed in 6.3, 6.5.1, 6.7.1, 6.8.2, 6.10.1 to 6.10.4, 6.11 (except 6.11.1), 6.12, 6.13, 6.15 (if inflated fast rescue boat is self-righting), 7.1.3, 7.2.2 to 7.2.11 (if inflated fast rescue boat is equipped with outboard motor), 7.2.12 (if inflated fast rescue boat is not self-righting), 7.2.13 to 7.2.19 and 7.4.2.

## 7.6 Rigid/inflated fast rescue boats

7.6.1 Rigid/inflated fast rescue boats should be subjected to the tests prescribed in 6.2 (for hull), 7.2.17 (for inflated part), 6.3, 6.5.1, 6.7.1, 6.8.2, 6.10.1 to 6.10.4, 6.11 (except 6.11.1) to 6.13, 6.15 (if rigid/inflated fast rescue boat is self-righting), 7.1.3, 7.2.2 to 7.2.11 (if rigid/inflated rescue boat is equipped with outboard motor), 7.4.3 (if rigid/inflated fast rescue boat is not self-righting), 7.2.13 (except that a larger engine is not required in the case of a boat with an inboard engine), 7.2.14, 7.2.18, 7.2.19, 7.4.1 and 7.4.2.

7.6.2 The tests prescribed in 7.2.8, 7.2.9 and 7.2.18 do not apply to rigid/inflated fast rescue boats if the boat has its waterline below the lower side of the inflated tube."

- 12 Replace the fifth sentence of 8.1.4 by the following:

"For a lifeboat or rescue boat launching appliance, the test load should drop not more than 1m when the brake is applied. For a fast rescue boat launching appliance, the test load should come to a rapid, but gradual stop, and the dynamical force induced in the wire should not exceed 0.5 times the working load of the launching appliance."

- 13 Add at the end of the last sentence of 8.1.5 the following:

"or 0.8 m/s in the case of a launching appliance for a fast rescue boat."

- 14 Add a new paragraph 8.1.8 as follows:

"8.1.8 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; and
  - .3 satisfactory operation of the tensioning device."
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MSC/Circ.809/Add.1  
17 June 1999

Ref. T1/3.02

**ADDENDUM TO THE RECOMMENDATION FOR CANOPIED REVERSIBLE  
LIFERAFTS, AUTOMATICALLY SELF-RIGHTING LIFERAFTS AND FAST RESCUE  
BOATS, INCLUDING TESTING, ON RO-RO PASSENGER SHIPS**

1 The Maritime Safety Committee, at its seventy-first session (19 to 28 May 1999), recalling that MSC 68 had approved MSC/Circ.809 on Recommendation for canopied reversible liferafts, automatically self-righting liferafts and fast rescue boats, including testing, on ro-ro passenger ships, agreed to amend the said Recommendation in order that, when determining the hull length of fast rescue boats, inflated structures or fixed fenders should be included. Paragraph 4.1.3 of the aforementioned Recommendation should, therefore, read:

"Notwithstanding paragraph 5.1.1.3.1, fast rescue boats should have a hull length of not less than 6 m and not more than 8.5 m, including inflated structures **or fixed fenders.**"

2 Member Governments are invited to bring the added text shown above to the attention of all those concerned and use the supplemented provisions, as appropriate, in conjunction with the relevant requirements of the 1974 SOLAS Convention, as amended.

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