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**GUIDELINES FOR THE APPROVAL OF INFLATABLE LIFERAFTS SUBJECT TO
EXTENDED SERVICE INTERVALS NOT EXCEEDING 30 MONTHS**

1 The Maritime Safety Committee, at its eighty-sixth session (27 May to 5 June 2009), approved the Guidelines for the approval of inflatable liferafts subject to extended service intervals not exceeding 30 months, as set out in the annex, following the recommendations made by the Sub-Committee on Ship Design and Equipment at its fifty-second session.

2 Member Governments are invited to use the annexed Guidelines when permitting extended service intervals of inflatable liferafts under the provisions of SOLAS regulation III/20.8.3.

ANNEX

GUIDELINES FOR THE APPROVAL OF INFLATABLE LIFERAFTS SUBJECT TO EXTENDED SERVICE INTERVALS NOT EXCEEDING 30 MONTHS

1 PREAMBLE

1.1 SOLAS regulation III/20.8.3 permits Administrations that approve new and novel inflatable liferaft arrangements to allow for extended service intervals. Such extended service intervals may be permitted if the new and novel liferaft arrangements have proved to maintain the same standard as required by testing procedures during extended service intervals.

1.2 While the justification for the existing service interval of 12 months has been verified through many years of experience and continuous observation of the product standard, it has been found that the instruments for allowing extended service intervals under the provisions of SOLAS regulation III/4 are not sufficiently detailed to ensure an equivalent and uniform level of safety is maintained during extended service intervals.

1.3 These Guidelines have been developed to address the above-mentioned concerns, with a view to possible mandatory application in the future after experience is gained in their application.

2 INTRODUCTION

These Guidelines are intended to provide guidance for Administrations when permitting extended service intervals for inflatable liferafts under the provisions of SOLAS regulation III/20.8.3. The approval of such liferafts by Administrations should be based on satisfactory testing, as specified in these Guidelines, and consideration of any history of component failure.

3 DEFINITIONS

For the purpose of these Guidelines the following definitions apply:

3.1 *Extended service interval* is a service interval in excess of 12 months.

3.2 *Service life* means the same as *lifetime* and is the time passed since a liferaft was manufactured.

3.3 *Onboard inspection* means an inspection carried out on board a ship to verify the conditions of liferafts without adversely affecting the protective arrangements.

3.4 *Inspection personnel* is personnel certified to carry out onboard inspections.

3.5 *Service* (of inflatable liferafts) means the execution of a control and maintenance process at an approved servicing station in accordance with resolution A.761(18).

3.6 *Environmental influences* mean conditions in the maritime environment which may have a direct or indirect effect on the operational deployment and reliability of liferafts.

3.7 *Protective arrangements* mean features in conjunction with liferafts approved for extended service intervals which can protect the liferafts from harmful environmental influences.

4 GENERAL

4.1 Liferafts approved and certified for extended service intervals pursuant to SOLAS regulation III/20.8.3 should be:

- .1 serviced at an approved servicing station* at intervals not exceeding 30 months for the first 10 years of their service lives, and thereafter at the frequency required by SOLAS regulation III/20.8.1.1. This 10-year limitation may be extended if real time verification justifies acceptance by the Administration;
- .2 inspected on board by inspection personnel in accordance with the provisions of these Guidelines and the instructions of the manufacturer at intervals not exceeding 12 months from the last service or onboard inspection and for the first 10 years of their service life;
- .3 tested according to the recommendations of these Guidelines or test procedures which are substantially equivalent; and
- .4 marked to indicate that they have been approved and certified for extended service intervals in accordance with these Guidelines.

4.2 When liferafts approved for extended service intervals are installed on a ship, measures should be taken to safeguard inspection personnel during the onboard inspection mentioned in 4.1.2. Should rafts require repositioning during onboard inspections to provide access, suitable means should be provided to do so safely.

4.3 In addition to complying with all relevant requirements of paragraphs 4.1 and 4.2 of the LSA Code, inflatable liferaft arrangements intended for extended service intervals should:

- .1 be capable of withstanding all environmental influences for extended service intervals on board seagoing ships;
- .2 include protective arrangements that give the liferaft, its fittings and equipment adequate protection to withstand the environmental influences imposed by the extended interval;
- .3 if the approved service interval exceeds the lifetime of dated items in the liferaft, include provisions for the replacement of expired items in conjunction with the annual onboard inspections required by SOLAS regulation III/20.8.3.2 without relocating the liferaft in its container or compromising the protective arrangements provided in accordance with 4.3.2;

* Refer to the Recommendation on conditions for the approval of servicing stations for inflatable liferafts, adopted by the Organization by resolution A.761(18).

- .4 be arranged so that all items to be inspected during the onboard inspection are accessible without relocating the liferaft in its container and without compromising the protective arrangements;
- .5 be arranged so that all replaceable dated items are readily accessible from the interior of the liferaft when the liferaft is deployed and inflated; and
- .6 include means to evaluate the humidity level behind the protective barrier and to detect any leakage of inflation gas during the annual onboard inspection. The efficiency and accuracy of these means should be verified.

5 TESTING

General

5.1 The liferafts should be subjected to all the relevant tests described in section 5 of resolution A.689(17), as amended by resolution MSC.81(70), and to the following tests in the sequence of appearance. In addition, the manufacturer should carry out a full 30 months' demonstration, by field trials, to verify adequacy and involving representative types of liferafts, onboard installations, stowage height and conditions of different operational areas. Approvals by Administrations should specify criteria restricting application of the approval to installation situations no more onerous than the field trial. Approvals by Administrations should also specify that they are based on compliance with these Guidelines.

5.2 Depending on the capacity and type of liferaft(s) submitted for approval, the Administration should, from the relevant range of liferafts, require:

- .1 two liferafts from a range of 6-8 person capacity;
- .2 two liferafts from a range of 9-20 person capacity;
- .3 two liferafts from a range of 21-39 person capacity;
- .4 two liferafts from a range of 40-51 person capacity;
- .5 two liferafts from a range of 52-109 person capacity;
- .6 two liferafts from a range of 110-150 person capacity;
- .7 two liferafts from a range greater than 151-person capacity;
- .8 two davit-launched liferafts from a range of 6-24 person capacity;
- .9 two davit-launched liferafts from a range of 25-39 person capacity; and
- .10 two davit-launched liferafts from a range greater than 39-person capacity,

to be subjected to the tests in 5.4.1 to .10 in accordance with the test raft distribution table described in 5.3.

5.3 A test sequence should always include four liferafts (or multiples of four liferafts) collected from the relevant test ranges in 5.2 and the test distribution should be in accordance with table 1*.

Table 1 – Test raft distribution

No.	Test	Test rafts			
		1	2	3	4
5.4.2	Vibration/shock test	X	X	X	X
5.4.3	Dated item replacement test	X	X	X	X
5.4.4	Damp heat cyclic test	X	X	X	X
5.4.5	Access to lifting hook test (D/L rafts only)	X	X	X	X
5.4.6	Drop test	X	X		
5.4.7	Cold inflation test			X	X
5.4.8	Pressure test	X	X	X	X
5.4.9	Floor seam test	X	X	X	X
5.4.10	Detailed inspection	X	X	X	X

Additional tests applicable only to liferafts with extended service intervals

5.4.1 Recording of humidity

The humidity behind the protective barrier of the four liferafts in the test sequence and in the operationally packed conditions should be measured and recorded using the procedure described in 5.4.4.3. The humidity should not exceed a relative humidity corresponding to 65% rH at 20°C. If drying agent is used to bring the humidity down to the acceptable level, its effect should be removed for the remainder of the test. No underpressure should be induced behind the protective barrier before or during the prototype test sequence.

5.4.2 Vibration/shock test

The liferafts in the operationally packed conditions should be subjected to a vibration and shock test.

- .1 Testing machinery
The impacts specified under test procedures should be capable of being obtained for the liferafts at the base of the mounting.
- .2 Mounting of the liferaft
Mounting on the test machine should simulate the mounting on board a ship. Thus, the liferaft is fastened to the vibration table by its cradle and in its normal position, oriented normally with respect to gravity in all three axes. Figure 1 shows types of representative mounting arrangements, where type B may be used to cover most

* Examples:

If approval is applied for liferafts in the range of 6-8 persons and in the range of 21-39 persons, two liferafts from the range 5.2.1 and two liferafts from the range 5.2.3 should be selected for a test sequence.

If approval is applied for a 10-person liferaft only, four liferafts should be selected from range 5.2.2, which could be four 10-person liferafts.

If approval is applied for liferafts from three ranges, the collection of liferafts for the test sequences should be two liferafts from the first two ranges and four liferafts from the third range.

types of container configurations, while type A is generally applicable for liferafts with a capacity of up to 16 persons.

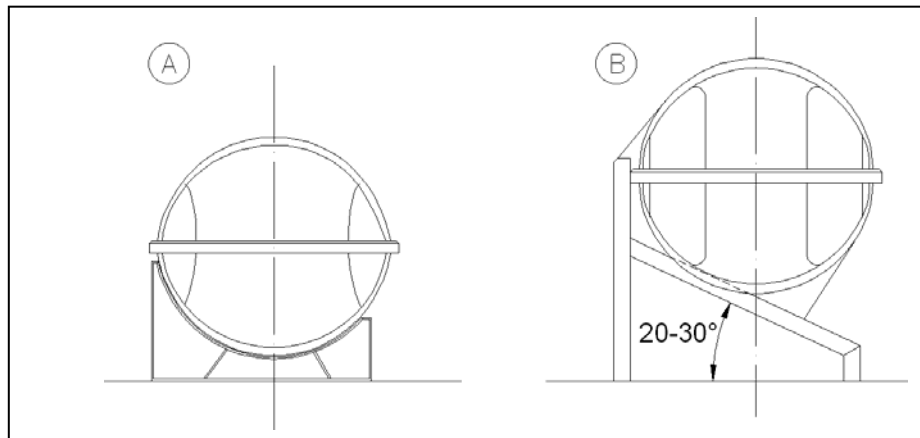


Figure 1 – Mounting arrangements

.3 Test procedures

The test is defined as a random endurance vibration test.

Reference: IEC 60068-2-64, Test Fh: Vibration, broadband random (digital control).

Frequency range:	2-100 Hz	
Acceleration spectral:	2-13 Hz	12 dB/octave
Density:	13-100 Hz	0.011 g ² /Hz
Total RMS level:	1 g	
Duration:	180 minutes per axis	
Number of axes:	3, mutually perpendicular	

5.4.3 Replacement of items with expiry date

If the service interval approval applied for exceeds the lifetime of dated items in the liferaft, it should be demonstrated that expired items can be replaced without compromising the protective barrier. This test should be carried out after the vibration test, and compliance should be proven through the damp heat cyclic test.

5.4.4 Damp heat cyclic test

Following the vibration test, the liferafts, still in the operationally packed condition, should be exposed to a damp heat cyclic test in accordance with IEC 60068-2-30.

- .1 The test should consist of four cycles of 24 hours' duration and the lower and upper temperature used should be 25°C and 65°C, respectively.
- .2 The variant for the temperature-fall period should be variant 1 shown in figure 2a of IEC 60068-2-30.
- .3 After the completion of the test, the liferaft should be removed from the test chamber and allowed to rest for 24 h. The humidity level behind the protective barrier should then be measured, using a procedure which will prevent air from the surroundings from affecting the test results. The relative humidity at a temperature corresponding to 20°C should not exceed 65% rH.

5.4.5 Access to lifting hook (applicable to davit-launched liferafts only)

It should be established by a test that there is easy access to the lifting hook or bridle on davit-launched liferafts after the vibration test has been carried out.

5.4.6 Drop test

Following the test in 5.4.4 (and 5.4.5 as applicable), two liferafts should subsequently be subjected to the drop test described in paragraph 5.1 of Part 1 of the Revised recommendation on testing of life saving appliances (resolution MSC.81(70)).

5.4.7 Cold inflation test

Following the damp heat cyclic test, two liferafts should be subjected to a cold inflation test in accordance with paragraph 5.17.5 of Part 1 of the Revised recommendation (resolution MSC.81(70)).

5.4.8 Pressure test

The liferafts should be subjected to the test described in paragraphs 5.17.7 and 5.17.8 of Part 1 of the Revised recommendation (resolution MSC.81(70)). The liferafts should be subjected to the test described in paragraphs 5.1.5 and 5.1.6 of Part 2 of the Revised recommendation (resolution MSC.81(70)) in order to reveal any leaks caused by previous tests.

5.4.9 Floor seam test

The liferafts should be subjected to the floor seam test described in paragraph 5.9 of the Recommendation on conditions for the approval of servicing stations for inflatable liferaft (resolution A.761(18), as amended by resolution MSC.55(66)).

5.4.10 Detailed inspection

Liferafts which have been subjected to the above specified tests, and have been found to comply with the acceptance criteria, should then be subjected to a thorough visual inspection in order to reveal any damage, wearing or chafing which may have been imposed by the previous tests.

6 SERVICING AND INSPECTION PROCEDURES

6.1 Servicing procedures

6.1.1 In addition to complying with all the relevant provisions of the Recommendation (resolution A.761(18)), servicing of inflatable liferafts approved for extended service intervals should comply with the provisions of this section of the Guidelines.

6.1.2 Servicing of inflatable liferafts approved for extended service intervals should only take place at approved servicing stations.

6.1.3 The liferaft should be packed according to the manufacturer's instructions, taking into consideration the specific requirements with regard to the particular protective arrangements, the management of dated items in the liferaft and the need to be able to confirm the condition of the liferaft during periodic onboard inspections.

6.1.4 Provisions should be available at the servicing station to ensure that the relative humidity behind the protective barrier of the liferaft approved for extended service intervals will not exceed a relative humidity of 65% rH at 20°C when the liferaft has been serviced and repacked.

6.1.5 Items of equipment should be checked to ensure that all are in good condition and dated items should be replaced in cases where the expiry date falls before the next service date of the liferaft if they cannot be replaced in due course in conjunction with an intermediate periodic onboard inspection.

6.1.6 Davit-launched liferafts approved for extended service intervals should be subjected to a 10% overload suspension test at intervals not exceeding 30 months.

6.1.7 Liferafts approved for extended service intervals should be serviced at the intervals specified in 4.1.1. Tests as described in appendix 2 to resolution A.761(18) should be applied thereafter.

6.1.8 Procedures as described in the appendix should be established to ensure that each gas cylinder is properly filled and gastight before fitting to a liferaft.

6.2 Periodic onboard inspection

6.2.1 Onboard inspections of liferafts should only be undertaken by qualified persons who have been adequately trained and certificated by the liferaft manufacturer.

6.2.2 Onboard inspections of liferafts approved for extended service intervals should include inspection and control of the humidity around the liferaft and behind the protective barrier and control of the gas cylinder. The certified service personnel should have the required equipment and necessary tools to conclude the inspection.

6.2.3 Sufficient and accurate tools and measuring equipment should be provided for the execution of the annual onboard inspection as required by SOLAS regulation III/20.8.3.2 and should include the following elements:

- .1 means capable of evaluating the humidity around the liferaft and behind its protective barrier;
- .2 means capable of detecting possible leakages of inflation gas from the gas cylinder;
and
- .3 if relevant, provisions for the replacement of expired items in the liferaft's equipment in conjunction with the onboard inspection.

6.2.4 If the periodic onboard inspection reveals a loss of inflation gas, the liferaft should undergo a full service immediately. If excess humidity is present, the liferaft should be serviced and repacked within three months of the date of the onboard inspection.

APPENDIX

CONTROL OF GAS CYLINDERS

(see 6.1.8)

1 All gas cylinders should be weighed and checked against the gross mass which has been marked on the bottle. To allow for difference of scales when check-weighing, a tolerance of 14 g should be permitted. No gas cylinder should be fitted unless it has passed one of the following two tests:

- .1 A storage period of at least 30 days after filling. Weighing should take place before and after storage using the same scales. There should be no loss of weight.
- .2 The leak test specified in paragraph 2.

2 This paragraph describes a leak test for CO₂ cylinders which is regarded as equivalent to weighing the filled cylinder before and after at least 30 days of storage.

.1 Materials required

- .1 Polythene bags of a suitable size to fit over the head of the cylinder, e.g.:
 - .1 for a 125 mm diameter cylinder the bag size is approximately 230 mm open width x 300 mm length;
 - .2 for a 100 mm diameter cylinder the bag size is approximately 165 mm open width x 300 mm length; and
 - .3 for a 90 mm diameter cylinder the bag size is approximately 150 mm open width x 300 mm length.
- .2 Elastic bands of a suitable size.
- .3 A measuring glass, capacity 25 ml.

.2 Test solution

- .1 The test liquid should be the standard test solution used to indicate small amounts of CO₂ gases (0.004N sodium carbonate in a 2% weight/volume solution of phenolphthalein).
- .2 The solution should be stored in a cool place in dark coloured glass bottles with a tight-fitting screw cap. The shelf life should not exceed 12 months.

.3 Method of testing

- .1 Lay the cylinder to be tested on its side in a rack, such that the valve end is protruding. Make sure the valve and shoulder of the cylinder are free from dust and other contaminants by carefully wiping it with a clean, dry cloth. Remove the dust cap to clean the valve, then replace the cap loosely.
- .2 Using the measuring glass, transfer 25 ml of the test solution into a polythene bag.
- .3 Pass the open end of the bag over the valve head and attach it to the cylinder body using one or more elastic bands. Make sure there are no air gaps in the seal.
- .4 The polythene bag should hang 20 cm off the valve end of the cylinder with the test solution in one corner.
- .5 Maintain the test for a period of not less than one hour.
- .6 After the period of time stated in 2.3.5, shake the solution gently and make the observations detailed in 2.4.
- .7 A control sample is necessary to detect any contamination. The sample is made by pouring 25 ml of test solution into a bag which is not fitted to a cylinder, but is sealed at the open end with adhesive tape to exclude atmospheric contamination. This bag should be placed on the rack in the vicinity of the cylinders being tested.

.4 Observations

- .1 A leak of carbon dioxide from the cylinder will cause the pink colour of the test solution to fade. The test solution will become clear as water.
 - .2 If no colour change is observed, there is no leak of gas from the cylinder.
 - .3 The control sample should not change colour during the test. If a colour change takes place, this indicates that the atmosphere in the test area is contaminated with carbon dioxide and tests carried out together with this control sample are invalid. Tests should be repeated after corrective action has been taken on the atmosphere.
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