TUVALU SHIP REGISTRY

Singapore Operations Office:
10 Anson Road #25-16, International Plaza, Singapore 079903
Tel: (65) 6224 2345 Fax: (65) 6227 2345
Email: info@tvship.com Website: www.tvship.com

MARINE CIRCULAR

MC-5/2018/1

12/2018

FOR: Ship Owners, Ship Managers, Ship Operators, Ship Masters, Ship Officers, Classification Societies

SUBJECT: APPROVAL OF VIKING LIFERAFT TYPE S30 FOR EXTENDED SERVICE INTERVALS

DEFINITIONS:

The following abbreviations stand for:
- "GRP" – Glass-Reinforced Plastic
- "CO_2" – Carbon Dioxide

The following terms shall mean:
- "Administration" – Tuvalu Ship Registry;
- "Ship" – a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating craft, floating platforms, FSUs and FPSOs.
- "Viking", "Manufacturer" – Viking Life-Saving Equipment A/S.
- "Extended service interval" – service interval in excess of 12 months.
- "Onboard inspection" – an inspection carried out on board a ship to verify the conditions of liferafts without adversely affecting the protective arrangements.
- "Inspection personnel" – personnel certified to carry out onboard inspections.
- "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).
- "Environmental influences" – conditions in the maritime environment which may have a direct or indirect effect on the operational deployment and reliability of liferafts.

PURPOSE:

This circular serves to inform all relevant parties concerned on the approval of Viking Liferaft Type S30 for extended service intervals by the Tuvalu Administration.

APPLICATION:

This circular applies to all Tuvalu flagged ships operating in the aquatic environment and includes submersibles, floating craft, floating platforms, FSUs and FPSOs.

REFERENCES:

(a) International Convention for the Safety of Life at Sea, 1974, as modified by the protocol of 1988 relating thereto (SOLAS 74/88)
(b) International Life-Saving Appliance Code (LSA Code)
(c) International Code of Safety for High-Speed Craft, 2000 (HSC Code, 2000)
(d) IMO Resolution MSC.1/Circ.1328, **GUIDELINES FOR THE APPROVAL OF INFLATABLE LIFERAFTS TO EXTENDED SERVICE INTERVALS NOT EXCEEDING 30 MONTHS**, adopted on 11 June 2009.
(e) IMO Resolution A.761(18), **RECOMMENDATION ON CONDITIONS FOR THE APPROVAL OF SERVICING STATIONS FOR INFLATABLE LIFERAFTS**, adopted on 04 November 1993 (Agenda item 11).

APPROVAL:

The Administration hereby approves the Viking Inflatable liferaft range type S30 packed for extended service intervals. The packing consists of a hermetically sealed pouch within a GRP container.

The liferafts are approved in accordance with Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended, SOLAS 74/88 as amended, Chapter III, Regulation 4, 21.1, 31.1, 34 and Chapter X, Regulation 3, the Resolution MSC.81(70) as amended, IMO MSC/Circ.811, and HSC Code as amended, Chapter 8.1, 8.5, 8.6 and 8.7.

In addition, the liferafts have undergone and successfully passed the tests described in IMO Resolution MSC.1/Circ.1328.

CONDITIONS UNDER WHICH EXTENDED SERVICING INTERVALS HAVE BEEN APPROVED:

1) Servicing shall be carried out at a maximum interval not exceeding thirty (30) months, only at approved servicing stations which have additionally been appointed for this purpose by Viking Life-Saving Equipment A/S.

2) As long as the hermetic seal has not been compromised, the thirty (30) month service intervals shall apply. Hermetic seal verification shall be performed at a maximum interval not exceeding twelve (12) months from the date of the last service. This shall be done by inspection personnel onboard the ship in accordance with the manufacturer's instruction for onboard inspection.

   In the event, if the seal verification inspection reveals a loss of hermetic seal for any reason, the liferaft shall be serviced and repacked within three (3) months, or thirty (30) months servicing and re-packing time limit from the date of the last service, whichever is earlier.

3) During servicing, a new packing material of the hermetically sealed pouch within the GRP outer container shall be used, in cases where there are signs of degradation as a result of environmental influences, abrasion or other wear and tear that will adversely affect the quality, purpose, and lifespan of the packing material.

4) All servicing test stipulated in IMO Resolution A.761(18) which would have been carried out during the period of extended service interval shall be carried out by the service station at the next service after the nominal "due date" of that test.

5) Monitoring onboard shall be carried out by certified personnel. Humidity level and possible CO_2 leakages shall be check based on instructions provided for by the manufacturer. All readings shall be recorded and kept onboard with the liferaft servicing certificate for documentation and inspection purpose.

6) Passenger ships equipped with liferafts specially packed as above shall comply with SOLAS 74/88 as amended, Chapter III, Regulation 19.4.3 by carrying onboard, or having ready access to a conventionally packed training liferaft of similar type and means of operation, or by carrying a visual training aid which can simulate inflation and davit launching of such liferafts.

7) In addition to all other required marks, the outer GRP container of specially packed S30 liferafts within the extended servicing scheme shall carry the following label:

> 1. This liferaft is permitted for extended service intervals of 30 months at an approved servicing station.
>
> 2. The liferafts must be inspected onboard by a person certified for such purpose by VIKING Life-Saving Equipment A/S at intervals not exceeding 12 months.

Deputy Registrar
Tuvalu Ship Registry

INTERNATIONAL MARITIME ORGANIZATION
4 ALBERT EMBANKMENT
LONDON SE1 7SR

Telephone: 020 7735 7611
Fax: 020 7587 3210

IMO

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Ref. T4/3.01

MSC.1/Circ.1328
11 June 2009

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.

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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 20ºC. 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.

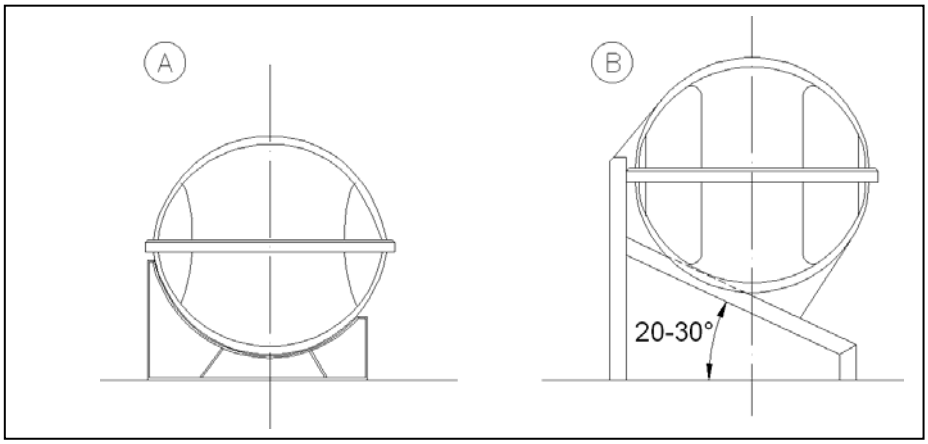

Figure 1 – Mounting arrangements

.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 25ºC and 65ºC, 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 20ºC 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 20ºC 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 CO_2 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 CO_2 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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Resolution A.761(18)

Adopted on 4 November 1993
(Agenda item 11)

RECOMMENDATION ON CONDITIONS FOR THE APPROVAL OF SERVICING STATIONS FOR INFLATABLE LIFERAFTS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING that regulation III/19.8.1 of the International Convention for the Safety of Life at Sea, 1974, as amended, requires that every inflatable liferaft shall be serviced at intervals not exceeding 12 months but that, where it appears proper and reasonable, the Administration may extend this period to 17 months and that inflatable liferafts shall be serviced at an approved servicing station which is competent to service them, maintains proper servicing facilities and uses only properly trained personnel,

NOTING ALSO resolution A.693(17) on the conditions for the approval of servicing stations for inflatable liferafts,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-second session,

1. ADOPTS the Recommendation on Conditions for the Approval of Servicing Stations for Inflatable Liferafts, set out in the annex to the present resolution;

2. INVITES Governments to inspect servicing stations for inflatable liferafts within their authority in accordance with that Recommendation;

3. AUTHORIZES the Maritime Safety Committee to keep the Recommendation under review and to adopt, when appropriate, amendments thereto;

4. REVOKES resolution A.693(17).

Annex

RECOMMENDATION ON CONDITIONS FOR THE APPROVAL OF SERVICING STATIONS FOR INFLATABLE LIFERAFTS

General

1 Administrations should ensure that the periodic survey of inflatable liferafts is performed at servicing stations that have demonstrated competence to service and repack rafts, maintain an adequate facility and use only properly trained personnel. In order to be approved, servicing stations should have demonstrated this capability for inflatable liferafts of each manufacturer whose liferafts they are competent to service and should comply with the following:

.1 servicing of inflatable liferafts should be carried out in fully enclosed spaces only. There should be ample room for the number of inflatable liferafts expected to be serviced at any one time; the ceiling should be sufficiently high to allow the largest liferafts to be serviced to be turned over

when inflated, or an equally efficient means to facilitate inspection of bottom seams should be provided;

.2 the floor should be provided with a clean surface sufficiently smooth to ensure that no damage will occur to the liferaft fabric;

.3 the servicing space should be well lit, provided that direct rays of sunlight do not enter the space;

.4 the temperature and, when necessary, the relative humidity in the servicing space should be sufficiently controlled to ensure that servicing and repairs can be effectively carried out;

.5 the servicing space should be efficiently ventilated, but be free from draughts;

.6 separate areas or rooms should be provided for:

.6.1 liferafts awaiting servicing, repair or delivery;

.6.2 the repair of glass-fibre containers and the painting of compressed gas cylinders;

.6.3 materials or spare parts;

.6.4 administrative purposes;

.7 means should be provided in the liferaft storage space to ensure that liferafts in containers or valises are neither stored on top of each other in more than two tiers unless supported by shelving nor subjected to excessive loads;

.8 spare and obsolete pyrotechnics should be stored in a separate, safe and secure magazine well away from the servicing and storage spaces;

.9 sufficient tools should be available for the servicing of liferafts and release gear in accordance with the requirements of the manufacturer, including:

.9.1 suitable and accurate manometers or pressure gauges, thermometers and barometers which can be easily read;

.9.2 one or more air pumps for inflating and deflating liferafts, together with a means of cleaning and drying the air and including the necessary high-pressure hoses and adapters;

.9.3 a scale for weighing inflation gas cylinders with sufficient accuracy;

.9.4 sufficient gas for blowing through the inlet system of the liferafts;

.10 procedures should be established to ensure that each gas cylinder is properly filled and gastight before fitting to a liferaft;

.11 sufficient materials and accessories should be available for repairing liferafts, together with replacements of the emergency equipment to the satisfaction of the manufacturer;

.12 when servicing davit-launched liferafts, adequate means should be provided for overload testing of such liferafts;

.13 servicing and repair work should only be carried out by qualified persons who have been adequately trained and certificated by the liferaft manufacturer. The training procedure should ensure that servicing personnel are made aware of changes and new techniques;

.14 arrangements should be made for the manufacturer to make available to the service station:

.14.1 changes to servicing manuals, servicing bulletins and instructions;

.14.2 proper materials and replacement parts;

.14.3 bulletins or instructions from the Administration;

.14.4 training for servicing technicians;

.15 smoking should not be allowed in the servicing and packing areas.

2 After initial approval, Administrations should arrange for the frequent inspection of servicing stations to ensure that manufacturer support is up to date and effective and that the requirements of this Recommendation are complied with.

3 Administrations should ensure that information regarding servicing facilities for inflatable liferafts is made available to mariners.

Servicing of inflatable liferafts

4 The following tests and procedures should be carried out, except where noted otherwise, at every servicing of an inflatable liferaft fitted as life-saving equipment.

5 Inflatable liferaft servicing should be carried out in accordance with the appropriate manufacturer's servicing manual. Necessary procedures should include, but not be limited to, the following:

.1 inspection of the container for damage;

.2 inspection of the folded liferaft and the interior of the container for signs of dampness;

.3 a gas inflation (GI) test should be carried out at 5-year intervals, and when undertaking a gas inflation test, special attention should be paid to the effectiveness of the relief valves. The folded liferaft should be removed from its container before activating the fitted gas inflation system. After gas inflation has been initiated, sufficient time should be allowed to enable the pressure in the buoyancy tubes to become stabilized and the solid particles of CO_2 to evaporate. After this period the buoyancy tubes should, if necessary, be topped up with air, and the liferaft subjected to a pressure holding test over a period of not less than one hour, during which the pressure drop will not exceed 5% of the working pressure;

.4 each liferaft should be subjected to the necessary additional pressure (NAP) test as described in appendix 1, or any other similar test recommended by the manufacturer, at yearly intervals after the tenth year of the liferaft's life unless earlier servicing is deemed necessary as a result of visual inspection. After allowing sufficient time for the liferaft to regain fabric tension at working pressure, the liferaft should be subjected to a pressure holding test over a period of not less than one hour, during which the pressure drop will not exceed 5% of the working pressure;

.5 when a NAP or GI test is not required, a working pressure (WP) test should be carried out (see appendix 2), by inflation of the liferaft with dry compressed air, after removing it from the container shell or valise and from its retaining straps, if fitted, to at least the working pressure, or to the pressure required by the manufacturer's servicing manual if higher. The liferaft should be subjected to a pressure holding test over a period of not less than one hour, during which the pressure drop will not exceed 5% of the working pressure;

.6 while inflated, the liferaft should be subjected to a thorough inspection inside and out in accordance with the manufacturer's instructions;

.7 the floor should be inflated, checked for broken reeds and tested in accordance with the manufacturer's instructions;

.8 the seams between floor and buoyancy tube should be checked for slippage or edge lifting;

.9 with the buoyancy tube supported at a suitable height above the service floor, a person weighing not less than 75 kg should walk/crawl around the perimeter of the floor for the entire circumference and the floor seams should be checked again. Manufacturers may substitute any other seam test which will determine the integrity of the floor seam until the next inspection is due. This test should be carried out at yearly intervals after the tenth year of the liferaft's life;

.10 after deflation, arch roots should be checked in accordance with the manufacturer's instructions;

.11 all items of equipment should be checked to ensure that they are in good condition and that dated items are replaced at the time of servicing if there is less than 6 months remaining before the expiry date approved by the Administration;

.12 davit-launched liferafts should be subjected to a 10% overload suspension test at every second servicing;

.13 a check should be made to ensure that the liferaft and the atmosphere are dry when the liferaft is being repacked;

.14 the required markings should be updated and checked;

.15 a record of servicing should be maintained for at least 5 years after the date of service;

.16 statistical records should be prepared on all liferafts serviced, indicating, in particular, defects found, repairs carried out and units condemned and withdrawn from service. Such statistics should be available to the Administration.

Responsibilities of manufacturers, Administrations and shipowners

6 In order to ensure that the servicing of inflatable liferafts is effectively conducted to provide reliable survival craft in an emergency, manufacturers, Administrations and shipowners have parallel and overlapping responsibilities; these include, but are not limited to, the following:

.1 *Manufacturers* are responsible for:

.1.1 ensuring that their liferafts can be adequately serviced in accordance with this Recommendation or with any additional requirements necessary for that particular product and design and thereto accredit a sufficient number of servicing stations;

.1.2 ensuring that each servicing station accredited by them for servicing and repair of their liferafts has qualified persons whom they have adequately trained and certificated to perform such work and who are aware of any changes or new techniques;

.1.3 keeping Administrations fully informed as to the list of servicing stations accredited by them and any changes thereto;

.1.4 making available to service stations:

- changes to servicing manuals, servicing bulletins and instructions;
- proper materials and replacement parts;
- bulletins or instructions from the Administration;

.1.5 keeping Administrations fully informed of any shipping casualties known to them and involving their liferafts; and also of any failures of liferafts, other than failures during inspections which are known to them; and

.1.6 informing shipowners whenever possible of any deficiency or danger known to them and related to the use of their liferafts and taking whatever remedial measures they deem necessary;

.2 *Administrations* are responsible for conducting periodic checks of servicing stations to determine compliance with this recommendation and for checking quality assurance by spot checks or inspections that are deemed to be adequate to achieve compliance;

.3 *Shipowners* are responsible for ensuring, as a minimum requirement, that all liferafts fitted as life-saving equipment are approved and are serviced at the appropriate intervals at an approved servicing station. Whenever practicable, a representative of the shipowner should be in attendance during service.

Appendix 1
Necessary additional pressure (NAP) test

1 Plug the pressure relief valves.

2 Gradually raise the pressure to the lesser of 2.0 times the working pressure or that sufficient to impose a tensile load on the inflatable tube fabric of at least 20% of the minimum required tensile strength.

3 After 5 minutes, there should be no seam slippage, cracking, or other defects (resolution A.521(13), part 1, paragraph 5.18.4.1), or significant pressure drop. If cracking in the buoyancy tubes is audible, the liferaft should be condemned; if no cracking is heard, the pressure in all buoyancy chambers should be reduced simultaneously by removing the plugs from the pressure relief valves.

4 Liferaft manufacturers should include tables in their servicing manuals of exact NAP test pressures corresponding to their particular tube sizes and fabric tensile strength requirements, calculated according to the equation:

$$p(\text{kg/cm}^2) = \frac{2 \times \text{tensile strength (kg per 5 cm)}}{25 \times \text{diameter (cm)}}$$

Appendix 2
Frequency of NAP tests: working pressure (WP), gas inflation (GI) and floor seam strength (FS)

Servicing intervals	Test method
End of first year	WP test
End of second year	WP test
End of third year	WP test
End of fourth year	WP test
End of fifth year	GI test
End of sixth year	WP test
End of seventh year	WP test
End of eighth year	WP test
End of ninth year	WP test
End of tenth year	GI test + FS
Eleventh to fourteenth year	NAP test + FS
Fifteenth year	GI test + NAP + FS
Sixteenth to nineteenth year	NAP test + FS
Twentieth year	GI test + NAP + FS
Twenty-first to twenty-fourth year	NAP test + FS
Twenty-fifth year onwards	GI test + NAP + FS

NAP - Necessary additional pressure test (appendix 1)
WP - Working pressure (compressed air)
GI - Gas inflation (fitted gas)
FS - Floor seam