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Part 2: Inflatable life rafts

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Partie 2: Radeaux pneumatiques de sauvetage

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Maritime safety*.

A list of all parts in the ISO 18079 series can be found on the ISO website.

Introduction

The IMO International Convention on the Safety of Life at Sea of 1974 (SOLAS 74) Chapter III Regulation 20.8 sets requirements for the annual servicing and inspection of inflatable life rafts, inflatable lifejackets, marine evacuation systems, and maintenance and repair of inflated rescue boats on ships. This regulation refers to the IMO Recommendation on the conditions for the approval of servicing stations for inflatable life rafts Assembly resolution A.761(18).

However, this resolution only provides specific standards for the servicing, maintenance and repair of inflatable life rafts and remains silent for other types of inflatable or inflated life-saving appliances mentioned by SOLAS Chapter III Regulation 20.8 and consequently, the application of this statutory requirement could vary widely in practice.

The ISO 18079 series addresses those areas in which the IMO recommendation is silent, in order to facilitate consistent implementation by maritime Administrations. It is intended for use as a companion to the IMO recommendation and also to encompass all other relevant life-saving appliances covered by the ISO 18079 series and not necessarily regulated by IMO instruments.

The IMO Recommendation on the conditions for the approval of servicing stations for inflatable life rafts Assembly resolution A.761(18) specifies obligations and responsibilities for Administrations, manufacturers and ship owners. While the ISO 18079 series covers the requirements of this resolution, it has been rearranged and reformulated in order to enable a single entity, i.e. a servicing station, to attain certification in accordance with the ISO 18079 series. This does not mean that the specified obligations and responsibilities are lifted, delegated or otherwise transferred by authority from those parties to the single entity being certified.

This document addresses the servicing of inflatable life rafts and it is intended for use as a companion to the IMO recommendation and also to encompass all other relevant inflatable life rafts not regulated by IMO/SOLAS.

Ships and marine technology — Servicing of inflatable life-saving appliances —

Part 2:
Inflatable life rafts

1 Scope

This document, in conjunction with ISO 18079-1, provides provisions for servicing stations servicing inflatable life rafts referred to in SOLAS III/20.8. This document is applicable to non-SOLAS inflatable life rafts, as appropriate.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 18079-1:2018, *Ships and marine technology — Part 1: Servicing of inflatable life-saving appliances*

Recommendation on conditions for the approval of servicing stations for inflatable life rafts, as adopted by IMO assembly resolution A.761(18), and amended by resolutions MSC.55(66) and MSC.388(94)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18079-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
flag state
state under whose laws the ship is registered or licensed

4 Servicing of inflatable life rafts

4.1 General

Inflatable liferafts approved by a SOLAS contracting government or its recognised organisations shall be inspected and serviced in accordance with paragraphs 4 and 5 of the annex to IMO Assembly Resolution A.761(18), as amended. This shall include the following unless otherwise specified.

The following tests and procedures shall be carried out, except where noted otherwise, at every servicing of an inflatable life raft fitted as life-saving appliance. Inflatable life raft servicing shall be carried out in accordance with the appropriate manufacturer's servicing manual. Necessary procedures shall include, but not be limited to, the following.

4.2 Initial visual inspection

4.2.1 The life raft shall be visually inspected before performing the tests required according to 4.3.

This visual inspection shall, as a minimum, include the following in accordance with the instructions of the manufacturers servicing manual.

4.2.2 The container or valise shall be inspected for damage and signs of pilferage. This shall include inspection of outer appendages, lines, sealing, closing bands and labels.

4.2.3 The life raft container or valise shall then be opened and the still folded life raft and the interior of the container or valise shall be inspected for signs of dampness or damage.

4.3 Test procedures

4.3.1 General

Following the visual inspections in 4.2, the life raft shall be subject to the following tests at frequencies as described in Annex A. The tests shall be performed in accordance with the manufacturer's servicing manual.

4.3.2 Gas inflation (GI) test

Gas inflation (GI) test shall be carried out at five-year intervals, and when undertaking a GI test, special attention shall be paid to the effectiveness of the relief valves.

The folded life raft shall be removed from its container before activating the fitted gas inflation system.

After gas inflation has been initiated, sufficient time shall be allowed to enable the pressure in the buoyancy tubes to become stabilized and any formation of solid particles of the inflation gas to evaporate.

After this period, the buoyancy tubes shall, if necessary, be topped up with air, and the life raft 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.

Life rafts associated with a marine evacuation system having been deployed and successfully inflated in conjunction with a rotational deployment in accordance with ISO 18079-4:2018, Clause 7 shall be deemed to have satisfied the gas inflation test.

4.3.3 Necessary additional pressure (NAP) test

Each life raft shall be subjected to the necessary additional pressure (NAP) test at yearly intervals after the tenth year of the life raft's service life unless earlier servicing is deemed necessary as a result of visual inspection.

The life raft shall be removed from its container or valise and from its retaining straps, if fitted.

The life raft shall then be inflated using dry compressed air to a pressure at least equal to the working pressure, or to the pressure required by the manufacturer's servicing manual, if higher.

After allowing sufficient time for the life raft to regain fabric tension at working pressure, then all pressure release valves shall be blocked. Blocking of pressure relief valves shall only be done using the equipment and methods prescribed by the manufacturer and care shall be taken as to not damage the valves.

The pressure shall then be gradually raised using dry compressed air to a pressure to the lesser of two 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, i.e. NAP test pressure.

Life raft manufacturers shall include tables in their servicing manuals of exact NAP test pressures corresponding to their particular life raft types and/or tube sizes and fabric tensile strength requirements, calculated according to Formula (1):

$$p\left(\mathrm{N/m^2}\right) = \frac{\text{tensile strength } \left(\mathrm{N/m}\right)}{5 \cdot \text{radius } \left(\mathrm{m}\right)} \tag{1}$$

After 5 min, there should be no seam slippage, cracking, other defects, or significant pressure drop. If cracking in the buoyancy tubes is audible, the life raft shall be condemned; if no cracking is heard, the pressure in all buoyancy chambers shall be reduced simultaneously by removing the plugs from the pressure relief valves.

The life raft shall then be subjected to a pressure holding test over a period of not less than one hour, during which the pressure drop shall not exceed 5 % of the working pressure.

4.3.4 Working pressure (WP) test

At services where a NAP or GI test is not required, a working pressure (WP) test shall be carried out in accordance with Annex A and in accordance with the manufacturer's servicing manual.

The life raft shall be removed from its container or valise and from its retaining straps, if fitted.

The life raft shall then be inflated using dry compressed air to a pressure at least equal to the working pressure, or to the pressure required by the manufacturer's servicing manual if higher.

The life raft shall then 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.

4.3.5 Floor inspection

The floor, if of an inflatable design, shall be inflated not exceeding the test pressure prescribed by the manufacturer.

The inflated floor shall then be checked for broken reeds and tested in accordance with the manufacturer's instructions.

The seams between floor and buoyancy tube shall be checked for slippage or edge lifting.

Where the insulation required is by means other than an inflatable floor, this shall be inspected for damage, including its secure attachment.

4.3.6 Floor seam (FS) test

Following the test and inspections in 4.3.4 and 4.3.5, a floor seam (FS) test shall be carried out at yearly intervals after the tenth year of the life raft's life.

For this test the life raft buoyancy tubes shall be supported by a system which leaves the floor seams unsupported, at a suitable height above the service floor as shown in Figure B.1 (see Annex B).

Then, a person weighing not less than 82,5 kg shall walk or crawl around the perimeter of the floor for the entire circumference and the floor seams should be checked again.

Manufacturers may substitute this test with another test which will determine the integrity of the floor seam until the next inspection is due.

The floor seam (FS) test required in the eleventh and subsequent years need not be carried out for davit-launched life rafts at servicing when the overload suspension test is conducted according to 4.3.8.

4.3.7 Additional tests and inspections

While inflated, the life raft shall be subjected to a thorough inspection inside and out in accordance with the manufacturer's instructions.

Following deflation, arch roots shall be checked in accordance with the manufacturer's instructions.

All items of equipment shall be checked to ensure that they are in good condition and that dated items are replaced at the time of service if their expiry dates occur before the date of the next service.

The required markings and records on the life raft shall be updated and checked.

Checks shall be made to ensure that the life raft and the atmosphere are dry when the life raft is being repacked.

4.3.8 Davit-launched inflatable life raft overload testing

Davit-launched life rafts shall be subject to a 10 % overload suspension test at every second servicing in accordance with the schedule in Table A.1.

Before conducting the overload test, all parts of the lifting bridle arrangement shall be visually inspected. Lines and webbing shall be checked for signs of damage, chamfering or ageing and all patches connecting the lifting bridles to the life raft supporting structure shall be checked for slippage or edge lifting.

The davit-launched inflatable life raft should be loaded with a weight equal to 110 % of the weight of its emergency pack and the number of persons for which it is approved, the weight of each person being taken as 82,5 kg.

Except for the floor which shall not be inflated, the inflatable life raft shall be fully inflated with all relief valves operative.

The loaded inflatable life raft shall then remain suspended for at least 5 min.

During the test and after its completion, the inflatable life raft shall remain suitable for its intended use.

4.3.9 Gas inflation systems inspection

All gas cylinders shall be weighed and checked against the gross weight which has been marked on the filled cylinder. To allow for difference of scales when check-weighing, a tolerance of ±14 g is permitted. No gas cylinder shall be fitted to a life raft unless it has passed one of the following tests.

a) For gases other than CO_2: storage for a period of at least 30 days after filling. Weighing shall take place before and after storage using the same scales. There shall be no loss of weight.

b) For CO_2 gas only: as in a) or the leak test as specified in Annex C.

c) Checked for leakage using an electronic instrument capable of detecting a leakage equivalent to 10 g per year.

5 Documentation

5.1 General

Records of servicing shall be prepared and maintained for at least 5 years after the date of service. Items to be included in the servicing records shall as a minimum include the information in 5.2 to 5.5.

5.2 General information to be recorded

— Identification of servicing station and certified technician.

— Ship identification.

— Flag state of ship.

— Life raft serial number.

— Date of manufacture.

— Manufacturer.

— Type and capacity of life raft.

— Approval information, i.e. approving authority and type approval number.

— Date when last serviced.

— Name and place of servicing station where it was last serviced.

— Condition of the life raft when received.

— Any deficiencies found.

NOTE For records of deficiencies, refer to Clause 6.

5.3 Test data to be recorded

— Result of gas inflation test (GI test).

— Result of necessary additional pressure test (NAP test).

— Result of floor seam test (FS test).

— Result of working pressure test (WP test).

5.4 Condemnation Documentation for life rafts

When condemning a life raft, the following information shall be recorded and forwarded to the manufacturer:

— manufacturer, type, capacity and serial number of life raft;

— ship owner;

— name and IMO number of ship;

— flag state of ship;

— type of ship hosting the life raft;

— cause of condemnation.

Annex D shows an example of a condemnation form.

5.5 Control objects to be included in the inspection schedule

5.5.1 General

The inspection schedule, which shall be acquired from the manufacturer, shall address, but not necessarily be limited, to the following objects.

5.5.2 Life raft container/valise

Bursting band/tape, stowage height, painter inside, painter outside, connecting line, marking on container/valise, protective lining in container, container retaining line incl. pocket and fastening.

5.5.3 Davit-launched life raft container/valise

Suspension straps/patches, shackle, steering lines with patches.

5.5.4 Life raft external

Canopy, aerial outlet, external lights and batteries, buoyancy tubes and floor fabric, righting system, stabilizing pockets, rain water collecting system, boarding ramp, entrance ladder, relief valves with stoppers, inflation hoses and fittings, markings, lifelines and fastening, bridle, safety knife with holder, towing line.

5.5.5 Life raft internal

Rescue quoit with line, lifeline and fastening, safety knife with holder, closure for canopy openings, canopy, marking/instructions, collection bags for rain water, rain water collecting system with plugs, buoyancy tubes and floor fabric, thwarts, fastening for emergency pack, internal lights and batteries, viewing ports, topping up valves, aerial support, radar transponder, radar transponder mounting arrangement, drainage arrangement, paddles, bellows, repair kit, sea-anchor with line, bailer, SART, EPIRB.

5.5.6 Emergency pack

Drinking water, drinking cup, bailer, food rations, TPA, medicine kit, anti-seasickness tablets, parachute rockets, hand flares, smoke signals, signal lamp with whistle, spare batteries and bulb for signal lamp, fishing kit, sponges, tin opener, pair of scissors, seasickness bags, signalling mirror, life-saving signals, survival instruction.

5.5.7 Gas cylinder

Hydro testing, gas filling date, chemical test, gross weight, tare weight, CO_2 content, N_2 content, operating head, actuating knife, release wire.

5.5.8 Hydrostatic release Unit

Name and type of HRU, serial number, expiry date, test of HRU, release pressure, weak link, log card.

6 Deficiency records

Records shall be prepared on life rafts serviced, where the required servicing frequency is violated, defects found, repairs carried out and units condemned and withdrawn from service. Such records shall be submitted without undue delay to the manufacturer and subsequently made available to the Administration as and when required. Annex D shows an example of a condemnation form.

Annex A
(normative)

Test schedule for inflatable life rafts

Table A.1 — Frequency of tests to be performed during servicing

Servicing intervals	Test methods			
End of first year	WP			
End of second year	WP			
End of third year	WP			
End of fourth year	WP			
End of fifth year		GI		
End of sixth year	WP			
End of seventh year	WP			
End of eighth year	WP			
End of ninth year	WP			
End of tenth year		GI		FS
End of eleventh to fourteenth year			NAP	FS
End of fifteenth year		GI	NAP	FS
End of sixteenth to nineteenth year			NAP	FS
End of twentieth year		GI	NAP	FS
End of twenty-first to twenty-fourth year			NAP	FS
End of twenty-fifth year		GI	NAP	FS

WP Working pressure (see 4.3.4).

GI Gas inflation (see 4.3.2).

NA Necessary additional pressure (see 4.3.3).

FS Floor seam testing (see 4.3.6).

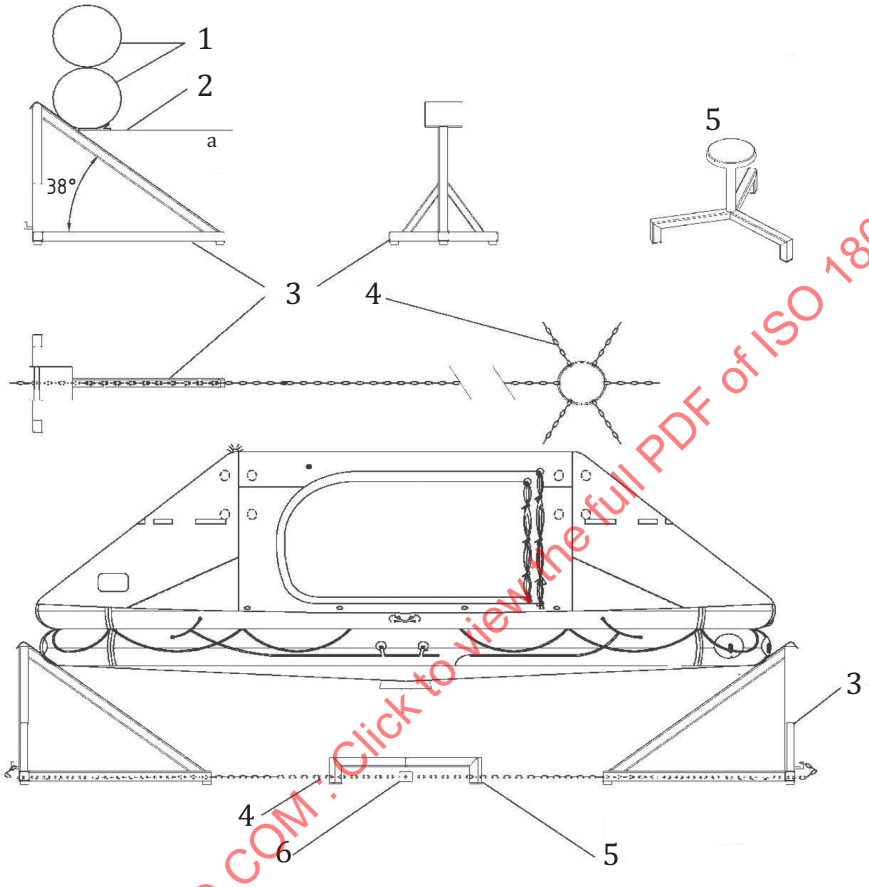
Life rafts older than 25 years shall follow the test frequencies applicable from end of years 15 and onwards.

In the Servicing intervals column. “End of …” shall be understood as the periodic service dates in accordance with SOLAS Chapter III Regulation 20.

NOTE Overload test (4.3.8) of davit-launched life rafts not included in schedule.

Annex B
(informative)

Guidelines for floor seam (FS) test supports



Key

1 buoyancy tubes
2 raft floor
3 support
4 chain
5 centre support for life rafts having a capacity of more than 35 persons
6 centre ring
a Floor seam is unsupported.

Figure B.1 — Typical support arrangement for floor seam (FS) testing

SAFETY PRECAUTIONS — All supports should be securely fastened and stable as to prevent the life raft from falling when performing the floor seam test.

Annex C
(normative)

Cylinder leak test — CO_2 only

C.1 General

When included in the Manufacturer's instructions, a leak test as prescribed by 4.3.9 b) may be performed using the method and materials below. Chemicals used in the test shall be stored and disposed of in accordance with the Manufacturer's instructions and local waste management regulations.

C.2 Required materials

The following material shall be provided for the purpose of testing:

— polythene bags of a suitable size to fit over the head of the cylinder, for example:

  — for a 125 mm diameter cylinder, the bag size is approximately 230 mm open width × 300 mm length;

  — for a 100 mm diameter cylinder, the bag size is approximately 165 mm open width × 300 mm length;

  — for a 90 mm diameter cylinder, the bag size is approximately 150 mm open width × 300 mm length;

— elastic bands of a suitable size;

— a measuring glass, capacity 25 ml;

— test solution as specified by the Manufacturer used to indicate small amounts of CO_2 gas.

C.3 Test method

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 with a clean, dry cloth. Remove the dust cap and clean the valve. Replace the cap loosely.

Using the measuring glass, transfer 25 ml of the test solution into a polythene bag and pass the open end of the polythene bag over the valve head and seal this to the cylinder body using one or more elastic bands. Make sure there are no air gaps in the seal. The polythene bag should hang 200 mm off the valve end of the cylinder with the test solution in one corner.

Maintain the test for a period of not less than one hour. After the test period, shake the solution gently and make the observations detailed in C.4.

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.

C.4 Test observations

If no colour change is observed, there is no leak of gas from the cylinder. A leak of CO_2 from the cylinder will cause the pink colour of the test solution to fade. The test solution will become clear as water.

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.