
**Ships and marine technology —
Servicing of immersion suits, anti-
exposure suits and constant wear suits**

*Navires et technologie maritime — Entretien des combinaisons
d'immersion, des vêtements de survie et des combinaisons de port
permanent*

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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 of 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 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*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The IMO International Convention on the Safety of Life at Sea of 1974 (SOLAS 74) sets requirements for the monthly inspection and periodic inspection of life-saving appliances, including immersion suits, anti-exposure suits and constant wear suits. The IMO has circulated guidelines which are not sufficiently detailed as to provide uniform application by crews on board ships and for authorisation of servicing stations.

This document addresses the servicing of immersion suits, anti-exposure suits and constant wear suits. It is intended for use as a companion to the IMO recommendations. It is also intended to encompass all other relevant personal protective suits not covered by SOLAS regulations.

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Ships and marine technology — Servicing of immersion suits, anti-exposure suits and constant wear suits

1 Scope

This document, in conjunction with ISO 18079-1, specifies provisions for servicing stations conducting servicing of immersion suits, anti-exposure suits and constant wear suits, including, but not limited to, those subject to IMO regulations, recommendations and guidelines.

2 Normative references

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

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

ISO 18079-3, *Ships and marine technology — Servicing of inflatable life-saving appliances — Part 3: Inflatable lifejackets*

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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

immersion suit

protective suit including head, hand and feet protection which reduces the body heat loss of a person wearing it in cold water

3.2

anti-exposure suit

protective suit designed for use by rescue boat crews and marine evacuation system parties, with head and hand protection, but the feet need not be covered, and a minimum buoyancy of 70 N

3.3

constant wear suit

protective suit designed to be routinely worn for activities on or near water in anticipation of accidental immersion in water, but permitting physical activity to such an extent that actions can be undertaken without undue encumbrance and thus, head, hands and feet need not be covered

3.4

dry suit

protective suit designed to protect the user against the effect of cold water immersion by precluding the entry of water upon immersion

3.5

wet suit

protective suit designed to protect the user against the effect of cold water immersion by providing insulation and permitting the entry and exit of water upon immersion

3.6

helicopter transit suit

constant wear suit (3.3) worn by helicopter occupants

3.7

passenger suit

suit worn by passengers being transported over water

3.8

rescue suit

suit worn by professional users designated to perform search and rescue operations

3.9

flood response suit

suit worn by professional users designated to carry out flood response operations

3.10

floatation suit

suit incorporating *inherent buoyant materials* (3.12) for the purpose of floatation of the wearer in water

3.11

authorized repair station

authorized servicing station

station authorized by the suit manufacturer to perform repairs or servicing and acceptable to the Administration

3.12

inherent buoyant material

material that provides buoyancy, forming a permanent or separate part of the suit, with a density less than that of water

3.13

retro-reflective tape

material that reflects light beams back to their point of origin

3.14

buddy line

length of cord which can be tied or otherwise fixed to another person, or to that person's personal flotation device or other objects, so as to keep a user in the vicinity of that person or object with a view to making location and thus rescue easier

4 Servicing of immersion suits and anti-exposure suits

4.1 General

Immersion and anti-exposure suits encompass dry suits and wet suits intended for planned immersion or emergency abandonment that are not normally used as constant wear.

Periodic servicing and repair of immersion and anti-exposure suits shall be carried out in accordance with the requirements of ISO 18079-1 and the appropriate manufacturer's servicing manual and instructions. The tests and procedures shall include, but not be limited to, those specified in 4.2.

4.2 Inspection, testing and repair

4.2.1 Check closures on storage bag as well as general condition of bag, if provided.

4.2.2 Ensure donning instructions are legible. Confirm that suit is the type and size identified on the bag, if provided.

4.2.3 Unpack and visually inspect the suit for damage and signs of moisture or dampness. The suit shall be dry inside and out. All outer materials shall be checked for rips, tears and punctures. All separable inherent buoyant or insulation materials shall be removed for inspection. All inherent buoyant or insulation materials, both fixed and separable, shall be checked for rips, tears and undue compression, stiffening, cracking or deterioration.

Rips, tears or punctures shall be repaired in accordance with the manufacturer's instructions by an authorized servicing station using proper parts and certified personnel. Deterioration or damage to inner buoyancy and insulation materials shall be referred to the manufacturer for further checks and advice.

4.2.4 Check the zipper by fully opening and closing to check for ease of operation. Where lubricant is recommended by the manufacturer, lubricate the zipper according to manufacturer's instructions. If the zipper is not functional, the suit shall be removed from service and discarded or returned to the manufacturer or an authorized repair station.

4.2.5 If fitted, check inflatable head support and/or buoyancy ring for damage and ensure that it is properly attached. Check inflation hose(s) for deterioration. Head support/buoyancy ring shall be fully inflated and tested for leaks.

Any leaks shall be repaired in accordance with manufacturer's instructions by an authorized servicing station using proper parts and certified personnel.

4.2.6 If fitted with integral inflatable lifejacket, all appropriate checks and tests shall be carried out in accordance with ISO 18079-3 and in accordance with the manufacturer's manual.

4.2.7 If fitted, check any valves for correct function and mounting in accordance with the manufacturer's manual.

4.2.8 Check all closures, fastenings, straps, belts, harnesses, buckles and D-rings for proper condition, correct function and security of attachment.

4.2.9 Check all seals at neck, wrists and ankles for condition, function, integrity and security of attachment.

4.2.10 Check hood, gloves and socks or boots for condition, function, integrity and security of attachment.

Socks or boots are not a requirement for anti-exposure suits so may not be fitted.

4.2.11 Check retro-reflective tape for condition and adhesion.

4.2.12 If fitted, inspect whistle for function and mounting.

4.2.13 If fitted, check expiration date of light and battery and inspect for function and mounting.

4.2.14 If fitted, check buddy line for condition, integrity and security of attachment.

4.2.15 If fitted, check lifting strap and/or grab loop for condition, integrity and security of attachment.

4.2.16 For all dry type suits, a pressure test shall be carried out according to [Clause 6](#) to check for leakages.

4.2.17 The marking shall be checked for legibility and the date of current service and next service shall be clearly marked.

4.2.18 The suit shall only be repacked in a dry condition and atmosphere.

4.2.19 The suit shall be packed with all zippers and closures fully open except where the manufacturer's instruction specifies otherwise.

4.2.20 Any repairs or replacement of parts shall only be carried out in accordance with the manufacturer's instruction or servicing manuals.

5 Servicing of constant wear suits

5.1 General

Constant wear suits encompass dry suits and wet suits; including, but not limited to, floatation suits, helicopter transit suits, passenger suits, rescue suits and flood response suits, where designated for constant wear use as opposed to emergency abandonment or immersion situations.

Periodic servicing of constant wear suits shall be carried out in accordance with the requirements of ISO 18079-1 and the appropriate manufacturer's servicing manual. The tests and procedures shall include, but not be limited to, those specified in [5.2](#).

5.2 Inspection, testing and repair

5.2.1 Unpack and visually inspect the suit for damage and signs of moisture or dampness. The suit shall be dry inside and out. All outer materials shall be checked for rips, tears and punctures. All separable inherent buoyant or insulation materials shall be removed for inspection. All inherent buoyant or insulation materials, both fixed and separable, shall be checked for rips, tears and undue compression, stiffening, cracking or deterioration.

Rips, tears or punctures shall be repaired in accordance with manufacturer's instructions by an authorized servicing station using proper parts and certified personnel. Deterioration or damage to inner buoyancy and insulation materials shall be referred to the manufacturer for further checks and advice.

5.2.2 Check the zipper by fully opening and closing to check for ease of operation. Where lubricant is recommended by the manufacturer, lubricate the zipper according to manufacturer's instructions. If the zipper is not functional, the suit shall be removed from service and discarded or returned to the manufacturer or an authorized repair station.

5.2.3 If fitted, check inflatable head support and/or buoyancy ring for damage and ensure that it is properly attached. Check inflation hose(s) for deterioration. Head support/buoyancy ring shall be fully inflated and tested for leaks. Leaks shall be repaired in accordance with manufacturers' instructions by an authorized repair station.

5.2.4 If fitted with integral inflatable lifejacket, all appropriate checks and tests shall be carried out in accordance with ISO 18079-3 and in accordance with the manufacturer's manual.

5.2.5 If fitted, check any valves for function and mounting.

5.2.6 Check all closures, fastenings, straps, belts, harnesses, buckles, D-rings for condition, function and security of attachment.

5.2.7 If fitted, check all seals at neck, wrists and ankles for condition, function, integrity and security of attachment.

5.2.8 If fitted, check hood, gloves and socks or boots for condition, function, integrity and security of attachment.

Gloves, socks or boots are not a requirement for constant wear suits so may not be fitted.

5.2.9 Check retro-reflective tape for condition and adhesion.

5.2.10 If fitted, inspect whistle for function and mounting.

5.2.11 If fitted, check expiration date of light and battery and inspect for function and mounting.

5.2.12 If fitted, check buddy line for condition, integrity and security of attachment.

5.2.13 If fitted, check lifting strap and /or grab loop for condition, integrity and security of attachment.

5.2.14 A pressure test shall be carried out according to [Clause 6](#) to check for leakages for all dry type suits.

5.2.15 The marking shall be checked for legibility and the date of current service and next service shall be clearly marked.

5.2.16 The suit shall only be repacked in a dry condition and atmosphere.

5.2.17 Any repairs or replacement of parts shall only be carried out in accordance with the manufacturer's instruction or servicing manuals.

6 Pressure test

6.1 General

This test is applicable to dry type suits where protection and insulation of the wearer is dependent on the water tightness, integrity, seals and closures of these suits. It is not applicable to wet type suits.

The test shall be performed following the inspections as per [Clauses 4](#) or [5](#) respectively.

To ensure the maintenance of adequate strength and water tightness of seams and closures of these suits, each suit shall be subjected to an air pressure test in accordance with the manufacturer's instructions. The test shall include, but not be limited to, the procedure specified in [6.2](#). It shall be performed at intervals not exceeding three years, and annually for suits over ten years of age.

6.2 Procedure

6.2.1 A suitable head piece, fitted with a means to inject air into the suit, shall be inserted into the face orifice of the suit and secured so as to minimize leakage around the face seal. A low-pressure monitoring device, either integral to the fitting for air injection or as a separate device, shall also be inserted. If the suit is fitted with detachable gloves and/or boots, the wrists and/or cuffs shall be sealed by inserting a short length of suitable diameter plastic pipe and securing the gloves and/or boots with suitable wire ties or hose clamps. The zipper shall be fully zipped, and any face flap closed. The suit shall then be inflated to the pressure stated by the manufacturer which shall not be less than 2,0 kPa. If an auxiliary inflatable means of buoyancy is provided, it shall be inflated through the oral valve to the pressure stated by the manufacturer which shall not be less than 0,7 kPa.

6.2.2 Each seam and closure of the suit - and each seam, oral tube and attachment points and joint or valve of any auxiliary inflatable means of buoyancy - shall then be covered with a soapy water solution containing enough soap to produce bubbles.

If leakage is noted at a foot valve to the extent that air pressure cannot be maintained, the valves shall be sealed for the test.

6.2.3 If leaks are revealed by the propagation of bubbles at seams or closures, the leaking areas shall be marked and, after cleaning the suit thoroughly with fresh water and drying it, repaired in accordance with the suit manufacturer's recommendations. After the completion of repairs the suit shall be retested in accordance with [6.2](#) to ensure all repairs are satisfactory.

6.3 Repairs

Any repairs and renewals shall only be carried out in accordance with the manufacturer's instructions and authorization.

7 Servicing records

7.1 General

Records of servicing shall be prepared and maintained for at least 5 years after the date of service. The records shall include, but not be limited to, the items specified in [7.2](#) to [7.4](#).

7.2 General information

- a) Identification of servicing station and certified technician.
- b) Identification and contact details of customer.
- c) Suit serial number and/or lot/batch number(s).
- d) Date of manufacture.
- e) Make, model and size.
- f) Approval, where applicable.
- g) Date of servicing.
- h) Information on previous service, if applicable.

7.3 Information about suit condition when received

If a non-conformity has to be raised, information about the reason and name of the previous servicing station shall be recorded and submitted to the manufacturer without delay.

7.4 Inspection and test information to be recorded

- a) Result of inspection.
- b) Result of pressure test, if applicable.
- c) Weight of CO₂ cylinder (if fitted).
- d) Result of functional test on light (if fitted).
- e) Batch numbers and expiry dates (as applicable) of all component parts as received, e.g. inflator system, cartridge, bobbin and light.

- f) General condition and integrity of all parts checked.
- g) Inspection schedule, faults found and work carried out.

7.5 Re-inspection certificate

The service station shall issue a re-inspection certificate or similar documentation (an example of such a certificate is shown in [Annex B](#)) verifying that all servicing, inspection, testing and maintenance provided has been carried out in accordance with this document and other instruments where applicable. The format and contents of this certificate shall be acceptable to the manufacturer and shall include, but not be limited to the following:

- a) identification of the service station,
- b) identification of the equipment such as name of manufacturer, type, model and size, serial number, batch number and date of manufacture,
- c) identification of the customer,
- d) date of servicing,
- e) a statement that the equipment was serviced and inspected in accordance with this document,
- f) a statement that the equipment is fit for purpose.

The certificate shall be issued to the customer with the returned equipment and a copy shall be retained by the service station for a period of at least 5 years.

7.6 Log card information

The servicing station shall update the information on the log card, where provided, as appropriate and at least including the following:

- a) confirmation of suit being tested as satisfactory/fit for purpose;
- b) date of service.

7.7 Condemnation documentation for suits

When condemning a suit, the following information shall be recorded as a minimum and be forwarded to the owner and to the manufacturer (an example of such a form is shown in [Annex A](#)):

- a) manufacturer, suit model, type approval, size and serial/lot/batch number of suit;
- b) ship owner/company/end-user;
- c) name and IMO number of ship, if applicable;
- d) flag state of ship, if applicable;
- e) type of vessel hosting the suit, if applicable;
- f) cause of condemnation;
- g) date of condemnation.

7.8 Control objects to be included in the inspection schedule

The inspection schedule, which shall be provided by the manufacturer, shall address, but not necessarily be limited to, the following objects:

a) Suit storage bag

Materials, straps, buckles and marking.

b) Suit exteriors

Fabric, seams, zippers, seals, valves, hood, gloves, boots, socks, straps, belts, harnesses, lifting strap, reflective tape, buddy line, grab loop, light, whistle and marking.

c) Suit inflation system (if fitted)

Inflator unit (bobbins, tablets, cartridges), CO₂ cylinder, oral inflation, including mouth piece valve, relief valves, inflator system connection/fitting to bladder – e.g. sealing ring, manifold, valve.

d) Suit inners

Liners, inherent buoyancy and insulation materials such as foam or neoprene that may also be separate to the outer suit; zips, seams, tapes, seals, glue.

8 Exception and deficiency reports

Records shall be prepared on suits serviced, where the servicing frequency is violated, defects are found, repairs are carried out and units are condemned and withdrawn from service. Such records shall be immediately submitted to the manufacturer and subsequently be made available to the Administration upon request. ([Annex A](#) shows an example of a condemnation form).