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## Small craft — Inflatable liferafts —

### Part 1: Type I and II

ICS: 47.080

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[ISO/DIS 9650-1](#)

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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](http://www.iso.org/directives)).

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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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 188, *Small craft*.

This edition cancels and replaces ISO/WDI 9650-1 and 2.

The main changes compared to the previous edition are as follows:

- Combined ISO 9650-1 and ISO 9650-2;
- Modified Scope to align with meteorological conditions;
- Rationalization of Types and Groups of liferafts;
- Inclusion of Testing schedule for prototypes, manufacturing and servicing;
- Updated reference standard for sea anchors;
- Included reference standard for gas inflation systems;
- Increased requirements for marking products;
- Reviewed terminology of painter/towing line;
- Modified requirements for canopy;
- Modified requirements for boarding system;
- Modified testing requirements,

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](http://www.iso.org/members.html).

## Introduction

This document is intended for inflatable liferafts for small craft used for leisure activities. It does not apply to liferafts required for ships under the International Maritime Organization (IMO) *Safety Of Life At Sea* (SOLAS) Convention.

A liferaft manufactured and maintained in accordance with this document should provide:

- a reasonably safe refuge for a shipwrecked person awaiting rescue;
- a reasonable service lifetime, provided a user meets a manufacturer's clearly specified recommendations on stowage and maintenance.

Compliance with this document does not imply that a liferaft will be suitable in all circumstances.

A liferaft which complies with this document must be constructed in such a manner that maintenance is as easy and straightforward as possible.

A user must be responsible for selecting a liferaft appropriate to the intended circumstances of use. Manufacturers and vendors must inform potential purchasers of the properties of the product, including possible choices (e.g. different equipment packs), limits on normal usage, and recommendations on stowage and maintenance.

The tests in this document have been designed to simulate reality as closely as possible. Compliance with a test does not guarantee similar performance in service. For example, compliance with the righting tests does not guarantee that a liferaft can be righted at sea by an exhausted person in all circumstances.

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# Small craft — Inflatable liferafts —

## Part 1: Type I and II

### 1 Scope

This document specifies the minimum requirements for design, performance and marking characteristics, and gives the test methods for inflatable liferafts:

- having a carrying capacity of 4 persons to 16 persons;
- applicable on small craft of hull length up to 24 m;
- intended for launching overboard from a height not exceeding 6 m;
- of type 1 and type 2.

NOTE Type 1 and Type 2 liferafts are defined within [Clause 4.2](#).

### 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 12402-3:2020, *Personal flotation devices — Part 3: Lifejackets, performance level 150 — Safety requirements*

ISO 15738:2019, *Ships and marine technology — Maritime safety — Gas inflation systems for inflatable life-saving appliances*

ISO 17339:2018, *Ships and marine technology — Life saving and fire protection — Sea anchors for survival craft and rescue boats*

IMO SOLAS 83, Chapter III, Resolution A.658 (16), Annex 2

SOLAS *International Life-Saving Appliance Code* (LSA Code)

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

##### operating pressure

pressure determined by the designed reseal pressure of the relief valves, except that, if the actual reseal pressure of the relief valves, determined by testing, exceeds the designed reseal pressure by more than 15 %, the higher figure is used

### 3.2

#### **full load**

load of the number of people corresponding to the maximum capacity (see 5.2.3.2) of the liferaft, each weighing 82,5 kg, seated at their normal place, or, unless otherwise specified, load of the number of uniformly distributed equivalent masses weighing 82,5 kg (e.g., bags of sand)

### 3.3

#### **buoyancy chamber**

buoyancy compartment

inflatable compartment contributing to the buoyancy of the liferaft

### 3.4

#### **small craft**

recreational boat, and other watercraft using similar equipment, of up to 24 m length of hull (LH)

### 3.5

#### **inflatable compartment**

compartment which inflates to provide insulation, buoyancy or structure

### 3.6

#### **calm water**

water conditions at or below meteorological condition Beaufort Force 3

### 3.7

#### **carrying capacity**

the number of persons which a liferaft shall be permitted to accommodate

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## 4 General provisions

### 4.1 Introduction

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#### 4.1.1 An inflatable liferaft is comprised of:

- a structure;
- an inflation system;
- fittings;
- equipment;
- instructions;
- protective outer container.

#### 4.1.2 The structure of a liferaft is comprised of:

- at least two independent buoyancy chambers;
- a floor;
- a canopy and a canopy support;
- stabilization means.

#### 4.1.3 The inflation system is comprised of:

- an initial inflation system;
- a manual back-up inflation system.



**4.1.4** The fittings shall include:

- external lighting;
- painter /mooring line
- painter/towing attachment point;
- external and internal lifelines;
- righting system;
- means of boarding;
- sea anchor;
- rescue quoit and line;
- safety knife.

Further fittings may be included, provided the tests of [Clause 6](#) are completed.

**4.2 Types of liferaft**

This document defines two types of liferaft.

Type 1:

- designed for extended voyages, where high wind and significant wave heights may be experienced, but excluding abnormal conditions such as hurricanes;
- prepared to meet serious emergencies without expectation of outside assistance;
- not for voyaging in extreme zones.

Type 2:

- designed for conditions, up to significant wave height of 2 m and up to and including a wind speed of Beaufort 6;
- designed for conditions with an ambient air temperature of above 10 °C.

**5 Requirements****5.1 General requirements**

Inflatable liferafts serviced in accordance with the manufacturer's instructions, shall provide adequate protection against the risks incurred and shall satisfy the requirements described in this document.

[Table 1](#) summarizes the subclause(s) to consider for each main characteristic.

**Table 1 — General Requirements**

Characteristics	Requirements in	Tests methods in
Launching	<a href="#">5.2.1.1</a>	<a href="#">6.2</a>
Inflation	<a href="#">5.2.2</a>	<a href="#">6.3</a>
Buoyancy	<a href="#">5.2.3</a>	<a href="#">6.15</a>
Stability and performance at sea	<a href="#">5.2.4</a>	<a href="#">6.4, 6.5, 6.6, 6.7, 6.15</a>
Solidity, watertightness, materials	<a href="#">5.2.5</a>	<a href="#">6.8, 6.9, 6.15</a>

**Table 1** (continued)

Characteristics	Requirements in	Tests methods in
Habitability	<a href="#">5.2.6</a>	
Visibility to rescuers	<a href="#">5.2.7</a>	<a href="#">6.14</a>
Fittings and equipment	<a href="#">5.2.8</a>	<a href="#">6.12</a> , <a href="#">6.13</a> , <a href="#">6.14</a>
Instructions and marking	<a href="#">5.2.9</a>	<a href="#">6.10</a>
Protective outer container	<a href="#">5.2.10</a>	<a href="#">6.10</a>

## 5.2 Detailed requirements

### 5.2.1 Deployment

#### 5.2.1.1 Launching

The liferaft shall be capable of being dropped into the water from a minimum height of 6 m above the water level or the liferaft storage position, whichever is the greater, without damage, in accordance with [6.2](#).

#### 5.2.1.2 Properties of the painter

The painter /towing attachment point shall be accessible from the entrance to the liferaft.

The length of the painter shall be 9 m.

A contrasting coloured indication shall be visible at 1 m from the firing point  $\pm 0,1$  m. The painter shall be easy to handle and to pull.

The breaking load of the painter, shall not be less than:

- 7,5 kN for capacities of 4 – 12 persons;
- 10 kN for capacities of 13 – 16 persons.

The breaking load of the painter's attachment/towing system to the liferaft, shall be greater than the painter by 0.5 kn.

The painter attachment/towing system shall be constructed so as to not damage the liferaft on failure of the attachment system during the liferafts' serviceable life.

The painter shall withstand weathering, so as not to detrimentally effect its intended use for the service interval of the liferaft.

### 5.2.2 Inflation

Type 1 liferafts shall be designed to inflate correctly in an air temperature between - 15 °C and + 65 °C during the course of the launching and temperature inflation tests conducted in accordance with [6.2](#) and [6.3](#).

Type 2 liferafts shall be designed to inflate correctly in an air temperature between 0 °C and + 65 °C during the course of the launching and temperature inflation tests conducted in accordance with [6.2](#) and [6.3](#).

#### 5.2.2.1 Initial inflation system - General

The initial inflation system shall be actuated by a pull on the painter, thereby allowing the release of pressurized gas. All subsequent force exerted on the painter shall act directly on the painter/towing attachment point, or any other point offering strength characteristics equivalent to the values required for the painter (see [5.2.1.2](#)).

This inflation system may be supplemented by an automatic inflation system, i.e. inflation without pulling on the painter (e.g. hydrostatic pressure-sensitive automatic actuation).

The gas inflation system including valves should meet the requirements as set out in ISO 15738:2019.

#### 5.2.2.2 Quantity of gas

The quantity of gas shall be sufficient for the liferaft to inflate and achieve working pressure under low temperatures, as required by 6.3.4.

The quantity of gas in the cylinder shall be such that the internal pressure of the cylinder, at the temperature of + 65 °C, does not exceed the hydraulic test pressure of the cylinder.

#### 5.2.2.3 Relief Valves

The number and location of relief valves shall be such that the pressure is limited in all the inflatable compartments.

Relief valves shall be able to be sealed off according to the manufacturer's instructions. The relevant outlet should not discharge inside the liferaft.

The relief valves shall be positioned so that they can be sealed off from the interior of the raft, the canopy opening or the lookout position, in such a way that this can be achieved without leaving the interior of the raft.

#### 5.2.2.4 Non-Return Valves

Sufficient non-return shall be provided at gas inlets to comply with 5.2.3.1.

#### 5.2.2.5 Topping-up inflation valves

All inflatable compartments, including canopy supports, but excluding, where fitted, boarding ramps, shall be provided with a topping-up non-return valve allowing the compartments to be inflated by a bellows or a pump.

### 5.2.3 Buoyancy

#### 5.2.3.1 Number of compartments

Buoyancy shall be provided by not less than two separate compartments, each inflated through a non-return inflation valve on each compartment.

The buoyancy compartment shall be so arranged that, in the event of any one of the compartments being damaged or failing to inflate, the intact compartments shall be able to support, with positive freeboard over the liferaft's entire periphery, the number of persons which the liferaft is permitted to accommodate, each having a mass of 82,5 kg and seated in their normal positions.

#### 5.2.3.2 Carrying capacity – Type 1 liferaft

The number of persons which a liferaft shall be permitted to accommodate shall be equal to the lesser of:

- a) the greatest whole number obtained by dividing by 0,096 the volume, measured in cubic metres, of the main buoyancy tubes (which for this purpose shall not include the arches or the thwarts, if fitted) when inflated; or
- b) the greatest whole number obtained by dividing by 0,372 the inner horizontal cross-sectional area of the liferaft, in square metres, measured to the innermost edge of the buoyancy tubes; or