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Ships and marine technology — Breathing apparatus for ships —

Part 1: Emergency escape breathing devices (EEBD) for shipboard use

Navires et technologie maritime — Appareils respiratoires pour les navires —
Partie 1: Dispositifs de respiration pour issues de secours (EEBD) à bord des navires

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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 organisations, 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 23269-1 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Lifesaving and fire protection*.

ISO 23269 consists of the following parts, under the general title *Ships and marine technology — Breathing apparatus for ships*:

— *Part 1: Emergency escape breathing devices (EEBD) for shipboard use*

— *Part 2: Breathing apparatus for shipboard firefighters*

— *Part 3: Self-contained breathing apparatus (safety equipment) required for IMO IBC and IGC Codes*

— *Part 4: Self-contained breathing apparatus for emergency escape required by the IMO IBC and IGC Codes*

Introduction

The amendments of 2000 to Chapter II-2 of the 1974 International Convention for the Safety of Life at Sea (SOLAS), which entered into force 1 July 2002, made the carriage of emergency escape breathing devices (EEBD) mandatory on SOLAS ships. SOLAS and the related mandatory International Code for Fire Safety Systems (FSS Code) prescribe basic performance requirements for EEBD. This part of ISO 23269 provides more detailed requirements to ensure an adequate level of safety for users of these devices.

Ships and marine technology — Breathing apparatus for ships —

Part 1: Emergency escape breathing devices (EEBD) for shipboard use

1 Scope

This part of ISO 23269 provides performance specifications for emergency escape breathing devices (EEBD) required by regulation in Part D of chapter II-2 of the 1974 International Convention for the Safety of Life at Sea (SOLAS), as amended in 2000, and chapter 3 of the IMO International Code for Fire Safety Systems (FSS Code). These devices are intended to supply air or oxygen needed to escape from accommodation and machinery spaces with a hazardous atmosphere. They are not intended for use in fighting fires, entering oxygen-deficient voids or tanks, or to be worn by fire-fighters.

2 Normative references

The following referenced documents are indispensable for the application 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 4674-1, *Rubber- or plastics-coated fabrics — Determination of tear resistance — Part 1: Constant rate of tear methods*

ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

EN 1146:1997, *Respiratory protective devices for self-rescue — Self-contained open-circuit compressed air breathing apparatus incorporating a hood (compressed air escape apparatus with hood) — Requirements, testing, marking*

International Convention for the Safety of Life at Sea (SOLAS), 1974, Chapter II-2, as amended

IMO International Code for Fire Safety Systems (FSS Code)

3 Terms and definitions

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

3.1
breathing bag
device which compensates for variations in the air supply or demand and provides for peak inhalation flow requirements

3.2
competent authority
administration whose flag the ship is entitled to fly, or an organization authorized by an administration to perform functions required by this International Standard

3.3
facepiece
face covering designed to form a complete seal around the eyes, nose, and mouth which is secured in position by suitable means

3.4
high pressure component
parts exposed to the pressure of the cylinder situated between the cylinder and the pressure regulator

3.5
hood
head covering which completely covers the head and neck, and may cover portions of the shoulders

3.6
medium pressure component
parts exposed to the pressure that has been reduced by a regulator

3.7
ready-for-use apparatus
complete and operational EEBD in the ready-to-use condition

3.8
relief valve
device preventing the excessive pressurization of the breathing circuit

3.9
visor
part of the facepiece or hood which meets the field of vision requirement of this International Standard and can in addition provide eye protection

4 General

4.1 System design and performance

4.1.1 The EEBD shall have a minimum duration of service of 10 min under the conditions specified in 6.1.

4.1.2 The EEBD shall include a hood or full facepiece, as appropriate, to protect the eyes, nose and mouth. Hoods and facepieces shall be constructed of flame resistant materials and include a clear window for viewing.

4.1.3 The EEBD shall be designed so that there are no protruding parts or sharp edges likely to be caught on projections in narrow passages or that may hurt the wearer.

4.1.4 The EEBD shall be designed to ensure its full function in any orientation of the EEBD.

4.1.5 If the EEBD is equipped with a compressed air/gas cylinder, it shall be equipped with a reliable and continuous means to show that the cylinder is fully charged and ready for use, without the necessity of activating the EEBD.

4.1.6 The EEBD shall be capable of being carried hands-free.

4.1.7 A pressure indicator incorporating a suitable blow-out release shall be provided, such that in the event of an explosion or fracture of the pressure indicator, the release shall be away from the wearer. The blow-out release shall be protected from dirt and mechanical damages.

4.1.8 If a window is incorporated in the pressure indicator, it shall be of non-splintering clear material.

4.1.9 The pressure indicator shall not contain oil.

4.1.10 The relief valve for the breathing bag of a closed circuit oxygen type device, if provided, shall be designed so as to function properly in any orientation in the bag and be protected from dirt and mechanical damages.

4.1.11 In the case of oxygen generated chemically, the EEBD shall be designed so as to prevent such chemical from entering the wearer's respiratory tract, and to ensure that saliva or condensate shall not interfere with the function of the device or cause any harmful effect to the wearer.

4.1.12 The EEBD shall be designed so as to prevent inadvertent activation.

4.1.13 Dummy devices and components that are intended exclusively for training shall not be interchangeable with operational devices or components, and shall be manufactured and marked in such a way that they are clearly distinguishable from and cannot be inadvertently confused with operational devices.

4.1.14 Parts attached to the EEBD shall be firmly fixed so that they do not detach easily.

4.1.15 Compressed air/gas cylinders and their valves shall comply with appropriate national regulations.

4.1.16 Breathing hoses, if fitted, shall be flexible and non-kinking.

4.1.17 The air or gas provided in the cylinder shall be clean, dry, and free of contaminants. Compressed air or oxygen shall comply with appropriate national or international standards for breathing air.

NOTE EN 12021 and EN 13794 are typical suitable standards for this purpose.

4.1.18 An EEBD shall withstand anticipated shock, when tested in accordance with the drop and shock tests specified in Clause 5.5.

4.1.19 Where the EEBD is intended for storage in machinery spaces, a suitable container or cover such as a box, bag or case shall be provided to prevent contamination (e.g. by oil, mist, or dust).

4.2 Facepiece and hood requirements

4.2.1 The finish of any part likely to be in contact with the wearer shall be free from sharp edges and burrs.

4.2.2 All components shall be able to be donned or removed with ease.

4.2.3 Transparent components shall not distort vision to the extent to affect the movement of the wearer.

4.2.4 The connection between the breathing apparatus and the facepiece or hood may be achieved by either a permanent, special or thread type connector.

4.2.5 Dismountable connections shall be readily connected and secured, preferably by hand, and any means of sealing used between components (e.g. O-rings or gaskets) shall be retained in position when the connection(s) is (are) disconnected.

4.2.6 A mouthpiece, if fitted, shall facilitate reliable sealing and it shall not be possible to inadvertently block the breathing circuit when the device is in operation. The mouthpiece shall be fitted with an adjustable or self-adjusting harness if it is likely that an undue load is exerted on the wearer's mouth otherwise.

4.2.7 A nose clip, if fitted, shall provide an airtight seal of the nose. It shall be flexibly attached to the mouthpiece assembly such that, when fitting the mouthpiece, the wearer's attention is automatically drawn to the nose clip.

5 Resistance to environmental damage

5.1 General

5.1.1 The tests in 5.2 to 5.5 shall be conducted in the specified sequence with four sample EEBDs. After each of the tests, each EEBD shall be visually inspected, and shall not break or develop deformation, corrosion, or any other defects which may render it unsuitable for use.

5.1.2 At the completion of the test sequence, four of the sample EEBDs shall then be evaluated and tested against the requirements of Clause 6, 6.8 excluded.

5.2 High temperature, high humidity test

Each sample EEBD shall be subjected to a temperature of (65 ± 2) °C in an atmosphere with relative humidity of not less than 90 % for at least 48 h, and then left in an environment of 20 °C to 25 °C with a relative humidity of (65 ± 10) % for at least 48 h.

5.3 Temperature cycling test

Each sample EEBD shall be subjected to a temperature of (−30 ± 2) °C for at least 8 h, and then to a temperature of (65 ± 2) °C for at least 8 h, the cycle to be repeated 10 times.

5.4 Resonance and vibration tests

Each EEBD shall be subjected to the resonance tests specified in Table 1, followed by the vibration tests as specified in Table 1.

Table 1 —Resonance and vibration tests

		Total amplitude	Acceleration	Frequency	Sweep period	Direction of vibration	Number of tests	Total duration of tests
Resonance tests	(i)	2 mm	—	5-16 Hz continuous change	10 min	In each of the 3 planes	3 times in each direction	1,5 hours
	(ii)	—	± 1 *g*	16-60 Hz continuous change	As above	As above	As above	As above
Vibration test	Where resonant frequency (ies) exist(s) within the vibration test frequencies	Amplitude or acceleration used for vibration tests		Resonant frequency	—	As above	Once in each direction	4,5 hours (1,5 hours in each of the 3 planes)
	No resonant frequency within the vibration test frequencies	2 mm	—	16 Hz	—	As above	As above	As above

5.5 Drop and shock tests

5.5.1 Drop test

Each EEBD shall be dropped from a height of 1 m onto a concrete floor in each axis in its ready-for-use condition as stored.

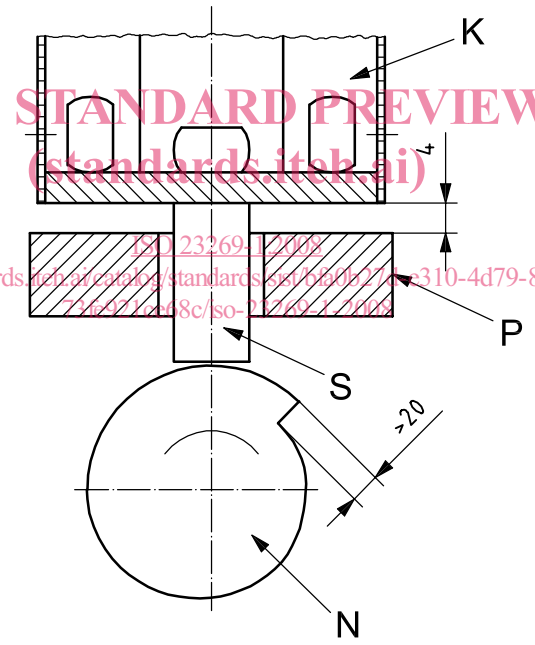
5.5.2 Shock test

The test apparatus is shown schematically in Figure 1 and consists of a steel case (K) which is fixed on a vertically moving piston (S) capable of being lifted up 20 mm by a rotating cam (N) and dropping down onto a steel plate (P) under its own mass as the cam rotates. The mass of the steel case shall be greater than 10 kg, and the mass of the base of the equipment shall be at least 10 times as much as the case, or the equipment shall be bolted to the floor.

Each EEBD in its ready-for-use condition shall be tested as stored, including fully charged compressed air or oxygen cylinder(s). Each EEBD shall be placed in the case (K) in a test.

The test rig shall be operated at the rate of approximately 100 rotation/min for a total of 500 rotations (shocks).

Dimensions in millimetres



Key

K steel case
N rotating cam
P steel plate
S vertically moving piston

Figure 1 — Test equipment for shock test

5.6 Corrosion resistance test

Each EEBD, as stored, in its ready-for-use condition shall be subject to the neutral salt spray corrosion resistance test in accordance with ISO 9227 for 250 h.