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Ships and marine technology — Breathing apparatus for ships —

Part 2: Self-contained breathing apparatus for shipboard firefighters

Navires et technologie maritime — Appareils respiratoires pour les navires —

Partie 2: Appareils respiratoires autonomes pour les pompiers à bord de 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 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.

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 23269-2 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: Self-contained breathing apparatus for shipboard firefighters*

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

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

Introduction

Chapter II-2 of the International Convention of Safety of Life at Sea 1974 (SOLAS 74), as amended, requires carriage by ships of breathing devices for firefighting purposes. The International Maritime Organization (IMO) International Code for Fire Safety Systems (FSS Code) specifies basic performance requirements for these devices. However, neither SOLAS 74 nor the FSS Code provides specifications in sufficient detail to ensure an adequate level of safety for users.

This part of ISO 23269 provides detailed technical specifications for shipboard breathing apparatus, to supplement the basic requirements in the FSS Code. It takes into account existing European standards for firefighter's outfits for use by professional firefighters, such as EN 136 and EN 137. However, it also takes into account that ships' crews are generally not professional firefighters, and require a more user-friendly ensemble than that specified in the EN standards.

Ships and marine technology — Breathing apparatus for ships —

Part 2:
Self-contained breathing apparatus for shipboard firefighters

1 Scope

This part of ISO 23269 specifies self-contained breathing apparatus for firefighters on board ships, which are required to be carried on ships by Part C (Suppression of Fire) of chapter II-2 of the 1974 International Convention of Safety of Life at Sea (SOLAS 74), as amended, and chapter 3 of the International Code for Fire Safety Systems (FSS Code).

Although the breathing apparatus manufactured in accordance with this part of ISO 23269 are intended for use in fighting small to medium magnitude fires before the operation of any installed fixed firefighting systems, they are not intended or suitable for direct entry into flames.

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.

International Convention of Safety of Life at Sea 1974 (SOLAS 74), Chapter II-2, as amended

IMO International Code for Fire Safety Systems (FSS Code)

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

ISO 23269-1, *Ships and marine technology — Breathing apparatus for ships — Part 1: Emergency escape breathing devices (EEBD) for shipboard use*

EN 136:1998, *Respiratory protective devices — Full face masks — Requirements, testing, marking*

EN 137:2006, *Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking*

EN 469:2005, *Protective clothing for firefighters — Performance requirements for protective clothing for firefighting*

EN 837-1:1996, *Pressure gauges — Part 1: Bourdon tube pressure gauges — Dimensions, metrology, requirements and testing*

EN 13274-2:2001, *Respiratory protective devices — Methods of test — Part 2: Practical performance tests*

EN 13274-3:2001, *Respiratory protective devices — Methods of test — Part 3: Determination of breathing resistance*

EN 13274-4:2001, *Respiratory protective devices — Methods of test — Part 4: Flame tests*

3 Terms and definitions

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

3.1
face blank
main body of a facepiece to which the functional components of the breathing apparatus are attached

3.2
facepiece
part of a breathing device which connects the wearer's respiratory tract to the other parts of the device and isolates the respiratory tract from ambient atmosphere

3.3
visor
part of the facepiece which meets the field of vision requirement of this part of ISO 23269 and can in addition provide eye protection

3.4
cavity
space between the visor and the inner mask adjacent to the face seal

4 General design requirements

Breathing devices shall comply with the following requirements and be tested in accordance with Clauses 5 and 7.

4.1 Breathing apparatus shall be of the self-contained compressed air-operated type for which the volume of air contained in the cylinders shall be at least 1 200 l.

4.2 The breathing apparatus shall be of simple and reliable construction and as compact as possible. The design of the breathing apparatus shall be such as to allow its reliable inspection.

4.3 The breathing apparatus shall be sufficiently robust to withstand the rough usage it is likely to receive in service.

4.4 The breathing apparatus shall be designed so that there are no protruding parts likely to be caught on projections in narrow passages.

4.5 The finish of any part of the breathing apparatus likely to be in contact with the wearer shall be free from sharp edges or burrs.

4.6 The breathing apparatus shall be designed so that the wearer can remove it and, while still wearing the facepiece, continue to breathe from the apparatus.

4.7 The breathing apparatus shall be designed to ensure its full function in any orientation.

4.8 The main valve(s) of compressed air cylinder(s) shall be arranged so that the wearer can operate it (them) while wearing the breathing apparatus and protective firefighters' gloves, see Reference [1].

4.9 The breathing apparatus shall have a suitable audible warning device that operates when the air remaining in the cylinder reaches a predetermined level. Either the warning device shall be activated automatically when the cylinder valve is opened, or if manually activated it shall not be possible to use the apparatus before the device is activated.

4.10 The total mass of the breathing apparatus ready for use with facepiece and fully charged compressed air cylinder(s) shall not exceed 18 kg.

4.11 Air cylinders and their valves shall comply with appropriate national regulations.

4.12 The breathing apparatus shall be equipped with a class 3 full facepiece according to EN 136.

4.13 The air provided in the cylinder shall be clean, dry, and free of contaminants. The compressed air shall comply with the specifications given in relevant national or International Standards.

NOTE EN 12021[4] is a suitable standard for air for this purpose.

4.14 The connection between the breathing apparatus and the facepiece may be achieved by a permanent, special or thread type connector. Dismountable connections shall be readily connected and secured, preferably by hand and any means of sealing used shall be retained in position when the connection(s) is (are) disconnected.

4.15 Where the facepiece includes a speech diaphragm, the speech diaphragm shall be protected against mechanical damage.

4.16 Visors shall be attached in a reliable and gastight manner to the face blank.

4.17 Visors shall not distort vision and shall not mist to the extent that operation of the apparatus is hampered.

4.18 Where anti-fogging compounds are used as specified by the manufacturer, they shall be known not to cause irritation or other adverse effects to health.

4.19 All adjusting devices of the body harness shall be so constructed that once adjusted they will not slip inadvertently.

4.20 The apparatus shall be equipped with a reliable pressure gauge which will read the pressure in the cylinder(s) on opening the valve and be positioned to enable the pressure to be read conveniently by the wearer. The gauge shall be provided with a suitable safety system to protect the wearer of the apparatus in the event of explosion or fracture of the pressure elements of the gauge. If a window is incorporated in the pressure gauge, it shall be of non-splintering clear material. The information given by the pressure gauge and the warning device shall be complementary in every case.

4.21 Breathing hoses shall be flexible and non-kinking. The breathing hoses shall permit free head movement and shall not restrict or close off the supply under chin or arm pressure. The hose shall not collapse.

4.22 The pressure reducer safety valve shall be designed to pass an air flow at a medium pressure not exceeding 3 MPa in accordance with EN 137:2006, 7.5.1 and 7.5.2. When the pressure reducer safety valve opens, the inhalation peak pressure shall be a positive pressure, and the exhalation peak pressure shall be a positive pressure of not more than 2,5 kPa.

4.23 The demand valve shall provide positive pressure and shall be fitted with a manual or an automatic means to stop the flow of air when the mask is not being worn.

4.24 The head harness shall be designed so that the full facepiece can be donned and removed easily. The head harness shall be adjustable or self-adjusting and shall hold the full facepiece firmly and comfortably in position.

4.25 The components of the breathing apparatus supplying compressed air shall be reliably protected against the penetration of particulate matter that may be contained in the compressed air.

4.26 It shall not be possible to fit a low pressure tube or hose directly to a high pressure part of the circuit.

4.27 All components requiring manipulation by the wearer shall be readily accessible and easily distinguishable from one another by touch. All adjustable parts and controls shall be constructed so that their adjustment is not liable to accidental alteration during use.

4.28 The apparatus shall be fitted with a fireproof lifeline of at least 30 m length. The lifeline shall have a minimum nominal breaking load of at least 10 kN, and shall be able to withstand a static proof load of at least 3,5 kN for 5 min without failure. The lifeline shall be capable of attachment by means of a snaphook to the harness of the apparatus or to a separate belt. Lifelines and associated fittings shall be of materials unlikely to create sparks.

5 Resistance to environmental damage tests

5.1 General

5.1.1 The tests in 5.2 to 5.5 shall be conducted in the specified sequence with four sample breathing apparatus. After each of the tests, each breathing apparatus 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, the four sample breathing apparatus shall then be evaluated and tested against the requirements of Clause 6.

Note that

a) all four devices shall perform according to 6.9.1.2 and 6.9.1.3,

b) one device out of the four shall be tested according to 6.9.2,

c) one out of the remaining three shall be tested according to 6.9.3,

d) the remaining two devices shall be undertaken by the practical performance test according to 7.7.3.

5.2 High temperature, high humidity test

The breathing apparatus shall be subjected to a high temperature of 65 °C in an atmosphere with relative humidity of 90 % for 48 hours and then left in the environment between 20 °C and 25 °C with relative humidity of 65 % for 48 hours.

5.3 Temperature cycling test

The breathing apparatus shall be subjected to a low temperature of –30 °C for eight hours and then to a high temperature of 65 °C for eight hours, the cycle repeated ten times.

5.4 Corrosion test

The breathing apparatus shall be exposed to a 5 % solution of neutral salt-water spray in accordance with ISO 9227 for eight hours, then left for 16 hours in an environment between 20 °C to 25 °C with relative humidity of 65 %. This procedure shall be carried out three times within a 72 hour period.

5.5 Resonance and vibration tests

The breathing apparatus shall undergo the resonance tests and then the vibration resistance tests specified in Table 1. After the tests, the sample apparatus shall continue to function properly.