SLOVENSKI STANDARD
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Oprema za varovanje dihal - Avtonomni dihalni aparat z zaprtim krogom z dovodom stisnjenega kisika - Zahteve, preskušanje, označevanje

Respiratory protective devices - Self-contained closed-circuit breathing apparatus, compressed oxygen type - Requirements, testing, marking

Atemschutzgeräte - Regenerationsgeräte mit Drucksauerstoff, Sauerstoffschutzgeräte - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils autonomes a circuit fermé, a oxygene comprimé - Exigences, essais, marquage

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13.340.30	Varovalne dihalne naprave	Respiratory protective devices

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English version

Respiratory protective devices; Self-contained closed-circuit breathing apparatus, compressed oxygen type; Requirements, testing, marking

Appareils de protection respiratoire; Appareils autonomes à circuit fermé, à oxyène comprimé; Exigences, essais, marquage

Atemschutzgeräte; Regenerationsgeräte mit Drucksauerstoff, Sauerstoffschutzgeräte; Anforderungen, Prüfung, Kennzeichnung

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat : Rue Bréderode 2, B-1000 Brussels

Brief History

This European Standard was drawn up by CEN/TC 79 "Respiratory Protective Devices", the Secretariat of which is held by DIN.

Futher to the positive result of the formal vote, this standard was ratified by the CEN Members the 1 August 1988.

According to the Common CEN/CENELEC Rules, following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Preamble

A given respiratory protective device can only be approved when the individual components satisfy the requirements of the test specification which may be a complete standard or part of a standard and when practical performance test have been carried out on complete apparatus.

1 Object and Field of Application

This European Standard refers to self-contained closed-circuit breathing apparatus, compressed oxygen type, used as respiratory protective devices, except escape apparatus and diving apparatus.

It specifies the minimum requirements for self-contained closed-circuit breathing apparatus, compressed oxygen type.

Laboratory and practical performance tests are included for the assessment of compliance with the requirements.

2 References

EN 136	Respiratory protective devices; Full face masks; Requirments, testing, marking
EN 142	Respiratory protective devices; Mouthpiece assemblies; Requirements, testing, marking
EN 148 part 2	Respiratory protective devices; Threads for facepieces; Centre thread connection

3 Definition and Description

A self-contained closed-circuit breathing apparatus, compressed oxygen type, is designed and constructed so that exhaled breathing gas is ducted from the facepiece into a circuit which contains a regeneration cartridge and a breathing bag where it is available for rebreathing. The regeneration cartridge contains chemicals which absorb exhaled carbon dioxide. Oxygen is fed into the circuit at

a suitable point by means of a constant injected flow or by a lung governed flow or by a suitable combination of both. The gas flow may be of the pendulum or loop type and excess gas is ejected via a relief valve.

4 Classification

The apparatus are classified according to the nominal working duration, which is based on the calculation of the nominal oxygen consumption. See Table 1.

Table 1 - Class of apparatus

Class of apparatus	Nominal working duration hours	Nominal oxygen-consumption (flow rate) l/min	Minimum oxygen capacity l
1 h apparatus	1	2,5	150
2 h apparatus	2	2,0	240
4 h apparatus	4	1,5	360

If the flow rate is greater than the value given in Table 1, the actual working duration shall be calculated using the actual flow rate.

The actual volume of oxygen contained by each classified apparatus may be greater than the value given in Table 1 to include a reserve period.

5 Requirements

5.1 Design

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

The apparatus shall be sufficiently robust to withstand the rough usage it is likely to receive in service and designed so that it will continue to function satisfactorily while, temporarily, accidentally submerged in water in a normal wearing position (upright) and, thereafter, until the oxygen in the cylinder is exhausted.

Note:
The apparatus is not designed for prolonged use under water.

The apparatus shall be designed so that there are no parts or sharp edges likely to be caught on projections in narrow passages.

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

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

The main valve of the oxygen cylinder(s) shall be arranged so that the wearer can operate it while wearing the apparatus.

Testing according to 6.1 and 6.2.

The apparatus shall be so designed and constructed as to prevent ingress of the external atmosphere within the limits set out in this standard.

5.2 Material

All materials used in the construction shall have adequate mechanical strength, durability and resistance to deterioration, ie, by heat or by contact with sea-water. Such materials shall be antistatic as far as it is practicable.

Exposed parts of the apparatus, excluding cylinders, ie, those which may be subjected to impact during use, shall not be made of magnesium, titanium, aluminium or alloys containing such proportions of these metals as will, on impact, give rise to frictional sparks capable of igniting flammable gas mixtures.

Any cylinder making use of such materials shall be adequately protected so that, when tested according to national regulations for impact and scraping, no metal shall be exposed.

Materials which come in direct contact with the wearer's skin and the breathable gas shall not be known to be likely to cause irritation or any adverse effect to health.

Note: Care shall be taken in selecting materials that may come into contact with high pressure oxygen.

Testing according to 6.2 to 6.4 and 6.6.

5.3 Cleaning and Disinfection

The materials used shall withstand the cleaning and disinfecting agents recommended by the manufacturer.

5.4 Mass

The mass of the apparatus as ready for use with facepiece and fully charged cylinder(s) shall not exceed 16 kg.

5.5 Connections

The design and construction of the apparatus shall permit its components to be readily separated for cleaning, inspecting and testing. Demountable connections to achieve this shall be readily connected and secured, preferably by hand.

Any means for sealing used shall be retained in position when the connection(s) is(are) disconnected during normal maintenance.

Testing according to 6.1.

5.6 Equipment Connector

The connection between the facepiece and the apparatus may be achieved by a permanent or special type of connection or by a centre thread connection.

If a centre thread connection is used, then the coupling-elbow BA according to EN 148 part 2 shall be used.

Testing according to 6.1.

5.7 Body Harness

The body harness shall be designed to allow the user to don and to doff the apparatus quickly and easily without assistance and shall be adjustable. All adjusting devices shall be so constructed that once adjusted they will not slip inadvertently.

The body harness shall be constructed such that when tested in practical performance tests the apparatus shall be worn without avoidable discomfort, the wearer shall show no undue sign of strain attributable to wearing the apparatus, and that the apparatus shall impede the wearer as little as possible when in a crouched position or when working in a confined space.

Testing according to 6.1 and 6.2.

5.8 Inhalation and Exhalation Valves

The design of valve assemblies shall be such that valve discs or the assemblies can be readily replaced; it shall not be possible to fit an inhalation valve assembly in the expiratory circuit or an exhalation valve assembly in the inspiratory circuit or to fit a valve assembly in the reverse manner.

Testing according to 6.1.

5.9 Relief Valve

The apparatus shall be provided with a relief valve operated automatically by pressure in the breathing circuit. The valve shall be protected against dirt and mechanical damage.

Means shall be provided for sealing the relief valve to permit leak testing of the apparatus.

The opening pressure of the moist relief valve measured at a constant flow of 1 l/min shall be between +1,5 and +4 mbar in any orientation of the valve.

If the relief valve is positioned in the breathing circuit before the regeneration cartridge then the pressure between the relief valve and the entry of the breathing bag shall be in no case greater than the minimum opening pressure of the relief valve. The resistance of the relief valve shall not exceed 5 mbar in any orientation of the valve when tested:

a) at 50 l/min for sets with a continuous oxygen flow rate greater than 2 l/min
b) at 30 l/min for sets with a continuous oxygen flow rate less than 2 l/min.

Testing according to 6.1 and 6.7.

5.10 Breathing Bag

The breathing bag shall be made of strong flexible material and shall be protected against compression and damage by external forces.

The breathing bag shall be reliably and tightly joined to the connectors. The connector at the inhalation side shall be shaped in such a way that its opening can not be closed by the bag itself.

The capacity of the breathing bag, when correctly fitted and ready for use, shall be at least 5 litres.

In apparatus without a lung governed supply, the capacity of the breathing bag when correctly fitted is measured between the opening pressure of the relief valve and minus 2 mbar relative to atmospheric pressure.

In apparatus with a lung governed oxygen supply, the capacity of the breathing bag when correctly fitted is measured between the opening pressure of the relief valve and the opening pressure of the lung governed supply relative to atmospheric pressure.

Testing according to 6.1 and 6.7.

5.11 Practical Performance Tests

In addition to the machine tests described, the apparatus shall also undergo practical performance tests under realistic conditions. These general practical performance tests serve the purpose to check the apparatus for imperfections that cannot be determined by the tests described in other parts of this European Standard.

Where, in the opinion of the testing authority, approval is not granted because practical performance tests show the appa-

ratus has imperfections related to wearer's acceptance, the testing authority shall describe the tests which revealed these imperfections. This will enable other testing stations to duplicate the tests and assess the results thereof.

Testing according to 6.2.

5.12 Resistance to Temperature

5.12.1 Storage

Troublefree operation shall be ensured after storage at temperatures ranging from -30 °C to + 60 °C.

Testing according to 6.3.

5.12.2 Performance

The apparatus shall operate troublefree over the temperature range -6 °C to +30 °C.

Testing according to 6.3.

5.13 High and Medium Pressure Parts

Metallic high pressure tubes, valves and connections shall be capable of withstanding a test pressure of 50% above the maximum filling pressure of the cylinder(s).

Non-metallic high pressure parts shall be capable of withstanding a test pressure of twice the maximum filling pressure.

All medium pressure tubes downstream of the pressure reducer shall be capable of withstanding twice their maximum attainable working pressure for at least 15 minutes.

5.14 High, Medium and Low Pressure Connections

High, medium and low pressure connections shall not be interchangeable.