SLOVENSKI STANDARD
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Oprema za varovanje dihal pri samoreševanju - Filter z ustnikom za varovanje pred ogljikovim monoksidom za uporabo pri samoreševanju

Respiratory protective devices for self-rescue - Filter self-rescuer from carbon monoxide with mouthpiece assembly

Atemschutzgeräte für Selbstrettung - Filterselbstretter mit Mundstückgarnitur zum Schutz gegen Kohlenmonoxid

Appareils de protection respiratoire pour l'évacuation - Auto-sauveteur avec ensemble embout buccal a filtre monoxide de carbone

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Respiratory protective devices for self-rescue - Filter self-rescuer from carbon monoxide with mouthpiece assembly

Appareils de protection respiratoire pour l'évacuation - Auto-sauveteur avec ensemble embout buccal à filtre monoxide de carbone

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Foreword

This document (EN 404:2005) has been prepared by Technical Committee CEN/TC 79 “Respiratory protective devices”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

This document supersedes EN 404:1993.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 89/686 EEC.

For relationship with EU Directive 89/686 EEC, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

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 practical performance tests have been carried out successfully on complete device where specified in the appropriate standard. If for any reason a complete device is not tested then simulation of the device is permitted provided the respiratory characteristics and mass distribution are similar to those of the complete device.

1 Scope

This document refers to filtering devices designed for protection against carbon monoxide (filter self-rescuer). It specifies minimum requirements for filter self-rescuers. This document does not apply to apparatus for work and rescue or to diving apparatus. Laboratory and practical performance tests are included for the assessment of compliance with the requirements.

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.

EN 132:1998, *Respiratory protective devices – Definitions of terms and pictograms*

EN 134:1998, *Respiratory protective devices – Nomenclature of components*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 132:1998 and the nomenclature given in EN 134:1998 apply.

4 Description

A filter self-rescuer is a respiratory protective filtering device in a suitable packing for use in personal escape, and designed to protect the wearer against carbon monoxide. It is dependent on ambient atmosphere and does not provide protection against oxygen deficient atmospheres. The filtering device consists of a mouthpiece assembly with a filter. The mouthpiece assembly of the filtering device is connected directly or indirectly to the filter(s).

5 Classification

Filter self-rescuers are classified according to the minimum test duration which is defined by performing a breathing machine test in accordance with 7.6.1.

Table 1 — Classes of filter self-rescuers

Class		Minimum duration min
FSR 1 A	FSR 1 B	60
FSR 2 A	FSR 2 B	75
FSR 3 A	FSR 3 B	90
FSR 4 A	FSR 4 B	120

In the class, the numbers 1 - 4 indicate the minimum duration time as seen in the Table 1. The letters A and B indicate the flow rates 30 l/min and 40 l/min. Devices passing “rough usage” requirements shall be marked “R”.

NOTE The effective duration time may vary according to the work rate.

6 Requirements

6.1 General

In all tests, all test samples shall meet the requirements.

Wherever a test clause is referenced, all sub-clauses of the test clause shall apply, unless otherwise stated.

NOTE The requirements and test methods are based on experience with existing design of filter self-rescuers incorporating Hopcalite and drier. Consideration should be given to the behaviour of designs incorporating other filtering materials.

6.2 Ergonomics

The requirements of this document are intended to take account of the interaction between the wearer, the respiratory protective device, and where possible the working environment in which the respiratory protective device is likely to be used. The device shall satisfy 6.3 and 6.19.

6.3 Design

The design of the device shall be such as to allow its inspection in accordance with the information supplied by the manufacturer.

The device shall be sufficiently robust to withstand the rough usage it is likely to receive in use with respect to its classification.

The device shall be designed so that there are no protruding parts, sharp edges or burrs likely to be caught on projections in narrow passages or that may harm the wearer.

No part of the device likely to be in contact with the wearer shall have sharp edges or burrs.

The filter self-rescuer shall be designed such that the outside of carrying container can be cleaned easily.

If the filtering device is fitted with a coarse dust filter bag this filter bag shall be easily detachable.

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

Testing shall be done in accordance with 7.3 and 7.5.

6.4 Materials

The carrying container and the locking device shall be adequately protected against corrosion. The materials used shall be able to withstand temperatures and mechanical stress expected when carried on the person or stored on machines and vehicles.

Testing shall be done in accordance with 7.4.3 and 7.5.2.

Exposed parts, i.e. those which may be subjected to impact during use of the device, shall not be made of aluminium, magnesium, titanium or their alloys.

Materials that may come into contact with the wearer's skin and the inhaled air shall not be known to be likely to cause irritation or any other adverse effect to health.

Testing shall be done in accordance with 7.3 and 7.5.

To prevent electrostatic charges on non-metallic carrying containers the insulation resistance shall not exceed 10^9 ohm.

Testing shall be done in accordance with 7.6.6.

6.5 Cleaning and disinfecting

All material shall be visibly unimpaired after cleaning and disinfection by the agents and procedures specified by the manufacturer.

Testing shall be done in accordance with 7.3.

6.6 Mass

That part of the mass of the filtering device supported by the head, ready for use, shall not exceed 750 g.

The mass of the complete device including carrying case shall not exceed 2 000 g.

The determination of the mass shall be carried out where appropriate.

Testing shall be done in accordance with 7.1.

6.7 Connections

All connections of the filtering device shall be gas tight.

Testing shall be done in accordance with 7.6.1 and 7.6.2.

All the connections of the filtering device shall be sufficiently robust and withstand a force of 50 N applied for 10 s. Connections of unprotected breathing hoses shall withstand a force of 250 N applied for 10 s.

Testing shall be done in accordance with 7.3, 7.5.1 and 7.6.10.2.

6.8 Means of carrying

The carrying container shall be provided with means of carrying, which ensures comfortable, safe and - if required - continuous carrying on the person. This may also be achieved by additional measures, e.g. a carrying bag.

Testing shall be done in accordance with 7.5.2.

When the device is designed to be carried on the person the tear-off force of the carrying means shall be not less than 400 N and shall not exceed 800 N.

Testing shall be done in accordance with 7.6.10.3.

6.9 Harness

The filter self-rescuer shall have a harness which ensures comfortable and safe wearing of the device when donned. The harness shall be adjustable or elastic or a suitable combination of both.

Testing shall be done in accordance with 7.5.1.

Each strap of the harness shall withstand a pull of 50 N for 10 s in the direction in which the harness is pulled when the device is donned.

Testing shall be done in accordance with 7.6.10.2.

6.10 Handling

The filter self-rescuer shall be capable of being donned in accordance with the information supplied by the manufacturer in a quick and simple manner within maximum of 20 s without undue exertion. The locking device shall be protected against being opened inadvertently. It shall be apparent whether or not the device has been opened and therefore requires inspection.

Testing shall be done in accordance with 7.5.1.

Any part of the filter self-rescuer used to pull the filtering device from its carrying or storage container shall withstand a force of 400 N applied for 10 s in the direction in which the part is subjected to such force during normal withdrawal of the filtering device.

Testing in shall be done accordance with 7.6.10.2.

6.11 Leak tightness

Leakages into any container designed to protect the device from exposure to contamination shall be detectable by a means specified by the manufacturer.

Testing shall be done in accordance with 7.6.4.

6.12 Facepiece

6.12.1 Mouthpiece assembly

The facepiece shall be a mouthpiece assembly, held by the teeth, sealing against the lips, and through which air is inhaled and exhaled while the nose is blocked by a nose clip. The mouthpiece shall ensure reliable sealing and shall not inadvertently be able to block the airways when in operation.

The nose clip shall provide an airtight seal of the nose. It shall be flexibly attached to the filtering device such that when fitting the mouthpiece the wearer's attention is automatically drawn to the nose clip.

Testing shall be done in accordance with 7.3 and 7.5.1.

6.12.2 Breathing hose

Where fitted, breathing hoses shall permit free head movement and shall not restrict or close off the air supply under chin or arm pressure. The hose may be extensible or compressible. The hose shall not collapse and the temporary elongation shall be at least 20 %, while the permanent linear deformation of the hose shall not exceed 10 %.

Testing shall be done in accordance with 7.5.1 and 7.6.9.

6.13 Inhalation and exhalation valves

If valves are fitted, they shall function in all orientations. When tested in accordance with 7.6.7 the requirements of 6.18.1, 6.18.2, and 6.18.4 shall be met.

Testing shall be done in accordance with 7.6.1, 7.6.2 and 7.6.7.

6.14 Saliva trap

The filtering device shall be designed such that saliva or condensate shall not interfere with the function of the filtering device or cause any harmful effect to the wearer.

Testing shall be done in accordance with 7.5.1.

6.15 Integrity of device at high carbon monoxide concentrations

When tested in accordance with 7.6.2 subsequent to 7.3 the device shall maintain its mechanical integrity and shall not present a hazard to the wearer.

6.16 Conditioning

6.16.1 Mechanical strength

After conditioning the filter self-rescuer in accordance with 7.4.2 the requirements of 6.15 and 6.18 shall be met.

6.16.2 Rough usage (optional)

The test is optional.

If a device is claimed to be resistant to rough usage, the filter-rescuer shall be subjected to a cement mixer test.

After conditioning the filter self-rescuer in accordance with 7.4.3 the performance requirements of 6.18 shall be met.

Markings shall be in accordance with 8.1.4.

6.16.3 Temperature

After conditioning in accordance with 7.4.4 and returning to room temperature the performance requirements of 6.18 shall be met.

6.16.4 Transport

After conditioning the filter self-rescuer in accordance with 7.5.2, the filter-rescuer shall pass the tests mentioned in Table 3.

6.17 Carbon dioxide content of inhalation air (dead space)

The carbon dioxide content of inhalation air (dead space) shall not exceed an average of 2 % by vol.

Testing shall be done in accordance with 7.6.8.

6.18 Performance requirements

6.18.1 Minimum test duration

The filtering device shall meet the appropriate requirements laid down for its class when tested at the minute volume given in Table 2.

Table 2 — Minimum test duration

Class	Minute volume l/min		Minimum test duration min
	Type A	Type B	
FSR 1	30	40	60
FSR 2	30	40	75
FSR 3	30	40	90
FSR 4	30	40	120

NOTE The minute volume for testing filter self-rescuers is based on practical experiences in many countries where such devices are in use for various mining applications.

Testing shall be done in accordance with 7.6.1.

6.18.2 Carbon monoxide - breakthrough criteria

The carbon monoxide concentration of the inhalation air for type B shall not exceed 200 ml/m^3 time weighted average in any single 5 min interval. The total carbon monoxide slip of inhalation air for type A shall not exceed 400 ml during the minimum test duration. The total carbon monoxide slip of inhalation air for type B shall not exceed 200 ml during the minimum test duration.

Testing shall be done in accordance with 7.6.1 and 7.6.2.

6.18.3 Temperature and humidity

The temperature of inhalation air for type A shall not exceed 90 °C dry bulb and 50 °C wet bulb during the minimum test duration.

The temperature of the inhalation air for type B shall not exceed 85 °C dry bulb and 50 °C wet bulb during the minimum test duration.

Testing shall be done in accordance with 7.6.1 and 7.6.2.

6.18.4 Breathing resistance

The inhalation resistance for type A shall not exceed 12 mbar during the minimum test duration. The exhalation resistance shall not exceed 3,5 mbar during the minimum test duration.

The inhalation resistance for type B shall not exceed 7 mbar during the minimum test duration. The exhalation resistance shall not exceed 2,5 mbar during the minimum test duration.

Testing shall be done in accordance with 7.6.1, 7.6.2 and 7.6.3.

6.19 Practical performance

In addition to the machine tests described, the device shall also undergo simulated practical performance tests under realistic conditions. These practical performance tests serve the purpose to check the device for imperfections that cannot be determined by the tests described elsewhere in this document.

If during any activity, by any test subject the test subject fails to finalise the selected activity due to the apparatus being not fit for the purpose for which it has been designed, the apparatus shall be deemed to have failed.