SLOVENSKI STANDARD
oSIST prEN 13794:2014

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Oprema za varovanje dihal - Samoreševalni avtonomni dihalni aparat z zaprtim krogom - Zahteve, preskušanje, označevanje

Respiratory protective devices - Self-contained closed-circuit devices for escape - Requirements, testing and marking

Atemschutzgeräte - Isoliergeräte für Selbstrettung - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils de protection respiratoire isolants autonomes à circuit fermé pour l'évacuation - 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 devices for escape - Requirements, testing and marking

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 79.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 13794:2014) has been prepared by Technical Committee CEN/TC 79 “Respiratory protective devices”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13794:2002.

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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

1 Scope

This European Standard specifies minimum requirements for self-contained closed-circuit breathing devices, chemical oxygen (KO_2, $NaClO_3$) type and compressed oxygen type, for escape (short: oxygen escape device).

This European Standard does not apply to devices for work and rescue and to diving apparatus.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 132, *Respiratory protective devices - Definitions of terms and pictograms*

EN 134, *Respiratory protective devices - Nomenclature of components*

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

EN 166:1995, *Personal eye protection – Specifications*

EN 168:1995, *Personal eye protection - Non-optical test methods*

EN 13274-1, *Respiratory protective devices - Methods of test - Part 1: Determination of inward leakage and total inward leakage*

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

EN 13274-3:2002, *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*

EN 13274-5, *Respiratory protective devices - Methods of test - Part 5: Climatic conditions*

3 Terms and definitions

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

3.1
quick start system
mechanism which activates the oxygen generation/flow whilst opening the storage container or by pulling the facepiece

3.2
Respiratory Interface
(RI)
part of a respiratory protective device that forms the protective barrier between the wearer's respiratory tract and the ambient atmosphere

[SOURCE: ISO 16972, 3.162]

3.3
ready for use device
device where the container is opened

4 Description

An oxygen escape device is designed and constructed so that exhaled breathing gas is ducted from the facepiece into a circuit which contains a cartridge and a breathing bag where it is available for re-breathing. The cartridge contains chemicals which absorb exhaled carbon dioxide and - in case of a KO_2 device - humidity and generates also oxygen.

In case of a $NaClO_3$ device, a chemical oxygen source ($NaClO_3$ candle) generates the oxygen to be needed.

In case of a compressed oxygen device, oxygen is fed into the circuit at a suitable point by means of a constant flow device or by a lung governed demand valve or by a suitable combination of both.

The breathing gas flow may be of the pendulum or loop type and excess gas is ejected via a relief valve.

5 Classification

5.1 General

Oxygen escape devices are classified according to their oxygen source and rated working duration in types and classes.

5.2 Types of oxygen escape devices

— Type C $NaClO_3$ device;

— Type D Compressed oxygen device;

— Type K KO_2 device.

5.3 Classes of oxygen escape devices

Oxygen escape devices are classified according to the rated working duration (see 6.19.1) which is defined by performing a breathing machine test in accordance with 7.9.1 after the device is being exposed to shock in accordance with 7.5.1 and vibration in accordance with 7.5.2.

Rated working duration will be defined in increments of 5 min up to and including duration of 30 min and thereafter in steps of 10 min.

6 Requirements

6.1 General

All test specimens shall meet all requirements.

Where it is required in a specific clause the manufacturer shall declare that a failure modes and effect analysis (FMEA) has been conducted.

The FMEA shall at least cover the following areas

— Materials (6.3)

— Cleaning and disinfection (6.4)

The manufacturer shall maintain a copy of the FMEA in their records for a time period of at least 10 years or for 5 years after the device ceases production whichever is the longest.

NOTE Further information is given in EN 60812 [1].

6.2 Design

The device shall be of reliable construction and as compact as possible.

The device shall be designed so as not to interfere with work activities when being carried. It shall be used in accordance with the information supplied by the manufacturer.

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

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

The device shall be so designed and constructed as to prevent ingress of external atmosphere within the limits specified in this European Standard.

The device shall be so designed that the outside of the container can be easily cleaned.

The device shall be so designed as to prevent the chemical from entering the wearer's respiratory tract and that saliva or condensate shall not interfere with the function of the device or cause any harmful effect to the wearer.

Check in accordance with 7.3 and test in accordance with 7.14.

It shall not be possible to initiate a quick start system inadvertently, if fitted.

It shall not be possible to don the device without initiating the quick start system, if fitted.

Devices for special use, i.e. in mining, shall meet the requirements specified in Annex A when tested in accordance with Annex A.

Devices for training purposes only shall meet the requirements specified in Annex C when tested in accordance with Annex C.

Training may also be carried out with the device specified in this standard.

Check in accordance with 7.3.

6.3 Materials

The carrying container and the locking device, where present, shall be adequately protected against corrosion. The materials used shall be able to withstand temperatures and mechanical stress to be expected whilst being carried on the person as well as being stored on machines and vehicles.

Check in accordance with 7.3, test in accordance with 7.8.1 and 7.14.

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

Check in accordance with 7.3.

Any container or carrying container using such materials shall be adequately protected.

If national regulations allow the use of such containers or carrying containers then when tested for impact and scraping no metal shall be exposed.

Non-metallic carrying containers shall be antistatic.

If the device is required to be antistatic during escape, materials used shall be antistatic.

Exposed parts shall have a surface resistance of lower than 10^{11} Ω measured in accordance with IEC 60079-32-2, 4.2. Exposed parts that do not meet this criterion may also be used if the maximum transferred charge tested in accordance with IEC 60079-32-2, 4.10 does not exceed the maximum acceptable values for the appropriate explosion group given in IEC 60079-32-1, Table 4 .

A general decision process for evaluating and testing plastic materials is given in Figure 1 (compare cited documents).

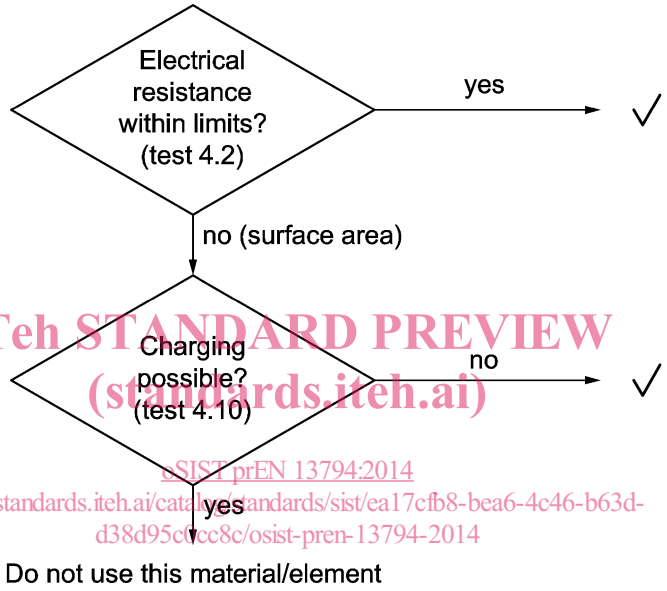

Figure 1 — General decision process

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

Check in accordance with 7.3 and test in accordance with 7.14.

Care shall be taken in selecting materials that may come into contact with oxygen to ensure that no oxygen ignition take place.

Devices using oxygen generating chemicals shall be known not to ignite or combust due to the elevated temperatures of the device (caused by the exothermic chemical reaction) as a result of foreseeable use addressed by a FMEA.

Check in accordance with 7.3.

6.4 Cleaning and disinfecting

All parts requiring cleaning and disinfecting shall be able to withstand cleaning and disinfecting agents and procedures recommended by the manufacturer.

This shall be addressed in the FMEA.

Check in accordance with 7.3.

6.5 Mass

The mass of the complete device including carrying container shall not exceed 5 kg when designed to be carried for at least 8 h.

The mass of the device excluding any container when stored in ready-for-use condition shall not exceed 7,5 kg.

Check in accordance with 7.3.

6.6 Connections (couplings)

The design and construction of the device shall permit its components to be easily disassembled for cleaning, inspecting and testing. If demountable connections are used to achieve this, they shall be easily 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.

Check in accordance with 7.3 and test in accordance with 7.14.

6.7 Harness

The device in use shall have a harness, or other means of support, so that the wearers' hands are left free, when the device is in use.

Any harness shall be designed to allow quick, easy and correct donning of the device without assistance.

Check in accordance with 7.3 and test in accordance with 7.14.

6.8 Handling

The device shall be capable of being donned and simply put into operation without undue exertion under difficult conditions, e. g. in the dark and in restricted spaces.

If the device container is fitted with a special fastening, the design shall be such that it cannot be opened inadvertently.

If the device has been opened this shall be obvious by visual inspection.

Check in accordance with 7.3 and test in accordance with 7.14.

6.9 Leaktightness

The ready-for-use device shall be leak tight so that the pressure change does not exceed 0,3 mbar within 1 min.

Testing shall be performed in accordance with 7.4.2.

6.10 Facepiece [Respiratory Interface (RI)]

The facepiece shall be either a mouthpiece assembly or a full face mask and shall be attached securely to the device.

Type D-device relying only upon a lung governed demand valve shall be fitted with a full face mask.

The mouthpiece assembly shall have two teeth bites and a permanently attached nose clip.