SLOVENSKI STANDARD
SIST EN 400:1996

01-april-1996

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

Respiratory protective devices for self-rescue - Self-contained closed-circuit breathing apparatus - Compressed oxygen escape apparatus - Requirements, testing, marking

Atemschutzgeräte für Selbstrettung - Regenerationsgeräte - Drucksauerstoffselbstretter - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire pour l'évacuation - Appareils de protection respiratoire autonomes a circuit fermé - Appareils d'évacuation a oxygene comprimé - Exigences, essais, marquage

Ta slovenski standard je istoveten z: **EN 400:1993**

ICS:

13.340.30	Varovalne dihalne naprave	Respiratory protective devices

SIST EN 400:1996 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 400:1993

March 1993

UDC 614.894.7:620.1:62-777:614.8

Descriptors: Accident prevention, personal protective equipment, respiratory protective equipment, disposal, compressed gas, oxygen, classifications, specifications, tests, marking

English version

Respiratory protective devices for self-rescue - Self-contained closed-circuit breathing apparatus - Compressed oxygen escape apparatus - Requirements, testing, marking

Appareils de protection respiratoire pour l'évacuation - Appareils de protection respiratoire autonomes à circuit fermé - Appareils d'évacuation à oxygène comprimé - Exigences, essais, marquage

Atemschutzgeräte für Selbstrettung - Regenerationsgeräte - Drucksauerstoffselbstretter - Anforderungen, Prüfung, Kennzeichnung

This European Standard was approved by CEN on 1993-03-16. 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.

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

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 79 "Respiratory protective devices" of which the secretariat is held by DIN.

The text has been submitted to the formal vote and has been approved by CEN as a European Standard.

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of EC Directive(s).

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 September 1993, and conflicting national standards shall be withdrawn at the latest by September 1993.

In accordance with the CEN/CENELEC Internal Regulations, following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 on complete apparatus where specificed in the appropriate standard. If for any reason a complete apparatus is not tested then simulation of the apparatus is permitted provided the respiratory characteristics and weight distribution are similar to those of the complete apparatus.

1 Scope

This European Standard refers to self-contained closed-circuit breathing apparatus, compressed oxygen type, for escape (in short: compressed oxygen escape apparatus). This standard does not apply to apparatus for work and rescue or to diving devices.

It specifies the minimum requirements for compressed oxygen escape apparatus.

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

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 132	Respiratory protective devices; Definitions
EN 134	Respiratory protective devices; Nomenclature of components
EN 136	Respiratory protective devices; Full face masks; Requirements, testing, marking

3 Definition and description

For the purpose of this European Standard the definitions given in EN 132 and the nomenclature given in EN 134 apply together with the following:

A compressed oxygen escape apparatus 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 CO_2 regeneration cartridge contains chemicals which absorb exhaled carbon dioxide. 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 gas flow may be of the pendulum or loop type and excess gas is ejected via a relief valve.

4 Classification

Compressed oxygen escape apparatus are classified according to the nominal duration which is defined by performing a breathing machine test in accordance with clause 6.4.1 with a minute volume of 35 l/min.

Rated duration will be defined in steps of 5 minutes up to a duration of 30 minutes and thereafter in steps of 10 minutes.

However, it should be recognized that the effective duration may vary in accordance with the work rate.

5 Requirements

5.1 Design

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

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

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

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

The apparatus shall be so designed that the outside can be cleaned easily.

The apparatus 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 apparatus or cause any harmful effect to the wearer.

Testing in accordance with 6.1 and 6.2.

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

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

Parts which are designed for training apparatus shall not be interchangeable with the working apparatus and shall be clearly marked accordingly or manufactured in such a way that they cannot be inadvertently fitted to a working apparatus.

Testing in accordance with 6.1.

5.2 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 expected whilst being carried on the person as well as on machines and vehicles.

Testing in accordance with 6.1, 6.2, 6.4.6 and 6.5.

Exposed parts, excluding gas containers, i.e. those which may be subjected to impact during use of the apparatus 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.

Any gas container making use of such materials shall be adequately protected so that when tested in accordance with national regulations for impact and scraping no metal shall be exposed.

Testing in accordance with 6.1 and 6.2.

To prevent electrostatic charges on non-metal carrying containers, the insulation resistance shall not exceed 10^9 ohm. Where the apparatus is required to be antistatic during escape materials used shall be antistatic as far as it is practicable.

Testing in accordance with 6.4.9.

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

Testing in accordance with 6.1 and 6.2.

Care shall be taken in selecting materials that may come into contact with oxygen.

Testing in accordance with 6.1.

5.3 Cleaning and Disinfection

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

Testing in accordance with 6.1.

5.4 Mass

The mass of the complete apparatus including carrying container shall not exceed 5 kg when designed to be carried for a complete shift.

Testing in accordance with 6.1.

5.5 Harness

The ready for use apparatus shall have a harness.

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

Testing in accordance with 6.1 and 6.2.

5.6 Handling

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

If the apparatus is fitted with a special lock, the design shall be such that it cannot be opened inadvertently.

If the apparatus has been opened a clear indication of this shall be given on the outside of the apparatus.

Testing in accordance with 6.1 and 6.2.

5.7 Leaktightness

The ready for use apparatus shall be leaktight so that the pressure change does not exceed 0,3 mbar in 1 min.

Testing in accordance with 6.4.8.

5.8 Facepiece

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

Normally the facepiece should be a mouthpiece assembly with two teeth bites and a permanently attached nose clip.

The mouthpiece shall facilitate reliable sealing and it shall not be possible to block inadvertently the breathing circuit when the apparatus is in operation.

The mouthpiece shall be fitted with an adjustable or self- adjusting head harness if it is likely that an undue load is exerted on the wearer's mouth.

The nose clip shall provide an air-tight 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.

If a full face mask is used as a facepiece the following requirements shall be met:

The full face mask shall be provided with an adjustable or self-adjusting head harness.

The requirements of the clauses 4.11.1 and 4.11.3 of EN 136 shall be met.

The lens of the full face mask shall meet the requirements for eyepieces and visors in EN 136 except the requirement for the field of vision.

The face seal leakage of the full face mask shall be tested separately and shall meet the requirement in clause 4.7 of EN 136.

Testing in accordance with 6.1 and 6.2 and the relevant clauses in EN 136.

5.9 Goggles

If the device shall be used with goggles, then the lenses of the goggles shall be protected against fogging. The head straps of the goggles shall be flexible and easily adjustable or self-adjusting.

The goggles shall be attached to the apparatus to prevent loss when opening the carrying container. The goggles shall not interfere with the donning of the apparatus.

Testing in accordance with 6.1 and 6.2.

5.10 Inhalation and exhalation valves

It shall not be possible to fit inhalation and exhalation valves in an incorrect manner.

Testing in accordance with 6.1.

5.11 Relief valve

When the apparatus is provided with a relief valve it shall function properly irrespective of the orientation of the apparatus and shall be protected against dirt and mechanical damage.

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

Testing in accordance with 6.1.

5.11.1 Opening pressure

The relief valve shall open at a positive pressure of not less than 1 mbar.

When the relief valve is positioned in the breathing circuit before the regeneration cartridge then the pressure drop between the relief valve and the entry of the breathing bag shall in no case be greater than the minimum opening pressure of the relief valve.

Testing in accordance with 6.4.4.1.

5.11.2 Inward leakage

If the relief valve is a downstream type (valve closing against pressure) then it shall be so designed that the inward leakage of the external atmosphere shall not exceed 0,0025 % when the moist valve is tested.

Testing in accordance with 6.4.4.2.1.

If the relief valve is a mechanically operated upstream type (valve closing with pressure) then it shall be sufficiently leak-tight to withstand an outside positive pressure of 10 mbar without exceeding a maximum pressure drop of 1 mbar in 1 min.

Testing in accordance with to 6.4.4.2.2.

5.12 Breathing bag

The breathing bag and its materials shall be able to withstand the expected stress. This can also be achieved by additional protective measures.

The effective volume of the breathing bag shall be at least 6 l.

Testing in accordance with 6.4.5.

5.13 Resistance to temperature

After the temperature test and being allowed to return to room temperature the apparatus shall meet the following requirements:

The carrying container shall still be leaktight and shall have no deficiencies that impair its functionability. The apparatus shall still be functionable; the materials used shall not show deteriorations (severe deformations, cracks, etc.).

The apparatus shall be leaktight and be tested at a minute volume of 35 l/min and also at a minute volume of 70 l/min.

Testing in accordance with 6.1, 6.4.1, 6.4.2 and 6.4.8.

The apparatus shall also function correctly at a temperature of -15 °C and shall meet the requirements for oxygen content and carbon dioxide content.

At the beginning of the test at the breathing machine the carbon dioxide content of inhalation gas shall not exceed 3 % (by volume) for a short period of time.

Testing in accordance with 6.4.6.2.