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Oprema za varovanje dihal - Dihalni aparat na stisnjeni zrak z ventilom ï 2. del: Aparat s polobrazno masko na pozitiven tlak - Zahteve, preskuġanje, oznaļ evanje

Respiratory protective devices - Compressed air line breathing apparatus with demand valve - Part 2: Apparatus with a half mask at positive pressure - Requirements, testing, marking

Atemschutzgeräte - Druckluft-Schlauchgeräte mit Lungenautomat - Teil 2: Geräte mit einer Halbmaske und Überdruck - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils de protection respiratoire isolants a adduction d'air comprimé avec soupape a la demande - Partie 2: Appareil avec demi-masque a pression positive - Exigences, essais, marquage

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13.340.30	Varovalne dihalne naprave	Respiratory protective devices

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English version

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This European Standard was approved by CEN on 15 March 2005.

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.

This European Standard exists 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.

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Contents

Foreword

This European Standard (EN 14593-2:2005) 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of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.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 European Standard 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, see informative Annex ZA, which is an integral part of this European Standard.

Together with EN 14593-1 and EN 14594, this European Standard supersedes EN 139:1994.

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 apparatus where specified 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 specifies minimum requirements for compressed air line breathing apparatus with demand valve for use with a half mask at positive pressure, as a respiratory protective device. Escape and diving apparatus, apparatus for fire fighting and apparatus used in abrasive blasting operations without additional protective features are not covered by this European Standard, although certain requirements addressing the use in conjunction with escape apparatus and escape conditions are noted.

Laboratory and practical performance tests are included for the assessment of conformance to the requirements.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. 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 140, *Respiratory protective devices — Half masks and quarter masks — Requirements, testing, marking*

EN 148-1, *Respiratory protective devices — Threads for facepieces — Part 1: Standard thread connection*

EN 148-2, *Respiratory protective devices — Threads for facepieces — Part 2: Centre thread connection*

EN 148-3, *Respiratory protective devices — Threads for facepieces — Part 3: Thread connection M45 x 3*

EN 12021, *Respiratory protective devices — Compressed air for breathing apparatus*

EN 13274-1:2001, *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, *Respiratory protective devices — Methods of test – Part 3: Determination of breathing resistance*

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

EN 13274-6, *Respiratory protective devices — Methods of test — Part 6: Determination of carbon dioxide content of inhalation air*

EN ISO 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance (ISO 8031:1993)*

3 Terms, definitions and pictograms

For the purposes of this European Standard, the terms, definitions and pictograms given in EN 132:1998 and EN 134:1998 and the following apply,

3.1
compressed air line breathing apparatus with a demand valve for use with a half mask at positive pressure
apparatus, which is not self-contained, in which the wearer is supplied with breathable air from a source of compressed air at a maximum pressure of 10 bar

3.2
mobile high pressure air supply system
supply system that may include a compressor, filters, compressed air pressure vessels, for use as a mobile source of breathing air

4 Description

This apparatus enables the wearer to be provided with breathable air, which shall be in accordance with EN 12021, which, on inhalation flows through a lung governed demand valve operating at positive pressure to a suitable facepiece, possibly via a breathing hose. A compressed air supply tube connects the wearer to supply of compressed air. Exhaled air flows into the ambient atmosphere via an exhalation valve.

NOTE Conformance to EN 12021 can be ensured by a breathable air supply system or an additional device such as a compressed air filter system.

5 Requirements

5.1 General

Unless otherwise specified, the values stated in this European Standard are expressed as nominal values. Except for temperature limits, values which are not stated as maxima or minima shall be subject to a tolerance of ± 5 %. Unless otherwise specified, the ambient temperature for testing shall be between 16 °C and 32 °C and the temperature limits shall be subject to an accuracy of ± 1 °C. Where a test clause is referenced, all subclauses of the test clause shall apply, unless otherwise stated.

5.2 Ergonomics

The requirements of this European Standard 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 5.3, 5.9 and 5.10.

Testing shall be done accordance with 6.4.

5.3 Materials

5.3.1 All materials used in the construction shall have adequate resistance to deterioration by heat and adequate mechanical strength. Testing shall be done in accordance with 6.3, after any pre-conditioning according to 6.8, and any safety data sheet, if applicable, and declaration of the manufacturer related to materials used in the construction of the device.

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

5.3.3 Materials that may come into direct contact with the wearer's skin or that may affect the quality of the breathed air shall not be known to be likely to cause skin irritation or any other adverse effects to health.

Testing shall be done in accordance with 6.3.

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

Testing shall be done in accordance with 6.3.

5.4 Water immersion

The apparatus shall continue to function satisfactorily after being submerged temporarily in water. Before immersion and after removal from the water the apparatus shall meet the requirements of 5.21.

NOTE The apparatus is not designed for use under water.

Testing shall be done in accordance with 6.2.

5.5 Cleaning and disinfecting

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

Testing shall be done in accordance with 6.3.

5.6 Practical performance

The complete apparatus shall undergo practical performance tests under realistic conditions. These general tests serve the purpose of checking the apparatus for imperfections that can not be determined by the tests described elsewhere in this European Standard.

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.

After completion of the activities the test subjects are asked to answer the questions in 6.6 of EN 13274-2:2001. These answers shall be used by the test house to determine if the apparatus passes or fails. The test house shall provide full details of those parts of the practical performance tests which revealed these imperfections.

NOTE This will enable other test houses to duplicate the tests and assess the results thereof.

The testing shall be done in accordance with 6.4.

5.7 Connections

5.7.1 General

Components of the apparatus shall be readily separated for cleaning, examining and testing. All demountable connections shall be readily connected and secured, where possible by hand. Any means of sealing used shall be retained in position when the joints and couplings are disconnected during normal use and maintenance.

Testing shall be done in accordance with 6.3 and 6.4.

5.7.2 Couplings

The apparatus shall be constructed so that any twisting of the hoses and tubes does not affect the fit or performance of the apparatus, or cause the hoses or tubes to become disconnected. At least one swivelling coupling shall be fitted to the compressed air supply tube adjacent to the wearer. The design of the couplings shall be such as to prevent unintentional interruption of the air supply.

Testing shall be done in accordance with 6.3 and 6.4.

5.7.3 Strength of connections to half mask, demand valve, medium pressure hose and breathing hose

Connections of the breathing hose at the half mask connector and at the demand valve or between the half mask connector and the demand valve shall withstand a force of 50 N.

Testing shall be done in accordance with 6.5.

5.7.4 Connection between apparatus and half mask

The connection between the breathing apparatus and the half mask may be achieved by a permanent, special or thread type connector.

Threads in accordance with EN 148-1, -2 and -3 shall not be used with equipment covered by this European Standard.

Testing shall be done in accordance with 6.3.

5.7.5 Unacceptable connections

It shall not be possible to connect the compressed air supply tube directly to the breathing hose, medium pressure connecting tube or half mask.

Testing shall be done in accordance with 6.3.

5.8 Body harness or belt

A body harness or belt shall be provided to which the medium pressure connecting tube and compressed air supply tube shall be attached. Buckles shall not slip, and the harness or belt shall not be damaged.

Testing shall be done in accordance with 6.3, 6.4 and 6.7.

5.9 Performance requirements after storage

After conditioning in accordance with 6.8.1 and 6.8.2, and returning to room temperature, all performance requirements of this European Standard shall be met, except for 5.10.

Apparatus specifically designed for storage in temperatures beyond the limits of storage conditioning given in 6.8.1 shall be tested and marked accordingly.

Testing shall be done in accordance with 6.8.

5.10 Flammability

5.10.1 The requirements of 5.10.2 and 5.10.3 do not apply to the compressed air source, e.g. mobile high pressure air supply systems, but do include the compressed air supply tube.

5.10.2 No exposed components of the apparatus shall continue to burn for more than 5 s after removal from the flame. Testing shall be done in accordance with 6.9.1.

5.10.3 Wherever the manufacturer designs the apparatus to be used in applications with a high flammability risk, the exposed components shall be tested in accordance with 6.9.2. The exposed components shall not continue to burn for more than 5 s after removal from the flame and the apparatus shall be marked in accordance with Clause 7.

Testing shall be done in accordance with 6.9.2.

5.11 Resistance to pressure

The compressed air supply tube and the medium pressure connecting tube and their couplings shall be capable of withstanding a pressure of 30 bar for 15 min without damage.

Testing shall be done in accordance with 6.1 and 6.3.

5.12 Mobile high pressure air supply systems

5.12.1 General

The requirements of 5.21 shall apply simultaneously to each apparatus connected to a mobile high pressure air supply system.

Where multiple wearers are supplied from one pressure reducer, a tests are conducted with the first wearer outlet attached to a breathing machine and all remaining apparatus operating at a continuous flow of 160 l/min.

The mobile high pressure air supply system shall supply breathable air in accordance with EN 12021, and shall be fitted with a pressure reducer, a high pressure gauge, medium pressure gauge, relief valve and a warning device.

Testing shall be done in accordance with 6.3.

5.12.2 Pressure reducer

The pressure reducer and the characteristics of the compressed air supply system incorporating the compressed air supply tube(s) shall be such that the requirements of 5.16 and 5.21 are met.

If the outlet pressure is variable, the pressure reducer shall not be adjustable without the use of special tools and the pressure gauge shall be suitably marked to indicate the pressure range.

Testing shall be done in accordance with 6.3 and 6.4.

5.12.3 Pressure reducer relief valve

A pressure reducer relief valve shall be provided. The pressure reducer relief valve shall be designed to pass an air flow of 400 l/min at a medium pressure not exceeding 30 bar. With the pressure reducer relief valve operational, the inhalation and exhalation breathing resistances shall not exceed 25 mbar.

Testing shall be done in accordance with 6.10.

5.13 Warning devices for mobile high pressure air supply systems

5.13.1 General

A warning device shall be provided which activates at the minimum operating conditions specified by the manufacturer.

If the equipment is intended by the manufacturer to be operated without an assistant at the air supply control, then the warning device shall be worn by the wearer.

If the equipment is intended by the manufacturer to be operated with an assistant at the air supply control, then the warning device shall warn the assistant and/or the wearer.

At the predetermined operating pressure of the warning device ± 5 bar the duration of the warning shall be at least 15 s for a continuous signal and at least 60 s for an intermittent signal and thereafter shall continue. The warning device shall activate when the residual air volume per user is no less than 300 litres per user at atmospheric pressure.

Testing shall be done in accordance with 6.3 and 6.17.

5.13.2 Audible warning device

If an audible warning device is incorporated, the sound pressure level shall be at least 90 dB(A) measured at the ear nearest the device in the case of the wearer, or within 1 m of the mobile high pressure air supply system in the case of an assistant.

The signal may be continuous or intermittent.

At the predetermined operating pressure of the warning device ± 5 bar the duration of the warning at 90 dB(A) shall be at least 15 s for a continuous signal and at least 60 s for an intermittent signal and thereafter shall continue to sound down to 10 bar.

In the case of an intermittent warning device the peak sound pressure shall be at least 90 dB(A). The frequency range shall be between 2 000 and 4 000 Hz.

The warning device shall continue to operate in a temperature range of 0 ºC to 10 ºC at a relative humidity of 90 %.

The air loss that might be caused by the warning signal shall not exceed an average of 5 l/min from response of signal to a pressure of 10 bar. During and after response of the warning device the wearer shall be able to continue breathing without added difficulty.

5.14 Compressed air supply tube

5.14.1 Resistance to kinking

When tested, the compressed air supply tube shall maintain a uniform near-circular loop and spiral from this loop. It shall not deform during the test to an extent that decreases the flow of air through it by more than 10 %, when compared with that measured when the tube is straight and unstressed.

Testing shall be done in accordance with 6.11.

5.14.2 Resistance to collapse

The reduction in air flow when tested shall not be greater than 10 %.

Testing shall be done in accordance with 6.12.

5.14.3 Strength

The compressed air supply tube, couplings and demand valve shall not separate from the couplings, belt or harness as appropriate.

Testing shall be done in accordance with 6.3 and 6.7.