SLOVENSKI STANDARD
SIST EN 14593-1:2018

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Oprema za varovanje dihal - Dihalni aparat na stisnjeni zrak z regulatorjem - 1. del: Aparat z obrazno masko - Zahteve, preskušanje in označevanje

Respiratory protective devices - Compressed air line breathing devices with demand valve - Part 1: Devices with a full face mask - Requirements, testing and marking

Atemschutzgeräte - Druckluft-Schlauchgeräte mit Lungenautomat - Teil 1: Geräte mit einer Vollmaske - Anforderungen, Prüfung und Kennzeichnung

Appareils de protection respiratoire - Appareils de protection respiratoire isolants à adduction d'air comprimé avec soupape à la demande - Partie 1: Appareil avec masque complet - Exigences, essais et marquage

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13.340.30	Varovalne dihalne naprave	Respiratory protective devices

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EUROPEAN STANDARD

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Respiratory protective devices - Compressed air line breathing devices with demand valve - Part 1: Devices with a full face mask - Requirements, testing and marking

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European foreword

This document (EN 14593-1:2018) 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of an identical text or by endorsement, at the latest by November 2018, and conflicting national standards shall be withdrawn at the latest by November 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14593-1:2005.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential health and safety requirements of EU Regulation(s).

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

The following main technical changes have been made compared to EN 14593-1:2005:

a) requirements for cleaning and disinfection deleted;

b) visual inspection changed to inspection and detailed list inserted;

c) test for leaktightness added;

d) test for noise level adapted to the test procedure specified in ISO 16900-14;

e) Annex B deleted;

f) figures adapted to the changes made in the test procedures, where appropriate.

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

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1 Scope

This document specifies minimum requirements for compressed air line breathing devices with demand valve for use with a full face mask as a respiratory protective device (RPD).

Diving RPD are not covered by this document.

RPD used in abrasive blasting operations without additional protective features are not covered by this document.

Escape RPD, although certain requirements addressing the use in conjunction with escape RPD and escape conditions are given, are not covered by this document.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 136:1998, *Respiratory protective devices — Full face masks — Requirements, testing, marking*

EN 137:2006, *Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — 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: Tread connection M 45 x 3*

EN 402:2003, *Respiratory protective devices — Lung governed demand self-contained open-circuit compressed air breathing apparatus with full face mask or mouthpiece assembly for escape — Requirements, testing, marking*

EN 12021, *Respiratory equipment — Compressed gases 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 13274-3:2001, *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 13274-6, *Respiratory protective devices — Methods of test — Part 6: Determination of carbon dioxide content of the inhalation air*

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

ISO 16900-14, *Respiratory protective devices — Methods of test and test equipment — Part 14: Measurement of sound level*

3 Terms, description and symbols

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

3.1 Terms

3.1.1
as received
not pre-conditioned or modified to carry out a test

3.1.2
facepiece
[Respiratory Interface (RI)]
full face mask conforming to EN 136 (Class 2 or Class 3)

3.1.3
mobile high pressure air supply system
supply system that can include a compressor, filters, compressed air cylinders, for use as a mobile source of breathable air

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3.1.4
switch over device
device that ensures that in the event of a malfunction or disconnection of the airline, the air supply, when airline is used in conjunction with self-contained breathing devices, automatically switches over to the self contained air supply, without interruption of supplied air to the wearer

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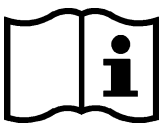
3.2 Description

This RPD supplies the wearer with breathable air in accordance with EN 12021, which on inhalation, flows through a lung governed demand valve. The latter can operate at negative pressure or at positive pressure and is connected to a suitable full face mask, possibly via a breathing hose. A compressed air supply tube connects the wearer to a 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.

3.3 Symbols

3.3.1



See information supplied by the RPD manufacturer

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4 Requirements

4.1 General

All test samples specified in the related test clauses shall meet the relevant requirements.

Where it is required in a specific clause, the manufacturer shall declare that a risk assessment e.g. a Failure Modes and Effect Analysis (FMEA) concerning these specific requirements has been conducted.

NOTE Further information is given in EN 60812 [3].

If the manufacturer claims that the RPD may be used in potentially explosive atmospheres it shall comply with the appropriate requirements.

4.2 Nominal values and tolerances

Unless otherwise specified, the values stated in this document 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 conditions for testing shall be between 16 °C and 32 °C and (50 ± 30) % relative humidity. Any temperature limits specified shall be subject to an accuracy of ± 1°C.

4.3 Ergonomics

The requirements of this document are intended to take account of the interaction between the wearer, the RPD, and where possible the working environment in which the RPD is likely to be used. The RPD shall satisfy 4.4 and 4.8 .

Testing shall be performed accordance with 5.3.

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4.4 Materials

4.4.1 All materials used in the construction shall have adequate resistance to deterioration by heat and adequate mechanical strength.

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After any pre-conditioning according to 5.7, testing shall be performed in accordance with 5.3.

The manufacturer shall supply a declaration that this was addressed by a risk assessment, e.g. a FMEA.

Check in accordance with 5.2.

4.4.2 If the manufacturer claims that the RPD may be used in potentially explosive atmospheres, exposed parts, i.e. those which can be subjected to impact during use of the RPD shall not be made of aluminium, magnesium, titanium or their alloys.

The manufacturer shall supply a declaration that this was addressed by a risk assessment, e.g. a FMEA.

Check in accordance with 5.2.

4.4.3 Materials that can come into direct contact with the wearer's skin or that can 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.

The manufacturer shall supply a declaration that this was addressed by a risk assessment, e.g a FMEA.

Check in accordance with 5.2.

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

Check in accordance with 5.2 and test in accordance with 5.3.

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4.5 Practical performance

The complete RPD shall undergo practical performance tests under realistic conditions. These general tests serve the purpose of checking the RPD for imperfections that cannot be determined by the tests specified elsewhere in this document.

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

After completion of the activities the test subjects are asked to answer the questions in EN 13274-2:2001, 6.6.

Testing shall be performed in accordance with 5.3.

4.6 Connections

4.6.1 General

Components of the RPD 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.

Check in accordance with 5.2 and test in accordance with 5.3.

4.6.2 Couplings

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The RPD shall be constructed so that any twisting of the hoses and tubes does not affect the fit or performance of the RPD, 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.

Check in accordance with 5.2 and test in accordance with 5.3.

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4.6.3 Strength of connections to full face mask, demand valve, medium pressure connecting tube and breathing hose

Connections of the breathing hose at the full face mask and at the demand valve or between the full face mask connector and the demand valve shall withstand a force of 250 N.

Testing shall be performed in accordance with 5.4.

4.6.4 Connection between RPD and full face mask

The connection between the RPD and the full face mask can be achieved by a permanent, special or thread type connector. If a thread connector is used, either it shall conform to the requirements of one of the following standards:

— EN 148-1, for RPD without positive pressure,

— EN 148-3, for RPD with positive pressure

or if any other thread type connector is used it shall not be possible to connect it with the above mentioned threads.

The thread in accordance with EN 148-2 shall not be used.

Check in accordance with 5.2.

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4.6.5 Unacceptable connections

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

Check in accordance with 5.2.

4.7 Compressed air line breathing device used with self-contained breathing device - switch over device

4.7.1 General

If a compressed air line breathing device is used in conjunction with self-contained breathing device meeting the requirements of EN 137 or EN 402, a switch over device shall be provided on the airline device to ensure continuous breathable air in the event of malfunction or disconnection of the air line.

After “switch over”, the air supply of the self-contained breathing device shall continue to meet the requirements of EN 137 or EN 402, and the switch over shall cause no interruption of supply to the wearer. After disconnecting the compressed air supply tube, the self-contained breathing device shall continue to meet the requirements of EN 137 or EN 402.

Any pressure peak exceeding the limits specified in 4.22 caused during the "switch over" measured within one breathing cycle shall be disregarded.

Testing shall be performed in accordance with EN 137:2006, 6.21 or EN 402:2003, 6.24.2 and 6.24.3 as appropriate.

The design of the switch over device shall prevent air loss from the self-contained breathing device.

Check in accordance with 5.2.

If the switch over device is connected to the compressed air supply tube, the connection shall withstand a pull force of 1 000 N.

Testing shall be performed in accordance with 5.6.

If the switch over device is connected to the breathing hoses or to the medium pressure supply tube, the connection shall withstand a pull force of 250 N.

Testing shall be performed in accordance with 5.4.

Couplings (if fitted) shall be self-sealing. When not connected, it shall be possible to protect all connectors from contamination. Disconnecting of the compressed air supply tube shall be possible in case of emergency and shall be operable by the user.

Check in accordance with 5.2 and test in accordance with 5.3.

4.7.2 Switch over warning device

4.7.2.1 General

Once the switch over has occurred a warning signal shall be activated to give indication to the wearer of the use of breathable air from the self-contained breathing device.

4.7.2.2 Audible switch over warning device

If an audible warning device is incorporated, the signal may be continuous or intermittent. The peak sound pressure level shall be at least 90 dB (A) measured at the ear nearest the device and the frequency range shall be between 2 000 Hz and 4 000 Hz.

Check in accordance with 5.2 and test in accordance with 5.16.