SLOVENSKI STANDARD
oSIST prEN 12941:2017

01-februar-2017

Oprema za varovanje dihal - Oprema s tlačno filtracijo zraka z ohlapnim sistemom za pritrditev vmesnika - Zahteve, preskušanje, označevanje

Respiratory protective devices - Powered filtering devices incorporating a loose fitting respiratory interface - Requirements, testing, marking

Atemschutzgeräte - Gebläsefiltergeräte mit einem Atemanschluss ohne Dichtsitz (Haube) - Anforderungen, Prüfung und Kennzeichnung

Appareils de protection respiratoire - Appareils filtrants à assistance motorisée avec interface respiratoire à ajustement lâche - Exigences, essais, marquage

Ta slovenski standard je istoveten z: **prEN 12941**

ICS:

13.340.30	Varovalne dihalne naprave	Respiratory protective devices

oSIST prEN 12941:2017 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 12941

December 2016

ICS 13.340.30

Will supersede EN 12941:1998

English Version

Respiratory protective devices - Powered filtering devices incorporating a loose fitting respiratory interface - Requirements, testing, marking

Appareils de protection respiratoire - Appareils filtrants à assistance motorisée avec interface respiratoire à ajustement lâche - Exigences, essais, marquage

Atemschutzgeräte - Gebläsefiltergeräte mit einem Atemanschluss ohne Dichtsitz (Haube) - Anforderungen, Prüfung und Kennzeichnung

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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword

This document (prEN 12941:2016) 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 12941:1998, EN 12941:1998/A1:2003 and EN 12941:1998/A2:2008.

The following main technical changes have been made compared to EN 12941:1998, EN 12941:1998/A1:2003 and EN 12941:1998/A2:2008:

a) number of test samples added to the requirements, where necessary;

b) classification table amended to cover Hg and NO filter for all classes (TH1, TH2 and TH3);

c) nominal values and tolerances added;

d) clogging deleted;

e) warning facilities amended to cover low energy and low flow warning;

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

g) test substances and number of test subjects for inward leakage test changed;

h) table of results for field of vision score revised;

i) test for noise level adapted to ISO test procedure;

j) Annex A deleted;

k) Annex B deleted;

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

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 document specifies minimum requirements for powered filtering Respiratory Protective Devices (RPD) incorporating a loose fitting respiratory interface (RI). It does not cover devices designed for use in circumstances where there is or might be an oxygen deficiency (concentration in oxygen less than a volume fraction of 17 %).

Escape RPD are not covered by this document.

Laboratory and practical performance tests are included for the assessment of compliance with 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, *Respiratory protective devices — Definitions of terms and pictograms*

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

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

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

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

EN 13274-7, *Respiratory protective devices — Methods of test — Part 7: Determination of particle filter penetration*

EN ISO 80079-37:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36:2016)*

EN ISO 80079-37:2016, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety ''c'', control of ignition sources ''b'', liquid immersion ''k'' (ISO 80079-37:2016)*

EN 60079-0:2012, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2011, modified + Cor.:2012)*

EN 60079-11:2012, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety “i” (IEC 60079-11:2011 + Cor.:2012)*

IEC TS 60079-32-1, *Explosive atmospheres — Part 32-1: Electrostatic hazards, guidance*

3 Terms, definitions, description, abbreviations and symbols

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

3.1 Terms, definitions and abreviations

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

3.1.2
ready for assembly state
component with seals, plugs or other environmental protective means, if applicable, still in place

3.1.3
re-usable particle or combined filter
particle or combined filter intended to be used for more than a single shift

3.1.4
Respiratory Interface
(RI)
part of a RPD that forms the protective barrier between the wearer's respiratory tract and the ambient atmosphere

Note 1 to entry: The respiratory interface is connected to the filtering part of the device, or the part managing the supply of breathable gas.

[SOURCE: ISO 16972:2010, definition 3.162, modified – **respiratory protective device** has been changed to RPD and addition of abbreviation **(RI)**]

3.1.5
loose-fitting respiratory interface
RI which does not rely on forming a complete seal to the wearer's skin

3.1.6
powered filtering RPD

filtering RPD in which air is moved through the filter(s) by means of a blower to supply the wearer with breathable air

3.1.7
un-encapsulated
refers to a filter that in itself does not contain a rigid housing

3.2 Description

The device typically consists of:

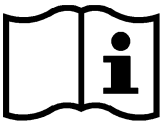
— a loose-fitting respiratory interface, e.g. hood, blouse or suit which can be combined with other types of PPE;

— a blower unit with an energy supply intended to be carried/worn by the wearer which supplies filtered ambient air to the respiratory interface;

— a filter or filters through which all air supplied passes

3.3 Symbols

3.3.1



3.3.2

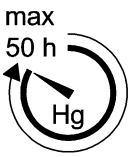
Note 1 to entry: During one shift multiple use is allowed.

3.3.3

hour glass “end of shelf life”

Key: yyyy year, mm month

3.3.4



maximum time of use

4 Designation

Respiratory protective devices meeting the requirements of this document shall be designated as follows:

Powered filtering device EN 12941, class, gas filter type and class, as shown in Table 1.

EXAMPLES Powered filtering device EN 12941A2 TH2P

Powered filtering device EN 12941 TH2P

5 Classification

The complete devices are classified and designated according to the maximum inward leakage and maximum particle filter penetration as given in Table 1.

Table 1 — Classification

Classification of complete device			Maximum inward leakage TIL [a] %	Maximum particle filter penetration	
Class	Gas filter type and class (if applicable)	Particle filter, (if applicable)		NaCl aerosol	Paraffin oil mist
				%	
TH 1	A1, A2 or A3 B1, B2 or B3 E1, E2 or E3 K1, K2 or K3 AX SX	P	10	10	10
	Hg P NO P			0,2	0,2
TH 2	A1, A2 or A3 B1, B2 or B3 E1, E2 or E3 K1, K2 or K3 AX SX	P	2	2	2
	Hg P NO P			0,2	0,2
TH 3	A1, A2 or A3 B1, B2 or B3 E1, E2 or E3 K1, K2 or K3 AX SX	P	0,2	0,2	0,2
	Hg P NO P				
EXAMPLE	TH2B1P: an powered filtering device incorporating a loose-fitting RI (TH) fitted with a combined gas filter and a particle filter (B1P) and where the inward leakage of the complete device is 2 % or less.				

[a] TIL for particle filter systems only.

Check in accordance with 7.3.

6 Requirements

6.1 General

All test sample(s) shall meet all requirements given in Table 6.

Where it is required in a specific clause the manufacturer shall declare that a Failure Modes and Effect Analysis (FMEA) has been conducted.

NOTE Further information is given in EN 60812.

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

Test in accordance with EN ISO 80079-36:2016, EN ISO 80079-37:2016 or IEC TS 60079-32-1.

If the RPD is intended to provide additional protection, e.g. head protection, eye protection, face protection, or including protective clothing, it shall additionally comply with the relevant requirements of the standards covering those related PPE.

Check in accordance with 7.3.

It shall not be possible to connect any part of the RPD to a thread conforming to EN 148-2 or EN 148-3.

Check in accordance with 7.3.

When the RPD manufacturer states that an accessory is intended for use with the RPD, the RPD including the accessory shall be tested.

Check in accordance with 7.3 and the appropriate test method.

6.2 Nominal values and tolerances

Unless otherwise specified, the values stated in this document are expressed as nominal values. Except for temperature limits, values which describe test conditions and that 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.

For each of the required measurements performed in accordance with this document, a corresponding estimate of the uncertainty of measurement should be evaluated. This estimate of uncertainty should be applied and stated when reporting test results, in order to enable the user of the test report to assess the reliability of the result.

6.3 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 6.5, 6.11 and 6.12.

Testing shall be performed in accordance with 7.14.

6.4 Design

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

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

6.5 Materials

6.5.1 General

Materials used shall be suitable to withstand the intended use and conditions, (e.g. temperatures, humidity and corrosive environments) as stated by the manufacturer unless specified in this document. The manufacturer shall supply a declaration that this was addressed by the FMEA.

Check in accordance with 7.3.

6.5.2 Skin compatibility

Materials that may come into direct contact with the wearer's skin or that may affect the quality of the breathing 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 the FMEA.

Check in accordance with 7.3.

6.6 Mechanical stress (optional)

Blower units and battery casings (if separate from the blower unit) in a ready for assembly state shall be subjected to mechanical stress in three different orientations (x, y, z) with 650 rotations each and shall be marked accordingly, see 8.3 d).

Testing shall be performed in accordance with 7.11 prior to all other tests.

6.7 Resistance to temperature

After conditioning at the extremes of temperature and humidity given in the manufacturer's information and in accordance with 7.2, the RPD components including filters in their ready for assembly state shall show no significant deformation of major components, nor shall these components separate from each other or from the complete RPD. The requirements of 6.8 to 6.14 and 6.16 to 6.21 shall be met.

Testing shall be performed in accordance with 7.2.

6.8 Respiratory Interface (RI)

6.8.1 General

When the RI does not include an integral blower unit it shall not be possible to fit the filter(s) directly to the RI or the breathing hose (if applicable).

6.8.2 Head harness

The head harness (if fitted) of a RI shall be capable of being adjusted to fit a range of head sizes.

Check in accordance with 7.3 and test in accordance with 7.4 and 7.14.

6.8.3 Visor

6.8.3.1 Two samples of the RPD shall be preconditioned in accordance with 7.2.1.

6.8.3.2 Visors shall not distort vision nor shall any misting occur which significantly affects vision as determined in the course of testing.

Where anti-misting compounds are used or specified by the manufacturer, they shall be compatible with eyes, skin and the device under the foreseeable conditions of use.

Testing shall be performed in accordance with 7.4 and 7.14.

6.8.3.3 The two preconditioned samples of the RPD, shall befitted three times each sample and shall have an average visual field score (VFS) of at least 98. Six out of 8 dots of the section between 20° and 30°; 340° and 350° on the right side and between 150° and 160°, 190° and 200° on the left side in the modified VFS scale shall be within the number counted.

This requirement shall not apply if means of protection against non-ionizing radiation is an integral part of the RPD covered by this document.

Testing shall be performed in accordance with 7.5.

6.8.3.4 The two preconditioned samples of the RPD shall be fitted to a test subject.

In this case a sign consisting of letters 100 mm in height, black on white and 1/5 of the height in mm thickness at a distance of 6 m shall be readable.

This requirement shall not apply if means of protection against non-ionizing radiation is an integral part of the RPD covered by this document.

Testing shall be performed in accordance with 7.14.

6.8.3.5 After being tested in accordance with 7.6 one of the two preconditioned samples shall not be visibly damaged and the device shall comply with 6.9.

6.9 Inward leakage

Two samples, or more if disposable, shall be temperature preconditioned in accordance with 7.2.1 and, if applicable, mechanical stress in accordance with 6.6.

The measured minimum flow rate shall be determined and checked against the specified manufacturer's minimum flowrate in accordance with 7.8.

When tested at the lowest value either of the manufacturer's minimum flowrate or the determined measured minimum flow rate, the inward leakage of the test substance for each of the exercises shall not exceed the levels given in the appropriate class from Table 1.

If the intended use of the RPD is for gases or gases and particles, the inward leakage test shall be performed with 10 test subjects using SF_6, alternatively with five test subjects, using SF_6 and five subjects using NaCl aerosol as a test agent.

If the intended use of the RPD is for particles only, the inward leakage test shall be performed with ten subjects using NaCl aerosol as a test agent.

Testing shall be performed in accordance with 7.4.

6.10 Breathing resistance

One sample shall be temperature preconditioned in accordance with 7.2.1 and, if applicable, mechanical stress in accordance with 6.6.

The positive pressure under the helmet or hood shall not exceed 5 mbar.

Testing shall be performed in accordance with 7.7.

6.11 Air supply

One sample shall be temperature preconditioned in accordance with 7.2.1 and, if applicable, mechanical stress in accordance with 6.6.

When mounted on a test head or torso the flow into the RI shall be not less than the manufacturer's minimum flow rate for the manufacturer's stated design duration which shall not be less than 4 h.

Testing shall be performed in accordance with 7.8.

The flow rate and distribution of the air under the RI shall not cause distress to the wearer (for example by excessive local cooling of the head and face or by causing eye irritation).

Testing shall be performed in accordance with 7.14.

It shall not be possible to switch off the air supply inadvertently.

Testing shall be performed in accordance with 7.14.

If a means is provided to adjust the air supply to give a RPD classification then it shall not be possible to change the classification during use. The mechanism which adjusts the flow rate shall simultaneously indicate the appropriate reference to the selected classification (see Table 1) as specified in the information supplied by the manufacturer. The mechanism shall be so designed that it is not possible to inadvertently change the air flow.

A means for adjusting the air flow during use within a classification can be provided.

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

6.12 Warning facilities

6.12.1 General

Two samples shall be temperature preconditioned in accordance with 7.2.1 and, if applicable, mechanical stress in accordance with 6.6.

All warnings shall draw the attention of the wearer within 15 s once activated at or above the manufacturer's minimum flow rate.

All warnings shall continue to function while the cause of the warning remains.

After activation of the warning, the warning device shall not be capable of being turned off by the wearer while the cause of the alarm remains.

Test in accordance with 7.14.

6.12.2 Low energy warning

All classes of the RPD shall be equipped with at least one low energy warning facility. Information about the remaining service time to leave the hazardous environment, which shall be at least 5 min, shall be given in the information supplied by the manufacturer.

Check in accordance with 7.3 and test in accordance with 7.8.6 and 7.14.

6.12.3 Low flow warning

All classes of the RPD shall be equipped with at least one low flow warning facility.

Check in accordance with 7.3 and test in accordance with 7.8.7 and 7.14.

6.13 Electrical components

One sample shall be checked as received.

Electrical components shall be so designed that it is not possible to inadvertently reduce or reverse the air flow.

Check in accordance with 7.3 and 7.14.

If the device is claimed to be intrinsically safe for use in potentially explosive atmospheres it shall comply with the appropriate requirements of EN 60079-0 and EN 60079-11.

6.14 Breathing hose, if applicable, and couplings

6.14.1 General

Two samples shall be temperature preconditioned in accordance with 7.2.1.

Any breathing hose shall permit free head movement without danger of being caught up, as assessed by the test subjects.

Testing shall be performed in accordance with 7.4 and 7.14.