



SLOVENSKI STANDARD

SIST EN 12941:1999

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Respiratory protective devices - Powered filtering devices incorporating a helmet or a hood - Requirements, testing, marking

Atenschutzgeräte - Gebläsefiltergeräte mit einem Helm oder einer Haube -
Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils filtrants a ventilation assistée avec
casque ou cagoule - Exigences, essais, marquage

Ta slovenski standard je istoveten z: EN 12941:1998

ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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en

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EUROPEAN STANDARD

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Descriptors: accident prevention, personal protective equipment, filters, helmets, classifications, design, specifications, tests, technical notices, marking

English version

Respiratory protective devices - Powered filtering devices incorporating a helmet or a hood - Requirements, testing, marking

Appareils de protection respiratoire - Appareils filtrants à ventilation assistée avec casque ou cagoule - Exigences, essais, marquage

Atemschutzgeräte - Gebläsefiltergeräte mit einem Helm oder einer Haube - Anforderungen, Prüfung, Kennzeichnung

This European Standard was approved by CEN on 24 August 1998.

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

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Foreword

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

This European Standard replaces EN 146:1991.

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 April 1999, and conflicting national standards shall be withdrawn at the latest by April 1999.

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(s).

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

A given respiratory protective device incorporating a helmet or a hood 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 powered filtering devices incorporating a helmet or a hood with gas, particle or combined filter(s) for respiratory protection. It does not cover devices designed for use in circumstances where there is or might be an oxygen deficiency (oxygen less than 17 % by volume). Also, it does not cover respiratory protective devices designed for escape purposes.

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.

- prEN 132:1996 Respiratory protective devices - Definitions
- EN 134:1998 Respiratory protective devices - Nomenclature of components
- EN 136:1998 Respiratory protective devices - Full face masks - Requirements, testing, marking
- EN 140:1998 Respiratory protective devices - Half masks and quarter masks - Requirements, testing, marking
- prEN 143:1997 Respiratory protective devices - Particle filters - Requirements, testing, marking
- EN 148-1:1987 Respiratory protective devices - Threads for facepieces - Standard thread connection
- EN 166:1995 Personal eye protection - Specifications
- EN 169:1992 Personal eye protection - Filters for welding and related techniques - Transmittance requirements and recommended use
- EN 170:1992 Personal eye protection - Ultraviolet filters - Transmittance requirements and recommended use
- EN 171:1992 Personal eye protection - Infrared filters - Transmittance requirements and recommended use

- EN 379:1994 Specification for welding filters with switchable luminous transmittance and welding filters with dual luminous transmittance
- EN 397:1995 Industrial safety helmets
- EN ISO 6941:1995 Textile fabrics - Burning behaviour - Measurement of flame spread properties of vertically oriented specimens
- EN 50 014:1992 Electrical apparatus for potentially explosive atmospheres - General requirements
- EN 50 020:1994 Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"
- IEC 651:1979 Sound level meters

3 Definitions and description

3.1 Definitions

For the purposes of this European Standard the definitions given in prEN 132 and the nomenclature given in EN 134 apply together with the following.

3.1.1 Powered filtering device incorporating a helmet or hood: A device, dependent on the ambient air, incorporating:

- one or more particle filter(s) providing protection against solid or liquid aerosols of negligible volatility and decomposition, or a combination of such aerosols, or
- one or more gas filter(s) providing protection against specified gases and vapours, or
- one or more combined filter(s) providing protection against dispersed solid and/or liquid particles as defined above, and specified gases and vapours
- and a turbo unit supplying the filtered air to a facepiece, which can be a hood or a helmet.

3.2 Description

The device typically consists of:

- a) a facepiece which can be a hood as defined in prEN 132 or a device which seals on the face, excluding facepieces specified in EN 136 or EN 140. Either type of facepiece may incorporate a helmet e.g. to provide head protection against mechanical impact and/or a visor to provide eye and face protection against given risks, possibly combined,
- b) a turbo unit designed to be carried/worn by the wearer which supplies filtered ambient air to the facepiece. The energy supply for the turbo unit may or may not be carried on the person,
- c) a filter or filters through which all air supplied passes,
- d) exhalation valves or other outlets depending on the design by which exhaled air and air in excess of the wearer's demand is discharged.

4 Designation

Respiratory protective devices meeting the requirements of this standard shall be designated in the following manner:

Powered filtering device/EN12941/ (Class) (type) (options)

for example: Powered filtering device/EN12941/TH2A2P SL.

5 Classification

The complete devices are classified and designated according to the maximum inward leakage required as given in table 1.

6 Requirements

6.1 Materials

6.1.1 General

The device shall be made of suitable material to withstand normal usage and exposure to those temperatures, humidities and corrosive environments that are likely to be encountered.

Testing shall be done in accordance with 7.2.

6.1.2 Compatibility with skin

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

Testing shall be done in accordance with 7.2.

6.1.3 Cleaning and disinfection

The materials used in the construction of the device shall withstand the cleaning and disinfecting agents and procedures recommended by the manufacturer.

Testing shall be done in accordance with 7.2 and 7.3.5.16.

6.1.4 Surface finish

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

Testing shall be done in accordance with 7.2.

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Table 1: Classification

Classification of complete device			Maximum inward leakage %	Maximum particle filter penetration	
Class	Gas filter type and class (if applicable)	Particle filter (if applicable)		NaCl aerosol %	Paraffin oil mist %
TH 1	A1, 2 or 3 B1, 2 or 3 E1, 2 or 3 K1, 2 or 3 AX SX	P	10	10	10
TH 2	A1, 2 or 3 B1, 2 or 3 E1, 2 or 3 K1, 2 or 3 AX SX	P	2	2	2
TH 3	A1, 2 or 3 B1, 2 or 3 E1, 2 or 3 K1, 2 or 3 AX SX Hg NO	P	0,2	0,2	0,2
Example: TH2B1P: a powered filtering device incorporating a helmet or a hood (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.					

6.2 Resistance to temperature

After conditioning in accordance with 7.1.2., the complete device excluding filters shall show no appreciable deformation of major components, nor shall these components separate in the complete device. The requirements of 6.3 to 6.10 and 6.12 to 6.17 shall continue to be met.

Testing shall be done in accordance with 7.1.

NOTE 1: The complete device is deemed to exclude the battery charger, unless the charger is integral with the device.

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NOTE 2: The requirements for conditioning of filters, prior to testing, are given in 7.1.

6.3 Helmets and hoods

6.3.1 General

If the device is intended to provide in addition head, eye or face protection against those possible risks, it shall comply with relevant requirements of standards covering related protectors (for example EN 166 and EN 397).

Additions to the equipment specified by the manufacturer shall not impair the respiratory protective performance of the equipment complying with the standard.

6.3.2 Head harness

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

Testing shall be done in accordance with 7.2, 7.3 and 7.16.

6.3.3 Visor

6.3.3.1 Visors shall not distort vision nor shall any misting occur which significantly affects vision as subjectively 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 done in accordance with 7.3 and 7.16.

6.3.3.2 The effective field of vision shall be not less than 70 %, related to the natural field of vision, and the overlapped field of vision, related to the natural overlapped field of vision, shall be not less than 80 %.

Testing shall be done in accordance with 7.4.

Devices shall also be assessed for field of vision during the practical performance test.

Testing shall be done in accordance with 7.16.

6.3.3.3 If it is intended additionally to provide protection against certain type of non-ionizing radiation then the protection shall comply with EN 166, EN 169, EN 170, EN 171 or EN 379 as appropriate.

If the means of protection against non-ionizing radiation is integral with the equipment covered by this standard then the field of vision shall be measured as described in 7.4 and reported for information only and the equipment shall comply with EN 166, EN 169, EN 170, EN 171 or EN 379 as appropriate.

6.3.3.4 The visor shall not be visibly damaged and the device shall comply with 6.4.

Testing shall be done in accordance with 7.5.

6.4 Inward leakage

When tested at the manufacturer's minimum design 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 column 5 of table 1, for each of the 10 test subjects.

Testing shall be done in accordance with 7.3.

6.5 Breathing resistance

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

Testing shall be done in accordance with 7.6.

6.6 Air supply

6.6.1 The manufacturer's minimum design flow rate shall be not less than 120 l/min.

Testing shall be done in accordance with 7.7.

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

Testing shall be done in accordance with 7.7.

The flow rate and distribution of the air under the helmet or hood 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 done in accordance with 7.3 and 7.16.

6.6.3 It shall not be possible to switch off the air supply inadvertently as assessed during the practical performance test.

Testing shall be done in accordance with 7.16.

6.6.4 If a means is provided to adjust the air supply to give a particular 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 manufacturer's information. The mechanism shall be so designed that it is not possible inadvertently to change the air flow.

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

Testing shall be done in accordance with 7.2 and 7.16.

6.7 Checking and warning facilities

6.7.1 A means shall be provided to check that the manufacturer's minimum design flow rate is exceeded.

6.7.2 Class TH2 and Class TH3 devices shall be fitted with a warning facility that indicates to the wearer during use when a further check in accordance with 6.7.1 and the manufacturer's instructions is necessary.

6.7.3 A means for checking the correct functioning of the warning facility shall be provided.

6.7.4 The facilities provided under 6.7.1, 6.7.2 and 6.7.3 shall be tested to ensure that it operates at or above the minimum design flow rate.

Testing shall be done in accordance with 7.2, 7.16 and the manufacturer's information.

6.8 Clogging

Where particle or combined filters (including special filters) are fitted the device shall be tested for clogging. On completion of this test:

- a) the flow rate shall not have fallen below the manufacturer's minimum design flow rate,

and

- b) the filters shall meet the penetration requirements of 6.11.1.1.

Testing shall be done in accordance with 7.8.

6.9 Electrical components

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

If the device is claimed to be intrinsically safe for use in potentially explosive atmospheres it shall comply with the appropriate requirements of EN 50 014 and EN 50020.

If the power supply is a battery it shall be a non-spillable type.

Protection against the effects of an occurrence of a short circuit shall be provided for the battery.

Testing shall be done in accordance with 7.2 and 7.16.

NOTE: Long power leads should be avoided. The use of very low voltages is recommended which, in this context, means less than 60 V (D.C.) or less than 25 V (A.C.) (50 Hz).

6.10 Breathing hose

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

Testing shall be done in accordance with 7.3 and 7.16.

6.10.2 The air flow when the load is applied shall not be reduced by more than 5 % of the manufacturer's minimum design flow rate.

There shall be no distortion 5 min after completion of the test.

Testing shall be done in accordance with 7.9.

6.10.3 Hoses and couplings shall meet the requirements given in table 2 and shall not become disconnected or visibly damaged. Where multiple hoses are fitted to the device each hose shall meet the requirements given in table 2.

Testing shall be done in accordance with 7.10.

Table 2: Strength of hose and couplings

Classification	Strength N
TH 1	50
TH 2	100
TH 3	250

6.10.4 Strength of coupling to hood

The coupling between hose and helmet/hood shall comply with the strength requirements of table 2 and shall not become disconnected or suffer visible damage.

Testing shall be done in accordance with 7.10.

6.11 Filters

6.11.1 Types and classification

6.11.1.1 Particle filters

Powered particle filtering devices shall be classified according to their penetration as given in columns 5 and 6 of table 1.

Three levels are classified and shall be designated:

THyP

where y is the inward leakage class 1, 2 or 3.

The protection provided by a class 2 or a class 3 filter includes that provided by the corresponding filter of lower class or classes.

6.11.1.2 Gas filters

Powered gas filtering devices shall be classified according to their application and protection capacity.

They shall be designated:

THy Gas z

where y is the inward leakage class 1, 2 or 3 and z is the capacity of the gas filter 1, 2 or 3 and where "Gas" means one of the "types" listed in (i) or (ii) or (iii).

a) Types of filters. Gas filters are contained in one of the following types or combinations of them. If a filter is a combination of types, it shall meet the requirements of each type separately.

(i) Types, A, B, E and K **ITeh STANDARD PREVIEW**
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Type A: For use against certain organic gases and vapours with a boiling point higher than 65 °C as specified by the manufacturer.

Type B: For use against certain inorganic gases and vapours as specified by the manufacturer (excluding carbon monoxide).

Type E: For use against sulfur dioxide and other acidic gases and vapours as specified by the manufacturer.

Type K: For use against ammonia and organic ammonia derivatives as specified by the manufacturer.

(ii) Special filters

Special filters shall only be in TH3 devices and shall include a particle filter on the inlet side. They are:

Type NO: For use against oxides of nitrogen, e.g. NO, NO₂, NO_x.

Type Hg: For use against mercury.

(iii) AX and SX filters

Type AX: For use against certain low boiling compounds (boiling point ≤ 65 °C) as specified by the manufacturer.

Type SX: For use against specific compounds.

(b) Classes of filters

(i) Gas filters of types A, B, E, and K are classified in one of the following classes:

Class 1: Low capacity

Class 2: Medium capacity

Class 3: High capacity.

The gas capacity provided by a class 2 or class 3 filter includes that provided by the corresponding filter of lower class or classes.

Only one class of special filter is specified.

6.11.1.3 Combined filters

Combined filters shall be specified and described as separate entities in accordance with 6.11.1.1 and 6.11.1.2 that is, THy Gas z P (e.g. TH3 A2P),

where

y = 1, 2 or 3

z = 1, 2 or 3

and

Gas = one or more of the types of gas filter.

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6.11.2 Design and performance

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6.11.2.1 Construction

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The connection between filter(s) and the mating part of the device shall be robust and leaktight.

The connection between filter and the mating part may be achieved by a special type of connection or by a screw thread connection (including threads other than the standard thread).

The standard thread is defined in EN 148-1.

Filters other than prefilters shall be designed to be irreversible and shall be readily replaceable without use of special tools.

The particle filter of combined filters shall be on the influent side of the gas filter.

Testing shall be done in accordance with 7.2.

6.11.2.2 Materials

Internally the filter shall withstand corrosion by the filtering media.

Material from the filter media released by the air flow through the filter shall not constitute a hazard or nuisance for the wearer.

6.11.2.3 Mechanical strength

After testing in accordance with 7.11 filters shall show no mechanical defects. After a visual inspection they shall meet the performance requirements given in 6.11.2.4.

6.11.2.4 Protection efficiency/capacity

6.11.2.4.1 Particle filters

Particle filters shall comply with the requirements given in columns 5 or 5 and 6 of table 1.

Testing shall be done in accordance with 7.12.1 and 7.12.2.

Filters for use against solid and liquid aerosols shall be tested against sodium chloride and paraffin oil.

Filters only for use against solid and water-based aerosols shall be tested against sodium chloride only.

6.11.2.4.2 Gas filters type A, B, E and K and combined filters

The filters shall comply with the requirements given in table 3.

Testing shall be done in accordance with 7.12.1, 7.12.3.1 and 7.12.3.2.

Where such a gas filter is combined with a particle filter, the combined filter shall comply with the penetration requirement for the particle filter given in table 1 in addition to the requirements of table 3.

6.11.2.4.3 Special filters iTeh STANDARD PREVIEW

Special filters shall comply with the requirements of table 4 and the penetration requirements for the particle filter given in table 1.

Testing shall be done in accordance with 7.12.1, 7.12.3.1 and 7.12.3.3.

Only one class of special filter is specified.

6.11.2.4.4 AX filters

AX filters shall comply with the requirements of table 5 and if applicable with the penetration requirements for the particle filter given in table 1.

Testing shall be done in accordance with 7.12.1, 7.12.3.1 and 7.12.3.4.