



# SLOVENSKI STANDARD

## SIST EN 1827:1999

01-julij-1999

CdfYa UnUj Ufcj Ub^X\ U`E`Dc`cVfUnbUa Ug\_UVfYn`j Ybh`cj `nUj X\ Uj Ub^N  
cXXj c^Aj ja ]Z]f]nUnUy ]lc`dfYX`d`]b]U]d`]b]b`XYW]U]gUa c`XYW]E`NU hYj Yz  
dfYg\_i yUb^ZcnbU Yj Ub^

Respiratory protective devices - Half masks without inhalation valves and with separable filters to protect against gases or gases and particles or particles only - Requirements, testing, marking

Atenschutzgeräte - Halbmasken ohne Einatemventile und mit trennbaren Filtern zum Schutz gegen Gase, Gase und Partikel oder nur Partikel - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Demi-masques sans soupape inspiratoire et avec filtres démontables, contre les gaz, contre les gaz et les particules, ou contre les particules uniquement - Exigences, essais, marquage

**Ta slovenski standard je istoveten z: EN 1827:1999**

**ICS:**

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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EUROPEAN STANDARD

EN 1827

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EUROPÄISCHE NORM

January 1999

ICS 13.340.30

Descriptors: personal protective equipment, accident prevention, respiratory protective equipment, safety masks, filters, gases, classifications, designation, specifications, tests, marking, instructions

English version

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This European Standard was approved by CEN on 26 December 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.

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

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

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

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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 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 1999, and conflicting national standards shall be withdrawn at the latest by July 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 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 performance requirements, test methods and marking requirements for half masks (re-usable) without inhalation valves and with separable filters (designed for a maximum of single shift use) to protect against gases or gases and particles or particles only. 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) or 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.

|          |   |
|----------|---|
| EN 132   | Respiratory protective devices - Definitions of terms and pictograms  |
| EN 134   | Respiratory protective devices - Nomenclature of components   |
| EN 136   | Respiratory protective devices - Full face masks - Requirements, testing, marking                                   |
| prEN 141 | Respiratory protective devices - Gas filters and combined filters - Requirements, testing, marking                  |
| prEN 143 | Respiratory protective devices - Particle filters - 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 M 45 x 3                        |
| prEN 149 | Respiratory protective devices - Filtering half masks to protect against particles - Requirements, testing, marking |

|             |   |
|-------------|---|
| EN 371      | Respiratory protective devices - AX gas filters and combined filters against low boiling organic compounds - Requirements, testing, marking               |
| EN 372:1992 | Respiratory protective devices - SX gas filters and combined filters against specific named compounds - Requirements, testing, marking                    |
| EN ISO 6941 | Textile fabrics - Burning behaviour - Measurement of flame spread properties of vertically oriented specimens (ISO 6941:1984, including Amendment 1:1992) |

### 3 Terms and definitions

For the purposes of this European Standard the definitions in EN 132 and the nomenclature from EN 134 apply.

Gas filters remove specified gases. Combined filters remove dispersed solid and/or liquid particles and specified gases. The term "gases" is taken to include vapours.

Particle filters remove solid and/or liquid particles.

A solid aerosol is defined as a dispersion of solid particles in air. A liquid aerosol is defined as a dispersion of liquid particles in air.

### 4 Description

A half mask without inhalation valves covers the nose and mouth and the chin, has no inhalation valves and may or may not have exhalation valves. It comprises a facepiece and separable and replaceable filters. It provides adequate sealing for the intended use on the face of the wearer against the ambient atmosphere, when the skin is dry or moist and when the head is moved.

Inhalation air enters through the filter and passes directly to the nose and mouth area of the device. Exhaled air passes through the filter and an exhalation valve (if fitted) to the ambient atmosphere.

In addition to providing protection against gases these devices can be designed to protect against both solid and liquid aerosols.

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### 5 Classification

#### 5.1 General

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Half masks shall be classified according to the types and classes of filters used.

#### 5.2 Filter types

Type FM A - for use against certain organic gases and vapours with a boiling point higher than 65 °C as specified by the manufacturer.

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

Type FM E - for use against sulfur dioxide and other acid gases and vapours as specified by the manufacturer.

Type FM K - for use against ammonia and organic ammonia derivatives as specified by the manufacturer.

Type FM AX - for use against certain low boiling organic compounds as specified by the manufacturer.

Type FM SX - for use against specific named gases and vapours.

Type FM P - for use against particles.

Any combination of these types is permitted.

### 5.3 Filter classes

#### 5.3.1 Gas filter classes

Class 1 - low capacity (Gas 1).

Class 2 - medium capacity (Gas 2).

The protection provided by class 2 devices includes that provided by the corresponding class 1 device of the same type.

FM AX and FM SX filters are not classified.

#### 5.3.2 Particle filter classes

Class 1 low filtering efficiency (FM P1).

Class 2 medium filtering efficiency (FM P2).

Class 3 high filtering efficiency (FM P3).

The protection provided by a FM P2- or FM P3-filter also includes that provided by the corresponding filter of lower class or classes.

## 6 Designation

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

Half mask without inhalation valve / EN 1827 / FM (Type) (Class) (Options)

EXAMPLE Half mask without inhalation valve / EN 1827 / FM E1 P2.

## 7 Requirements

### 7.1 General

In all tests, all test samples shall meet the requirements.



## 7.2 Nominal values and tolerances

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  $\pm 5\%$ . Unless otherwise specified, the ambient temperature for testing shall be  $(24 \pm 8)^\circ\text{C}$ , and the temperature limits shall be subject to an accuracy of  $\pm 1^\circ\text{C}$ .

## 7.3 Visual inspection

The visual inspection shall include the marking and the information supplied by the manufacturer.

Testing shall be done in accordance with 8.3.

## 7.4 Materials

Materials used shall be suitable to withstand handling and wear over the period for which the half mask is designed to be used. After testing in accordance with 8.2.4, 8.12 and 8.13 none of the devices shall have suffered mechanical failure of the facepiece body, straps or filter elements.

Testing shall be done in accordance with 8.3.

## 7.5 Flammability

Parts of a complete device that might be exposed to a flame during use shall not burn or continue to burn for more than 5 s after removal from the flame.

Testing shall be done in accordance with 8.3 and 8.4.

It is not required that the device still has to be useable after the test.

## 7.6 Cleaning and disinfecting

Any part of the device designed to be used for more than a single shift (single-use), shall withstand the cleaning and disinfecting agents and procedures recommended by the manufacturer.

Testing shall be done in accordance with 8.5.

## 7.7 Filter material

Any material of the filter media or any gaseous products that may be released by the air flow through the filter shall not constitute a hazard or nuisance for the wearer.

Testing shall be done in accordance with 8.3 and 8.13.

## 7.8 Finish of parts

Parts of the device likely to come into contact with the wearer shall have no sharp edges or burrs.

Testing shall be done in accordance with 8.3.

## 7.9 Demountable parts

All parts designed to be demountable shall be readily connected and secured, where possible by hand.

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Testing shall be done in accordance with 8.3 and 8.13.

## 7.10 Head harness

**7.10.1** The head harness shall be designed so that the device can be donned and removed easily.

Testing shall be done in accordance with 8.12 and 8.13.

**7.10.2** The head harness shall be adjustable or self-adjusting and shall be sufficiently robust to hold the device firmly in position and be capable of maintaining inward leakage requirements for the device.

Testing shall be done in accordance with 8.12 and 8.13.

## 7.11 Connections

The connection between filter(s) and half mask shall be robust and reliable. The connection shall be achieved by use of a special connection. Threads specified in EN 148-1, EN 148-2 or EN 148-3 shall not be used. If a thread connection is used, it shall not be possible to connect this to the threads specified in EN 148-1, EN 148-2 or EN 148-3.

Testing shall be done in accordance with 8.3, 8.12 and 8.13.

## 7.12 Exhalation valves

**7.12.1** Exhalation valve(s) (if fitted) shall function correctly in all orientations.

Testing shall be done in accordance with 8.12.

**7.12.2** Exhalation valves (if fitted) shall be protected against or be resistant to dirt and mechanical damage. They may be shrouded or include any other device that may be necessary to comply with 7.21.

Testing shall be done in accordance with 8.3.

**7.12.3** Exhalation valve(s) (if fitted) shall continue to operate correctly after a continuous flow of 300 l/min over a period of 30 s.

Testing shall be done in accordance with 8.6.1.

**7.12.4** Where the exhalation valve housing is attached to the faceblank, the housing shall withstand axially a tensile force of 10 N applied for 10 s.

Testing shall be done in accordance with 8.6.2.

## 7.13 Packaging

The device and its replaceable parts shall be offered for sale packaged in such a way that they are protected against mechanical damage and contamination before use.

Gas and combined filters shall be factory sealed to protect the filter media against environmental influences in such a way, that the breaking of the factory sealing can be identified.

Testing shall be done in accordance with 8.3.

#### 7.14 Mass

The total weight of filter(s) used in devices meeting the requirements of this European Standard shall not exceed 300 g.

Testing shall be done in accordance with 8.3.

#### 7.15 Gas filter capacity

**NOTE** The minimum breakthrough time is intended only for laboratory tests under standardized conditions. It does not give an indication of the possible service time in practical use. Possible service times can differ from the breakthrough times determined according to this European Standard in both directions, positive or negative, depending on the conditions of use.

**7.15.1** The filters shall meet the requirements for minimum breakthrough times given in tables 1, 2 or 3.

Testing shall be done in accordance with 8.7.

**7.15.2** Where the filter is designed for a combination of types of gases, it shall meet the requirements of each type separately.

Testing shall be done in accordance with 8.7.

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**Table 1 - Minimum breakthrough times for gas filters of types FM A, FM B, FM E and FM K**

| Filter<br><br>Type<br>and<br>class | Test gas   | Test gas concentration in<br>air |      | Breakthrough<br>concentration<br><br>ml/m <sup>3</sup> | Minimum<br>breakthrough<br>time<br><br>min |
|------------------------------------|--|----------------------------------|------|--|--|
|                                    |  | % by volume                      | mg/l |  |  |
| FM A1                              | Cyclohexane<br>(C <sub>6</sub> H <sub>12</sub> ) | 0,1                              | 3,5  | 10   | 70   |
| FM B1                              | Chlorine<br>(Cl <sub>2</sub> )                   | 0,1                              | 3,0  | 0,5  | 20   |
|                                    | Hydrogen sulfide<br>(H <sub>2</sub> S)           | 0,1                              | 1,4  | 10   | 40   |
|                                    | Hydrogen cyanide<br>(HCN)                        | 0,1                              | 1,1  | 10 <sup>1)</sup>                                       | 25   |
| FM E1                              | Sulfur dioxide<br>(SO <sub>2</sub> )             | 0,1                              | 2,7  | 5  | 20   |
| FM K1                              | Ammonia<br>(NH <sub>3</sub> )                    | 0,1                              | 0,7  | 25   | 50   |
| FM A2                              | Cyclohexane<br>(C <sub>6</sub> H <sub>12</sub> ) | 0,5                              | 17,5 | 10   | 35   |
| FM B2                              | Chlorine<br>(Cl <sub>2</sub> )                   | 0,5                              | 15,0 | 0,5  | 20   |
|                                    | Hydrogen sulfide<br>(H <sub>2</sub> S)           | 0,5                              | 7,1  | 10   | 40   |
|                                    | Hydrogen cyanide<br>(HCN)                        | 0,5                              | 5,6  | 10 <sup>1)</sup>                                       | 25   |
| FM E2                              | Sulfur dioxide<br>(SO <sub>2</sub> )             | 0,5                              | 13,3 | 5  | 20   |
| FM K2                              | Ammonia<br>(NH <sub>3</sub> )                    | 0,5                              | 3,5  | 25   | 40   |

<sup>1)</sup> C<sub>2</sub>N<sub>2</sub> can sometimes be present in the effluent air. The total concentration of (C<sub>2</sub>N<sub>2</sub> + HCN) shall not exceed 10 ml/m<sup>3</sup>.

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**Table 2 - Minimum breakthrough times for gas filters of type FM AX**

| Filter<br>Type | Test gas   | Test gas concentration<br>in air |      | Breakthrough<br>concentration<br>ml/m <sup>3</sup> | Minimum<br>breakthrough<br>time<br>min |
|----------------|--|----------------------------------|------|--|--|
|                |  | % by<br>volume                   | mg/l |  |  |
| FM AX          | Dimethylether<br>(CH <sub>3</sub> OCH <sub>3</sub> ) | 0,05                             | 0,95 | 5  | 50                                     |
|                | Isobutane<br>(C <sub>4</sub> H <sub>10</sub> )       | 0,25                             | 6,0  | 5  | 50                                     |

**Table 3 - Minimum breakthrough times for gas filters of type FM SX**

|            |   |
|------------|---|
| Sorption   | When tested in accordance with 6.4.2 of EN 372:1992, FM SX filters shall have a breakthrough time of not less than 20 min                           |
| Desorption | When tested in accordance with 6.4.3 of EN 372:1992, the effluent concentration from FM SX filters shall not exceed 5 ml/m <sup>3</sup> of test gas |

### 7.16 Particle filter penetration

The requirements for the maximum penetration of the test aerosol as specified in EN 143 for each class of particle filter shall be met.

Testing shall be done in accordance with 8.8.

### 7.17 Clogging (Optional)

#### 7.17.1 General

The clogging requirement may apply to all types and classes of device which include particle filters. When such devices are claimed to meet clogging performance requirements they shall be subjected to the dolomite dust clogging procedure specified in EN 149.

#### 7.17.2 Filter penetration

After the clogging procedure, the filter penetration shall not exceed the values given in 7.16.

#### 7.17.3 Breathing resistance

##### 7.17.3.1 Devices with exhalation valves

- a) the inhalation resistance shall not exceed the values given in table 4;