



SLOVENSKI STANDARD

SIST EN 405:1996

01-april-1996

Oprema za varovanje dihal za samoreševanje - Polobrazna maska z ventili za varovanje pred plini ali plini in delci - Zahteve, preskušanje, označevanje

Respiratory protective devices - Valved filtering half masks to protect against gases or gases and particles - Requirements, testing, marking

Atemschutzgeräte - Filtrierende Halbmasken mit Ventilen zum Schutz gegen Gase oder Gase und Partikel - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Demi-masques filtrants a soupapes contre les gaz ou contre les gaz et les particules - Exigences, essais, marquage

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Ta slovenski standard je istoveten z: **EN 405:1992**

ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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en

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EUROPEAN STANDARD

EN 405:1992

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1992

UDC 614.894.2:620.1:62-777:614.8

Descriptors: Accident prevention, personal protective equipment, respiratory protective equipment, safety masks, air filters, classifications, specifications, tests, marking

English version

**Respiratory protective devices - Valved filtering
half masks to protect against gases or gases and
particles - Requirements, testing, marking**

Appareils de protection respiratoire -
Demi-masques filtrants à soupapes contre les
gaz ou contre les gaz et les particules -
Exigences, essais, marquage

Atemschutzgeräte - Filtrierende Halbmasken mit
Ventilen zum Schutz gegen Gase oder Gase und
Partikeln - Anforderungen, Prüfung,
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This European Standard was approved by CEN on 1992-11-16. 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.

The European Standards exist 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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 was prepared by the Technical Committee CEN/TC 79 "Respiratory protective devices", of which the secretariat is held by DIN.

The text of the draft was submitted to the Formal Vote and was approved as EN.

This European Standard has been prepared under a mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of the EC Directive(s).

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 May 1993, and conflicting national standards shall be withdrawn at the latest by May 1993.

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The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, 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 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 valved filtering half masks incorporating either gas or combined filters as respiratory protective devices except for escape purposes. It does not cover gas or combined filtering half masks which do not have valves, or are fitted only with exhalation valves. 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).

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Laboratory and practical performance tests are included for the assessment of compliance with the requirements.

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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
EN 136	Respiratory protective devices; Full face masks; Requirements, testing, marking
EN 140	Respiratory protective devices; Half masks and quarter masks; Requirements, testing, marking

EN 141	Respiratory protective devices; Gas filters and combined filters; Requirements, testing, marking
EN 143	Respiratory protective devices; Particle filters; Requirements, testing, marking
EN 149	Respiratory protective devices; Filtering half masks to protect against particles; Requirements, testing, marking
EN 371	Respiratory protective devices; AX filters and combined filters against low boiling compounds; Requirements, testing, marking
EN 372	Respiratory protective devices; SX gas filters and combined filters against specific named substances; Requirements, testing, marking

3 Definitions and classification

3.1 Definitions

For the purposes of this standard the definitions in EN 132 apply together with the following.

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3.1.1 Valved filtering half mask

A valved filtering half mask is one that covers the nose and mouth and possibly the chin and has both inhalation and exhalation valves and

- consists entirely or substantially of filter material or,
- comprises a facepiece in which the gas/vapour filter(s) form(s) an inseparable part of the device and where particle filters may be replaceable if appropriate to extend the life of the gas/vapour device(s) to its rated duration.

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 material and through an inhalation valve(s). Exhaled air passes through an exhalation valve(s) to the ambient atmosphere.

In addition to providing protection against gases these devices can be designed to protect against solid and water-based aerosols only or against both solid and liquid aerosols. A solid aerosol is defined as a suspension of solid particles in air, a liquid aerosol is defined as a suspension of liquid droplets in air and a water-based aerosol is defined as one which is produced from solutions and/or suspensions of solid materials in water such that the only hazardous component is attributable to the solid material.

The term 'gases' is taken to include vapours.

Gas filters remove specified gases and vapours. Combined filters remove dispersed solid and/or liquid particles and specified gases and vapours.

3.2 Classification

3.2.1 General

According to their application and protection capacity, gas and combined filters are classified into types and classes.

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3.2.2 Types of gas filtering half masks

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

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

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

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

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

Type FFSX - for use against specific named gases and vapours.

3.2.3 Classes of gas filtering half masks

Valved filtering half masks may incorporate gas filters of types listed in 3.2.2 and combinations of these types, belonging to one of the two following classes relating to their capacity:

Class 1 - low capacity FFGas1 filtering half mask e.g. FFA1

Class 2 - medium capacity FFGas2 filtering half mask e.g. FFB2

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

3.2.4 Types of combined filtering half masks

There are two types of valved combined filtering half masks described in this European Standard: one with integral particle filter(s), the second one with replaceable particle filter(s). Examples of classifications are:

FFA1P1; FFA1P2; FFA1P3.

4 Requirements

4.1 Materials

4.1.1 Materials used shall be suitable to withstand handling and wear over the period for which the valved filtering half mask is designed to be used. After undergoing the treatment described in 5.2.2 none of the devices shall have suffered mechanical failure of the facepiece body or straps.

4.1.2 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.

- 4.1.3 The use of aluminium, magnesium and titanium or alloys containing such proportions of these metals, as will, on impact, give rise to frictional sparks capable of igniting flammable gas mixtures, for exposed parts, i.e. those which may be subjected to impact during use of the device, shall be restricted to a minimum.
- 4.1.4 Where the device can be used for more than a single shift (single-use), the materials used shall withstand the cleaning and disinfecting agents recommended by the manufacturer.

4.2 Packaging

The device shall be offered for sale packaged and individually sealed to prevent contamination before use.

4.3 Practical performance test

The device shall undergo practical performance tests under realistic conditions. These general tests serve the purpose of checking the equipment for imperfections that cannot be determined by the tests described elsewhere in this standard.

Where, in the opinion of the test station, approval is not granted because practical performance tests show the apparatus has imperfections related to wearer's acceptance, the test station shall provide full details of those parts of the practical performance tests which revealed these imperfections. This will enable other test stations to duplicate the tests and the results thereof.

Testing in accordance with 5.3.

4.4 Leakage

When the valved gas filtering half mask is tested in accordance with 5.4, the values of inward leakage including valve leakage shall comply with the following:

For valved filtering half masks fitted in accordance with the instructions for use, at least 46 out of the 50 individual results for the inward leakage over each of the exercise periods as defined in 5.4.7 (i.e. 10 subjects x 5 exercise periods) shall be not greater than

5 %

and, in addition, at least 8 out of the 10 individual wearer arithmetic means (10 subjects) for the inward leakage, averaged over all exercise periods shall be not greater than

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2 %.

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Note: The test specimen, depending upon design, may require modification in order to ensure that the measurements taken, are those corresponding to faceseal leakage. This is done by modifying the test specimen (as per examples provided in 5.4.6) to ensure that any contribution to inward leakage, attributable to filter penetration, will be negligible.

4.5 Filter penetration/capacity

4.5.1 Particle filter penetration

4.5.1.1 Integral filters

The penetration of the filter of the valved gas filtering half mask, with integral particle filters according to class, shall meet the requirements given in table 1.

Table 1: Particle filter penetration (integral filters)

Type/Class	Maximum initial penetration of test aerosols at 95 l/min	
	Sodium chloride %	Paraffin oil %
FFGasP1	20	-
FFGasP2	6	2
FFGasP3	3	1

This requirement shall be met before and after conditioning procedures specified in 5.2.

Filtering half masks not passing the paraffin oil test shall be marked in accordance with 7.1.7.

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Testing in accordance with EN 143.

4.5.1.2 Separable filters

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Separable particle filters other than prefilters shall meet the requirements of EN 143.

Testing in accordance with EN 143.

4.5.2 Gas filtering capacity

4.5.2.1 When tested in accordance with 5.5 the devices shall meet the requirements given in table 2 for minimum breakthrough times for FFGas1 and/or FFGas2 devices and/or the requirements of EN 371 or EN 372 as appropriate.

4.5.2.2 Where a device is a combination of types, it shall meet the requirements of each type separately.

4.5.2.3 Test requirements shall apply to the capacity of the complete device.

Table 2: Gas filtering capacity

Gas filtering half mask Type and Class	Test agent	Test gas concentration in air		Breakthrough concentration (ml/m ³)	Minimum breakthrough time (min)
		% by volume	mg/l		
FFA1	Tetrachloromethane (CCl ₄)	0,1	6,4	10	80
FFB1	Chlorine (Cl ₂)	0,1	3,0	0,5	20
	Hydrogen sulfide (H ₂ S)	0,1	1,4	10	40
	Hydrogen cyanide (HCN)	0,1	1,1	10 (1)	25
FFE1	Sulfur dioxide (SO ₂)	0,1	2,7	5	20
FFK1	Ammonia (NH ₃)	0,1	0,7	25	50
FFA2	Tetrachloromethane (CCl ₄)	0,5	32,0	10	40
FFB2	Chlorine (Cl ₂)	0,5	15,0	0,5	20
	Hydrogen sulfide (H ₂ S)	0,5	7,1	10	40
	Hydrogen cyanide (HCN)	0,5	5,6	10 (1)	25
FFE2	Sulfur dioxide (SO ₂)	0,5	13,3	5	20
FFK2	Ammonia (NH ₃)	0,5	3,5	25	40

(1) C₂N₂ may sometimes be present in the effluent air. The total concentration of (C₂N₂ + HCN) shall not exceed 10 ml/m³.

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 standard in both directions positive or negative depending on the conditions of use.

4.6 Inhalation and exhalation valves

- 4.6.1 Inhalation valve(s) and exhalation valve(s) shall function correctly in all orientations.

Testing in accordance with 5.4.

- 4.6.2 Exhalation valve(s) shall be protected against dirt and mechanical damage and shall be shrouded or shall include any other device that may be necessary to comply with 4.4.

- 4.6.3 Exhalation valve(s) shall continue to operate correctly after a continuous exhalation flow of 300 l/min over a period of 30 s.

- 4.6.4 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 when tested in accordance with 5.9.

4.7 Breathing resistance

4.7.1 General

The breathing resistances of the various classes of valved gas and combined filtering half masks shall meet the requirements of 4.7.2 and 4.7.3.