



SLOVENSKI STANDARD
SIST EN 136:1996

01-april-1996

Oprema za varovanje dihal - Obrazne maske - Zahteve, preskušanje, označevanje

Respiratory protective devices - Full face masks - Requirements, testing, marking

Atemschutzgeräte - Vollmasken - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Masques complets - Exigences, essais, marquage

Ta slovenski standard je istoveten z: EN 136:1989

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ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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EUROPEAN STANDARD

EN 136

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EUROPAISCHE NORM

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Key words: Accident prevention, personal protective equipment, respiratory protective devices, safety masks, specifications, tests, marking

English version

Respiratory protective devices; Full-face masks;
Requirements, testing, marking

Appareils de protection respiratoire; Atemschutzgeräte; Vollmasken;
Masques complets; Exigences, essais, Anforderungen, Prüfung, Kennzeichnung
marquage.

This European Standard was accepted by CEN on 1988-12-16.
CEN members are bound to comply with the requirements of the CEN/CENELEC Common Rules 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 CEN 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 CEN Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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AGENCIJA ZA
REPUBLIKU SRBIJU
POSREDOVANJE U PROMETU
STANDARDIMA I
TEHNIČKIM PRAVILNICIMA

Brief History

This European Standard was drawn up by CEN/TC 79 "Respiratory protective devices", the secretariat of which is held by DIN.

In 1975 the Sub-Group 3 (SG 3) "Facepieces" with DIN secretariat started to work on the Draft Proposal.

At the Plenary Meeting of CEN/TC 79 in the Hague in November 1978 this Draft Proposal was presented and unanimously accepted by CEN/TC 79. It was then submitted to the secretariat of CEN/TC 79 for publication as Draft European Standard.

In January 1981 the Draft European Standard prEN 136 was circulated by the CEN Central Secretariat in Brussels to all CEN Members for vote and comments. Within the voting period 9 Members approved and 3 Members disapproved the document.

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The comments received were discussed and decided on during the following meetings of SG 3.

In accordance with the Common CEN/CENELEC Rules, 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 and United Kingdom.

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 Object and Field of Application

This European Standard refers to full face masks for respiratory protective devices, except escape apparatus and diving apparatus. It specifies minimum requirements for full face masks for use as part of respiratory protective devices.

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

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References

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EN 148 Part 1 Respiratory Protective Devices; Threads for facepieces; Standard thread connection

EN 148 Part 2 Respiratory Protective Devices; Threads for facepieces; Centre thread connection

3 Definition and Description

A full face mask is a facepiece which covers the eyes, nose, mouth and chin and provides adequate sealing on the face of the wearer of a respiratory protective device against the

ambient atmosphere, when the skin is dry or moist, when the head is moved and when the wearer is speaking. Air enters the full face mask through the facepiece connector(s) and passes either directly to the nose and mouth area or via the eye (visor) area of the full face mask.

The exhaled air flows back either through the facepiece connector into the breathing apparatus (closed-circuit breathing apparatus, pendulum breathing) or directly to the ambient atmosphere, via the exhalation valve(s), or by other appropriate means in other types of respiratory protective devices.

An inner mask may be used to separate the nose and mouth from the eye (visor) area(s) of the full face mask.

4 Requirements

4.1 Materials

Exposed parts i.e. those which may be subjected to impact during use of the apparatus shall not be made of aluminium, magnesium, titanium or alloys containing such proportions of these metals as will, on impact, give rise to frictional sparks capable of igniting flammable gas mixtures.

Where the speech diaphragm is likely to be exposed to the puncturing action of certain transuranium contaminants of high specific activity this shall be considered and a suitable material selected.

4.2 Cleaning and disinfecting

The materials used shall withstand the cleaning and disinfecting agents recommended by the manufacturer.

4.3 Speech diaphragm assembly

4.3.1 Where the facepiece includes with a speech diaphragm the latter shall be protected against mechanical damage as assessed by visual inspection (see 5.1). The speech diaphragm shall withstand a differential pressure of 80 mbar¹⁾ (static pressure) with the positive pressure on the outside (ambient atmosphere).

4.3.2 When a speech diaphragm assembly can be subjected to an external force it shall withstand axially a tensile force of 150 N applied for 10 s. The test shall be repeated 10 times at 10 s intervals.

4.4 Replaceable components

Unless integral with the full face mask the following components (when fitted) shall be replaceable:

Inner mask, head harness, lens/visor, connector(s), inhalation and exhalation valves, check valves, speech diaphragm, lens wiper.

Testing according to 5.1

1) 1 bar = 10⁵ N/m² = 100 kPa

4.5 Practical performance test

The complete apparatus 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 in other parts of this standard. In addition to the tests described in this standard details of practical performance tests for breathing apparatus are given in the relevant European Standard. Where a full face mask is to be used for filtering devices testing shall be in accordance with 5.2.

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 assess the results thereof.

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4.6 Resistance to temperature

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After storing in accordance with 5.3 and being allowed to return to room temperature the full face mask shall show no appreciable deformation. After the resistance to temperature test the facepiece shall be tested for inward leakage and shall meet the requirements of 4.7.

4.7 Inward leakage of facepiece

A full face mask shall fit against the contours of the face so that when tested in accordance with 5.4 the inward leakage of the test contaminant shall not exceed an average value of 0,05 % of the inhaled air for any of the recommended ten test subjects in any of the test exercises. The measured inward leakage includes the exhalation valve leakage. A recommended procedure for measuring the contribution from leakage through an exhalation valve is given in Annex A. It should not exceed 0,01 %.

4.8 Compatibility with skin

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

4.9 Flammability

When tested in accordance with 5.5 the full face mask shall prove to be "self-extinguishing", i.e. the material must not be of highly flammable nature and when tested in accordance with 5.5 the facepiece must not continue to burn after removal from the flame.

When tested both before and after the flammability test in accordance with 5.5 the leakage shall not exceed that indicated by a change of pressure of 1 mbar in 1 min.

4.10 Carbon dioxide content of the inhalation air

When tested in accordance with 5.6 the carbon dioxide content of the inhalation air (dead space) shall not exceed an average of 1,0 percent (by volume).

4.11 Head harness

4.11.1 The head harness shall be designed so that the full face mask can be donned and removed easily.

Testing according to 5.2.

4.11.2 The head harness shall be adjustable and shall hold the full face mask firmly and comfortably in position.

Testing according to 5.2.

4.11.3 Each strap of the head harness shall withstand a pull of 150 N applied for 10 s in the direction of pulling when the full face mask is donned.

4.11.4 Each strap shall extend to no more than 100 % at a pull of 50 N. There should be no permanent linear deformation of more than 5 % when tested at a pull of 50 N for 10 s.

4.12 Facepiece connector

Testing according to 5.1.

The connections between the facepiece and the apparatus may be achieved by a permanent or special type of connection or by a standard thread connection. If a standard thread connection is used e.g. for a single filter mask then the relevant requirements of EN 148 part 1 shall be satisfied. A facepiece shall not have more than one standard thread connection.

If any other screw thread is used it shall not be possible to connect it to the standard thread.

4.12.1 Standard thread connection

The standard thread connection in accordance with EN 148 part 1 may be used as the full face mask connection for respiratory protective devices, except closed-circuit breathing apparatus and positive pressure demand breathing apparatus.

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4.12.2 Centre thread connection

The centre thread connection in accordance with EN 148 part 2 may be used as the full face mask connection for closed-circuit breathing apparatus.

4.12.3 The connection between the faceblank and the connector shall be sufficiently robust to withstand axially a tensile force of 500 N when tested in accordance with 5.7.

4.12.4 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 connection is disconnected during normal maintenance.

4.12.5 Correct and reliable connection between facepiece and other parts of the equipment shall be assured.

4.13 Eyepiece(s) and visor(s)

- 4.13.1 Visors and anti-mist discs designed to serve as visors shall be attached in a reliable and gastight manner to the face-blank.

Testing according to 5.1.

- 4.13.2 Visors shall not distort vision as determined in practical performance tests.

Testing according to 5.2.

- 4.13.3 The field of vision shall be tested in accordance with 5.8 and shall meet the following requirements:

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A full face mask equipped with a single visor shall be designed so that 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 %.

A full face mask with two eyepieces shall be designed so that the effective field of vision shall be not less than 70 %, and the overlapped field of vision shall be not less than 20 %.

- 4.13.4 The manufacturer shall provide means to reduce misting of the eyepiece(s) or visor(s) so that vision is not interfered with when the apparatus is tested in the practical performance tests.

Where anti-fogging compounds are used as intended or specified by the manufacturer, they shall be compatible with the eyes, skin and the components of the facepiece.

4.13.5 The impact resistance of the eyepiece(s) or visor shall be tested in accordance with 5.9^{*)}. At the end of the test the facepiece shall not be damaged in any way that may make it ineffective or cause injury to the wearer. The effectiveness shall be tested in accordance with 5.9 by comparing the tightness of the full face mask before and after the test. When tested for leak tightness, the facepiece shall not indicate increased leakage after the test for impact resistance of the eyepiece or visor.

4.14 Inhalation and exhalation valves

Valve assemblies shall be such that they can be readily maintained and correctly replaced.

It shall not be possible to fit an exhalation valve assembly into the inspiratory circuit or an inhalation valve assembly into the exhalation circuit.

Testing according to 5.1.136:1996

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4.14.1 Inhalation valve(s)

4.14.1.1 A full face mask except one with a centre thread connection should preferably be provided with one or more inhalation valve(s). If a standard thread connection is used, an inhalation valve shall be incorporated in the full face mask. If a full face mask has to be used with filters it shall be provided with an integral inhalation valve, if there is no valve in the filter.

^{*)} National legislation for eye protection may sometimes require higher impact resistance than that specified in clause 5.9

4.14.1.2 Inhalation valve(s) shall function correctly in all orientations.

4.14.2 Exhalation valve(s)

4.14.2.1 Exhalation valve(s) shall function correctly in all orientations.

4.14.2.2 A full face mask fitted with a standard thread connection shall be designed to meet the following requirements:

It shall have at least one exhalation valve or other appropriate means to allow the escape of exhaled air and, where applicable, any excess air delivered by the air supply.

4.14.2.3 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 4.7.

4.14.2.4 The exhalation valve(s) shall continue to operate correctly after (a) a continuous exhalation flow of 300 l/min and (b) a negative pressure (static) in the mask of 80 mbar (30 s for each test).

4.14.3 When the exhalation valve housing is attached to the faceblank it shall withstand axially a tensile force of 150 N applied for 10 s. The test is repeated 10 times in 10 s intervals.

4.15 Breathing resistance

Testing in accordance with 5.10.

The breathing resistance of a full face mask (except for positive pressure breathing apparatus) shall meet the requirements of 4.15.1 or 4.15.2.

4.15.1 Facepieces with connections other than that in 4.15.2 shall not exceed 2,5 mbar for inhalation and 3,0 mbar for exhalation when tested with a breathing machine (25 x 2 l/min) or a continuous flow of 160 l/min.

The inhalation resistance shall not exceed 0,5 mbar at 30 l/min continuous flow and 1,5 mbar at 95 l/min continuous flow.

- 4.15.2 Facepieces with centre thread connections and without valve(s) shall not exceed 0,6 mbar for inhalation or exhalation.

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Testing

Number of Samples*	Test(s) required	Pre-conditioning (yes/no)	Clauses
All	Visual inspection	no	4.3/4.4; 4.12/ 4.13.1/ 4.14/5.1
5	Cleaning and disinfection for total inward leakage tests	as recommended by manufacturer	4.2/5.4
3	<u>Speech Diaphragm</u> (i) Differential pressure test (ii) Axial pull test	no	4.3.1/ 4.3.2
3	<u>Head Harness Tests</u> (i) Pull test (ii) Elongation (iii) Permanent linear deformation	no	4.11.3/ 4.11.4
3	<u>Facepiece connector</u> Pull test	no	4.12.3/ 5.7
3	<u>Exhalation valve housing</u> Pull test	no	4.14.3
5	<u>Facepieces</u> <u>Exhalation valves</u> <u>Performance tests</u> (i) Continuous flow (ii) Negative pressure Optional leakage test	no 2 conditioned** 3 as received then use for leakage test	4.14.2/ 4.14.2.4/ 4.7/ Annex A
5 for impact tests	<u>Eyepiece/Visor</u> (i) Field of vision (1 sample) (ii) Impact resistance (5 samples) (iii) Distortion (2 samples)	no - except to check for distortion**	4.13.3/ 5.8 4.13.5/ 5.9
3	<u>Flammability</u> Note: Check leakage after test	2 conditioned** 1 as received	4.9/5.5
1	<u>Carbon dioxide content</u>	no	4.10/5.6
3	<u>Breathing resistance</u>	no	4.15/5.10
5	<u>Inward leakage</u>	2 conditioned** 3 as received	4.7/5.4
2	<u>Practical performance test</u>	no	4.5/5.2

* Most samples are used for more than one test

** Conditioning/resistance to temperature - clauses 4.6/5.3