



SLOVENSKI STANDARD
SIST EN 136:1998

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CdfYa UnUj Ufcj Ub^YX\ U'!CVfUnbY'a Ug_Y!'NUA Hfj YZdfYg_i yUb^YZcnbU Yj Ub^Y

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

Atenschutzgeräte - Vollmasken - Anforderungen, Prüfung, Kennzeichnung

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

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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English version

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

Appareils de protection respiratoire - Masques complets -
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Atemschutzgeräte - Vollmasken - Anforderungen, Prüfung,
Kennzeichnung

This European Standard was approved by CEN on 3 April 1997.

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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 136:1989 and EN 136-10:1992.

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of an identical text or by endorsement, at the latest by July 1998, and conflicting national standards shall be withdrawn at the latest by July 1998.

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 successful 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 minimum requirements for full face masks for respiratory protective devices.

Full face masks for diving apparatus are not included in the scope of this European Standard.

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 132:1990	Respiratory protective devices - Definitions
EN 134:1990	Respiratory protective devices - Nomenclature of components
EN 148-1:1987	Respiratory protective devices - Threads for facepieces - Standard thread connection
EN 148-2:1987	Respiratory protective devices - Threads for facepieces - Centre thread connection
EN 148-3:1992	Respiratory protective devices - Threads for facepieces - Thread connection M 45 x 3
ISO 6941:1984/ AMD 1:1992	Textile fabrics - Burning behaviour - Measurement of flame spread properties of vertically oriented specimens
ISO 6942:1993	Clothing for protection against heat and fire - Evaluation of thermal behaviour of materials and material assemblies when exposed to a source of radiant heat

3 Definition

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

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, and even when the head is moved or when the wearer is speaking.

4 Description

Air enters the full face mask through the 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 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.

5 Classification

Three classes of full face masks are described, each providing the same level of respiratory protection but having some differences which reflect intended areas of application.

Class 1: Full face masks for light duty use.

Class 2: Full face masks for general use.

Class 3: Full face masks for special use.

6 Designation

Designation of a full face mask meeting the requirements of this standard:

Full face mask EN 136 (Class) (Options).

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 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 $(24 \pm 8)^\circ\text{C}$, the temperature limits shall be subject to an accuracy of $\pm 1^\circ\text{C}$ and the relative humidity shall be $(50 \pm 30)\%$.

7.3 Visual inspection

The visual inspection shall include that of the marking and of any information to be supplied by the manufacturer.

Testing shall be done in accordance with 8.3.

7.4 Materials

For class 2 and class 3 full face masks 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.

Testing shall be done in accordance with 8.3.

7.5 Resistance to temperature

Before and after this test the full face mask shall meet the requirement of 7.16.

Following the conditioning in accordance with 8.2 and after being allowed to return to ambient temperature the full face mask shall show no appreciable deformation and any incorporated threaded connector to EN 148-1, EN 148-2 or EN 148-3 shall be gauged and shall comply with the appropriate standard.

In addition with class 3 full face masks, the threads specified in EN 148-1, EN 148-2 or EN 148-3 as appropriate shall also be accurate according to the gauge, at the end of the conditioning period in accordance with 8.2 b.

Testing shall be done in accordance with 8.3, 8.4, 8.13 and 8.16.

7.6 Flammability

7.6.1 General

Before and after these tests the full face mask shall meet the requirement of 7.16.

7.6.2 Class 1 full face masks

Parts of the full face mask 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 8.5.1.

7.6.3 Class 2 and class 3 full face masks

Parts of the full face mask 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 8.5.2.

7.7 Resistance to thermal radiation

Class 3 full face masks shall be resistant to thermal radiation. This may be achieved in one of two ways, i.e.:

The full face mask is considered to be resistant to thermal radiation in accordance with this standard if it remains leaktight after a test period of 20 min although it may be deformed.

Alternatively the full face mask can be considered to be resistant to thermal radiation if the visibility becomes impaired after a test period of ≥ 4 min and the facepiece is still leaktight after a further minute.

Before and after the thermal radiation test the full face mask shall meet the requirement of 7.16.

Testing shall be done in accordance with 8.6.

7.8 Cleaning and disinfecting

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

Testing shall be done in accordance with 8.7.

7.9 Finish of parts

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

Testing shall be done in accordance with 8.3 and 8.18.

7.10 Replaceable components

This requirement applies to class 3 full face masks only.

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 shall be done in accordance with 8.3.

7.11 Head harness

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

Testing shall be done in accordance with 8.3 and 8.18.

7.11.2 The head harness shall be adjustable or self-adjusting and shall hold the full face mask firmly and comfortably in position.

Testing shall be done in accordance with 8.3 and 8.18.

7.11.3 Strength

7.11.3.1 For class 1 full face masks each strap of the harness shall withstand a pull of 100 N applied for 10 s in the direction of pulling when the full face mask is donned.

Buckles and attachment lugs (if present) shall withstand the same pull.

Testing shall be done in accordance with 8.3 and 8.8.1.

7.11.3.2 For class 2 and class 3 full face masks 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.

Buckles and attachment lugs (if present) shall withstand the same pull.

Testing shall be done in accordance with 8.3 and 8.8.1.

7.11.4 There shall be no permanent linear deformation of each strap of more than 5 % after having been tested at a pull of 50 N for 10 s.

Testing shall be done in accordance with 8.3 and 8.8.2.

7.11.5 For class 3 full face masks once fitted the head harness shall be easily adjustable by the wearer or self-adjusting.

Testing shall be done in accordance with 8.3 and 8.18.

7.12 Connector

7.12.1 General

The connection between the full face mask and the apparatus may be achieved by a permanent or special type of connection or by a threaded connection.

If more than one connector is fitted the design of the facepiece or of the remainder of the equipment shall be such that the use of different types or combinations of respiratory protective devices does not present a risk.

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.

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

Testing shall be done in accordance with 8.3, 8.16 and 8.18.

7.12.2 Class 1 full face masks

Class 1 full face masks shall not have threaded connectors defined in EN 148-1, EN 148-2 and EN 148-3.

Testing shall be done in accordance with 8.3.

7.12.3 Class 2 and class 3 full face masks

Full face masks shall have only one threaded connector defined in EN 148-1, EN 148-2 or EN 148-3.

If any other connector is used it shall not be possible to connect it to the threads defined in EN 148-1, EN 148-2 or EN 148-3.

Testing shall be done in accordance with 8.3.

7.12.4 Strength of connection

7.12.4.1 Before and after this test the full face mask shall meet the requirement of 7.16.

7.12.4.2 For class 1 full face masks the connection between the faceblank and the connector shall be sufficiently robust to withstand axially a tensile force of 250 N.

Testing shall be done in accordance with 8.9 and 8.13.

7.12.4.3 For class 2 and class 3 full face masks the connection between the faceblank and the connector shall be sufficiently robust to withstand axially a tensile force of 500 N.

Testing shall be done in accordance with 8.9 and 8.13.

7.13 Speech diaphragm

7.13.1 Where the facepiece includes a speech diaphragm the latter shall be protected against mechanical damage as assessed by visual inspection in accordance with 8.3.

The speech diaphragm shall withstand a differential pressure of 80 mbar (static pressure) with the positive pressure on the outside (ambient atmosphere).

Testing shall be done in accordance with 8.3 and 8.10.1.

7.13.2 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 nine times at 10 s intervals.

Testing shall be done in accordance with 8.3 and 8.10.2.

7.13.3 After a class 3 full face mask has been subjected to the thermal radiation test in accordance with 8.6 and allowed to return to ambient temperature, the requirements of 7.13.1 and 7.13.2 shall be met.

Testing shall be done in accordance with 8.3 and 8.10.3.

7.14 Eyepieces/visor

7.14.1 Eyepieces/visor and anti-mist discs designed to serve as visors shall be attached in a reliable and gastight manner to the faceblank.

Testing shall be done in accordance with 8.3.

7.14.2 Eyepieces and visors shall not distort vision as determined in practical performance tests.

Testing shall be done in accordance with 8.18

7.14.3 The manufacturer shall provide means to reduce misting of the eyepieces or visors 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 not be known to be likely to cause irritation or any other adverse effect to health.

Testing shall be done in accordance with 8.3 and 8.18.

7.14.4 After the test for mechanical strength of the eyepiece(s) or visor 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 by comparing the tightness of the full face mask before and after the test. The full face mask shall meet the requirements of 7.16 both before and after the test for mechanical strength of the eyepiece or visor.

Testing shall be done in accordance with 8.3, 8.11 and 8.13.

7.15 Inhalation valves and exhalation valves

7.15.1 General

Valve assemblies shall be such that they can be readily maintained and if intended by the manufacturer correctly replaced.

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

Inhalation and exhalation valve assemblies, sub-assemblies and piece parts that are designed by the manufacturer to be identical, are acceptable.

Differently designed inhalation and exhalation valve assemblies, sub-assemblies and piece parts are acceptable if a precise and comprehensible description is given in the information supplied by the manufacturer. This information should be supported by illustrations (photographs, drawings) on how to assemble the unit correctly.

To enable correct assembling, the parts shall be unambiguously described or marked.

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Means to check the correct assembly shall be described (visual inspection, simple check by wearer, test by maintenance personnel - whatever may be appropriate).

Testing shall be done in accordance with 8.3.

7.15.2 Inhalation valves

7.15.2.1 Inhalation valves shall function correctly in all orientations and meet the requirements of 7.19.

7.15.2.2 A full face mask with a threaded connection to EN 148-2 shall not have an inhalation valve.

If a threaded connection to EN 148-1 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 inhalation valve, if there is no valve in the filter.

Testing shall be done in accordance with 8.3.

7.15.3 Exhalation valves

7.15.3.1 A full face mask with a threaded connection to EN 148-2 shall not have an exhalation valve.

Testing shall be done in accordance with 8.3.

7.15.3.2 Exhalation valves shall function correctly in all orientations and meet the requirements of 7.19.

Testing shall be done in accordance with 8.3 and 8.15.1.

7.15.3.3 A full face mask fitted with a threaded connection to EN 148-1 or EN 148-3 and a full face mask class 1 shall have at least one exhalation valve or other appropriate means to allow the escape of exhaled air and/or excess air.

Testing shall be done in accordance with 8.3.

7.15.3.4 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 7.20.

Testing shall be done in accordance with 8.3.

7.15.3.5 Exhalation valves shall continue to operate correctly and meet the requirements of 7.19 after (a) a continuous exhalation flow of 300 l/min and (b) a negative pressure (static) in the facepiece of 80 mbar (30 s for each test).

Testing shall be done in accordance with 8.3 and 8.12.1.

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7.15.4 Tensile force

7.15.4.1 Class 1 full face masks

Before and after the test the full face mask shall meet the requirement of 7.16.

When the exhalation valve housing is attached to the faceblank it shall withstand axially a tensile force of 50 N applied for 10 s.

The test shall be repeated 9 times at 10 s intervals.

Testing shall be done in accordance with 8.3 and 8.12.2.

7.15.4.2 Class 2 and class 3 full face masks

Before and after the test the full face mask shall meet the requirement of 7.16.

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 shall be repeated 9 times at 10 s intervals.

Testing shall be done in accordance with 8.3 and 8.12.2.

7.16 Leaktightness

The leakage of the full face mask shall not exceed that indicated by a change of pressure of 1 mbar in 1 min, when tested with 10 mbar negative pressure.

Testing shall be done in accordance with 8.13.

7.17 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 have any other adverse effect to health.

Testing shall be done in accordance with 8.3 and 8.18.

7.18 Carbon dioxide content of the inhalation air

The carbon dioxide content of the inhalation air (dead space) shall not exceed an average of 1 % (by volume).

Testing shall be done in accordance with 8.14.

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7.19 Breathing resistance

7.19.1 According to its class and type including the kind of connection a full face mask (except for positive pressure breathing apparatus) shall meet the requirements specified in 7.19.2 or 7.19.3.

When the facepiece has a special connection for use only with positive pressure breathing apparatus, its breathing resistance is not assessed separately but as a part of the complete apparatus, which shall meet the requirements of the appropriate standard for breathing apparatus.

7.19.2 Facepieces with connections other than those in 7.19.3 and 7.19.4 shall meet the requirements given in table 1.

Table 1

Inhalation resistance mbar			Exhalation resistance mbar
30 l/min continuous flow	95 l/min continuous flow	160 l/min continuous flow or 50 l/min sinusoidal (25 cycles/min, 2,0 l/stroke)	160 l/min continuous flow or 50 l/min sinusoidal (25 cycles/min, 2,0 l/stroke)
≤ 0,5	≤ 1,5	≤ 2,5	≤ 3,0

Testing shall be done in accordance with 8.15.1.

7.19.3 Class 2 and class 3 facepieces with threaded connection to EN 148-2 and without valve(s) shall meet the requirements given in table 2.

Table 2

Inhalation resistance mbar	Exhalation resistance mbar
160 l/min continuous flow or 50 l/min sinusoidal (25 cycles/min, 2,0 l/stroke)	160 l/min continuous flow or 50 l/min sinusoidal (25 cycles/min, 2,0 l/stroke)
≤ 0,6	≤ 0,6

Testing shall be done in accordance with 8.15.1.