



SLOVENSKI STANDARD

SIST EN 140:1996

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Oprema za varovanje dihal - Polobrazne in četrtinske maske - Zahteve, preskušanje, označevanje

Respiratory protective devices - Half masks and quarter masks - Requirements, testing, marking (Amendment 1:1992)

Atenschutzgeräte - Halbmasken und Viertelmasken - Anforderungen, Prüfung und Kennzeichnung (Änderung 1:1992)

Appareils de protection respiratoire - Demi-masques et quarts de masques - Exigences, essai, marquage (Amendement 1:1992)

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ICS:

13.340.30	Varovalne dihalne naprave	Respiratory protective devices
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EUROPEAN STANDARD

EN 140

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EUROPAISCHE NORM

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English version

Respiratory protective devices; Half-masks and quarter-masks; Requirements, testing, marking

Appareils de protection respiratoire;	Atemschutzgeräte; Halbmasken und
Demi-masques et quarts de masques;	Viertelmasken; Anforderungen, Prüfung
Exigences, essais, marquage	und Kennzeichnung

This European Standard was accepted by CEN on 1989-05-31. 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.

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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 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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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) 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 140 was circulated by the CEN Central Secretariat in Brussels to all CEN Members for vote and comments. Within the voting period 9 Members have approved and 7 Members disapproved the document.

The detailed 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 half masks and quarter masks for respiratory protective devices, except escape apparatus and diving apparatus. It specifies minimum requirements for half masks and quarter masks for use as part of respiratory protective devices.

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

2 References

EN 148-1:1987 Respiratory Protective Devices; Threads for facepieces; Standard thread connection

3 Definition and Description

A half mask is a facepiece which covers the nose, mouth and chin. A quarter mask is a facepiece which covers the nose and mouth. They are intended to provide 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 when the head is moved.

Air enters the facepiece and passes directly to the nose and mouth area of the facepiece. The exhaled air flows directly to the ambient atmosphere, via the exhalation valve(s) or by other appropriate means.

4 Requirements

4.1 Materials

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 apparatus shall be restricted to a minimum.

4.2 Cleaning and disinfecting 140:1996

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

4.3 Replaceable components

Unless integral with the half mask or the quarter mask the following components (when fitted) shall be replaceable:

Head harness, connector(s), inhalation and exhalation valves.

Testing according to 5.1

4.4 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 elsewhere in 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 half mask or quarter 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 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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4.5 Resistance to temperature

After storing in accordance with 5.3 and return to room temperature the facepiece shall not show appreciable deformation.

After the resistance to temperature test the facepiece shall be tested for inward leakage and has to meet the requirements of 4.6.

4.6 Inward leakage of facepiece

The facepiece 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 a time average value of 5 % of the inhaled air for any of the required ten test subjects in any of the test exercises.

The mean of all exercises for any one person shall not exceed 2 % .
The measured inward leakage includes the exhalation valve leakage.

Note:

A recommended procedure for measuring the contribution from leakage through an exhalation valve is given in Annex A.
It should not exceed 0,05 %.

4.7 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.

4.8 Flammability

The material used shall not present a danger for the wearer and shall not be of highly flammable nature.

When tested in accordance with 5.5 the facepiece shall not continue to burn after removal from the flame.

It is not required that the facepiece still has to be usable after the test.

4.9 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 per cent (by volume).

4.10 Head harness

4.10.1 The head harness shall be designed so that the facepiece can be donned and removed easily.

Testing according to 5.2

- 4.10.2 The head harness shall be adjustable or self-adjusting and shall hold the facepiece firmly and comfortably in position.

Testing according to 5.2

- 4.10.3 Each strap of the head harness shall withstand a pull of 50 N applied for 10 s in the direction of pulling when the facepiece is donned.

- 4.11 Facepiece connector

Testing according to 5.1.

- 4.11.1 The connections between the facepiece and the apparatus may be achieved by a permanent or special (e.g., insert) 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 148-1:1987 shall be satisfied.

- 4.11.1.1 A facepiece shall not have more than one standard thread connection.
- 4.11.1.2 If any other screw thread is used it shall not be possible to connect it to the standard thread.
- 4.11.1.3 If a screw thread is used for a twin filter facepiece it shall not be possible to connect it to the standard thread.
- 4.11.1.4 Half masks and quarter masks shall not be equipped with a centre thread connector.
- 4.11.2 The connection between the faceblank and the connector shall be sufficiently robust to withstand axially a tensile force of 50 N when tested in accordance with 5.7.

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

4.12 Field of vision

The field of vision is acceptable if determined so in practical performance tests.

Note:

If comparative testing of the field of vision is carried out the method described in 5.8 shall be used.

4.13 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.

4.13.1 Inhalation valve(s)

4.13.1.1 The facepiece 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 facepiece. If the facepiece has to be used with filters it shall be provided with an integral inhalation valve, if there is no valve in the filter.

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

4.13.2 Exhalation valve(s)

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

- 4.13.2.2 The facepiece shall have at least one exhalation valve or appropriate means to allow the escape of exhaled air and, where applicable, any excess air delivered by the air supply.
- 4.13.2.3 The 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 4.6.
- 4.13.2.4 The exhalation valve(s) shall continue to operate correctly after a continuous exhalation flow of 300 l/min over a period of 30 s. Test specimen shall be in the state as received.
- 4.13.3 When the exhalation valve housing is attached to the faceblank, it shall withstand axially a tensile force of 50 N applied for 10 s. Test specimens shall be in the state as received.

4.14 Breathing resistance

Testing in accordance with 5.9
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The breathing resistance of the facepiece shall not exceed 2,0 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 1,3 mbar at 95 l/min continuous flow.

4.15 Demountable parts

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.

*) $1 \text{ bar} = 10^5 \text{ N/m}^2 = 100 \text{ kPa}$

Testing

Table 1 - Summary of tests

<u>NO. OF SAMPLES*)</u>	<u>TEST(S) REQUIRED</u>	<u>PRE-CONDITIONING (YES/NO)</u>	<u>CLAUSES</u>
ALL	VISUAL INSPECTION	NO	4.3/4.11.1/ 4.13/5.1
5	CLEANING AND DISINFEC- TION FOR TOTAL INWARD LEAKAGE TESTS	AS RECOMMENDED BY MANUFACTURER	4.2/ 5.1/ 5.4
3	<u>HEAD HARNESS TESTS</u> PULL TEST	NO	4.10.3
3	<u>FACEPIECE CONNECTOR</u> PULL TEST	NO	4.11.2/ 5.7
3	EXHALATION VALVE HOUSING PULL TEST	NO	4.13.3
5	FACEPIECES EXHALATION VALVES PERFORMANCE TESTS () CONTINUOUS FLOW OPTIONAL LEAKAGE TEST	NO 2 CONDITIONED AS RECEIVED THEN USE FOR LEAKAGE TEST	4.13.2 / 4.13.2.4 ANNEX A
3	<u>FLAMMABILITY</u>	NO	4.8/5.5
1	<u>CARBON DIOXIDE CONTENT</u>	NO	4.9/5.6
3	<u>BREATHING RESISTANCE</u>	NO	4.14/5.9
5	<u>INWARD LEAKAGE</u>	2 CONDITIONED **) 3 AS RECEIVED	4.6/5.4
2	<u>PRACTICAL PERFORMANCE TEST</u>	NO	4.4/ 4.10.1/ 4.10.2/ 4.12 5.2

*) Most samples are used for more than one test

**) Conditioning/resistance to temperature - clauses 4.5/5.3

5.1 Visual inspection

The visual inspection is carried out where appropriate by the test station prior to laboratory or practical performance tests.

5.2 Practical performance tests

All tests shall be carried out by two test subjects at ambient temperature and the test temperature and humidity shall be recorded.

For the test, persons shall be selected who are familiar with using such or similar equipment.

During the tests the facepiece shall be subjectively assessed by the wearer and after the test, comments on the following shall be recorded:

- a) harness comfort
- b) security of fastenings and couplings
- c) accessibility of controls (if fitted)
- d) clarity of vision on the visor of the facepiece (if fitted)
- e) any other comments reported by the wearer on request
- f) field of vision (to be determined with the component to be used directly on the facepiece

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Walking test

The subjects wearing normal working clothes and wearing the facepiece fitted with a filter simulator (figure 3) shall walk at a regular rate of 6 km/h on a level course. The test shall be continuous, without removal of the facepiece, for a period of 10 min.

Work simulation test

- a) Facepieces with standard thread connection

The facepiece shall be fitted with a filter simulator (figure 3).

- b) Facepieces with special connections

The facepiece shall be fitted with the filters supplied by the manufacturer.

- c) Test procedure

Each combination shall be tested under conditions which can be expected during normal use. During this test the following activities shall be carried out in simulation of the practical use of the apparatus. The test shall be completed within a total working time of 20 min.