



SLOVENSKI STANDARD
SIST EN 270:1998

01-april-1998

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Respiratory protective devices - Compressed air line breathing apparatus incorporating a hood - Requirement, testing, marking

Atenschutzgeräte - Druckluft-Schlauchgeräte in Verbindung mit Haube - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils de protection respiratoire a adduction d'air comprimé avec cagoule - Exigences, essais, marquage

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Ta slovenski standard je istoveten z: **EN 270:1994**

ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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EUROPEAN STANDARD

EN 270

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Respiratory protective equipment, accident prevention, compressed air, classifications, specifications, tests, marking

English version

**Respiratory protective devices - Compressed air
line breathing apparatus incorporating a hood -
Requirements, testing, marking**

Appareils de protection respiratoire -
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adduction d'air comprimé avec cagoule -
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CEN

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

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

Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 79 "Respiratory protective devices", the secretariat of which is held by DIN.

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 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of an identical text or by endorsement, at the latest by April 1995, and conflicting national standards shall be withdrawn at the latest by April 1995.

According to 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 minimum requirements for compressed air line breathing apparatus incorporating a hood as a respiratory protective device. Escape and diving apparatus and that used in abrasive blasting operations are not covered by this 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
<https://standards.iteh.ai/catalog/standards/sist/2490f179-6cea-4ef5-8667-704400000000/en-134-1990>
- EN 136:1989** Respiratory protective devices - Full face masks - Requirements, testing, marking
- EN 146:1991** Respiratory protective devices - Powered particle filtering devices incorporating helmets or hoods - Requirements, testing, marking
- 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
- EN 28031:1993** Rubber and plastics hoses and hose assemblies - Determination of electrical resistance (ISO 8031:1987)
- IEC 651 :1979** Sound level meters
- ISO 6941:1984/AMD 1:1992** Textile fabrics - Burning behaviour - Measurement of flame speed properties of vertically oriented specimens



3 Definitions and nomenclature

For the purposes of this European Standard the definitions and nomenclature given in EN 132 and EN 134 respectively apply together with the following:

3.1 Compressed air line breathing apparatus incorporating a hood

Apparatus incorporating a hood which is not self-contained and in which the wearer is supplied with breathable air from a source of compressed air at a maximum pressure of 10 bar.

3.2 Compressed air supply tube

A tube which delivers breathable air at a maximum pressure of 10 bar from a source of compressed air.

4 Description

The construction of this apparatus enables the wearer to be provided with breathable air (as defined in the relevant European Standard) supplied at a continuous flow to a suitable hood via a breathing hose. The apparatus may be fitted with a continuous flow valve which may be carried by the wearer. The exhaled and excess air flows into the ambient atmosphere. A compressed air supply tube connects the wearer to a supply of compressed air. This can be ensured by a breathable air supply system or an additional device (e.g. a filtering device).

Where a full face mask, half mask or mouthpiece assembly is incorporated into a hood the apparatus is classified as being fitted with a full face mask, half mask or mouthpiece assembly.

5 Designation

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

Compressed air line BA EN 270.

6 Requirements

6.1 Materials

6.1.1 All materials used in the construction shall have adequate mechanical strength, durability and resistance to deterioration by heat.

6.1.2 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.

6.1.3 Materials that may come into direct contact with the wearer's skin or that may affect the quality of the breathable air shall not be known to be likely to cause skin irritation or any other adverse effects to health.

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

6.1.5 The requirements of 6.1.1, 6.1.2, 6.1.3 and 6.1.4 shall be assessed during the tests described in 7.2 and 7.6.

5.2 Cleaning and disinfecting

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

Testing in accordance with 7.2.

6.3 Resistance to temperature

6.3.1 After storing in accordance with 7.3.1 and returning to room temperature the apparatus shall show no appreciable deformation or distortion of the lens(es) or visor and all other requirements of this standard shall be met.

6.3.2 After storing in accordance with 7.3.1 the apparatus shall continue to operate satisfactorily as assessed by the procedures described in 7.3.2 and 7.3.3.

6.3.3 Apparatus specifically designed for temperatures beyond the limits for storage and use given in 7.3.1 shall be tested and marked accordingly.

6.4 Inward leakage

The continuous flow valve (if fitted) in the "minimum flow" position shall permit the minimum flow specified by the manufacturer at the minimum stated supply pressure, when measured at the coupling to the hood and with the maximum stated length of compressed air supply tube, and/or filter and air conditioner, (if fitted). The inward leakage shall not exceed an average of 0,5 % of the inhaled air of any of the 10 test subjects in any of the test exercises when tested in accordance with 7.4.

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6.5 Flammability

All exposed components of the apparatus (including the hood) shall not continue to burn for more than 5 s after passing through the flame when tested in accordance with 7.5.

6.6 Practical performance test

When assessed in accordance with 7.6 the apparatus shall be such that it can be worn without avoidable discomfort, the wearer shall show no undue signs of strain attributable to wearing the apparatus, and it shall impede the wearer as little as possible when in a crouched position or when working in a confined space.

These 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 as indicated by comments recorded in 7.6.6, the test station shall describe the test which revealed these imperfections. This will enable other test stations to duplicate the tests and assess the results thereof.

6.7 Connectors

6.7.1 General

Components of the apparatus shall be readily separated for cleaning, examining and testing.

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 joints and couplings are disconnected during normal maintenance.

Testing in accordance with 7.2 and 7.6.

6.7.2 Couplings

The apparatus shall be constructed so that any twisting of the hoses and tubes does not affect the fit or performance of the apparatus, or cause the hoses or tubes to become disconnected. The design of the coupling shall be such as to prevent unintentional interruption of air supply. At least one swivelling coupling shall be fitted to the compressed air supply tube adjacent to the wearer.

Testing in accordance with 7.2 and 7.6.

6.7.3 Strength of breathing hose connections

When tested in accordance with 7.7 the connections of the breathing hose between belt and hood shall withstand axially a tensile force of 250 N for 10 s.

6.7.4 Connection between apparatus and hood

The connection between the hood and the remainder of the apparatus may be achieved by a permanent or special type of connection or by a screw thread connection.

Threads defined in EN 148-1, EN 148-2 and EN 148-3 shall not be used for the hood connector.

If any screw thread 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 in accordance with 7.2.

6.8 Head harness

6.8.1 The head harness, if provided, shall be designed so that the hood can be donned and removed readily. It shall be adjustable or self-adjusting and shall hold the hood firmly and comfortably in position.

Testing in accordance with 7.2 and 7.6.

6.8.2 In case of emergency, e.g. air loss or severe over-inflation, it shall be possible easily to obtain ambient air or to make use of any emergency system provided.

Testing in accordance with 7.6.

6.9 Body harness or belt

6.9.1 A body harness or belt shall be provided to which the breathing hose shall be attached. Buckles shall not slip.

Testing in accordance with 7.2 and 7.6.

6.9.2 It shall not be possible to connect the compressed air supply tube directly to the breathing hose or hood.

Testing in accordance with 7.2.

6.10 Mobile high pressure air supply systems

6.10.1 General

The air supply system shall be fitted with a pressure reducer, incorporating a high pressure gauge, low pressure gauge, safety valve and high pressure warning device.

Testing in accordance with 7.2.

6.10.2 Pressure reducer

The pressure reducer and the characteristics of the compressed air supply system incorporating the compressed air supply tube(s) shall be such that the requirements of 6.4 and 6.15.4 shall be met.

Testing in accordance with 7.4 and 7.14.

The required pressure on the outlet side shall be either preset or variable; in the latter case the variable valve shall not be adjustable without the use of special tools and the pressure gauge shall be suitably marked to indicate the pressure range.

Testing in accordance with 7.2 and 7.6.

6.10.3 High pressure warning device for compressed air cylinder systems

The system shall have a warning device that warns the wearer or assistant when the cylinder pressure drops to a predetermined level. The warning device shall operate, at a residual pressure of minim. 30 bar. If an audible warning device is incorporated, the sound pressure level shall be a minimum of 85 dB(A) and not greater than 95 dB(A) at a distance of 1 m from the warning device. The duration of the audible warning at 90 dB(A) shall be at least 15 s for a continuous signal and 60 s for an intermittent signal. The frequency range shall be between 2000 Hz and 4000 Hz.

Testing in accordance with 7.2.

6.10.4 Pressure reducer safety valve

A pressure reducer safety valve shall be provided. The pressure reducer safety valve shall be designed to pass an air flow of 400 l/min at a medium pressure not exceeding 30 bar. With the pressure reducer safety valve operational, the inhalation and exhalation breathing resistances shall not exceed 25 mbar when tested in accordance with 7.17.

Note: This requirement only applies to one wearer operating from one pressure reducer; where multiple wearers operate from a single pressure reducer additional safety features will be needed.

6.11 Compressed air supply tube

6.11.1 Resistance to kinking

When tested in accordance with 7.8 the compressed air supply tube shall maintain a uniform near-circular shape and spiral from the loop configuration described and shall not deform to an extent that decreases the flow of air through it by more than 10 % compared with that measured when the tube is straight and unstressed.

6.11.2 Resistance to collapse

When tested in accordance with 7.9 using an applied load of 1000 N the reduction in air flow shall not be greater than 10 %.

6.11.3 Strength

The compressed air supply tube, couplings and continuous flow valve if present, shall not separate from the couplings, when tested in accordance with 7.10.

6.11.4 Flexibility

When pressurized to the maximum working pressure the compressed air supply tube shall be capable of being wound once around a drum 300 mm in diameter.

Testing in accordance with 7.2.

6.11.5 Heat resistance

Compressed air supply tubes claimed to be resistant to damage from contact with hot surfaces and boiling water shall be tested in accordance with 7.11 and shall show no signs of damage or indications of failure and the air quality shall not be significantly affected.

6.11.6 Electrostatic properties

Compressed air supply tubes claimed to be antistatic, when tested in accordance with EN 28031 making connections to the couplings shall have an electrical resistance that is greater than $10^3 \Omega$ and less than $10^9 \Omega$.

6.11.7 Couplings

Where a hand operated connection is fitted to the outlet of the compressed air supply tube it shall incorporate a self-sealing coupling to seal the air supply.

Testing in accordance with 7.2.

6.11.8 Resistance to air pressure

The compressed air supply tube and its couplings shall be capable of withstanding without damage an air pressure of 30 bar for not less than 15 min.

Testing in accordance with 7.2.

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6.12 Breathing hose

Breathing hoses shall be flexible and non-kinking. Breathing hoses shall permit free head movement and shall not restrict or close off the air supply under chin or arm pressure during practical performance tests.

Testing in accordance with 7.2 and 7.6.

6.13 Continuous flow valve

6.13.1 A continuous flow valve when fitted, shall be easily adjusted by the wearer to supply air as required. The complete apparatus in the "minimum flow" condition shall pass the manufacturer's minimum design flow rate at the minimum supply pressure, when measured at the coupling to the hood and with the maximum stated length of compressed air supply tube, and/or filter (if fitted). If the valve is designed to shut off it shall not be possible inadvertently to reduce the flow below the manufacturer's minimum design flow rate.

The requirements of this clause shall apply to every apparatus connected to the air supply system.

6.13.2 A means shall be provided to enable the user to check that the manufacturer's minimum design flow rate is achieved or exceeded prior to a use of the equipment.

6.13.3 All devices shall be fitted with a warning facility that immediately draws the attention of the wearer during use to the fact that the manufacturer's minimum design flow rate is not being achieved.

If an audible warning device is incorporated in the apparatus the sound pressure level shall be not less than 90 dB(A) when measured at the ears of the wearer. The frequency range of the warning device shall be between 2000 Hz to 4000 Hz.

Testing in accordance with 7.2, 7.6 and 7.12.

6.14 Adjustable parts

All parts requiring manipulation by the wearer shall be readily accessible and easily distinguishable from one another by touch. All adjustable parts and controls shall be constructed so that their adjustment is not liable to accidental alteration during use. Parts that are not intended for adjustment by a wearer shall require the use of tools for their adjustment.

Testing in accordance with 7.2 and 7.6.

6.15 Hood

Note: It is proposed to include requirements for strength of hood materials when appropriate test methods and levels of performance are available from CEN/TC 162.

6.15.1 Lens(es) and visor

Lenses and anti-mist discs designed to serve as lenses shall be attached in a reliable manner to the hood.

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

When the apparatus is tested in accordance with 7.3.3, 7.4 and 7.6 vision shall remain adequate as assessed by the test subjects in 7.4 and 7.6.

Where anti-misting compounds are used they shall be compatible with the components of the hood, and shall not be known to be likely to cause adverse effects to the eyes and skin under normal conditions.

The mechanical resistance of the lens(es) or visor of hoods shall be tested in accordance with 7.13. After the test the hood shall meet the requirements of 6.4.

6.15.2 Field of vision

The field of vision shall be satisfactory when the apparatus is subjected to the practical performance tests described in 7.6.

In cases of dispute the method using the Stoll apertometer as described in clause 5.8 of EN 136:1989 shall be used for comparative tests.

6.15.3 Exhalation valves

The complete apparatus may be provided with one or more exhalation valves. Hoods which employ a drawstring neck seal shall have at least one exhalation valve.

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

Where exhalation valves are used they shall function properly in all orientations.

The exhalation valve(s) shall be protected against or be resistant to dirt and mechanical damage. It may be shrouded or include any other device that may be necessary to comply with 6.4.

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The exhalation valve(s) shall continue to operate after a continuous exhalation flow of 160 l/min plus the manufacturer's maximum design flow rate for $(1 \pm 0,1)$ min.

The exhalation valve housing shall be attached to the hood such that it withstands axially a tensile force of 50 N for (10 ± 1) s.

6.15.4 Breathing resistance

6.15.4.1 General

The requirements of 6.15.4.2 and 6.15.4.3 shall apply simultaneously to every apparatus connected to the air supply system.

6.15.4.2 Inhalation resistance

When tested in accordance with 7.14 the pressure in the hood shall not fall below zero.

6.15.4.3 Exhalation resistance

When tested in accordance with 7.14 the exhalation resistance shall not exceed 5 mbar.

6.15.5 Ease of removal

The hood shall be easily removable as assessed in accordance with 7.6.