



SLOVENSKI STANDARD

SIST EN 139:1998

01-april-1998

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Respiratory protective devices - Compressed air line breathing apparatus for use with a full face mask, half mask or a mouthpiece assembly - Requirements, testing, marking

Atenschutzgeräte - Druckluft-Schlauchgeräte in Verbindung mit Vollmaske, Halbmaske oder Mundstückgarnitur - Anforderungen, Prüfung, Kennzeichnung

Appareils de protection respiratoire - Appareils de protection respiratoire a adduction d'air comprimé avec masque complet, demi-masque ou ensemble embout buccal - Exigences, essais, marquage

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Ta slovenski standard je istoveten z: EN 139:1994

ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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en

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EUROPEAN STANDARD

EN 139

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1994

UDC 614.894.72:620.1

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

English version

**Respiratory protective devices - Compressed air
line breathing apparatus for use with a full face
mask, half mask or a mouthpiece assembly -
Requirements, testing, marking**

Appareils de protection respiratoire
Appareils de protection respiratoire à
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This European Standard was approved by CEN on 1994-10-14. 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.

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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 for use with a full face mask, a half mask or a mouthpiece assembly 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
- EN 136:1989** Respiratory protective devices - Full face masks - Requirements, testing, marking
<https://standards.iteh.ai/catalog/standards/sist/174f2449-d4b0-495a-8414-99b10e2a8a4a/sist-en-139-1998>
- EN 140:1989** Respiratory protective devices - Half masks and quarter masks - Requirements, testing, marking
- EN 142:1989** Respiratory protective devices - Mouthpiece assemblies - 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)
- ISO 6941:1984/AMD 1:1992** Textile fabrics - Burning behaviour - Measurement of flame speed properties 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 for use with a full face mask, a half mask or a mouthpiece assembly

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

3.2 Overflow valve

A non-return valve, fitted to the breathing hose, that is specifically designed to allow the excess air supply to escape to atmosphere.

3.3 Breathing bag

A device which compensates for variation in the air supply and provides for peak inhalation flow requirements.

3.4 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

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Note: The term "suitable facepiece" means a facepiece complying with EN 136, EN 140 or EN 142 as appropriate.

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4.1 Compressed air line breathing apparatus (continuous flow type)

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This apparatus enables the wearer to be provided with breathable air (as defined in the relevant European Standard*) supplied at a continuous air flow to a suitable facepiece via a breathing hose. The apparatus may incorporate an adjustable continuous flow valve which may be carried by the wearer. A compressed air supply tube connects the wearer to a supply of compressed air. An overflow valve may be fitted to the breathing hose. The excess and exhaled air flows into the ambient atmosphere.

In certain circumstances a breathing bag or similar device may be necessary to compensate for variations of the air supply and to provide for peak inhalation flow requirements.

* This can be ensured by a breathable air supply system or an additional device (e.g. a filtering device).

4.2 Compressed air line breathing apparatus (demand type)

4.2.1 Apparatus without positive pressure

This apparatus enables the wearer to be provided with breathable air (as defined in the relevant European Standard*) which flows through a lung governed demand valve to a suitable facepiece on inhalation. A compressed air supply tube connects the wearer to a supply of compressed air. The excess and exhaled air flows into the ambient atmosphere.

4.2.2 Apparatus with positive pressure

This apparatus enables the wearer to be provided with breathable air (as defined in the relevant European Standard*) which flows through a lung governed demand valve operating at positive pressure to a suitable facepiece on inhalation. A compressed air supply tube connects the wearer to a supply of compressed air. The excess and exhaled air flows into the ambient atmosphere.

* This can be ensured by a breathable air supply system or an additional device (e.g. a filtering device).

5 Designation

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

Compressed air line BA/EN 139/(Options).

Example: Compressed air line BA EN 139, [SIST EN 139:1998](https://standards.iteh.ai/catalog/standards/sist/174f2449-d4b0-495a-8414-99b10e2a8a4a/sist-en-139-1998)

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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 breathed 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 Compliance with 6.1.1, 6.1.2, 6.1.3 and 6.1.4 shall be assessed in accordance with 7.3.

6.2 Water immersion

The apparatus shall continue to function satisfactorily after being submerged in water and shall meet the requirements of 6.20.

WARNING: The apparatus is not designed for use underwater.

Testing in accordance with 7.2.

6.3 Cleaning and disinfecting

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

Testing in accordance with 7.3.

6.4 Practical performance test

The apparatus shall be such that it can be worn without avoidable discomfort, the wearers 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, 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.

Testing in accordance with 7.4.

6.5 Connectors

6.5.1 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.

6.5.2 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. At least one swivelling coupling shall be fitted to the compressed air supply tube adjacent to the wearer. The design of the couplings shall be such as to prevent unintentional interruption of the air supply.

Testing in accordance with 7.3 and 7.4.

6.5.3 Strength of breathing hose connections

Couplings of the breathing hose at the equipment connector and waist belt shall withstand a force of 250 N. Where however a half mask with a non-standard thread is used in the apparatus the requirement for coupling strength shall be 50 N.

Testing in accordance with 7.5.

6.5.4 Connection between apparatus and facepiece

The connection between the breathing apparatus and the facepiece may be achieved by a permanent, special or thread type connector.

If a thread connector is used it shall comply with the requirements of one of the following standards:

EN 148-1 for breathing apparatus without positive pressure,

EN 148-2 for closed-circuit breathing apparatus,

EN 148-3 for breathing apparatus with positive pressure.

If any other thread type connector is used it shall not be possible to connect it with the above mentioned threads.

The standard thread according to EN 148-1 shall not be used for apparatus with positive pressure, closed-circuit apparatus and diving apparatus.

The thread according to EN 148-2 shall not be used for open-circuit devices and diving apparatus.

The thread according to EN 148-3 shall not be used for apparatus without positive pressure, closed-circuit apparatus and diving apparatus.

6.6 Compressed air line breathing apparatus used with self-contained breathing apparatus

If compressed air line breathing apparatus is used in conjunction with self-contained breathing apparatus, the design of the combined system shall be such as to prevent air loss from the breathing apparatus in the event of a malfunction or disconnection of the air line. The connection of the compressed air supply tube to the self-contained breathing apparatus shall withstand an axial force of 1000 N.

Testing in accordance with 7.3 and 7.6.

6.7 Body harness or belt and breathing bag

6.7.1 A body harness or belt shall be provided to which the medium pressure connecting tube, breathing hose and breathing bag if fitted shall be attached. Buckles shall not slip.

Testing in accordance with 7.3 and 7.4.

6.7.2 It shall not be possible to connect the compressed air supply tube directly to the breathing hose, medium pressure connecting tube or facepiece.

Testing in accordance with 7.3 and 7.4.

6.7.3 Where a breathing bag is fitted it shall be protected against damage.

Testing in accordance with 7.3.

6.8 Resistance to temperature

6.8.1 After storage in accordance with 7.7.1 all other performance requirements of this standard shall be met.

6.8.2 After storage in accordance with 7.7.1 the apparatus shall comply with 6.20 and shall continue to operate satisfactorily as assessed by the procedures of 7.7.2 and 7.7.3.

6.8.3 Apparatus specifically designed for temperatures beyond the limits for storage or use given in 7.7.1 shall be tested and marked accordingly.

6.9 Flammability

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When tested in accordance with 7.8 all exposed components of the apparatus shall not continue to burn for more than 5 s after passing through the flame.

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6.10 Resistance to air pressure

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The compressed air supply tube and the medium pressure connecting tube and their couplings shall be capable of withstanding without damage an air pressure of 30 bar for 15 min.

Testing in accordance with 7.3.

6.11 Mobile high pressure air supply systems

6.11.1 General

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

Testing in accordance with 7.3.

6.11.2 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 6.14 and 6.20 shall be met.

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 7.3 and 7.4.

6.11.3 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 30 bar (minimum). 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 shall be at least 15 s for a continuous signal and 60 s for an intermittent signal. The frequency range of the signal shall be between 2000 Hz and 4000 Hz.

Testing in accordance with 7.3.

6.11.4 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.

Testing in accordance with 7.9.

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.

6.12 Compressed air supply tube

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6.12.1 Resistance to kinking

When tested in accordance with 7.10 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.

6.12.2 Resistance to collapse

When tested in accordance with 7.11 using an applied load of 1000 N the reduction in air flow shall not be greater than 10 %.

6.12.3 Strength

When tested in accordance with 7.6 the compressed air supply tube, couplings and continuous flow valve or demand valve, if fitted, shall not separate from the couplings.

Testing in accordance with 7.3 and 7.6.

6.12.4 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 7.3.

6.12.5 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 7.12 and shall show no signs of damage or indications of failure and the air quality shall not be significantly affected.

6.12.6 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 $10^6 \Omega$.

6.12.7 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 7.3.

6.13 Breathing hose

Breathing hoses shall be flexible and non-kinking. The 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 7.4.

6.14 Supply regulators

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6.14.1 General

The requirements of 6.14.2 and 6.14.3 shall apply simultaneously to every apparatus connected to the air supply system.

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6.14.2 Continuous flow valve

A continuous flow valve when fitted, shall be easily adjustable by the wearer to supply air as required. With the complete apparatus in minimum flow conditions, and the overflow valve, if fitted, closed, the continuous flow valve shall deliver not less than 120 l/min in the minimum flow position and not less than 300 l/min in the maximum flow position measured at the outlet of the breathing hose. If the valve is designed to shut off it shall not be possible inadvertently to reduce the flow below 120 l/min.

Testing in accordance with 7.3 and 7.4.

6.14.3 Lung governed demand valve

6.14.3.1 Without positive pressure

The negative pressure for opening the lung governed demand valve shall be between 0,5 mbar and 3,5 mbar when tested using a continuous flow of 10 l/min.

A self-opening of the demand valve at negative pressures of less than 0,5 mbar shall not occur.

At a flow rate of 300 l/min the negative pressure shall not exceed 10 mbar.

The requirements of this clause shall be met over the pressure range of the air supplied to the apparatus as specified by the manufacturer.

Testing in accordance with 7.3.

6.14.3.2 With positive pressure

The apparatus shall be designed such that at a sinusoidal flow of 40 cycles/min and 2,5 l/stroke a positive pressure is maintained in the cavity of the facepiece adjacent to the face seal. The pressure shall not exceed 5 mbar during inhalation.

Note: Where apparatus is equipped with a thread connector complying with EN 148-3 and may, in use, inadvertently be connected to an existing facepiece, it is recommended that compliance with A.1, A.2 and A.3 of annex A should be assessed.

The requirements of this clause shall be met over the pressure range of the air supplied to the apparatus as specified by the manufacturer.

Testing in accordance with 7.3.

6.14.3.3 Supplementary air supply

Apparatus without positive pressure shall be provided with a manually operated means of providing a supply of air at a flow rate of at least 60 l/min at the minimum stated compressed air supply conditions.

Testing in accordance with 7.3.

Apparatus with positive pressure may also be provided with such a device.

6.14.3.4 Couplings

Where a hand operated coupling is fitted between the demand valve and the waist belt or body harness it shall incorporate a self-sealing device to prevent loss of air from the compressed air supply tube.

Testing in accordance with 7.3 and 7.4.

6.15 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 7.3 and 7.4.

6.16 Overflow valve for continuous flow apparatus

Where a standard thread (EN 148-1) is used as an equipment connector an overflow valve shall be fitted. It shall be protected against dirt and mechanical damage.

Testing in accordance with 7.3.