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Respiratory protective devices - Compressed air line or powered fresh air hose breathing apparatus incorporating a hood for use in abrasive blasting operations - Requirements, testing, marking

Atenschutzgeräte - Druckluft-Schlauchgeräte oder Frischluft-Schlauchgeräte mit Luftförderer mit Haube für Strahlarbeiten - Anforderungen, Prüfung, Kennzeichnung  
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Appareils de protection respiratoire - Appareils de protection respiratoire isolants a adduction d'air comprimé ou a air libre a ventilation assisté avec cagoule utilisés pour les opérations de projection d'abrasifs - Exigences, essais, marquage

**Ta slovenski standard je istoveten z: EN 271:1995**

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**ICS:**

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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EUROPEAN STANDARD

EN 271

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 1995

ICS 13.340.30

Descriptors: Respiratory protective equipment, accident prevention, compressed air, spraying, surface treatment, abrasives, specifications, tests, marking

English version

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# CEN

European Committee for Standardization  
Comité Européen de Normalisation  
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## 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of an identical text or by endorsement, at the latest by July 1995, and conflicting national standards shall be withdrawn at the latest by July 1995.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 and powered fresh air hose breathing apparatus incorporating a hood which are used to provide protection when undertaking blasting work using solid abrasives.

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
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 166:1994	Personal eye protection - Specifications
EN 269:1994	Respiratory protective devices - Powered fresh air hose breathing apparatus incorporating a hood - Requirements, testing, marking
EN 270:1994	Respiratory protective devices - Compressed air line breathing apparatus incorporating a hood - Requirements, testing, marking
EN 397:1994	Industrial safety helmets
EN 28031:1993	Rubber and plastics hoses and hose assemblies - Determination of electrical resistance (ISO 8031:1987)

### 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 Breathing apparatus for use in abrasive blasting operations

A protective hood fitted with an impact resistant visor and a blouse covering the shoulders and the upper part of the chest. Breathable air is supplied to the wearer from a source of air not carried by the wearer.

#### 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.

#### 3.3 Air supply hose

A hose which delivers breathable air blown from an air source by means of a powered air supply device.

### 4 Description

The apparatus incorporates a hood or blouse that provides protection to the wearer's head, shoulders and the upper part of the chest against rebounding abrasive materials.

The hood or blouse allows breathable air (as defined in the relevant European Standard\*) to be supplied to the wearer from either: (standards.iteh.ai)

a) a source of compressed air via a pressure reducer (if fitted), a compressed air supply tube, a continuous flow valve (if fitted), and a breathing hose,

or

b) a source of fresh air via a powered air supply and an air supply hose, a continuous flow valve (if fitted) and a breathing hose.

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

Note: In France national regulation requires that at least 165 l/min of breathable air be supplied.

### 5 Designation

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

Compressed air line BA EN 271

or

Powered fresh air BA EN.271.

## 6 Requirements

### 6.1 Materials

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

6.1.2 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 effect to health.

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

6.1.4 The requirements of 6.1.1, 6.1.2 and 6.1.3 shall be assessed in accordance with 7.2 and 7.6.

### 6.2 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 and returning to room temperature the apparatus shall show no appreciable deformation or distortion of the lens(es) or visor and all performance requirements of this standard shall be met.

6.3.2 After storing in accordance with 7.3.1 of EN 270:1994 the apparatus shall continue to operate satisfactorily as assessed by the procedures described in 7.3.2 and 7.3.3 of EN 270:1994.

6.3.3. Apparatus specifically designed for temperatures beyond the limits for storage and use given in 7.3 shall be tested and marked accordingly.

### 6.4 Inward leakage

The continuous flow valve 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, or air supply hose and/or filter and air conditioner, (if fitted) and the inward leakage shall not exceed an average of 0,1 % of the inhaled air of any of the 10 test subjects in any of the test exercises when tested in accordance with 7.4.

### 6.5 Flammability

All exposed materials of hood, breathing tube and harness shall not continue to burn for more than 5 s 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 of EN 270:1994, 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. Where the apparatus uses a compressed 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 and EN 148-3.

Testing in accordance with 7.2.



## 6.8 Head harness

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.

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

Testing in accordance with 7.2 and 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 or air supply hose directly to the breathing hose or hood.

Testing in accordance with 7.2.

## 6.10 Mobile high pressure air supply systems (for compressed air line apparatus only)

### 6.10.1 General

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

Testing in accordance with 7.2.

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### 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 6.17 shall be met.

Testing in accordance with 7.4 and 7.18.

The required pressure on the outlet side shall be either preset or variable; in the latter case the variable flow 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.

### 6.10.3 High pressure warning device for 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 minimum 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 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 of the signal shall be between 2000 Hz and 4000 Hz.

Testing in accordance with 7.2, 7.6 and 7.16.

#### 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 of EN 270:1994.

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 Power operated fresh air supply system

Rotary type blowers shall be capable of maintaining a positive air pressure with either direction of rotation, or they shall be designed to operate in one direction only. Where the blower can operate in either direction the direction of operation in which the blower delivers the lesser volume of air shall be used in the tests.

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

6.11.2 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.

Testing in accordance with 7.2, 7.6 and 7.16.

#### 6.12 Compressed air supply tube (where fitted)

##### 6.12.1 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.

##### 6.12.2 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 %.

##### 6.12.3 Strength

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

##### 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 7.2.

#### 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 7.11 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  $10^8 \Omega$ .

#### 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 7.2.

#### 6.12.8 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.

#### 6.13 Fresh air supply hose (where fitted)

##### 6.13.1 Resistance to collapse

When tested in accordance with 7.12 the reduction in air flow shall not exceed 10 % when a force of 1000 N is used.

##### 6.13.2 Resistance to kinking

When tested in accordance with 7.13 the reduction in air flow shall not exceed 10 % when a force of 250 N is used.

##### 6.13.3 Strength of hose and its couplings

The air supply hose, couplings and continuous flow valve (if present) shall not separate from the couplings, when tested in accordance with 7.14.

##### 6.13.4 Flexibility

The air supply hose shall be capable of being wound once around a drum 500 mm in diameter.

Testing in accordance with 7.2.