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

Atenschutzgeräte - Frischluft-Schlauchgeräte in Verbindung mit Vollmaske, Halbmaske oder Mundstückgarnitur - Anforderungen, Prüfung, Kennzeichnung
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Appareils de protection respiratoire - Appareils de protection respiratoire a air libre avec masque complet, demi-masque ou ensemble embout buccal - Exigences, essais, marquage
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ICS:

13.340.30 Varovalne dihalne naprave Respiratory protective devices

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EUROPEAN STANDARD

EN 138

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1994

UDC 614.894.73:620.1

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

English version

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

Appareils de protection respiratoire -
Appareils de protection respiratoire à air
libre avec masque complet, demi-masque ou
ensemble embout buccal - Exigences, essais,
marquage

Atenschutzgeräte - Frischluft-Schlauchgeräte in
Verbindung mit Vollmaske, Halbmaske oder
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Kennzeichnung

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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

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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of an identical text or by endorsement, at the latest by February 1995, and conflicting national standards shall be withdrawn at the latest by February 1995.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 fresh air hose breathing apparatus for use with a full face mask, a half mask or a mouthpiece assembly as a respiratory protective device. Two classes of apparatus are covered; the differentiation resulting from mechanical performance and not respiratory protection. 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
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 of vertically oriented specimens

3 Definitions and nomenclature

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

3.1 Fresh air hose breathing apparatus for use with a full face mask, half mask or a mouthpiece assembly

Apparatus which is not self-contained in which breathable fresh air is drawn from an air source with or without the assistance of a device.

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.

4 Description

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

4.1 Fresh air hose breathing apparatus (unassisted)

This apparatus enables the wearer to be provided with breathable air supplied by his own breathing action through an air supply hose to a full face mask or mouthpiece assembly. The exhaled air flows into the ambient atmosphere. This type of apparatus is class 2 only and cannot incorporate a half mask.

4.2 Fresh air hose breathing apparatus (manually assisted)

This apparatus enables the wearer to be provided with breathable air which is forced through a low pressure air supply hose by a manually operated device (blower) to a suitable facepiece. In an emergency the wearer is able to inhale whether or not the blower is operating. The exhaled and excess air flows into the ambient atmosphere. This type of apparatus can be class 1 or class 2.

In certain circumstances a breathing bag or similar device may be necessary.

4.3 Fresh air hose breathing apparatus (power operated)

This apparatus enables the wearer to be provided with breathable air which is forced through a low pressure air supply hose by a motor driven blower or other device such as a compressed air injector to a suitable facepiece. In an emergency the wearer is able to inhale whether or not the device is operating. The exhaled and excess air flows into the ambient atmosphere. This type of apparatus can be class 1 or class 2.

In certain circumstances a breathing bag or similar device may be necessary.

5 Classification and designation

5.1 Classification

Apparatus shall be classified in terms of robustness of construction in accordance with table 1.

Table 1: Classification of apparatus

Class	Apparatus details
1	Light duty construction
2	Heavy duty construction

5.2 Designation

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

Fresh air BA EN 138 (class) (options)

Example : Fresh air BA EN 138 class 2

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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 effect 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 7.2.

6.2 Water immersion

The apparatus shall continue to function satisfactorily after being submerged in water and shall meet the requirements of 6.19.

WARNING : The apparatus is not designed for use under water.

Testing in accordance with 7.3.

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 7.2.

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

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describe the tests 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 shall be retained in position when the joints or couplings are disconnected during normal maintenance.

Testing in accordance with 7.2 and 7.4.

6.5.2 Couplings

The apparatus shall be constructed so that any twisting of the breathing hose or fresh air supply hose does not affect the fit or performance of the apparatus, or cause either hose to become disconnected. The design of the coupling shall be such as to prevent unintentional interruption of the air supply.

Testing in accordance with 7.2 and 7.4.

6.5.3 Strength of breathing hose connections

When tested in accordance with 7.5 couplings of the breathing hose at the equipment connector and waist belt shall withstand the forces given in table 2.

Table 2: Strength of breathing hose connections

Facepiece	Class	Force N
Full face mask	1	50
	2	250
Half mask	1	50
	2	250
Mouthpiece assembly	1	50
	2	250

6.6 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 apparatus 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.

6.7 Body harness, belt and breathing bag

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

Testing in accordance with 7.2 and 7.4.

6.7.2 It shall not be possible to connect the air supply hose directly to the breathing hose or facepiece.

Testing in accordance with 7.2.

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

Testing in accordance with 7.2.

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 6.19 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

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

6.10 Air supply system

6.10.1 Unassisted air supply

The air supply hose shall be fitted with a strainer at the free end to exclude debris. Provision shall be made for securely anchoring the free end of the hose and strainer.

Testing in accordance with 7.2 and 7.4.

6.10.2 Manually assisted air supply

Manually assisted blowers shall be capable of being operated continuously by one man at the manufacturer's minimum air supply rate for at least 30 min.

It is recommended that apparatus provided with a manually assisted air supply should incorporate a breathing bag or similar device.

6.10.3 Power operated air supply

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.

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6.11 Air supply hose

6.11.1 Resistance to collapse

6.11.1.1 Unassisted apparatus

When unassisted apparatus is tested in accordance with 7.9 with an applied load of 1000 N the increase in breathing resistance shall not exceed 1 mbar.

6.11.1.2 Manually assisted or power operated apparatus

When manually assisted and power operated apparatus is tested in accordance with 7.9 the reduction in air flow shall not exceed 10 % when an applied force of 250 N is used for class 1 or an applied force of 1000 N is used for class 2.

6.11.2 Resistance to kinking

6.11.2.1 Unassisted apparatus

When unassisted apparatus is tested in accordance with 7.10 with an applied load of 250 N the increase in breathing resistance shall not exceed 1 mbar.

6.11.2.2 Manually assisted or power operated apparatus

When manually assisted or power operated apparatus is tested in accordance with 7.10 the reduction in air flow shall not exceed 10 % when an applied force of 125 N is used for class 1 or an applied force of 250 N is used for class 2.

6.11.3 Strength

The air supply hose, couplings and continuous flow valve (if present) shall not separate when tested in accordance with 7.11.

6.11.4 Flexibility

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

Testing in accordance with 7.2

6.11.5 Heat resistance

Air supply hose 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.

6.11.6 Electrostatic properties

Air supply hoses claimed to be antistatic, when tested in accordance with EN 28031 making connections to the couplings shall have an electrical resistance measured complete with couplings that is greater than $10^3 \Omega$ and less than $10^8 \Omega$.