

Handläggande organ

Allmänna Standardiseringsgruppen, STG

Fastställt

1994-12-02

Utgåva

1

Sida

1 (1+18)

SIS FASTSTÄLLER OCH UTGER SVENSK STANDARD SAMT SÅLJER NATIONELLA, EUROPEISKA OCH INTERNATIONELLA STANDARDPUBLIKATIONER ©

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

The European standard EN 138:1994 has the status of a Swedish standard. This document contains the official English version of EN 138:1994.

**Andningskydd – Sugslangsapparat
för helmask, halvmask eller bitmun-
stycke – Fordringar, provning,
märkning**

Europastandarden EN 138:1994 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 138:1994.

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

Atemschutzgeräte —
Frischluff-Schlauchgeräte in Verbindung mit
Vollmaske, Halbmaske oder Mundstückgarnitur
— Anforderungen, Prüfung, Kennzeichnung

This European Standard was approved by CEN on 1994-08-17. 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.

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 the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 the 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.

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	<i>Respiratory protective devices — Definitions</i>
EN 134 : 1990	<i>Respiratory protective devices — Nomenclature of components</i>
EN 136 : 1989	<i>Respiratory protective devices — Full face masks — Requirements, testing, marking</i>
EN 140 : 1989	<i>Respiratory protective devices — Half masks and quarter masks — Requirements, testing, marking</i>
EN 142 : 1989	<i>Respiratory protective devices — Mouthpiece assemblies — Requirements, testing, marking</i>
EN 148-1 : 1987	<i>Respiratory protective devices — Threads for facepieces — Standard thread connection</i>

EN 148-2 : 1987	<i>Respiratory protective devices — Threads for facepieces — Centre thread connection</i>
EN 148-3	<i>Respiratory protective devices — Threads for facepieces — Thread connection M 45 × 3</i>
EN 28031 : 1993	<i>Rubber and plastics hoses and hose assemblies — Determination of electrical resistance (ISO 8031 : 1987)</i>
ISO 6941 : 1984/ AMD 1 : 1992	<i>Textile fabrics — Burning behaviour — Measurement of flame speed properties of vertically oriented specimens</i>

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 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.

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

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.

NOTE. 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 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
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 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.

6.7 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.

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 $10^8 \Omega$.

6.12 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 7.2 and 7.4.

6.13 Overflow valve

Where a standard thread (EN 148-1) is used as an equipment connector and where the equipment is manually assisted or power operated an overflow valve shall be fitted. It shall be protected against or be resistant to dirt and mechanical damage.

The overflow valve shall continue to function after a constant flow of air through the valve at 300 l/min for 1 min and after being subjected to a negative pressure of 80 mbar for 1 min.

When tested in accordance with 7.13 the overflow valve shall be leaktight.

6.14 Continuous flow valve

A continuous flow valve, when fitted, shall be easily adjusted 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 7.2 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 7.2 and 7.4.

6.16 Facepieces

Full face masks, half masks and mouthpiece assemblies shall comply with EN 136, EN 140 or EN 142 as appropriate.

Testing in accordance with 7.2 and 7.4.

6.17 Inward leakage

Where the full face mask or half mask is fitted with a connection not complying with EN 148-1 the complete apparatus shall be tested in accordance with clause 5.4 of EN 136 : 1989 and the inward leakage shall comply with clause 4.7 in EN 136 : 1989 for full face masks and with clause 4.6 in EN 140 : 1989 for half masks.

For 'assisted' apparatus the test is carried out at the manufacturer's stated minimum air flow.

6.18 Inhalation and exhalation valves

All complete apparatus not fitted with a standard thread shall be provided with an inhalation valve and one or more exhalation valves. Valve assemblies shall be such that they can be readily maintained and correctly replaced. It shall not be possible to fit an inhalation valve assembly in the expiratory circuit.

Exhalation valves not tested for leakage in the course of assessing compliance with EN 136, EN 140 or EN 142 shall be tested in accordance with 7.15 and the leakage shall not exceed 0,01 %. Testing in accordance with 7.15.

6.19 Breathing resistance

6.19.1 All apparatus

After being subjected to the storage temperatures given in 7.7.1 and subsequently tested on a breathing machine in accordance with 7.14 the breathing resistances shall not exceed the limits given in table 3.

6.19.2 Manually assisted and power operated apparatus

When tested in accordance with 7.14.2 the inhalation resistance shall not exceed 10 mbar.