

Respiratory protective devices — Gas filter(s) and combined filter(s) — Requirements, testing, marking

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ICS 13.340.30

National foreword

This British Standard is the UK implementation of EN 14387:2004+A1:2008, incorporating corrigendum December 2004. It supersedes BS EN 14387:2004 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by \square_{A1} \square_{A1} .

The UK participation in its preparation was entrusted by Technical Committee PH/4, Respiratory protection, to Subcommittee PH/4/4, Filters.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 6 February 2004

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ISBN 978 0 580 61897 0

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
15573 Corrigendum No. 1	24 January 2006	Supersession details added on title page
	30 April 2008	Implementation of CEN amendment A1:2008

EUROPEAN STANDARD

EN 14387:2004+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2008

ICS 13.340.30

Supersedes EN 14387:2004

English Version

Respiratory protective devices - Gas filter(s) and combined filter(s) - Requirements, testing, marking

Appareils de protection respiratoire - Filtres anti-gaz et filtres combinés - Exigences, essais, marquage

Atemschutzgeräte - Gasfilter und Kombinationsfilter - Anforderungen, Prüfung, Kennzeichnung

This European Standard was approved by CEN on 10 December 2003 and includes Corrigendum 1 issued by CEN on 8 December 2004 and includes Amendment 1 approved by CEN on 5 December 2007.

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Ref. No. EN 14387:2004+A1:2008: E

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Foreword

This document (EN 14387:2004+A1:2008) has been prepared by Technical Committee CEN/TC 79 "Respiratory protective devices", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by July 2007 and conflicting national standards shall be withdrawn at the latest by July 2007.

This document includes Amendment 1, approved by CEN on 2007-12-05.

This document supersedes A1 EN 14387:2004 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags AC AC.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and 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 successfully 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 mass distribution are similar to those of the complete apparatus.

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1 Scope

This European Standard refers to gas filters and combined filters for use as components in unassisted respiratory protective devices.

Filters for use against CO are excluded from this standard.

Laboratory tests are included for the assessment of compliance with the requirements.

Some filters complying with this standard can also be suitable for use with assisted respiratory protective devices and if so they need to be tested and marked according to the appropriate European Standard.

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 (including amendments).

EN 132:1998, *Respiratory protective devices – Definitions of terms and pictograms.*

EN 134:1998, *Respiratory protective devices – Nomenclature of components.*

EN 143, *Respiratory protective devices – Particle Filters - Requirements, testing, marking.*

EN 148-1, *Respiratory protective devices – Threads for facepieces – Part 1: Standard thread connection.*

EN 148-2, *Respiratory protective devices – Threads for facepieces – Part 2: Centre thread connection.*

EN 148-3, *Respiratory protective devices – Threads for facepieces – Part 3: Thread connection M 45 x 3.*

EN 13274-3, *Respiratory protective devices – Methods of test – Part 3: Determination of breathing resistance.*

EN 13274-5, *Respiratory protective devices – Methods of test – Part 5: Climatic conditions.*

EN 13274-7:2008, *Respiratory protective devices – Methods of test – Part 7: Determination of particle filter penetration.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 132:1998, EN 134:1998 and the following apply.

3.1

re-useable combined filter

combined filter intended to be used for more than a single shift

4 Description

Air enters the gas or combined filter(s) and passes to the facepiece after removal of gases and vapours or gases, vapours and particles.

5 Classification

5.1 Types of filters

5.1.1 Gas filters

Gas filters are produced in one of the following types: Types A, B, E, K, AX and SX.

— Type A

For use against certain organic gases and vapours with a boiling point > 65 °C as specified by the manufacturer.

— Type B

For use against certain inorganic gases and vapours as specified by the manufacturer.

— Type E

For use against sulphur dioxide and other acidic gases and vapours as specified by the manufacturer.

— Type K

For use against ammonia and organic ammonia derivatives as specified by the manufacturer.

— Type AX

For use against certain organic gases and vapours with a boiling point ≤ 65 °C as specified by the manufacturer. For single use only.

— Type SX

For use against specific named gases and vapours as specified by the manufacturer.

5.1.2 Multi-type gas filters

Filters which are a combination of two or more of the above types excluding type SX and which meet the requirements of each type separately.

5.1.3 Combined filters

Gas or multi-type gas filters incorporating a particle filter according to EN 143.

5.1.4 Special filters

Special filters are:

— Type NOP3

For use against nitrogen oxides, e.g. NO, NO₂, NO_x.

— **Type HgP3**

For use against mercury.

These filters shall always incorporate a P3 filter according to EN 143 and may be combined with each other and/or types specified under 5.1.1 except for type SX.

5.2 Classes of filters

Gas filters of types A, B, E and K are classified in terms of capacity as follows:

- Class 1 low capacity filters;
- Class 2 medium capacity filters;
- Class 3 high capacity filters.

The protection provided by a class 2 or class 3 filter includes that provided by the corresponding filter of lower class or classes.

The classification of combined filter(s) includes that of particle filter(s) according to EN 143.

Type AX and type SX gas filters and special filters are not classified.

6 Requirements

6.1 General

In all tests, all test samples shall meet the requirements.

6.2 Ergonomics

The requirements of this standard are intended to take account of the interaction between the wearer, the respiratory protective device, and where possible the working environment in which the respiratory protective device is likely to be used. See annex ZA.

6.3 Design

The filter shall be sufficiently robust to withstand the rough usage it is likely to receive in service.

No part of the filter likely to be in contact with the wearer shall have sharp edges or burrs.

The filter shall be designed to ensure its full function in any orientation.

Testing shall be done in accordance with 7.3.

6.4 Materials

The filter shall be made of suitable material to withstand normal usage and exposures to those temperatures, humidity and corrosive environments that are likely to be encountered. Internally it shall withstand corrosion by the filtering media.

Any material of the filter media or any gaseous products that may be released by the air flow through the filter shall not be known to constitute a hazard or nuisance for the wearer.

Testing shall be done in accordance with 7.3.

6.5 Mass

The maximum mass of filter(s) designated to be used directly connected to a half mask is 300 g.

The maximum mass of filter(s) designated to be used directly connected to a full face mask is 500 g.

Testing shall be done in accordance with 7.1.

6.6 Connection

The connection between filter(s) and facepiece or other device(s) with which it is intended to be used shall be robust and leaktight.

The connection between filter and facepiece may be achieved by a permanent or special connector or a screw thread including a thread conforming to EN 148-1.

Threads conforming to EN 148-2 or EN 148-3 shall not be used.

If the filter is designated to be used on a multiple filter facepiece or has any other thread, it shall not be possible to connect it to a thread conforming to EN 148-1, EN 148-2 or EN 148-3.

The filter shall be readily replaceable without use of special tools and shall be designed or marked to prevent incorrect assembly.

The particle filter of combined filters shall be on the influent side of the gas filter.

Testing shall be done in accordance with 7.3.

6.7 Multiple filters

Where respirators are designed to use more than one filter (i.e. multiple filter device), through which the flow is proportioned, all requirements given in this European Standard are to be met by the complete set of filters (e.g. the total mass of a filter set designated to be used directly connected to a half mask shall not exceed 300 g).

If, however, it is possible that a single filter of a multiple filter device may be used alone, then the requirements of the full flow rate for the tests, as stated in this European standard, shall be met.

In the information supplied by the manufacturer all necessary information on how to use multiple filters shall be given.

Testing shall be done in accordance with 7.1 and 7.3.

6.8 Packaging

Filters shall be offered for sale packaged in such a way that they are protected against mechanical damage or visible contamination before use.

Where appropriate, filters shall be factory sealed to protect the filter media against environmental influences in such a way that the breaking of the factory sealing can be identified.

Testing shall be done in accordance with 7.3.

6.9 Mechanical strength (M.S.)

Filters shall be subjected to the mechanical strength test when required by the relevant clauses of this standard.

Testing shall be done in accordance with 7.4.

After this treatment the filters shall show no mechanical defect and shall meet the requirement of the relevant clauses.

Testing shall be done in accordance with 7.3.

6.10 Temperature conditioning (T.C.)

Filters shall be subjected to the temperature conditioning test when required by the relevant clauses of this standard.

Testing shall be done in accordance with 7.5.

After the treatment the filters shall show no signs of damage and shall meet the requirement of the relevant clauses.

Testing shall be done in accordance with 7.3.

6.11 Breathing resistance

The resistance imposed by filter(s) to the flow of air shall be as low as possible and in no case exceed the values shown in Table 1. For multi type gas filters with mixed classes and/or types, the value corresponding to the highest shall not be exceeded.

Four filters shall be tested, two after the test for mechanical strength according to 7.4 and two after the test for mechanical strength according to 7.4 followed by the temperature conditioning test according to 7.5.

Testing shall be done in accordance with 7.7.

Table 1 — Maximum breathing resistance and maximum breathing resistance after clogging

Filter type and class	Maximum resistance in mbar ^a		Maximum resistance after clogging in mbar ^a at 95 l/min
	at 30 l/min	at 95 l/min	
Types A, B, E and K			
1	1,0	4,0	-
1-P1	1,6	6,1	8,0
1-P2	1,7	6,4	9,0
1-P3	2,2	8,2	9,0
2	1,4	5,6	-
2-P1	2,0	7,7	9,6
2-P2	2,1	8,0	10,6
2-P3	2,6	9,8	10,6
3	1,6	6,4	-
3-P1	2,2	8,5	10,4
3-P2	2,3	8,8	10,6
3-P3	2,8	10,6	10,6
Types AX			
AX	1,4	5,6	-
AX -P1	2,0	7,7	9,6
AX -P2	2,1	8,0	10,6
AX -P3	2,6	9,8	10,6
Types SX			
SX	1,4	5,6	-
SX -P1	2,0	7,7	9,6
SX -P2	2,1	8,0	10,6
SX -P3	2,6	9,8	10,6
Special filters			
NO-P3	2,6	9,8	10,6
Hg-P3	2,6	9,8	10,6
^a 1 bar = 10 ⁵ N/m ² = 100 kPa			

6.12 Gas capacity

6.12.1 General

Filters shall meet the appropriate requirements of Table 2, Table 3 and Table 4.

Three filters shall be tested after the test for mechanical strength according to 7.4.

Testing shall be done in accordance with 7.8.

NOTE The minimum breakthrough time is intended only for laboratory tests under standardised conditions. It does not give an indication of the possible service time in practical use. Possible service times can differ from the breakthrough times determined according to this standard in both directions, positive or negative, depending on the conditions of use.

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6.12.2 Types A, B, E, K, AX and special filters

Table 2 — Gas capacity and test conditions of gas filters of types A, B, E and K

Type and class	Test gas	Minimum breakthrough time at test condition min	Test gas concentration in air		Breakthrough concentration ml/m ³
			% by volume	mg/l	
A 1	Cyclohexane (C ₆ H ₁₂)	70	0,1	3,5	10
B 1	Chlorine (Cl ₂)	20	0,1	3,0	0,5
	Hydrogen sulphide (H ₂ S)	40	0,1	1,4	10
	Hydrogen cyanide (HCN)	25	0,1	1,1	10 ^a
E 1	Sulphur dioxide (SO ₂)	20	0,1	2,7	5
K 1	Ammonia (NH ₃)	50	0,1	0,7	25
A 2	Cyclohexane (C ₆ H ₁₂)	35	0,5	17,5	10
B 2	Chlorine (Cl ₂)	20	0,5	15,0	0,5
	Hydrogen sulphide (H ₂ S)	40	0,5	7,1	10
	Hydrogen cyanide (HCN)	25	0,5	5,6	10 ^a
E 2	Sulphur dioxide (SO ₂)	20	0,5	13,3	5
K 2	Ammonia (NH ₃)	40	0,5	3,5	25
A 3	Cyclohexane (C ₆ H ₁₂)	65	0,8	28,0	10
B 3	Chlorine (Cl ₂)	30	1,0	30,0	0,5
	Hydrogen sulphide (H ₂ S)	60	1,0	14,2	10
	Hydrogen cyanide (HCN)	35	1,0	11,2	10 ^a
E 3	Sulphur dioxide (SO ₂)	30	1,0	26,6	5
K 3	Ammonia (NH ₃)	60	1,0	7,0	25

^a C₂N₂ may sometimes be present in the effluent air. The total concentration of (C₂N₂ + HCN) shall not exceed 10 ml/m³ at breakthrough.

Table 3 — Gas capacity and test conditions of gas filters of type AX

Type	Test gas	Minimum breakthrough time at test condition min	Test gas concentration in air		Breakthrough concentration ml/m ³
			% by volume	mg/l	
AX	Dimethylether (CH ₃ OCH ₃)	50	0,05	0,95	5
	Isobutane (C ₄ H ₁₀)	50	0,25	6,0	5

Table 4 — Gas capacity and test conditions of special filters

Type	Test gas	Minimum breakthrough time at test condition	Test gas concentration in air		Breakthrough concentration
			% by volume	mg/l	
NO-P3	Nitric oxide (NO) ^a	20 min	0,25 % by volume	3,1 mg/l	5 ml/m ^{3b}
	Nitrogen dioxide (NO ₂) ^a	20 min	0,25 % by volume	4,8 mg/l	5 ml/m ^{3b}
Hg-P3	Mercury vapour (Hg)	100 h	1,6 ml/m ³	13 ± 1 mg/m ³	0,1 mg/m ³

^a The test gas shall be at least 95 % pure. This is probably best obtained as compressed gas in cylinders.

^b Both NO and NO₂ may be present in the effluent air. The total concentration of (NO + NO₂) shall not exceed 5 ml/m³. A detection method shall be used which is capable of differentiating NO and NO₂.

6.12.3 Type SX

6.12.3.1 Sorption

The filters of type SX shall have a breakthrough time of not less than:

$$t_{br} = \frac{5\,000 \text{ ml/m}^3 \times 20 \text{ min}}{C_{i(\max)}}$$

where C_i is the concentration of test gas as specified by the manufacturer.

Testing shall be done in accordance with 7.8.5.1.

6.12.3.2 Desorption

The effluent concentration of type SX filters shall not exceed the breakthrough concentration of the test gas as used in 7.8.5.1.

Testing shall be done in accordance with 7.8.5.2.

6.13 Combined filters

6.13.1 General

The particle filter shall be on the influent side of the filter.

Testing shall be done in accordance with 7.3.

6.13.2 Filter penetration

Combined filters shall meet the requirements for the maximum penetration of each test aerosol as specified in EN 143 for each class of particle filter.

A1) For each aerosol, three filters shall be tested following the mechanical strength test according to 7.4 and the temperature conditioning according to 7.5.

Filters not meeting the requirement after the storage test according to 5.4 of EN 13274-7:2008 shall be classified as single shift use only. **A1)**

Testing shall be done in accordance with 7.6 and 7.9.

6.14 Clogging (optional)

6.14.1 General

If a combined filter is claimed to be resistant to dust clogging, it shall be tested according to the clogging test procedure described in EN 143 and marked D for dolomite. The specified breathing resistances shall not be exceeded before the required dust loading equivalent of $263 \text{ mg} \times \text{h} \times \text{m}^{-3}$ is reached.

If the clogging test is performed for a single filter of a multiple filter device at the proportioned test air flow, the stated requirement for the breathing resistance of the filter after clogging holds for the stated dust loading proportioned by the number of filters of the filter set. For example for testing a single filter out of a twin filter, class P2, the clogging is performed at a flow rate of 47,5 l/min, until 5 mbar have been reached or until $263 \text{ mg} \times \text{h} \times \text{m}^{-3}$ have been deposited, whichever occurs first.

6.14.2 Filter penetration

The filter penetration requirements of 6.13.2 shall be satisfied for each test aerosol before and after the clogging test with dolomite dust.

For each aerosol, two filters shall be tested, one after the test for mechanical strength according to 7.4 and one after the test for mechanical strength according to 7.4 followed by the temperature conditioning test according to 7.5.

Testing shall be done in accordance with 7.9.

6.14.3 Breathing resistance

The breathing resistance after clogging shall not exceed the values given in Table 1.

Four filters shall be tested, two after the test for mechanical strength according to 7.4 and two after the test for mechanical strength according to 7.4 followed by the temperature conditioning test according to 7.5.

Testing shall be done in accordance with 7.7.

7 Testing

7.1 General

If no special measuring devices or measuring methods are specified, commonly used methods and devices should be applied.

Performance tests for the filters not having a connector in accordance with EN 148-1 shall be performed in the filter holder where it will be used in practice.

7.2 Nominal values and tolerances

Unless otherwise specified, the values stated in this standard are expressed as nominal values. Except for temperature limits, values which are not stated as maximum or minimum shall be subject to a tolerance of $\pm 5\%$. Unless otherwise specified, the ambient temperature for testing shall generally be from 16 °C to 32 °C but for the mechanical tests from 10 °C to 30 °C, and the temperature limits shall be subject to an accuracy of ± 1 °C.

7.3 Visual inspection

A visual inspection of the filters shall be carried out and the appropriate results reported. The visual inspection includes marking and information supplied by the manufacturer.

7.4 Mechanical strength (M.S.)

7.4.1 Test equipment

The apparatus as shown schematically in Figure 1 consists of a steel case (K) which is fixed on a vertically moving piston (S), capable of being lifted up 20 mm by a rotating cam (N) and dropping down onto a steel plate (P) under its own mass as the cam rotates. The mass of the steel case shall be more than 10 kg.

The weight of the steel plate onto which the steel case falls should be at least 10 times the weight of the steel case. This may be achieved by bolting the base plate to a hard solid floor.

7.4.2 Test procedure

The filters shall be tested as received, removed from their packing but still sealed.

Un-encapsulated filter(s) shall be tested in the smallest commercially available package.

The filters shall be placed on their sides in the steel case (K) so that they do not touch each other during the test, allowing 6 mm horizontal movement and free vertical movement. After the test any loose material that may have been released from the filter shall be removed prior to the performance testing.

The test rig shall be operated at the rate of approximately 100 rotations/min for approximately 20 min and a total of 2 000 rotations.

7.5 Temperature conditioning (T.C.)

The test method shall be as described in EN 13274-5. The filter in its packaging, if appropriate, shall be subjected to the following thermal cycle:

- a) to a dry atmosphere at $(70 \pm 3) ^\circ\text{C}$ for 24 h;
- b) to a temperature of $(-30 \pm 3) ^\circ\text{C}$ for 24 h.

and allowed to return to room temperature for at least 4 h between exposures and prior to subsequent testing.

The conditioning shall be carried out in a manner which ensures no thermal shock occurs.

7.6 Test flow conditions

7.6.1 General

All performance tests shall be conducted so that the test air or test aerosol will pass through the filter horizontally, except where the test procedure specifies otherwise.

7.6.2 Multiple filters

When one filter of a multiple filter device is tested separately, the air flow specified for a test shall be divided by the number of filters through which the air flow is proportioned. If, however, it is possible that one filter of a multiple filter device may be used alone, then the full air flow shall be used for testing.

If the filters' resistances meet the following equation:

$$\frac{|\Delta \text{ flow resistance }|_{\max}}{\text{mean flow resistance}} \leq 0,2$$

then the filter may be tested as a single filter with a proportioned flow. If the filters' breathing resistances do not meet that equation, the filters shall be tested in a complete unit at the full flow rate.

When testing one filter of a multiple filter device with the proportioned test air flow, the appropriate performance requirements of this standard are to be met.

7.7 Breathing resistance

The test method shall be as described in EN 13274-3 test method 1. For each test a new filter shall be used.

The filter shall be connected in a leaktight manner to the test equipment by means of a suitable adaptor.

Testing shall be carried out at two flow rates (30 l/min and 95 l/min continuous flow or proportioned as appropriate) with air at room temperature, ambient atmospheric pressure and of such humidity that condensation does not occur.

The resistance values shall be corrected for the resistive value introduced by the adaptor. The flow rate at which the resistance is measured, shall be corrected to 23 °C and 1 bar absolute.

7.8 Gas capacity

7.8.1 General

Any experimental method may be employed for obtaining the specified influent concentration, and for measuring the effluent concentration, provided it conforms with the following limits:

- influent concentration: $\pm 10\%$ of specified value;
- effluent concentration: $\pm 20\%$ of specified value.

The recorded breakthrough time should be adjusted if necessary by simple proportion to conform with the specified influent concentration.

The breakthrough time shall be measured at a flow rate of 30 l/min ($\pm 3\%$), or the appropriate rate with a tolerance of $\pm 3\%$ if the filter under test is intended only to be used in a multiple filter device, and at ($70 \pm 5\%$) relative humidity and at (20 ± 1) °C.

7.8.2 Filters Type A, B, E and K

Test conditions and breakthrough concentrations are given in Table 2.

7.8.3 Filters Type AX

Test conditions and breakthrough concentrations are given in Table 3.

7.8.4 Special filters

Test conditions and breakthrough concentrations are given in Table 4.

7.8.5 Filters Type SX

7.8.5.1 Sorption

Test gas(es) shall be used against which the filters are intended to provide protection.

The test gas concentration shall be as close to 0,5 % by volume as is practicable. If for physical/chemical reasons, this value can not be achieved, the value specified by the manufacturer shall be used and reported.

The breakthrough concentration shall be 0,1 % of the specified test gas concentration. Where this concentration cannot be detected, the breakthrough concentration specified by the manufacturer, in agreement with the test laboratory, shall be used and reported.

7.8.5.2 Desorption

The filters shall be loaded with the test gas for 10 minutes under the same conditions as for sorption test.

After dosing the filters shall be sealed and stored at (23 ± 2) °C for a period of (3 ± 1) days.

After this storage clean air shall be passed at a flow rate of 30 l/min ($\pm 3\%$), at ($70 \pm 5\%$) relative humidity and a temperature of (20 ± 1) °C through the filter for a period of 2h.

The concentration of the test gas in the effluent air shall be monitored during the desorption test.

7.9 Filter penetration

The test shall be carried out using the test equipment and test flow rates and test aerosols described in EN 143.

8 Marking

8.1 General

The marking shall be as clearly visible and as durable as possible.

Sub-assemblies and components with considerable bearing on safety shall be marked so that they can be identified.

If sub-assemblies with considerable bearing on safety are too small to be marked, the information shall be given in the information supplied by the manufacturer.

8.2 Filters

All filters shall be marked at least with:

- a) the appropriate filter type, class and colour code, in accordance with Table 5.

Table 5 — Marking

Type	Class	Colour code
A	1, 2 or 3	brown
B	1, 2 or 3	grey
E	1, 2 or 3	yellow
K	1, 2 or 3	green
AX		brown
SX		violet
P	1, 2 or 3	white
or combinations of them		
NOP3		blue-white
HgP3		red-white

A1 The type and class are followed by a single space and then:

- “NR” if the particle filter part of the combined filter is limited to single shift use only;

or

- “R” if the particle filter part of the combined filter is re-usable.

A1

EXAMPLES:

A ₁ A2P3 R	brown-white;
A2B1	brown-grey;
AB2	brown-grey;
AXP3 NR	brown-white;
SXP3 R	violet-white;
AB1P1 NR	brown-grey-white;
ABEK2P3 R	brown-grey-yellow-green-white. A ₁

If the marking is not directly on the filter body, it shall be on a label of the appropriate colour code affixed to the filter body. In this case, the colour of the body shall not be considered to be the colour code.

Silver or light metal colour shall not be regarded as white or grey.

- b) a mark showing if the filter is for a multiple filter device;
- c) A₁ the number of this European Standard, i.e. EN 14387; A₁
- d) the year and month of end of shelf life. The end of shelf life may be informed by a pictogram as shown in Figure 2 where the code "yyyy/mm" indicates the year and month;
- e) the manufacturer, supplier or importer shall be identified by name, trademark, or other means of identification;
- f) the sentence "See information supplied by the manufacturer" at least in the official language(s) of the country of destination, or the appropriate pictogram as shown in Figure 2;
- g) A₁ manufacturers A₁ model designation;
- h) for AX filter, the sentence A₁ "For single use only" A₁ at least in the official language(s) of the country of destination, or an appropriate pictogram;
- i) for SX filter, name(s) of chemicals and the respective maximum concentrations against which the filter provides protection.
- j) A₁ all A₁ NOP3 filters shall additionally be marked "For single use only" at least in the official language(s) of the country of destination, or an appropriate pictogram;
- k) A₁ all A₁ HgP3 filters shall additionally be marked with the sentence "Maximum use time 50 hours". at least in the official language(s) of the country of destination, or an appropriate pictogram;
- l) A₁ combined filters meeting the clogging requirements may be additionally marked by the letter "D". This letter shall follow the classification marking preceded by a single space. A₁

8.3 Filter package

The filter package shall be marked at least with the following information:

- a) year and month of the end of shelf life. The end of shelf life may be informed by a pictogram as shown in Figure 2 where the code 'yyyy/mm' indicated the year and month.
- b) manufacturers model designation;
- c) manufacturer's recommended conditions of storage (at least the temperature and humidity) or equivalent pictogram as shown in Figure 2.

9 Information supplied by the manufacturer

On the delivery, the information supplied by the manufacturer:

- a) shall accompany every smallest commercially available package;
- b) shall be at least in the official language(s) of the country of destination;
- c) of the filters shall contain all information necessary for trained and qualified persons on:
 - application/limitations;
 - give type-identifying marking to ensure that the filter can be identified;
 - checks prior to use;
 - fitting;
 - describe how the filter(s) is inserted in the equipment for which it is (they are) designed and how that equipment is identified;
 - use;
 - maintenance;
 - storage of the filter;
 - disposal.
- d) shall be clear and comprehensible. If helpful, illustrations, part numbers, marking should be added;
- e) shall include warnings against problems likely to be encountered, for example:
 - hazards of oxygen deficiency;
 - hazards of oxygen and oxygen-enriched air;
 - the use of gas or combined respiratory protective devices, specially those which are not directly connected to the face piece during work with open flames or liquid metal droplets may cause serious risk due to the ignition of the charcoal containing filters which may generate acute levels of toxic substances;
 - air quality;

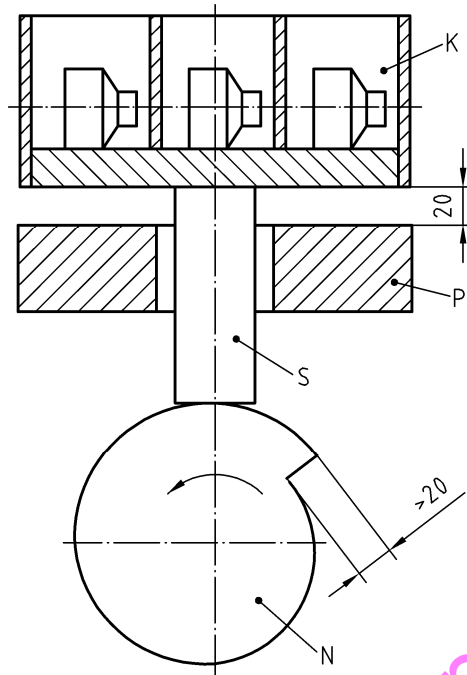
- use of equipment in explosive atmosphere;
 - storage under conditions other than those specified by the manufacturer may affect the shelf life;
 - guidance as to use of filter(s) with both full face mask or half mask, or not with half mask as appropriate (weight of filter);
- f) explanation of the used symbols shall be given;
- g) name and address of manufacturer and/or his authorised representative shall be given;
- h) A_1 for filters marked "NR", a warning shall be given that the combined filter shall not be used for more than one shift. A_1

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Table 6 — Testing schedule

Requirement Clause	Title	Conditioning according	Test clause	Title	Number of samples ^a
6.3	Design	A.R.	7.3	Visual inspection	all
6.4	Materials	A.R.	7.3	Visual inspection	all
6.5	Mass	A.R.	7.1	General	all
6.6	Connection	A.R.	7.3	Visual inspection	all
6.7	Multiple filters	A.R.	7.1 7.3	General Visual inspection	all
6.8	Packaging	A.R.	7.3	Visual inspection	all
6.9	Mechanical strength	A.R.	7.3 7.4	Visual inspection Mechanical strength	---
6.10	Temperature Conditioning	A.R.	7.3 7.5	Visual inspection Temperature conditioning	---
6.11	Breathing resistance	M.S. M.S. + T.C.	7.7 7.7	Breathing resistance	2 (for each flow rate) 2 (for each flow rate)
6.12	Gas capacity	M.S.	7.8	Gas capacity	3 (for each test gas)
A1 6.13	Combined filters	M.S. + T.C.	7.9	Filter penetration	3 for each aerosol A1
6.14.2	Clogging (optional)	M.S. M.S. + T.C.	7.9 7.9	Filter penetration	2 (one for each aerosol) 2 (one for each aerosol)
6.14.3	Clogging (optional)	M.S. M.S. + T.C.	7.7	Breathing resistance	2 (one for each flow rate) 2 (one for each flow rate)
8	Marking	A.R.	7.3	Visual inspection	all
9	Information supplied by the manufacturer	A.R.	7.3	Visual inspection	all
^a most samples are used for more than one test					
Abbreviations:					
A.R. as received					
M.S. mechanical strength					
T.C. temperature conditioned					

Dimensions in millimetres



Key

- | | | | |
|---|-------------|---|--------|
| K | Steel case | S | Piston |
| P | Steel plate | N | Cam |

Figure 1 — Test equipment for test of mechanical strength

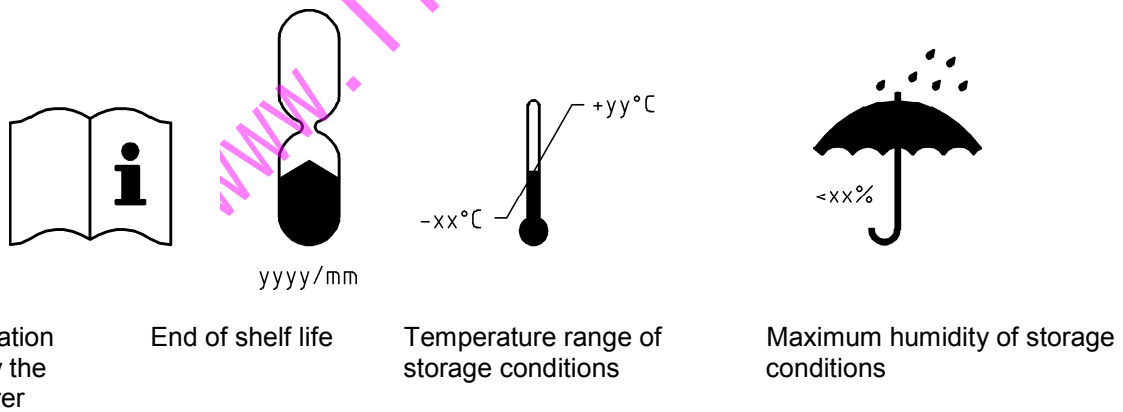


Figure 2 — Pictograms

Annex ZA (informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

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 EU Directive 89/686/EEC.

WARNING : Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The following clauses of this standard are likely to support requirements of Directive 89/686/EEC, Annex II:

EU Directive 89/686/EEC, Annex II	Clauses of this standard
1.1.2.1	6.5
1.1.2.2	5
1.2.1	6.3; 6.7
1.2.1.1	6.4
1.2.1.2	6.3
1.3.2	6.5; 6.9; 6.10
1.3.3	6.6
1.4	8; 9
2.4	6.8
2.9	6.6
2.10	6.6
2.12	8
3.10.1	6.6; 6.11; 6.12; 6.13 and 6.14

Compliance with the clauses of this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

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