

Respiratory protective devices — Methods of test —

Part 4: Flame tests

The European Standard EN 13274-4:2001 has the status of a
British Standard

ICS 13.220.4; 13.340.30

National foreword

This British Standard is the official English language version of EN 13274-4:2001.

The UK participation in its preparation was entrusted by Technical Committee PH/4, Respiratory protection, to Subcommittee PH/4/9, Test methods and interpretation, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

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This British Standard, having been prepared under the direction of the Health and Environment Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 21 September 2001

Summary of pages

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English version

Respiratory protective devices - Methods of test - Part 4: Flame tests

Appareils de protection respiratoire - Méthodes d'essai -
Partie 4: Essais à la flamme

Atenschutzgeräte - Prüfverfahren - Teil 4:
Flammenprüfungen

This European Standard was approved by CEN on 17 June 2001.

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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 Management Centre has the same status as the official versions.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by February 2002, and conflicting national standards shall be withdrawn at the latest by February 2002.

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(s).

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

EN 13274-4 is one of several parts, which are as follows:

Part 1: Determination of inward leakage and total inward leakage

Part 2: Practical performance tests

Part 3: Determination of breathing resistance

Part 4: Flame tests

Part 5: Climatic conditions

Part 6: Determination of carbon dioxide content of inhalation air

Part 7: Determination of particle filter penetration

Part 8: Determination of dolomite dust clogging

Annex A is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is intended as a supplement to the specific device standards for respiratory protective devices. Test methods are specified for complete or parts of devices. If deviations from the test method given in this standard are necessary, these deviations will be specified in the relevant device standard.

1 Scope

This European Standard specifies methods for flame tests to be applied to respiratory protective devices.

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, *Respiratory protective devices – Definitions of terms and pictograms*.

ISO 6941:1987/AMD 1:1992, *Textile fabrics - Burning behaviour - Measurement of flame spread properties of vertically oriented specimens*.

3 Terms and definitions

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

4 Pre-requisites

In order to implement this European Standard, at least the following parameters need to be specified in the relevant device standard:

- Components to be tested;
- Test method, 1, 2, or 3;
- Number of specimens;
- Climatic conditioning;
- Mounting and orientation of specimens;
- Any deviations from the test procedure chosen;
- Pass/fail criteria

5 General test requirements

Unless otherwise specified, the values stated in this European Standard are expressed as nominal values. Except for temperature limits, values which are not stated as maxima or minima shall be subject to a limit deviation of $\pm 5\%$.

Unless otherwise specified, the ambient temperature for testing shall be between 16 °C and 32 °C and the temperature limits shall be subject to a limit deviation of ± 1 °C.

6 Six burner static test: Method 1

6.1 Principle

The specimen is exposed to a flame from an array of six burners for $(5 \pm 0,5)$ s at (950 ± 50) °C.

6.2 Test rig

The test rig consists mainly of a propane cylinder with flow control device, flow meter, pressure gauge, flash back arrester and six propane burners which are adjustable in height. Figure 1 shows a schematic diagram of the apparatus and the top view of the arrangements of the six burners. The purity of the propane shall be a minimum of 95%.

NOTE A "TEKLU" burner has been found to be suitable, and information on a source of supply can be obtained from the Secretariat of CEN/TC79.

6.3 Procedure

Mount the specimen such that the external parts have direct exposure to the flame.

Before lighting the burners, position the specimen centrally above the array of six burners and individually adjust the height of each burner such that the distance between the burner tip and specimen is 250 mm. Figure 2 shows the adjustment of the burner tips for one example of specimen.

With the specimen removed from above the burners, fully open the propane control valve on each of the six burners. Initially close the air control valve on each of the six burners. Ignite the burners and adjust the propane cylinder output regulator to a pressure, such that a flow meter in the main propane supply line indicates a total flow to all six burners of $(21 \pm 0,5)$ litres/min, propane.

NOTE A typical pressure range has been found to be 0,3 to 1,25 bar.

Adjust the flame temperature at a height of 250 mm above the burner tips in the centre of the flame, above one burner, to a temperature of (950 ± 50) °C, using a mineral insulated thermocouple probe of 1.5 mm diameter (see Figure 1). The flame temperature at a height of 250 mm above all burners shall be within the limits specified.

In order to achieve the correct temperature it may be necessary to adjust the air control valve on each burner to an optimum and to shield the whole test rig from the effect of external air flows.

Expose the specimen to the flames for $(5 \pm 0,5)$ s. Where components of the specimen are positioned such that they are not exposed directly to the flame, the test shall be repeated with the same, or with other samples, as appropriate, oriented in the appropriate position.

Observe and report whether or not the specimen continues to burn or presents any additional hazard to the wearer.

7 Single burner static test: Method 2

7.1 Principle

The specimen is exposed to a flame at a temperature of (800 ± 50) °C for $(12 \pm 0,5)$ s, such that the centre of the flame impinges on the edge of the specimen under test.

7.2 Test rig

The test rig consists mainly of a propane cylinder with flow control device, pressure gauge, flashback arrester, specimen support and burner (see Figure 3). The burner shall either be in accordance with 6.2 or with ISO 6941:1987/AMD 1:1992. The purity of the propane shall be a minimum of 95 %.

7.3 Procedure

Mount the material or component to be tested on the support such that it is orientated horizontally above the burner. Adjust the height of the burner tip to the lowest part of the horizontal specimen at a distance of (20 ± 2) mm. The edge of the specimen shall be positioned directly over the burner during the test. An example is shown in Figure 3.

With the specimen removed from above the burner, ignite the burner and adjust the flame height with the propane flow control valve to (40 ± 4) mm. Check that these settings give a flame temperature of (800 ± 50) °C at a point (20 ± 2) mm above the burner tip, measured with a mineral insulated thermocouple probe, 1,5 mm diameter (see Figure 4). In order to achieve the correct flame temperature at the correct flame height, it may be necessary to shield the whole test rig from the effect of external airflows.

Expose the specimen to the flame for $(12 \pm 0,5)$ s ensuring that the centre of flame impinges on the edge of the specimen.

Observe and report whether or not the specimen continues to burn or presents any additional hazard to the wearer.

8 Single burner moving specimen test: Method 3

8.1 Principle

The specimen under test is mounted such that it may be passed through a flame at a temperature of (800 ± 50) °C at a speed of (60 ± 5) mm/s.

8.2 Test rig

The test rig consists mainly of a propane cylinder with flow control device, pressure gauge, flash back arrester, specimen support, rotation motor with speed controller, and burner (see Figure 4). The burner shall be either be in accordance with 6.2 or with ISO 6941:1987/AMD 1:1992. The purity of the propane shall be a minimum of 95 %.

8.3 Procedure

Mount the component on the specimen support, and adjust the position such that the specimen under test passes directly over the tip of the burner when the support is rotated.

With the specimen directly over the burner, adjust the height between the tip of the burner and the lowest part of the specimen to (20 ± 2) mm.

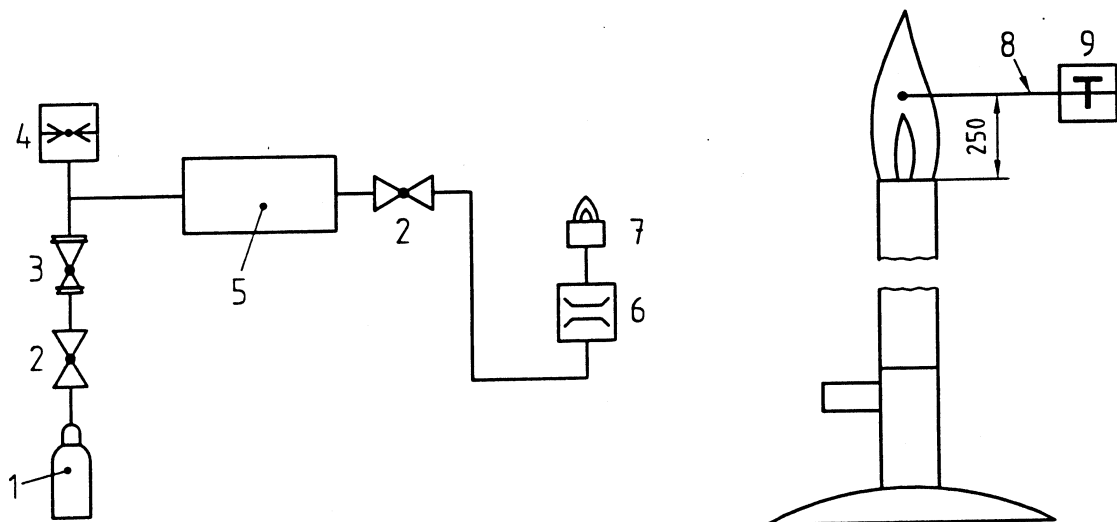
Adjust the rotation speed of the motor such that the linear speed of the specimen, measured at the burner is (60 ± 5) mm/s.

With the specimen removed from above the burner, ignite the burner and adjust the flame height with the propane flow control valve to (40 ± 4) mm. Check that these settings give a flame temperature of (800 ± 50) °C at a point (20 ± 2) mm above the burner tip, measured with a mineral insulated thermocouple probe, 1,5 mm diameter (see Figure 4). In order to achieve the correct flame temperature at the correct flame height it may be necessary to shield the whole test rig from the effect of external airflows.

Pass the specimen once through the flame. Repeat the test with the specimen mounted in a different orientation or with other specimen so that an assessment can be made of all materials or components, as specified by the relevant device standard. It is important that no part of the specimen passes through the flame more than once.

Observe and report whether or not the specimen continues to burn or presents any additional hazard to the wearer.

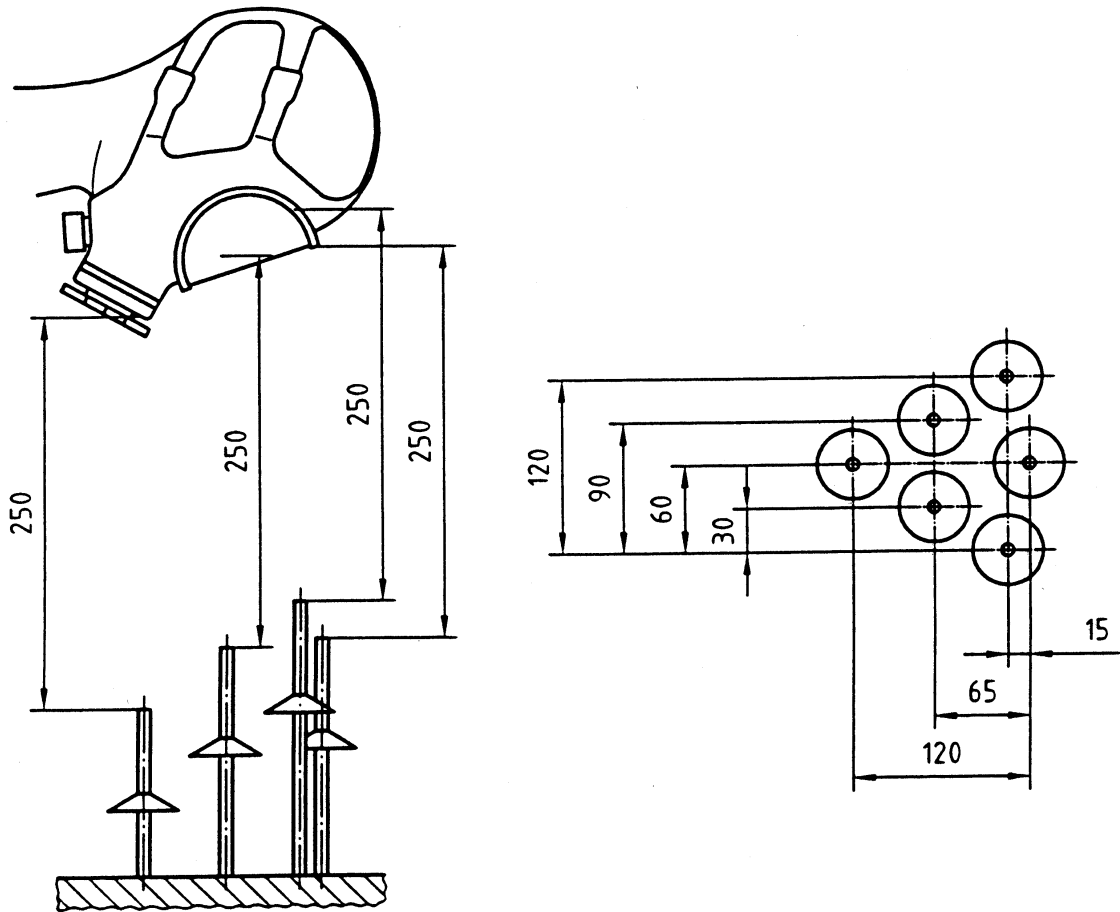
Dimensions in millimetres

**Key**

- 1 Propane cylinder
- 2 Valve
- 3 Pressure reducer
- 4 Pressure gauge
- 5 Flame arrester

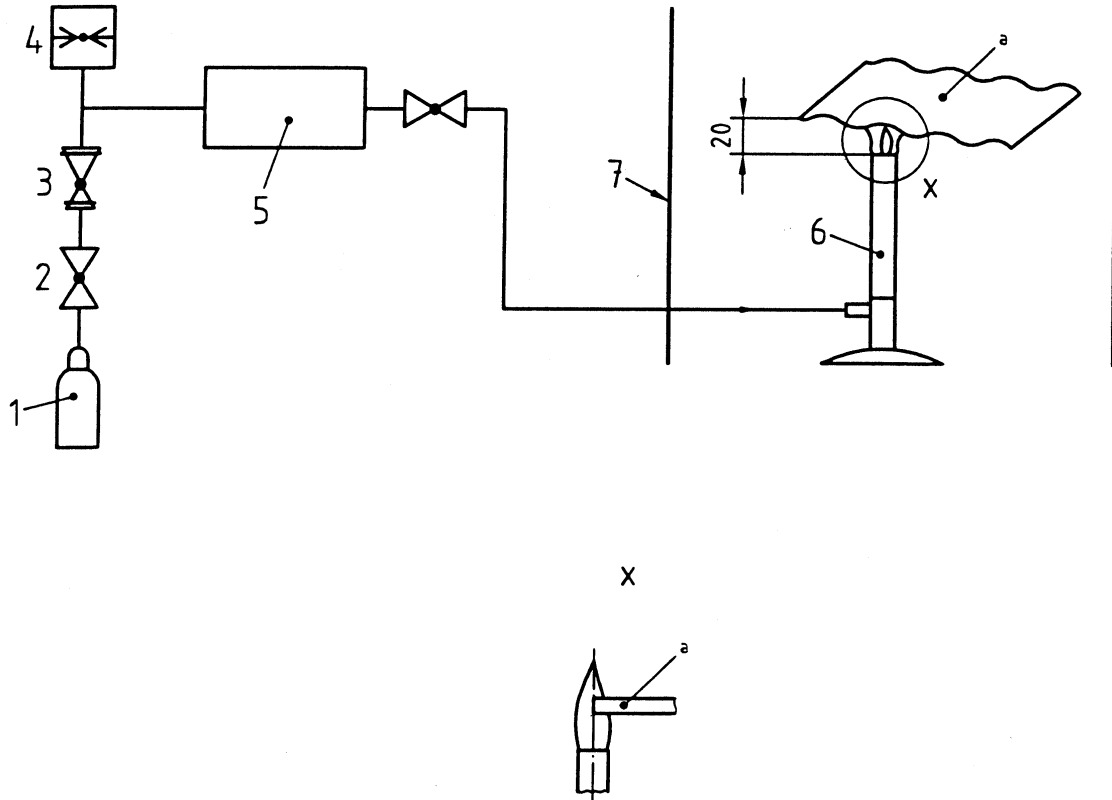
- 6 Flow meter
- 7 Burner
- 8 Thermocouple (\varnothing 1,5)
- 9 Temperature measuring device

Figure 1 —Schematic diagram of apparatus for six burner static test



Detail: plan view

Figure 2 — Schematic diagram of arrangement of six burners in six burner static test for facepiece

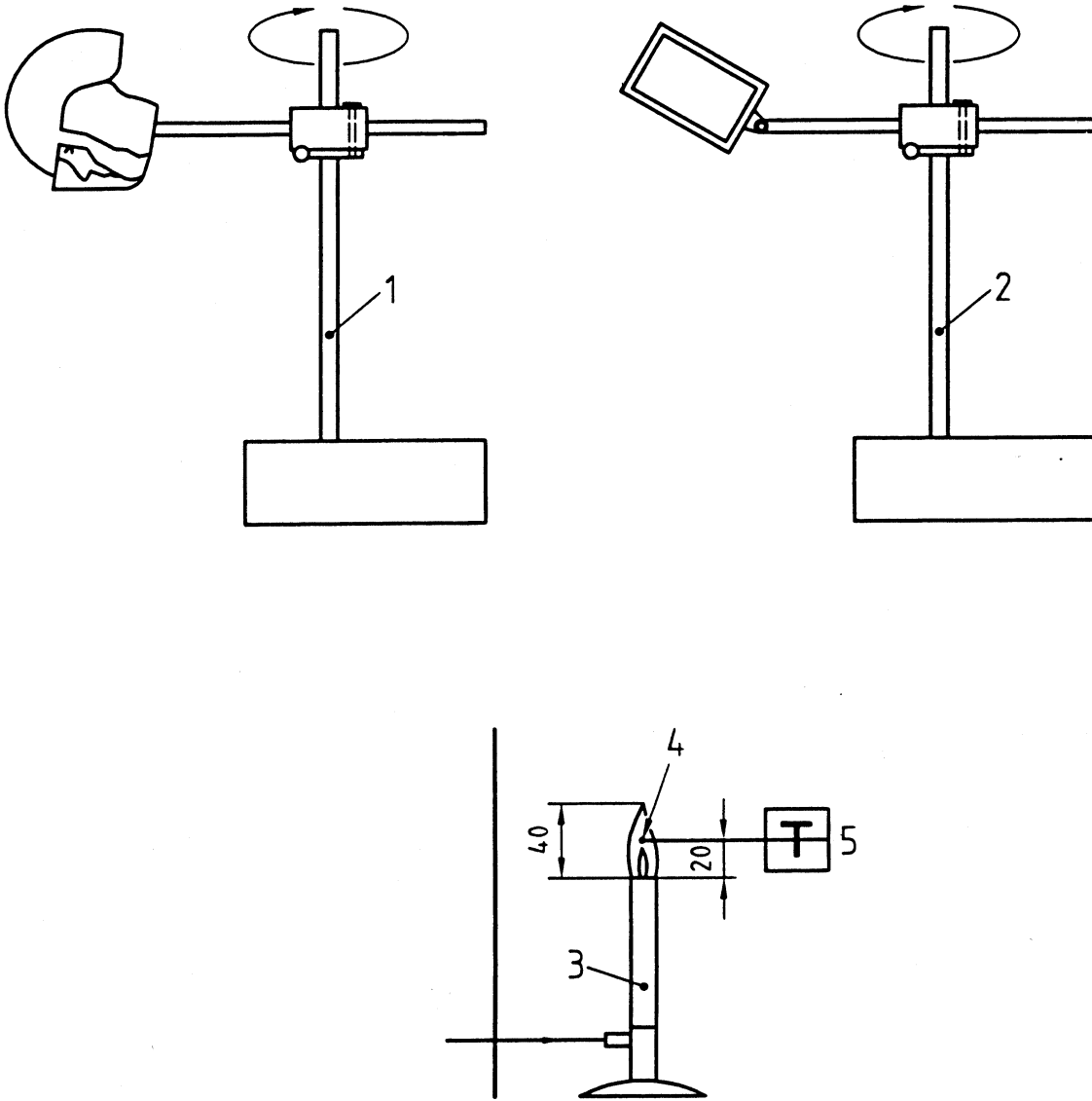


Key

- 1 Propane cylinder
- 2 Valve
- 3 Pressure reducer
- 4 Pressure gauge

- 5 Flame arrester
- 6 Burner
- 7 Shield
- a) Material under test

Figure 3 —Schematic diagram of apparatus for single burner static flammability test



Key

1 Rotating motor device (facepieces)

2 Rotating motor device (components)

3 Burner

4 Thermocouple (Ø 1.5)

5 Temperature measuring device

Figure 4 — Typical arrangement of apparatus for single burner moving specimen test for facepieces or components

Annex A

(normative)

Test results - Uncertainty of measurement

For each of the required measurements performed in accordance with this standard, a corresponding estimate of the uncertainty of measurement shall be evaluated. This estimate of uncertainty shall be applied and stated when reporting test results, in order to enable the user of the test report to assess the reliability of the data.

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 clauses of this standard are likely to support requirements in Clauses 3.6.1 and 3.10.1 of Annex II of Directive 89/686/EEC.

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

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