
**Protective clothing — Protection against
heat and flame — Method of test for limited
flame spread**

*Vêtements de protection — Protection contre la chaleur et les flammes —
Méthode d'essai pour la propagation de flamme limitée*

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Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope	1
2 Terms and definitions	1
3 Principle	2
4 Health and safety of test operators.....	2
5 Reagents.....	2
6 Apparatus	2
7 Sampling and sample preparation	7
7.1 Sampling.....	7
7.2 Conditioning atmosphere of the test sample.....	8
8 Procedure	8
8.1 Installation of the test apparatus.....	8
8.2 Test.....	10
9 Precision.....	11
10 Test report	11
Annex A (normative) Description and construction of the burner.....	13
Annex B (informative) Experimental techniques.....	14
Annex C (normative) Measurement of char length	15
Bibliography	16

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15025 was prepared by Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*.

Annexes A and C form a normative part of ISO 15025. Annex B is for information only.

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Introduction

This International Standard was initially prepared by Technical Committee ISO/TC38/SC19 as part of the revision of ISO 6940 and ISO 6941. This specific work item was transferred to Technical Committee ISO/TC 94/SC 13 in April 1997.

This method of test is closely related to the method of test specified in ISO 6941. It uses the same basic equipment but a smaller specimen holder and template. Materials which do not burn to the upper or vertical edges of the smaller test specimen used in this test may be classified as producing limited flame spread.

This method assesses the properties of textile fabrics in response to a short contact with a small igniting flame under controlled conditions. Results may not apply to situations where there is restricted air supply or exposure to large sources of intense heat.

The influence of seams on the behaviour of fabrics can be determined by this method, the seam being positioned within the test specimen so as to be subjected to the test flame.

Whenever practicable, trimmings should be tested as part of the fabric assembly on which they are or will be used.

A list of standards related to ISO 15025 is given in the Bibliography.

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Protective clothing — Protection against heat and flame — Method of test for limited flame spread

1 Scope

This International Standard specifies a method for the measurement of limited flame spread properties of vertically oriented textile fabrics and industrial products in the form of single or multi-component fabrics (coated, quilted, multilayered, sandwich constructions, and similar combinations), when subjected to a small defined flame.

This test method is not appropriate for materials that demonstrate extensive melting or shrinkage.

2 Terms and definitions

For the purposes of this International Standard the following terms and definitions apply.

2.1

flame application time

time for which the ignition flame is applied to the test specimen

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2.2

afterflame time

duration of flame

length of time for which a material continues to flame, under the specified test conditions, after the ignition source has been removed

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NOTE

Afterflame time is measured to the nearest second and afterflame times of less than 1,0 s should be recorded as zero.

2.3

afterglow

persistence of glowing combustion of a material under specified test conditions, after cessation of flaming or, if no flaming occurs, after removal of the ignition source

NOTE

Afterglow is a continuation of combustion with the evolution of heat and light but without flame. Some materials absorb heat during the flame application and continue to emit this absorbed heat after removal of the igniting flame. This glowing without combustion should not be recorded as afterglow.

2.4

afterglow time

duration of afterglow

time for which a material continues to afterglow, under specified test conditions after cessation of flaming or after removal of the ignition source

NOTE

Afterglow time is measured to the nearest second and afterglow times of less than 1,0 s should be recorded as zero.

2.5

char

formation of a brittle residue when material is exposed to thermal energy

2.6 debris
material separating from the specimen during the test procedure and falling from the specimen without flaming

2.7 flaming debris
material separating from the specimen during the test procedure and igniting the filter paper

2.8 hole
<surface ignition of procedure A> break in the test specimen of at least 5 mm in any dimension and having a continuous perimeter caused by melting, glowing or flaming

NOTE 1 If the hole is crossed by any material it is described as discontinuous.

NOTE 2 This International Standard describes the reporting of holes in any separable layer of a multilayer specimen obtained during surface ignition testing [see 8.2.1.3 g) and 10 i)].

3 Principle

A defined flame from a specified burner is applied for 10 s to the surface or the bottom edge of textile specimens which are vertically oriented.

Information is recorded on the spread of flame and afterglow, and on the formation of debris, flaming debris, or a hole. Afterflame time and afterglow time are recorded.

NOTE 1 Surface exposure tests may be performed on both sides of multilayer fabric assemblies.

NOTE 2 The bottom-edge ignition test may not offer acceptable reproducibility for testing some materials.

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4 Health and safety of test operators

Burning of materials may produce smoke and toxic gases which can affect the health of operators. Between tests, the atmosphere of the test location, which should be of adequate dimensions to avoid endangering the health of operators, should be cleared of smoke and fumes by an extractor fan or other means of ventilation (see 6.1).

NOTE Smoke and fume emission may be subject to national regulations concerning atmospheric pollution control.

5 Reagents

5.1 Gas, of commercial grade, either propane or butane or butane/propane mixtures.

NOTE Commercial grade propane is preferred but other gases may be used and this fact recorded in the test report (see item b) in clause 10.

6 Apparatus

6.1 Test apparatus — General requirements

— Construction: consisting of material which shall not be adversely affected by the fumes and that is resistant to heat and flame.

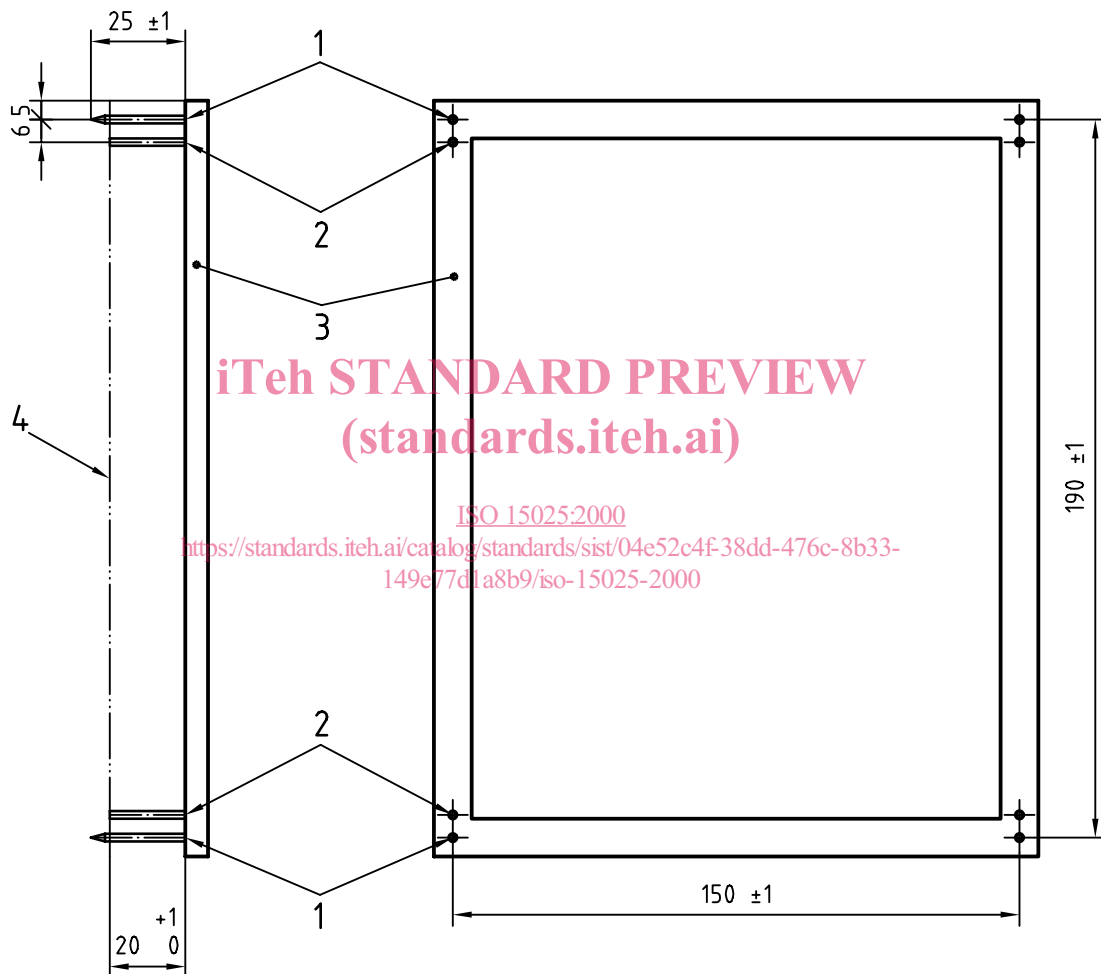
NOTE Some products of combustion are corrosive.

- Location: surrounded by a volume of air sufficient not to be affected by any reduction of oxygen concentration. Where an open-fronted cabinet is used for the test, provision shall be made to permit the specimen to be mounted at least 300 mm from any wall.

6.2 Mounting frame, constructed to a design capable of holding the test specimen holder (see 6.4 and Figure 1) and the gas burner (see 6.3 and Figure 2) in the specified relative orientation (see Figure 3).

6.3 Gas burner, as described in annex A (see Figure 2), capable of being moved from a standby position, where the tip of the burner is at least 75 mm from the test specimen, to either the horizontal or inclined operating position [see Figure 3 a) and 3 b) respectively].

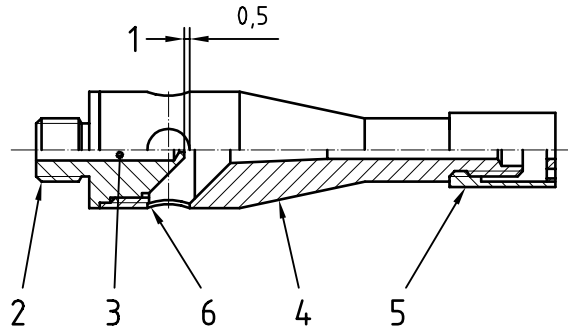
Dimensions in millimetres



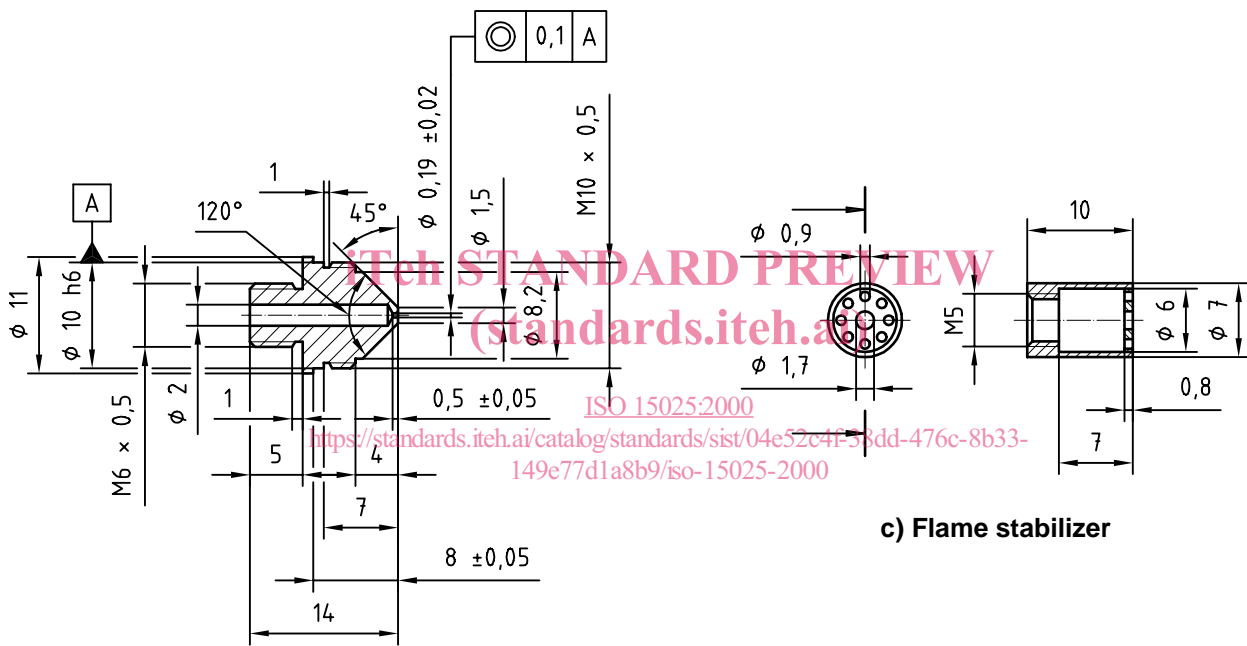
Key

- 1 Specimen support pin, $(2 \pm 0,5)$ mm diameter
- 2 Spacer stub, 2 mm diameter
- 3 Mounting frame
- 4 Specimen

Figure 1 — Test specimen holder



a) Gas burner arrangement



b) Gas jet

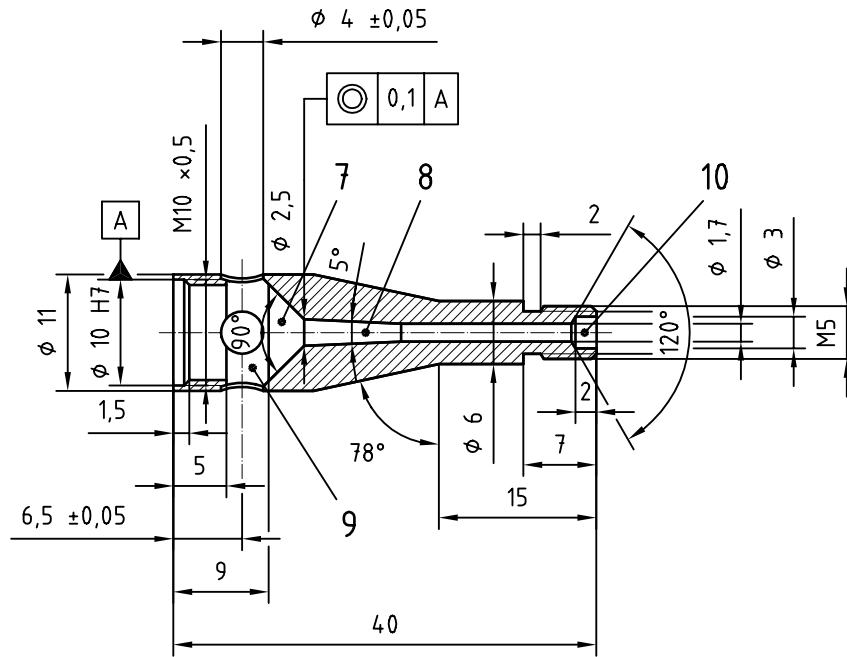
c) Flame stabilizer

Key

- 1 Fitted in during assembly
- 2 Gas jet
- 3 Choke tube
- 4 Burner tube
- 5 Flame stabilizer
- 6 Notch

Figure 2 — Gas burner

Dimensions in millimetres



d) Burner tube

Key

- 7 Gas-mixing zone
- 8 Diffusion zone
- 9 Air chamber
- 10 Outlet

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Figure 2 — Gas burner (continued)