BRITISH STANDARD

BS EN
50265-2-1:1999

Common test methods for cables under fire conditions — Test for resistance to vertical flame propagation for a single insulated conductor or cable —

Part 2-1: Procedures — 1 kW pre-mixed flame

The European Standard EN 50265-2-1:1998 has the status of a British Standard

ICS 13.220.40; 29.060.01

National foreword

This British Standard is the English language version of EN 50265-2-1:1998. When used in conjunction with BS EN 50265-1, it supersedes BS 4066-1:1980 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/3, Insulation and sheath, 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.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 9 and a back cover.

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EN 50265-2-1

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ICS 13.220.40; 29.060.20

Supersedes HD405.1 S1: 1983 + A1: 1992

Descriptors: Electrical installation, electrical cables, insulated conductors, insulated cables, fire tests, flammability tests, flame propagation, testing conditions, procedures

English version

Common test methods for cables under fire conditions — Test for resistance to vertical flame propagation for a single insulated conductor or cable — Part 2-1: Procedures — 1 kW pre-mixed flame

Méthodes d'essai communes aux câbles soumis au feu — Essai de résistance à la propagation verticale de la flamme sur un conducteur ou câble isolé — Partie 2-1: Procédures — Flamme de type à prémélange 1 kW

Allgemeine Prüfverfahren für das Verhalten von Kabeln und isolierten Leitungen im Brandfall — Prüfung der vertikalen Flammenausbreitung an einer Ader oder einem Kabel — Teil 2-1: Prüfverfahren — 1 kW-Flamme mit Gas-/Luftegemisch

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart, 35 B-1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 20, Electric Cables.

When used in conjunction with EN 50265-1 this European Standard supersedes HD 405.1 S1 and its amendment A1.

Significant technical differences are:

a) introduction of revised flame application times;

b) transfer of requirements to an informative annex, as recommendations only.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50265-2-1 on 1998-04-01.

The following dates were fixed:

—	latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	1999-03-01
—	latest date by which national standards conflicting with the EN have to be withdrawn	(dow)	2000-03-01

Annexes designated "informative" are given for information only.

In this standard annexes A and B are informative.

Contents

1 Scope

EN 50265 specifies a method of test for resistance to flame propagation for a single electrical insulated conductor or cable, or optical cable, under fire conditions. Part 1 specifies the test apparatus and part 2 specifies various procedures.

EN 50265-2-1 specifies the use of a 1 kW pre-mixed flame and is for general use, except that the procedure specified may not be suitable for the testing of small single insulated conductors or cables of less than 0,5 mm^2 total cross-section because the conductor melts before the test is completed, or for the testing of small optical fibre cables because the cable is broken before the test is completed. In these cases, the procedure given in EN 50265-2-2 is recommended.

This standard includes an informative annex of recommended requirements for conformity.

NOTE Since the use of insulated conductor or cable which retards flame propagation and complies with the recommended requirements of this standard is not sufficient by itself to prevent propagation of fire under all conditions of installation, it is recommended that wherever the risk of propagation is high, for example in long vertical runs of bunches of cables, special installation precautions should also be taken. It cannot be assumed that because the sample of cable complies with the performance requirements recommended in this standard a bunch of cables will behave in a similar manner. (See EN 50266 — under preparation.)

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 50265-1, *Common test methods for cables under fire conditions — Test for resistance to vertical flame propagation for a single insulated conductor or cable — Part 1: Apparatus.*

EN 60695-4, *Fire hazard testing — Part 4: Terminology concerning fire tests.*

NOTE IEC 60695 is in the course of re-numbering its parts and sections. This will also affect the equivalent ENs.

3 Definitions

For the purposes of EN 50265-2-1 the following definitions apply. The definitions are taken from EN 60695-4.

3.1
ignition source
a source of energy that initiates combustion

3.2
char
carbonaceous residue resulting from pyrolysis or incomplete combustion

4 Test apparatus

4.1 General

The apparatus specified in EN 50265-1 shall be used.

4.2 Ignition source

The ignition source shall comply with EN 50265-1, subclause **4.3.2.**

5 Procedure

5.1 Sample

The test sample shall be a piece of the insulated conductor or cable (600 ± 25) mm long.

5.2 Conditioning

Before testing, all test pieces shall be conditioned at (23 ± 5) °C for not less than 16 h at a relative humidity of (50 ± 20) %.

In the case of an insulated conductor or cable with a finish of paint or lacquer, this conditioning shall follow an initial period where the test piece shall be kept at a temperature of (60 ± 2) °C for 4 h.

5.3 Positioning of test piece

The test piece shall be secured to two horizontal supports by means of a suitable size of copper wire so that the distance between the bottom of the upper support and the top of the lower support is (550 ± 5) mm. In addition the test piece shall be positioned so that the bottom of the specimen is approximately 50 mm from the base of the screen. (See Figure 1.)

The vertical axis of the test piece shall be arranged centrally within the screen (i.e. 150 mm from each side and 225 mm from the rear).

5.4 Flame application

5.4.1 *Safety warning*

Precautions shall be taken to safeguard personnel against the following when conducting tests:

a) the risk of fire or explosion;

b) the inhalation of smoke and/or noxious products, particularly when halogenated materials are burned;

c) harmful residues.

5.4.2 *Positioning of flame*

One calibrated burner, as described in subclause **4.3.2** of EN 50265-1, shall be ignited and the recommended flow rates of gas and air adjusted. The burner shall be positioned so that the tip of the inner blue cone impinges on the surface of the test piece at a distance of (475 ± 5) mm from the lower edge of the upper horizontal support, whilst the burner is at an angle of 45° to the vertical axis of the sample. (See Figure 2.)

For flat-form cables the flame impingement shall be on the middle of the flat side of the cable.

5.4.3 ***Test duration***

The flame shall be applied continuously for the period of time corresponding to the diameter shown in Table 1.

Table 1

Overall diameter [1] of test piece mm	Time for flame application s
$D \leq 25$	60
$25 < D \leq 50$	120
$50 < D \leq 75$	240
$D > 75$	480

[1] Where non-circular cables (e.g. flat-form constructions) are to be tested, the circumference shall be measured and used to calculate an equivalent diameter, as if the cable were circular
NOTE For flat cables having a ratio of major to minor axis greater than 17:1, the flame application time remains under consideration.

At the end of the specified test duration, the burner shall be removed and the flame of the burner extinguished.

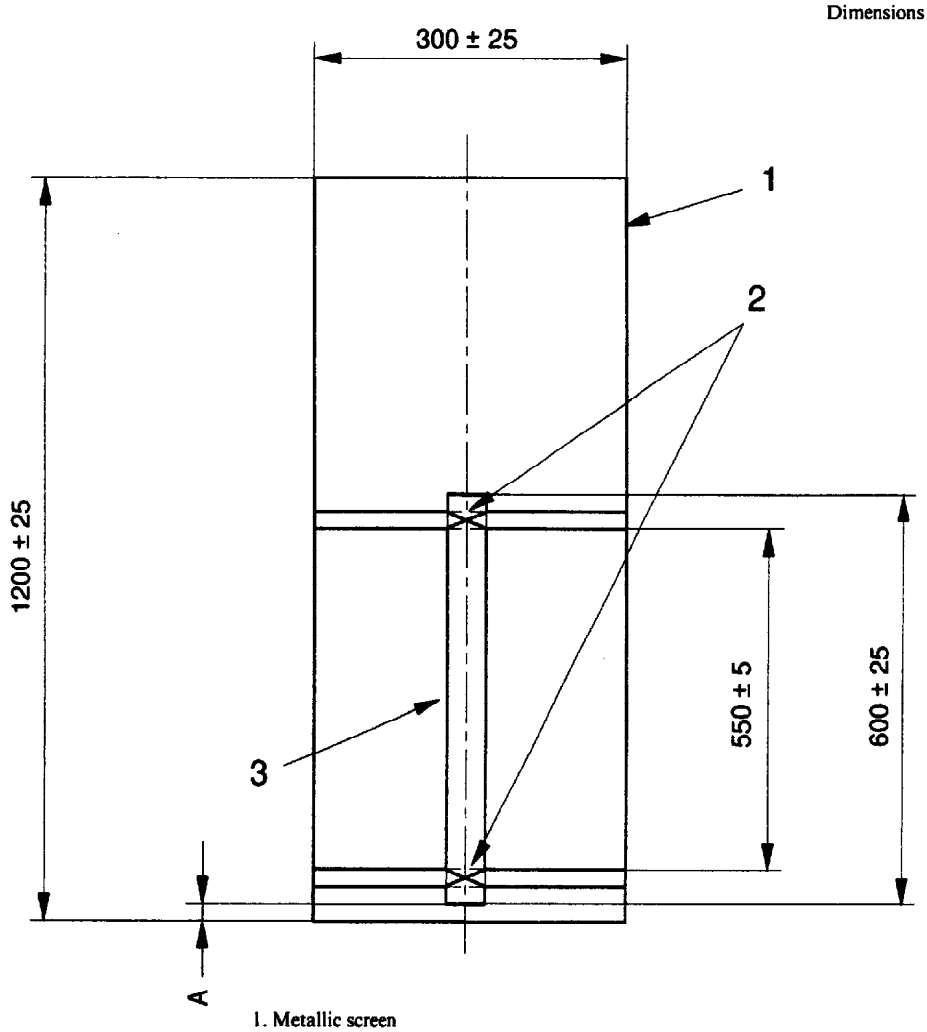
6 Evaluation of test results

After all burning has ceased, the test piece shall be wiped clean.

All soot shall be ignored if, when wiped off, the original surface is undamaged. Softening or any deformation of the non-metallic materials shall also be ignored. The distance from the lower edge of the top support to the upper and lower onset of charring shall be measured to the nearest millimetre.

The onset of char shall be determined as follows.

Press against the cable surface with a sharp object, e.g. a knife blade. Where the surface changes from a resilient to a brittle (crumbling) surface indicates the onset of charring.

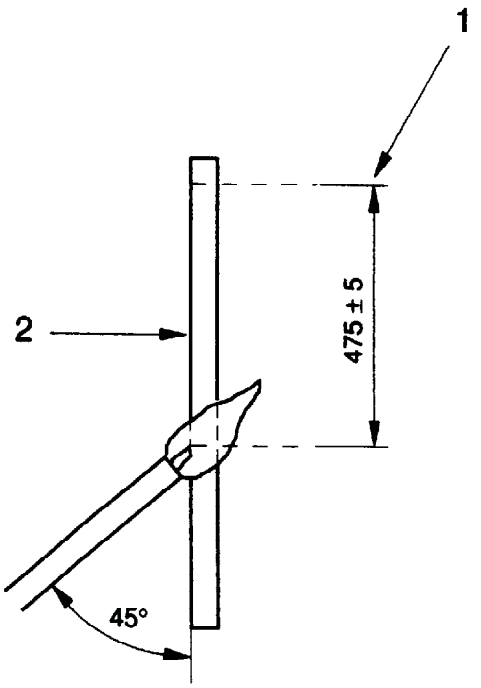


1. Metallic screen
2. Support arm and copper wire fixing
3. Sample

Distance A: Length from base of screen to bottom of sample = 50 mm (approximately)

Figure 1 — Arrangement of sample in test apparatus

Dimensions in millimetres



1. Lower edge of top support
2. Sample

Figure 2 — Application of 1 kW pre-mixed flame to test sample

Annex A (informative)
Recommended performance requirements

The performance requirements for a particular type or class of insulated conductor or cable should preferably be given in the individual cable standard. In the absence of any given requirement it is recommended that those given below should be taken as a minimum acceptable level.

The insulated conductor or cable shall pass the test if the distance between the lower edge of the top support and the onset of charring is greater than 50 mm.

In addition, a failure shall be recorded if burning extends downwards to a point greater than 540 mm from the lower edge of the top support.

If a failure is recorded two more tests shall be carried out. If both tests result in passes, the insulated conductor or cable shall be deemed to have passed the test.

Annex B (informative)
Bibliography

The following standards are referred to in the notes and do not therefore constitute normative parts of this standard.

EN 50265-2-2,*Common test methods for cables under fire conditions — Test for resistance to vertical flame propagation for a single insulated conductor or cable — Part 2-2:Procedures — Diffusion flame.*

EN 50266,*Common test methods for cables under fire conditions — Test for vertical flame spread of vertically-mounted bunched wires or cables (in preparation).*

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