BRITISH STANDARD

BS EN
50268-2:2000

Common test methods for cables under fire conditions — Measurement of smoke density of cables burning under defined conditions —

Part 2: Procedure

The European Standard EN 50268-2:1999 has the status of a British Standard

ICS 13.220.40; 29.060.20

National foreword

This British Standard is the official English language version of EN 50268-2:1999. It supersedes BS 7622-2:1993 which is withdrawn.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 international/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 6, an inside back cover and a back cover.

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EUROPEAN STANDARD

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EN 50268-2

September 1999

ICS 13.220.40; 29.060.20

Supersedes HD 606.2 S1:1992

English version

Common test methods for cables under fire conditions — Measurement of smoke density of cables burning under defined conditions — Part 2: Procedure

Méthodes d'essai communes aux câbles soumis au feu — Mesure de la densité de fumées dégagées par des câbles brûlant dans des conditions définies — Partie 2: Procédure

Allgemeine Prüfverfahren für das Verhalten von Kabeln und isolierten Leitungen im Brandfall — Messung der Rauchdichte von Kabeln und isolierten Leitungen beim Brennen unter definierten Bedingungen — Teil 2: Prüfverfahren

This European Standard was approved by CENELEC on 1999-04-01.

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

Ref. No. EN 50268-2:1999 E

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC20, Electric cables, and agreed at its Dublin meeting (April 1997).

The text of the draft was submitted to the Unique Acceptance Procedure and approved by CENELEC as EN 50268-1 on 1999-04-01.

This European Standard supersedes HD 606.2 Sl:1992

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) 2000-04-01
- latest date by which national standards conflicting with the EN have to be withdrawn (dow) 2001-04-01

Annexes designated informative are given for information only. In this standard annexes A and B are informative.

Contents

1 Scope

EN 50268 specifies a method of test for measurement of smoke density of cables burning under defined conditions. It is suitable for electric insulated conductor or cable, or optical cables. Part 1 specifies the apparatus and part 2 specifies procedure. This standard includes an informative annex of recommended requirements for compliance.

NOTE Experience has shown that the test protocol is not suitable for some cables that exceed 70 mm overall diameter. In such cases the manufacturer should be consulted.

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 50268-1, *Common test methods for cables under fire conditions — Measurement of smoke density of cables burning under defined conditions — 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 this part 2 of EN 50268 the definitions in EN 60695-4 apply.

4 Test apparatus

The test procedure defined in this part 2 of EN 50268 shall be carried out using the test apparatus, i.e. test enclosure, photometric system and standard fire source, given in EN 50268-1.

5 Test assembly

5.1 Cable test pieces

These shall consist of one or more samples of cable 1,00 m ± 0,05 m long which shall be carefully straightened and then conditioned for at least 16 h at 23 °C ± 5 °C.

5.2 Cable selection and assembly

5.2.1 *Selection of number of test pieces*

Overall diameter of the cable (*D*) mm	**Number of test pieces**	
	Cables	**Bundles**[d]
$D > 40$	1	—
$20 < D \leq 40$	2	—
$10 < D \leq 20$	3	—
$5 < D \leq 10$	N_1[a, c]	—
$1 \leq D \leq 5$	—	N_2[b, c]

[a] $N_1 = \frac{45}{D}$ cables

[b] $N_2 = \frac{45}{3D}$ bundles

[c] The value of N_1 and N_2 shall be rounded downwards to the integer to give the number of cables or bundles.

[d] Each bundle shall consist of seven cables twisted together with a lay between 20 *D* and 30 *D* and bound with two turns of approximately 0,5 mm diameter wire in the centre and at every 100 mm each side from the centre (see Figure 1)

5.2.2 *Assembly of test pieces*

The test pieces shall remain in situ during the test as follows:

— cables or bundles shall be bound together at the ends, and at 300 mm from each end, at which place they shall be clamped to the support by means of wire binders.

NOTE Depending upon construction, small cables and flexible cables may be subject to movement during the test. In these cases it is also recommended that the cables or bundles are bound with two turns of approximately 0,5 mm diameter wire in the centre and at every 100 mm each side from the centre. Alternatively, the cables or bundles may be tensioned at one or both ends by means of an appropriate device, for example spring or weight.

5.3 Positioning of test pieces

The tray containing the alcohol shall be supported above the ground surface to permit air circulation around and beneath the tray. The test pieces (cables or bundles) shall be laid touching in a horizontal position and centred above the tray so that the distance between the underneath of the test pieces and the bottom of the tray is 150 mm ± 5 mm (see Figure 2).

6 Test procedure

NOTE Before each test it may be necessary to clean the windows of the photometric system to regain 100 % light transmission after stabilization of the voltage (see also clause **A.2** of annex A of EN 50268-1).

6.1 Immediately before commencing a test, the temperature within the cube shall be in the range of 25 °C ± 5 °C when measured at the internal door surface at a height of 1,5 m to 2,0 m and a minimum of 0,2 m from the walls.

6.2 Before a test, carry out one blank test as defined in EN 50268-1, clause **8** to preheat the test enclosure if necessary.

6.3 For the test, the fire source shall be as defined in EN 50268-1, clause **6**.

6.4 With the test samples supported above the tray, start the air circulation and ignite the alcohol. Make sure that all the persons leave the cube immediately, and that the door is closed.

6.5 The test is considered as ended when there is no decrease in light transmittance for 5 min after the fire source has extinguished or when the test duration reaches 40 min.

6.6 Record the minimum light transmittance.

NOTE If it is required to use information on smoke density for wider hazard evaluation or fire safety engineering purposes, it may be necessary to calculate absorbance levels. Guidance on such calculations is given in annex A.

6.7 Extract the combustion products at the end of each test.

7 Evaluation of test results

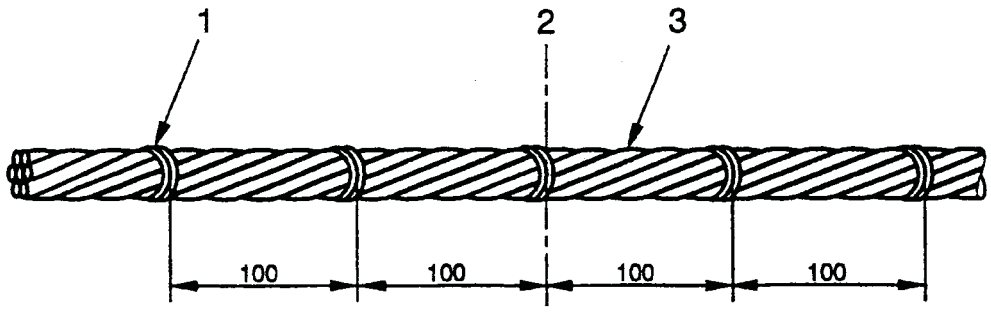
The requirement shall be as given in the relevant cable specification.

NOTE If no value is given in the relevant cable specification it is recommended that the recommendation in annex B be adopted as a minimum.

8 Retest procedure

In case of dispute a further two tests shall be undertaken using similar cables.

Both of these test results shall comply with the requirements of clause **7**.

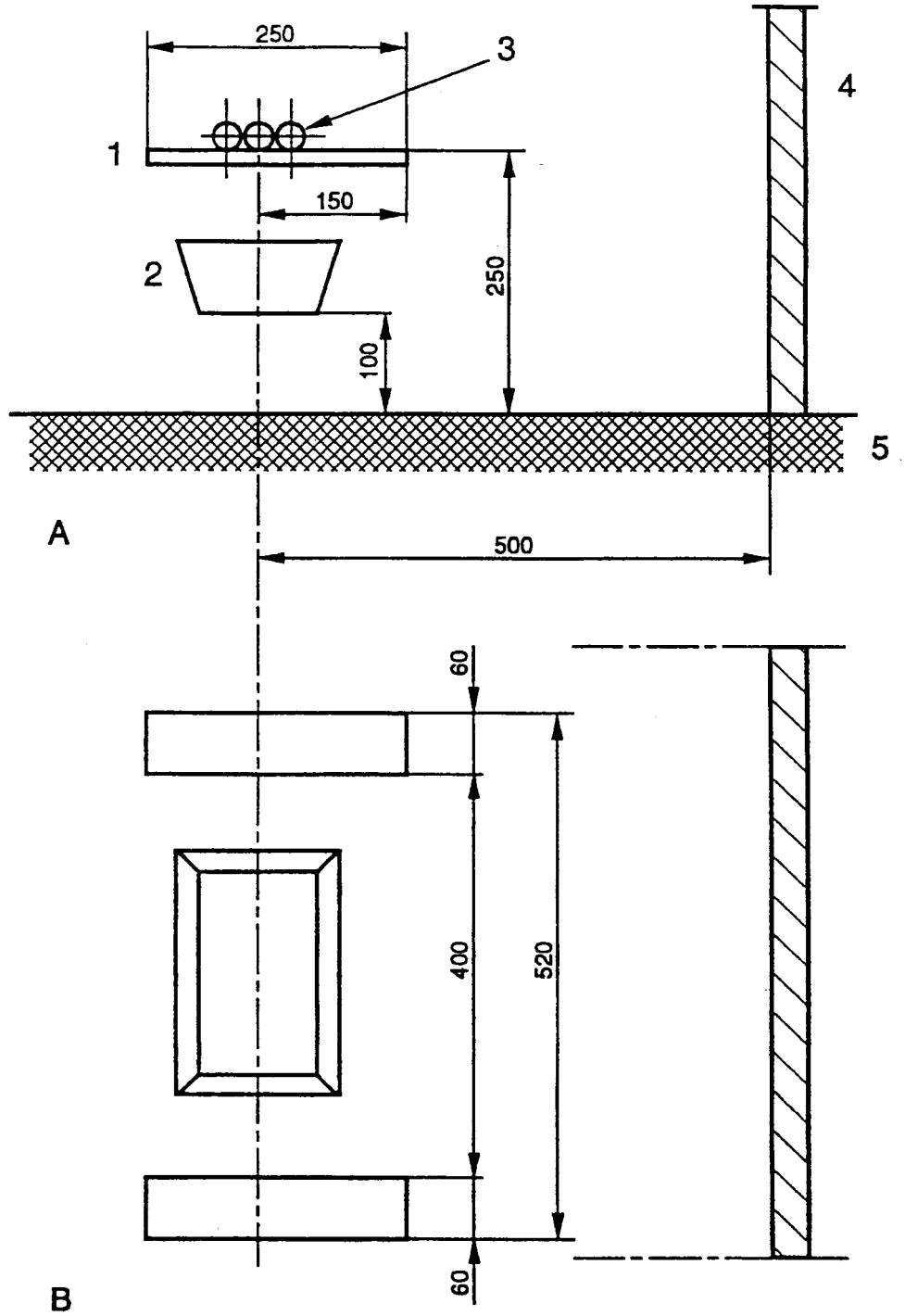


Key:

1. Wire binder
2. Centre
3. Number of test pieces = 7

Dimensions in millimetres

Figure 1 — Method of binding for cable bundles



Key:

A. Side view
B. Plan view
1. Support
2. Metal tray
3. Test piece
4. Back wall
5. Floor

Dimensions in millimetres

Figure 2 — Method of support of test pieces

Annex A (informative)

Guidance on calculation of absorbance

The absorbance (A_o), i.e. the absorbance produced across the opposite faces of a cube of side 1 m when one unit of material is burned, is calculated from the expression.

$$A_o = \frac{A_m V}{nl}$$

where

A_m is the measured absorbance as calculated in EN 50268-1, **10.5** using the minimum light transmittance (l_t) recorded by the photocell in **6.6** of this part 2;

V is the measured volume of the cube (in m^3);

n is the total number of samples of cable in the test assembly;

NOTE Where bundles are tested n is the number of bundles multiplied by the number of cable samples in each bundle.

l is the measured length of the optical path (in m).

The absorbance value obtained is of significance if the system involves different cables/products and an overall assessment of smoke density level is required.

Annex B (informative)

Recommended performance requirement

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 a value of 60 % light transmittance is adopted as a minimum for any cable tested against this standard.

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