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**Splošne metode za preskušanje kablov v požarnih razmerah - Ugotavljanje nastajanja plinov pri gorenju kabelskih materialov - 2-2. del: Postopki - Ugotavljanje stopnje kislosti plinov za materiale z merjenjem pH in prevodnosti**

Common test methods for cables under fire conditions - Tests on gases evolved during combustion of materials from cables - Part 2-2: Procedures - Determination of degree of acidity of gases for materials by measuring pH and conductivity

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Allgemeine Prüfverfahren für das Verhalten von Kabeln und isolierten Leitungen im Brandfall - Prüfung der bei der Verbrennung der Werkstoffe von Kabeln und isolierten Leitungen entstehenden Gase - Teil 2-2: Prüfverfahren - Bestimmung des Grades der Azidität von Gasen bei Werkstoffen durch pH-Wert und Leitfähigkeit

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Méthodes d'essai communes aux câbles soumis au feu - Essais sur les gaz émis lors de la combustion d'un matériau prélevé sur un câble - Partie 2-2: Procédures - Détermination de l'acidité des gaz des matériaux par une mesure du pH et de la conductivité

**Ta slovenski standard je istoveten z: EN 50267-2-2:1998**

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**ICS:**

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
29.060.20	Kabli	Cables

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ICS 13.220.40; 29.060.20

Descriptors: Electrical installation, electrical cables, fire tests, combustion tests, combustion products, burning gases, corrosive gases, determination, acidity, measurements, pH, conductivity, testing conditions, procedures

English version

**Common test methods for cables under fire conditions**  
**Tests on gases evolved during combustion of materials from cables**  
**Part 2-2: Procedures - Determination of degree of acidity of gases for**  
**materials by measuring pH and conductivity**

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This European Standard was approved by CENELEC on 1998-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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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 TC20, Electric Cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50267-2-2 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 "normative" are part of the body of the standard. Annexes designated "informative" are given for information only. In this standard annex A is informative. There is no normative annex.

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## 1. Scope

EN 50267-2-2 specifies the test method and procedure for the determination of the degree of acidity of gases evolved during the combustion of materials taken from electric or optical cables by measuring pH and conductivity.

NOTE: The relevant cable standard should indicate which materials from the cable should be tested.

## 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 50267-1: Common test methods for cables under fire conditions. Tests on gases evolved during the combustion of materials from cables. Part 1: Test 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. Definition

For the purposes of EN 50267-2-2 the following definition applies. The definition is taken from EN 60695-4. **(standards.iteh.ai)**

3.1 **Combustion:** Exothermic reaction of a substance with an oxidizer with emission of effluent, generally accompanied by flames and/or glowing and/or emission of smoke.

## 4. Test apparatus

The apparatus used shall be that specified in EN 50267-1 together with the following measuring instruments:

- analytical balance of an accuracy of  $\pm 0,1$  mg;
- pH meter to an accuracy of  $\pm 0,02$ , equipped with a suitable pH electrode;

- conductivity measuring device with a range  $10^{-2} \mu\text{S}/\text{mm}$  to  $10^2 \mu\text{S}/\text{mm}$  and a suitable electrode;
- timer

## 5. Test method and procedure

### 5.1 General principle

A pre-determined quantity of the test material is burned in a tube furnace. The evolved gases are trapped by bubbling through wash bottles filled with distilled or demineralised water. Each wash bottle shall contain approximately 450 ml of distilled or demineralised water with the following properties:

$$\begin{aligned} \text{pH } 6,5 \pm 1,0 \\ \text{conductivity } \leq 0,5 \mu\text{S}/\text{mm} \end{aligned}$$

The acidity is measured by determination of pH value. The conductivity of the solution is also measured.

### 5.2 Samples and conditioning

Representative samples of the material to be tested shall be taken. The samples shall be stored for at least 16 h at a temperature of  $(23 \pm 2)^\circ\text{C}$  and a relative humidity of  $(50 \pm 5)\%$ .

### 5.3 Test pieces

A test piece shall consist of  $(1000 \pm 5)$  mg of the material to be tested taken from the representative sample. The test piece shall be cut into a number of smaller pieces.

### 5.4 Procedure

The test pieces, which shall be weighed to an accuracy of 1 mg, shall be put into a combustion boat. They shall be evenly distributed on the bottom of the boat.

The air flow shall be adjusted by means of a needle valve at  $(0,0157 \cdot D^2)$  litre  $\cdot$  h $^{-1}$   $\pm 10\%$  and kept constant during the test.

NOTE 1: It is recommended that the air flow is not started until immediately prior to the commencement of the test.

The temperature value shall be measured by a thermocouple suitably protected against corrosion and placed inside the tube.

The boat containing the test pieces shall be quickly inserted into the effective zone of the tube and the timer shall be started. The combustion boat shall be placed in such a way that the distance between the boat and the exit end of the effective heating zone is  $\geq 300$  mm; the temperature measured at the position of the boat shall be not less than  $935^\circ\text{C}$ . The temperature measured at a position 300 mm from the boat in the direction of the air flow shall be not less than  $900^\circ\text{C}$ .

The combustion procedure under the air flow condition shall be continued for 30 min in the furnace.

**NOTE 2:** The operator should take precautions, i.e. the wearing of eye protection and suitable protective clothing, because certain materials ignite quickly, and can cause 'blow-back' of hot gases. Care should also be taken to avoid over-pressurisation of the system, and to allow for venting of exhaust gases.

After the test, and before determination of the pH and conductivity, the contents of both bottles shall be aggregated in a volumetric flask and made up to 1000 ml using water with the properties given in 5.1.

**NOTE 3:** After removing the combustion boat, the tube has to be cleaned throughout its length by calcination at 950°C.

## 5.5 Determination of the pH value and conductivity

### 5.5.1 *Calibration of the pH meter*

The pH meter shall be calibrated as proposed by the instrument supplier.

### 5.5.2 *Determination of the pH value and conductivity of the solution*

The pH value of the solution shall be determined at room temperature. The pH value shall be read by using the automatic temperature compensation, usually integral with the instrument. Conductivity measurements shall be performed in accordance with the test procedures as prescribed by the supplier.

## 6. Expression of the results

Two test determinations shall be undertaken on each non-metallic individual material to be tested.

The test is considered to be passed if both the pH value of each sample of the material is not less than the specified value and the conductivity does not exceed the specified value.

If one sample fails, the test determination shall be repeated on two further samples of the relevant material. Both repeat samples shall comply with specified limit values.

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