

SLOVENSKI STANDARD

SIST EN 15426:2019

01-februar-2019

Nadomešča:
SIST EN 15426:2008

Sveče - Specifikacija lastnosti saj

Candles - Specification for sooting behaviour

Kerzen - Spezifikation für das Rußverhalten

Bougies - Spécification relative à l'émission de suie

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Ta slovenski standard je istoveten z: EN 15426:2018

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ICS:

75.140	Voski, bitumni in drugi naftni proizvodi	Waxes, bituminous materials and other petroleum products
97.180	Razna oprema za dom in trgovino	Miscellaneous domestic and commercial equipment

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en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15426

November 2018

ICS 71.100.99

Supersedes EN 15426:2007

English Version

Candles - Specification for sooting behaviour

Bougies - Spécification relative à l'émission de suie

Kerzen - Spezifikation für das Rußverhalten

This European Standard was approved by CEN on 15 July 2018.

CEN 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 CEN-CENELEC Management Centre or to any CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 15426:2018) has been prepared by Technical Committee CEN/TC 369 “Candle fire safety”, 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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

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

This document supersedes EN 15426:2007.

It should be noted that the following significant changes compared to the previous edition have been incorporated in this document:

- improved terms and definitions;
- simplified requirement for the sooting behaviour;
- clearer description of test equipment and apparatus;
- clearer description of the test method including improved illustration for setting up the equipment and new illustrated guidance for selecting the wire mesh cylinder;
- modified characteristics of the candles for selecting the soot test cycles;
- new informative Annex B for the calculation of the hourly fuel consumption.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Candles have accompanied mankind for more than 2 000 years serving above all as a light source. Closely connected to the development history of the candle are the efforts made to improve its quality and its safety in use. Discussions in the past and present over possible self-forming, harmful emissions and fires caused by unsafe candles and/or inappropriate use during the burning of candles have led to consumer concern for these issues.

This document describes the requirements and a simple method for measuring the sooting behaviour of candles. The soot index obtained by this procedure may be considered as characteristic of the sooting behaviour of the type of candle tested.

The soot which is emitted from a candle is collected on a glass plate throughout a defined period. Afterwards the attenuation of light intensity caused by soot precipitation is quantified in a measuring chamber.

This method helps to ensure a reasonable degree of safety for normal use, thereby improving personal safety.

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1 Scope

This document specifies requirements and the test method for evaluating the sooting behaviour of burning indoor candles. It is applicable to single wick candles with a diameter up to 100 mm or equivalent cross sectional area intended to be burned indoors.

NOTE Single wick candles with a diameter above 100 mm or equivalent cross sectional area and multiwick candles cannot be evaluated with this test method for technical reasons. Evaluation of the visible release of soot is a possibility for these candles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9044:2016, *Industrial woven wire cloth — Technical requirements and tests*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

base material <https://standards.iteh.ai/catalog/standards/sist/5990a1c0-bd37-4ed4-84a4-7123af39ef2c/sist-en-15426-2019>
intended fuel source for a candle flame

3.2

candle

one or more combustible wicks supported by a material that constitutes a fuel, which is solid or semisolid at room temperature (20 °C to 27 °C) with the main function of sustaining a light-producing flame, including any coatings on and articles or substances in the fuel

3.3

container candle

candle that is produced and used in the same container

Note 1 to entry: This definition includes tea lights.

3.4

freestanding candle

candle that is designed to be used without a supporting holder

3.5

indoor candle

candle intended and designed for use inside a house or a building with typical indoor conditions concerning ventilation, draught and temperature

Note 1 to entry: An outdoor candle is a candle intended and designed to be used outside buildings in the open air.

EN 15426:2018 (E)**3.6****measuring period**

time the candle is burned and soot is collected

3.7**molten fuel pool**

portion of the fuel of a candle that is in the liquid form when the candle is burning

3.8**residual height**

height of the candle, measured from the bottom of the candle to the surface of the molten fuel pool

3.9**soot**

solid, carbon enriched particles, which come into existence when the base material is incompletely burned in the flame and which are subsequently released into the atmosphere

3.10**soot index**

index number for the evaluation of the sooting behaviour of candles

3.11**soot test cycle**

total length of time the candle is burned during the stabilizing period, measuring period, including pause

3.12**stabilizing period**

period of time the candle is burned without collecting soot

3.13**total measuring time**

total time of all measuring periods

3.14**wick**

object that delivers fuel to a flame through the process of capillary action

4 Sooting behaviour

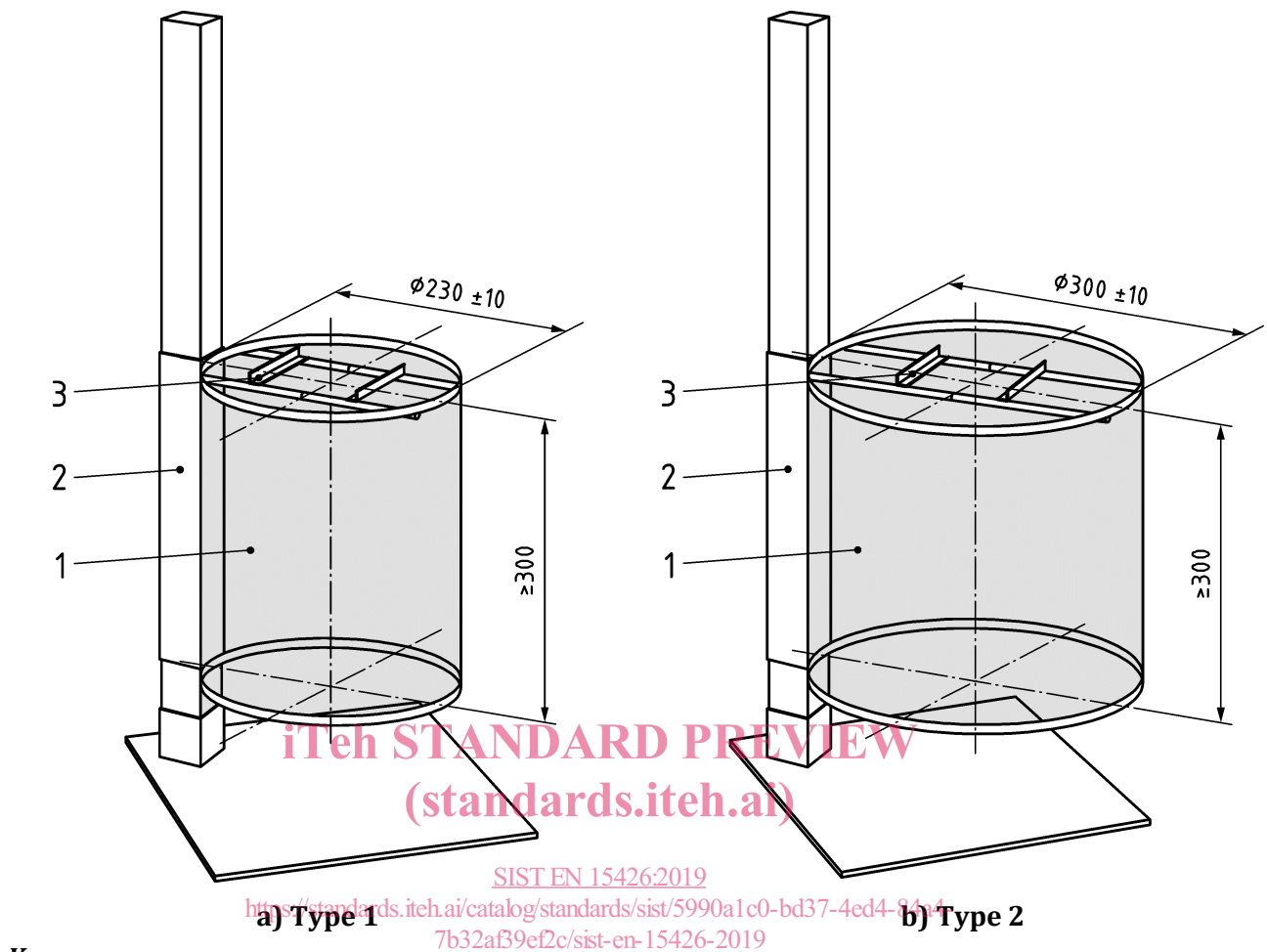
When tested in accordance with Clause 9, the average soot index per hour from three tests (samples) shall be less than 1,0/h.

5 Test equipment and apparatus

5.1 A wire mesh cylinder¹⁾ fixed to a stand of which the height can be adjusted, with a fixture for a glass plate (see Figure 1). The cylinder has a minimum height of 300 mm and consists of wire mesh with an open screening area of $(60 \pm 5) \%$ according to ISO 9044:2016.

¹⁾ Wire mesh cylinder RMG 2.1 is the trade name of a product supplied by Heil Metalle GmbH, Germany. This information is given for the convenience of the user of this European Standard and does not constitute an endorsement by CEN of the product named. Equivalent products may be used.

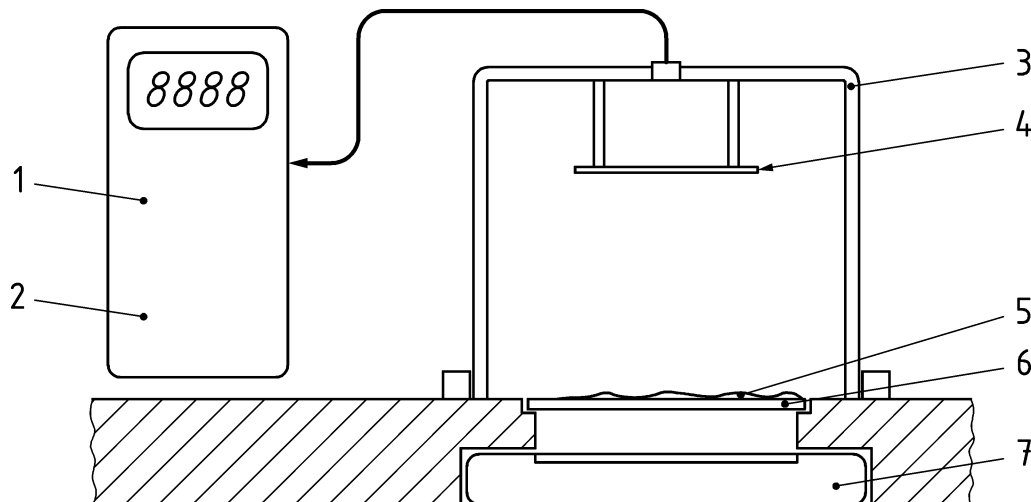
Dimensions in millimetres

**Figure 1 — Wire mesh cylinder**

5.2 Measurement unit (e.g. RMG 2.1²⁾) consisting of an indication instrument and a measuring chamber. The measuring chamber consists of the light source, fixture for the heat resistant glass plate, a cover with light reflecting interior coating (at least 90 % reflectivity) with a photodiode integrated in it, which is connected with the indication instrument (see Figure 2).

NOTE First operation and calibration of the measurement unit refer to Annex A.

2) RMG 2.1 is the trade name of a product supplied by Heil Metalle GmbH, Germany. This information is given for the convenience of the user of this European Standard and does not constitute an endorsement by CEN of the product named. Equivalent products may be used if they can be shown to lead to the same results.

**Key**

- | | |
|----------------------|------------------------------|
| 1 detector current | 2 photometer |
| 3 photo detector | 4 baffle |
| 5 soot precipitation | 6 heat resistant glass plate |
| 7 light source | |

Figure 2 — Measurement unit

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5.3 Heat resistant glass plates, 100 mm × 100 mm, with a thickness of 3,5 mm to 4,5 mm. Each glass plate shall be marked in such a way that it can be easily identified and the marking does not affect the measurement results. The light absorption of these glass plates shall not exceed 25 % [see Formula (1)]. *E* is the individually measured illuminance.

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$$1 - \frac{E_1}{E_0} \leq 0,25 \quad (1)$$

where

E_1 illuminance of the measuring chamber with a cleaned glass plate, in lx;

E_0 illuminance of the empty measuring chamber, in lx.

5.4 Stop watch.

5.5 Balance, precision 0,1 g.

5.6 Rule.

5.7 Fat dissolving detergent.

5.8 Lint free paper towels.

5.9 Pair of scissors.

5.10 Suitable candle holder.

5.11 Additional stand for height adjustment.

5.12 Calibration disk, made of dark neutral density glass (e.g. NG4³⁾) having a wavelength-independent optical absorption coefficient of $(1,20 \pm 0,10) \text{ mm}^{-1}$ and dimensions $(20 \pm 0,3) \times (20 \pm 0,3) \times (2,4 \pm 0,3) \text{ mm}^3$.

6 Sampling

The test shall be carried out on finished candles representative of those intended to be supplied commercially. For the test result to represent a specific candle type, a minimum of three samples shall be tested.

7 Sample preparation

Remove any outer wrapping and label material and prepare the sample for use according to the manufacturer's instructions if any given, e.g. trim the wick. For identification of the sample, measure the dimensions and mass of the candle. The temperature of the sample shall be $(20 \pm 5) ^\circ\text{C}$ before the test is started.

8 General test conditions

The room temperature at which the burning test is to take place shall be $(20 \pm 5) ^\circ\text{C}$. The room shall be draught free. If during the test the temperature is outside the range, the maximum and/or minimum temperature shall be recorded in the test report.

For testing floating candles, the temperature of the water shall be $(20 \pm 5) ^\circ\text{C}$ when the test is started.

NOTE Draught free means that a candle can burn without noticeable disturbance of the flame. If the flame is flickering this can be verified using a reference candle such as a paraffin candle with a diameter of 22 mm. If this reference candle is also flickering there is a draught; if not then the tested candle is flickering due to the candle design or quality.

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9 Test method

9.1 General

In the case of candle designs not catered for in the test procedures, the test should be carried out as far as possible as described and deviations from the test procedure shall be recorded in the test report.

If sooting becomes excessive the measuring may be stopped early.

9.2 Test preparation

The wire mesh cylinder type shall be selected according to Table 1.

The diameter of the candle is measured at the largest cross-section at any point from 50 mm below the bottom of the cylinder to the top of the candle when the candle is placed in correct position for the test, as the air exchange within the cylinder would otherwise be hindered. For non-circular candles the cylinder is selected based on the same cross-section as for the diameter of a circular candle, see Annex C.

³⁾ NG4 is the trade name of a product supplied by Schott AG, Germany. This information is given for the convenience of the user of this European Standard and does not constitute an endorsement by CEN of the product named. Equivalent products may be used if they can be shown to lead to the same results.