BRITISH STANDARD

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Candles — Specification for fire safety

The European Standard EN 15493:2007 has the status of a British Standard

ICS 71.100.99; 97.180

National foreword

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The UK participation in its preparation was entrusted to Technical Committee I/-/1, Miscellaneous standards materials and chemicals.

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Foreword

This document (EN 15493:2007) has been prepared by Technical Committee CEN BT/TF 164 “Candle 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of an identical text or by endorsement, at the latest by May 2008, and conflicting national standards shall be withdrawn at the latest by May 2008.

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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 European Standard helps to ensure a reasonable degree of safety during use, thereby improving personal safety and reducing the risk of fires, deaths and injuries.

1 Scope

This European Standard specifies requirements and test methods for the fire safety of candles intended to be burned indoors.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 15494:2007, *Candles - Candles - Product safety labels*

3 Terms and definitions

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

3.1
base material
intended fuel source for candle flame

3.2
burning period
time the candle burns from initial being lit until it is extinguished

3.3
burn test cycle
total time of a burning period and pause

3.4
candle
one or more combustible wicks supported by a material that constitutes a fuel, which is solid, semisolid or quasi-rigid at room temperature (20 °C to 27 °C)

NOTE 1 It can also contain additives, which are used for colour, odour, stability, or to modify the burning characteristics; the combined function of which is to sustain a light-producing flame.

NOTE 2 Including candles with decoration attached to or contained within the candle.

3.5
container candle
candle which is produced in and will be burned in a container

3.6
flame height
base of the flame to the top of the flame

NOTE See Figure 1.

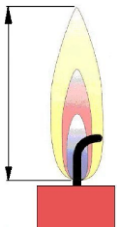

Figure 1 — Flame height

3.7
free-standing candle
candle that is designed to be used without a supporting holder

3.8
molten fuel pool
portion of the wax or fuel pool of a candle that is in liquid form when the candle is burning

3.9
re-ignition
self-ignition of the wick after it has been extinguished

3.10
secondary ignition
self-sustained flame other than that on the intended wick(s), including flash over where the base material's vapours ignite over the molten fuel pool

3.11
self-sustained flame
flame that continues to burn until the fuel source is removed or depleted or requires manual extinguishing

3.12
tea light
cylindrical candle that is burned up in a container which may be suitable to keep vessels containing coffee, tea or other liquids warm, by using a warming stove

NOTE 1 Typical dimensions of a tea light are 38 mm in diameter and 15 in mm height.

NOTE 2 A tea light container can be made from metal, glass or plastic.

3.13
wax
crystalline, plastic solid or semi-solid material at 25 °C consisting of a mixture of hydrocarbons and/or hydrocarbon derivatives

NOTE Wax melts typically at temperatures equal to or greater than 40 °C and becomes a low viscosity liquid. Waxes may be of mineral (particularly petroleum), vegetable, animal (including insect), or synthetic origin.

3.14
wick
object that delivers fuel to a flame through the process of capillary action

4 Safety requirements

4.1 Stability

Free-standing candles shall not tip over when tested on a slope of 10 ° according to 9.2.

4.2 Secondary ignition

No secondary ignition shall occur for more than 10 s, when the candle is burned according to 9.3.

NOTE Wick remaining in the molten fuel pool is considered as a potential source for secondary ignition.

4.3 Flame height

The flame height for all candle types, except tea lights, shall not exceed 75 mm. The flame height for tea lights shall not exceed 30 mm. Test method see 9.4.

NOTE The natural tendency of a candle is for the flame height to vary during the burn life. The maximum allowable flame height requirement in this standard takes into account such variation and anticipates that manufacturers will design candles to ensure that they remain below the maximum flame height requirement throughout the burning. Furthermore, the manufacturer should determine the appropriate lower flame height for optimum performance for individual candle types.

4.4 Behaviour by self-extinguishing at the end of the burning process

Container candles and candles marketed as self-extinguishing shall, at the end of the burning time, self extinguish and, in the case of container candles, not cause the container to break.

4.5 Re-ignition after extinguishing

The wick shall not continue to glow or smoke for more than 20 s after extinguishing. After extinguishing the candle shall not spontaneously re-light. For the test method see to 9.3.

5 Test equipment and apparatus

5.1 **Incline plane** (fixed or adjustable) with an angle of (10 ± 0,2) ° from a horizontal level.

5.2 **Measuring device**, non flammable with millimetre grading.

5.3 **Candle extinguisher**, type “snuffer”.

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 3 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 dimension and the mass of the candle. The temperature of the sample shall be (20 ± 5) °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 ± 5) °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 of floating candles, the temperature of the water shall be (20 ± 5) °C when the test is started.

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

9 Test methods

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.

9.2 Stability test

Place the prepared, unlit candle on an incline plane (5.1) in the orientation most likely to cause tipping at (10 ± 0,2) ° from level. Rotation around the candle's vertical axis may be necessary to determine the stability of an asymmetrical candle.

9.3 Burning test

Follow the instructions for use, if any. If no instructions are given, the following shall apply:

Place each candle in an upright position on a heat resistant, non flammable surface. Non free-standing candles are placed in a suitable candleholder which does not affect the burning property of the candle. Free-standing candles are placed on a surface that does not affect the burning property. Floating candles are placed in a suitable bowl filled with water.

When testing multiple samples all candles, except for floating candles, shall be separated by the distance specified by the manufacturer's instructions, see EN 15494:2007, Figure 3 (edge to edge). The specified distance between samples does not apply to floating candles.

Position the wick in an upright position and light the candle without contaminating the candle by the ignition source.

Burn the candles according to the burn test cycle specified in Table 1. Use a candle extinguisher (5.3) to extinguish candles.

Table 1 — Burn test cycles

Type of candle	Burn test cycle
Floating candles, container candles and candles marketed as self-extinguishing with a mass below 40 g (including tea lights)	Burn candle continuously until self-extinguishing.
Floating candles and container candles with a mass above 40 g	Burn candle 4 h, pause for minimum 1 h. Continue to burn in cycles until self- extinguishing.
Candles with a mass below 40 g (excluding floating candles and container candles)	Burn candle continuously until a residual height of 10 mm.
Candles with a mass above 40 g (excluding floating candles and container candles)	Burn candle 4 h, pause for minimum 1 h. Continue to burn in cycles until a residual height of 20 mm.

Visual observations are made 5 min after ignition, at least at hourly intervals throughout the burning period, at extinguishing and self-extinguishing, when applicable.

9.4 Flame height

The flame height (whole visible part of the flame, see 3.6) is measured and recorded 5 min after ignition and before extinguishing in each burning period. If the flame appears to approach the maximum allowable flame height at other times, it shall also be measured and recorded. For candles with a total burning time less than one specified burning period, the flame height is measured and recorded at least twice.

NOTE In a burning period where a candle is burning until self-extinguishing, the flame height will gradually become lower as the fuel source becomes depleted. This behaviour is to be considered when time for measuring the flame height, before end of life, is defined for this type of candle.

10 Test report

The test report serves to identify the tested candle and to record the test results.

The test report shall include the following details:

a) reference to the number and year of publication of this European Standard (EN 15346:2007);

b) details of the test sample (e. g. identification, dimensions, mass);

c) any defects identified during sample preparation;

d) test results according to this European Standard;

e) details of any deviation from this European Standard;

f) name and address of the test facility;

g) date of the test.

Bibliography

[1] EN 15426, Candles - Specification for sooting behaviour

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