



# SLOVENSKI STANDARD

## SIST EN 16738:2016

01-februar-2016

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### Emisijska varnost vnetljivih snovi v osvežilnikih zraka - Preskusne metode

Emission safety of combustible air fresheners - Test methods

Emissionssicherheit brennbarer Lufterfrischer - Testverfahren

Sécurité des émissions des désodorisants combustibles - Méthodes d'essais

Ta slovenski standard je istoveten z: **EN 16738:2015**

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#### **ICS:**

13.040.20      Kakovost okoljskega zraka      Ambient atmospheres

**SIST EN 16738:2016**

**en,fr,de**

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EUROPEAN STANDARD

EN 16738

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2015

ICS 13.040.20

English Version

## Emission safety of combustible air fresheners - Test methods

Sécurité des émissions des désodorisants à combustion  
- Méthodes d'essais

Emissionssicherheit brennbarer Lufterfrischer -  
Testverfahren

This European Standard was approved by CEN on 17 October 2015.

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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## European foreword

This document (EN 16738:2015) has been prepared by Technical Committee CEN/TC 421 “Project Committee - Emission safety of combustible air fresheners”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by May 2016.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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**EN 16738:2015 (E)****1 Scope**

This European standard specifies a test method for the determination of emissions resulting from the use of combustible air fresheners into indoor air by means of chamber operation according to EN ISO 16000-9.

This standard defines specific testing conditions for the measurement of the emissions from combustible air fresheners which minimize the effect of the testing on the combustion process.

This standard provides a measurement method for the determination of the following non-exhaustive list of target substances emitted directly from the burning process:

- VOC;
- Benzene;
- Naphthalene;
- Formaldehyde.

The measurement method can allow the determination of other substances.

This standard provides additional information on the optional measurement of the following substances:

- SO<sub>2</sub>;
- NO<sub>x</sub>;
- CO.

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This standard is not suitable for the quantitative determination of particulate matter.

This standard does not apply to non-combustible air fresheners and loose incenses.

Any scented candle with burning time shorter than 2,5 h is outside the scope of the standard.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 717-1, *Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method*

EN 14211, *Ambient air - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence*

EN 14212, *Ambient air - Standard method for the measurement of the concentration of sulphur dioxide by ultraviolet fluorescence*

EN 14626, *Ambient air - Standard method for the measurement of the concentration of carbon monoxide by non-dispersive infrared spectroscopy*

EN 14789, *Stationary source emissions - Determination of volume concentration of oxygen (O<sub>2</sub>) - Reference method - Paramagnetism*

EN 14792, *Stationary source emissions - Determination of mass concentration of nitrogen oxides (NO<sub>x</sub>) - Reference method: Chemiluminescence*

EN 15058, *Stationary source emissions - Determination of the mass concentration of carbon monoxide (CO) - Reference method: Non-dispersive infrared spectrometry*

EN 15426, *Candles - Specification for sooting behaviour*

EN ISO 16000-9, *Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method (ISO 16000-9)*

EN ISO 16017-1, *Indoor, ambient and workplace air - Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography - Part 1: Pumped sampling (ISO 16017-1)*

ISO 16000-3, *Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method*

ISO 16000-6, *Indoor air — Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID*

### 3 Terms and definitions

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

#### 3.1

##### **combustible air freshener**

product constituted by a fragranced combustible material which by action of combustion releases in the air smelling substances which it contains (e.g.: scented candle, incense, catalytic lamp, etc.)

#### 3.2

##### **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), the combined function of which is to sustain a light-producing flame

Note 1 to entry: It can also contain additives, which are used for colour, odour, stability, or to modify the burning characteristics; including candles with decoration attached to or contained within them.

#### 3.2.1

##### **scented candle**

candle in the fuel of which a fragrance intended to be released is added

#### 3.3

##### **indoor air**

air within an enclosed space, e.g. dwelling or public building

#### 3.4

##### **scented oil lamp (for indoor use)**

container in which scented oil is burned at the wick

**EN 16738:2015 (E)****3.5****incense**

dried plants (herbs or wood) which are pulverized and mixed with resins

Note 1 to entry: The sticks in incense sticks may be of sandalwood, bamboo or similar material that has the ability to burn together with the wrapped plant ingredients. Some incense mixtures are composed of dried and finely chopped herbs, woods and roots, others from resins and balsams as small pellets or granules. Incense may be mixtures but may also consist of one single type of incense based on single plants or plant parts. Besides, natural or synthetic essential oils can be added. Four common types of incense exist: loose incense (granulate or powder), cones, incense sticks with and without solid stick.

**3.6****catalytic lamp**

system based on the catalytic combustion of a combustible liquid by using a catalytic burner composed of porous material which is made of synthetic or mineral materials

Note 1 to entry: The product requires also a wick that feeds the burner from the liquid container by capillarity, a cap designed to stop operation of the catalytic lamp and openwork mounting for protection and ventilation.

The catalytic lamp diffuses perfume and combustibles in the air. It perfumes and destroys smells, at the same time.

**3.6.1****catalytic burner**

burner composed of a porous material made from synthetic or mineral material and a specific catalyst in the catalytic oxidation of solvent which favours the production of carbon dioxide and water

**3.7****unit specific emission rate** **$SE_{R_u}$** 

product specific rate describing the mass of a volatile organic compound emitted per unit ( $u$ ) of combustible air freshener per unit of time at a given time from the start of the test

**3.8****burn rate****BR**

mass of material burned per unit of time under test conditions

**3.9****background of the test chamber**

emission level of the test chamber operated with all the equipment except the specimen

**3.10****test specimen**

sample intended for emission testing in an emission test chamber

**4 Test methods****4.1 Principles**

The principle of the test is to determine the unit specific emission rate ( $SE_{R_u}$ ) of emissions resulting from the use of combustible air fresheners. The test is performed under controlled conditions in an emission test chamber according to EN ISO 16000-9. The air in the emission test chamber is fully mixed and measurements of a substance concentration in the air at the test chamber outlet are representative of the emission test chamber concentrations for that substance.



Unit specific emission rates,  $SER_U$ , at a given time,  $t$ , are calculated from the emission test chamber air concentrations,  $C$ , the air change rate,  $n$ , and number of test specimens at the same time in the test chamber,  $N$ . With knowledge of the concentration in the outlet air, the air flow through the emission test chamber and the number of the test specimens, the unit specific emission rates of emissions from the product under test can be determined.

## 4.2 Apparatus

Dynamic environmental emission test chamber according to EN ISO 16000-9, and a suitable number of wire mesh cylinders type 2 according to EN 15426.

## 4.3 General test conditions

### 4.3.1 General

Combustible air fresheners are ignited and burned in the test chamber using the parameters specified in Table 1 until a state of equilibration is reached.

Dynamic emission test chamber according to EN ISO 16000-9 using inlet air at 23 °C and 50 % relative humidity with 2 air changes per hour.

If the burn rates data outside the chamber are not available the data can be provided by a burning test run outside the test chamber and for candles it will be according to EN 15426 for the minimum testing time in the test chamber.

The test protocol and test conditions of the chamber experiment are defined in such a way that standardized (well controlled) burning processes inside the chamber are guaranteed.

Parameters to be controlled are: (standards.iteh.ai)

- air mixing inside the chamber;
- avoidance of disturbance of the flame, burning in draught free conditions and no flickering;
- composition of the stand on which the candle is positioned;
- temperature;
- relative humidity;
- oxygen concentration.

### 4.3.2 Test chamber volume

The test chamber volume shall be  $1,0 \text{ m}^3 \pm 0,1 \text{ m}^3$ .

Test chambers with larger volumes may be accepted provided that sufficient data support evidence of comparable results. Sufficient data requires a validation study with a minimum of 10 comparative tests between a  $1 \text{ m}^3$  chamber and another chamber and successful participation in the Round Robin Test with a minimum of 5 participating laboratories.

### 4.3.3 Number of test specimens at the same time in the test chamber

Number of test specimens as defined in Table 1.