SLOVENSKI STANDARD
oSIST prEN ISO 12863:2021

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Standardna preskusna metoda za ocenjevanje nagnjenosti k vžigu cigaret (ISO/DIS 12863:2021)

Standard test method for assessing the ignition propensity of cigarettes (ISO/DIS 12863:2021)

Normprüfverfahren zur Beurteilung der Zündneigung von Zigaretten (ISO/DIS 12863:2021)

Méthode d'essai normalisée pour évaluer le potentiel incendiaire des cigarettes (ISO/DIS 12863:2021)

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13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
65.160	Tobak, tobačni izdelki in oprema	Tobacco, tobacco products and related equipment

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Standard test method for assessing the ignition propensity of cigarettes

Méthode d'essai normalisée pour évaluer le potentiel incendiaire des cigarettes

ICS: 13.220.40; 65.160

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Foreword

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This document was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

This second edition cancels and replaces the first edition (ISO 12863:2010, AC:2011, AMD 1:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

— an new normative Annex G “Physical parameters of filter paper substrates for the determination of ignition propensity testing of cigarettes” was added

— Bibliography was updated

This International Standard is based, with permission from ASTM International, on ASTM International E2187, *Standard Test Method for Measuring the Ignition Strength of Cigarettes*, copyright ASTM International.

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Introduction

A very common initiating event in a fatal fire is the dropping of a cigarette onto a bed or piece of upholstered furniture. The burning cigarette heats the furnishing materials to the point where smouldering combustion begins, perhaps followed by a transition to flaming combustion. Since limiting the frequency of ignitions is a principal approach to reducing fire loss, it is desirable to establish a test method for the propensity of a cigarette to ignite soft furnishings.

The International Organization for Standardization (ISO) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

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Standard test method for assessing the ignition propensity of cigarettes

WARNING — This International Standard involves the use of combustible materials that are exposed to ignition sources. The burning materials emit toxic combustion products. The user shall take proper precautions to avoid thermal injury and inhalation of combustion products. The user shall ensure that all burning has ceased before safely discarding test materials.

1 Scope

This International Standard provides a standard assessment of the capability of a cigarette, positioned on one of three standard substrates, to extinguish or to generate sufficient heat to continue burning, and thus potentially cause ignition of bedding or upholstered furniture. This International Standard is applicable to factory-made cigarettes that burn along the length of a tobacco column. This is a performance-based standard; it does not prescribe any design features of the cigarette that might lead to improved or degraded performance in the test method. The output of this method has been correlated with the potential for cigarettes to ignite upholstered furniture.

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.

ASTM E2187, *Standard Test Method for Measuring the Ignition Strength of Cigarettes*

ISO 8243, *Cigarettes — Sampling*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943 and the following apply.

3.1
determination
single measurement involving a lit cigarette placed on a selected substrate

3.2
full-length burn
outcome of a determination in which the cigarette continues to burn to or past the front plane of the tipping paper (filter tip cigarettes) or past the tips of the metal pins for non-filter tip cigarettes

3.3
no full-length burn
outcome of a determination in which the cigarette ceases to burn before reaching the front plane of the tipping paper (filter tip cigarettes) or the tips of the metal pins for non-filter tip cigarettes

3.4
substrate (for cigarette testing)
horizontal surface consisting of layers of filter paper on which a test cigarette is placed for testing

3.5
test
set of 40 determinations

4 General principle

This test method measures the probability that a cigarette, placed on a heat absorbing substrate, will generate sufficient heat to maintain burning of the tobacco column and potentially initiate a fire. Each determination consists of placing a lit cigarette on one of three standard substrates (3, 10, or 15 layers of filter paper). Observation is made of whether or not the cigarette continues to burn nominally the length of the tobacco column, as defined in this International Standard. Forty determinations (comprising a test) are performed to obtain the relative probability that the cigarette will continue burning despite heat abstraction by the substrate.

For use of semi-automated/fully automated systems to perform the test, see Annex F.

5 Apparatus

5.1 General description

An apparatus consists of a holder for the filter paper substrate, a metal rim to compress the layers of filter paper, a clear enclosure to protect the test specimens from air currents, and associated accessories, as defined in this clause. The materials of construction shall meet occupational health and safety requirements. The apparatus shall be placed under a fume hood to minimize the exposure of personnel to combustion products. Technical drawings of the test chamber are provided in Annex A.

5.2 Test and conditioning environment

5.2.1 General

Cigarettes and filter paper shall be conditioned in one of the two ways described in 5.2.2 and 5.2.3.

5.2.2 Conditioning room

An environmental conditioning room shall be maintained which provides an area adequate for conditioning both cigarettes and filter paper specimens. This room shall be capable of maintaining a relative humidity of (55 ± 5) % and a temperature of (23 ± 3) °C and shall be continuously monitored. The room in which the tests are conducted, which may also be the conditioning room, shall be maintained within the same temperature and relative humidity ranges.

NOTE These conditioning requirements are consistent with those used for fire safety testing. Other types of testing can require different conditioning requirements.

5.2.3 Conditioning box

Alternatively, cigarettes and filter paper shall be stored in a box of sufficient size to hold the needed quantities of filter paper and cigarettes. The interior of the box shall be maintained at the same temperature and relative humidity conditions as in 5.2.2 and shall be continuously monitored. A tray containing a saturated solution of sodium bromide (NaBr) in water will provide the appropriate relative humidity when the box temperature is as prescribed. The box shall be located convenient to the test chamber such that test materials shall not be exposed to a non-conditioned environment for more than 5 min between their removal from the box and the beginning of a determination.

5.3 Test chamber

A rectangular test chamber with a chimney that can be placed under an exhaust hood (5.8) shall be constructed of clear, rigid material that allows observation of the entire determination.

NOTE Clear polymethylmethacrylate (PMMA) has been found suitable for this purpose.

The inside dimensions of the test chamber shall be: height (340 ± 25) mm, width (292 ± 6) mm and depth (394 ± 6) mm. The full front panel of the chamber shall be hinged, with a latch to effect positive closure. The top of the chamber shall have a flattop cylindrical chimney of height (165 ± 13) mm and inside diameter (152 ± 6) mm. The chimney shall be centred on the chamber top and sealed to the chamber top panel. A sheet of rigid material shall be used to cover the chimney when required in the test procedure (Clause 9). The chamber shall be supported on four feet, located near each corner, each approximately 15 mm in height. Technical drawings of the test chamber are provided in Annex A.

5.4 Substrate holder

A cylindrical support for the layers of circular filter paper shall be made of rigid material.

NOTE Clear polymethylmethacrylate (PMMA) has been found suitable for this purpose.

The outer diameter of the substrate holder shall be (165 ± 1) mm, the inner diameter shall be (127 ± 1) mm, and the height shall be (50 ± 1) mm. A recess in the top, (10 ± 2,5) mm deep, shall expand the inner diameter to (152 ± 1) mm. Three or four legs shall raise the bottom of the holder approximately (20 ± 1) mm above the chamber floor. Technical drawings of the holder are provided in Annex A.

5.5 Metal rim

A circular metal rim, made of brass with a density of (8 550 ± 150) kg·m^{-3} or other, equally dense material shall be used to hold the sheets of filter paper flat against each other. The outside diameter of the rim shall be (150 ± 1) mm and shall not exceed the inner diameter of the recess in the substrate holder. The inner diameter shall be (130 ± 2) mm. The thickness shall be (6,4 ± 1) mm. The mass shall be between 235 g and 295 g. The rim surfaces shall be flat and smooth. A pair of parallel metal pins, each approximately 1 mm in diameter and whose inner distance is (8,1 ± 0,05) mm apart, shall be located (3,2 ± 0,05) mm from the bottom of the rim and shall protrude (17 ± 1) mm toward the centre of the rim. The pins shall be spaced to prevent the non-ignited end of a conventional 25 mm circumference cigarette from rolling, but without pressuring the cigarette. If cigarettes of significantly different diameter are to be tested, other pairs of pins, appropriately spaced, shall be inserted into the rim. Technical drawings of the rim are provided in Annex A. Information on the placement of additional pins is provided in Annex B.

5.6 Cigarette holder

A holder shall be used to support the lit cigarette in a horizontal position in the test chamber prior to placement of the cigarette onto the substrate. The holder shall not clamp the cigarette or stress it in any other manner, nor shall it contact the cigarette within 30 mm of its lit end.

5.7 Cigarette ignition system

A system consisting of an air draw component and an ignition source shall be used to ignite the test cigarettes. The cigarette shall be supported in a horizontal position. A butane gas lighter capable of producing a stable, luminous flame or a hot element igniter shall be used for lighting the cigarette. The air flow and the draw time through the cigarette shall be sufficient to light the cigarette and continue the combustion to within ± 1 mm of the mark 5 mm from the original tip of the cigarette.

5.8 Exhaust hood

A chemical or canopy hood shall be used for removing combustion products from the test room. Air flow through the hood shall be sufficient to remove cigarette and substrate combustion products while not being high enough to influence the combustion processes in the test chamber(s) (see 6.3).

6 Verification of test equipment

6.1 Frequency of verification

Verification of equipment shall be carried out as noted below and at any time when equipment or test conditions indicate that evaluation and re-calibration are necessary. The time intervals for verifications stated in this method shall be considered to be the minimum.

6.2 Examination for chamber leakage

The test chamber shall be checked before use to minimize air leakage so that the smoke plume from a cigarette rises undisturbed during testing. Door seals shall be checked visually to ensure that they are closed flush against the chamber's side wall and the latching device secures the door tightly. All construction seams shall be inspected to ensure they are airtight and no cracks shall be visible on any surface of the test chamber.

6.3 Stability of chamber atmosphere

The stability of the air inside the test chamber shall be determined by placing a lit cigarette in the test position on three or more layers of filter paper, then closing the chamber door. Air movement in the chamber shall be observed to ensure that smoke being emitted by the cigarette is rising vertically and is not showing turbulence within nominally 150 mm above the lit end of the cigarette. This operation shall be conducted prior to use on each day of testing.

If turbulence is noted, then:

a) the test chamber shall be checked for leaks;

b) the test chamber locations shall be evaluated for excess air flow in the laboratory;

c) the air flow of the exhaust system shall be evaluated as the source of the disturbance.

All sources of the turbulence shall be corrected prior to starting testing.

6.4 Humidity and temperature sensors

It shall be assured that the humidity and temperature sensors used to record environmental conditions in the test room, and the conditioning room or conditioning box are operating with the required accuracy. Temperature and humidity shall be validated by using sensors calibrated with a traceable standard. This shall be performed at least weekly unless otherwise prescribed.

NOTE An inaccurate sensor might lead to the rejection of all test data since the last verification of accuracy. One way to lessen this possibility is the use of two independent sensors for temperature and two independent sensors for relative humidity.