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# Textiles — Fibres — Determination of burning behaviour by oxygen index

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# National foreword

This British Standard is the UK implementation of ISO 7249:2024.

The UK participation in its preparation was entrusted to Technical Committee TCI/100, Co-ordination of activities in textiles and clothing.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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# Textiles — Fibres — Determination of burning behaviour by oxygen index

*Textiles — Fibres — Détermination du comportement au feu au moyen de l'indice d'oxygène*

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# Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 23, *Fibres and yarn*.

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# Textiles — Fibres — Determination of burning behaviour by oxygen index

**WARNING — The use of this document can involve hazardous materials, operations and equipment. It does not purport to address all of the safety or environmental problems associated with its use. It is the responsibility of users of this document to take appropriate measures to ensure the safety and health of personnel and the environment prior to application of the document.**

## 1 Scope

This document specifies a test method for the determination of burning behaviour of textile fibres by oxygen index.

This document is only used for the purpose of testing burning behaviour of textile fibres under conditions of this test, controlling quality of the products, or studying the factors causing the fire of some particular textile fibres. It is not used for assessing fire risk in their actual use.

## 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 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 2060, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method*

ISO 2061, *Textiles — Determination of twist in yarns — Direct counting method*

ISO 4589-1, *Plastics — Determination of burning behaviour by oxygen index — Part 1: General requirements*

ISO 4589-2:2017, *Plastics — Determination of burning behaviour by oxygen index — Part 2: Ambient-temperature test*

ISO 4880, *Burning behaviour of textiles and textile products — Vocabulary*

ISO 6741-3:1987, *Textiles — Fibres and yarns — Determination of commercial mass of consignments — Part 3: Specimen cleaning procedures*

## 3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 4589-1 and ISO 4880 apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp/ui

— IEC Electropedia: available at https://www.electropedia.org/

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## 4 Principle

A test specimen is fixed vertically in a transparent chimney with upward flowing oxygen mixture gas. The top end of the test specimen is ignited and its burning behaviour is observed. The burning length or burning duration is compared with the given criterion.

The minimum oxygen concentration is estimated by a series of experiments at different volume fractions of oxygen.

## 5 Apparatus

The usual laboratory apparatus and, in particular, the following shall be used.

**5.1 Test chimney**, as specified in ISO 4589-2:2017, 5.1.

**5.2 Test specimen holder,** to support a test specimen vertically, which is fixed on the axial central position of the test chimney.

The clamping position is at least 15 mm away from the nearest point where the test specimen can burn.

It is recommended that the frame of the test specimen holder is smooth to minimize induction of turbulence in the rising flow gas.

**5.3 Gas supplies,** shall comprise pressurized sources of oxygen and nitrogen or other gases mixed with oxygen.

When using gas flow meter to control the oxygen concentration (volume fraction), gas supplies shall comprise pressurized sources of oxygen and nitrogen, both with a purity not less than 99,99 %.

When using oxygen analyser to control the oxygen concentration (volume fraction), gas supplies shall comprise pressurized sources of oxygen and/or nitrogen not less than 98 % (mass fraction) pure and/or clean air [containing 20,9 % (volume fraction) oxygen], as appropriate.

**5.4 Gas control devices,** with a suitable gas flow meter or oxygen analyser measures the oxygen concentration (volume fraction) in the gas mixture with an accuracy of ±0,5 %.

When the gas flow rate within the test chimney is (40 ± 2) mm/s at temperature [10 °C, 30 °C], the precision of concentration adjustment is ±0,1 %.

There are needle valves, calibrated orifices, gas pressure regulators, pressure gauges, flow meters on every gas supply line.

It is equipped with a calibrated flow meter to indicate the flow rate of gas through the test chimney is within the required limits.

Equipment shall be regularly calibrated in accordance with ISO 4589-2:2017, Annex A.

A typical test system for oxygen index is shown in Figure 1 or Figure 2.

Other apparatus specified in ISO 4589-2:2017, 5.4, may be used for the test provided that equivalent results are obtained.

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