



BSI Standards Publication

Space systems — Safety and compatibility of materials

Part 2: Determination of flammability of electrical-wire insulation and accessory materials

National foreword

This British Standard is the UK implementation of [ISO 14624-2:2023](#). It supersedes [BS ISO 14624-2:2003](#), which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/68, Space systems and operations.

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

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Space systems — Safety and compatibility of materials —

Part 2: Determination of flammability of electrical-wire insulation and accessory materials

Systèmes spatiaux — Sécurité et compatibilité des matériaux —

*Partie 2: Détermination de l'inflammabilité des systèmes d'isolation
des fils électriques, et des matériaux accessoires*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

This second edition cancels and replaces the first edition ([ISO 14624-2:2003](http://www.iso.org/iso/14624-2:2003)), which has been technically revised.

The main changes are as follows:

- updated [6.3.5](#) "Resistance meter";
- updated the Bibliography.

A list of all parts in the ISO 14624 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In this document, the following verbal forms are used:

- “shall” indicates a requirement;
- “should” indicates a recommendation;
- “may” indicates a permission;
- “can” indicates a possibility or a capability.

Recommended criteria are, while not mandatory, considered to be of primary importance in providing serviceable economical and practical designs. Deviations from the recommended criteria may be made only after careful consideration, extensive testing and thorough service evaluation have shown an alternative method to be satisfactory.

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Space systems — Safety and compatibility of materials —

Part 2:

Determination of flammability of electrical-wire insulation and accessory materials

1 Scope

This document specifies two test methods for determining the flammability of electrical-wire insulation and accessory materials by exposure to an external ignition source in a static environment (test A) and in a gas-flow environment (test B). These tests determine if a wire insulation material, when exposed to a standard ignition source, will self-extinguish and not transfer burning debris which can ignite adjacent materials.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1

ambient conditions

test environment with an oxygen concentration of $20,9 \% \pm 0,2 \%$, a pressure of $101,4 \text{ kPa} \pm 5 \text{ kPa}$, and a temperature of $23 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$

[SOURCE: ISO 14624-1:2023, 3.1]

3.2

burn length

distance from the ignition location (point directly above the igniter) to the farthest evidence of flame consumption damage or flame attachment point to the test specimen's insulation material as determined by visual observation, visual/physical post-test examination, video of burn, and/or other means

Note 1 to entry: See [Table 1](#) and [Figure 2](#). The burn length distance includes areas of partial or complete combustion, charring or embrittlement, but does not include heat affected areas which can have been damaged only by the heat of the flames emanating from sample consumption below. Heat affected areas appear as sooted, stained, warped or discoloured, or areas where the material has shrunk or melted away from the heat. In some cases, the flame can propagate beyond the farthest evidence of damage to the test specimen.

Table 1 — Burn length assessment characteristics and techniques summary

Burn length / Flame consumption damage	Heat affected damage area	Burn length determination techniques
Complete combustion	Sooted	Visual observation

Table 1 (continued)

Burn length / Flame consumption damage	Heat affected damage area	Burn length determination techniques
Partial combustion	Stained	Visual post-test examination
Charring	Warped	Physical post-test examination
Embrittlement	Melted away from heat	Video of burn
Furthest flame attachment point	Shrunk away from heat	Other means

3.3
burn propagation time

time that elapses from ignition of the specimen until vertical flame propagation stops

[SOURCE: ISO 14624-1:2023, 3.3]

3.4
chemical ignitor

ignitor validated to strict specifications in order to produce a flame that meets all the requirements for an ignition source

Note 1 to entry: The requirements for the ignition source are specified in 5.3.3. See Annex A for one method of producing a chemical ignitor.

[SOURCE: ISO 14624-1:2023, 3.4, modified — In note 1 to entry, the cross-reference to 6.3 has been replaced by 5.3.3.]

3.5
good laboratory practice
GLP

practice which involves the testing of standard reference materials to verify data accuracy and repeatability

Note 1 to entry: In addition, the test facility shall successfully demonstrate the ability to obtain repeatable data when testing a selected material. The authority having jurisdiction shall choose appropriate GLP materials and shall determine the frequency of testing these materials for its test facilities.

[SOURCE: ISO 14624-1:2023, 3.5]

3.6
self-extinguish

phenomenon in which the *burn length* (3.2) on a *standard test specimen* (3.7) does not exceed 150 mm

[SOURCE: ISO 14624-1:2023, 3.7]

3.7
standard test specimen

representative part of a wire with insulation materials, taken from a quantity of material or fabricated per required preparation method, with a length of 1,2 m and an active length of 300 mm

Note 1 to entry: See 5.3.2.1 to 5.3.2.3.

Note 2 to entry: Wire configuration and end use application should be considered in determining what constitutes a representative test specimen. Features such as wire conductor size, number of conductors, insulation materials, insulation thickness can impact flammability.

3.8
transfer of burning debris

movement of any material from a burning specimen with sufficient energy to ignite adjacent material

Note 1 to entry: The sheet of paper below the test specimen is specified in 5.3.8.