
**Space systems — Safety and
compatibility of materials —**

Part 4:

**Determination of upward flammability of
materials in pressurized gaseous oxygen
or oxygen-enriched environments**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Systèmes spatiaux — Sécurité et compatibilité des matériaux —

*Partie 4: Détermination de l'inflammabilité verticale des matériaux dans
des environnements d'oxygène gazeux pressurisé ou enrichis en
oxygène*

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9095-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 14624-4:2003

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

© ISO 2003

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Conformance	1
3 Terms and definitions	1
4 Principle	1
5 Reagents	2
6 Test system	2
7 Test specimens	4
8 Procedure	5
9 Accuracy	6
10 Test report	6
11 Good laboratory practice	6
Annex A (informative) Competency and accreditation of test facilities	7
Bibliography	8

ISO 14624-4:2003
<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 14624-4 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

ISO 14624 consists of the following parts, under the general title *Space systems — Safety and compatibility of materials*:

- *Part 1: Determination of upward flammability of materials*
- *Part 2: Determination of flammability of electrical-wire insulation and accessory materials*
- *Part 3: Determination of offgassed products from materials and assembled articles*
- *Part 4: Determination of upward flammability of materials in pressurized gaseous oxygen or oxygen-enriched environments*
- *Part 5: Determination of reactivity of materials with aerospace propellants*
- *Part 6: Determination of reactivity of processing materials with aerospace fluids*
- *Part 7: Determination of permeability of materials to aerospace fluids*

Introduction

Throughout this part of ISO 14624, the minimum essential criteria are identified by the use of the imperative or the key word “shall”. Recommended criteria are identified by the use of the key word “should” and, while not mandatory, are 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 14624-4:2003

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

ISO 14624-4:2003

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

Space systems — Safety and compatibility of materials —

Part 4:

Determination of upward flammability of materials in pressurized gaseous oxygen or oxygen-enriched environments

1 Scope

This part of ISO 14624 specifies a test method for determining the flammability of aerospace materials in pressurized gaseous oxygen (GOX) and oxygen-enriched environments, at ambient temperature. This method may also be used to provide supplementary information by testing at pressures other than the intended use pressure (see Clause 4). The standard pressure range for this test method is from ambient to 69 000 kPa.

2 Conformance

The tests shall be performed in an accredited test facility (see Annex A for guidelines).

The authority having jurisdiction, or the test requester, shall provide properly identified material(s) for testing. Alternatively, accredited test facilities may be authorized by the test requester to procure the appropriate material(s).

3 Terms and definitions

ISO 14624-4:2003

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

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

3.1

burn length

length of specimen that has been consumed by combustion

NOTE The burn length is determined by subtracting the post-test specimen length from the pre-test specimen length.

3.2

flammable material

a material is considered to be flammable at a specific pressure if at least one specimen burns more than 150 mm at that pressure

3.3

good laboratory practice

GLP

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

4 Principle

In a high-pressure test chamber containing a specific test environment, an ignition source, delivering a defined amount of energy, is applied to the lower end of a vertically oriented test specimen. The maximum post-test burn length for at least 10 standard-sized specimens is recorded. Materials are considered flammable at a specific pressure if at least one specimen burns more than 150 mm. Tests shall be conducted at ambient temperature, in gaseous oxygen or oxygen-enriched environments. The test pressure shall simulate the worst-case environment in which ignition and combustion of the material are likely to occur. To obtain

supplementary information, as well as provide a direct comparison between all the materials tested, specimens may be tested at the appropriate pressures selected from those given in Table 1.

Table 1 — Test pressures

Test pressure kPa
100
170
350
690
1 700
3 500
6 900
14 000
21 000
35 000
52 000
69 000

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5 Reagents

5.1 Gases, used for the tests.

[ISO 14624-4:2003](https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003)

<https://standards.iteh.ai/catalog/standards/sist/e5613510-9093-4d46-9c0f-169cedcc5d3b/iso-14624-4-2003>

6 Test system

6.1 Test chamber and associated equipment, capable of providing a pressure of up to 69 000 kPa, and having a volume such that no more than 5 % of the available oxygen is consumed during the test. In addition, the test chamber shall not interfere chemically or physically with the test.

6.2 Specimen holder, capable of being attached to the top of the specimen and holding it in a vertical position (see Figure 1).

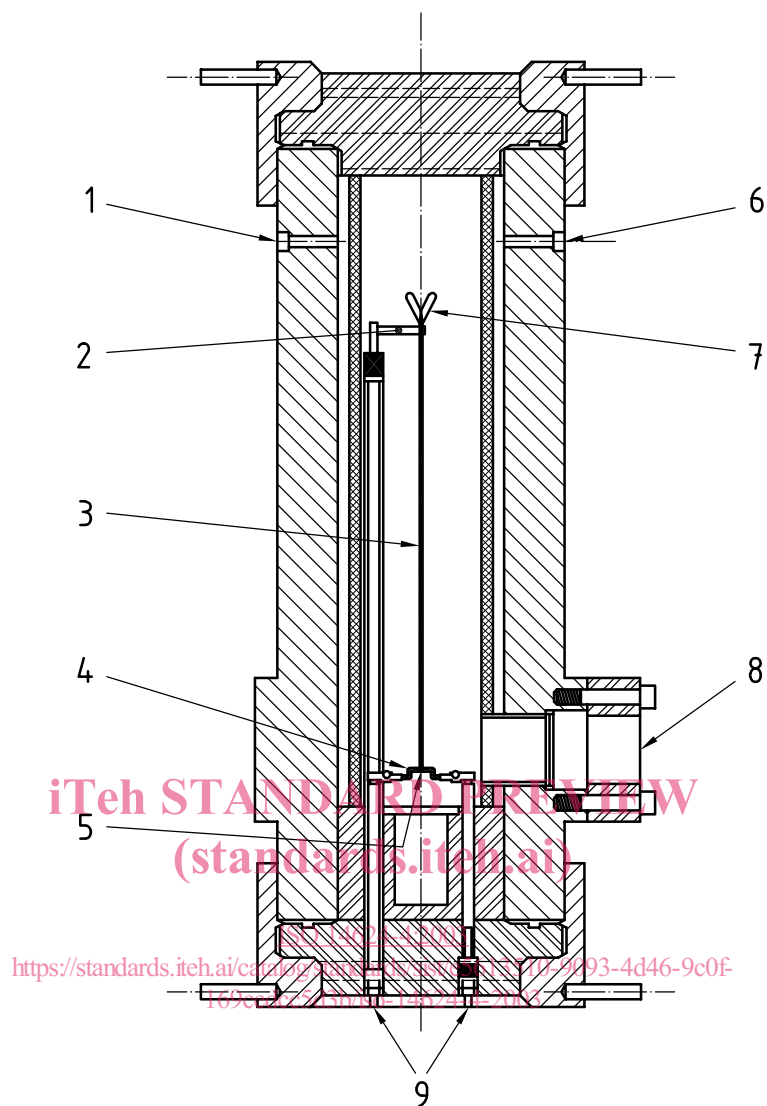
6.3 Ignition source, comprising a promoter (6.3.1), an ignitor wire (6.3.2) and a power supply (6.3.3).

6.3.1 Promoter, physically attached to the specimen (see Figure 2) and consisting of a sufficient quantity of aluminium or magnesium to release at least 3,0 kJ.

6.3.2 Ignitor wire, bare, made of aluminium-palladium or nickel-chromium.

6.3.3 Power supply, electrically insulated, capable of providing 40 A (RMS) at 50 V, used to supply current to the ignitor wire (6.3.2).

6.4 Measuring devices, such as pressure gauges and oxygen-measuring devices, in proper calibration.

**Key**

- 1 oxygen supply port
- 2 ceramic specimen holder
- 3 test specimen
- 4 ignitor wire
- 5 promoter
- 6 gas outlet port
- 7 copper alligator clip
- 8 viewing port
- 9 ignition wire feedthroughs

Figure 1 — Typical test chamber with specimen mounted in specimen holder