INTERNATIONAL STANDARD

**ISO 14624-5**

Second edition
2023-06

# Space systems — Safety and compatibility of materials —

## Part 5: Determination of reactivity of system/component materials with aerospace propellants

*Systèmes spatiaux — Sécurité et compatibilité des matériaux —*

*Partie 5: Détermination de la réactivité des matériaux des systèmes/composants avec les ergols spatiaux*

Reference number
ISO 14624-5:2023(E)

© ISO 2023



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland



© ISO 2023 – All rights reserved

# Contents

Page

**Foreword** ..... **iv**
**Introduction** ..... **v**
**1 Scope** ..... **1**
**2 Normative references** ..... **1**
**3 Terms and definitions** ..... **1**
**4 Fluid transfer, storage and flight systems** ..... **2**
4.1 General ..... 2
4.1.1 Procedure ..... 2
4.1.2 Safety ..... 2
4.2 Test criteria ..... 2
4.2.1 Screening test ..... 2
4.2.2 Immersion test ..... 2
4.2.3 Post-test analysis ..... 2
4.3 Sample ..... 3
4.3.1 Receiving inspection ..... 3
4.3.2 Sample preparation ..... 3
4.3.3 Sample cleaning ..... 3
4.3.4 Sample inspection ..... 3
4.4 Test system ..... 3
4.4.1 Screening test ..... 3
4.4.2 Immersion test ..... 3
4.5 Procedure ..... 4
4.5.1 Before testing ..... 4
4.5.2 Test ..... 5
4.5.3 Post-test analysis ..... 5
4.6 Precision ..... 6
4.7 Good laboratory practices ..... 6
**Annex A** (informative) **Example forms** ..... **7**
**Bibliography** ..... **10**

© ISO 2023 – All rights reserved

# 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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

This second edition cancels and replaces the first edition (ISO 14624-5:2006), which has been technically revised.

The main changes are as follows:

— updated sections of Clause 4.

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.


© ISO 2023 – All rights reserved

# Introduction

This purpose of this document is to identify changes resulting from exposure of a material to an aerospace fluid that renders either the material or the fluid unsuitable for use.

This document can be used to determine the reactivity of system and component materials with aerospace fluids.

While this procedure is an excellent quick screen test for long-term propellant compatibility, it is semi-qualitative, and (if exposures exceed 12 months) long-term tests need to be used to quantify degradation as a function of time under use conditions.

© ISO 2023 – All rights reserved

# Space systems — Safety and compatibility of materials —

# Part 5: Determination of reactivity of system/component materials with aerospace propellants

## 1 Scope

This document specifies test equipment and techniques used to identify interactions resulting from exposure of a material to an aerospace fluid.

It is applicable for determining interactive reactions between propellants and materials used in the design, construction, and operation of propellant storage, transfer, and flight systems.

## 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 4954, *Steels for cold heading and cold extruding*

ISO 15859-3, *Space systems — Fluid characteristics, sampling and test methods — Part 3: Nitrogen*

## 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**
**degradation**
adverse physical or chemical change in a substance

**3.2**
**immersion test**
test in which the fluid covers the entire sample for the duration of the test

**3.3**
**propellant**
fluid, such as hydrazine and monomethylhydrazine, and oxidizer usually used for space projects

**3.4**
**reaction**
chemical change in which a substance decomposes, combines with other substances, or interchanges constituents with other substances

© ISO 2023 – All rights reserved