

**Space product assurance - Thermal testing for the  
evaluation of space materials, processes, mechanical  
parts and assemblies**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 16602-70-04:2014 sisaldab Euroopa standardi EN 16602-70-04:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 16602-70-04:2014 consists of the English text of the European standard EN 16602-70-04:2014.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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English version

## Space product assurance - Thermal testing for the evaluation of space materials, processes, mechanical parts and assemblies

Assurance produit des projets spatiaux - Essais thermiques pour l'évaluation des matériaux, des processus, des composants et assemblages mécaniques d'un projet spatial

Raumfahrtproduktsicherung - Temperaturtest zur Untersuchung von Werkstoffen, Prozessen, mechanischen Teilen und Zusammenbauten der Raumfahrttechnik

This European Standard was approved by CEN on 20 March 2014.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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## Foreword

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This document (EN 16602-70-04:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-04:2014) originates from ECSS-Q-ST-70-04C.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.

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

This document supersedes EN 14098:2001.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

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The deleterious effects to be anticipated during the thermal cycling test under vacuum include:

- outgassing,
- cracking or fracture of materials or assemblies due to sudden dimensional changes by expansion,
- contraction or pressure,
- short circuiting of electrical wiring,
- overheating of materials or assemblies due to change in convection and conductive heat transfer characteristics.

# 1

## Scope

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This Standard establishes the requirements for the specification, the procedures, the execution and the reporting of a thermal cycling test under vacuum for the evaluation of materials, processes, mechanical parts and assemblies intended for use in the fabrication of spacecraft and associated equipment. This is one of the tests to determine the ability of these articles to withstand changes of ambient temperature under vacuum.

Typical materials or assemblies that can be evaluated by means of this test method are listed below.

- adhesives;
- adhesive bonded joints;
- coatings (paint, thermal and protective);
- insulating materials;
- metallic bonded joints;
- metallic samples, finished by plating or chemical conversion;
- metallized plastic films;
- organic or non-organic bonding;
- plated surfaces;
- potting compounds;
- reinforced structural laminates;
- sealants.

NOTE This is not an exhaustive list and other products or items can be tested.

This standard may be tailored for the specific characteristic and constraints of a space project in conformance with ECSS-S-ST-00.



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## Normative references

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The following normative documents contain provisions which, through reference in this text, constitute provisions of this ECSS Standard. For dated references, subsequent amendments to, or revisions of any of these publications do not apply. However, parties to agreements based on this ECSS Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references the latest edition of the publication referred to applies.

EN reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system – Glossary of terms
EN 16602-10-09	ECSS-Q-ST-10-09	Space product assurance – Nonconformance control system
EN 16602-20	ECSS-Q-ST-20	Space product assurance – Quality assurance
EN 16602-20-07	ECSS-Q-ST-20-07	Space product assurance – Quality assurance for test centres
EN 16602-70	ECSS-Q-ST-70	Space product assurance – Materials, mechanical parts and processes