



SLOVENSKI STANDARD

SIST EN 16602-70-29:2015

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Nadomešča:
SIST EN 14100:2004

Zagotavljanje varnih proizvodov v vesoljski tehniki - Ugotavljanje odvajanja plinskih produktov iz materialov in sestavin, uporabljenih v kabinah vesoljskih plovilih s posadko

Space product assurance - Determination of offgassing products from materials and assembled articles to be used in a manned space vehicle crew compartment

iTeh STANDARD PREVIEW

Raumfahrtproduktsicherung - Bestimmung der Abgabe von Fremdstoffen durch Werkstoffe und Bauteile im Mannschaftsraum von Raumfahrzeugen

[SIST EN 16602-70-29:2015](#)

Assurance produit des projets spatiaux - Détermination des produits de dégazage sous atmosphère pour les matériaux et éléments assemblés utilisés dans le poste d'équipage du satellite habité

Ta slovenski standard je istoveten z: EN 16602-70-29:2014

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49.140 Vesoljski sistemi in operacije Space systems and operations

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EUROPEAN STANDARD
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English version

Space product assurance - Determination of offgassing products from materials and assembled articles to be used in a manned space vehicle crew compartment

Assurance produit des projets spatiaux - Détermination des produits de dégazage sous atmosphère pour les matériaux et éléments assemblés utilisés dans le poste d'équipage du satellite habité

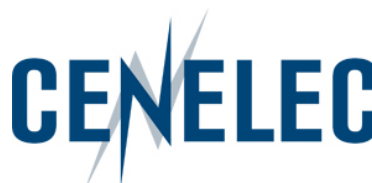
Raumfahrtproduktsicherung - Bestimmung der Abgabe von Fremdstoffen durch Werkstoffe und Bauteile im Mannschaftsraum von Raumfahrzeugen

This European Standard was approved by CEN on 11 April 2014.

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Foreword

This document (EN 16602-70-29:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-29:2014) originates from ECSS-Q-ST-70-29C.

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of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.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 14100:2001.

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.

1 Scope

All non-metallic materials release trace contaminants into the surrounding environment; the extent to which this occurs is dependent on the nature of the material concerned. In the closed environment of a manned spacecraft contaminants within the atmosphere are potentially dangerous with respect to toxicity and its consequences for the safety of the crew.

This Standard defines a test procedure for the determination of the trace contaminants release by non-metallic materials under a set of closely controlled conditions. The test procedure covers both individual materials and assembled articles.

In this Standard the supplier means the testing authority that is responsible for specifying and executing the offgassing tests.

This Standard describes a test to provide data for aid in the evaluation of the suitability of assembled articles and materials for use in a space vehicle crew compartment. The data obtained are in respect of the nature and quantity of organic and inorganic volatile contaminants evolved when subjected to the crew compartment environment.

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

Normative references

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 revision 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 more 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 16602-70	ECSS-Q-ST-70	Space product assurance – Materials, mechanical parts and processes

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Terms, definitions and abbreviated terms

3.1 Terms defined in other standards

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 and ECSS-Q-ST-70 apply.

3.2 Terms specific to the present standard

3.2.1 assembled article

any component "black box" or assembly of components which represents the article to be used in a spacecraft

3.2.2 experiment

item designed and built to accomplish a specific purpose which can be disassembled and retain its capabilities after re-assembly

3.2.3 offgassing

evolution of gaseous products for an assembled article subjected to slight radiant heat in the specified test atmosphere

3.2.4 offgassing product

organic or inorganic compound evolved from a material or assembled article or experiment or rack

3.2.5 rack

structure in which different experiments take place during a manned mission

3.2.6 SMAC (Spacecraft Maximum Allowable Concentration)

maximum concentration of a volatile offgassed product that is allowed in the spacecraft atmosphere for a specified flight duration

3.2.7 toxic hazard index (T)

ratio of the projected concentration of each offgassed product to its SMAC value and summing the ratios for all offgassed products without separation into toxicological categories

NOTE Further details on the calculation of this T-value can also be obtained in NASA-STD-6001.

3.3 Abbreviated terms

For the purpose of this Standard, the abbreviated terms from ECSS-S-ST-00-01 and the following apply:

Abbreviation	Meaning
C	concentration expressed in $\mu\text{g}/\text{m}^3$
C_1	concentration expressed in ppm
CI^\ddagger	chemical ionization
EI	electron ionization
eV	electron volt
GC	gas-chromatograph
MS	mass-spectrometer
MW_t	molecular weight
m/z	ratio mass to charge
ppm	part per million
SMAC	Spacecraft Maximum Allowable Concentration
T	toxic hazard index

NOTE For $\mu\text{g}/\text{m}^3$, the conversion to ppm is done, using the formula ((3-1) given in clause 3.4

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3.4 Formula for conversion

Formula (3-1) shows the conversion from $\mu\text{g}/\text{m}^3$ to ppm:

$$C = C_1 \times MW_t \times \frac{10^3}{24,47} \times \frac{P}{1013} \times \frac{298}{273 + t} \quad (3-1)$$

Where:

- C is the concentration ($\mu\text{g}/\text{m}^3$)
- C_1 is the concentration (ppm)
- MW_t is the molecular weight (g)
- P is the pressure (hPa)
- t is the room temperature ($^\circ\text{C}$) (End of test)
- 24,47 is the molecular volume at 25°C (l)

4 Requirements

4.1 Preparatory conditions

4.1.1 Test specimen preparation

4.1.1.1 General preferences

- a. The supplier shall classify all materials to be tested into one of the three categories "Surface", "Volume" and "Mass" described in 4.1.1.2, 4.1.1.3 and 4.1.1.4, respectively.

4.1.1.2 Samples of category "Surface"

- a. The category "Surface" shall include films, fabrics, coatings, finishes, inks, primers, adhesives, thin film lubricants, tapes and electrical insulating materials.

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NOTE This category is defined for materials that are essentially two dimensional.

- b. The supplier shall select test samples with a surface of (300 ± 10) cm² per litre of test chamber.
- c. Coatings and finishes shall be coated on a clean aluminium substrate.
- d. Material thickness, curing process and method of application shall be in accordance with the manufacturer's recommendations.

NOTE Only the outer surfaces of a material on the aluminium panel are counted in surface area determinations.

- e. The supplier shall cut films, fabrics and similar materials to ensure a surface of (300 ± 10) cm².

NOTE Because materials are often "two surfaced" in use, the total surface area is determined by counting, the top and the bottom surface.

- f. Heat shrinkable tubing or boots shall be applied and shrunk to simulate actually used configuration.