SLOVENSKI STANDARD
SIST EN 16602-70-03:2015

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Zagotavljanje varnih proizvodov v vesoljski tehniki - Črno eloksiranje kovin z anorganskimi barvili

Space product assurance - Black-anodizing of metals with inorganic dyes

Raumfahrtproduktsicherung - Schwarzes anodisieren von Metallen mit anorganischen Farben

Assurance produit des projets spatiaux - Anodisation noire des métaux avec colorants non organiques

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ICS:

49.140	Vesoljski sistemi in operacije	Space systems and operations
87.040	Barve in laki	Paints and varnishes

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Space product assurance - Black-anodizing of metals with inorganic dyes

Assurance produit des projets spatiaux - Anodisation noire des métaux avec colorants non organiques

Raumfahrtproduktsicherung - Schwarzes anodisieren von Metallen mit anorganischen Farben

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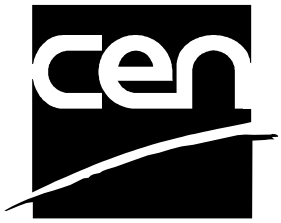

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Table of contents

Tables

Foreword

This document (EN 16602-70-03:2014) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16602-70-03:2014) originates from ECSS-Q-ST-70-03C.

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of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015..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

Passive thermal control systems onboard spacecraft are often based on the thermo-optical properties of the surfaces, namely emissivity and absorbance. The ratio of these two properties defines the equilibrium temperature of the surface. This Standard provides requirements for black-anodizing surface treatment applied on metallic surfaces to achieve an emissivity versus absorbance ratio close to unity, as requested for many applications.

1
Scope

This Standard defines requirements for measurements and verifications to guarantee that an anodized coating is adequate for the intended application. The requirements set by this Standard ensure high reliability of surface treatments intended to withstand normal terrestrial conditions and environment loads imposed on spacecraft and associated equipment where surfaces require high solar absorptance, high emittance, high optical blackness, or a combination of these properties.

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

2
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 16602-20	ECSS-Q-ST-20	Space product assurance – Quality assurance
EN 16602-70	ECSS-Q-ST-70	Space product assurance – Materials, mechanical parts and processes
EN 16602-70-04	ECSS-Q-ST-70-04	Space product assurance – Thermal testing for the evaluation of space materials, processes, mechanical parts and assemblies
EN 16602-70-09	ECSS-Q-ST-70-09	Space product assurance – Measurement of thermo-optical properties of thermal control materials
EN 16602-70-13	ECSS-Q-ST-70-13	Space product assurance – Measurements of the peel and pull-off strength of coatings and finishes using pressure-sensitive tapes

3
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 apply.

3.2 Terms specific to the present standard

3.2.1 anodizing

placing a film coating on a metal surface by an electrolytic or chemical action

3.2.2 batch (material)

material that originates from the same casting lot, and followed the same transformation processes and the same heat treatment

3.2.3 emittance (ε)

ratio of the radiant intensity of the specimen to that emitted by a black body radiator at the same temperature and under the same geometric and wavelength conditions

NOTE Differentiation is made between:

- Hemispherical emittance (ε_h) - conditions for incidence or viewing of flux over a hemispherical region.
- Normal emittance (ε_n) - conditions for incidence or viewing through a solid angle normal to the specimen. Ratio refers to the emissivity normal to the surface of the emitting body.

3.2.4 solar absorbance (α_s)

ratio of the solar radiant flux absorbed by a material (or body) to that incident upon it

NOTE Measurement methods are:

- Spectroscopic method using a photo-spectrometer covering the range from 0,25 μm

up to 2,5 μm for the determination of α_s.

- Portable equipment using a xenon flash for relative measurements (α_p)

3.2.5 test piece

piece that follows a treatment as close as possible than that is applied on the workpieces with the purpose of assessing the suitability of the process

NOTE A test piece can be destructively tested.

3.2.6 workpiece

piece that is intended to be used as space-hardware and for which the adequacy of the treatment is assessed by tests performed on work pieces treated in as similar as possible conditions than the workpiece