



SLOVENSKI STANDARD
SIST EN 16602-70-08:2015
01-april-2015

Zagotavljanje varnih proizvodov v vesoljski tehniki - Ročno spajkanje visoko zanesljivih električnih spojev

Space product assurance - Manual soldering of high-reliability electrical connections

Raumfahrtproduktsicherung - Manuelles Löten von hoch-zuverlässigen elektrischen Verbindungen

Assurance produit des projets spatiaux - Soudage manuel des connexions électriques à fiabilité élevée

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Ta slovenski standard je istoveten z: EN 16602-70-08:2015

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ICS:

25.160.50	Trdo in mehko lotanje	Brazing and soldering
49.140	Vesoljski sistemi in operacije	Space systems and operations

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EUROPEAN STANDARD

EN 16602-70-08

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2015

ICS 25.160.50; 49.140

English version

Space product assurance - Manual soldering of high-reliability electrical connectionsAssurance produit des projets spatiaux - Soudage manuel
des connexions électriques à fiabilité élevéeRaumfahrtproduktsicherung - Manuelles Löten von hoch-
zuverlässigen elektrischen Verbindungen

This European Standard was approved by CEN on 18 October 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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**CEN-CENELEC Management Centre:
Avenue Marnix 17, B-1000 Brussels**

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Foreword

This document (EN 16602-70-08:2015) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-08:2015) originates from ECSS-Q-ST-70-08C.

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of an identical text or by endorsement, at the latest by July 2015, and conflicting national standards shall be withdrawn at the latest by July 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of 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

The main part of this Standard is based on recommendations from the National Aeronautics and Space Administration and European soldering technology experts. Modifications have been incorporated into the text to provide for the specific requirement of low-outgassing electrical systems which are required by scientific and application satellites. Other additions have been made in the light of recent technological advances and the results of verification test programmes. The methods and workmanship contained in this document are considered to be fully approved for normal spacecraft requirements.

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1 Scope

This Standard defines the technical requirements and quality assurance provisions for the manufacture and verification of manually-soldered, high-reliability electrical connections.

The Standard defines acceptance and rejection criteria for high reliability manufacture of manually-soldered electrical connections intended to withstand normal terrestrial conditions and the vibrational g-loads and environment imposed by space flight.

The proper tools, correct materials, design and workmanship are covered by this document. Workmanship standards are included to permit discrimination between proper and improper work.

The assembly of surface-mount devices is covered in ECSS-Q-ST-70-38.

Requirements related to printed circuit boards are contained in ECSS-Q-ST-70-10 and ECSS-Q-ST-70-11.

Verification of manual soldering assemblies which are not described in this standard are performed by vibration and thermal cycling testing. The requirements for verification are given in this Standard.

This standard does not cover the qualification and acceptance of EQM and FM equipment with hand soldered connections.

The qualification and acceptance tests of equipment manufactured in accordance with this Standard are covered by ECSS-E-ST-10-03.

The mounting and supporting of components, terminals and conductors prescribed herein applies to assemblies designed to operate within the temperature limits of $-55\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$.

For temperatures outside this normal range, special design, verification and qualification testing is performed to ensure the necessary environmental survival capability.

Special thermal heat sinks are applied to devices having high thermal dissipation (e.g. junction temperatures of $110\text{ }^{\circ}\text{C}$, power transistors) in order to ensure that solder joints do not exceed $85\text{ }^{\circ}\text{C}$.

This standard may be tailored for the specific characteristic and constraints 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 16602-20	ECSS-Q-ST-20	Space product assurance - Quality assurance
EN 16602-70-02	ECSS-Q-ST-70-02	Space product assurance - Thermal vacuum outgassing test for the screening of space materials
EN 16602-70-10	ECSS-Q-ST-70-10	Space product assurance - Qualification of printed circuit boards
EN 16602-70-11	ECSS-Q-ST-70-11	Space product assurance - Procurement of printed circuit boards
EN 16602-70-28	ECSS-Q-ST-70-28	Space product assurance - Repair and modification of printed circuit board assemblies for space use
EN 16602-70-71	ECSS-Q-ST-70-71	Space product assurance - Data for selection of space materials and processes
	ESCC 23500	Requirements for lead materials and finishes for components for space application
	EN 61340-5-1	Protection of electronic devices from electrostatic phenomena - General requirements
	EN 61340-5-2	Protection of electronic devices from electrostatic phenomena – User guide
	MIL-STD-883 Rev.G	Test methods and procedures for microelectronics

Terms, definitions and abbreviated terms

3.1 Terms from other standards

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

For the purpose of this Standard, the following terms from ECSS-Q-ST-70-28 apply:

repair

rework

3.2 Terms specific to the present standard

3.2.1 approval authority

entity that reviews and accepts the verification programme, evaluating the test results and grants the final approval

3.2.2 base laminate

see "substrate"

3.2.3 bifurcated (split) terminal

terminal containing a slot or split in which wires or leads are placed before soldering

3.2.4 bit

removable heat store of a soldering iron

3.2.5 blister

delamination in a distinct local area or areas

3.2.6 bridging

build-up of solder or conformal coating between parts, component leads or base substrate forming an elevated path

NOTE See "fillet".