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Flyg- och rymdteknik – Handlödning av elektriska förbindningar med hög tillförlitlighet

*Space product assurance –
The manual soldering of high-reliability electrical connections*

Som svensk standard gäller europastandarden EN 50390:2004. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50390:2004.

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Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

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EUROPEAN STANDARD

EN 50390

NORME EUROPÉENNE

EUROPÄISCHE NORM

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**Space product assurance –
The manual soldering of high-reliability electrical connections**

Conformité pour les produits spatiaux -
Manuel de soudabilité des connexions
électriques de haute fiabilité

Raumfahrt-Produktsicherung –
Handlöten elektrischer Verbindungen
hoher Zuverlässigkeit

This European Standard was approved by CENELEC on 2004-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard has been prepared by the former CENELEC BTTF 91-3, Space equipment standardization, the work of which has been transferred by 113 BT to CENELEC TC 107X, Process management for avionics.

It is based on a previous version ¹⁾ originally prepared by the ECSS Product Assurance Working Group, reviewed by the ECSS Technical Panel and approved by the ECSS Steering Board. The European Cooperation for Space Standardization (ECSS) is a cooperative effort of the European Space Agency, National Space Agencies and European industry associations for the purpose of developing and maintaining common standards.

This European Standard is one of the series of space standards intended to be applied together for the management, engineering and product assurance in space projects and applications.

Requirements in this European Standard are defined in terms of what shall be accomplished, rather than in terms of how to organize and perform the necessary work. This allows existing organizational structures and methods to be applied where they are effective, and for the structures and methods to evolve as necessary without rewriting the standards.

The formulation of this European Standard takes into account the existing ISO 9000 family of documents.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50390 on 2004-04-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2005-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2007-04-01

¹⁾ ECSS-Q-70-08A.

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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 results of metallurgical test programmes. The methods and workmanship contained in this standard are considered to be fully approved for normal spacecraft requirements.

1 Scope

This standard defines the technical requirements and quality assurance provisions for the manual soldering of high-reliability electrical connections intended for use in spacecraft and associated equipment.

The rigorous requirements set by this standard ensure the high reliability of hand-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 standard. Acceptance and rejection criteria are stated and some workmanship standards are included to discriminate between proper and improper work.

Wave-soldering processes and surface mount technologies are specified in separate documents, and those processes require to be verified as prescribed in the respective standard.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 13291-2		<i>Space product assurance — Part 2: Quality assurance</i>
EN 13291-3		<i>Space product assurance — Part 3: Materials, mechanical parts and processes</i>
EN 13701		<i>Space systems — Glossary of terms</i>
EN 14097		<i>Space product assurance — Non-conformance control system</i>
EN 100015-1	1992	<i>Protection of electrostatic sensitive devices — Part 1: General requirements</i>
ECSS-Q-70-02		<i>Space product assurance — Thermal vacuum outgassing test for the screening of space materials</i>
ECSS-Q-70-10	²⁾	<i>Space product assurance — Qualification printed circuit boards</i>
ECSS-Q-70-11	²⁾	<i>Space product assurance — Procurement of multilayer printed-circuit boards</i>
ECSS-Q-70-28	²⁾	<i>Space product assurance — Repair and modification of printed-circuit board assemblies</i>
ECSS-Q-70-38	²⁾	<i>Space product assurance — High-reliability soldering for surface-mount and mixed technology printed-circuit boards</i>
ECSS-Q-70-71	²⁾	<i>Space product assurance — Data for the selection of space materials</i>

²⁾ To be published.