SLOVENSKI STANDARD
SIST EN 16602-70-07:2015

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Zagotavljanje varnih proizvodov v vesoljski tehniki - Preverjanje in odobritev strojnega valovnega spajkanja

Space product assurance - Verification and approval of automatic machine wave soldering

Raumfahrtproduktsicherung - Verifikation und Zulassung von Maschinenschwalllötverfahren

Assurance produits des projets spatiaux - Validation et approbation du brasage automatique à la vague

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25.160.50	Trdo in mehko lotanje	Brazing and soldering
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EUROPEAN STANDARD

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English version

Space product assurance - Verification and approval of automatic machine wave soldering

Assurance produits des projets spatiaux - Validation et approbation du brasage automatique à la vague

Raumfahrtproduktsicherung - Verifikation und Zulassung von Maschinenschwalllötverfahren

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Foreword

This document (EN 16602-70-07:2014) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16602-70-07:2014) originates from ECSS-Q-ST-70-07C.

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of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.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 14612:2003.

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

Wave soldering is regarded as a critical process that can find limited application during the assembly of components on to printed circuit boards (PCBs) intended for spacecraft. The preferred procedure is by manual soldering to the requirements of ECSS-Q-ST-70-08. Generally the small number of identically designed circuits does not warrant the setting up of unique machine parameters for each individual layout.

When wave soldering is identified as a suitable alternative to manual soldering for use in the customer's projects, it can be essential to follow the steps outlined in this document before the final customer's approval is granted. The sequence of main events is shown in Figure 4-1. Each step is fully completed and the details recorded, so that a dossier is compiled for each manufacturer's assembly line. All dossiers are kept updated by the approval authority and serve as a reference for the approval authority's Project Engineers.

A general qualification is not granted for wave soldering. Wave soldering lines that have been previously verified (see also clause 5.2) can be also approved for use on named projects, but this depends entirely on the specific project requirements. Project process approval is requested, as for all materials and critical processes, by means of ECSS-Q-ST-70.

1
Scope

This specification defines the basic requirements for the verification and approval of automatic machine wave soldering for use in spacecraft hardware. The process requirements for wave soldering of double-sided and multilayer boards are also defined.

This standard may be tailored for the specific characteristic and constrains 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 16602-10-09	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
EN 16602-70-08	ECSS-Q-ST-70-08	Space product assurance - Manual soldering of high-reliability electrical connections
EN 16602-70-10	ECSS-Q-ST-70-10	Space product assurance - Qualification 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

3
Terms, definitions and abbreviated terms

3.1 Terms from other standards

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 ECSS-Q-ST-70, ECSS-Q-ST-70-08 and ECSS-Q-ST-70-28 apply.

3.2 Terms specific to the present standard

3.2.1 approval authority

entity/organization responsible for executing (or sub-contracting) the examination of the technology samples, performing the automatic wave soldering process line-audit, authorizing the implementation of the supplier's verification programme, and notifying, renewing or withdrawing the approval of the verification

NOTE The approval authority is the final customer or the representative nominated by him. For example, for ESA programmes, the final customer is ESA.

3.2.2 component density

number of components per unit board area

3.2.3 ionisable contaminant

process residues that exist as ions and when dissolved, increase electrical conductivity

NOTE Examples of such process residues flux are activators, fingerprints, etching and plating salts.

3.2.4 machine oil

liquid compounds formulated for use as oil in wave-soldering equipment

NOTE They serve primarily to provide a barrier between the atmosphere and molten solder, thereby reducing the oxidation (drossing) of the solder. Certain oils also reduce the surface tension of molten solder, thereby enhancing the wetting characteristics of the solder.

3.2.5 measling

condition existing in the base laminate of a printed circuit board in the form of discrete white spots or "crosses" below the surface of the base laminate, reflecting a separation of fibres in the glass cloth at the weave intersection

3.2.6 technology samples

samples of wave-solder assembled boards

NOTE These samples are provided by the supplier in addition to the application for verification.

3.2.7 wave soldering

process wherein printed circuit boards are brought in contact with a gently overflowing wave of liquid solder which is circulated by a pump in an appropriately designed solder pot reservoir

NOTE The prime functions of the molten wave are to serve as a heat source and heat transfer medium and to supply solder to the joint area.

3.2.8 wave-soldering equipment

systems that achieve wave soldering

NOTE 1 A typical wave soldering equipment consist of stations for fluxing, preheating, and soldering by means of a conveyer.

NOTE 2 Cleaning is usually offered as an option. Normally, additional cleaning can be required in order to meet ECSS (or customer specific) cleanliness standards.

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
PID	process identification document

4 Principles

The sequence of main events for final customer verification and approval of wave soldering process is given in Figure 4-1.

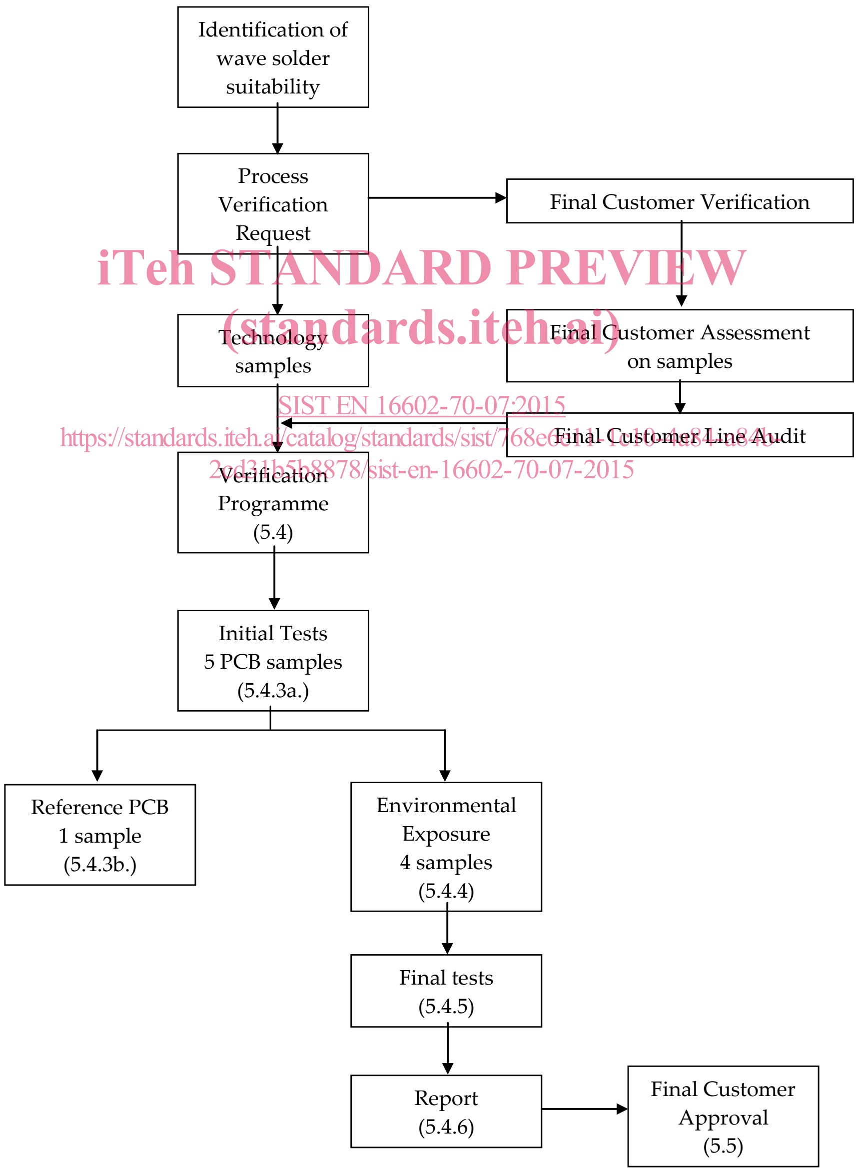

Figure 4-1: Sequence of main events for final customer verification and approval of wave soldering process