SLOVENSKI STANDARD
SIST EN 50390:2007

01-januar-2007

Zagotavljanje vesoljskih izdelkov - Ročno spajkanje visoko zanesljivih električnih spojev

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

Raumfahrt-Produktsicherung - Handlöten elektrischer Verbindungen hoher Zuverlässigkeit

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

Ta slovenski standard je istoveten z: EN 50390:2004

ICS:

25.160.50	Trdo in mehko lotanje	Brazing and soldering
49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems

SIST EN 50390:2007 en

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST EN 50390:2007

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50390

July 2004

ICS 49.060

English version

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/...468-4837-996b-02d3278fcca8/sist-en-50390-2007

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

© 2004 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 50390:2004 E

SIST EN 50390:2007

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-04-01

---

[1] ECSS-Q-70-08A.

SIST EN 50390:2007

Contents

Page

Introduction 8
1 Scope 8
2 Normative references 8
3 Terms, definitions and abbreviated terms 9
3.1 Terms and definitions 9
3.2 Abbreviated terms 17
4 Principles and prerequisites of reliable soldered connections 17
4.1 Principles 17
4.2 Prerequisites 18
5 Preparatory conditions 18
5.1 Facility cleanliness 18
5.2 Environmental conditions 19
5.3 Precautions against static charges 19
5.4 Lighting requirements 19
5.5 Equipment and tools 20
5.5.1 Brushes 20
5.5.2 Files 20
5.5.3 Cutters and pliers 20
5.5.4 Bending tools 20
5.5.5 Clinching tools 21
5.5.6 Insulation strippers 21
5.5.7 Soldering irons and resistance soldering equipment 21
5.5.8 Non-contact heat sources 21
5.5.9 Soldering tools 22
5.5.10 Defective or uncalibrated equipment or tools 22
6 Materials selection 22
6.1 Solder 22
6.1.1 Form 22
6.1.2 Composition 22
6.1.3 Melting temperatures and choice 22
6.2 Flux 22
6.2.1 Rosin-based fluxes 22
6.2.2 Corrosive acid fluxes 23
6.3 Solvents 24
6.3.1 Acceptable solvents 24
6.3.2 Drying 24
6.4 Flexible insulation materials 24
6.5 Terminals 24
6.5.1 Preferred terminals 24
6.5.2 Tin-, silver- and gold-plated terminals 24
6.5.3 Shape of terminals 25
6.6 Wires 25
6.7 PCBs 25
6.7.1 Boards 25
6.7.2 Plated-through holes 25

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

6.7.3 Tin-lead finish on conductors 25
6.7.4 Gold finish on conductors 25
6.8 Conformal coating, staking compounds and potting materials 25
7 Preparation for soldering 26
7.1 Preparation of conductors, terminals and solder cups 26
7.1.1 Insulation removal 26
7.1.2 Damage to insulation 26
7.1.3 Damage to conductors 26
7.1.4 Insulation clearance 26
7.1.5 Surface to be soldered 26
7.1.6 De-golding and pre-tinning of conductors 27
7.2 Preparation of the soldering bit 27
7.2.1 Inspection 27
7.2.2 Maintenance 27
7.2.3 Copper bits for special soldering applications 28
7.2.4 Plated bits 28
7.2.5 Tip in operation 28
7.3 Maintenance of resistance-type soldering electrodes 28
7.4 Handling (work station) 28
7.5 Storage (work station) 28
7.5.1 Components 28
7.5.2 PCBs 28
7.5.3 Materials requiring segregation 28
7.5.4 Traceability 28
7.6 Baking of PCBs 28
8 Mounting of components 29
8.1 General requirements 29
8.1.1 Introduction 29
8.1.2 Heavy components 29
8.1.3 Metal-case components 29
8.1.4 Glass-encased components 29
8.1.5 Stress relief 29
8.1.6 Reinforced plated-through holes 31
8.1.7 Lead and conductor cutting 31
8.1.8 Heat-generating components 31
8.1.9 Moulded components 31
8.1.10 Hook-up wire 31
8.1.11 Location 31
8.1.12 Conformal coating, cementing and encapsulation 31
8.2 Lead bending requirements 31
8.2.1 General 31
8.2.2 Components with leads terminating on the opposite side of a PCB 32
8.2.3 Components with leads terminating on the same side of a PCB 32
8.2.4 Conductors terminating on both sides of a non-plated-through hole 32
8.2.5 Non-bendable leads 33
8.3 Mounting of terminals to PCB 33
8.3.1 General 33
8.3.2 Methods of attachment 33

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

8.4 Lead attachment to PCBs 34
8.4.1 General 34
8.4.2 Lead access holes 34
8.4.3 Clinched leads 36
8.4.4 Stud leads 36
8.4.5 Lapped round leads 37
8.4.6 Lapped ribbon leads 37
8.4.7 Lapped round- and ribbon-lead parts with solder connection on same side 38
8.5 Mounting of components to terminals 39
8.5.1 General 39
8.5.2 Special constraints 39
8.6 Cordwood modules 40
8.7 Mounting of connectors to PCBs 40
8.7.1 General 40
8.7.2 Special constraints 40
9 Attachment of conductors to terminals, solder cups and cables 41
9.1 General 41
9.1.1 Conductors 41
9.1.2 Terminals 41
9.1.3 Component leads 41
9.2 Wire termination 41
9.2.1 Breakouts from cables 41
9.2.2 Minimum and maximum insulation clearance 41
9.2.3 Multiple parallel entry 41
9.2.4 Variations 41
9.2.5 Solid hook-up wire 41
9.2.6 Stress relief 41
9.2.7 Mechanical support 41
9.3 Turret and straight pin terminals 42
9.3.1 Side route 42
9.3.2 Bottom route 42
9.4 Bifurcated terminals 43
9.4.1 General 43
9.4.2 Bottom route 43
9.4.3 Side route 44
9.4.4 Top route 45
9.4.5 Combination of top and bottom routes 45
9.4.6 Combination of side and bottom routes 45
9.5 Hook terminals 45
9.6 Pierced terminals 45
9.7 Solder cups (connector type) 47
9.8 Insulation tubing application 47
9.9 Wire and cable interconnections 47
9.9.1 General 47
9.9.2 Preparation of wires 47
9.9.3 Preparation of shielded wires and cables 48
9.9.4 Pre-assembly 48
9.9.5 Soldering procedures 48

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba3341df-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

9.9.6 Cleaning 49
9.9.7 Inspection 49
9.9.8 Workmanship 49
9.9.9 Sleeving of interconnection 49
9.10 Connection of stranded wires to PCBs 49
10 Soldering to terminals and PCBs 51
10.1 General 51
10.1.1 Securing conductors 51
10.1.2 Insulation sleeving, potting or coating 51
10.1.3 Thermal shunts 51
10.1.4 High-voltage connections 51
10.2 Solder application to terminals 51
10.2.1 Soldering of swaged terminals onto PCBs 51
10.2.2 Soldering of conductors onto terminals (except cup) 51
10.2.3 Soldering of conductors onto cup terminals 51
10.3 Solder application to PCB 51
10.3.1 Solder coverage 51
10.3.2 Solder fillets 52
10.3.3 Soldering of component leads to plated-through holes 52
10.3.4 Solder application 52
10.4 Wicking 52
10.5 Solder rework 52
11 Cleaning of PCB assemblies 52
11.1 General 52
11.2 Ultrasonic cleaning 52
11.3 Monitoring for cleanliness 53
11.3.1 Cleanliness testing 53
11.3.2 Testing frequency 53
11.3.3 Test limits 53
11.3.4 Test methods 53
12 Final inspection 54
12.1 General 54
12.2 Acceptance criteria 54
12.3 Rejection criteria 54
13 Verification 55
13.1 General 55
13.2 Temperature cycling 55
13.3 Vibration 55
14 Quality assurance 56
14.1 General 56
14.2 Data 56
14.3 Non-conformance 56
14.4 Calibration 56
14.5 Traceability 56
14.6 Workmanship standards 56
14.7 Inspection 56
14.8 Operator and inspector training and certification 57
Annex A (informative) Typical satisfactory and unsatisfactory solder connections 58

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-03d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

Figures

Figure 1 — Profiles of correct and incorrect cutters for trimming leads 20
Figure 2 — Non-approved types of mechanical strippers 21
Figure 3 — Stress relieved component terminations on PCB 30
Figure 4 — Minimum lead bend 32
Figure 5 — Component and solder termination on the same side 32
Figure 6 — Leads with solder termination on both sides 33
Figure 7 — Types of terminal swaging 34
Figure 8 — Clinched-lead terminations - unsupported holes 35
Figure 9 — Clinched lead terminations - plated through-holes 35
Figure 10 — Stud terminations 37
Figure 11 — Through-hole lapped terminations 38
Figure 12 — Design dimensions for single-surface lapped terminations. 39
Figure 13 — Method of stress relieving parts attached to terminals 40
Figure 14 — Side- and bottom-route connections to turret terminals 42
Figure 15 — Bottom-route connections to bifurcated terminal 43
Figure 16 — Side-route connection to bifurcated terminal 44
Figure 17 — Top-route connection to bifurcated terminal 45
Figure 18 — Connections to hook terminals 46
Figure 19 — Connections to pierced terminals 46
Figure 20 — Connections to solder cups (connector type) 47
Figure 21 — Methods for securing wires 49
Figure 22 — Stranded wires to PCBs 50
Figure A.1 — Soldered clinched terminals 58
Figure A.2 — Soldered stud terminals 59
Figure A.3 — Soldered turret terminals 60
Figure A.4 — Soldered turret terminals 61
Figure A.5 — Soldered bifurcated terminals 62
Figure A.6 — Soldered hook terminals 63
Figure A.7 — Soldered cup terminals 64
Figure A.8 — Hand-soldered wire to shielded cable interconnections 65
Figure A.9 — Hand-soldered wire to shielded wire interconnections 66
Figure A.10 — Hand-soldered wire interconnections – details of defects 67

Tables

Table 1 — Chemical composition of spacecraft solders 23
Table 2 — Guide to choice of solder types 23
Table 3 — Insulation clearance 26
Table 4 — Dimensions for Figure 22 50
Table 5 — Cleanliness test values 54
Table 6 — Minimum severity for vibration testing 55

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

SIST EN 50390:2007

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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.

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-92d3278fcca8/sist-en-50390-2007

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

[2)] To be published.

SIST EN 50390:2007

EN 29453 (mod) *Soft soldering fluxes – Chemical compositions and forms* (ISO 9453)

ISO EN 29454 *Flux specification*

J-STD-004 *Requirements for soldering fluxes*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13701 and the following apply.

3.1.1
base laminate
see “substrate”

3.1.2
bifurcated (split) terminal
terminal containing a slot or split in which wires or leads are placed before soldering

3.1.3
bit
removable heat store of a soldering iron

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.4
blister
delamination in a distinct local area or areas

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

3.1.5
bridging
build-up of solder or conformal coating between parts, component leads or base substrate forming an elevated path (see “fillet”)

3.1.6
cable
two or more insulated conductors, solid or stranded, of equal length, contained in a common covering; or two or more insulated conductors, of equal length, twisted or moulded together without common covering; or one insulated conductor with a metallic covering shield or outer conductor (shielded cable or coaxial cable)

3.1.7
chipped lead seal
cracked glass-to-metal component package seal

NOTE Often caused during lead forming operations.

3.1.8
cleanroom
room in which the concentration of airborne particles is controlled, and which is constructed and used in a manner to minimize the introduction, generation, and retention of particles inside the room, and in which others parameters, e.g. temperature, humidity and pressure are controlled as necessary

3.1.9
clinched termination
conductor or component lead which passes through a printed circuit board and is then bent to make contact with the printed circuit board pad

SIST EN 50390:2007

3.1.10
cold solder joint
joint in which the solder has a blocky, wrinkled or piled-up appearance and shows signs of improper flow or wetting action

NOTE A cold solder joint can appear either shiny or dull, but not granular. It normally has abrupt lines of demarcation rather than a smooth, continuing fillet between the solder and the surfaces being joined. These lines are caused by either insufficient application of heat or the failure of an area of the surfaces being joined to reach soldering temperature.

3.1.11
colophony
see “resin”

3.1.12
component
device which performs an electronic, electrical or electromechanical function and consists of one or more elements joined together and which cannot normally be disassembled without destruction

NOTE The terms component and part may be interchanged. Typical examples of components are transistors, integrated circuits, hybrids and capacitors.

3.1.13
component lead
solid wire which extends from and serves as a connection to a component

3.1.14
conduction soldering
method of soldering which employs a soldering iron for transfer of heat to the soldering area

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d32781cca8/sist-en-50390-2007

3.1.15
conductor
lead or wire, solid or stranded, or printed circuit patch serving as an electrical interconnection between terminations

3.1.16
conformal coating
thin protective coating which conforms to the configuration of the covered assembly

3.1.17
connection
electrical termination

3.1.18
contact angle
angle enclosed between half-planes, tangent to a liquid surface and a solid-liquid interface at their intersection

NOTE In particular, the contact angle of liquid solder in contact with a solid metal surface. An approximate value for this can be determined by shadow projection or other means, by measuring after the solder has solidified. Note that the contact angle is always the angle inside the liquid.

3.1.19
contamination
particles, liquids, gases, materials and micro-organisms which by their presence can disturb the performance of an item

3.1.20
cordwood construction
circuitry in which components are mounted between, and perpendicular to, two printed circuit or conductive networks

SIST EN 50390:2007

3.1.21
corrosion
deterioration of a metal by chemical or electrochemical reaction with its environment

3.1.22
cracked solder joint
soldered connection which has fractured or broken within the solder

3.1.23
crazing
condition existing in the base laminate of a printed circuit board in the form of connected white spots or "crosses" on or below the surface of the base laminate, reflecting the separation of fibres in the glass cloth and connecting weave intersections, usually related to mechanically induced stress

3.1.24
delamination
distinct separation of printed circuit board layers (resin from glass) originating from or extending to the edges of a hole or edge of the board

3.1.25
dewetting
condition in a soldered area in which the liquid solder has not adhered intimately, characterized by an abrupt boundary between solder and conductor, or solder and terminal or termination area (often seen as a dull surface with islands of thicker shiny solder)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.26
discrete component
any individually packaged electronic device, either active or passive (e.g. resistors, capacitors, inductors, diodes and transistors)

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

3.1.27
disturbed solder joint
unsatisfactory connection resulting from relative motion between the conductor and termination during solidification of the solder

3.1.28
dross
scum that forms on the surface of molten metal

NOTE On liquid solder it can comprise impurity elements or oxidation products.

3.1.29
electrical connection
conductive connection in electrical or electronic circuits

3.1.30
encapsulating compound
electrically non-conductive compound used for environmental protection which completely encloses and fills in voids between electrical components

3.1.31
eutectic alloy
alloy of two or more metals that has one distinct melting point

NOTE One eutectic solder is a tin-lead alloy containing 63 % Sn and 37 % Pb which melts at 183 °C.

3.1.32
excessive solder joint
unsatisfactory connection wherein the solder obscures the configuration of the connection, or prevents assessment of the true wetting angle

SIST EN 50390:2007

3.1.33
eyelet
tubular metal part inserted into a printed circuit board and having both ends headed or rolled over

3.1.34
fillet
smooth concave build-up of material between two surfaces, e.g. a fillet of solder between a component lead and a solder pad or terminal, or a fillet of conformal coating material between a component and printed circuit board

3.1.35
flatpack (flat package)
term used to describe the appearance of an integrated circuit which has been hermetically sealed within a thin, rectangular enclosure, with flat coplanar leads protruding from the periphery

3.1.36
flux
material which, during soldering, removes the oxide film, protects the surface from oxidation, and enables the solder to wet the surfaces to be joined

3.1.37
flux activity
property of a flux which allows the smallest contact angle between molten solder and a solid surface (see also “rosin”)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.38
flux particle
tiny fragment of flux residue of yellow or sometimes whitish translucent appearance

NOTE Usually appears whitish green under ultraviolet light.

SIST EN 50390:2007
https://standards.iteh.ai/catalog/standards/sist/ba334fdf-3468-4837-996b-02d3278fcca8/sist-en-50390-2007

3.1.39
fractured joint
soldered connection which has fractured or broken within the solder (see “cracked solder joint”)

3.1.40
glass meniscus
glass fillet of a lead seal which occurs where an external lead leaves the package body

3.1.41
haloing
condition existing in the base laminate of a printed circuit board in the form of a light area around holes or other machined areas on or below the surface of the laminate

3.1.42
hermetic seal
seal which protects an enclosed circuit from corrosion by preventing the entry of such contaminants as water vapour

3.1.43
hook terminal
terminal formed in a hook shape

3.1.44
hybrid microcircuit
component performing an electronic circuit function which consists of a thick- or thin-film network on a substrate which supports active or passive chip components connected to it

SIST EN 50390:2007

3.1.45
icicles
see “solder icicle”

3.1.46
integrated-circuit component
individually packaged functional circuit formed by depositing an active or passive electronic element on to a substrate

3.1.47
interfacial connection
conductor which connects conductive patterns between opposite sides of a printed circuit board (normally a plated-through hole or metallic wire)

3.1.48
lap joint
joining or fusing of two overlapping metal surfaces with solder without use of any other mechanical attachment or support

3.1.49
measling/measles
condition existing in the base laminate of 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

NOTE During soldering this can be caused by excessive heat.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.50
multi-layer circuit board
product consisting of alternate laminates of printed circuit substrates and insulators, bonded together by simultaneous application of heat and pressure prior to drilling and plating holes for interconnections (see also “printed circuit board”)

SIST EN 50390:2007
02d3278fcca8/sist-en-50390-2007

3.1.51
overheated solder joint
joint in which the solder can appear either shiny or dull, but which also has a crystalline appearance and shows evidence of a grain structure caused by excessive dwell time of a solder iron, too great a heat source, or repeated rework

3.1.52
pad
termination of a conducting surface on a printed circuit board to which leads are soldered to form an electrical connection

NOTE These can be described as either functional, where an active track is terminated, or non-functional, where the pad is isolated.

3.1.53
pin hole
small hole in solder

3.1.54
pits
small holes or sharp depressions in the surface of solder

NOTE Pits can be caused by flux blow-out due to entrapment or overheating.