

© Copyright SEK Svensk Elstandard. Reproduction in any form without permission is prohibited.

Kretskort – Del 1: Artspecifikation – Lödda kretskort där ytmontering eller besläktad monterings teknik använts

*Printed board assemblies –
Part 1: Generic specification –
Requirements for soldered electrical and electronic
assemblies using surface mount and related assembly technologies*

Som svensk standard gäller europastandarden EN IEC 61191-1:2018. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 61191-1:2018.

Nationellt förord

Europastandarden EN IEC 61191-1:2018

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61191-1, Third edition, 2018 - Printed board assemblies - Part 1: Generic specification - Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61191-1, utgåva 2, 2013, gäller ej fr o m 2021-10-19.

ICS 31.190.00; 31.240.00

Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

**Printed board assemblies - Part 1: Generic specification -
Requirements for soldered electrical and electronic assemblies
using surface mount and related assembly technologies
(IEC 61191-1:2018)**

Ensembles de cartes imprimées - Partie 1: Spécification
générique - Exigences relatives aux ensembles électriques
et électroniques brasés utilisant les techniques de montage
en surface et associées
(IEC 61191-1:2018)

Elektronikaufbauten auf Leiterplatten - Teil 1:
Fachgrundspezifikation - Anforderungen an gelötete
elektrische und elektronische Baugruppen unter
Verwendung der Oberflächenmontage und verwandter
Montagetechniken
(IEC 61191-1:2018)

This European Standard was approved by CENELEC on 2018-10-19. 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 CEN-CENELEC Management Centre or to any CENELEC member.

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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 91/1481/CDV, future edition 3 of IEC 61191-1, prepared by IEC/TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61191-1:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-07-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-10-19

This document supersedes EN 61191-1:2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61191-1:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---------------|------|----------------------------|
| IEC 61188-5-1 | NOTE | Harmonized as EN 61188-5-1 |
| IEC 61188-5-2 | NOTE | Harmonized as EN 61188-5-2 |
| IEC 61188-5-3 | NOTE | Harmonized as EN 61188-5-3 |
| IEC 61188-5-4 | NOTE | Harmonized as EN 61188-5-4 |
| IEC 61188-5-5 | NOTE | Harmonized as EN 61188-5-5 |
| IEC 61188-5-6 | NOTE | Harmonized as EN 61188-5-6 |
| IEC 61188-7 | NOTE | Harmonized as EN 61188-7 |
| IEC 61189-2 | NOTE | Harmonized as EN 61189-2 |
| IEC 61190-1-2 | NOTE | Harmonized as EN 61190-1-2 |
| IEC 61193-1 | NOTE | Harmonized as EN 61193-1 |
| IEC 61193-3 | NOTE | Harmonized as EN 61193-3 |
| IEC 62326-1 | NOTE | Harmonized as EN 62326-1 |
| IEC 62326-4 | NOTE | Harmonized as EN 62326-4 |

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|------------------|-------------|
| IEC 60068-2-20 | - | Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads | EN 60068-2-20 | - |
| IEC 60068-2-58 | - | Environmental testing - Part 2-58: Tests - Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD) | EN 60068-2-58 | - |
| IEC 60194 | - | Printed board design, manufacture and assembly - Terms and definitions | - | - |
| IEC 60721-3-1 | - | Printed board design, manufacture and assembly - Terms and definitions | EN IEC 60721-3-1 | - |
| IEC 61189-1 | - | Test methods for electrical materials, interconnection structures and assemblies - Part 1: General test methods and methodology | EN 61189-1 | - |
| IEC 61189-3 | - | Test methods for electrical materials, printed boards and other interconnection structures and assemblies - Part 3: Test methods for interconnection structures (printed boards) | EN 61189-3 | - |
| IEC 61190-1-1 | - | Attachment materials for electronic assembly - Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly | EN 61190-1-1 | - |
| IEC 61190-1-3 | - | Attachment materials for electronic assembly - Part 1-3: Requirements for electronic grade solder alloys and fluxed and non-fluxed solid solder for electronic soldering applications | EN IEC 61190-1-3 | - |
| IEC 61191-2 | - | Printed board assemblies - Part 2: Sectional specification - Requirements for surface mount soldered assemblies | EN 61191-2 | - |

EN IEC 61191-1:2018 (E)

| | | | | |
|------------------|------|--|------------------|---|
| IEC 61191-3 | - | Printed board assemblies - Part 3: Sectional specification - Requirements for through-hole mount soldered assemblies | EN 61191-3 | - |
| IEC 61191-4 | - | Printed board assemblies - Part 4: Sectional specification - Requirements for terminal soldered assemblies | EN 61191-4 | - |
| IEC 61249-8-8 | - | Materials for interconnection structures - Part 8: Sectional specification set for non-conductive films and coatings - Section 8: Temporary polymer coatings | EN 61249-8-8 | - |
| IEC 61340-5-1 | - | Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements | EN 61340-5-1 | - |
| IEC/TR 61340-5-2 | - | Electrostatics - Part 5-2: Protection of electronic devices from electrostatic phenomena - User guide | CLC/TR 61340-5-2 | - |
| IEC 61760-2 | - | Surface mounting technology - Part 2: Transportation and storage conditions of surface mounting devices (SMD) - Application guide | EN 61760-2 | - |
| ISO 9001 | 2008 | Quality management systems - Requirements | - | - |
| IPC-A-610 | - | Acceptability of Electronics Assemblies | - | - |

CONTENTS

| | |
|---|----|
| FOREWORD..... | 6 |
| 1 Scope..... | 8 |
| 2 Normative references..... | 8 |
| 3 Terms and definitions | 9 |
| 4 General requirements | 10 |
| 4.1 Order of precedence | 10 |
| 4.1.1 General remark..... | 10 |
| 4.1.2 Conflict..... | 10 |
| 4.1.3 Conformance documentation..... | 10 |
| 4.2 Interpretation of requirements..... | 11 |
| 4.3 Classification | 11 |
| 4.4 Defects and process indicators..... | 11 |
| 4.5 Process control requirements | 12 |
| 4.6 Requirements flowdown | 12 |
| 4.7 Physical designs | 12 |
| 4.7.1 New designs | 12 |
| 4.7.2 Existing designs..... | 12 |
| 4.8 Visual aids | 12 |
| 4.9 Proficiency of personnel..... | 13 |
| 4.9.1 Design proficiency..... | 13 |
| 4.9.2 Manufacturing proficiency..... | 13 |
| 4.10 Electrostatic discharge (ESD)..... | 13 |
| 4.11 Facilities | 13 |
| 4.11.1 General | 13 |
| 4.11.2 Environmental controls..... | 13 |
| 4.11.3 Temperature and humidity..... | 13 |
| 4.11.4 Lighting | 14 |
| 4.11.5 Field conditions..... | 14 |
| 4.11.6 Clean rooms | 14 |
| 4.12 Assembly tools and equipment | 14 |
| 4.12.1 General | 14 |
| 4.12.2 Process control..... | 14 |
| 5 Requirements of materials | 14 |
| 5.1 Overview..... | 14 |
| 5.2 Solder..... | 14 |
| 5.3 Flux | 14 |
| 5.4 Solder paste | 15 |
| 5.5 Preform solder | 15 |
| 5.6 Adhesives | 15 |
| 5.7 Cleaning agents | 15 |
| 5.7.1 General | 15 |
| 5.7.2 Cleaning agents selection | 15 |
| 5.8 Polymeric coatings | 16 |
| 5.8.1 Solder resists and localized maskants | 16 |
| 5.8.2 Conformal coating and encapsulants | 16 |
| 5.8.3 Spacers (permanent and temporary)..... | 16 |

| | | |
|-------|---|----|
| 5.9 | Chemical strippers | 16 |
| 5.10 | Cleaning Agents..... | 16 |
| 5.11 | Heat shrinkable soldering devices | 16 |
| 6 | Components and printed board requirements | 16 |
| 6.1 | General..... | 16 |
| 6.2 | Solderability..... | 17 |
| 6.2.1 | Parts solderability | 17 |
| 6.2.2 | Reconditioning | 17 |
| 6.2.3 | Solderability testing of ceramic boards | 17 |
| 6.3 | Solderability maintenance | 17 |
| 6.3.1 | General | 17 |
| 6.3.2 | Preconditioning | 17 |
| 6.3.3 | Gold embrittlement of solder joints | 17 |
| 6.3.4 | Tinning of non-solderable parts | 18 |
| 6.4 | Solder purity maintenance | 18 |
| 6.5 | Lead preparation..... | 19 |
| 6.5.1 | General | 19 |
| 6.5.2 | Lead forming..... | 19 |
| 6.5.3 | Lead-forming limits..... | 19 |
| 7 | Assembly process requirements..... | 20 |
| 7.1 | Overview..... | 20 |
| 7.2 | Cleanliness | 20 |
| 7.3 | Part markings and reference designations | 20 |
| 7.4 | Solder connection contours | 20 |
| 7.5 | Moisture traps..... | 20 |
| 7.6 | Thermal dissipation | 20 |
| 8 | Assembly soldering requirements..... | 20 |
| 8.1 | General..... | 20 |
| 8.1.1 | Soldering process | 20 |
| 8.1.2 | Machine maintenance | 21 |
| 8.1.3 | Handling of parts..... | 21 |
| 8.1.4 | Preheating..... | 21 |
| 8.1.5 | Carriers | 21 |
| 8.1.6 | Hold down of surface mount leads | 21 |
| 8.1.7 | Heat application | 21 |
| 8.1.8 | Cooling..... | 21 |
| 8.2 | Reflow soldering | 21 |
| 8.2.1 | Requirements | 21 |
| 8.2.2 | Process development for reflow soldering..... | 22 |
| 8.2.3 | Flux application..... | 22 |
| 8.2.4 | Solder application | 22 |
| 8.3 | Manual/hand soldering | 23 |
| 8.3.1 | Non-reflow manual soldering | 23 |
| 8.3.2 | Reflow manual soldering | 23 |
| 9 | Cleanliness and residue requirements..... | 24 |
| 9.1 | General..... | 24 |
| 9.2 | Qualified cleaning/manufacturing process | 24 |
| 9.2.1 | General | 24 |

| | | |
|--------|--|----|
| 9.2.2 | Cleaning designator | 25 |
| 9.2.3 | Upper specification limit | 25 |
| 9.3 | Visual requirements | 25 |
| 9.4 | Correlation of ionic testers..... | 26 |
| 9.5 | Non-ionic residues | 26 |
| 9.6 | SIR testing..... | 26 |
| 10 | Assembly requirements..... | 26 |
| 10.1 | General..... | 26 |
| 10.2 | Acceptance requirements | 26 |
| 10.2.1 | Process control | 26 |
| 10.2.2 | Corrective action limits | 27 |
| 10.2.3 | Control limit determination..... | 27 |
| 10.3 | General assembly requirements | 27 |
| 10.3.1 | Assembly integrity..... | 27 |
| 10.3.2 | Assembly damage..... | 27 |
| 10.3.3 | Markings..... | 28 |
| 10.3.4 | Flatness (bow and twist)..... | 28 |
| 10.3.5 | Solder connection | 28 |
| 10.3.6 | Interfacial connections | 30 |
| 11 | Coating and encapsulation..... | 30 |
| 11.1 | Conformal coating..... | 30 |
| 11.1.1 | Coating instructions | 30 |
| 11.1.2 | Application..... | 30 |
| 11.1.3 | Performance requirements | 31 |
| 11.1.4 | Rework of conformal coating | 32 |
| 11.1.5 | Conformal coating inspection | 32 |
| 11.2 | Encapsulation | 32 |
| 11.2.1 | Encapsulation instructions..... | 32 |
| 11.2.2 | Application..... | 32 |
| 11.2.3 | Performance requirements | 33 |
| 11.2.4 | Rework of encapsulant material..... | 33 |
| 11.2.5 | Encapsulant inspection | 33 |
| 12 | Rework and repair | 33 |
| 12.1 | Rework of unsatisfactorily soldered electrical and electronic assemblies | 33 |
| 12.2 | Repair..... | 34 |
| 12.3 | Post rework/repair cleaning | 34 |
| 13 | Product quality assurance..... | 35 |
| 13.1 | System requirements..... | 35 |
| 13.2 | Inspection methodology..... | 35 |
| 13.2.1 | Verification inspection | 35 |
| 13.2.2 | Visual inspection..... | 35 |
| 13.2.3 | Sampling inspection | 36 |
| 13.3 | Process control | 36 |
| 13.3.1 | System details | 36 |
| 13.3.2 | Defect reduction..... | 36 |
| 13.3.3 | Variance reduction | 37 |
| 14 | Other requirements..... | 37 |
| 14.1 | Health and safety | 37 |

| | | |
|---------------------|---|----|
| 14.2 | Special manufacturing requirements | 37 |
| 14.2.1 | Manufacture of devices incorporating magnetic windings | 37 |
| 14.2.2 | High-frequency applications | 37 |
| 14.2.3 | High-voltage or high-power applications | 37 |
| 14.3 | Guidance on requirement flowdown | 37 |
| 15 | Ordering data | 37 |
| Annex A (normative) | Requirements for soldering tools and equipment | 39 |
| A.1 | Requirements for tools and equipment..... | 39 |
| A.2 | Abrasives..... | 39 |
| A.3 | Benchtop and hand-soldering systems..... | 39 |
| A.4 | Soldering iron holders | 40 |
| A.5 | Wiping pads | 40 |
| A.6 | Soldering guns..... | 40 |
| A.7 | Solder pots | 40 |
| A.8 | Process control | 40 |
| Annex B (normative) | Quality assessment | 41 |
| B.1 | Process control (PC) | 41 |
| B.2 | Reduction of quality conformance testing..... | 41 |
| B.3 | Audit plan | 42 |
| Bibliography | | 43 |
| Figure 1 | – Solder contact angle..... | 29 |
| Figure 2 | – Solder wetting of plated through-holes without leads | 30 |
| Figure 3 | – Coating conditions..... | 31 |
| Table 1 | – Solder contamination limits; maximum contaminant limit (percentage by weight) | 19 |
| Table 2 | – Designation of surfaces to be cleaned..... | 25 |
| Table 3 | – Residue testing for process control | 25 |
| Table 4 | – Maximum acceptable rosin flux residues | 26 |
| Table 5 | – Electrical and electronic assembly defects | 34 |
| Table 6 | – Magnification requirements..... | 35 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRINTED BOARD ASSEMBLIES –

Part 1: Generic specification – Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61191-1 has been prepared by IEC technical committee 91: Electronics assembly technology.

This third edition cancels and replaces the second edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the requirements have been updated to be compliant with the acceptance criteria in IPC-A-610F;
- b) the term "assembly drawing" has been changed to "assembly documentation" throughout;
- c) references to IEC standards have been corrected;
- d) Clause 9 was completely rewritten;

e) Annex B was removed because there are already procedures for circuit board assemblies.

The text of this International Standard is based on the following documents:

| CDV | Report on voting |
|-------------|------------------|
| 91/1481/CDV | 91/1510/RVC |

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 61191 series, published under the general title *Printed board assemblies*, can be found in the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

PRINTED BOARD ASSEMBLIES –

Part 1: Generic specification – Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies

1 Scope

This part of IEC 61191 prescribes requirements for materials, methods and verification criteria for producing quality soldered interconnections and assemblies using surface mount and related assembly technologies. This part of IEC 61191 also includes recommendations for good manufacturing processes.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60194, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 60721-3-1, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Storage*

IEC 61189-1, *Test methods for electrical materials, interconnection structures and assemblies – Part 1: General test methods and methodology*

IEC 61189-3, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 3: Test methods for interconnection structures (printed boards)*

IEC 61190-1-1, *Attachment materials for electronic assembly – Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly*

IEC 61190-1-3, *Attachment materials for electronic assembly – Part 1-3: Requirements for electronic grade solder alloys and fluxed and non-fluxed solid solders for electronic soldering applications*

IEC 61191-2, *Printed board assemblies – Part 2: Sectional specification – Requirements for surface mount soldered assemblies*

IEC 61191-3, *Printed board assemblies – Part 3: Sectional specification – Requirements for through-hole mount soldered assemblies*

IEC 61191-4, *Printed board assemblies – Part 4: Sectional specification – Requirements for terminal soldered assemblies*

IEC 61249-8-8, *Materials for interconnection structures – Part 8: Sectional specification set for non-conductive films and coatings – Section 8: Temporary polymer coatings*

IEC 61340-5-1, *Electrostatics – Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements*

IEC/TR 61340-5-2, *Electrostatics – Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide*

IEC 61760-2, *Surface mounting technology – Part 2: Transportation and storage conditions of surface mounting devices (SMD) – Application guide*

ISO 9001:2008, *Quality management systems – Requirements*

IPC-A-610, *Acceptability of Electronic Assemblies*