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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

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English version

**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 61190-1-3:2002)**

Matériaux de fixation pour  
les assemblages électroniques  
Partie 1-3: Exigences relatives aux  
alliages à braser de catégorie  
électronique et brasures solides  
fluxées et non-fluxées pour les  
applications de brasage électronique  
(CEI 61190-1-3:2002)

Verbindungsmaterialien für  
Baugruppen der Elektronik  
Teil 1-3: Anforderungen an  
Elektroniklote und an Festformlote  
mit oder ohne Flussmittel für das  
Löten von Elektronikprodukten  
(IEC 61190-1-3:2002)

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This European Standard was approved by CENELEC on 2002-06-01. 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 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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

The text of document 91/279/FDIS, future edition 1 of IEC 61190-1-3, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61190-1-3 on 2002-06-01.

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) 2003-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-06-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes B and ZA are normative and annex A is informative.

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61190-1-3:2002 was approved by CENELEC as a European Standard without any modification.

SIST EN 61190-1-3:2003

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## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60194	1999	Printed board design, manufacture and assembly - Terms and definitions	-	-
IEC 61190-1-1	- <sup>1)</sup>	Attachment materials for electronic assembly Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly	EN 61190-1-1	2002 <sup>2)</sup>
IEC 61190-1-2	- <sup>1)</sup>	Part 1-2: Requirements for solder pastes for high-quality interconnections in electronics assembly	EN 61190-1-2	2002 <sup>2)</sup>
ISO 9002	- <sup>1)</sup>	Quality systems - Model for quality assurance in production, installation and servicing	EN ISO 9002	1994 <sup>2)</sup>
ISO 9453	1990	Soft solder alloys - Chemical compositions and forms	EN 29453	1993
ISO 9454-1	- <sup>1)</sup>	Soft soldering fluxes - Classification and requirements Part 1: Classification, labelling and packaging	EN 29454-1	1993 <sup>2)</sup>
ISO 9454-2	- <sup>1)</sup>	Part 2: Performance requirements	EN ISO 9454-2	2000 <sup>2)</sup>

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1) Undated reference.

2) Valid edition at date of issue.

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CEI  
IEC

61190-1-3

Première édition  
First edition  
2002-03

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**Matériaux de fixation pour  
les assemblages électroniques –**

**Partie 1-3:  
Exigences relatives aux alliages à braser  
de catégorie électronique et brasures solides  
fluxées et non fluxées pour les applications  
de brasage électronique**

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**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**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61190-1-3 has been prepared by IEC technical committee 91: Electronics assembly technology.

The text of this standard is based on the following documents:

FDIS	Report on voting
91/279/FDIS	91/289/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A is for information only.

Annex B forms an integral part of this standard.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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

## 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

#### 1 Scope

This part of IEC 61190 prescribes the requirements and test methods for electronic grade solder alloys, for fluxed and non-fluxed bar, ribbon, and powder solders, other than solder paste, for electronic soldering applications as well as for special electronic grade solders. For the generic specifications of solder alloys and fluxes, see ISO 9453, ISO 9454-1 and ISO 9454-2, respectively. This standard is a quality control document and is not intended to relate directly to the material performance in the manufacturing process

Special electronic grade solders include all solders which do not fully comply with the requirements of standard solder alloys and solder materials listed herein. Some examples of special solders are anodes, ingots, preforms, bars with hook and eye ends, multiple-alloy solder powders, etc.

#### 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.

- <https://standards.iteh.ai/catalog/standards/sist/dc3ab282-137e-4ac1-9256-497e19711203>
- IEC 60194:1999, *Printed board design, manufacture and assembly – Terms and definitions*
- IEC 61190-1-1, *Attachment materials for electronic assembly – Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly*<sup>1)</sup>
- IEC 61190-1-2, *Attachment materials for electronic assembly – Part 1-2: Requirements for solder pastes for high-quality interconnections in electronics assembly*<sup>1)</sup>
- ISO 9002, *Quality Systems – Model for Quality Assurance in Production, Installation and Servicing*
- ISO 9453:1990, *Soft solder alloys – Chemical compositions and forms*
- ISO-9454-1, *Soft soldering fluxes – Classification and requirements – Part 1: Classification, labelling and packaging*
- ISO-9454-2, *Soft soldering fluxes – Classification and requirements – Part 2: Performance requirements*

<sup>1)</sup> To be published.

### 3 Classification

Soldering materials covered by this standard shall be classified by alloy composition, solder form, flux type, flux percentage, and by other characteristics peculiar to the solder material form.

#### 3.1 Alloy composition

The solder alloys covered by this standard are the alloys listed in annex B, table B.1, and include pure tin and pure indium. Each alloy is identified by an alloy name, which is composed of a series of alphanumeric characters that identify the component elements in the alloy by chemical symbol and nominal percentage by mass, and ending with an arbitrarily assigned alloy variation letter (A, B, C, D, E). Alloys are also identified by an alloy short name, which is a five-character alphanumeric designation composed of the chemical symbol for the key element in the alloy (see A.4), the nominal percentage of that element in the alloy, and the arbitrarily assigned alloy variation letter. Annex B, table B.1, identifies alloy composition, the alloy short name, and alloy temperature characteristics. Annex B, table B.2, cross-references solidus and liquidus temperatures to alloy names. Annex B, table B.3, cross-references alloy short names to alloy names. Annex B, table B.4, cross-references ISO alloy numbers and designations from ISO 9453 to alloy names.

#### 3.2 Solder form

The forms of solder materials covered by this set of standards are listed with their single-letter designating symbols in table 1.

**Table 1 – Solder materials**

Identifying symbol	Solder form
F	Flux (only)
P	Paste (cream)
B	Bar
D	Powder
R	Ribbon
W	Wire
S	Special

#### 3.3 Flux type

The flux types used in/on solders covered by this set of standards are listed in table 2. The requirements for fluxes are covered by IEC 61190-1-1.