



BSI Standards Publication

Test methods for electrical materials, printed boards and other interconnection structures and assemblies

Part 5-301: General test methods for materials and assemblies —
Soldering paste using fine solder particles

National foreword

This British Standard is the UK implementation of EN IEC 61189-5-301:2021. It is identical to IEC 61189-5-301:2021.

The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic Assembly Technology.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Test methods for electrical materials, printed boards and other
interconnection structures and assemblies - Part 5-301: General
test methods for materials and assemblies - Soldering paste
using fine solder particles
(IEC 61189-5-301:2021)

Méthodes d'essai pour les matériaux électriques, les cartes
imprimées et autres structures d'interconnexion et
ensembles - Partie 5-301: Méthodes d'essai générales pour
les matériaux et les assemblages - Pâte à braser à fines
particules de brasage
(IEC 61189-5-301:2021)

Prüfverfahren für Elektromaterialien, Leiterplatten und
andere Verbindungsstrukturen und Baugruppen - Teil 5-
301: Allgemeine Prüfverfahren für Materialien und
Baugruppen - Lötpaste mit feinen Lötpartikeln
(IEC 61189-5-301:2021)

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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

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-04-21

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The text of the International Standard IEC 61189-5-301:2021 was approved by CENELEC as a European Standard without any modification.

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 61189-5-3	2015	Test methods for electrical materials, printed boards and other interconnection structures and assemblies - Part 5-3: General test methods for materials and assemblies - Soldering paste for printed board assemblies	EN 61189-5-3	2015
IEC 61190-1-2	2014	Attachment materials for electronic assembly - Part 1-2: Requirements for soldering pastes for high-quality interconnects in electronics assembly	EN 61190-1-2	2014
ISO 857-2	-	Welding and allied processes - Vocabulary - Part 2: Soldering and brazing processes and related terms	-	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**TEST METHODS FOR ELECTRICAL MATERIALS, PRINTED BOARDS AND
OTHER INTERCONNECTION STRUCTURES AND ASSEMBLIES –****Part 5-301: General test methods for materials and assemblies –
Soldering paste using fine solder particles**

FOREWORD

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IEC 61189-5-301 has been prepared by IEC technical committee TC 91: Electronics assembly technology. It is an International Standard.

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

Draft	Report on voting
91/1655/CDV	91/1698/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 61189 series, published under the general title *Test methods for electrical materials, printed boards and other interconnection structures and assemblies*, can be found on 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 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.

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TEST METHODS FOR ELECTRICAL MATERIALS, PRINTED BOARDS AND OTHER INTERCONNECTION STRUCTURES AND ASSEMBLIES –

Part 5-301: General test methods for materials and assemblies – Soldering paste using fine solder particles

1 Scope

This part of IEC 61189 specifies methods for testing the characteristics of soldering paste using fine solder particles (hereinafter referred to as solder paste).

This document is applicable to the solder paste using fine solder particle such as type 6, type 7 specified in IEC 61190-1-2 or finer particle sizes.

This type of solder paste is used for connecting wiring and components in high-density printed circuit boards which are used in electronic or communication equipment and such, equipping fine wiring (e.g., minimum conductor widths and minimum conductor gaps of 60 µm or less).

Test methods for the characteristics of solder paste in this document are considering the effect of surface activation force due to the fine sized solder particles which could affect the test result by existing test methods.

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 61189-5-3:2015, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 5-3: General test methods for materials and assemblies: Soldering paste for printed board assemblies*

IEC 61190-1-2:2014, *Attachment materials for electronic assembly – Part 1-2: Requirements for soldering pastes for high-quality interconnects in electronics assembly*

ISO 857-2, *Welding and allied processes – Vocabulary – Part 2: Soldering and brazing processes and related terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 857-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

digital microscope

microscope displaying an enlarged image on a screen of a personal computer or a monitor

4 Powder particle size distribution measurement

4.1 General

This measurement is for determining whether or not the solder particle used in the solder paste complies with the relevant powder particle size type. Solder particle specimen shall be obtained from the supplier or extracted from the solder paste according to 4.14.4 and 4.14.5 of IEC 61189-5-3:2015.

4.2 Powder particle size distribution measurement – Scanning electron microscope

4.2.1 Object

The powder particle size distribution of the solder particle is measured using scanning electron microscope (hereinafter, referred to as SEM).

4.2.2 Equipment/apparatus

SEM (Scanning Electron Microscope): 1 000 times or more magnification with image storage device.

4.2.3 Procedure

At least 100 solder particles shall be observed using SEM. Observation may be done either directly or using the acquired SEM image. The solder particle size shall be determined by assumption that the solder particles are spherical. The solder particle shall be sorted out according to the assigned classification type specified in Table 2 of IEC 61190-1-2:2014. The number of sorted solder particle shall be counted and converted into masses.

4.2.4 Evaluation

Express the masses of the particle above, within, and below the nominal size range as percentages of the mass of the original specimen. Enter the data in the test report. Annex A shows an example of the test report.

4.3 Powder particle size distribution measurement – Laser diffraction

4.3.1 Object

The powder particle size distribution of the solder powder is measured using laser diffraction type particle size distribution measuring apparatus.

4.3.2 Equipment/apparatus

- a) laser diffraction type particle size distribution measuring apparatus;
- b) balance: 0,01 g sensitivity;
- c) spatula.

4.3.3 Procedure

Measurement shall be done in accordance with the instructions of the measuring apparatus. Measure the blank sample to ensure the measuring apparatus is clean enough for measuring. 0,5 g to 10 g of solder powder shall be measured for the particle size distribution.