



# **IPC-4922** **2024 - January**

## **Requirements for Sintering Materials for Electrical and Thermal Interconnects**

*An international standard developed by IPC*



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# **Requirements for Sintering Materials for Electrical and Thermal Interconnects**

Developed by the Sintering Materials for Electronic Assemblies  
Task Group (5-21p) of the Assembly & Joining Committee (5-20) of IPC

Users of this publication are encouraged to participate in the  
development of future revisions.

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## Acknowledgment

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# Requirements for Sintering Materials for Electrical and Thermal Interconnects

## 1 SCOPE

This standard prescribes general minimum requirements for the classification and testing of sintering materials for reliable electrical and thermal interconnects. This standard is a sintering materials classification, quality assurance and procurement document for sintering materials.

**1.1 Purpose** This standard defines the characteristics of sintering materials through the definitions of properties and specifications of test methods and inspection criteria. The materials include both:

- 1) Fluid and semifluid paste and ink materials (in this section collectively designated “pastes”) made from a combination of solid metal particles combined with a continuous phase of material designated an “organic carrier vehicle” (OCV). The OCV may or may not contain dissolved or dispersed organometallics (OMC) or similar materials, and a broad means of their characterization is within the scope of this document.
- 2) Solid and semi-solid predried preforms and films (hereinafter collectively designated “preforms”) of various shapes and sizes.

Detailed OCV characterization remains out of the scope of this standard, since the OCV itself will not be used as a material separate from the sintering paste. However, cleanliness remains within the scope of the standard and **shall** be addressed as agreed between user and supplier (AABUS) concerning the determination of the residues after sintering, characterization of the same and cleaning processes.

The requirements for sintering materials are defined in general terms. In practice, where more stringent requirements are necessary, additional requirements **shall** be as agreed between user and supplier (AABUS).

The standard is explicitly not designed to cover liquid phase or transient liquid phase materials or their associated principles, methodologies, and techniques, as their joint formation mechanism is not by sintering.

## 1.2 Classification

### CLASS 1 General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

### CLASS 2 Dedicated Service Electronic Products

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failures.

### CLASS 3 High Performance/Harsh Environment Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when required, such as life support or other critical systems.

**1.3 Measurement Units** This Standard uses International System of Units (SI) units per ASTM SI10, IEEE/ASTM SI 10, Section 3 [Imperial English equivalent units are in brackets for convenience]. The SI units used in this Standard are millimeters (mm) [in] for dimensions and dimensional tolerances, Celsius (°C) [°F] for temperature and temperature tolerances, grams (g) [oz] for weight, and lumens (lm) [footcandles] for illuminance.

*Note:* This Standard uses other SI prefixes (ASTM SI10, Section 3.2) to eliminate leading zeroes (for example, 0.0012 mm becomes 1.2 μm) or as an alternative to powers-of-ten (3.6 x 10<sup>3</sup> mm becomes 3.6 m).

**1.4 Definition of Requirements** The words **shall** or **shall not** are used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance. The word “should” reflects recommendations and is used to reflect general industry practices and procedures for guidance only. Line drawings and illustrations are depicted herein to assist in the interpretation of the written requirements of this Standard. The text takes precedence over the figures.

**1.5 Process Control Requirements** The primary goal of process control is to continually reduce variation in the processes, products, or services to provide products or processes meeting or exceeding User requirements. Process control tools such as IPC-9191, JESD557 or other User-approved system may be used as guidelines for implementing process control.