

# IPC/JPCA-4591

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## Requirements for Printed Electronics Functional Conductive Materials

*A standard developed by IPC*

*Association Connecting Electronics Industries*



**JPCA**



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# Requirements for Printed Electronics Functional Conductive Materials

Developed by the Printed Electronics Functional Materials Subcommittee (D-63) of the Printed Electronics Committee (D-60) of IPC

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

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## Acknowledgment

Any document involving a complex technology draws material from a vast number of sources. While the principal members of the Printed Electronics Functional Materials Subcommittee (D-63) of the Printed Electronics Committee (D-60) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of IPC extend their gratitude.

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# Requirements for Printed Electronics Functional Conductive Materials

## 1 SCOPE

**1.1 Statement of Scope** This standard establishes the classification system, the qualification and quality conformance requirements for printed electronics functional conductive materials.

**1.2 Purpose** The purpose is to provide practitioners of printed electronics based products with the necessary technical structure to design and manufacture product meeting conformance to industry determined metrics.

**1.3 Classification System** Sections 1.3.1 through 1.3.3 identify the system used to classify printed electronics functional conductive materials.

**1.3.1 Thick Film Functional Conductive Material Definition** Thick film functional conductive material refers to the class of materials that post processing (thermal cure, UV cure, etc.) result in a continuous structure that has a thickness of equal to or greater than 1 micrometer. A thick film functional conductive material designation is intended for use by designers on master drawings to designate their functional conductive material choice.

**1.3.2 Thin Film Functional Conductive Material Definition** Thin film functional conductive material refers to the class of materials that post processing (thermal cure, UV cure, etc.) result in a continuous structure that has a thickness of less than 1 micrometer. A thin film functional conductive material designation is intended for use by designers on master drawings to designate their functional conductive material choice.

**1.3.3 Functional Conductive Material Designation** Functional conductive material designation should be in the form shown in the following example, and is intended for use on material purchase orders by fabricators (see Section 8). The specific designation should not be used by designers on master drawings to indicate their material selection. Designers **shall** specify on master drawings their material selection, and the specific designation is lengthy and requires fabricator level knowledge in making the detailed selections.

*Example of functional material specific designation:*

IPC-4591/3 – A1

**Where:**

IPC-4591/3 – Designation (see 1.3.3.1) for thin film.

A – Post-Processed Bulk Type Designation (see 1.3.3.2), specifying metal.

1 – Pre-Processed Conductive Element Type Designation (see 1.3.3.3), specifying spheres.

**1.3.3.1 Post-Processed Structure Dimensional Classification** The classification of the functional material structure post-processing **shall** be designated per Table 1-1.

**Table 1-1 Post-Processed Functional Material Structure Designation**

Designation	Type
1	Thick film
2	Thick film, transparent
3	Thin film
4	Thin film, transparent