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JOINT INDUSTRY STANDARD

Requirements for Soldering Fluxes

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IPC-J-STD-004D

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If a conflict occurs between the English language and translated versions of this document, the English version will take precedence.

Developed by the 5-24A Flux Specifications Task Group
of the Assembly and Joining General Committee 5-20 of IPC

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

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1 SCOPE

This standard prescribes general requirements for the classification and characterization of fluxes for high quality solder interconnections. This standard may be used for quality control and procurement purposes.

1.1 Purpose The purpose of this standard is to classify and characterize Sn/Pb and Pb-free soldering flux materials for use in electronic metallurgical interconnections for printed board assembly. Soldering flux materials include the following: liquid flux, paste flux, solder paste, solder cream as well as flux-coated and flux-cored solder wires and preforms. The fluxes involved relate to all aspects of application, such as: printed board fabrication, lead tinning, wave soldering, reflow and rework. Fluxes covered by this standard are intended for use in various applications in industry. It is not the intent of this standard to exclude any acceptable flux or soldering material; however, these materials must produce the desired electrical and metallurgical interconnection.

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 All dimensions and tolerances in this specification are expressed in hard SI (metric) units and bracketed soft imperial [inch] units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1 mm [0.0394 in] will be expressed in millimeters and inches. All dimensions < 1 mm [0.0394 in] will be expressed in micrometers and microinches.

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.

Manufacturers of Class 3 products **shall** develop and implement a documented process control system.

A documented process control system, if established, **shall** define process control and corrective action limits.

This may or may not be a statistical process control system. The use of “statistical process control” (SPC) is optional and should be based on factors such as design stability, lot size, production quantities, and the needs of the Manufacturer, see 4.6.

Process control methodologies **shall** be used in the planning, implementation and evaluation of the manufacturing processes used to produce soldered electrical and electronic assemblies. The philosophy, implementation strategies, tools and techniques may be applied in different sequences depending on the specific company, operation, or variable under consideration to relate process control and capability to end product requirements.

When a decision or requirement is to use a documented process control system, failure to implement process corrective action and/or the use of continually ineffective corrective actions would be grounds for disapproval of the process and associated documentation.