



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

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Qualification and Performance Specification of Permanent Solder Mask

Developed by the Solder Mask Performance Task Group (5-33b) of the
Cleaning and Coating Committee (5-30) of IPC

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

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1 SCOPE AND DESIGNATION

1.1 Scope This specification **shall** define the criteria for and method of obtaining the maximum information about and confidence in cured permanent solder mask material under evaluation with the minimum of test redundancy.

This specification **shall** establish the requirements for:

- The evaluation of solder mask materials.
- The conformance of solder mask material properties.
- The qualification of the solder mask via the appropriate test substrate.
- The qualification assessment of the solder mask in conjunction with the production printed board process.

1.2 Purpose This specification **shall** establish the requirements, based on applicable test methods and conditions, for the evaluation of a solder mask material and for the determination of the acceptability of use on a standard printed board system. These same requirements **shall** also be used to qualify a printed board production process based on conformance criteria defined by the reliability requirements of the end use environment. Acceptability and/or verification criteria of the production printed board **shall** be determined in accordance with the applicable performance requirements contained in IPC-6011, IPC-6012, IPC-6013 and IPC-6018.

The solder mask materials described herein, when applied to the printed board substrate **shall** prevent and/or minimize the formation and adherence of solder balls, solder bridging, solder build-up and physical damage to the printed board substrate. The solder mask material **shall** help retard electromigration and other forms of detrimental or conductive growth.

NOTE: The determination of compatibility between solder mask materials and post soldering products and processes is beyond the scope of this specification. The use of Test Methods specified herein to determine the compatibility and the requirement to do so shall be as agreed between user and supplier (AABUS).

This specification **shall** list the base requirements for solder mask and solder mask production processes. The solder mask **shall** be cured per the manufacturer's recommended process in accordance with those conditions specified for that product. Additional requirements or deviations from these requirements **shall** be AABUS.

1.3 Classes This specification provides two classes of requirements, T and H, to reflect functional performance requirements and testing severity based on industry/end use requirements. Qualification to a particular class **shall not** be extended to cover any other class.

Note: The reference of a single class does not preclude invoking or allowing specific requirements defined in other classes.

T – Telecommunication This includes computers, telecommunication equipment, sophisticated business machines, instruments, and certain noncritical military applications. Solder mask on printed boards in this class is suitable for high performance commercial and industrial products in which extended performance life is required but for which interrupted service is not life threatening.

H – High Reliability/Military This includes that equipment where continued performance is critical, equipment down-time cannot be tolerated and/or the equipment is a life support item. Solder mask on printed boards of this class is suitable for applications where high levels of assurance are required and uninterrupted service is essential.

Notes:

- **Class Designations** – Previous versions of this and other IPC specifications make reference to “Class 1,” “Class 2,” and “Class 3” end product classes. For all practical purposes there is no Class 1 solder mask. The requirements in this specification are not applicable for solder mask used in Class 1 end-product. Class 2 is equivalent to Class T (Telecommunications). Class 3 is the equivalent of Class H (Military/high reliability).
- Solder mask types were previously described as Type A for screen imaged (liquid) or coverlay for flex (dry), and type B for all types of photo defined solder mask (liquid or dry film). A Type B1 solder mask was identified as a liquid solder mask and a Type B2 solder mask was identified as a dry film solder mask.

1.4 Presentation Dimensions and tolerances **shall** be expressed in metric units. English units are shown in brackets [] and are not necessarily direct conversions or usable numbers. Reference information is shown in parentheses (). Deviations to this **shall** be AABUS.

1.5 Terms and Definitions The definition of terms **shall** be in accordance with IPC-T-50 and as stated in 1.5.1 through 1.5.16.