IPC-4555

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Performance Specification for High Temperature Organic Solderability Preservatives (OSP) for Printed Boards

An international standard developed by IPC

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- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

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- Keep people out
- Increase cycle time
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Performance Specification for High Temperature Organic Solderability Preservatives (OSP) for Printed Boards

Developed by 4-14E Final Finishes for Printed Boards – OSP Task Group of IPC

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

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Performance Specification for High Temperature Organic Solderability Preservatives (OSP) for Printed Boards

1.0 SCOPE

This performance specification sets requirements for High Temperature Organic Solderability Preservatives (OSP-High Temperature) for Pb-free soldering. It is intended for use by chemical suppliers, printed board manufacturers, electronics manufacturing services (EMS) and original equipment manufacturers (OEM).

1.1 Purpose This standard may be used to specify acceptance criteria to meet performance requirements in addition to those found in the IPC-6010 family (IPC-6011, IPC-6012 and IPC-6013) of standards. The OSP deposit specified by using this document will meet the highest coating durability rating for OSP as specified in the J-STD-003 printed board solderability specification.

This specification is based on three critical factors:

1.1.1 The OSP coating process is in control producing a normal distribution for organic film coating thicknesses.

1.1.2 That the tool used to measure the deposit and therefore control the process is accurate and reproducible for the thickness range specified.

1.1.3 That the OSP process results in uniform deposit characteristics.

If any of these three critical factors are not met, then the deposit produced will not meet the performance criteria defined herein.

1.2 Feature Size for Thickness Measurement This performance specification has been generated based on a deposit thickness measured ONLY on feature sizes per each supplier's procedure. Measurement of non-standard feature sizes and/or a combination of different feature sizes will prevent compliance to the statistical requirements of this specification. Requirements to measure non-standard sized features is AABUS and the supplier of the printed board is not responsible for the performance of the deposit as specified in this document.

1.3 Description OSP is an organic containing coating that is applied directly to a bare copper surface. It is a single use surface finish typically used for soldering. It may be used in conjunction with gold, both electrolytic gold and ENIG/ENEPIG. In such cases use of a so-called selective OSP is necessary to avoid formation of OSP deposits on the gold surfaces. The OSP layer protects the underlying copper from oxidation. Some OSP processes have been validated for use with press fit applications (IPC-9797).

1.4 OSP Chemical Descriptions: High Temperature OSP processes are compatible with the higher temperatures of lead-free assembly.

OSP processes (for higher temperatures of lead-free assembly) are typically acidic and the main functional material is a nitrogen containing organic molecule. Each supplier of the OSP process **shall** ensure that its particular formulation is compatible with lead-free assembly. It is the function of the OSP coating to minimize oxygen penetration to the base metal during multiple thermal excursions.

1.5 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 **shall** function when required, such as life support or other critical systems.