IPC-9716

Requirements for Automated Optical Inspection (AOI) Process Control for Printed Board Assemblies

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Developed by the Automated Optical Inspection Process Control Standard Task Group (7-25a) of the Process Control Management Committee (7-20) of IPC

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1 SCOPE

This standard provides requirements for automated optical inspection (AOI) systems to define, set up, establish and apply process control for manufacturing printed board assemblies, including general and specific process and AOI system conditions. Requirements include inspection parameters, lighting conditions, calibration, detectability, resolution, threshold limits and program setups, measurement system analysis (MSA), maintenance and verification protocols.

1.1 Purpose The purpose of this standard is to set industry-defined requirements for AOI systems to reduce false calls to ensure quality and reliability of printed board assemblies, with improved throughput and shortened cycle times. This standard also supports electronics manufacturers to enable advanced manufacturing, real-time data analytics and control capabilities.

1.2 Classification This standard recognizes that electrical and electronic assemblies are subject to classifications by intended end-item use. Three general end-product classes have been established to reflect differences in manufacturability, complexity, functional performance requirements, quality and reliability requirement, and verification (inspection/test) frequency.

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 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 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.

Where the words **shall** or **shall not** are used in this standard, the requirements for each class are in brackets next to the requirement.

N = No requirement has been established for this Class but may require separate criteria as agreed between the Manufacturer and User.

A = Acceptable

P = Process Indicator

D = Defect

Examples:

[A1P2D3] is Acceptable Class 1, Process Indicator Class 2 and Defect Class 3

[N1D2D3] is No requirement has been established Class 1, Defect Classes 2 and 3

[A1A2D3] is Acceptable Classes 1 and 2, Defect Class 3

[D1D2D3] is Defect for all Classes

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.