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Guidelines for Design, Manufacture, Inspection and Testing of Electronic Enclosures Assembly

Developed by the Requirements for Structural Enclosure Task Group (7-31j) of the Product Assurance Committee (7-30) of IPC

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

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Table of Contents

Figures

Tables

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1 PREFACE

1.1 Scope This document has been written to assist the designers, manufacturers and end users of electronic enclosures of electrical and electronic equipment to understand the best practices to meet requirements, ensuring the reliability and function of the end item assembly for its intended design life.

An electronic enclosure, for the purpose of this document, is defined as a chassis, box, top level assembly, high level assembly (HLA), functional unit, drawer, cabinet, or other designation forming a top level system assembly. An enclosure typically consists of a combination of printed board assemblies (PBAs), cable and wire harness assemblies and other electronics and/or mechanical components, and is typically tested as a functional unit. The enclosure includes the necessary mechanical and structural elements to protect and integrate the assembly into a finished system. Enclosures are often modular components or sub-systems of larger systems, designed for replacement in the end-use environment.

1.2 Purpose This handbook provides guidelines for the design, manufacture, inspection and test for electronic enclosures. It is not enough to understand the properties of the various components, materials and processes; the user should understand what is to be achieved by the set of selected components, materials and processes within the end use environment and how to verify that the desired results have been realized.

This document is intended to be used as a reference only. It is the responsibility of the user to determine the suitability, via appropriate testing, of the selected electronic enclosure and application method for a particular end use application. An electronic enclosure may have several functions depending on the type of application. The most common are:

a. To protect the electronic assembly from the end use environment, such as vibration, shock and other movements detrimental to electronic assemblies

b. To incorporate into the end use environment.

1.3 Applicability This handbook covers high reliability type end item equipment, such as Aerospace, Defense, Medical, Telecom, etc. Not all specialized technologies are covered in this handbook.

This handbook is for guidance only and cannot be cited as a requirement. If it is, the supplier does not have to comply.

The use of words like, ‘‘must,’’ ‘‘should’’ and ‘‘shall’’ have no special meaning in this guideline. They do not indicate a binding criterion.

1.4 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 producibility, complexity, functional performance requirements and verification (inspection/test) frequency. It should be recognized that there may be overlaps of equipment between classes.

The product class should be stated in the procurement documentation package.

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 should function when required such as life support or other critical systems.