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Guidance for the Development and Implementation of a Foreign Object Debris (FOD) Control Plan

A White Paper Report Developed by IPC

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In May 1995 the IPC's Technical Activities Executive Committee (TAEC) adopted Principles of Standardization as a guiding principle of IPC's standardization efforts.

Standards Should:
- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- 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

Standards Should Not:
- Inhibit innovation
- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

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Guidance for the Development and Implementation of a Foreign Object Debris (FOD) Control Plan

Developed by the Wire Harness Design Task Group (7-31k)
of the Product Assurance Committee (7-30) of IPC

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

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Guidance for the Development and Implementation of a Foreign Object Debris (FOD) Control Plan

TECHNICAL BACKGROUND

Most Foreign Object Damage/Foreign Object Debris (FOD) issues can be attributed to poor housekeeping, facilities deterioration, improper maintenance, careless assembly, or inadequate operational practices. An effective FOD Prevention Program (Control Plan) identifies potential problems, corrects negative factors, promotes awareness, provides for effective employee training, and uses ‘‘lessons learned’’ for continual improvement. The objective of any FOD Prevention Program should always be zero FOD, to provide visibility to problem areas and trends, provide management and workers with inspection results, incident/mishap reports, and feedback of progress.

1 GENERAL REQUIREMENTS

1.1 Scope This document introduces design concepts, attributes, and recommendations for the control and mitigation of performance and reliability risks associated with the introduction of Foreign Object Debris (FOD) in electrical and electronic (E/E) assemblies, including optical and metallic cable and wiring harness assemblies, and elements thereof.

1.2 Purpose The intent of this document is to provide guidance and a template for the development and implementation of a Foreign Object Debris (FOD) Control Plan.

For purposes of this document:
- The Designer is the design agent for the User.
- The User is the individual, organization, company, contractually designated authority, or agency responsible for the procurement or design of electrical / electronic / electromechanical (EEE) hardware, and having the authority to define the class of equipment and any variation or restrictions to the requirements of this document (e.g., the originator/custodian of the contract detailing these requirements). The User is the Design Authority.
- The Supplier is the individual, organization or company that provides the Manufacturer (assembler) components (electrical, electronic, electromechanical, mechanical, printed boards, etc.) and/or materials (solder, flux, cleaning agents, etc.).
- The Manufacturer is considered the entity that provides a service or product to the User.

Figure 1-1 Foreign Object Debris (FOD) Logo

1.3 Applicability This document is targeted for control of Foreign Object Debris (FOD) in areas where both critical and complex work is performed, and to operations involved with designing, developing, manufacturing, assembling, testing, operating, repairing, modifying, refurbishing, and maintaining Class 3 (or higher) hardware to the User specified cleanliness level.

a. The design concepts, guidelines, and procedures presented in this document are for guidance ONLY, and **are not** requirements. As such, the use of the words ‘‘**must**,’’ ‘‘**should**’’ and ‘‘**shall**’’ (and derivations thereof) have no special meaning in this document, and they **do not** indicate a binding criterion.

b. This document **is not** binding, unless separately and specifically included by the applicable contract, approved drawing(s), or purchase order.

1.4 Commercial Off-The-Shelf (COTS) This document **does not** apply to Commercial-Off-The-Shelf (COTS) or catalog items (e.g., components, assemblies, subassemblies and/or hardware). Designers considering the use of COTS hardware for applications described above **are** responsible for identifying and managing risks associated with hardware built without a control plan to control and/or reduce the introduction of Foreign Object Debris (FOD) in electrical and electronic (E/E) assemblies, including optical and metallic cable and wiring harness assemblies, and elements thereof.

1.5 Existing or Previously Approved Designs The implementation of a Foreign Object Debris (FOD) Control Plan **should not** constitute the sole cause for the redesign of previously approved designs. When drawings for existing or previously approved designs undergo revision, they **should** be reviewed and changes made that allow for compliance with the requirements of this document.