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AEROSPACE RECOMMENDED PRACTICE

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Superseding ARP1870

Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety

RATIONALE

The document is still a valid standard which may benefit from a future update. The basic technology described in the document is still valid. The subcommittee designated to update the document is not currently active, so stabilization of the document is the best approach until such time as a committee can be established to open a WIP.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE AE-4, Electromagnetic Environmental Effects (E3) Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

1.1 Purpose:

This document establishes the minimum requirements for the electrical bonding and grounding of electric, avionic, armament, communication, and electronic equipment installations for aeronautical and aerospace applications. The bonding and grounding requirements specified herein are to ensure that an adequate low resistance return path for electric, avionic, armament, communication and electronic equipment is achieved which can withstand operating conditions and corrosion. This is essential for the reduction of coupling of electromagnetic fields into or out of the equipment as well as for providing electrical stability to control the currents and/or voltages caused by static charges and discharges and for suppressing the hazardous effects thereof.

1.2 General:

A prerequisite to effective control of electromagnetic interference (EMI) and the hazards of electrical effects is the establishing of a reference ground plane and the means of providing adequate connections to it. Making a connection to the ground plane is grounding, and the mechanical method of providing a low impedance union between conductors is electrical bonding.

2. REFERENCE DOCUMENTS:

The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this standard to the extent specified herein.

Standards

MIL-STD-889	Dissimilar Metals
MIL-STD-1250	Corrosion Prevention and Deterioration Control in Electronic Components and Assemblies
MIL-STD-1757	Lightning Qualification Test Techniques for Aerospace Vehicles and Hardware

Specifications

MIL-M-3171	Magnesium Alloys, Processes for Pretreatment and Prevention of Corrosion on
MIL-B-5087	Bonding, Electrical and Lightning Protection, for Aerospace Systems
MIL-S-5002	Surface Treatments and Inorganic Coatings for Metal Surfaces of Weapons Systems
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-E-6051D	Electromagnetic Compatibility Requirements, Systems
MIL-C-7439	Coating System Elastomeric Rain Erosion Resistant and Rain Erosion Resistant with Anti-Static Treatment for Exterior Aircraft and Missile Plastic Parts
MIL-I-46058	Insulating Compound, Electrical (for Coating Printed Circuit Assemblies)
MIL-T-83454	Terminals, Stud, Blind Plate, for Electrical Bonding and Grounding (Noninsulated)

2. (Continued):

TT-L-32	Lacquer, Cellulose Nitrate, Gloss for Aircraft Use
TT-L-20A	Lacquer, Camouflage
MS 25083	Jumper Assembly, Electric, Bonding and Current Return
NATO Stanag 3859	Standardized Data List for Interoperability Studies and Certification of Aircraft Stores on Fixed Wing Aircraft and Helicopters
DH1-4	Design Handbook, Electromagnetic Compatibility
Military Handbook MIL-HDBK-274 (AS)	Military Handbook - Electrical Grounding for Aircraft Safety

Miscellaneous Publications

ASCC 12/24	Air Standardization Coordinating Committee Document
SAE ARP1481	Corrosion Control and Electrical Conductivity in Enclosure Design
NASA RP-1008	Lightning Protection of Aircraft
FAA AC 20-53 ( )	Protection of Aircraft Fuel Systems Against Lightning
BCAR D4-6	Electrical Bonding and Lightning Discharge Protection

3. DEFINITIONS:

For the purpose of this specification, the following definitions are applicable:

Bond - An electrical connection between conductive parts which provides the required electrical conductivity.

Bonded - Conductive parts that are considered to be bonded when they are mechanically interconnected to maintain a common electrical potential.

Equipotential - For all practical purposes, an identical state of electrical potential for conducting item(s).

Equipment - Any electrical, electronic or electromechanical device, or collection of items, intended to operate as an individual unit and performing a singular function. As defined herein, equipments include, but are not limited to, the following: receivers, transmitters, transceivers, transponders, power supplies, electrical office machines, hand tools, processors, test apparatus and instruments, and material handling equipment.

Ground - A conducting connection, whether intentional or accidental, by which an electric current or equipment is connected to the earth, or to a conducting structure that serves a function similar to that of an earth ground (that is, a structure such as a frame of an air, space or land vehicle that is not conductively connected to earth).