

Instruction
Hardware Engineering

No. LMS 11-13

Subject: Electrical Bonding

APPROVED BY Manager, Hardware Engineering

STATUS Maintenance Revision

PURPOSE Defines electrical bonding requirements for use in grounding components, cases, and wiring of electronic equipment. It does not cover grounding of shielded and coaxial cable (refer to **LMS 11-18**, “Shielded Wire and Coaxial Cable Terminations”). L-3 Communications Corporation, Link Simulation & Training Division (hereafter referred to as Link) personnel shall follow the requirements of this instruction whenever electrical bonding is required.

AFFECTED FUNCTIONS Hardware Engineering
Manufacturing

REFERENCES **LMS 11-18** Shielded Wire and Coaxial Cable Terminations
MIL-C-5541 Chemical Conversion Coatings on Aluminum and Aluminum Alloys

DEFINITIONS

Bond. A bond is any fixed union existing between two objects that results in electrical conductivity between the objects. Such a union occurs either from physical contact between conductive surfaces of the objects or from the addition of a firm electrical connection between them.

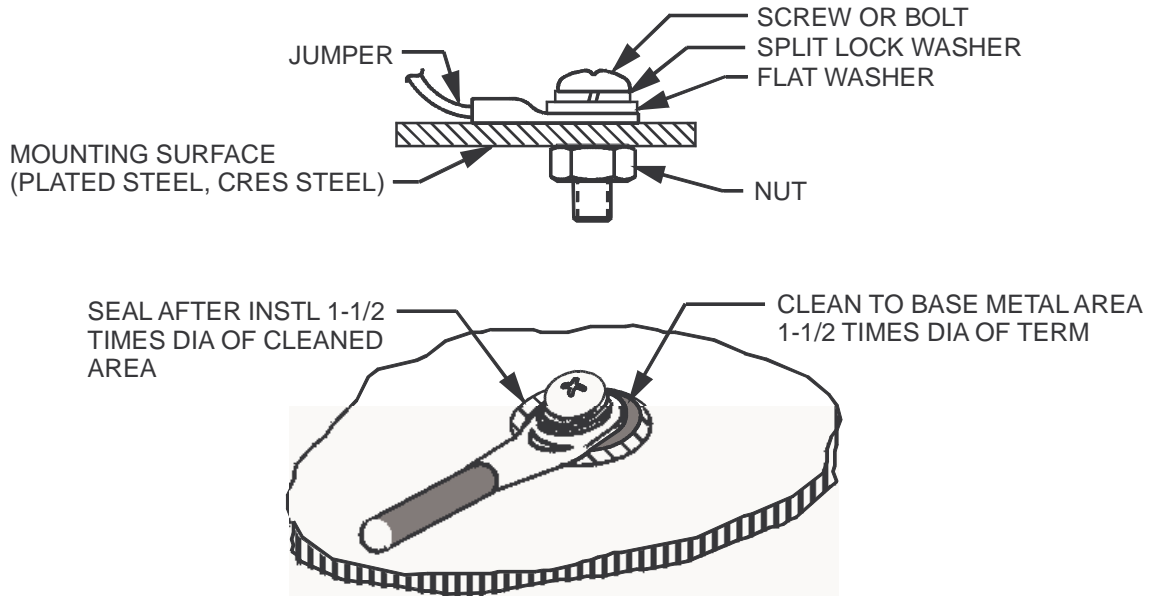
Bonding. Bonding is the process of connecting together metal parts so that they make low resistance electrical contact for direct current and lower frequency alternating current.

Grounding. Grounding is the electrical connection of signal or power return circuits to the reference ground plane.

INSTRUCTION

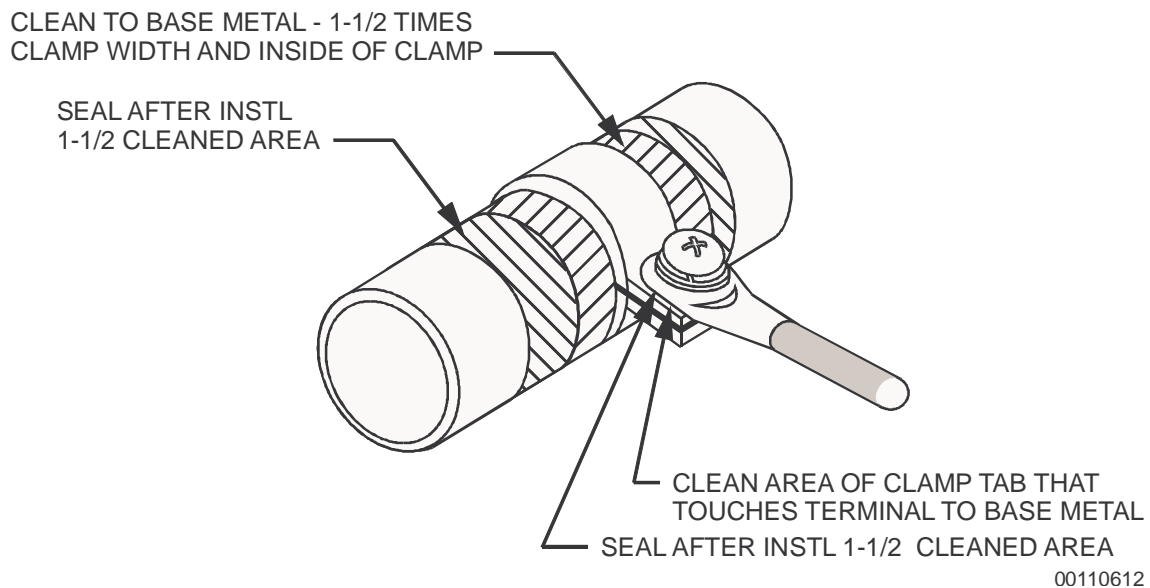
1. Requirements
 - 1.1 Bonding. When a component, assembly, or subassembly is to be bonded per the drawing, the connection shall meet the applicable requirements of this instruction.

- a. Surface preparation. Surface preparation for an electrical bond shall be accomplished by removing, to bare metal, all anodic film, grease, paint, lacquer, or other high-resistance properties from the immediate area to insure electrical contact between adjacent metal parts.
 - (1) Abrasives which cause corrosion, if embedded in the metal, shall not be used for preparation of bonding surfaces. If abrasives or scrapers are used to remove any protective finish, they shall be of such a nature that a clean, smooth surface is produced without removing excessive material under the protective finish.
 - (2) Use of steel wool is prohibited since corrosion by galvanic action may result due to deposits left on the metal surface. Wire brushing or scrapers are the preferred methods of removing nonconductive material from metallic surfaces.
- b. Aluminum alloys. After surface preparation and the assembly area conditions permit, the exposed base metal areas of the parts should receive a brush coating of Iridite No. 14-2, in accordance with MIL-C-5541 (MPM F-20, IIC), then reassemble the parts.
- c. Sealing or refinishing. When it has been necessary to remove any protective coating on metallic surfaces, the assembled connection shall be refinished with the original surface finish or other suitable protective finish within 24 hours after inspection. In no case shall refinishing be delayed more than 7 days after removal of the finish. If paint finish has been removed and a paint finish is required on the final assembly, seal with the original finish. Connections on surfaces that are and will remain unpainted may be sealed with clear lacquer.
- d. Figures 1 through 4 illustrate some typical bonding connections and are intended only to depict cleaning and sealing areas. It is not intended that they dictate attaching hardware or hardware arrangement.



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Figure 1 Typical Bonding Connection



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Figure 2 Typical Clamp Connection

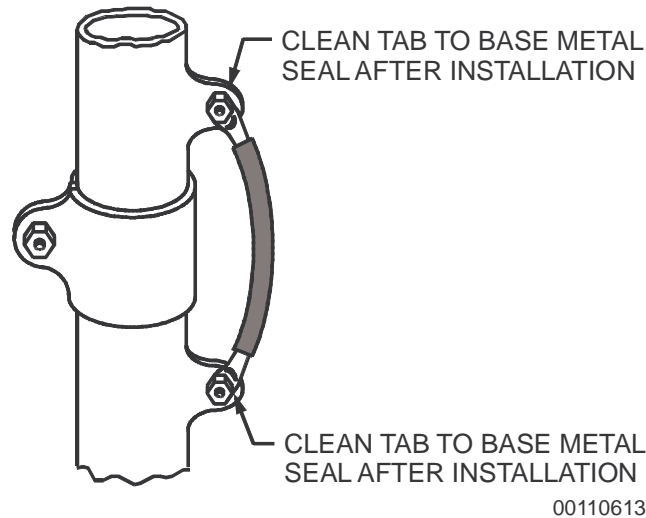


Figure 3 Typical Method of Bonding Tubing Across Clamps

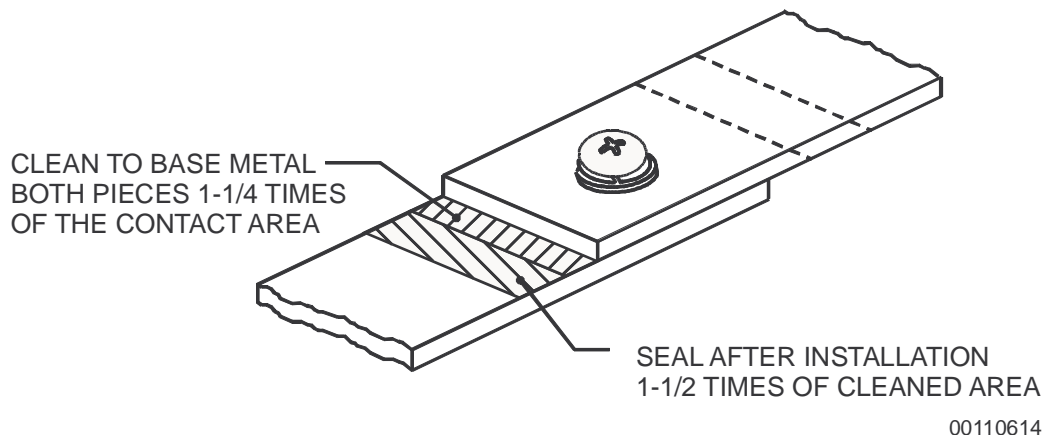


Figure 4 Typical Bonding Connection for Bolted Structural Joints

2. Quality Assurance Provisions
 - 2.1 The Quality Assurance Organization shall be responsible for assuring that the requirements of this instruction are met.
3. Preparation For Delivery (Not Applicable)

**UNSIGNED HARDCOPY
NOT CONTROLLED**



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4. Notes

4.1 This instruction supersedes Binghamton Standard Shop Practice 7.16.1.