

Bonding Of Electrical Systems In The Entertainment Industry

What is the difference between bonding and grounding?

Bonding: a connection of all metal parts of any equipment in or near the distribution system with a common (green) conductor. This provides a path for fault current back to the source to reduce the risk of shock.

Grounding: a (low impedance) connection to earth obtained by a grounding electrode(s). Sufficiently sized to carry any potential fault current and allows overcurrent devices to function correctly.

See EESCO document “Grounding Of Generators In The Entertainment Industry” for additional information.

Why do I have to bond?

To eliminate any potential voltage differences between metal surfaces and reduce the risk of electrical shock.

What is required to be bonded?

All cord connected utilization equipment must be approved and (unless double insulated) will be bonded as a requirement of the approval.

All metallic parts of any adjacent equipment that is in or near the distribution system. i.e., stages, scaffolding, lifts, fencing, etc.

Note: All bond connections shall be metal to metal. Remove paint if required.

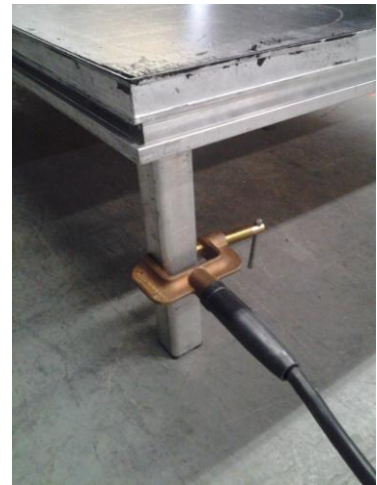
Examples of metal surfaces to be bonded:



Mobile Stage frame bonded



Lift bonded



Stage bond

When is a bond conductor used?

All distribution wiring must include a bond conductor. In multi-conductor cable the bond conductor must be an integral part of the cable. In single conductor cable sets the bond conductor must run with the line conductors.

What methods of bonding adjacent equipment are acceptable?

Acceptable connectors (examples below) and correctly sized bond conductors.

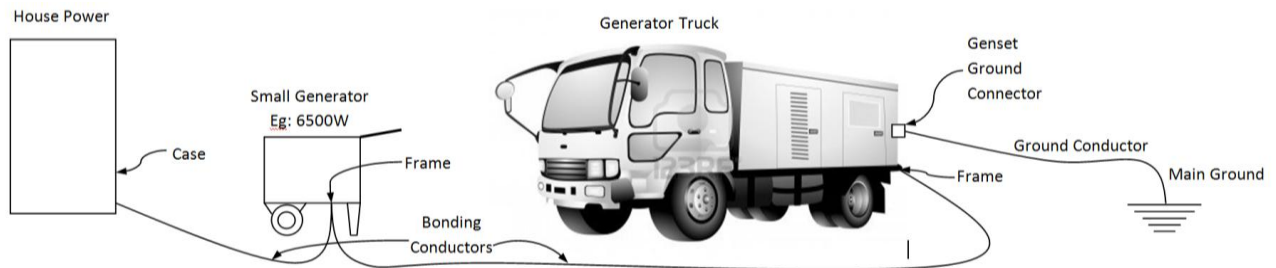


Bond conductor size table:

| Ampacity of Overcurrent Protection | Size of Copper Bonding Conductor AWG |
|------------------------------------|--------------------------------------|
| 100 or less | 4 |
| 101 to 200 | 2 |
| 201 to 300 | 2/0 |
| 301 and above | 4/0 |

I have multiple electrical systems. When do I need to bond them?

When multiple electrical systems are in proximity to each other and do not share the same ground electrode they shall be bonded together. Multiple systems could include systems supplied by multiple generators (regardless of size) or combinations of generator and utility sources.



Note: To reduce chances of electrical shock all metal surfaces in the proximity of any electrical systems must be considered when bonding. The primary concern is the path of single conductor cables near metal surfaces and the bonding of these metal surfaces. Any metal surfaces having electrical wires passing through, over or on them must be bonded. Think about it.....

What if I have other questions?

If you have further questions, visit the EESCO website (www.eesco.ca), consult SPEC-003, the Ontario Electrical Safety Code Section 10 or call your ESA inspector.