# Welding Aluminum Bus to Aluminum Connectors



Welding of aluminum in electrical construction offers a superior and economical means of joining conductors. Electric arc welding using an inert gas shield produces mechanically and electrically sound joints requiring no flux or special surface preparation other than the cleaning of the surface to be welded.

A welded connection that is mechanically satisfactory is also electrically satisfactory. With welded connections, there is an essentially homogeneous union that gives a permanent stable connection. It is not necessary to try to produce a connection with the same resistance as bus itself in order to have a stable permanent joint.

There are bus connectors where it is important to insure a resistance ratio of unity with the conductor itself. Small differences in resistance can affect the current distribution in some bus systems. Some bus systems require equalization bars. Welded connections are an ideal solution to both problems. Such connections can be made by following procedures outlined in The American Welding Society Handbook "Welding Aluminum."



© 2011, AFL, all rights reserved. PP-3-00213, Revision 3, 8.9.2022
Specifications are subject to change without notice.

# General Welding Specifications for Tubular Aluminum Bus Conductor

The following items cover key points that should be included in specifications for welding aluminum bus conductors. It is recommended that the references be reviewed in the preparation of proprietary welding specifications.

1. The welding process and all welding operators should be qualified in accordance with the Aluminum Association, "Aluminum Construction Manual" Section 7.2.4 "Qualification of Welding Procedure and Welding."
2. All Joints to be welded should be free of moisture and hydrocarbon. Moisture can be removed thermally, but the temperature applied should not exceed 250°F (121°C). Degreasing should be done with a non-toxic solvent so as to leave a minimum of residual on the parts. Sufficient time must be allowed for evaporation of the solvent prior to welding. Wire brushing with a stainless steel wire brush should be employed after solvent cleaning to remove thick heat-treat oxide films, water stains, etc., to permit optimum fusion and soundness of the weld.
3. All welds should be made by the gas metal-arc (MIG) or the gas tungsten-arc (TIG) welding process. Reversed polarity direct current should be used for MIG welding, whereas alternating current should be used for TIG welding. The shielding gas should be welding grade Argon, Helium, or a mixture of the two. Filler alloy 4043 should be used.
4. The working area should be substantially draft free and should be protected from atmospheric contamination.
5. All connections should be checked before, during and after the weld is made. Before the weld is begun, visually inspect the connection to determine proper edge preparation and alignment. During the weld, maintain a smooth and continuous flow of metal into the joint and maintain a constant current setting on the welding station. When several passes are to be made, check the previous pass before laying down the next one to enable detection of poor fusion or cracks. Defective areas should be removed with a dry chisel prior to application of subsequent weld passes. After the weld has been complete, it should be visually inspected again for quality and to insure the weld bead is of the correct size. The cross sectional area of the weld should not be less than that of the smallest member being joined.
6. Members being joined should be tack welded in place to prevent misalignment during the welding process.



© 2011, AFL, all rights reserved. PP-3-00213, Revision 3, 8.9.2022
Specifications are subject to change without notice.