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THE WELDING OF ALUMINUM BUSS

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

The scope of material presented here will be primarily directed at the making of electrically sound joints, however the cross section of the aluminum buss involved tends to be covered under mechanical construction techniques.

Control of the quality of welded joints is essential if the fabricated part is to perform satisfactorily in service. Quality control starts with the procurement of materials and is involved in all operations performed in producing the part from design to final inspection. Proper supervision of welding operations and maintenance of equipment is necessary for quality aluminum weldments. Aluminum does not permit as much deviation from established procedures as does mild steel. In addition, some types of defects in aluminum weldments are not as readily detected by non-destructive testing.

The two most adaptable methods of welding aluminum are tungsten arc welding (TIG) and consumable electrode welding (MIG). Both use inert gas shields of either argon and/or helium.

Cleanliness is vitally important for both TIG and MIG welding. Any impurities such as dirt, grease or heavy oxide will contaminate the weldment resulting in a porous weld and/or non-metallic inclusions and/or incomplete fusion. This weldment will be of high resistance and weak mechanically.

Good penetration is vital for an efficient joint. Trepanning, polishing and etching will indicate if proper penetration is achieved. Inadequate penetration can be caused by filler rod composition and/or size, technique, heat, manipulation or cleaning.

In conclusion, inspection should continue throughout the welding process. The welding operator should be made responsible for checking to see that gas and current settings do not change. He should check the previous pass before laying down the next one. This permits the detection of slag accumulations that were not removed. Although appearance of the weld is not a positive indication of quality, it gives a good clue to the care which has been used in making the weldment.

Distribution:

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Welding Alcoa Aluminum

Alcoa Aluminum Bus Conductor Handbook

Reynolds Aluminum Bus Conductor

Welding Aluminum — American Welding Society