

Tungsten Inert Gas (TIG) Arc Welding of Duramold-5 (5xxx series) Mold Plate

Scope: This welding procedure should be used to repair false cuts, defects, etc., in molds made from Duramold-5 mold plate. It is not necessarily applicable for repair of mold plate made from other alloys (Duramold-2, for example).

Welding Process: Gas tungsten arc welding using alternating current is to be used.

Welding Power Supply: A power supply capable of supplying square wave AC current should be used. The balance control should be set on approximately 65% (i.e., 65% straight polarity, 35% reverse polarity), but should be trimmed to obtain sufficient weld cleaning action. The high frequency arc stabilizing current should be set on "continuous".

Welding Position: Whenever possible, all welding should be performed in the downhand (flat) position. If welding must be performed out of position, use the vertical up position. Avoid overhead welding since it is very prone to developing porosity.

Pre-weld Cleaning: The surfaces to be welded and the surrounding area must be free of oils and greases. This is usually done by wiping the area with a clean, lint free rag saturated with an appropriate solvent, such as acetone, toluene, xylol, or MEK. Alternatively, the area can be degreased by using an appropriate alkaline-based aluminum cleaner. If such a cleaner is used, it must be completely wiped off before welding. In any case, the area to be welded **MUST** be completely dry before welding. If the surface of the aluminum is bright, deoxidization is not required before welding. However, if the aluminum surface is dull or water stained, the oxide should be removed before welding by wire brushing with a stainless steel wire brush. This brush should only be used on aluminum. Brushes that have been previously used on steel or copper alloys should not be used on aluminum.

Preheat: No preheat is required when welding Duramold-5. Higher temperature preheats should be avoided.

Shielding Gas: The shielding gas should be pure Helium. The flow rate should be 30-40 SCFH.

Welding Torch: A water-cooled welding torch must be used. Torches should be either 500 amp torches, such as the Weldcraft WP-12 or 18-P, or as a minimum, a 350 amp Weldcraft WP-18 type torch.