



11/2/2006

INSPECTION & REPAIR OF ALUMINUM FABRICATION WELDS

When possible, all repairs should be done by the original manufacturer. When it is not possible or impractical for repairs to be done by the original equipment manufacturer, the manufacturer should be contacted with details and pictures of repairs needed so information and instructions can be given as to how to proceed with the repairs. All repairs to aluminum welds should be done by certified AWS standards aluminum welders.

In response to the question how to inspect and repair our aluminum bricking machine frames please consider the following:

- 1) First be very careful and do not expect Aluminum to react like steel. They are two different animals and aluminum though as strong as steel is 3 times as flexible. Therefore the design, fabrication, welding and repair of aluminum structures can be very challenging.
- 2) Welding and inspection should be in accordance to AWS D1.2 -2003 an internationally recognized and used standard. Welding and Inspection should be done by a certified welder or under the supervision of a certified inspector guided by the AWS standards.
- 3) Inspection:
 - a. Unlike steel, aluminum welds cannot be inspected with a mag-flux process. A die penetrate process can be utilized. Care should be taken to clean the area thoroughly before applying the chemicals used in this process. Any cracks or defects (inclusions, contaminants, etc.) will be highlighted in red.
 - b. Visual inspection by an experienced or certified welder is another option. The inspector looks for obvious cracks or heat distortions. Cracks at the beginning or end of a weld can be inspected for stress cracks. Cracks within the creator are ok; cracks extending outward from the creator indicate a defect. Visual separation between the weld material and base material is another indication of a defect and can often be found at the beginning or end of a weld.
- 4) Repair –
 - a. **As a rule of thumb conservative aluminum experts will recommend that you do not repair aluminum defects.** They recommend that the defected piece be discarded. The reason being that the heat of a repair welding procedure tends to reduce the strength of the aluminum in the area of repair (for example a structure with a 3:1 Safety Factor may be reduced to a 2:1 Safety Factor)
 - b. If the repair is decided upon, the type of aluminum to be repaired (6061-T6 or?) must be determined – perhaps by contacting the original manufacturer.
 - i. Then determine the correct filler material.
 - ii. Then prep for repair – use new cutting wheels or abrasive wheels to avoid contamination of the repair area by wheels that may have been used on other materials. This will reduce the chance of porosity or inclusions. Also remove all traces of paint or other residue. Degrease the surface to be repaired with Baltane or an equivalent solvent.
 - iii. Always remove the old weld. Never weld new filler over an old weld.
 - iv. Always start the repair weld in front of and continue past the area to be repaired to avoid new cracks.
 - v. If the structure is fabricated from tubular material avoid welding across the face of the tube except at designed joints where the effects of welding across the face have been taken into account. Weld tubes on edges as welding across the face weakens the tube.
 - vi. Inspect visually per AWS when the repair is completed.

This dissertation is meant to be a guideline only and any repair or inspection should be done in accordance to the standards of AWS D1.2-2003 by someone certified or at least familiar with these standards.