

Fillet Welding Procedures

Fillet welding is used on body parts which have different thickness and which need to be strong comparatively. It is important to have a thorough grasp of what follows.

1. Adherence

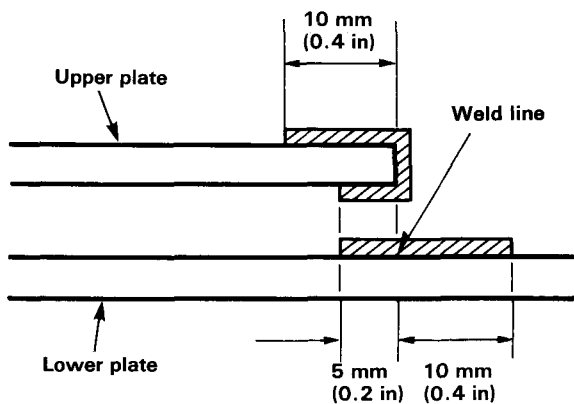
The aluminum alloy plates where the fillet welding is to be performed must fit together firmly, otherwise, the weld will be defective.

2. Cleaning and sanding

Use a wax and grease remover to clean away any dirt, oil or grease prior to welding. If the aluminum alloy surface is coated with a paint film, use a disc sander with a #80 sanding disc to remove the paint.

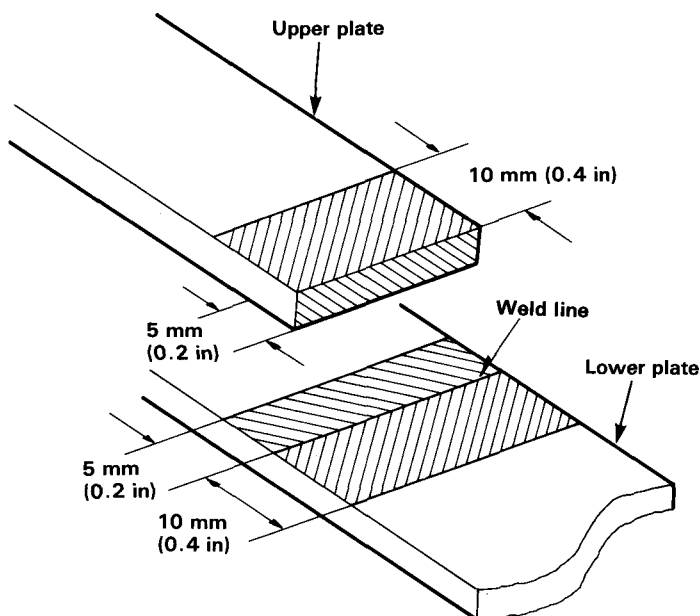
NOTE: Use a stainless steel wire brush to burnish the bare surface of the aluminum alloy immediately before welding.

Sanding range:



Sand the top and bottom surfaces of the upper plate and the adhesion surface of the lower plate.

Range of oxide film removal by sanding:



Sand to a width of about 10 mm (0.4 in) on both the upper and lower plates on the outside of the weld line, and to a width of about 5 mm (0.2 in) from the weld line for the inside surface which will be overlapped. Also sand the end of the upper plate.

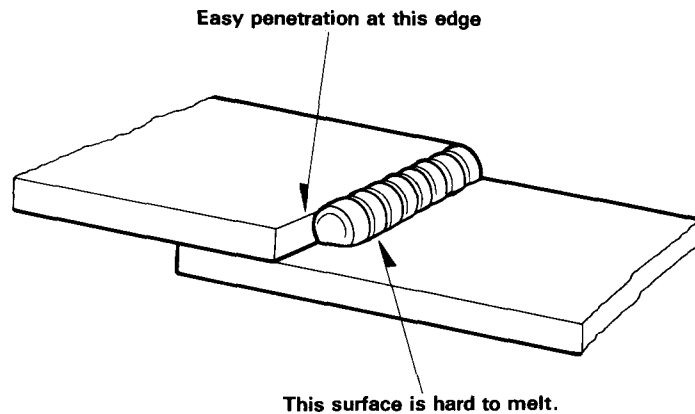
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Aluminum Alloy Repair

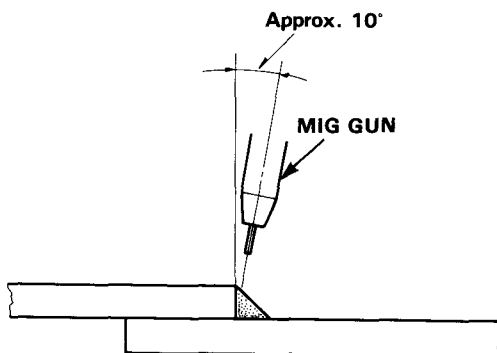
Fillet Welding Procedures (cont'd)

3. Welding

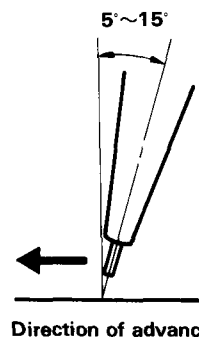
During actual welding, penetration will occur quickly for the top plate since the end of the plate is being welded. For the bottom plate, however, welding starts at the center of the plate, which is hard to melt. Proceed with the current slightly higher than for butt welding and closely observe bottom plate penetration.



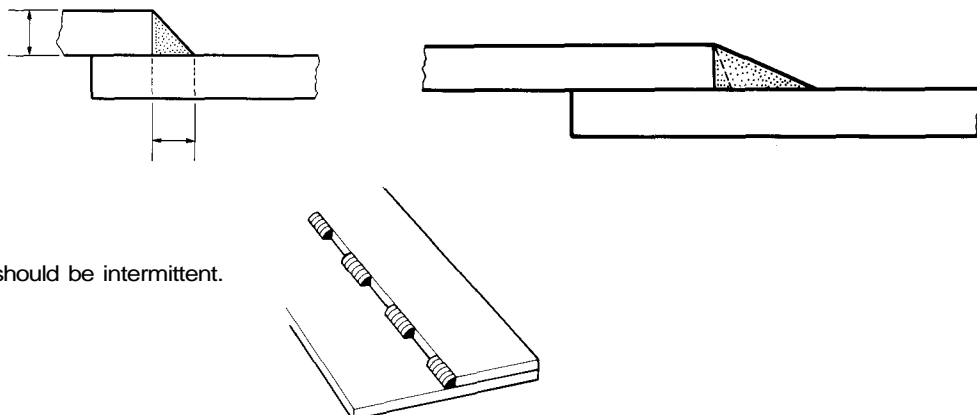
Although in the case of butt welding the gun is positioned perpendicular to the base metal, in fillet welding it is used at an angle with the base metal surface which depends on the plate thickness. The operator should carefully observe the melting of the base metal and proceed. Special attention must be paid when the thicknesses of the top and bottom plates differ.



Forehand weld sequence

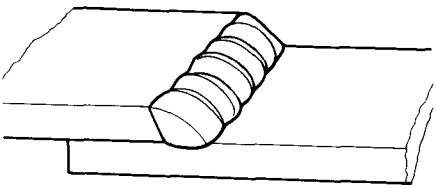
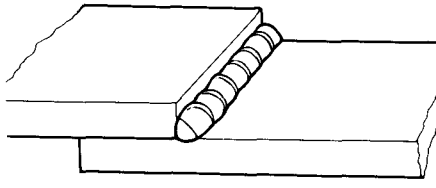
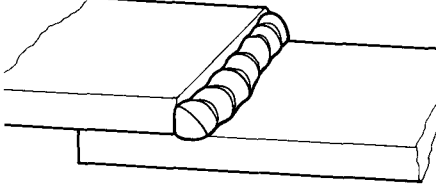
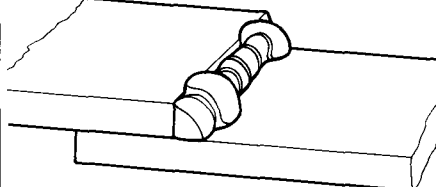
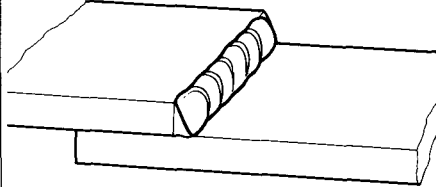


The ideal size of the bead in a cross-sectional view of fillet welding is identical to or slightly larger than the plate thickness. If the thickness of the plates differ, proceed to weld in alignment with the thin plate so as to minimize both the strain induced by welding the base metal and any changes in organization which may occur.



Fillet weld zone defects:

The table below shows frequent fillet weld zone defects and their causes.

Defect	Appearance	Main causes
Excessive melting of upper plate		Poor gun angle. Poor gun position. Excessively high welding current.
Incomplete penetration		Insufficient welding current.
Poor adhesion position		Faulty gun feed position.
Unaligned beads		Improper gun feed speed. Poor gun height.
Incomplete penetration of lower plate.		Faulty gun feed position. Insufficient welding current.