STUD WELD INSPECTION AND TESTING

GOOD WELD
A GOOD WELD shows an even flash with good height around the stud. The flash should appear bright, shiny, and flow slightly into the base material. There should be full flash around the stud periphery without undercut. The burn-off rate is a good measure of weld quality and can be checked by placing an unwelded stud next to a welded one.

HOT WELD
A HOT WELD produces excessive flash spread out beyond the area of the ferrule, with excessive spatter and undercutting of the stud. Considerable burn through will also be present on the base material. To prevent a hot weld, decrease time, power, or both. This may also be an indication of not enough plunge, so verify plunge setting first.

COLD WELD
A COLD WELD does not completely form flash around the stud weld and its flash height may be low. It will appear dull or features such as stringers may be seen coming from the weld. Preventative measures include increasing time, power or both. This may also be an indication of not enough plunge, so verify plunge setting first.

HANG-UP
A HANG UP is caused by binding during lift and plunge due to poor centering of the stud in the ferrule, poor alignment of the stud to the base material or too much lift. This produces little or no flash, there is no penetration to the base material, undercut in the weld and a weld height that is too long. To achieve a more consistent weld, the stud should always be centered in the ferrule. Adjust the gun settings for best results.

ARC STUD WELDING SEQUENCE
Gun is placed in the correct position and the main spring is slightly compressed.
Pressing the trigger lifts the stud off the work and creates an arc, melting the stud and base material.
After arc time is finished, the main spring plunges the stud into the pool of molten metal.
Gun is withdrawn from the welded stud; ferrule is broken away and discarded.

ARC WELDED STUD CROSS-SECTION

PROCEDURAL CONTROL TESTS (CSA STANDARD W59)

Before production welding with a particular set-up, given size and type of stud, at the beginning of each day or a shift’s production, testing shall be performed on the first two studs that are welded. The test studs shall be visually examined and should exhibit flash around the full periphery of the stud.

In addition to visual examination, the test shall consist of bending the studs, after they are allowed to cool, to an angle of approximately 30° from their original axes by either striking the studs with a hammer or placing a pipe or other suitable hollow device over the stud and manually or mechanically bending the stud. For threaded studs, the torque test shall be substituted for the bend test.

If failure occurs in the welded zone of either stud, the procedure shall be followed by two more studs welded and tested. Additional test welding should be continued until two consecutive studs are tested and found to be satisfactory. The results of the testing should be acceptable prior to continuation with the production welding of the studs.

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