

TECH SHEET

PEM® REF/ PEM PROJECTION WELD NUTS



SUBJECT: TIPS FOR SUCCESSFUL INSTALLATION

Installation Method:

A mounting hole is punched or drilled in a panel of sufficient thickness, the fastener is placed in the mounting hole, and an electrode squeezing force, a secondary current, and timing cycle are applied to install the fastener. Although weld nuts can be installed using a variety of equipment, spot welders are the most suitable and commonly used.

Preparation for Fastener Installation:

- 1) The panel material, fasteners and electrodes must be clean. Dirt and grease can weaken the holding strength of the weld.
- 2) Proper mounting hole tolerance must be maintained. Using the proper hole size prevents misalignment problems.
- 3) Minimum centerline to edge distance should not be violated. Centerline to edge distances control panel distortions such as sheet buckling and bulge.
- 4) Minimum sheet thickness requirements must be observed. Violation may result in arcing, spatter, and unsatisfactory weld caused from the shank contacting the electrode.
- 5) Make sure the fastener and panel materials are metal combinations that can be welded. See Table I below.

TABLE I - Metal Combinations That Can Be Spot-Welded

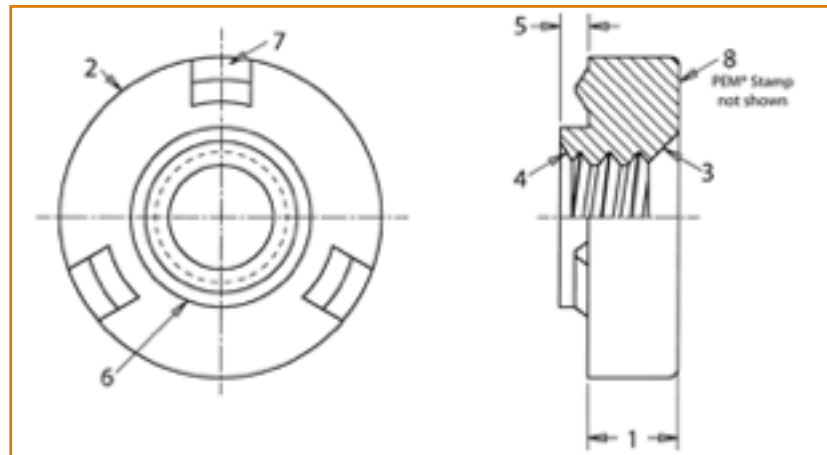
METAL	Aluminum	Brass	Copper	Galvanized Iron	Monel	Nickel	Nickel Silver	Nichrome	Steel	Tin Plate	Zinc
Aluminum	X									X	X
Brass		X	X	X	X	X	X	X	X	X	X
Copper		X	X	X	X	X	X	X	X	X	X
Galvanized Iron		X	X	X	X	X	X	X	X	X	
Iron (wrought)		X	X	X	X	X	X	X	X	X	
Monel		X	X	X	X	X	X	X	X	X	
Nickel		X	X	X	X	X	X	X	X	X	
Nickel Silver		X	X	X	X	X	X	X	X	X	
Nichrome		X	X	X	X	X	X	X	X	X	
Steel		X	X	X	X	X	X	X	X	X	
Tin Plate	X	X	X	X	X	X	X	X	X	X	
Zinc	X	X	X								X

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Weld Nut Features:

- 1) Head Height
- 2) Head Diameter
- 3) Head Countersink
- 4) Shank Countersink
- 5) Shank Height
- 6) Shank Diameter
- 7) Weld Projections
- 8) PEM® Trademark



The most critical areas of a weld nut are the weld projections, shank height and shank diameter.

Welding Process

PEM® weld nuts are projection welded. Generally these nuts have three projections. The contact area between the bottom electrode and the panel and the top electrode and the nut are greater than the area of the nut projections thus, most of the resistance of the current is at the projections causing virtually all the heating to occur at these points. As the fastener material softens due to heating, the force applied causes the projections to flatten as the weld is formed and the fastener and sheet are forced tightly together.

Shank Characteristics

The primary function of the shank is to align the mounting hole with the nut. The shank diameter controls the amount of float the nut has within the hole. Undersize shank diameters/oversize mounting holes create excess float, which may cause alignment problems of mating parts. Oversize shank diameters/undersize mounting holes prevent alignment of the fastener to the hole and prevent the projections' from contacting the panel. The shank height enables location of the nut to the mounting hole. Undersize shank height prevents part location. Oversize shank height/undersize sheet thickness can prevent the projections from contacting the panel and create arcing, spatter and poor welds.

Performance

The weld created at the projection points give the nut push-out and torque-out resistance. Push-out is the force required to push the fastener out of the sheet in the direction opposite its installation. Torque-out is the torsional strength of the fastener in a sheet. This is pure torque without introducing any clamping or axial load. Weld nuts are tested per PEM® Fastener Test Specifications, FTS-101. Performance data is specified in [PEM® Bulletin WN](#).