

## TECH SHEET

### PEM<sup>®</sup> - REF/STANDOFF BASICS

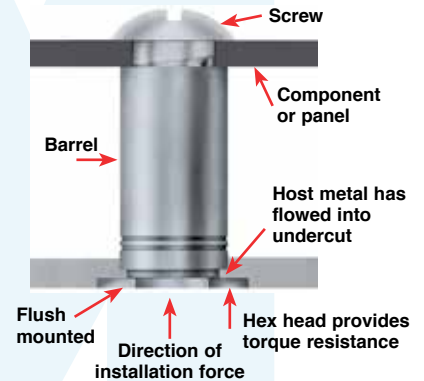
#### SUBJECT: PROPER USE OF PEM SELF-CLINCHING STANDOFFS INCLUDING TYPES SO, SOA, SOS, BSO, BSOA, BSOS, SO4, BSO4, TSO, TSOA, TSOS, DSO, DSOS AND MSO4

#### GENERAL INFORMATION

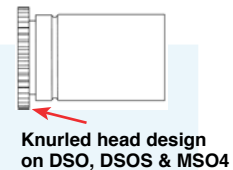
PEM<sup>®</sup> self-clinching standoffs install with a squeeze in properly sized round mounting holes and become permanently mounted in the thin sheet. These standoffs enable components to be stacked or spaced away from the panel in an assembly.

#### INSTALLATION

All standoffs are installed into **round** mounting holes. No other hole prep is necessary. The hexagonal head along with the PEM<sup>®</sup> self-clinching design ensures high axial and torsional strength. Installation tooling should be a flat punch and a non-chamfered anvil. Typically, a chamfered anvil should not be used because it will not properly move the panel material into the undercut. Some exceptions may be warranted.



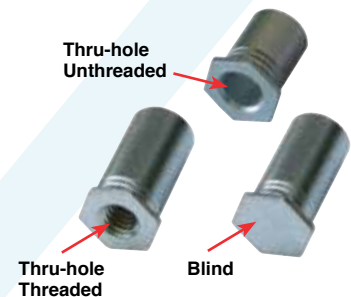
Types DSO, DSOS, and MSO4 have a knurled head design that allows for close-to-edge of sheet applications.



#### THRU-HOLE VERSUS BLIND HOLE

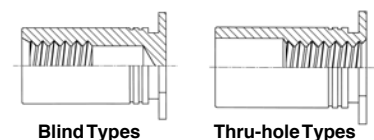
All PEM<sup>®</sup> standoffs are installed with their heads flush with one surface of the mounting sheet. When blind types are used, the outer sheet surfaces are not only flush, but closed as well.

Unthreaded standoffs are also available for spacing multi-panel assemblies.

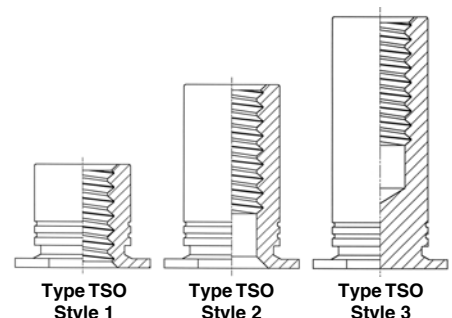


#### THREAD POSITIONING

The threaded portion on the thru-hole standoffs is at the head end of the standoff. Shorter standoffs up to .312"/8mm in length are thru-threaded. The threaded portion on the blind standoffs start at the barrel end.



Types TSO, TSOS, and TSOA threaded standoffs are for installation into sheets as thin as .025" / 0.63mm. The threaded portion on this standoff is at the barrel end for all 3 styles. Shorter standoffs (Style 1) are typically thru-threaded. **The mating screw for Style 2 standoffs will not pass through the unthreaded end.** Longer standoffs (Style 3) are blind.



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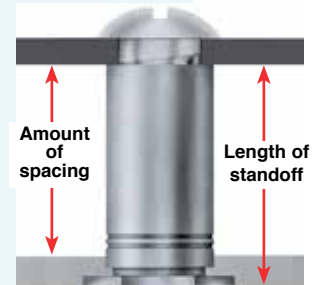
### BARREL ON PLATFORM

Standoffs with thread codes 6440, 8632, and 3.5M3 offer greater wall thickness for thread sizes 440, 632, and M3 respectively. Standoffs with a thicker wall provide more surface area for the mating component or panel reducing the chance of cracking or cutting into the board.



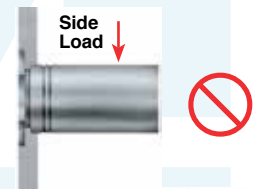
### DETERMINING STANDOFF LENGTH

When calculating the spacing distance needed between two panels, the thickness of the host sheet must be taken into consideration when selecting standoff length. The length of the standoff equals spacing plus the sheet thickness.



### IMPROPER STANDOFF USE

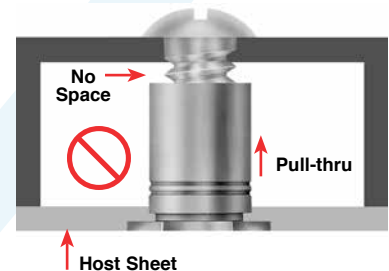
Using a standoff as a pivot point or bearing surface should be avoided if excessive side loads are anticipated. See below for more information.

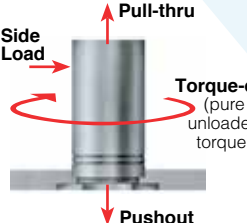


Using a standoff as a nut is not recommended because the thin head is designed for flush applications not for tension load.



The supported sheet should rest on the barrel of the standoff. Leaving gap (as in photo) may cause standoff to fracture or pull through host sheet when tightened.





**Pull-through** – The resistance of a fastener to a force applied in the same direction to which it was installed.

**Side Load** – The load applied to the fastener parallel to the panel at a given distance from the panel. Excessive side load will cause the clinch feature to fail or yield the panel or fastener. Consult our technical department for further information.

**Torque-out** – The amount of torque necessary to spin the fastener out of the sheet. The torsional holding power of a self-clinching fastener in a sheet. Torque-Out testing is conducted by applying pure torsion (no axial load) to the self-clinching fastener.

**Pushout** – The resistance of a self-clinching feature to axial loading. Push-out is conducted in the direction opposite the direction of installation of a self-clinching fastener.

Always look for the “One or Two Groove” trademarks to be sure you are getting genuine PEM® brand standoffs. On actual parts, location of grooves on barrel may be different than shown in photo.

