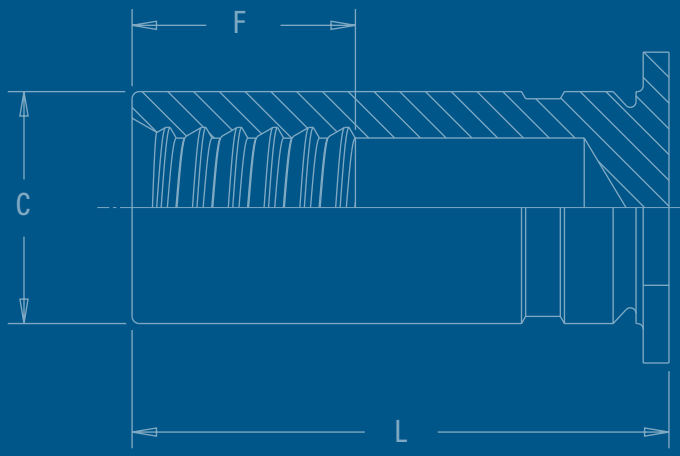
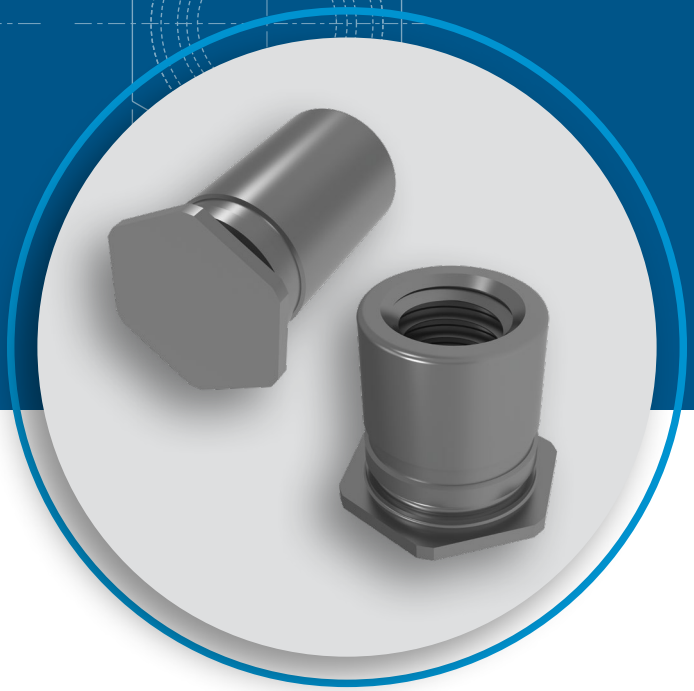
# SO-RT™

## PEM RT® FREE-RUNNING LOCKING STANDOFFS



**NOW AVAILABLE** - PEM RT®
Free-Running Locking Standoffs

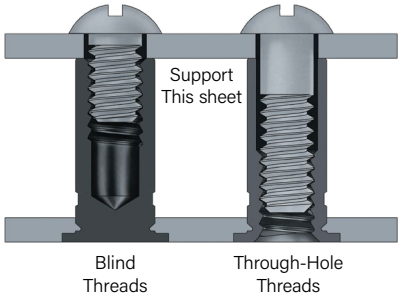
Thread profile with modified loaded flank angle that resists vibration loosening.

PEM® self clinching standoffs, which use the proven self-clinching design, provide ideal solutions for applications where mounting, spacing or stacking of panels, boards or components are required. Pressed into round holes, these fasteners mount permanently into metal sheets as thin as .025" / 0.63 mm.

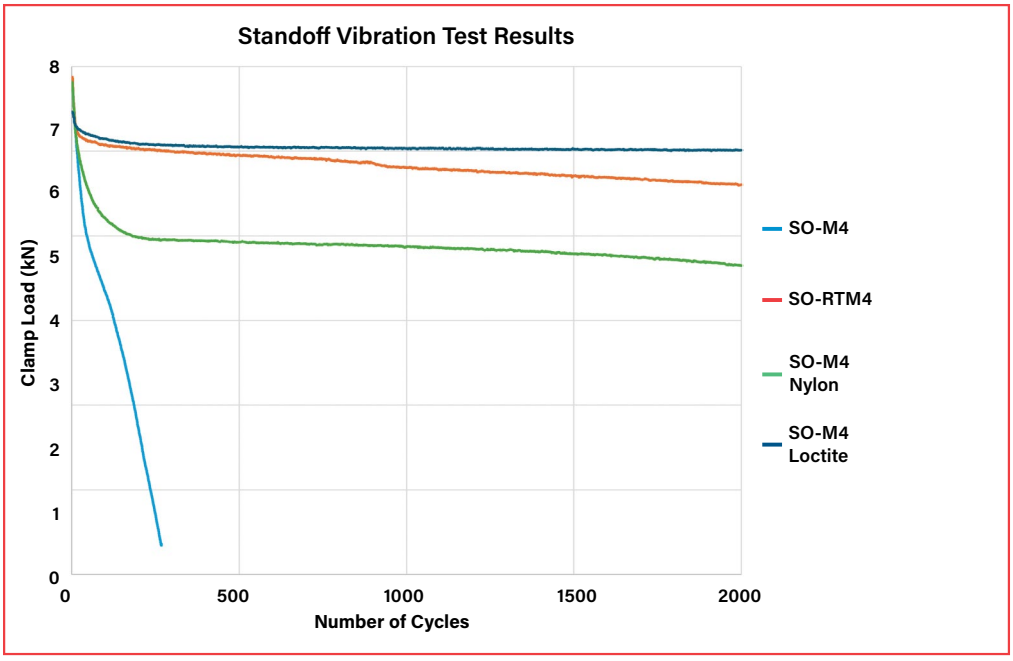
PEM® self clinching standoffs are **now available with PEM RT® free-running locking threads** that induce friction proportional to the clamp load induced by tightening of the bolted joint

The free-running locking feature allows the mating screw to turn freely until clamp load is applied. If the tightening force is removed, these standoffs no longer provide any torsional resistance to rotation until clamp load is reapplied.

- Improves load distribution among all threads, reducing stress on first engaged thread.
- Turns freely until clamp load is applied.
- Resistant to vibrational loosening.
- Locking feature reusability is not affected by number of on/off cycles.
- Uses same mounting hole and installation tooling as standard standoff.




The graph below represents the clamp load of the joint versus the number of cycles during transverse vibration testing for a PEM RT free-running standoff, a standoff with standard thread profile, a bolt with a nylon patch, and a bolt with Loctite Blue 242.




For details, see our tech sheet on the PEM RT® Vibration Resistant Thread Technology.

**Testing conditions:**

- Transverse vibration testing on Junkers machine, per ISO 16130
- M4 thread size, representative curve of the average performance result
- Clamp load applied using metric Property Class 10.9 bolts
- Tested to 2000 cycles or loss of clamp load
- Applied clamp load of 5.9 kN to all samples

## Part Number Designation

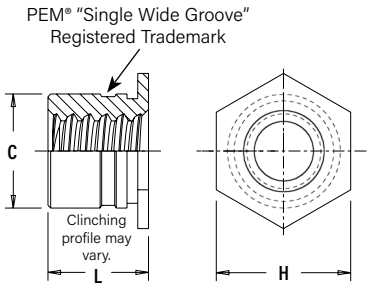
SO - RT632 - 8 ZI

| Type | Thread Size Code | Length Code | Finish |
|---|---|---|---|

PEM RT® free-running locking feature can be added to any PEM® internally threaded standoff.

## Through-hole Threaded Standoffs

Additional thread sizes and lengths available on special order. Please contact us for availability.




All dimensions are in inches.

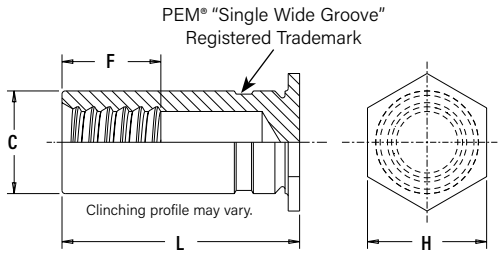
| | Part Number | Fastener Material | Min. Sheet Thickness | Hole Size in Sheet +.003 -.000 | Length "L" +.002 -.005 | C +.000 -.005 | H Nom. | Min. Dist. Hole C/L to Edge (1) | Non-stocked Length Range |
|---|---|---|---|---|---|---|---|---|---|
| Unified | SO-RT440-8ZI | Steel | .040 | .166 | .250 | .165 | .187 | .23 | .125 to .750 |
| | SOS-RT632-8 | Stainless Steel | .040 | .213 | .250 | .212 | .250 | .27 | .125 to 1.062 |

All dimensions are in millimeters.

| | Part Number | Fastener Material | Min. Sheet Thickness | Hole Size in Sheet +0.08 | Length "L" +0.05 -0.13 | C -0.13 | H Nom. | Min. Dist. Hole C/L to Edge (1) | Non-stocked Length Range |
|---|---|---|---|---|---|---|---|---|---|
| Metric | SO-RTM3-4ZI | Steel | 1 | 4.22 | 4 | 4.2 | 4.8 | 6 | 3 to 18 |
| | SO-RT3.5M3-6ZI | Steel | 1 | 5.41 | 6 | 5.39 | 6.4 | 6.8 | 3 to 18 |
| | SO-RTM4-8ZI | Steel | 1.27 | 7.14 | 8 | 7.12 | 7.9 | 8 | 3 to 25 |

## Blind Threaded Standoffs

Additional thread sizes and lengths available on special order. Please contact us for availability.




All dimensions are in millimeters.

| | Part Number | Fastener Material | Min. Sheet Thickness | Hole Size in Sheet +0.08 | Length "L" +0.05 -0.13 | C -0.13 | F Min. | H Nom. | Min. Dist. Hole C/L to Edge (1) | Non-stocked Length Range |
|---|---|---|---|---|---|---|---|---|---|---|
| Metric | BSO-RT3.5M3-10ZI | Steel | 1 | 5.41 | 10 | 5.39 | 4 | 6.4 | 6.8 | 6 to 25 |
| | BSOS-RTM4-14 | Stainless Steel | 1.27 | 7.14 | 14 | 7.12 | 6.5 | 7.9 | 8 | 6 to 25 |

(1) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

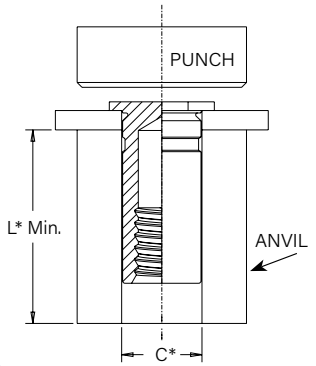
## Material And Finish Specifications

| | Threads (1) | Fastener Material | | Standard Finishes | | For Use in Sheet Hardness: (3) | |
|---|---|---|---|---|---|---|---|
| Type | Internal, ASME B1.12B/ ASME B1.13M 6H | Hardened Carbon Steel | 300 Series Stainless Steel | Zinc Plated per ASTM B633, SC1 (5µm), Type III Colorless (2) | Passivated and/or Tested per ASTM A380 | HRB 80 / HB 150 or Less | HRB 70 / HB 125 or Less |
| SO-RT | ▪ | ▪ | | ▪ | | ▪ | |
| SOS-RT | ▪ | | ▪ | | ▪ | | ▪ |
| BSO-RT | ▪ | ▪ | | ▪ | | ▪ | |
| BSOS-RT | ▪ | | ▪ | | ▪ | | ▪ |
| Part Number Code for Finishes | | | | ZI | None | | |

(1) Modified thread form on loaded flank. Will accept a maximum material 6g/2A screw.
(2) See PEM Technical Support section of our website for related plating standards and specifications.
(3) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.

## Installation

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operation such as deburring.
2. Insert standoff through mounting hole (preferably the punch side) of sheet and into anvil as shown in drawing.
3. With installation punch and anvil surfaces parallel, apply only enough squeezing force to embed the standoff's head flush in the sheet. Drawing at right shows suggested tooling for applying these forces.




*See page 3 for "C" and "L"

### Installation Tooling

| Thread Code | Haeger® Part Number | | PEMSERTER® Part Number | |
|---|---|---|---|---|
| | Anvil | Punch | Anvil | Punch |
| RT440 / RTM3 | H-109-4/M3L | H-108-0020L | 970200487300 | 975200048 |
| RT632 / RT3.5M3 / RTM3.5 | H-109-6/M3.5L | H-108-0020L | 970200012300 | 975200048 |
| RTM4 | H-109-10/ M5L | H-108-0020L | 970200013300 | 975200048 |

## Performance Data(1)

| Part Number | Max. Rec. Tightening Torque for Mating Screw (in. lbs.) | Test Sheet Material | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | .060" 5052-H34 Aluminum | | | | .060" Cold-rolled Steel | | | |
| | | Installation (lbs.) | Pushout (lbs.) | Torque-out (2) (in. lbs.) | Pull-thru (2) (lbs.) | Installation (lbs.) | Pushout (lbs.) | Torque-out (2) (in. lbs.) | Pull-thru (2) (lbs.) |
| SO-RT440-8ZI | 4.75 | 1100 | 160 | 11 | 280 | 2200 | 225 | 19 | 330 |
| SOS-RT632-8 | 7 | 1100 | 160 | 11 | 224 | 2200 | 225 | 19 | 264 |

| Part Number | Max. Rec. Tightening Torque for Mating Screw (N•m) | Test Sheet Material | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1.5 mm 5052-H34 Aluminum | | | | 1.5 mm Cold-rolled Steel | | | |
| | | Installation (kN) | Pushout (N) | Torque-out (2) (N•m) | Pull-thru (2) (N) | Installation (kN) | Pushout (N) | Torque-out (2) (N•m) | Pull-thru (2) (N) |
| SO-RTM3-4ZI | 0.55 | 4.9 | 710 | 1.24 | 1245 | 9.8 | 1000 | 2.15 | 1465 |
| SO-RT3.5M3-6ZI | 0.55 | 7.6 | 1330 | 2.82 | 1375 | 14.7 | 1860 | 3.95 | 1690 |
| SO-RTM4-8ZI | 2 | 10.7 | 1780 | 5.08 | 2575 | 17.8 | 2490 | 8.47 | 3110 |
| BSO-RT3.5M3-10ZI | 0.55 | 7.6 | 1330 | 2.82 | 1375 | 14.7 | 1860 | 3.95 | 1690 |
| BSOS-RTM4-14 | 1.6 | 10.7 | 1780 | 5.08 | 2060 | 17.8 | 2490 | 8.47 | 2488 |

(1) Published installation forces are for general reference. Actual set-up and confirmation of complete installation should be made by observing proper seating of fastener as described in the installation steps. Other performance values reported are averages when all proper installation parameters and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure may affect performance. Performance testing this product in your application is recommended. We will be happy to provide technical assistance and/or samples for this purpose.

(2) Joint failure in torque-out and pull-thru will depend on the strength and type of screw being used. In some cases the failure will be in the screw and not in the selfclinching standoff. Please contact our Applications Engineering group with any questions

All PEM® products meet our stringent quality standards. If you require additional industry or other specific quality certifications, special procedures and/or part numbers are required. Please contact your local sales office or representative for further information.

Regulatory compliance information is available in Technical Support section of our website. Specifications subject to change without notice. See our website for the most current version of this bulletin.

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