PEM® brand microPEM® fasteners are ideal for today’s and tomorrow’s compact electronics
# microPEM® FASTENERS

## IDEAL FOR TODAY’S AND TOMORROW’S COMPACT ELECTRONICS

- Wearables (smart watches, cameras, fitness bands, headphones, etc.)
- Laptops
- Tablets/eReaders
- Cell/Smart Phones
- Gaming/Hand Held Devices/Virtual Reality
- Infotainment/Automotive Electronics

- Thread code as small as M0.8.
- Pin diameters as small as 0.7 mm.
- Standoff lengths as short as .028” / 0.7 mm.
- Clinches flush into sheets as thin as .012” / 0.3 mm.
- Attach sheets as thin as .008” / 0.2 mm.

Parts for smaller and/or thinner applications have been designed. Please contact us for more information.

### MPP™ microPEM® Self-clinching Pins
Ideal for micro positioning and alignment applications - PAGE 3

### MSO4™ microPEM® Self-clinching Standoffs
Designed for mounting and/or spacing in extremely limited space applications - PAGE 3

### TA™/T4™ microPEM® TackPin® Fasteners
Enable sheet-to-sheet attachment, replacing costly screw installation in applications where disassembly is not required - PAGE 4

### TKA™/TK4™ microPEM® TackSert® Pins
Designed with diagonal knurl to hold a top panel to a bottom panel or chassis by broaching into the bottom panel/chassis. Type TKA pins are suitable for broaching into plastic applications, and Type TK4 pins are suitable for broaching into castings and brittle materials - PAGE 5

### TS4™ microPEM® TackScrew™ Fasteners
Enable cost effective sheet-to-sheet attachment by simply pressing into place. Can be removed by simply unscrewing, similar to other threaded fasteners - PAGE 6

### MSIA™/MSIB™ microPEM® Inserts For Plastics
Designed for use in straight or tapered holes. The symmetrical design eliminates the need for orientation. They are installed by pressing them into the mounting hole with ultrasonic equipment or with a thermal press - PAGE 7

### SMTSO™ microPEM® Surface Mount Fasteners
These fasteners for compact electronic assemblies attach to P.C. Boards for nut/standoff applications. These fasteners mount on P.C. Boards in the same manner and at the same time as other surface mount components prior to the automated reflow solder process - PAGE 8

### microPEM® Screws
Available in sizes as small as M0.8 and lengths as short as 1 mm / .039” - PAGE 9

### Material and finish specifications - PAGE 10

### Installation - PAGES 11 - 13

### Performance data - PAGES 14 - 15

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MPP™ microPEM® SELF-CLINCHING PINS

- Satisfy demanding micro positioning and alignment applications.
- Head mounts flush into panels as thin as 0.5 mm / .02".
- Chamfered end makes mating hole alignment easy.
- Can be installed into stainless steel sheets.
- Excellent corrosion resistance.
- Can be installed automatically.

**PART NUMBER DESIGNATION**

<table>
<thead>
<tr>
<th>Pin Diameter P</th>
<th>Type &amp; Material Code</th>
<th>Pin Diameter Code</th>
<th>Length Code</th>
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<td>±0.038mm</td>
<td>MPP</td>
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**MSO4™ microPEM® SELF-CLINCHING STANDOFFS**

- Designed for mounting and/or spacing in extremely limited space applications.
- Can be installed into stainless steel sheets.
- Have stronger threads than weld standoffs because they are made from heat-treated 400 Series Stainless Steel.
- Can be installed automatically.

**PART NUMBER DESIGNATION**

<table>
<thead>
<tr>
<th>Type &amp; Material Code</th>
<th>Thread Code</th>
<th>Length Code</th>
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</tr>
<tr>
<td>MSO4</td>
<td>256</td>
<td>3</td>
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All dimensions are in inches.

(1) MSO4 standoffs are designed for use in sheet hardness HRB 88 / HB 183 or less. For installation into harder sheets (up to HRC 36), contact our Tech Support line or your local representative.

(2) Unified ASME B11, 2B
(3) Miniature ISO 68-1, 5H
(4) Miniature ISO 68-1, 6H
(5) Metric ASME B1.13M, 6H
TA™/T4™ microPEM® TackPin® FASTENERS

- Advantages over micro screws: eliminates costly tapping, cross threading, torque control, vibration back-out and installation time.
- Interference fit minimizes hole tolerance issues.
- Tapered tip assists location.
- Low-profile head provides space savings.
- Top sheet can be any material.
- Can be installed automatically.

**PART NUMBER DESIGNATION**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Base Panel Hole Size Code</th>
<th>Top Sheet Thickness Code</th>
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<td>T4</td>
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Comparison of TackPin® fastener to screw installation.

**CUSTOM microPEM® TackPin® FASTENER SOLUTIONS**

**Countersunk TackPin® Fastener**
- Installs into a countersunk hole, replacing countersunk screws.
- Offers flush or near flush appearance.

**Thin Sheet TackPin™ Fastener**
- Simple, press-in installation.
- Enables sheet-to-sheet attachment of multiple layers.
- Flush or sub-flush on both sides of sheet.
- Head mounts flush into top sheets as thin as .008” / 0.2 mm.

**Large Head TackPin® Fastener**
- TackPin with a large head installed into boss of bottom panel.
- Holds down top panel that is free to rotate around the boss.

**Flush-head TackPin® Fastener**
- TackPin installed into a thicker, softer top-sheet and pressed flush.

In one notable application, TackPin® fasteners have been specified to replace screws to attach a super-thin membrane to a very thin substrate in keyboards. The switch to TackPin® fasteners significantly reduced assembly costs.
**TKA™/TK4™ microPEM® TackSert® PINS**

- Secure panels to common cast materials such as magnesium and aluminum. Also appropriate for attaching panels to plastics such as ABS and to P.C. Boards.
- Simple, press-in installation. Does not require heat or ultrasonics.
- Alternative to micro screws, eliminating the need to tap or use threaded inserts.
- Top sheet can be any material.
- Low-profile head.
- Eliminates the following:
  - Cost of screw
  - Cost of patch to prevent loosening
  - Cost of threaded insert or tapped hole
  - Cost of driver bits
  - Cost of rework due to cross-threading and driver bit "cam-out".
- Can be installed automatically.

### PART NUMBER DESIGNATION

<table>
<thead>
<tr>
<th>Type</th>
<th>Base Panel Hole Size Code</th>
<th>Length Code</th>
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</tr>
<tr>
<td>TK4</td>
<td>10</td>
<td>xxx</td>
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</table>

- **Type & Material**: TKA for aluminum, TK4 for stainless steel.
- **Base Panel Hole Size Code**: Represents the nominal size of the hole in the base panel.
- **Length Code**: Determines the length of the pin.

**Top Sheet Thickness (TST)**

- **DOE = L - TST**
- **DOE ≥ 0.8 mm / 0.0315”**

**Depth Of Engagement (DOE)**

- For through hole applications:
  - DOE = L - TST
- For blind hole applications:
  - DOE + 0.25 mm / 0.010” = Min. Blind Hole Depth

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<tr>
<th>Type</th>
<th>Base Panel Material</th>
<th>Base Panel Hole Size Code</th>
<th>Top Sheet Thickness (TST)</th>
<th>Base Panel Hole Size ±0.05 mm/-0.002”</th>
<th>Top Sheet Hole Size ±0.05 mm/-0.002”</th>
<th>Top Sheet Thickness Max.</th>
<th>C Max.</th>
<th>H ±0.06 mm/±0.002”</th>
<th>L ±0.06 mm/±0.002”</th>
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(1) Minimum boss diameter is twice centerline-to-edge value.
**TS4™ microPEM® TackScrew™ FASTENERS**

- Simple, press-in installation for secure attachment.
- Proven self-clinching technology resists vibrational loosening.
- Replaces micro screws, eliminating installation issues including:
  - Cost of locking patch
  - Cost of threaded insert or tapped hole
  - Cost of driver bits
  - Cost of rework due to cross-threading and driver bit “cam-out”
- Top sheet can be any material.
- Can be installed automatically.
- Twists out (unscrew) if removal is necessary. Can be reinstalled one time using a thread locking adhesive.

**PART NUMBER DESIGNATION**

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<td>TS4</td>
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(1) Minimum sheet to prevent protrusion from through hole or minimum blind hole depth.

**Comparison of TackScrew™ fastener to screw installation.**

- **With TackScrew™ Fastener**
  - Low-profile head
- **With Screw**
  - Clinches into base panel
  - Typical screw related issues include costly tapping, cross-threading, torque control, and vibration back out.

![TackScrew fastener installs into blind or through hole applications.](image)
**MSIA™/MSIB™ microPEM® INSERTS FOR PLASTICS**

- Threads as small as M1.
- Symmetrical design eliminates the need for orientation.
- Provides excellent performance in wide range of plastics.
- Aluminum inserts offer light weight, lead-free alternative.

**PART NUMBER DESIGNATION**

- MSI Type
- B Material
- M1 Thread Size Code
- 100 Length Code

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<th>Thread Size x Pitch</th>
<th>Type</th>
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<th>Length Code</th>
<th>A ±0.1</th>
<th>E ± 0.1</th>
<th>C Max.</th>
<th>Min. Wall Thickness (H)</th>
<th>Hole Depth Min.</th>
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(1) *Style #1* - length codes less than 150
(2) *Style #2* - length codes 150 and greater
(3) Metric ISO 68-1, 5H
(4) Metric ISO 68-1, 6H
(5) Metric ASME B1.13M, 6H
(6) Refers to wall thickness of boss as tested in ABS and polycarbonate.
SMTSO™ microPEM® SURFACE MOUNT FASTENERS

- Hex shaped barrel provides optimal size/performance.
- Provided on tape and reel.
- Reduces board handling.
- Can be installed automatically.

All dimensions are in inches.

<table>
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<th>Thread Size Type</th>
<th>Thread Code</th>
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<th>Min. Sheet Thickness</th>
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<th>E Ref.</th>
<th>H Nom.</th>
<th>L ±.003</th>
<th>ØH Hole Size In Sheet</th>
<th>ØD Min. Solder Pad</th>
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<td>.060-80 (40-80)</td>
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All dimensions are in millimeters.

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<th>H Nom.</th>
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(1) Unified ASME B1.1, 2B  (2) Miniature ISO 1501, 4H6  (3) Metric ASME B1.13M, 6H
microPEM® SCREWS (Available on special order. Minimum quantities may apply)

- Smallest thread code: M0.8.
- Shortest length: 1 mm / .039”.
- Fastener material: steel, stainless steel and aluminum.
- Driver types: Torx*/Torx Plus*/Microstix*, cross-recess/internal hex.
- Head styles: flat head/pan head/socket-head/wafer-head.
- Special features: Locking patch, REMFORM®, TAPTITE 2000®, FASTITE 2000®, PT* and DELTA PT*
- Platings: zinc, nickel, black nickel and black oxide.

REMFORM® SCREWS

- Designed primarily for plastic applications
- Provides superior performance in a wide range of plastics
- Asymmetrical thread minimizes radial hoop stress to reduce boss bursting
- Narrow tip angle reduces stress in plastic nut member
- Suitable for other ductile materials such as wood and soft metals

DELTA PT* SCREWS

- Minimal radial tension due to optimized flank angle
- High clamp load
- High tensile and torsion strength
- Increased cycle stress stability
- High strength under vibration

TORX PLUS® DRIVE SYSTEM

- 0° drive angle
- Elliptical geometric configuration maximizes drive bit engagement
- Large cross-sectional area at lobes
- Vertical sidewalls
- Optimizes torque transfer
- Virtually eliminates cam-out
- Reduces end load and worker fatigue
- Reduces annual drive bit costs

MICROSTIX® ULTRA-THIN-HEAD PRECISION SCREWS

- No cam-out
- No driving force
- High workability
- High torque transmission
- High precision bits
- Tamper proof
- High durability
- Better fit between bits and screws

PennEngineering is a licensee of Acument Global Technologies (Torx®, Torx Plus®), Reminc (REMFORM®, TAPTITE 2000®, FASTITE 2000®), EJOT® (PT* and DELTA PT*) and OSG Corporation and OSG System Products Co., Ltd. (Microstix®).
MATERIAL AND FINISH SPECIFICATIONS

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<th>Hardened 400 Series Stainless Steel</th>
<th>Hardened Aluminum</th>
<th>Free-Machining Leadless Brass</th>
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<th>Plain Finish</th>
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<th>HRB 86 / HD 163 or Less</th>
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<td>None</td>
</tr>
</tbody>
</table>

Part Number Codes For Finishes

| None | ET | None |

(1) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.

A NOTE ABOUT FASTENERS FOR STAINLESS STEEL PANELS

In order for self-clinching fasteners to work properly, the fastener must be harder than the sheet into which it is being installed. In the case of stainless steel panels, fasteners made from 300 Series Stainless Steel do not meet this hardness criteria. It is for this reason that 400 series fasteners are offered (Types MSO4, T4, TK4 AND TS4). However, while these 400 Series fasteners install and perform well in 300 Series stainless sheets they should not be used if the end product:

- Will be exposed to any appreciable corrosive presence.
- Requires non-magnetic fasteners.
- Will be exposed to any temperatures above 300°F (149°C)

If any of the these are issues, please contact techsupport@pemnet.com for other options.
INSTALLATION

MPP PINS
1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert pin through mounting hole (preferably the punch side) of sheet and into anvil hole.
3. With installation punch and anvil surfaces parallel, apply squeezing force to embed the head of the pin flush in the sheet.

PEMSERTER® Installation Tooling

<table>
<thead>
<tr>
<th>Type</th>
<th>Pin Diameter Code</th>
<th>Anvil Dimensions (mm)</th>
<th>Anvil Part Number</th>
<th>Punch Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPP</td>
<td>1MM</td>
<td>1.07</td>
<td>8014168</td>
<td>8014167</td>
</tr>
<tr>
<td>MPP</td>
<td>1.5MM</td>
<td>1.57</td>
<td>8014169</td>
<td>8014167</td>
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<td>MPP</td>
<td>2MM</td>
<td>2.07</td>
<td>8014170</td>
<td>8014167</td>
</tr>
</tbody>
</table>

MSO4 STANDOFFS
1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert standoff through mounting hole (preferably the punch side) and into anvil as shown in drawing.
3. With installation punch and anvil surfaces parallel, apply only enough squeezing force to embed the head of the standoff flush in the sheet.

PEMSERTER® Installation Tooling

<table>
<thead>
<tr>
<th>Type Code</th>
<th>Anvil Dimensions (inches)</th>
<th>Anvil Dimensions (mm)</th>
<th>Anvil Part Number</th>
<th>Punch Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSO4</td>
<td>080</td>
<td>.112 - .114</td>
<td>.097 - .099</td>
<td>8015796</td>
</tr>
<tr>
<td>MSO4</td>
<td>256</td>
<td>.142 - .144</td>
<td>.127 - .129</td>
<td>8015797</td>
</tr>
</tbody>
</table>

Requirements for Installation into Stainless Steel
1. Sheet hardness must be less than the specified limit for the fastener.
2. Panel material should be in the annealed condition.
3. Fastener should be installed in punch side of hole.
4. Mounting hole punch should be kept sharp to minimize work hardening around hole.
5. Maintain the mounting hole punch diameter to no greater than .025 mm / .001" over the minimum recommended mounting hole.
6. When installing fastener adjacent to bends or other highly cold-worked areas, use the C/L to edge values listed in the catalog.
INSTALLATION

TA/T4 FASTENERS

1. Prepare properly sized mounting hole in top sheet and base panel. Base panel mounting hole can be through or blind.
2. Place top sheet and base panel in proper position.
3. Place fastener through hole in top sheet and into mounting hole (preferably the punch side) of base panel.
4. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the fastener contacts the top sheet.

PEMSERTER® Installation Tooling

<table>
<thead>
<tr>
<th>Size</th>
<th>Manual Punch Part Number</th>
<th>Manual Anvil Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA/T4-10-025</td>
<td>8014167</td>
<td>975200046</td>
</tr>
<tr>
<td>TA/T4-10-050</td>
<td>8014167</td>
<td>975200046</td>
</tr>
<tr>
<td>TA/T4-10-075</td>
<td>8014167</td>
<td>975200046</td>
</tr>
</tbody>
</table>

microPEM® TackPin® fasteners can be installed automatically in high volume applications. Contact your nearest Engineering representative for more information.

TKA/TK4 PINS

1. Prepare properly sized mounting hole in top sheet and base panel. Base panel mounting hole can be through or blind.
2. Place top sheet and base panel in proper position.
3. Place pin through hole in top sheet and into mounting hole of base panel.
4. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the pin contacts the top sheet.

PEMSERTER® Installation Tooling

<table>
<thead>
<tr>
<th>Size</th>
<th>Punch Part Number</th>
<th>Anvil Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TKA/TK4-10-100</td>
<td>8014167</td>
<td>975200046</td>
</tr>
<tr>
<td>TKA/TK4-10-150</td>
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</tr>
<tr>
<td>TKA/TK4-10-200</td>
<td>8014167</td>
<td>975200046</td>
</tr>
<tr>
<td>TKA/TK4-10-250</td>
<td>8014167</td>
<td>975200046</td>
</tr>
<tr>
<td>TKA/TK4-10-300</td>
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<td>975200046</td>
</tr>
</tbody>
</table>

microPEM® TackSert® fasteners can be installed automatically in high volume applications. Contact your nearest Engineering representative for more information.
INSTALLATION

**TS4 FASTENERS**

1. Prepare properly sized mounting hole in top sheet and base panel. Base panel mounting hole can be through or blind.
2. Place sheet and base panel in proper position.
3. Place fastener through hole in sheet and into mounting hole (preferably the punch side) of base panel.
4. With punch and anvil surfaces parallel, apply squeezing force until the head of the fastener contacts the top sheet.

**Re-installation (if necessary)**

1. Place sheet and base panel in proper position.
2. Place adhesive into base panel mounting hole.
3. Place fastener through hole in top sheet and into mounting hole of base panel.
4. Screw in fastener with 2IP Torx Plus driver.

**PEMSERTER® Installation Tooling**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Punch Part Number</th>
<th>Anvil Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS4-10-025</td>
<td>804167</td>
<td>975200046</td>
</tr>
<tr>
<td>TS4-10-050</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AFTER PRESSING**

- Punch
- Anvil

**BEFORE PRESSING**

- Punch
- Anvil

Shown with blind mounting hole. Can also be used with a through hole.

**SMTSO FASTENERS**

- Polyimide patch applied here for vacuum pick up.
- Solder paste applied to pad on PCB.
- Solder fastener in place using standard surface mount techniques.

**Number of parts per reel/pitch (mm) for each size**

<table>
<thead>
<tr>
<th>Thread Code</th>
<th>Length Code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>—</td>
<td>3500 / 8</td>
<td>—</td>
<td>2000 / 8</td>
<td>—</td>
</tr>
<tr>
<td>M1, M1.2, M1.4, M1.6</td>
<td>3500 / 8</td>
<td>2500 / 8</td>
<td>2000 / 8</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Packaged on 330mm recyclable reels.
Tape width is 16mm.
Supplied with polyimide patch for vacuum pick up.
Reels conform to EIA-481.
### PERFORMANCE DATA(1)

#### MPP PINS

<table>
<thead>
<tr>
<th>Type</th>
<th>Pin Diameter Code</th>
<th>Test Sheet Thickness</th>
<th>Installation Pushout</th>
<th>Torque-out (lbs.) (2)</th>
<th>Pull-thru (lbs.) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPP</td>
<td>1MM</td>
<td>0.5mm stainless steel HRB 88</td>
<td>10</td>
<td>320</td>
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<tr>
<td>MPP</td>
<td>1.5MM</td>
<td>0.5mm stainless steel HRB 88</td>
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<tr>
<td>MPP</td>
<td>2MM</td>
<td>0.5mm stainless steel HRB 88</td>
<td>18</td>
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</tbody>
</table>

#### MPP STANDOFFS

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread Code</th>
<th>Max. Rec. Tightening Torque For Mating Screw (in.lbs.)</th>
<th>Sheet Thickness</th>
<th>Test Sheet Material</th>
<th>Installation Pushout</th>
<th>Torque-out (in.lbs.) (2)</th>
<th>Pull-thru (lbs.) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS04</td>
<td>080</td>
<td>.55</td>
<td>.013</td>
<td>Stainless Steel</td>
<td>2500</td>
<td>33</td>
<td>1.3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HRB 88</td>
<td>2500</td>
<td>45</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>256</td>
<td>1.3</td>
<td>.013</td>
<td>Stainless Steel</td>
<td>2500</td>
<td>33</td>
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<td></td>
<td></td>
<td>HRB 88</td>
<td>2500</td>
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<td>2.6</td>
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</table>

#### UNIFIED

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread Code</th>
<th>Max. Rec. Tightening Torque For Mating Screw (N•m)</th>
<th>Sheet Thickness</th>
<th>Test Sheet Material</th>
<th>Installation Pushout</th>
<th>Torque-out (N•m) (2)</th>
<th>Pull-thru (N•m) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS04</td>
<td>M1</td>
<td>0.019</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>0.036</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>M4</td>
<td>0.057</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
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<tr>
<td></td>
<td>M6</td>
<td>0.084</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
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<tr>
<td></td>
<td>M2</td>
<td>0.175</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>200</td>
<td>0.3</td>
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#### METRIC

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread Code</th>
<th>Max. Rec. Tightening Torque For Mating Screw (N•m)</th>
<th>Sheet Thickness</th>
<th>Test Sheet Material</th>
<th>Installation Pushout</th>
<th>Torque-out (N•m) (2)</th>
<th>Pull-thru (N•m) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS04</td>
<td>M1</td>
<td>0.019</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>0.036</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>M4</td>
<td>0.057</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>M6</td>
<td>0.084</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>150</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>0.175</td>
<td>.3</td>
<td>Stainless Steel</td>
<td>113</td>
<td>200</td>
<td>0.3</td>
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#### TK4 FASTENERS

<table>
<thead>
<tr>
<th>Type</th>
<th>Installation</th>
<th>Pullout</th>
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<tbody>
<tr>
<td>TA-10-025</td>
<td>820</td>
<td>185</td>
</tr>
<tr>
<td>TA-10-050</td>
<td>2020</td>
<td>455</td>
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</tbody>
</table>

(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) Performance in torque-out and pull-thru will depend on the strength and type of screw being used. In most cases the failure will be in the screw and not in the self clinching standoff. Please contact our Applications Engineering group with any questions.
**PERFORMANCE DATA**

**TS4 FASTENERS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tested Top Sheet Thickness</th>
<th>5052-H34 Aluminum HRB 63 / HB 104</th>
<th>304 Stainless Steel HRB 89 / HB 187</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Installation</td>
<td>Pullout (¹)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N)</td>
<td>(lbs.)</td>
</tr>
<tr>
<td>TS4-10-025</td>
<td>0.254 mm / .01&quot;</td>
<td>556</td>
<td>125</td>
</tr>
<tr>
<td>TS4-10-050</td>
<td>0.533 mm / .021&quot;</td>
<td>556</td>
<td>125</td>
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</tbody>
</table>

**MSIA/MSIB INSERTS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread Code</th>
<th>Length Code</th>
<th>Test Sheet Material</th>
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<tr>
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<td></td>
<td>ABS</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Pullout (N)</td>
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<td>M1.2</td>
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<tr>
<td></td>
<td>M1.4</td>
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<td>300</td>
</tr>
<tr>
<td></td>
<td>M1.6</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

For testing purposes, inserts were installed using heat stake equipment into a flat sheet.

**HOLE PREPARATION GUIDELINES**

*Wall Thickness.*

Thinner walls and bosses may be used but will affect performance.

**SMTSO(3)(4) FASTENERS**

<table>
<thead>
<tr>
<th>Type and Size</th>
<th>Test Sheet Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.062&quot; Single Layer RF-4</td>
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<tr>
<td></td>
<td>Pushout (lbs.)</td>
</tr>
<tr>
<td>SMTSO-080</td>
<td>85.1</td>
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<tr>
<td>SMTSO-M1.1</td>
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</tr>
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<td>SMTSO-M1.2</td>
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</tr>
<tr>
<td>SMTSO-M1.4</td>
<td></td>
</tr>
<tr>
<td>SMTSO-M1.6</td>
<td></td>
</tr>
</tbody>
</table>

(1) Pullout after initial installation.
(2) Torque-out performance will depend on the strength and type of screw being used. In most cases, the screw threads will fail before the insert threads.
(3) With lead-free paste. Average values of 30 test points. The data presented here is for general comparison purposes only. Actual performance is dependent upon application variables. We will be happy to provide samples for you to install. If required, we can also test your installed hardware and provide you with the performance data specific to your application.
(4) Further testing details can be found in our web site’s literature section.
To be sure you are getting genuine PEM® brand fasteners, look for the unique PEM product markings and identifiers.

Dimple (Registered trademark)

Single Groove (Registered trademark)

Double Notch (Registered trademark)

Fastener drawings and models are available at www.pemnet.com

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.