PEM® R'ANGLE® fasteners provide strong right angle attachment points in thin sheets.
PEM® R’ANGLE® fasteners provide strong right angle attachment points in sheet metal or PC Boards. RAA™ and RAS™ fasteners for metal are simply pressed into a rectangular mounting hole of the proper size. SMTRA™ fasteners are installed onto PC Boards using standard surface mount techniques. The holding power of the fastener is unaffected by the repeated tightening and loosening of the screw.

PEM® R’ANGLE® fasteners are cost-effective replacements for:
- Bent edge tabs
- Bent center tabs
- Angle brackets
- Tack welds
- Bent flanges
- Loose hardware

PEM® R’ANGLE® fasteners provide many advantages over bent tabs and flanges, including:
- More predictable designs
- Tighter design control
- Reduction of loose hardware
- Unmarred panel surfaces

RAS™ fasteners for sheet metal is a threaded right angle fastener that accepts standard unified or metric screws - PAGE 3

RAA™ right angle fasteners for sheet metal can accept thread forming or self-tapping screws - PAGE 4

SMTRA™ right angle threaded fasteners are installed on to PC Boards using standard surface mount techniques. They accept standard unified or metric screws - PAGE 5

Material and finish specifications - PAGE 6
Installation - PAGES 6 - 7
Performance data - PAGES 7 - 8

Depending on placement of the fastener within the mounting hole, a slight gap may be noticeable along the non-clinching edges of the fastener after installation. If gap is not acceptable in your application, check with techsupport for a solution.
**PEM® RAS™ THREADED RIGHT ANGLE FASTENER**

For use with standard metric or unified screws

**PART NUMBER DESIGNATION**

- **Type**
- **Material**
- **Thread Code**
- **Height Code**
- **Length Code**
- **Finish Code**

**All dimensions are in inches.**

<table>
<thead>
<tr>
<th>Thread Size (Pitch)</th>
<th>Type</th>
<th>Fastener Material</th>
<th>Thread Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Min. Sheet Thickness</th>
<th>Hole Size In Sheet</th>
<th>Min. Part Face to Edge</th>
<th>Min. Dist. Hole To Edge</th>
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<tbody>
<tr>
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**Clinching profile may vary.**

**All dimensions are in millimeters.**

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<th>Thread Size x Pitch</th>
<th>Type</th>
<th>Fastener Material</th>
<th>Thread Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Min. Sheet Thickness</th>
<th>Hole Size In Sheet</th>
<th>Min. Part Face to Edge</th>
<th>Min. Dist. Hole To Edge</th>
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</table>

**Finish Code**

- RA
- S
- 440
- ZI

**All dimensions are in millimeters.**

**PennEngineering • www.pemnet.com RA-3**
**RAA™ RIGHT ANGLE FASTENER**

For use with thread forming screws

---

**RIGHT ANGLE FASTENERS**

---

**RAA™ RIGHT ANGLE FASTENER**

For use with thread forming screws

---

**PART NUMBER DESIGNATION**

- Type
- Material (aluminum)
- Screw Size Code
- Height Code
- Length Code

---

**METRIC**

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<tr>
<th>Thread Form Screw Size</th>
<th>Type</th>
<th>Fastener Material</th>
<th>Screw Size Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Length L ±0.008</th>
<th>Min. Sheet Thickness</th>
<th>Hole Size in Sheet</th>
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</thead>
<tbody>
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<td>4</td>
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<td>B 8 x 4</td>
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</tr>
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<td>M4 x 0.7</td>
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**UNITED**

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<th>Length Code</th>
<th>Length L ±0.003</th>
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<th>Hole Size in Sheet</th>
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All dimensions are in inches.

---

All dimensions are in millimeters.

---

**Clinching profile may vary.**
SMTRA™ ReelFast® RIGHT ANGLE FASTENERS
Surface mounted and threaded to accept standard unified or metric screw

All dimensions are in inches.

<table>
<thead>
<tr>
<th>Thread Size x Pitch</th>
<th>Type</th>
<th>Thread Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Length L ±0.005</th>
<th>Min. Sheet Thickness +0.003 -0.000</th>
<th>Hole Size In Sheet ±0.006</th>
<th>A ±0.006</th>
<th>B ±0.006</th>
<th>C ±0.006</th>
<th>D ±0.006</th>
<th>Height F ±0.006</th>
<th>G ±0.006</th>
<th>J Nom.</th>
<th>K Nom.</th>
<th>N Max.</th>
<th>P Max.</th>
<th>Sr ±0.003</th>
<th>T Nom.</th>
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<td>7</td>
<td>1</td>
<td>1.35</td>
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<td>6.35</td>
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<td>0.75</td>
<td>1.22</td>
<td>1</td>
<td>7.9</td>
<td>4.8</td>
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All dimensions are in millimeters.

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<tr>
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<th>Type</th>
<th>Thread Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Length L ±0.001</th>
<th>Min. Sheet Thickness +0.008</th>
<th>hole Size In Sheet ±0.015</th>
<th>A ±0.015</th>
<th>B ±0.015</th>
<th>C ±0.015</th>
<th>D ±0.015</th>
<th>Height F ±0.015</th>
<th>G ±0.015</th>
<th>J Nom.</th>
<th>K Nom.</th>
<th>N Max.</th>
<th>P Max.</th>
<th>Sr ±0.008</th>
<th>T Nom.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2 x 0.4</td>
<td>SMTRA</td>
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<td>5.5</td>
<td>1</td>
<td>1.5</td>
<td>3.5</td>
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<td>8.4</td>
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<td>4</td>
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<td>1.22</td>
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<td>7</td>
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<td>M4 x 0.7</td>
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<td>1</td>
<td>7.9</td>
<td>4.8</td>
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If desired, space can be used for fast cable tie mounting.
RIGHT ANGLE FASTENERS

MATERIAL AND FINISH SPECIFICATIONS

<table>
<thead>
<tr>
<th>Threads</th>
<th>Fastener Materials</th>
<th>Standard Finishes</th>
<th>For Use In Sheet Hardness</th>
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<tr>
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</tr>
<tr>
<td>SMTRA</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

| Part Number Codes for Finishes | 2I | None | ET (3) |

1. See PEM® Technical Support section of our website for related plating standards and specifications.
3. Optimal solderability life noted on packaging.

INSTALLATION

RAS™ and RAA™ Fasteners
1. Prepare a properly sized rectangular mounting hole in the sheet. Do not perform any secondary operations such as deburring.
2. Place the fastener through the mounting hole (preferably the punch side) and into the anvil as shown in the drawing to the right.
3. With the installation punch and anvil surfaces parallel, apply a squeezing force until the bottom of the fastener becomes flush with the sheet.

PEMSERTER® Installation Tooling

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<thead>
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<th>Punch Part Number</th>
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</tr>
<tr>
<td>6 / 632</td>
<td>8002712</td>
</tr>
<tr>
<td>8 / 832</td>
<td>8003642</td>
</tr>
<tr>
<td>METRIC</td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>8002713</td>
</tr>
<tr>
<td>M4</td>
<td>8002714</td>
</tr>
</tbody>
</table>

*NOTE: The punch must be large enough to cover the entire base of the fastener to ensure proper installation.

Installation tooling is available from PennEngineering.

MOUNTING HOLE EXAMPLES

The mounting hole is defined by two dimensions. The two thick lines shown must be straight for the entire length defined by “Side 2” and must be separated by the distance shown as “Side 1” (Side 1 and Side 2 are the two dimensions given for the mounting hole on pages 3 and 4). The illustration shows three examples (#1, #2, and #3) of how it can be achieved. Example #4 in the lower right side will not work.

INSTALLATION NOTES

• For best results we recommend using a HAEGER® or PEMSERTER® machine for installation of PEM® self-clinching fasteners. Please check our website for more information.
• Visit the Animation Library on our website to view the installation process for this product.
## PERFORMANCE DATA

### RAA™ FASTENERS

<table>
<thead>
<tr>
<th>Screw Size Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Thread Forming Torque (in. lbs.)</th>
<th>Max. Rec. Tightening Torque (in. lbs.)</th>
<th>Test Sheet Material</th>
<th>Installation (lbs.)</th>
<th>Pushout (lbs.) (1)</th>
<th>Side Load (lbs.) (2)</th>
<th>Pull Thru (lbs.) (3)</th>
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<td>Aluminum</td>
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### RAS™ THREADED FASTENERS

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<tr>
<th>Thread Code</th>
<th>Height Code</th>
<th>Length Code</th>
<th>Material</th>
<th>Test Sheet Material</th>
<th>Installation (lbs.)</th>
<th>Pushout (lbs.) (1)</th>
<th>Side Load (lbs.) (2)</th>
<th>Pull Thru (lbs.) (3)</th>
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<td>5052-H34 Aluminum</td>
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</tbody>
</table>

### SMTRA™ SURFACE MOUNT FASTENERS

- Flat top for vacuum pick up.
- Solder paste applied to pad on PCB.
- Solder fastener in place using standard surface mount techniques.
- Undercut to accept solder fillet and permit flush to edge installation.

(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) Pushout test is conducted without side panel attached to RANGLE® fastener.

(3) 1” / 25.4mm from screw centerline.
### PERFORMANCE DATA

**SMTRA™ R’ANGLE® FASTENERS WITH ET FINISH\(^{(1)}(2)\)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Pullout (lbs.)</th>
<th>Side Load (lbs.)</th>
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</thead>
<tbody>
<tr>
<td>SMTRA256-8-6</td>
<td>51.7</td>
<td>71</td>
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<td>SMTRA440-9-6</td>
<td>89.5</td>
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<td>SMTRA632-10-8</td>
<td>110.3</td>
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<td>SMTRA832-12-9</td>
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</table>

<table>
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<th>Pullout (N)</th>
<th>Side Lead (N)</th>
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</thead>
<tbody>
<tr>
<td>SMTRAM2-6-5</td>
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<td>SMTRAM25-6-5</td>
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<td>SMTRAM3-7-5</td>
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<td>73.3</td>
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</table>

(1) 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.

(2) Further testing details can be found in the literature section on our website.

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**TESTING CONDITIONS**

- **Oven**: Quad ZCR convection oven with 4 zones
- **Vias**: None
- **High Temp**: 518°F / 270°C
- **Board Finish**: 62% Sn, 38% Pb
- **Paste**: Amtech NC559LF Sn96.5/3.0Ag/0.5Cu (SAC305) Lead-free
- **Board**: .062” thick, Single Layer FR-4
- **Stencil**: .0067” / 0.17 mm thick
- **Screen Printer**: Ragin Manual Printer

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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 the Technical Support section of our website. Specifications subject to change without notice. See our website for the most current version of this bulletin.