SH™ HARD PANEL NUTS

- Installs into thin, harder, high strength steel materials (high strength steel sheets at 975MPa maximum ultimate tensile)
- Allows overall weight reduction for all vehicles
- Provides lower installed cost

Compare to other thin sheet fastening devices:
- Addresses environmental concerns
- Smaller outer diameter
- Lighter weight
- Flush on reverse side of panel
- Close to edge of panel mounting
- No embossing required
- Hardened nut material provides stronger thread strength
- Can be installed automatically using press or in-die technology

Threads: Internal, ASME B1.1, 2B / ASME B1.13M, 6H
Material: Hardened Alloy Steel
Standard Finish: X - No finish (with rust preventative oil) (2)
For use in sheet hardness: HRC 30 / HB 277 or less


(1) For maximum performance, we recommend that you use the maximum shank length for your sheet thickness.
(2) Unplated threads may be oversized sized as permitted by thread standards to accept minimum plating thickness of .00020”/.0051 mm.
**HFLH™ HARD PANEL STUDS**

- Installs into thinner, harder, high strength steel materials (high strength steel sheets at 700MPa maximum ultimate tensile)
- Allows overall weight reduction for all vehicles
- Provides lower installed cost

**Compare to other thin sheet fastening devices:**
- Addresses environmental concerns
- Lighter weight
- Close to edge of panel mounting
- No embossing required
- Hardened stud material provides stronger thread strength
- Can be installed automatically using press or in-die technology

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All dimensions are in inches.

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Type</th>
<th>Thread Fastener Thread</th>
<th>Length Code &quot;L&quot; ±.015 (Length Code in Hths of an inch)</th>
<th>Min. Sheet Thickness (t)</th>
<th>Hole Size in Sheet +.005 -.000</th>
<th>Max. Hole In Attached Parts</th>
<th>H ±.01</th>
<th>S Max. (2)</th>
<th>T Max.</th>
<th>Min. Dist. Hole To Edge</th>
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</thead>
<tbody>
<tr>
<td>.190-32</td>
<td>HFLH</td>
<td>032</td>
<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>.040</td>
<td>.190 .280 .357 .102 .048 .360</td>
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<td>.250-20</td>
<td>HFLH</td>
<td>0420</td>
<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>.040</td>
<td>.250 .340 .462 .118 .060 .470</td>
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<td>.313-18</td>
<td>HFLH</td>
<td>0518</td>
<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>.060</td>
<td>.312 .402 .586 .133 .083 .560</td>
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**METRIC**

<table>
<thead>
<tr>
<th>Thread Size x Pitch</th>
<th>Type</th>
<th>Thread Fastener Thread</th>
<th>Length Code &quot;L&quot; ±.04 (Length Code in millimeters)</th>
<th>Min. Sheet Thickness (t)</th>
<th>Hole Size in Sheet +.013</th>
<th>Max. Hole In Attached Parts</th>
<th>H ±.025</th>
<th>S Max. (2)</th>
<th>T Max.</th>
<th>Min. Dist. Hole To Edge</th>
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</thead>
<tbody>
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<td>HFLH</td>
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<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>1</td>
<td>5 7.3 9.6 2.6 1.35 10</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6 x 1</td>
<td>HFLH</td>
<td>M6</td>
<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>1</td>
<td>6 8.3 11.35 2.8 1.52 11.5</td>
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<td></td>
</tr>
<tr>
<td>M8 x 1.25</td>
<td>HFLH</td>
<td>M8</td>
<td>.500 .750 1.00 1.25 1.50 1.75 2.00</td>
<td>1.5</td>
<td>8 10.3 15.3 3.3 2.13 14.5</td>
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</table>

**Tensile strength:** 120 ksi

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**Tensile strength:** 900 MPa

**Threads:** External, ASME B1.1, 2A / ASME B1.13M, 6g

**Material:** Hardened Alloy Steel

**Standard Finish:** ZI - Zinc plated, 5µm, colorless (3)

**Optional Finish:** X - No finish (with rust preventative oil) (4)

**For use in sheet hardness:** HRB 96 / HB 216 or less

HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.

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(1) See page 3 for installation tool requirements.
(2) Threads are gaugeable to within 2 pitches of the "S" Max. dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S" Max. dimension.
(3) See PEM Technical Support section of our web site (www.pemnet.com) for related plating standards and specifications.
(4) "X" suffix studs may have pitch diameters and major diameters below 2A "Basic", per ANSI B1.1, Section 7, and B1.13M, Section 8 to allow for minimum of 0.0002" / 0.0051 mm of plating.
**INSTALLATION - SH™ NUTS**

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in diagram to the right.
3. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the nut comes into contact with the sheet material.

**INSTALLATION - HFLH™ STUDS**

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert stud through mounting hole (punch side) of sheet and into anvil hole.
3. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the stud is embedded into the sheet.

**Tooling for sheet thicknesses less than .060” / 1.51 mm with #10 / M5 and 1/4” / M6 thread sizes and less than .075” / 1.9 mm and greater with 5/16” / M8 threads.**

**Tooling for sheet thicknesses .060” / 1.51 mm and greater with #10 / M5 and 1/4” / M6 thread sizes and .075” / 1.9 mm and greater with 5/16” / M8 threads.**

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**PEMSERTER® Installation Tooling**

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**INSTALLATION NOTES**

- For best results we recommend using a PEMSERTER® press 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 select products.
**PERFORMANCE DATA**

**SH™ NUTS**

<table>
<thead>
<tr>
<th>Thread Code</th>
<th>Shank Code</th>
<th>Test Sheet Thickness and Material (in.)</th>
<th>Sheet Hardness HRC</th>
<th>Installation (lbs.)</th>
<th>Pushout (lbs.)</th>
<th>Torque-out (lbs.)</th>
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</thead>
<tbody>
<tr>
<td>0420</td>
<td>1</td>
<td>.098” S700MC</td>
<td>23</td>
<td>1100</td>
<td>950</td>
<td>150</td>
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<td></td>
<td>2</td>
<td>.098” S700MC</td>
<td>23</td>
<td>1250</td>
<td>1000</td>
<td>170</td>
</tr>
<tr>
<td>0518</td>
<td>1</td>
<td>.098” S700MC</td>
<td>23</td>
<td>1350</td>
<td>1050</td>
<td>265</td>
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<tr>
<td></td>
<td>2</td>
<td>.098” S700MC</td>
<td>23</td>
<td>1390</td>
<td>1100</td>
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<td>0616</td>
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<td>.098” S700MC</td>
<td>23</td>
<td>1550</td>
<td>1200</td>
<td>500</td>
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</table>

**HFLH™ STUDS**

<table>
<thead>
<tr>
<th>Thread Code</th>
<th>Shank Code</th>
<th>Test Sheet Thickness and Material (mm)</th>
<th>Sheet Hardness HRC</th>
<th>Installation (kN)</th>
<th>Pushout (kN)</th>
<th>Torque-out (kN-m)</th>
<th>Tensile Pull Thru Test (kN)</th>
<th>Bushing Pull Thru Test (kN-m)</th>
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<tbody>
<tr>
<td>M6</td>
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<td>2.5 mm S700MC</td>
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<td>52.1</td>
<td>4200</td>
<td>17</td>
<td>2200</td>
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<td>2</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>57.4</td>
<td>4500</td>
<td>19</td>
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<td>.335</td>
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<tr>
<td>M8</td>
<td>1</td>
<td>2.5 mm S700MC</td>
<td>23</td>
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<td>4600</td>
<td>30</td>
<td>4000</td>
<td>.407</td>
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<td></td>
<td>2</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>57.4</td>
<td>4900</td>
<td>30</td>
<td>4000</td>
<td>.407</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) Installation controlled by proper cavity depth in punch.

(3) Head size is adequate to ensure failure in threaded area when tested with industry standard tensile bushing diameter.

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

**PEM® Dimple** (Registered Trademark)

**SH Stamp** (Registered Trademark)