Fasteners For Hard Panels
Designed to meet the challenges of today’s automotive assembly and design.

TYPE 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)

Optional Finish:
Consult technical support for recommended optional finishes

For use in sheet hardness:
HRC 30 / HB 277 or less


All dimensions are in inches.

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Type</th>
<th>Shank Code</th>
<th>A (Shank) Max.</th>
<th>Min. Sheet Thickness (1)</th>
<th>Hole Size in Sheet +.003 -.000</th>
<th>C Max.</th>
<th>E ±.001</th>
<th>T ±.001</th>
<th>Min. Dist Hole to Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>.250-20 SH 0420</td>
<td>0420</td>
<td>1</td>
<td>.054</td>
<td>.056</td>
<td>.344</td>
<td>.343</td>
<td>.440</td>
<td>.170</td>
<td>.34</td>
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<td>.313-18 SH 0518</td>
<td>0518</td>
<td>1</td>
<td>.054</td>
<td>.056</td>
<td>.413</td>
<td>.412</td>
<td>.500</td>
<td>.230</td>
<td>.38</td>
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<tr>
<td>.375-16 SH 0616</td>
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<td>.087</td>
<td>.090</td>
<td>.500</td>
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<td>.623</td>
<td>.270</td>
<td>.44</td>
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</tbody>
</table>

(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.

All dimensions are in millimeters.

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Type</th>
<th>Shank Code</th>
<th>A (Shank) Max.</th>
<th>Min. Sheet Thickness (1)</th>
<th>Hole Size in Sheet +.008</th>
<th>C Max.</th>
<th>E ±0.25</th>
<th>T ±0.25</th>
<th>Min. Dist Hole to Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 x 1 SH M6</td>
<td>M6</td>
<td>1</td>
<td>1.38</td>
<td>1.4</td>
<td>8.75</td>
<td>8.73</td>
<td>11.18</td>
<td>4.08</td>
<td>8.6</td>
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<tr>
<td>M8 x 1.25 SH M8</td>
<td>M8</td>
<td>1</td>
<td>1.38</td>
<td>1.4</td>
<td>10.5</td>
<td>10.47</td>
<td>12.7</td>
<td>5.47</td>
<td>9.7</td>
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<tr>
<td>M10 x 1.5 SH M10</td>
<td>M10</td>
<td>1</td>
<td>2.21</td>
<td>2.29</td>
<td>14</td>
<td>13.97</td>
<td>17.35</td>
<td>7.48</td>
<td>13.5</td>
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</tbody>
</table>

Threads: Internal, ASME B1.1, 2B / ASME B1.13M, 6H
Material: Hardened Alloy Steel

www.pemnet.com
Fasteners For Hard Panels
For installation into thin, harder, high-strength materials

**TYPE 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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**Part Number Designation**

<table>
<thead>
<tr>
<th>Type</th>
<th>Thread Size Code</th>
<th>Shank Code</th>
<th>Finish Code</th>
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<tbody>
<tr>
<td>HFLH</td>
<td>0420</td>
<td>20</td>
<td>ZI</td>
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**All dimensions are in inches.**

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<tbody>
<tr>
<td>.190-32</td>
<td>Hardened Alloy Steel</td>
<td>HFLH 032 8 12 16 20 24 28 32</td>
<td>.040 .190 .280 .357 .102 .048 .360</td>
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<tr>
<td>.250-20</td>
<td>Hardened Alloy Steel</td>
<td>HFLH 0420 8 12 16 20 24 28 32</td>
<td>.040 .250 .340 .462 .118 .060 .470</td>
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</tr>
<tr>
<td>.313-18</td>
<td>Hardened Alloy Steel</td>
<td>HFLH 0518 8 12 16 20 24 28 32</td>
<td>.060 .312 .402 .566 .133 .083 .560</td>
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</tbody>
</table>

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**All dimensions are in millimeters.**

<table>
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</thead>
<tbody>
<tr>
<td>M5 x 0.8</td>
<td>Hardened Alloy Steel</td>
<td>HFLH M5 15 20 25 30 35 40 50</td>
<td>1 5 7.3 9.6 2.6 1.35 10</td>
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</tr>
<tr>
<td>M6 x 1</td>
<td>Hardened Alloy Steel</td>
<td>HFLH M6 15 20 25 30 35 40 50</td>
<td>1 6 8.3 11.35 2.8 1.52 11.5</td>
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<tr>
<td>M8 x 1.25</td>
<td>Hardened Alloy Steel</td>
<td>HFLH M8 15 20 25 30 35 40 50</td>
<td>1.5 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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(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.

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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
INSTALLATION - TYPE HFLH

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 punch and anvil surfaces parallel, apply squeezing force until the head of the nut comes into contact with the sheet material.

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 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.

INSTALLATION - TYPE SH

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.

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

For installation into thin, harder, high-strength materials

PERFORMANCE DATA\(^{(1)}\)

**TYPE SH**

<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 (in. lbs.)</th>
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</thead>
<tbody>
<tr>
<td>0420</td>
<td>1</td>
<td>.098&quot; S700MC</td>
<td>23</td>
<td>11700</td>
<td>950</td>
<td>150</td>
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<td></td>
<td>2</td>
<td>.098&quot; S700MC</td>
<td>23</td>
<td>12900</td>
<td>1000</td>
<td>170</td>
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<tr>
<td>0518</td>
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<td>.098&quot; S700MC</td>
<td>23</td>
<td>12500</td>
<td>1050</td>
<td>265</td>
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<tr>
<td></td>
<td>2</td>
<td>.098&quot; S700MC</td>
<td>23</td>
<td>12900</td>
<td>1100</td>
<td>265</td>
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<td>0616</td>
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<td>.098&quot; S700MC</td>
<td>23</td>
<td>15300</td>
<td>1200</td>
<td>500</td>
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</tbody>
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**TYPE HFLH**

<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>Strength (kN)</th>
<th>Pull Thru Hole Size For Pull Thru Tests</th>
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</thead>
<tbody>
<tr>
<td>M6</td>
<td>1</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>521</td>
<td>4200</td>
<td>17</td>
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<tr>
<td></td>
<td>2</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>574</td>
<td>4500</td>
<td>19</td>
<td></td>
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</tr>
<tr>
<td>M8</td>
<td>1</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>561</td>
<td>4600</td>
<td>30</td>
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<td></td>
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<td></td>
<td>2</td>
<td>2.5 mm S700MC</td>
<td>23</td>
<td>574</td>
<td>4900</td>
<td>30</td>
<td></td>
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</tr>
<tr>
<td>M10</td>
<td>1</td>
<td>2.5 mm S700MC</td>
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<td>71.2</td>
<td>5400</td>
<td>56</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.

**PEM® Dimple** (Registered Trademark)

**Type SH** (Registered Trademark)

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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