SELFPIERCING RIVET

A work hole in the materials is not required. Dissimilar materials are securely fastened.

**Features**

No work hole required
The self-piercing rivet pierces through the materials while fastening them together. A work hole does not need to be made in advance.

Secure fastening of dissimilar materials
The self-piercing rivet fastens materials low in weldability, such as aluminum and iron.

Perfect for fastening color steel plates
The self-piercing rivet fastens materials without heating and repainting after fastening is not required.

Clean fastening friendly to working environment
Fastening with a self-piercing rivet does not cause sparks, smoke or riveting swarf. It is a clean fastening technique friendly to working environment.

**Structure of self-piercing rivet**

- **Head**
- **Shank**
- **Hole**

**Fastening process**

1. Place the workpieces on the punch.
2. The stem descends, pressing the rivet head.
3. At the same time, the catcher descends, holding the rivet.
4. The rivet pierces the workpieces and fastening is complete.

**Operating precautions**

If the rivet is installed in the situations below, it may result in improper fastening.
1. The workpieces are tilted.
2. There is a gap between the workpieces.
3. The punch is worn.

**Types of heads**

- **Low round**
- **Flat**
- **Countersunk**

**Rivet type**

- **Self-piercing**

**Nominal diameter / Under-head shank length**

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>2</th>
<th>3.6</th>
<th>4</th>
<th>5</th>
<th>5.5</th>
<th>6.5</th>
<th>7.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-head L</td>
<td>2.0</td>
<td>2.3</td>
<td>2.5</td>
<td>3.9</td>
<td>4.2</td>
<td>4.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Fastening range</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
<td>0.9</td>
<td>1.0</td>
<td>1.6</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>0.6</td>
<td>0.8</td>
<td>1.2</td>
<td>1.6</td>
<td>1.8</td>
<td>2.1</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Note: The table is based on assumption that workpieces of SPCC (painted or plated) with hardness of Hv 120 or equivalent are fastened.

**Comparison of strength with other fastening techniques**

<table>
<thead>
<tr>
<th>Rivet type</th>
<th>3 x 3</th>
<th>3.6 x 3.9</th>
<th>4 x 4</th>
<th>5 x 5.5</th>
<th>5 x 5.5</th>
<th>5 x 6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance spot welding (kN)</td>
<td>1.21</td>
<td>2.42</td>
<td>3.63</td>
<td>4.84</td>
<td>6.05</td>
<td>7.26</td>
</tr>
<tr>
<td>Self-piercing rivet</td>
<td>2.06</td>
<td>3.14</td>
<td>4.21</td>
<td>5.28</td>
<td>6.36</td>
<td>7.44</td>
</tr>
</tbody>
</table>

FUKUI BYORA Co., Ltd.
Self-Piercing Rivet

**Name**

- **Low round**
  - **Self-piercing**
    - 3 × 3.5

**Specification table**

<table>
<thead>
<tr>
<th>Nominal diameter d</th>
<th>2</th>
<th>3</th>
<th>3.6</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerance</td>
<td>±0.02</td>
<td>±0.03</td>
<td>±0.05</td>
<td>±0.05</td>
<td>±0.05</td>
</tr>
<tr>
<td>d</td>
<td>2.0</td>
<td>2.3</td>
<td>3.5</td>
<td>3.9</td>
<td>4.2</td>
</tr>
<tr>
<td>Tolerance</td>
<td>0.3</td>
<td>0.4</td>
<td>0.9</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>H</td>
<td>0.6</td>
<td>0.8</td>
<td>1.6</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Tolerance</td>
<td>1.0</td>
<td>1.2</td>
<td>1.8</td>
<td>2.1</td>
<td>2.6</td>
</tr>
<tr>
<td>A</td>
<td>1.2</td>
<td>1.8</td>
<td>2.2</td>
<td>2.4</td>
<td>2.9</td>
</tr>
<tr>
<td>B</td>
<td>1.5</td>
<td>2.3</td>
<td>3.5</td>
<td>3.9</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Surface treatment**

- Zinc plating, nickel plating, chrome plating, Geomat or bead baked finish

**Material**

- **Standard specification**: Steel (high-carbon steel)
- **Special specification**: Stainless steel or aluminum

**Fastening strength measurement test**

- **Rivet**
  - **Head-side material thickness**
  - **Curled-side material thickness**
  - **Total material thickness** (A + B)

<table>
<thead>
<tr>
<th>Rivet</th>
<th>Head-side material thickness (A)</th>
<th>Curled-side material thickness (B)</th>
<th>Total material thickness (A + B)</th>
<th>Tensile fracture (kN)</th>
<th>Shear fracture (kN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 × 3.5</td>
<td>0.60</td>
<td>0.60</td>
<td>1.20</td>
<td>1.18</td>
<td>1.97</td>
</tr>
<tr>
<td>3.6 × 4.3</td>
<td>1.20</td>
<td>1.20</td>
<td>2.40</td>
<td>2.97</td>
<td>4.21</td>
</tr>
<tr>
<td>4 × 5.5</td>
<td>1.80</td>
<td>1.80</td>
<td>3.60</td>
<td>4.80</td>
<td>9.00</td>
</tr>
<tr>
<td>5 × 7</td>
<td>2.40</td>
<td>2.40</td>
<td>4.80</td>
<td>9.10</td>
<td>11.20</td>
</tr>
</tbody>
</table>

**Examples of Customized Rivets**

- **Three-legged rivet**
  - **Features**: Swarf by punching of the workpieces won’t be generated.
  - **Uses**: The workpieces or the rivet won’t turn.

- **Half piercing rivet**
  - **Features**: By making a hole in the thicker workpiece in advance, positioning is enabled using the hole. The rivet can fasten thicker workpieces than standard self-piercing rivets.
  - **Uses**: Scaffolds (plated steel plate / plated steel plate with hole), heavy shutters (color steel plate / plated steel plate).

- **Low-profile fastening (thin round curl)**
  - **Features**: The buck-tail has a smooth contour and it does not catch swarf.

- **Self-piercing bolt**
  - **Features**: No welding is required and the fastened joint does not need a touch-up. The work area is kept clean and neat.

- **Sealed self-piercing rivet**
  - **Features**: The rivet shank does not pierce through the workpieces and thus high air-tightness is maintained. The appearance is neat.
  - **Uses**: Store rooms, scaffold planks, shutters, storm doors, containers (plywood / plated steel plate), building components, signboards and other products for outdoor use.

- **Rivet for plywood/plaster**
  - **Features**: No drilling is required, drilling a hole in the plywood or plaster.
  - **Uses**: Storerooms, scaffold planks, shutters, heavy shutters (color steel plate / plated steel plate), building components, signboards and other products for outdoor use.

**Note**

1. The strength values given in the brochure are measurement results obtained by our testing. They may vary with the type or thickness of materials used.
2. In designing, be sure to allow a safety factor of at least three.