SEMI-TUBULAR RIVET

Secure and uniform fastening is made without any skills.

- **Structure of semi-tubular rivet**
- **Easy fastening requiring no skill**
  A semi-tubular rivet can be easily and quickly fastened using a rivet setter without any special skills.

- **Rivet design tailored to specific purpose**
  Semi-tubular rivets can be made of various materials. They can be tailored to various requirements, such as conductivity and decorative design.

- **Stable and reliable fastening**
  A semi-tubular rivet does not loosen easily and that provides reliable fastening. The rivet installation can be checked visually.

- **Improvement in working efficiency**
  Using the rivet instead of screw, bolt or nut, the assembly efficiency can be drastically improved.

- **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 pilot pin is not fully out, interfered by the workpieces.
  (4) The curling set is worn.

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>φ1.2</th>
<th>φ1.6</th>
<th>φ2</th>
<th>φ2.5</th>
<th>φ3</th>
<th>φ4</th>
<th>φ5</th>
<th>φ6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWCH10A</td>
<td>0.29</td>
<td>0.49</td>
<td>0.85</td>
<td>1.23</td>
<td>1.69</td>
<td>3.00</td>
<td>4.69</td>
<td>6.76</td>
</tr>
<tr>
<td>C2700W</td>
<td>0.36</td>
<td>0.65</td>
<td>0.96</td>
<td>1.50</td>
<td>2.17</td>
<td>3.86</td>
<td>6.03</td>
<td>8.68</td>
</tr>
<tr>
<td>SUS430-WR</td>
<td>0.48</td>
<td>0.81</td>
<td>1.39</td>
<td>2.03</td>
<td>2.77</td>
<td>4.93</td>
<td>7.11</td>
<td>11.40</td>
</tr>
<tr>
<td>SUSXM7-WR</td>
<td>0.51</td>
<td>0.91</td>
<td>1.42</td>
<td>2.23</td>
<td>3.21</td>
<td>5.71</td>
<td>8.93</td>
<td>12.86</td>
</tr>
<tr>
<td>C1100W</td>
<td>0.28</td>
<td>0.47</td>
<td>0.81</td>
<td>1.18</td>
<td>1.62</td>
<td>2.88</td>
<td>4.50</td>
<td>6.48</td>
</tr>
<tr>
<td>A1070W</td>
<td>0.20</td>
<td>0.37</td>
<td>0.59</td>
<td>0.90</td>
<td>1.30</td>
<td>2.32</td>
<td>3.63</td>
<td>5.29</td>
</tr>
<tr>
<td>A1200W</td>
<td>0.07</td>
<td>0.12</td>
<td>0.20</td>
<td>0.28</td>
<td>0.40</td>
<td>0.70</td>
<td>1.16</td>
<td>1.76</td>
</tr>
<tr>
<td>A5052W</td>
<td>0.10</td>
<td>0.18</td>
<td>0.27</td>
<td>0.44</td>
<td>0.60</td>
<td>1.01</td>
<td>1.61</td>
<td>2.25</td>
</tr>
<tr>
<td>A5056W</td>
<td>0.17</td>
<td>0.29</td>
<td>0.47</td>
<td>0.70</td>
<td>1.18</td>
<td>2.21</td>
<td>3.48</td>
<td>5.46</td>
</tr>
</tbody>
</table>

- **Stainless steel**
  Stainless steel wire
  SUS430-WR
  SUSXM7-WR

- **Low round Semi-tubular 3 x 5**
  - Type of head (Low round, truss, flat, countersunk and round)
  - Nominal diameter (See the specification table.)
  - Under-head shank length (See the specification table.)

- **Types of materials and relevant JIS**
  - **Materials**
  - **Description**
  - **Code**
  - **Relevant JIS**

- **Types of heads**
  - Low round
  - Truss
  - Flat
  - Countersunk
  - Round head

- **Rivet type**
  - Semi-tubular

- **Strength test results by material and shank diameter**
  - Unit (kN)
  - Nominal diameter
  - Tensile
  - Shear

- **Note** Each of the results above is the measured strength of a rivet alone.
### Calculation of under-head shank length

- **Shank diameter** ($d$) x **Coefficient** (0.6) = **Swaging margin ($K$)**

  \[ L = \text{Shank diameter} (d) \times \text{Coefficient} (0.6) \times \text{Material thickness} \]

  The length obtained by this calculation shall be used as a guide.

  - **Material thickness** ($t$)
  - **Nominal diameter** ($d$) = 1.2, 1.6, 2, 2.5, 3, 4, 5, 6, 8

### Tolerance of length $L$

- **Nominal diameter** ($d$) = 1.2, 1.6, 2, 2.5, 3, 4, 5, 6, 8

  - **Tolerance** ±0.02 ±0.04 ±0.05 ±0.07 ±0.1 ±0.15 ±0.2 ±0.25 ±0.3

### Length B list

- **Nominal diameter** ($d$) = 2.5, 3, 4, 5

  - **Length B** (in mm)
    - 3, 3.5, 4.5, 5, 5.5, 6

- **Over 4 to 10** ±0.15 ±0.2 ±0.25 ±0.3
- **Over 10 to 20** ±0.2 ±0.25 ±0.3
- **Over 20 to 40** ±0.3 ±0.4
- **Over 40** — ±0.5

<table>
<thead>
<tr>
<th>Nominal diameter ($d$)</th>
<th>1.2</th>
<th>1.6</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tolerance</strong></td>
<td>±0.04</td>
<td>±0.05</td>
<td>±0.05</td>
<td>±0.07</td>
<td>±0.1</td>
<td>±0.15</td>
<td>±0.2</td>
<td>±0.25</td>
<td>±0.3</td>
</tr>
</tbody>
</table>

### Specification table

<table>
<thead>
<tr>
<th>Nominal diameter ($d$)</th>
<th>1.2</th>
<th>1.6</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length L</strong></td>
<td>3</td>
<td>3.5</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tolerance</strong></td>
<td>±0.15</td>
<td>±0.2</td>
<td>±0.25</td>
<td>±0.3</td>
<td>±0.25</td>
<td>±0.25</td>
<td>±0.3</td>
<td>±0.25</td>
<td>±0.3</td>
</tr>
</tbody>
</table>

### Shape and symbols of standard dimensions

- **Shape and symbols of standard dimensions**

  - **Truss Semi-Tubular Rivet**
  - **Low Round Semi-Tubular Rivet**

### Over 40 to 100

- **Material thickness** ($t$)
- **Nominal diameter** ($d$) = 10 to 20

  - **Tolerance** ±0.15 ±0.2 ±0.25 ±0.3

### Length B list

- **Nominal diameter** ($d$) = 2.0, 2.4, 3.2, 4.0

  - **Length B** (in mm)
    - 2.0, 2.4, 3.2, 4.0

- **Over 4 to 10** ±0.15 ±0.15 ±0.2 ±0.25 ±0.3
- **Over 10 to 20** ±0.2 ±0.25 ±0.3
- **Over 20 to 40** ±0.3 ±0.4
- **Over 40** — ±0.5

### Tolerance of length $L$

- **Nominal diameter** ($d$) = 1.2, 1.6, 2, 2.5, 3, 4, 5, 6, 8

  - **Tolerance** ±0.02 ±0.05 ±0.08 ±0.1 ±0.15 ±0.2 ±0.25 ±0.3 ±0.5

### Length B list

- **Nominal diameter** ($d$) = 2.5, 3, 4, 5, 6, 8

  - **Length B** (in mm)
    - 3, 3.5, 4.5, 5, 5.5, 6

  - **Over 4 to 10** ±0.15 ±0.1 ±0.2 ±0.25 ±0.3 ±0.25 ±0.3 ±0.4
  - **Over 10 to 20** ±0.2 ±0.25 ±0.3 ±0.4
  - **Over 10 to 20** ±0.3 ±0.4
  - **Over 40** — ±0.5

### Tolerance of length $L$

- **Nominal diameter** ($d$) = 1.2, 1.6, 2, 2.5, 3, 4, 5, 6, 8

  - **Tolerance** ±0.02 ±0.05 ±0.1 ±0.15 ±0.2 ±0.25 ±0.3 ±0.4 ±0.5

### Length B list

- **Nominal diameter** ($d$) = 2.0, 2.4, 3.2, 4.0

  - **Length B** (in mm)
    - 3, 3.5, 4.5, 5, 5.5, 6

  - **Over 4 to 10** ±0.15 ±0.1 ±0.2 ±0.25 ±0.3 ±0.25 ±0.3 ±0.4 ±0.5
  - **Over 10 to 20** ±0.2 ±0.25 ±0.3 ±0.4 ±0.5
  - **Over 20 to 40** ±0.3 ±0.4 ±0.5
  - **Over 40** — ±0.5
### Flat Semi-Tubular Rivet

#### Calculation of under-head shank length

\[
L = \text{Diameter} \times \text{Coefficient} \times (0.6) \times \text{Material thickness (t)}
\]

- If length \(L\) is close to the minimum or maximum, length \(B\) shall be 0.8 \times d. For details, see the length \(B\) list below.

#### Specification table

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td></td>
</tr>
<tr>
<td>Tolerance</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

- Max: 0.3
- Min: 0.2
- Recommended work hole diameter: 8.5

#### Tolerance of length \(L\)

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) or below</td>
<td>± 0.5</td>
</tr>
<tr>
<td>Over 2.5 to 4</td>
<td>± 0.4</td>
</tr>
<tr>
<td>Over 4 to 10</td>
<td>± 0.3</td>
</tr>
<tr>
<td>Over 10 to 20</td>
<td>± 0.25</td>
</tr>
<tr>
<td>Over 20 to 40</td>
<td>± 0.2</td>
</tr>
<tr>
<td>Over 40</td>
<td>± 0.15</td>
</tr>
</tbody>
</table>

#### Length \(B\) list

<table>
<thead>
<tr>
<th>Length (B)</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>2.4</td>
</tr>
<tr>
<td>2.4</td>
<td>3.2</td>
</tr>
<tr>
<td>3.2</td>
<td>4.0</td>
</tr>
</tbody>
</table>

### Countersunk Semi-Tubular Rivet

#### Calculation of under-head shank length

\[
L = \text{Diameter} \times \text{Coefficient} \times (0.5) \times \text{Material thickness (t)}
\]

- When length \(L\) is close to the minimum or maximum, length \(B\) shall be 0.8 \times d. For details, see the length \(B\) list below.

#### Specification table

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td></td>
</tr>
<tr>
<td>Tolerance</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

- Max: 0.3
- Min: 0.2
- Recommended work hole diameter: 8.5

#### Tolerance of length \(L\)

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Unit (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d) or below</td>
<td>± 0.15</td>
</tr>
<tr>
<td>Over 2.5 to 4</td>
<td>± 0.2</td>
</tr>
<tr>
<td>Over 4 to 10</td>
<td>± 0.15</td>
</tr>
<tr>
<td>Over 10 to 20</td>
<td>± 0.25</td>
</tr>
<tr>
<td>Over 20 to 40</td>
<td>± 0.3</td>
</tr>
<tr>
<td>Over 40</td>
<td>± 0.5</td>
</tr>
</tbody>
</table>
Round Semi-Tubular Rivet

Shape and symbols of standard dimensions

Calculation of under-head shank length

Nominal diameter 1.2 1.6 2 2.5 3 4 5 6 8

Tolerance
Standard

D

H

A

Tolerance

B

L

Tolerance

Unit (mm)

Material thickness t

Swaging margin K

Shank diameter d

Coefficient (0.6) Material thickness t

L = Shank diameter d / Coefficient (0.6) Material thickness t

*1. Shank diameter d = 0.6 x swaging margin K

*2. Use coefficient (0.5) as a guide for SUSXM7 (with hole diameter / depth between 0.75 d and 0.77 d)

*3. The under-head shank length L should be less than 5 times the shank diameter or in the case of stainless steel, less than twice.

The length obtained by this calculation shall be used as a guide.

Speciﬁcation table

Shape and symbols of standard dimensions

Shank diameter d

Coefficient (0.6)

Material thickness t

Swaging margin K

L = Shank diameter d / Coefficient (0.6) Material thickness t

*1. Shank diameter d = 0.6 x swaging margin K

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*3. The under-head shank length L should be less than 5 times the shank diameter or in the case of stainless steel, less than twice.

The length obtained by this calculation shall be used as a guide.

Examples of customized rivets

Shoulder rivet

Features: The rivet height, after fastened, is constant. It can be used as a fulcrum pin or a spring catch.

Uses: Glass louvers, bars and handles

Anti-crack rivet

Features: The rivet is highly resistant to corrosion by seawater or chemicals (sulfuric acid and organic acid).

Uses: Marine products and products designed for outdoor use

Expansion rivet

Features: The rivet shank is expanded to ensure alignment of the materials. The dual curls fasten the materials firmly. The curls won’t crack.

Uses: Hole punches

Highly corrosion resistant rivet

Features: The rivet is highly resistant to corrosion by seawater or chemicals (sulfuric acid and organic acid).

Uses: Marine products and products designed for outdoor use

Double head rivet

Features: Two different types of rivets are combined into a double head rivet.

Uses: Wheeled suitcases (handles) and kitchen knife handles

Tapered semi-tubular rivet

Features: The rivet is more resistant to buckling than ordinary rivets. It is suitable for fastening a long semi-tubular rivet.

Uses: Automobile-related products and can lever fittings

Examples of customized rivets

In addition to the standard products, we tailor rivets to specific customer needs. Please don’t hesitate to ask us.

Semi-tubular rivet

Features: The rivet height, after fastened, is constant. It can be used as a fulcrum pin or a spring catch.

Features: Heat treatment is performed to prevent cracks in curls.

Uses: Glass louvers, bars and handles

Features: The rivet is highly resistant to corrosion by seawater or chemicals (sulfuric acid and organic acid).

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Elements of customized rivets

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