# U-Bolt Clamps

## Flat Steel U-Bolt with Plastic Pipe Saddle (Short) and U-Profile Type FB+RUK (To be used as Fixed Point Clamps only)

**Order Codes**

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<tr>
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<table>
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<tr>
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<td>Carbon Steel, plastic coated</td>
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Please note: All items are supplied non-assembled.

### Standard Materials for Plastic Pipe Saddles

<table>
<thead>
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<th>Material</th>
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See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

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### Dimensions / Order Codes

#### Flat Steel U-Bolt (type FB) with Plastic Pipe Saddle (type RUK), U-Profile and Hexagon Head Bolts

<table>
<thead>
<tr>
<th>Diameter Nominal Pipe / Tube Ø D1 (mm)</th>
<th>Outside Diameter Nominal Pipe / Tube Ø D1 (in)</th>
<th>Nominal Bore Pipe Ø D1 (in)</th>
<th>Dimensions (mm)</th>
<th>U-Profile (DIN 1026)</th>
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Alternative materials and surface finishes are available upon request. Consult STAUFF for further information.
# Flat Steel U-Bolt with Plastic Pipe Saddle (Short) and U-Profile

(To be used as Fixed Point Clamps only) **Type FB+RUK**

## Dimensions / Order Codes

### Flat Steel U-Bolt with Plastic Pipe Saddle (Short) and U-Profile

(For size DN 40, dimension L4 is staggered by 90°)

<table>
<thead>
<tr>
<th>Diameter Nominal DN</th>
<th>Outside Diameter Ø D1 (mm)</th>
<th>Nominal Bore Pipe (in)</th>
<th>Dimensions (mm)</th>
<th>Hexagon Head Bolt (DIN EN ISO 4014 / 4017)</th>
<th>Thread G x L</th>
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### Plastic Pipe Saddle (type RUK)

(For size DN 40, dimension L4 is staggered by 90°)

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<th>Outside Diameter Ø D1 (mm)</th>
<th>Nominal Bore Pipe (in)</th>
<th>Dimensions (mm)</th>
<th>Hexagon Head Bolt (DIN EN ISO 4014 / 4017)</th>
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### Order Codes

- **FB** A 48,3 W1
  - Flat Steel U-Bolt
  - Material code: Carbon Steel, untreated
  - Material code: Carbon Steel, zinc-plated (Fe/Zn 8 C)
  - Material code: Stainless Steel V4A (1.4401 / 1.4571 (AISI 316 / 316 Ti))
  - Material code: Carbon Steel, Plastic coated

- **RUK** A 48,3 W5
  - Plastic Pipe Saddle (Short)
  - Material code: Stainless Steel V4A (1.4401 / 1.4571 (AISI 316 / 316 Ti))
  - Material code: Carbon Steel, Plastic coated

### Polypropylene

- Colour: Green
- Material code: PP

### Polyamide

- Colour: Black
- Material code: PA

### Standard Materials for Plastic Pipe Saddles

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

www.stauff.com

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### Order Codes

**Clamp Assembly**
- RB*W1*RUK/PP*G8.3

One clamp assembly consists of one Round Steel U-Bolt (type RB), one Plastic Pipe Saddle (type RUK) and four Nuts (to DIN EN ISO 4032).

- **Round Steel U-Bolt**
  - RB

- **Material code**
  - Carbon Steel, untreated W1
  - Stainless Steel V4A 1.4401 / 1.4571 (AISI 316 / 316 Ti) W5
  - Carbon Steel, Plastic coated W6
  - Carbon Steel, zinc-plated and thick-film passivated W66

- **Plastic Pipe Saddle (Short)**
  - RUK/

- **Material of Pipe Saddle**
  - PP

- **Exact outside diameter Ø D1 (mm)**
  - 48.3

Please note: All items are supplied non-assembled.

### Standard Materials for Plastic Pipe Saddles

- **Polypropylene**
  - Colour: Green
  - Material code: PP

- **Polyamide**
  - Colour: Black
  - Material code: PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

### Dimensions / Order Codes

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<th>Diameter Nominal DN</th>
<th>Round U-Bolt (Type RB) Ø D1</th>
<th>Ø D1 (mm)</th>
<th>Ø D1 (in)</th>
<th>Ø D1 (in)</th>
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<th>H2</th>
<th>H3</th>
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Alternative materials and surface finishings are available upon request. Consult STAUFF for further information.

www.stauff.com
**Round Steel U-Bolt with Plastic Pipe Saddle (Short)**

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<tr>
<th>Diameter Nominal</th>
<th>Outside Diameter Pipe / Tube Ø D1 (mm)</th>
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### Alternative materials and surface finishes available upon request.

**Dimensions / Order Codes**

**U-Bolt Clamps**

**Round Steel U-Bolt**

**Material code**
- Carbon Steel, untreated: W1
- Stainless Steel V4A: W5
- Carbon Steel, Plastic coated: W6
- Carbon Steel, zinc-plated and thick-film passivated: W66

**Order Codes**

- Only Round Steel U-Bolt: RB
- Dimension A (mm): A52
- Material code: Carbon Steel, untreated: W1
- Stainless Steel V4A: W5
- Carbon Steel, Plastic coated: W6
- Carbon Steel, zinc-plated and thick-film passivated: W66

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene: PP
- Polyamide: PA

**See page A90 for material properties and technical information.**

Alternative materials are available upon request. Please consult STAUFF for further information.

www.stauff.com A75
**U-Bolt Clamps**

**Dimensions / Order Codes**

### Round Steel U-Bolt with Plastic Pipe Saddle (Long) Type RB+RUL

**Order Codes**

**Clamp Assembly**

- Type RB+RUL
- Round Steel U-Bolt (type RB), one Plastic Pipe Saddle (type RUL) and four Nuts (to DIN EN ISO 4032).

- **Round Steel U-Bolt**
  - Material code:
    - Carbon Steel, untreated: W1
    - Stainless Steel V4A: W5
    - Carbon Steel, Plastic coated: W6
    - Carbon Steel, zinc-plated and thick-film passivated: W66

- **Plastic Pipe Saddle (Long)**
  - Material of Pipe Saddle (see below)

- **Order Codes**
  - Clamp Assembly
    - *RB/W1/RUL/PP*48,3
  - Round Steel U-Bolt
    - Material code:
      - Carbon Steel, untreated
      - Stainless Steel V4A
      - Carbon Steel, Plastic coated
      - Carbon Steel, zinc-plated and thick-film passivated
  - Plastic Pipe Saddle (Long)
    - Material code:
      - PP
  - Exact outside diameter Ø D1 (mm)
    - 48,3

Please note: All items are supplied non-assembled.

### Standard Materials for Plastic Pipe Saddles

- **Polypropylene**
  - Colour: Green
  - Material code: PP

- **Polyamide**
  - Colour: Black
  - Material code: PA

See page A90 for material properties and technical information. Alternative materials are available upon request. Please consult STAUFF for further information.

### Diameter / Dimension

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<th>Diameter (mm)</th>
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<th>Plastic Pipe Saddle</th>
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**Dimensions (mm)**

- **A**
- **L1**
- **H1**
- **H2**
- **H3**
- **H4**
- **Thread G**

**Alternative materials and surface finishings are available upon request. Consult STAUFF for further information.**
**Round Steel U-Bolt with Plastic Pipe Saddle (Long)**

Type RB+RUL

---

**Dimensions / Order Codes**

**Order Codes**

- only Round Steel U-Bolt
  - RB
  - A 52
- Round Steel U-Bolt
  - RB
  - Dimension A (mm)
  - A 52
- Material code
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - *RUL*48,3
- Exact outside diameter Ø D1 (mm)
  - 48,3
- Material of Pipe Saddle (see below)
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene
  - Colour: Green
  - Material code:
  - PP
- Polyamide
  - Colour: Black
  - Material code:
  - PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Plastic Pipe Saddle (type RUL)**

Alternative materials and surface finishings are available upon request. Consult STAUFF for further information.

---

**Order Codes**

- *RB*A 52*W1

- **Round Steel U-Bolt**
  - RB
  - Dimension A (mm)
  - A 52

- **Material code**
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Round Steel U-Bolt with Plastic Pipe Saddle (Long)**

Type RB+RUL

---

**Dimensions / Order Codes**

**Order Codes**

- only Round Steel U-Bolt
  - RB
  - A 52
- Round Steel U-Bolt
  - RB
  - Dimension A (mm)
  - A 52
- Material code
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene
  - Colour: Green
  - Material code:
  - PP
- Polyamide
  - Colour: Black
  - Material code:
  - PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Order Codes**

- *RB*A 52*W1

- **Round Steel U-Bolt**
  - RB
  - Dimension A (mm)
  - A 52

- **Material code**
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Round Steel U-Bolt with Plastic Pipe Saddle (Long)**

Type RB+RUL

---

**Dimensions / Order Codes**

**Order Codes**

- only Round Steel U-Bolt
  - RB
  - A 52
- Round Steel U-Bolt
  - RB
  - Dimension A (mm)
  - A 52
- Material code
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene
  - Colour: Green
  - Material code:
  - PP
- Polyamide
  - Colour: Black
  - Material code:
  - PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Round Steel U-Bolt with Plastic Pipe Saddle (Long)**

Type RB+RUL

---

**Dimensions / Order Codes**

**Order Codes**

- only Round Steel U-Bolt
  - RB
  - A 52
- Round Steel U-Bolt
  - RB
  - Dimension A (mm)
  - A 52
- Material code
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene
  - Colour: Green
  - Material code:
  - PP
- Polyamide
  - Colour: Black
  - Material code:
  - PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Round Steel U-Bolt with Plastic Pipe Saddle (Long)**

Type RB+RUL

---

**Dimensions / Order Codes**

**Order Codes**

- only Round Steel U-Bolt
  - RB
  - A 52
- Round Steel U-Bolt
  - RB
  - Dimension A (mm)
  - A 52
- Material code
  - Carbon Steel, untreated
  - W1
  - Stainless Steel V4A
  - 1.4401 / 1.4571 (AISI 316 / 316 Ti)
  - W5
  - Carbon Steel, Plastic coated
  - W6
  - Carbon Steel, zinc-plated and thick-film passivated
  - W66

- only Plastic Pipe Saddle
  - RUL
  - PP

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.

---

**Standard Materials for Plastic Pipe Saddles**

- Polypropylene
  - Colour: Green
  - Material code:
  - PP
- Polyamide
  - Colour: Black
  - Material code:
  - PA

See page A90 for material properties and technical information.

Alternative materials are available upon request. Please consult STAUFF for further information.
**U-Bolt Clamps**  
**DIN 3570, Type A**

## Dimensions / Order Codes

**Round Steel U-Bolt (without Plastic Pipe Saddle)**  
**Type RBD**

### Order Codes

**Clamp Assembly**  
*RBD*W1*A 30

- One clamp assembly is consisting of one Round Steel U-Bolt (type RBD) and two Nuts (to DIN EN ISO 4032).
- **Material code**  
  - Carbon Steel, untreated  
  - Carbon Steel, zinc-plated and thick-film passivated
- **Dimension A (mm)**  
  - A 30

Please note: All items are supplied non-assembled.

### Diameter Nominal Pipe / Tube Ø D1 (mm) | Outside Diameter Pipe / Tube Ø D1 (in) | Nominal Bore Pipe Ø d1 (in) | Dimensions (mm / in) | Round Steel U-Bolt (Type RBD) A | L | H1 | H2 | Thread G
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
20 | 25 | .98 | 30 | 40 | 70 | 40 | M10 |
26,9 | 1.06 | 3/4 | 1.18 | 40 | 70 | 40 | M10 |
25 | 30 | 1.18 | 38 | 48 | 76 | 40 | M10 |
33,7 | 1.33 | 1 | 1.50 | 48 | 76 | 40 | M10 |
32 | 38 | 1.55 | 46 | 56 | 86 | 50 | M10 |
42,4 | 1.69 | 1-1/4 | 1.81 | 56 | 86 | 50 | M10 |
40 | 44,5 | 1.76 | 52 | 62 | 92 | 50 | M10 |
48,3 | 1.90 | 1-1/2 | 2.05 | 62 | 92 | 50 | M10 |
50 | 57 | 2.28 | 64 | 76 | 108 | 50 | M12 |
60,3 | 2.41 | 2 | 2.52 | 76 | 108 | 50 | M12 |
65 | 76,1 | 3.84 | 82 | 94 | 125 | 50 | M12 |
60 | 88,9 | 3.56 | 84 | 106 | 138 | 50 | M12 |
100 | 108 | 4.32 | 120 | 136 | 171 | 60 | M12 |
114,3 | 4.57 | 4 | 4.72 | 136 | 171 | 60 | M16 |
125 | 133 | 5.32 | 148 | 164 | 191 | 60 | M16 |
139,7 | 5.59 | 5 | 5.83 | 164 | 191 | 60 | M16 |
150 | 159 | 6.36 | 176 | 192 | 217 | 60 | M16 |
168,3 | 6.73 | 6 | 6.93 | 192 | 217 | 60 | M16 |
175 | 193,7 | 7.75 | 202 | 218 | 249 | 60 | M16 |
200 | 216 | 8.64 | 228 | 248 | 283 | 70 | M20 |
219,1 | 8.76 | 8 | 8.98 | 248 | 283 | 70 | M20 |
250 | 267 | 10.68 | 282 | 302 | 334 | 70 | M20 |
273 | 19.92 | 18 | 11.10 | 302 | 334 | 70 | M20 |
300 | 318 | 12.72 | 332 | 352 | 385 | 70 | M20 |
322,9 | 12.96 | 12 | 13.07 | 352 | 385 | 70 | M20 |
350 | 355,6 | 14.22 | 14 | 378 | 402 | 435 | 70 | M24 |
368 | 14.72 | 14.88 | 402 | 435 | 70 | M24 |
400 | 406,4 | 16.26 | 16 | 428 | 452 | 487 | 70 | M24 |
419 | 16.76 | 16.85 | 452 | 487 | 70 | M24 |
500 | 508 | 20.32 | 28 | 530 | 564 | 599 | 70 | M24 |
521 | 20.84 | 20.87 | 554 | 589 | 70 | M24 |

Alternative materials and surface finishings are available upon request. Consult STAUFF for further information.

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[Image of Round Steel U-Bolt (Type RBD)]
Product Features

By preventing the direct metal-to-metal contact, STAUFF Rubber-Shrouded Round Steel U-Bolts, type RSU are primarily utilised in order to:

- Reduce or eliminate noise and fatigue due to vibration of pipework against the supporting structure

- Prevent galvanic corrosion due to the contact of dissimilar metals in the presence of an electrolyte

- Prevent wear and/or crushing of composite, thin-walled or non-ferrous pipework and less resilient cabling

Applications

STAUFF Rubber-Shrouded Round Steel U-Bolts, type RSU have been developed over a number of years to meet the arduous and very specific requirements of process pipework and cabling engineers worldwide.

Materials

Standard material for STAUFF Rubber-Shrouded Round Steel U-Bolts, type RSU is Carbon Steel, electroplated with zinc. Both can also be supplied with alternative surface finishings, or can be manufactured from Stainless Steel, grades V2A and V4A. Consult STAUFF for further information.

STAUFF offers a wide range of shroud and pipe support materials that have been developed and selected to provide optimum performance over a wide range of applications.

Materials include a high-temperature Silicone based solution that is suitable for most applications within a temperature range of -60°C (-76°F) to +244°C (+499°F) with excellent resistance to fire (flame rating of UL94-V0, very low toxicity and the ability to operate continuously at +300°C (+572°F) with only minimum loss of properties.

Please consult STAUFF and ask for detailed material specifications. Alternative materials are available upon request.

Sizes

STAUFF Rubber-Shrouded Round Steel U-Bolts, type RSU are available for almost all commonly used pipe and tube diameters, made of Steel, Stainless Steel, Copper as well as Cupro-Nickel:

- Nominal pipe sizes: up to DN 400
- Outside diameters: 21 mm / .87 in - 203 mm / 8.0 in

Approvals

STAUFF Rubber-Shrouded Round Steel U-Bolts, type RSU are particularly specified for use in Defence and Marine applications. They have been tested and approved for bulk use in surface ships and sub-marines from a fire characteristics point of view according to Def Stan 07-247 ("Selection of Materials on the Basis of their Fire Characteristics") of the UK Ministry of Defence.

Rubber-Lined Flat Steel U-Bolt Type LUS

Product Features

By preventing the direct metal-to-metal contact, STAUFF Rubber-Lined Flat Steel U-Bolts, type LUS are primarily utilised in order to:

- Reduce or eliminate noise and fatigue due to vibration of pipework against the supporting structure

- Prevent galvanic corrosion due to the contact of dissimilar metals in the presence of an electrolyte

- Prevent wear and/or crushing of composite, thin-walled or non-ferrous pipework and less resilient cabling

Applications

STAUFF Rubber-Lined Flat Steel U-Bolts, type LUS have been developed over a number of years to meet the arduous and very specific requirements of process pipework and cabling engineers worldwide.

Materials

Standard material for STAUFF Rubber-Lined Flat Steel U-Bolts, type LUS is Carbon Steel, electroplated with zinc. Both can also be supplied with alternative surface finishings, or can be manufactured from Stainless Steel, grades V2A and V4A. Consult STAUFF for further information.

STAUFF offers a wide range of shroud and pipe support materials that have been developed and selected to provide optimum performance over a wide range of applications.

Materials include a high-temperature Silicone based solution that is suitable for most applications within a temperature range of -60°C (-76°F) to +300°C (+572°F) with excellent resistance to fire (flame rating of UL94-V0, very low toxicity and the ability to operate continuously at +300°C (+572°F) with only minimum loss of properties.

Please consult STAUFF and ask for detailed material specifications. Alternative materials are available upon request.

Sizes

STAUFF Rubber-Lined Flat Steel U-Bolts, type LUS are available for almost all commonly used pipe and tube diameters, made of Steel, Stainless Steel, Copper as well as Cupro-Nickel:

- Nominal pipe sizes: up to DN 700
- Outside diameters: 21 mm / .87 in - 203 mm / 8.0 in

Approvals

STAUFF Rubber-Lined Flat Steel U-Bolts, type LUS are particularly specified for use in Defence and Marine applications. They have been tested and approved for bulk use in surface ships and sub-marines from a fire characteristics point of view according to Def Stan 07-247 ("Selection of Materials on the Basis of their Fire Characteristics") of the UK Ministry of Defence.

www.stauff.com
Standard Clamp Body Materials

<table>
<thead>
<tr>
<th>Material Code</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Material</td>
<td>Copolymeric Polypropylene</td>
<td>Polyamide</td>
<td>Aluminium AISi2</td>
<td>Thermoplastic Elastomer</td>
</tr>
<tr>
<td>Standard Colour</td>
<td>Green</td>
<td>Black</td>
<td>Natural</td>
<td>Black</td>
</tr>
</tbody>
</table>

### Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile E-Module</td>
<td>1073 N/mm² (ISO 527)</td>
<td>&gt; 1400 N/mm² (ISO 527)</td>
<td>&gt; 65000 N/mm²</td>
</tr>
<tr>
<td>Notch Impact Strength</td>
<td>7.5 kJ/m² at +23°C / +73.4°F (acc. to Charpy / ISO 179/1eA)</td>
<td>&gt; 15 kJ/m² at +23°C / +73.4°F (acc. to Charpy / ISO 179/1eA)</td>
<td>113 N/mm² at +23°C / +73.4°F (ASTM D412)</td>
</tr>
<tr>
<td>Low Temperature Notch Impact Strength</td>
<td>3.1 kJ/m² at -30°C / -22.0°F (acc. to Charpy / ISO 179/1eA)</td>
<td>&gt; 3 kJ/m² at -30°C / -22.0°F (acc. to Charpy / ISO 179/1eA)</td>
<td></td>
</tr>
<tr>
<td>Tensile Strength at Yield (Tensile Strength)</td>
<td>25 N/mm² (ISO 527)</td>
<td>&gt; 55 N/mm² (ISO 527)</td>
<td>&gt; 150 N/mm² (ISO EN 10002)</td>
</tr>
<tr>
<td>Ball Indentation Hardness (Brinell Hardness)</td>
<td>45.4 N/mm² (ISO 2039-1)</td>
<td>&gt; 65 N/mm² (ISO 2039-1)</td>
<td>&gt; 55 HBS</td>
</tr>
<tr>
<td>Shore Hardness</td>
<td></td>
<td></td>
<td>87 A (ISO 868)</td>
</tr>
</tbody>
</table>

### Thermal Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Resistance (Continuous Exposure, Min...Max)</td>
<td>30°C ... +90°C / -22°F ... +194°F</td>
<td>-40°C ... +120°C / -40°F ... +248°F (Brief exposure up to +140°C / +284°F)</td>
<td>up to +300°C / up to +572°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak Acids</td>
<td>conditionally consistent</td>
<td>conditionally consistent</td>
<td>conditionally consistent</td>
</tr>
<tr>
<td>Solvents</td>
<td>conditionally consistent</td>
<td>conditionally consistent</td>
<td>conditionally consistent</td>
</tr>
<tr>
<td>Benzine</td>
<td>consistent</td>
<td>consistent</td>
<td>consistent</td>
</tr>
<tr>
<td>Mineral Oils</td>
<td>conditionally consistent</td>
<td>consistent</td>
<td>conditionally consistent</td>
</tr>
<tr>
<td>Other Oils</td>
<td>consistent</td>
<td>consistent</td>
<td>consistent</td>
</tr>
<tr>
<td>Alcohols</td>
<td>consistent</td>
<td>consistent</td>
<td>consistent</td>
</tr>
<tr>
<td>Seawater</td>
<td>consistent</td>
<td>consistent</td>
<td>consistent</td>
</tr>
</tbody>
</table>

The information for the Polyamide material PA and the Polyamide based materials PV0 and PA-FF have been determined in a conditioned state according to ISO 1110. For Aluminium, the tensile strength (under reversed bending stress) and impact bending strength both rise constantly at decreasing temperatures whilst the value for breaking elongation decreases.

### Standard Rubber Insert Materials

#### Thermoplastic Elastomer (73 Shore-A)

<table>
<thead>
<tr>
<th>Property</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Material for STAUFF Group 4 and 6 (Standard Series)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Material for STAUFF Group 45 to 65 (Heavy Series)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shore Hardness</td>
<td>73A (ISO 868)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulus of Elasticity</td>
<td>16 N/mm² at +23°C / +73.4°F (ASTM D 412)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Stress</td>
<td>8.3 N/mm² (ASTM D 412)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Resistance</td>
<td>-40°C ... +125°C / -40°F ... +257°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Properties</td>
<td>Consistent against weak acids and solvents; conditionally consistent against benzine and mineral oils; consistent against other oils, alcohols and sea water.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Elastomer (70 Shore-A)

<table>
<thead>
<tr>
<th>Property</th>
<th>PP</th>
<th>PA</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Material for STAUFF Group 7 to 105 (Heavy Series)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shore Hardness</td>
<td>70A (DIN 53505)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Strength at Yield</td>
<td>9 N/mm² (DIN 53504)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Strain at Break</td>
<td>400 % (DIN 53504)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tear-Growth Resistance</td>
<td>9 N/mm² (DIN 53507-A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression Set</td>
<td>20% (DIN 53517)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(22h at +70°C / +158°F)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Consult STAUFF for further information.
Technical Appendix

Special Clamp Body Materials (Selection)
Preventive Fire Protection

<table>
<thead>
<tr>
<th>PAVO</th>
<th>PA-FF</th>
<th>PPDA</th>
<th>PP6853</th>
<th>PPVO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyamide</td>
<td>Polyamide</td>
<td>Polypropene</td>
<td>Polypropene</td>
<td>Polypropene</td>
</tr>
<tr>
<td>Grey</td>
<td>Black</td>
<td>White</td>
<td>White</td>
<td>Black</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 527-1/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1100 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 527-1/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200 N/mm² (ISO 527) at +23 °C / +73.4 °F: 50 mm/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1440 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ICE 60811-1-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 kJ/m² at +23 °C / +73.4 °F (acc. to Charpy / ISO 179/1eA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 kJ/m² at +23 °C / +73.4 °F (acc. to Charpy / ISO 179/1eA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11,8 kJ/m² at +23 °C / +73.4 °F (acc. to IZOD / ISO 179/1eA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 kJ/m² at +23 °C / +73.4 °F (acc. to IZOD / ISO 179/1eA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 kJ/m² at +23 °C / +73.4 °F (acc. to ISO 180/A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 527-1/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 N/mm²</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 527-1/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,1 N/mm² (ISO 527) at +23 °C / +73.4 °F: 50 mm/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20,4 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ICE 60811-1-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 N/mm²</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 2039-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 N/mm²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ISO 2039-1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-30°C ... +120°C / -22 °F ... +248 °F
-30°C ... +120°C / -22 °F ... +248 °F
-25°C ... +90°C / -13 °F ... +194 °F
-25°C ... +90°C / -13 °F ... +194 °F
-25°C ... +90°C / -13 °F ... +194 °F

Tested and approved according to UL94 (Vertical Burning Test)
- Classification: S4/V-0 (thickness: 0.4mm)
- Tested and approved according to DIN 5510, Part 2
  - Combustibility classification: S3
  - Smoke development classification: SR2
  - Drifting classification: ST2
- Tested and approved according to NF F 16-101
  - Classification: I2 / F2
- Halogen- and phosphor-free flame retardant system
- Oxygen index: 34.0% (according to ISO 4589-2)
- Flammability temperature: 299 °C / 570 °F (according to ISO 4589-3, Annex A)
- High durability, good UV, weathering and chemical resistance

Tested and approved according to DIN 5510, Part 2
- Combustibility classification: S4
- Smoke development classification: SR2
- Dripping classification: ST2
- Oxygen index: 28.0% (according to ISO 4589-2)
- Flammability temperature: 327 °C / 621 °F
- High durability (even at low temperatures), mechanical strength and rigidity, good attrition resistance and fatigue strength, good UV resistance

Tested and approved according to Def Stan 07-247
- Assesment: category B
- Approved by the UK Ministry of Defence (MoD)
- Smoke index: 11.1% (according to Def Stan 02-711, thickness: 3.0 mm)
- Halogen-free flame retardant system
- Toxicity index: 0.9 / 100 g (according to Def Stan 02-713)
- Oxygen index: 30.9% (according to ISO 4589-2)
- Flammability temperature: 231 °C / 448 °F (according to ISO 4589-3, Annex A)

Tested and approved according to BS 6853 (Code of practice for fire precautions in the design and construction of passenger carrying trains)
- Assesment: category 1a
- Compliant to the requirements of London Underground / Metronet (standard 2-01001-002: Fire Safety Performance of Materials)

Tested and approved according to DIN 5501, Part 2
- Combustibility classification: S3
- Smoke development classification: SR2
- Drifting classification: ST2

Tested and approved according to Def Stan 07-247
- Assesment: category B
- Smoke index: 6.1% (according to Def Stan 02-711, thickness: 3.0 mm)
- Halogen-free flame retardant system
- Toxicity index: 0.9 / 100 g (according to Def Stan 02-713)
- Oxygen index: 42.0% (according to ISO 4589-2)
- Flammability temperature: 325 °C / 617 °F (according to ISO 4589-3, Annex A)

Tested and approved according to UL94 (Vertical Burning Test)
- Classification: S4/V-0 (thickness: 3mm / 13mm)
Materials and Surface Finishes of Metal Parts

Materials

Unless otherwise stated, all metal parts (e.g. weld plates, cover plates, bolts, rail nuts, etc.) are made of Carbon Steel (surface finishing according to material code).

Besides that, all metal parts are also available ex stock in two different stainless steel qualities:

Stainless Steel V2A
- 1.4301 / 1.4305 (AISI 304 / 303)
- Material code: W4

Stainless Steel V4A
- 1.4401 / 1.4571 (AISI 316 / 316 Ti)
- Material code: W5

Alternative materials are available upon request. Consult STAUFF for further information.

Surface Finishes

Unless otherwise stated, all metal parts made of Carbon Steel S137 are available with the following standard surface finishings:

Carbon Steel, untreated
- Material code: W1

Carbon Steel, phosphated
- Fe/Znph r 10 according to DIN EN 12476
- Material code: W2

Carbon Steel, zinc/nickel-plated
- Fe/ZnNi (12...16) 6-6/6/A/T2 according to DIN 50962
- More than 720 hours resistance against red rust / base metal corrosion in the salt spray test to DIN EN ISO 9227
- Free of hexavalent chromium Cr(VI)
- RoHS compliant according to 2002/95/EC (Restrictions of the Use of Hazardous Substances)
- ELV compliant according to 2000/53/EC (End of Life Vehicles Directive)
- Material code: W3

Alternative surface finishings are available upon request. Consult STAUFF for further information.

Thread Conversion Chart

Metric ISO vs. Unified Coarse (UNC) Thread

Unless otherwise stated, all threaded parts available with Metric ISO thread or unified coarse (UNC) thread.

Standard Series (DIN 3015, Part 1)

<table>
<thead>
<tr>
<th>Group</th>
<th>STAFF</th>
<th>DIN</th>
<th>Thread Metric ISO</th>
<th>Unified Coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 6</td>
<td>1 to 6</td>
<td>M6</td>
<td>1/4–20 UNCS</td>
<td></td>
</tr>
</tbody>
</table>

Heavy Series (DIN 3015, Part 2)

<table>
<thead>
<tr>
<th>Group</th>
<th>STAFF</th>
<th>DIN</th>
<th>Thread Metric ISO</th>
<th>Unified Coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td>3S to 5S</td>
<td>1 to 3</td>
<td>M10</td>
<td>3/8–16 UNC</td>
<td></td>
</tr>
<tr>
<td>6S</td>
<td>4</td>
<td>M12</td>
<td>7/16–14 UNC</td>
<td></td>
</tr>
<tr>
<td>7S</td>
<td>5</td>
<td>M16</td>
<td>5/8–11 UNC</td>
<td></td>
</tr>
<tr>
<td>8S</td>
<td>6</td>
<td>M20</td>
<td>3/4–10 UNC</td>
<td></td>
</tr>
<tr>
<td>9S</td>
<td>7</td>
<td>M24</td>
<td>7/8–9 UNC</td>
<td></td>
</tr>
<tr>
<td>10S</td>
<td>8</td>
<td>M30</td>
<td>1–1/8–7 UNC</td>
<td></td>
</tr>
<tr>
<td>11S to 12S</td>
<td>9 to 10</td>
<td>M30</td>
<td>1–1/4–7 UNC</td>
<td></td>
</tr>
</tbody>
</table>

Twin Series (DIN 3015, Part 3)

<table>
<thead>
<tr>
<th>Group</th>
<th>STAFF</th>
<th>DIN</th>
<th>Thread Metric ISO</th>
<th>Unified Coarse</th>
</tr>
</thead>
<tbody>
<tr>
<td>1D</td>
<td>1</td>
<td>M6</td>
<td>1/4–20 UNCS</td>
<td></td>
</tr>
<tr>
<td>2D to 5D</td>
<td>2 to 5</td>
<td>M8</td>
<td>5/16–18 UNC</td>
<td></td>
</tr>
</tbody>
</table>

Property Classes / Grades of Bolts and Screws

Unless otherwise stated, all threaded parts available with Metric ISO thread or unified coarse (UNC) thread.

<table>
<thead>
<tr>
<th>Bolt / Screw Type</th>
<th>Property Class / Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexagon Head Bolt Type A5</td>
<td>8.8 (according to DIN EN ISO 898)</td>
</tr>
<tr>
<td>W1, W2, W3</td>
<td>5 (according to SAE J429)</td>
</tr>
<tr>
<td>W4</td>
<td>A2-70 (according to DIN EN ISO 3506)</td>
</tr>
<tr>
<td>W5</td>
<td>A7 (according to ASTM A193)</td>
</tr>
<tr>
<td>W4</td>
<td>A2-70 (according to DIN EN ISO 3506)</td>
</tr>
<tr>
<td>W5</td>
<td>A7 (according to ASTM A193)</td>
</tr>
<tr>
<td>Socket Cap Screw Type IS</td>
<td>8.8 (according to DIN EN ISO 898)</td>
</tr>
<tr>
<td>W1, W2, W3</td>
<td>5 (according to SAE J429)</td>
</tr>
<tr>
<td>W4</td>
<td>A2-70 (according to DIN EN ISO 3506)</td>
</tr>
<tr>
<td>W5</td>
<td>A7 (according to ASTM A193)</td>
</tr>
<tr>
<td>W4</td>
<td>A2-70 (according to DIN EN ISO 3506)</td>
</tr>
<tr>
<td>W5</td>
<td>A7 (according to ASTM A193)</td>
</tr>
<tr>
<td>Slotted Head Screw Type LI</td>
<td>8.8 (according to DIN EN ISO 898)</td>
</tr>
<tr>
<td>W1, W2, W3</td>
<td>5 (according to SAE J429)</td>
</tr>
<tr>
<td>W4</td>
<td>A2-70 (according to DIN EN ISO 3506)</td>
</tr>
<tr>
<td>W5</td>
<td>A7 (according to ASTM A193)</td>
</tr>
</tbody>
</table>

Unless otherwise stated, the above mentioned property classes / grades apply as standards for bolts and screws supplied by STAUFF. The information indicate the minimum requirements; higher property classes are available upon request. Consult STAUFF for details.

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