Your Partner for Innovative Connections

www.normagroup.com
Preface

NORMA Group. Perfect connections worldwide

Two well-known global players, ABA and NORMA, have merged to form the new NORMA Group. When it comes to technically superior connecting and retaining elements as well as complete fluid systems the new Group stands for "doubled expertise". Be it automotive or industry and trade, the NORMA Group sets the standard in innovative solutions worldwide.

And, not to forget, our portfolio comprises a vast product range of some 35,000 products. Thus our customers are on the safe side with innovative, high-quality and cost efficient products – NORMA products are first choice.

Today, the new Group operates subsidiaries in Sweden, Germany, Australia, Belgium, the Czech Republic, the Netherlands, China, England, France, Italy, Poland, Spain, in the USA and Singapore. No matter where you are you will find us nearby.
Survey of applications and products

The survey given on these two pages reflects the diversity of our products as well as their applications in the industrial market — at a glance. Use the page number given in the second column to get directly to the product you wish to learn more about.

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| NORMAFLEX®                        |                          |                       |                     |                     |                         |

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<tr>
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<th>Railway Vehicle Construction</th>
<th>Agricultural Machines and Tractors</th>
<th>Construction Machinery</th>
<th>Engine Construction</th>
<th>Pumps and Filters Manufacturing</th>
<th>Mining Industries</th>
<th>Drainage and Dewatering Systems</th>
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</table>
Products for use in industrial and trade areas

1. **Mechanical Engineering**
   NORMA® products are used for connecting media carrying lines (e.g., oil, water, air) and for fixing and retaining tubings, signs, containers etc.

2. **White Goods Industries**
   Fixing and retaining bath tub feet, the door closer on dish washers and the rubber bellow in the opening of washing machines.

3. **Chemical Industry**
   Conveying of granulate, connecting media carrying lines and systems, connecting components used in the chemical analysis.

4. **Irrigation Systems**
   Connecting water conduits, connecting and retaining pipes, tubes, pumps, filters etc.

5. **Shipbuilding Industries**
   Connecting cooling water lines on sports boats and cargo vessels. Connecting and retaining hydraulic lines and exhaust gas lines.

6. **Food and Beverage Industries**
   Connecting and retaining conveyor lines.

7. **Railway Vehicle Construction**
   Connecting charge air and cooling water tube systems as well as tubes in heating systems. Retaining tubings, containers and filters.

8. **Agricultural Machines and Tractors**
   Connecting charge air, cooling water, heating and hydraulic tube systems as well as tubes in power-assisted systems. Fastening sealing sleeves and retaining components and fluid lines.

9. **Construction Machinery**
   Fastening of protection sleeves, retaining filters, containers and tubings as well as connecting media carrying lines.

10. **Engine Construction**
    Connecting tube systems for cooling water, heating, charge-air, air-intake and exhaust gas applications. Retaining tubings and components.

11. **Pumps and Filters Manufacturing**
    Connecting feed and return lines retaining pumps, filters and tubings.

12. **Mining Industries**
    Connecting feed and return lines of pumps as well as hoses.

13. **Drainage and Dewatering Systems**
    Drainage of roofs, connecting drainage pipes. Connecting fresh water lines and fire fighting lines.
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About us

We have developed, produced and delivered for more than five decades customer-specific system solutions which have successfully been used to meet various and complex industrial requirements.

Our research and development teams use our state-of-the-art laboratory equipment and technologies in order to transfer customer requirements in the shortest possible time into trend-setting products: from the simple retaining clip to complete tube systems including the required connection technology.

Legal requirements as well as requirements of cost-efficient production processes determine the development and use of new materials and material combinations, together with the use of innovative connection technologies in complete systems.

Changing US and European legal regulations set new standards and limit values, which the industry is required to implement. Such new specifications require innovative but also cost efficient solutions.

NORMA® products ensure compliance with present and future norms and legal standards. In a close development partnership with our customers, we meet the technical and cost-relevant requirements of automated production.

NORMA® products connect and fix any part or system safely and reliably even in difficult installation conditions while at the same time ensuring a high product quality and low assembly times.
Know-How and Innovations for the Future

We implement the requirements in a flexible and innovative manner and always find the optimal solution — be it an individual component or a complex, multi-material system.

With optimised production processes, state-of-the-art manufacturing technology and system-accompanying services, we ensure the internationally recognized and certified quality of our products and services is consistently delivered to our worldwide industrial base.

A streamlined and efficient organizational structure means that every stage of production — from development to delivery — is optimised.

This efficiency, coupled with our extensive product knowledge and market experience, ensures that customer specific requirements are always processed in the shortest possible timeframe.
The NORMACLAMP® range provides the optimum sealing solution for all applications. The range varies from standard products with or without constant tension spring to special usage clips and heavy duty clamps.
NORMACLAMP® – Hose Clamps

NORMACLAMP® TORRO® – Worm Drive Hose Clips to DIN 3017

NORMACLAMP® TORRO® hose clips are specially suitable for applications under high mechanical loads. Since we are continuously working to improve its features this clip is still setting standards for modern hose clip design.

The distinguishing feature of the NORMACLAMP® TORRO® is the asymmetrical construction which tells you at first sight whether it is a genuine TORRO® or not.

Short description of technical features

1. Improved asymmetric housing = even distribution of forces and safe assembly
2. Screw support = Ease of assembly due to the safe guidance of the emerging band end
3. Material and clamping range stamped on the band = prevention of errors
4. Asymmetric extension = prevents the housing from tilting over when the clamp is tightened
5. Short housing saddle = even contact pressure = improved efficiency
6. Smooth or stamped inside of band = optimal hose protection

Materials

<table>
<thead>
<tr>
<th>W1*</th>
<th>W2*</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>

* No chromium VI used for the coating of the closure components
Types of clamp band

<table>
<thead>
<tr>
<th>Band width 9 mm</th>
<th>W1 with smooth inside</th>
<th>W2, W3, W4, W5 with stamped inside</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band width 12 mm</td>
<td>W1, W2, W3 with smooth inside</td>
<td>W4, W5 with stamped inside</td>
</tr>
</tbody>
</table>

Screw

<table>
<thead>
<tr>
<th>Phillips head</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW 7**</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slotted head</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

* Band width 7.5 mm = SW 6  ** Band width 16 mm = SW 8

The advantages at a glance

- Multi-range hose clamp
- Material: W1, W2, W3, W4, W5
- Chromium VI free: compliant with ROHS, WEEE and ELV Environmental Directives
- Clamping ranges to DIN 3017: 8 – 16 mm up to 140 – 160 mm
- Larger diameters on demand
NORMACLAMP® – Hose Clamps

Variants

NORMACLAMP® HD

HD clamps are suitable for special areas of application where high tightening torques and high contact pressures are required, for example, for fastening steel reinforced silicon, plastic and rubber hoses.

The extended bridge prevents the hose from protruding and being damaged.

The NORMACLAMP® HD clamp is an add-on type to our range of worm drive hose clips and therefore only available in 16 mm band width and W4 material quality.

Features

- Only 16 mm band width
- Only W4 material
NORMACLAMP® – Hose Clamps

Technical features

High band tensile force and high fracture torque

As always, the new NORMACLAMP® TORRO® features high tensile forces. However, when compared with competitor’s products and the previous model, we now achieve significantly higher fracture torques. This provides for an increased assembly reliability.

Even clamping force distribution

Thanks to its enhanced technical design, the new NORMACLAMP® TORRO® range delivers an even distribution of clamping force. The clamp sits perfectly on the hose and ensures the optimal sealing of the connection.

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
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<tbody>
<tr>
<td>W1</td>
<td>Min. 144 h</td>
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<tr>
<td>W2</td>
<td>Min. 72 h</td>
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<tr>
<td>W3</td>
<td>Min. 200 h*</td>
</tr>
<tr>
<td>W4</td>
<td>Min. 240 h</td>
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<tr>
<td>W5</td>
<td>Min. 400 h</td>
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* Max 10% corrosion of the base material allowed

Applications

- Cooling water lines
- Depressurized as well as pressurized fuel lines and vent lines
- Oil lines
- Connections in sanitary installations
- Connections in engine construction
- Connections in the white goods industry
- Hose connections in commercial vehicles industries
# NORMACLAMP® – Hose Clamps

## Table with torques

### TORRO 9 W1

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<th>Diameter (mm)</th>
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<th>10–16</th>
<th>12–18</th>
<th>12–22</th>
<th>16–27</th>
<th>20–32</th>
<th>25–40</th>
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<td>3 +0.5</td>
<td>3 +0.5</td>
<td>3 +0.5</td>
<td>3 +0.5</td>
<td>3 +0.5</td>
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<th>30–45</th>
<th>35–50</th>
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<td>3 +0.5</td>
<td>3 +0.5</td>
<td>3 +0.5</td>
<td>3 +0.5</td>
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### TORRO 12 W1

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### TORRO 12 W2/W3

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Legend:
- **AD** = recommended tightening torque in Nm;
- **LD** = no-load torque in Nm;
- **PD** = test torque in Nm;
- **BD** = fracture torque in Nm
### NORMACLAMP® – Hose Clamps

#### TORRO 9 W1

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## Survey of sizes, band widths & materials

### NORMACLAMP® TORRO®

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<th>Band width (mm)</th>
<th>Clamping Range in mm</th>
<th>Description in Inches</th>
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### Band Width Clamping Range Packaging

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### Survey of Band Widths & Materials

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### Survey of Band Widths & Materials

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Further sizes on request.

- **B** = total width in mm (housing)
- **h** = total height in mm (screw and housing)
- **IC** = industrial carton
- **L** = total length in mm (screw and housing)
- **PU** = packaging unit
- **s** = band thickness in mm (clamp band)
<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>Clamping Range in mm</th>
<th>Clamping Range in Inches</th>
<th>Packaging</th>
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<td>5/16–5/8</td>
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<td>3/4–11/4</td>
<td>PU 100, IC 1000, B 13.0, h 11.0, L 24.0, s 0.7, W2 X, W3 X, W4 X</td>
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<td>Clamping Range in Inches</td>
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Further sizes on request

B = total width in mm (housing)

h = total height in mm (screw and housing)

IC = industrial carton

L = total length in mm (screw and housing)

PU = packaging unit

s = band thickness in mm (clamp band)
## Survey of Sizes, Band Widths & Materials

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### Enquiries/ordering:

When making enquiries or placing an order please indicate as follows:

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<td>Example</td>
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NORMACLAMP® – Hose Clamps

NORMACLAMP® TORRO® Modular System

The TORRO® modular system offers several accessories that can be added to the clip, in order to modify its technical characteristics. You are free to combine two or more of these accessories according to your requirements.

The Notch

The notch is a clever means for pre-positioning the TORRO® hose clip on the hose. In this case the oval hole in the clamp band finds its exact counterpart on the hose surface. Thus the TORRO® is safely and accurately kept in place prior to the final assembly.

Advantage:

• Safe pre-assembly on the hose.

The Clip

With this accessory the TORRO® can also be pre-positioned on the hose. The two ‘teeth’ of this device keep the TORRO® hose clip safely in place if it needs to be stocked or transported prior to its final assembly.

Advantage:

• Safe pre-assembly on the hose
NORMACLAMP® – Hose Clamps

The Spring insert

For this version of the NORMACLAMP® TORRO® the standard hose clip is equipped with a spring insert on the inside of the clip band. When tightening the screw the spring is loaded and stores sufficient clamping force to ensure a long-lasting automatic re-tensioning effect. Thus the radial clamping force achieved will be sufficient even under extremely low temperatures. Therefore, the TORRO® is an optimal solution for applications under extreme temperature changes.

Advantages:

- Automatic re-tensioning effect in the event of hose relaxation
- Increased sealing reliability across a wide temperature range

The Torque Cap

The torque cap cuts off when the permissible torque is reached and thus saves the need for a torque wrench. Even without the cap the hose clip still remains adjustable and can be disassembled and/or retightened if necessary.

Advantages:

- Defined tightening torque without special tool
- Visual assembly control
Please make sure that the NORMACLAMP® TORRO® accessory you wish to order is suitable for your application.
NORMACLAMP® – Hose Clamps

NORMACLAMP® S/SP – Sealing clamps (NORMACLAMP® S) to DIN 3017, Retaining clamps (NORMACLAMP® SP) to DIN 3016

Thanks to their robust clamping brackets with metric bolts the clamping force offered by NORMACLAMP® S/SP is very high. We recommend the two-part version for applications submitted to extreme pressure and tensile loads.

Short description of technical features

1. Strong clamping brackets
   - high clamping force
   - optimum sealing

2. Bridge
   - optimum hose protection

3. Robust band with rounded edges
   (from band width 20 mm)
   - prevention of injuries and damage to the hose

Materials

<table>
<thead>
<tr>
<th></th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
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<tbody>
<tr>
<td>x</td>
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<td></td>
<td></td>
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</tbody>
</table>

* For band width 30 mm on demand
NORMACLAMP® – Hose Clamps

Bolts

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Zy</th>
<th>Sz</th>
<th>Sk</th>
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<tbody>
<tr>
<td>5</td>
<td>M 2 x 12</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>M 3 x 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>M 4 x 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>M 5 x 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>M 6 x 30</td>
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<td>20</td>
<td>M 8 x 40</td>
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<td>25</td>
<td>M 10 x 45</td>
<td></td>
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<tr>
<td>30</td>
<td>M 12 x 65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following band widths will be supplied with special screws on request:
Band width 9 mm – Thumbscrew
Band width 12 mm – Eye screw
Band width 25 mm – Eye screw

Static torques to DIN 3017-2

<table>
<thead>
<tr>
<th>Band width (mm) b₁</th>
<th>Static tightening torque Nm max.</th>
<th>Static test torque Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>9</td>
<td>1.2</td>
<td>1.5</td>
</tr>
<tr>
<td>12</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>20</td>
<td>12</td>
<td>14.5</td>
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<tr>
<td>25</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>30</td>
<td>70</td>
<td>84</td>
</tr>
</tbody>
</table>

The advantages at a glance

- High clamping force
- Optimal clamping force distribution
- Available with optional angles, consoles or brackets
- Available with optional rubber sleeve for vibration damping and protection against creeping water
NORMACLAMP® – Hose Clamps

Clamp Types

**NORMACLAMP® S**
Hose sealing clamps are used to seal rubber and plastic hoses as well as rubber sleeves on pipe ends or connecting spigots.

Larger diameters can be connected without problems using two-part clamps.

Sizes are stepped up in 1 mm intervals.

**NORMACLAMP® SP**
Retaining clamps are suitable for clamping containers, pipes and cables.

**NORMACLAMP® SPGU**
Clamps with rubber profile are available from band width 9 mm. They are suitable for use when vibration damping or protection against creeping water is required.
NORMACLAMP® – Hose Clamps

Technical features

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Min. 72 h</td>
</tr>
<tr>
<td>W4</td>
<td>Min. 240 h</td>
</tr>
<tr>
<td>W5</td>
<td>Min. 400 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Band width ( b_1 ) (mm)</th>
<th>Min. diameter ( (mm) )</th>
<th>Material thickness (mm)</th>
<th>Rubber profile (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>S ( (mm) ) W1 W4 W5</td>
<td>SP ( (mm) ) W1 W4 W5 b_1 s_2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0.2 – –</td>
<td>– – –</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>0.3 / 0.4 – 0.4 –</td>
<td>0.4 – 0.4 – –</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>0.4 – 0.4 –</td>
<td>0.6 – 0.4 12.5 – 1</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>0.5 – 0.5 –</td>
<td>0.7 – 0.5 15 – 1.2</td>
</tr>
<tr>
<td>15</td>
<td>20</td>
<td>0.6 – 0.6 –</td>
<td>0.8 – 0.6 18.5 – 1.5</td>
</tr>
<tr>
<td>20</td>
<td>25</td>
<td>1.0 – –</td>
<td>0.8 (up to ( \phi ) 47) 1.0 (from ( \phi ) 48) 1.25 – 0.8 25 2</td>
</tr>
<tr>
<td>25</td>
<td>50**</td>
<td>1.25 – 1.0</td>
<td>1.25/1.5 – 1 – 31 3</td>
</tr>
<tr>
<td>30</td>
<td>80</td>
<td>2.5 – –</td>
<td>2.5 – 36 3</td>
</tr>
<tr>
<td>30</td>
<td>100*</td>
<td>– 2.5 –</td>
<td>– 2.5 – 36 3</td>
</tr>
</tbody>
</table>

* Material W4 \( \phi \) 100 – 150 only available as two-part version
** SPGU = 40
NORMACLAMP® – Hose Clamps

Rubber profiles

Depending on the profile type (a or b) the rubber profiles are available either in Silicone or EPDM material.

- \( B \) = Band width of the clamp
- \( b_1 \) = Width in mm
- \( s_2 \) = Material thickness in mm

Material Properties of Different Rubber Types

<table>
<thead>
<tr>
<th>Properties</th>
<th>Silicone</th>
<th>EPDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength [N/mm²]</td>
<td>8.5</td>
<td>min. 8</td>
</tr>
<tr>
<td>Breaking elongation [%]</td>
<td>420</td>
<td>350</td>
</tr>
<tr>
<td>Shore Hardness A</td>
<td>70 ± 5</td>
<td>70 ± 5</td>
</tr>
<tr>
<td>Temperature [°C]</td>
<td>−60 ° to +170 °</td>
<td>−40 ° to +120 °</td>
</tr>
<tr>
<td>Resistance:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather &amp; Ozone</td>
<td>Good</td>
<td>Very good</td>
</tr>
<tr>
<td>Ageing &amp; Sun cracks</td>
<td>Very good</td>
<td>Very good</td>
</tr>
<tr>
<td>Petrol</td>
<td>Average</td>
<td>Not resistant</td>
</tr>
<tr>
<td>Oils &amp; greases</td>
<td>Good</td>
<td>Not resistant</td>
</tr>
<tr>
<td>Alcohols</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Acids</td>
<td>Average</td>
<td>Good</td>
</tr>
<tr>
<td>Alkalis</td>
<td>Average</td>
<td>Good</td>
</tr>
</tbody>
</table>

Applications

The NORMACLAMP® S/SP/SPGU clamps are specially suitable for:

- Retaining rubber and plastic hoses (NORMACLAMP® S)
- Retaining rubber sleeves on pipe ends or hose connectors (NORMACLAMP® S)
- Clamping and retaining containers, generators, pipes and cables (NORMACLAMP® SP)

Also, NORMACLAMP® S are being used by the automotive industry for the fastening of airbags. Safety parts of this kind are submitted to 100% testing.
## Survey of sizes, band widths & materials

**NORMACLAMP® S**

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Band width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 mm Zy</td>
</tr>
<tr>
<td>up to 9</td>
<td>X</td>
</tr>
<tr>
<td>up to 10</td>
<td>X</td>
</tr>
<tr>
<td>from 15</td>
<td>X</td>
</tr>
<tr>
<td>up to 20</td>
<td>X</td>
</tr>
<tr>
<td>up to 28</td>
<td>X</td>
</tr>
<tr>
<td>up to 30</td>
<td>X</td>
</tr>
<tr>
<td>from 36</td>
<td>X</td>
</tr>
<tr>
<td>up to 40</td>
<td>X</td>
</tr>
<tr>
<td>up to 50</td>
<td>X</td>
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<tr>
<td>up to 60</td>
<td>X</td>
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<tr>
<td>up to 70</td>
<td>X</td>
</tr>
<tr>
<td>up to 75</td>
<td>X</td>
</tr>
<tr>
<td>up to 80</td>
<td>X</td>
</tr>
<tr>
<td>up to 90</td>
<td>X</td>
</tr>
<tr>
<td>up to 100</td>
<td>X</td>
</tr>
<tr>
<td>up to 110</td>
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<tr>
<td>up to 120</td>
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<tr>
<td>up to 190</td>
<td>X</td>
</tr>
<tr>
<td>up to 200</td>
<td>X</td>
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</table>

Sizes are increased in 1 mm steps.
## Survey of sizes, band widths & materials

### NORMACLAMP® SP

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>Band width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 mm Zy</td>
</tr>
<tr>
<td>up to 9</td>
<td>X</td>
</tr>
<tr>
<td>up to 10</td>
<td>X</td>
</tr>
<tr>
<td>from 15</td>
<td></td>
</tr>
<tr>
<td>up to 20</td>
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<td>up to 28</td>
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<td>from 36</td>
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<td>up to 120</td>
<td>X</td>
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<tr>
<td>up to 130</td>
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<tr>
<td>up to 140</td>
<td>X</td>
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<tr>
<td>up to 150</td>
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<tr>
<td>up to 160</td>
<td>X</td>
</tr>
<tr>
<td>up to 170</td>
<td></td>
</tr>
<tr>
<td>up to 180</td>
<td>X</td>
</tr>
<tr>
<td>up to 190</td>
<td></td>
</tr>
<tr>
<td>up to 200</td>
<td>X</td>
</tr>
</tbody>
</table>

* except for band width 5 mm

Sizes are increased in 1 mm steps.
## Survey of sizes, band widths & materials

### NORMACLAMP® SPGU

<table>
<thead>
<tr>
<th>Diameter in mm</th>
<th>15 mm</th>
<th>20 mm</th>
<th>25 mm</th>
<th>W1</th>
<th>W5</th>
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<tbody>
<tr>
<td>up to 20</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>from 36</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>up to 40</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<td>X</td>
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<tr>
<td>up to 70</td>
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<td>X</td>
<td></td>
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<tr>
<td>up to 75</td>
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<tr>
<td>up to 200</td>
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</tr>
</tbody>
</table>

Sizes are increased in 1 mm steps.

### Enquiries and ordering:

When making enquiries or placing orders please indicate as follows:

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<tr>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Example</td>
<td>S</td>
<td>6/7</td>
<td>W1</td>
<td>Zy</td>
<td>1-part</td>
</tr>
</tbody>
</table>

For NORMACLAMP® SPGU please state the required rubber material – if there is a choice.
NORMACLAMP® – Hose Clamps

NORMACLAMP® GBS – Heavy duty clamps to DIN 3017

NORMACLAMP® GBS are particularly suited for sealing suction and pressure lines with plastic or steel reinforcements and high shore hardesses. Their distinguishing feature is the extremely high band tensile force.

The assembly of NORMACLAMP® GBS is easily completed by means of either manual, pneumatic or electric standard tools.

Short description of technical features

1. W1/W2/W4
   New specially designed bolt with integrated spacer
   = improved efficiency, cannot get lost
   W5
   Hexagonal socket screw

2. Reinforced loops
   = allow to withstand significantly higher torques

3. Mechanically locked closure
   = no welding points, no contact corrosion

4. Bridge = optimal hose protection

5. Robust band with rounded edges
   = protection against injuries and damage to the hose surface

Materials

<table>
<thead>
<tr>
<th>W1*</th>
<th>W2*</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

* No Chromium VI used for surface treatment of closure unit
NORMACLAMP® – Hose Clamps

Clamp Types

NORMACLAMP® GBS with QR closure

On request the NORMACLAMP® GBS is available with QRC (Quick Release Closure). The hinged bolt can be quickly released and enables the fast and easy assembly or disassembly of the clamp.

Only available in W1 and W2!

NORMACLAMP® GBS Multi-Part version

The 2-part version of the NORMACLAMP® GBS is an additional clamp type in this range.

Technical features

Band tensile forces

The results of numerous test sequences proved that NORMACLAMP® GBS are superior to comparable competitive products:

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>W1</th>
<th>W2</th>
<th>W4</th>
<th>W5</th>
<th>M</th>
<th>SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>6</td>
<td>8</td>
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<tr>
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<td>0.8</td>
<td>0.8</td>
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<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>30</td>
<td>1.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>10</td>
<td>17</td>
</tr>
</tbody>
</table>
NORMACLAMP® – Hose Clamps

Torques

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>NORMACLAMP®GBS</th>
<th>Fracture torques (min.)</th>
<th>Recommended tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W1</td>
<td>W2</td>
<td>W4</td>
</tr>
<tr>
<td>18</td>
<td>15 Nm</td>
<td>15 Nm</td>
<td>15 Nm</td>
</tr>
<tr>
<td>20</td>
<td>25 Nm</td>
<td>20 Nm</td>
<td>20 Nm</td>
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<tr>
<td>25</td>
<td>35 Nm</td>
<td>30 Nm</td>
<td>30 Nm</td>
</tr>
<tr>
<td>30</td>
<td>50 Nm</td>
<td>45 Nm</td>
<td>45 Nm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>NORMACLAMP®GBS QRC</th>
<th>Fracture torques (min.)</th>
<th>Recommended tightening torque</th>
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<tr>
<td></td>
<td>W1</td>
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<td>10 Nm</td>
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Corrosion resistance

<table>
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<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
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<tr>
<td>W1</td>
<td>Min. 72 h</td>
</tr>
<tr>
<td>W2</td>
<td>Min. 72 h</td>
</tr>
<tr>
<td>W4</td>
<td>Min. 240 h</td>
</tr>
<tr>
<td>W5</td>
<td>Min. 400 h</td>
</tr>
</tbody>
</table>

Applications

The NORMACLAMP® GBS are specially suitable for use on commercial and special vehicles:

- Sealing and retaining suction and pressure hoses with steel or plastic reinforcements and high shore hardness.

The advantages at a glance

- Twofold improved failure torque
- Threefold improved band tensile forces
**Survey of sizes, band widths & materials**

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>Clamping Range in mm</th>
<th>Clamping Range in Inches</th>
<th>Packaging PU</th>
<th>W1</th>
<th>W2</th>
<th>W4</th>
<th>W5</th>
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<td>X</td>
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</table>

* These sizes are not mechanically locked but spot welded

PU = packaging unit
### Survey of sizes, band widths & materials

**NORMACLAMP® GBS 2-parts**

<table>
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<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>Clamping Range in mm</th>
<th>Clamping Range in Inches</th>
<th>Packaging PU</th>
<th>W1</th>
<th>W2</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
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<td>X</td>
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<td>67–75</td>
<td>25/8–215/16</td>
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<td>123/5–137/12</td>
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</table>

*PU = packaging unit*

**Enquiries/ordering:**

When making enquiries or placing an order please indicate as follows:

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<tr>
<td>Example</td>
<td>GBS QR</td>
<td>43-47</td>
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NORMACLAMP® – Hose Clamps

NORMACLAMP® SVS – Quick Release Clamps

NORMACLAMP® SVS and NORMACLAMP® SVSP provide safe and flexible solutions in applications where the fast and frequent assembly and disassembly of connections is required, for example in filter and bottling plants or in piping systems in food and beverage industries which need constant cleaning.

Short description of technical features

1. Safe locking system can be manually locked and unlocked without using a tool
2. Bridge = optimal hose protection

Materials

<table>
<thead>
<tr>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
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<tr>
<td>x</td>
<td></td>
<td></td>
<td>x*</td>
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</table>

* only light version
NORMA CLAMP® – Hose Clamps

Clamp Types

NORMA CLAMP® SVS and SVSP quick release clamps feature a secure catch which can easily be locked and opened with one hand. A special assembly tool is not required.

The light version is equipped with a metric cylinder head screw.

Alternatively, the catch can be fitted with an eye screw, provided the quantity ordered is large enough.

NORMA CLAMP® SVS and NORMA CLAMP® SVSP clamps are manufactured in standard band widths and materials. Sizes are increased in 1 mm steps.

Up to 300 mm clamping diameter they are supplied in rolled up form. From 301 mm diameter they are supplied in flat form.

The advantages at a glance

- Closure is manually locked and opened
- No assembly tool required
NORMACLAMP® – Hose Clamps

Technical features

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Min. 72 h</td>
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<tr>
<td>W4</td>
<td>Min. 240 h</td>
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Quick release clamps SVS

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<th>Min. ø (mm)</th>
<th>Max. ø (mm)</th>
<th>s</th>
<th>W1</th>
<th>W4</th>
<th>Screws</th>
<th>Clamping force</th>
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<tr>
<td>15</td>
<td>80</td>
<td>800</td>
<td>1.0</td>
<td>0.6</td>
<td>(*)</td>
<td>•</td>
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<td>20</td>
<td>80</td>
<td>800</td>
<td>1.0</td>
<td>0.8</td>
<td>(*)</td>
<td>•</td>
<td>–</td>
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<tr>
<td>25</td>
<td>80</td>
<td>800</td>
<td>1.5</td>
<td>1.0</td>
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Quick release clamps SVSP

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<th>Max. ø</th>
<th>s</th>
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<th>Clamping force</th>
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<td>15</td>
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<td>1.0</td>
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<td>800</td>
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<td>1.0</td>
<td>(*)</td>
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Oe = Eye screw
NORMA CLAMP® – Hose Clamps

Survey of sizes, band widths & materials
NORMA CLAMP® SVS

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<th>20 mm</th>
<th>25 mm</th>
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<td>up to 110</td>
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<td>up to 120</td>
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<td>up to 130</td>
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<td>up to 140</td>
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<td>up to 150</td>
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<td>up to 160</td>
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<td>up to 170</td>
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<td>up to 210</td>
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<td>up to 220</td>
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<td>up to 240</td>
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Larger diameters on request

Enquiries/ordering:

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<td>25</td>
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<td>ZY</td>
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</table>

light
NORMACLAMP® – Hose Clamps

NORMACLAMP® COBRA – One-piece hose clips

The low profile of NORMACLAMP® COBRA one-piece clips allows the exact fitting even in very narrow assembly conditions.

The fitting is fast and easy.

Short description of technical features

1. Self-adjusting diameter = compensation for tolerances in the hose outside diameter
2. Bead = safe guidance of the band
3. Colour code = different nominal diameters can be quickly distinguished
4. Protruding tool gripping points = simple and safe assembly
5. Marking: Production date and machine number
6. Single lock-in point = visual check for correct assembly without difficulties
7. Clamp band with rounded edges = hose protection

Materials

<table>
<thead>
<tr>
<th>W1*</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>x</th>
</tr>
</thead>
</table>

* No chromium VI used for surface treatment
NORMA CLAMP® – Hose Clamps

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W4</td>
<td>Min. 240 h</td>
</tr>
</tbody>
</table>

The advantages at a glance

- One-piece hose clip
- Fast and easy fitting
- Maintenance-free fit
For professional assembly work we offer you the following range of tools:

**NORMACLAMP® COBRA**

hand-held pliers

The hand-held pliers allow accurate assembly and disassembly operations. The tips of the pliers precisely fit the gripping points on the clamp. The integrated spring element keeps the pliers open, thus permitting comfortable and fast working.

**NORMACLAMP® COBRA**

pneumatic pliers

The pneumatic pliers, available in a 0° version (Fig. 1), an extended 0° version (Fig. 2) and a 90° version (not shown), are the ideal tools for industrial use. Assembly operations in large volume production are no problem with these pliers.
NORMACLAMP® – Hose Clamps

Workshop assortment

The workshop assortment contains a customised variety of NORMACLAMP® COBRA hose clamps arranged in a plastic display box.

One box contains 500 NORMACLAMP® COBRA made from stainless chrome nickel steel in 7 mm and 8 mm band widths and sorted in different quantities as follows:

- 30 x COBRA 7.5/7
- 25 x COBRA 8/7
- 25 x COBRA 8.5/7
- 25 x COBRA 9/7
- 25 x COBRA 9.5/7
- 25 x COBRA 10/7
- 25 x COBRA 10.5/7
- 25 x COBRA 11/7
- 25 x COBRA 11.5/7
- 25 x COBRA 12/8
- 30 x COBRA 13/8
- 30 x COBRA 14/8
- 30 x COBRA 15/8
- 30 x COBRA 16/8
- 30 x COBRA 17/8
- 30 x COBRA 18/8
- 30 x COBRA 19/8
- 30 x COBRA 21/8

Applications

- Suction lines
- Fuel ventilation lines
- Hoses for washing machines
- Irrigation systems
- Pneumatic tube systems
Survey of sizes, band widths & materials

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>Clamping Range $D_a$ (hose outside-$ø$)</th>
<th>Packaging PU $W_4$</th>
<th>Colour Code</th>
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<tbody>
<tr>
<td>7</td>
<td>COBRA 7.5/7 W4</td>
<td>8.0–9.0 $\frac{5}{16}$–$\frac{3}{8}$</td>
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<td>X White</td>
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<td>X Black</td>
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<td>X Yellow</td>
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<td>X Purple</td>
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<td>X Black</td>
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<td>COBRA 13/8 W4</td>
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<td>X Yellow</td>
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<tr>
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<td>14.5–16.0 $\frac{9}{16}$–$\frac{5}{8}$</td>
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<td>X Purple</td>
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<td>X White</td>
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<td>16.5–18.0 $\frac{5}{8}$–$\frac{3}{4}$</td>
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<td>X Green</td>
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<td>COBRA 17/8 W4</td>
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<td>X Black</td>
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<td>X Yellow</td>
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<td>COBRA 19/8 W4</td>
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<td>X Purple</td>
</tr>
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<td>8</td>
<td>COBRA 20/8 W4</td>
<td>20.5–22.0 $\frac{13}{16}$–$\frac{7}{8}$</td>
<td>100</td>
<td>X White</td>
</tr>
<tr>
<td>8</td>
<td>COBRA 21/8 W4</td>
<td>21.5–23.0 $\frac{13}{16}$–$\frac{7}{8}$</td>
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<td>X Green</td>
</tr>
<tr>
<td>8</td>
<td>COBRA 22/8 W4</td>
<td>22.5–24.0 $\frac{7}{8}$–$\frac{15}{16}$</td>
<td>100</td>
<td>X Black</td>
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<tr>
<td>8</td>
<td>COBRA 23/8 W4</td>
<td>23.5–25.0 $\frac{7}{8}$–$1$</td>
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<tr>
<td>8</td>
<td>COBRA 24/8 W4</td>
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<td>X Purple</td>
</tr>
<tr>
<td>8</td>
<td>COBRA 25/8 W4</td>
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<td>X White</td>
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<tr>
<td>8</td>
<td>COBRA 26/8 W4</td>
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<td>100</td>
<td>X Green</td>
</tr>
<tr>
<td>8</td>
<td>COBRA 27/8 W4</td>
<td>27.5–29.0 $\frac{11}{16}$–$1\frac{1}{8}$</td>
<td>100</td>
<td>X Black</td>
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<tr>
<td>8</td>
<td>COBRA 28/8 W4</td>
<td>28.5–30.0 $\frac{11}{16}$–$1\frac{3}{16}$</td>
<td>100</td>
<td>X Yellow</td>
</tr>
<tr>
<td>8</td>
<td>COBRA 29/8 W4</td>
<td>29.5–31.0 $\frac{11}{8}$–$1\frac{4}{16}$</td>
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<td>X Purple</td>
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<tr>
<td>8</td>
<td>COBRA 30/8 W4</td>
<td>30.5–32.0 $\frac{13}{16}$–$1\frac{1}{4}$</td>
<td>100</td>
<td>X White</td>
</tr>
</tbody>
</table>

PU = packaging unit

**Enquiries/ordering:**

When making enquiries or placing orders please indicate as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>COBRA</td>
<td>7.5/7 W4</td>
<td>W4</td>
</tr>
</tbody>
</table>
NORMACLAMP® – Hose Clamps

Colour Coding

How to determine the correct nominal diameter

• Slide the hose onto the spigot and measure the Outside Diameter $D_a$.

• The Nominal Diameter $d_1$ matching the outside diameter $D_a$ of the hose can then be taken from the table.

Please do not hesitate to ask for samples prior to ordering nor to ask for advice if you have further questions concerning possible applications.
NORMACLAMP® – Hose Clamps

NORMACLAMP® FBS –
Springband hose clips to DIN 3021

Because of their design, NORMACLAMP® FBS springband hose clips are particularly suitable for use with hose-spigot connections which are submitted to extreme temperature changes.

Once assembled NORMACLAMP® FBS provide a continuously readjusting dynamic tightening effect.

Also at low temperatures the radially acting tightening force is sufficient to assure a reliable tightness of the system. Even hoses that are submitted to extreme temperature cycles, or those with a tendency to “creep” can be combined to form a safe connection when NORMACLAMP® FBS are used.

Short description of technical features

1. Lot number stamped on clamp band = safe retraceability
2. NORMA® Logo = the visible sign for high quality
3. Organic/inorganic coating
   - optimal protection against corrosion
   - Coating in different colour
   - improved engine design
4. Nominal diameter stamped on the clamp
   = prevention of mistakes
5. Special design = uniform distribution of clamping forces and optimal roundness
6. Round band edges
   = optimal hose protection

Materialien

<table>
<thead>
<tr>
<th>C 75 S</th>
<th>Zinc-Aluminium Coating</th>
<th>Organic Coating</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Basecoat</td>
<td>Topcoat</td>
</tr>
</tbody>
</table>
NORMACLAMP® – Hose Clamps

Short Description

• Dynamic hose clip
• Band material C 75 S
• Coating contains zinc – chromium VI-free
• Nominal diameter from 13 up to 80 mm – different gradations

Technical characteristics

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>C 75 S</td>
<td>from 480 h</td>
</tr>
</tbody>
</table>

The advantages at a glance

• Single-part hose clips without screw
• Uniform distribution of clamping forces
• Optimal roundness
• Temperature resistance from – 40 °C up to 200 °C
• Unmistakable tracing due to lot numbering
• Visual control of nominal diameters by colour codes
Variants

**NORMACLAMP® FBS R**

is a space-saving clamp. It was designed with the aim of realising the technical minimum overall height to allow its use in difficult assembly situations.

**NORMACLAMP® FBS HC**

is a pre-opened version secured by a plastic retaining clip. After slipping the clamp onto the hose, this clip can be easily removed by hand.

**NORMACLAMP® FBS MC**

is a pre-opened (and, if desired, pre-positioned) clamp secured by a small metal clip. The retaining clip for this version is removed by using pliers.

**NORMACLAMP® FBS C**

is a pre-opened clamp which is pre-positioned on the hose. The retaining mechanism for this version is an integral part of the clamp band.
NORMA CLAMP® – Hose Clamps

NORMA®-Professional tooling

Hand-held pliers

For professional assembly operations we offer you a range of quality hand-held and pneumatic tools:

FBS hand-held pliers Type 1

Suitable for small diameters.

FBS hand-held pliers Type 2

Suitable for all nominal diameters.
The integrated safety lever fixes the position of the pliers.

Pneumatic tools

FBS pneumatic pliers Type “S”

Suitable for the assembly of FBS that are pre-positioned on the hose.

FBS pneumatic pliers Type “W”

Suitable for volume production.
The clamp head is approached sideways.
NORMACLAMP® – Hose Clamps

Applications

NORMACLAMP® FBS springband clips are specially suitable for use in applications where connections are under extreme cyclic temperature loads:

- Coolant and heating systems
- Fuel lines
- Airducts
- Drainage of water and brine

In order to determine the correct size of clamp please proceed as follows:

1. Slide the hose onto the spigot and measure the Dmin. and Dmax. (see diagram below)

2. From the Dmin. value determine the nominal diameter (Dn) of the appropriate clamp.
   \[ D_n = D_{\text{min}}. \]

3. Compare the Dmax. value with the stated minimum diameter of the open clamp and select the suitable clamp size.
   \[ D_{0 \text{ min}} \geq D_{\text{max}}. \]

Samples can be provided on request. We shall be pleased to discuss your specific problem or application in detail. Just contact us.
# NORMACLAMP® – Hose Clamps

## Survey of sizes, band widths & materials

### NORMACLAMP® FBS

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>$D_0$ in mm</th>
<th>$D_0$ min in mm</th>
<th>Packaging (industrial carton)</th>
<th>C 75 S</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>FBS 13/12</td>
<td>13</td>
<td>14.5</td>
<td>3000</td>
<td>X</td>
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<tr>
<td>12</td>
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<td>15.8</td>
<td>3000</td>
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<tr>
<td>12</td>
<td>FBS 15/12</td>
<td>15</td>
<td>16.8</td>
<td>3000</td>
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<tr>
<td>12</td>
<td>FBS 16/12</td>
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<tr>
<td>12</td>
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### Enquiries/ordering:

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<tbody>
<tr>
<td>Example</td>
<td>FBS</td>
<td>13/</td>
</tr>
</tbody>
</table>
NORMACONNECT® – Pipe Connections

Both industrial and OEM manufacturers rely on NORMACONNECT® pipe connections as a safe means of connecting pipes in various applications that feature different materials and sizes.
NORMACONNECT® – Pipe Connections

NORMACONNECT® DCS
Couplings for drainage pipes

With many years of proven performance in all types of domestic, commercial and industrial drainage system applications the NORMACONNECT® DCS range of specialist couplings has an excellent record for safety and reliability. There are DCS couplings for both above and below ground applications, and bridge drainage, in diameters from 40 mm to 600 mm.

Features:

- Simple and quick assembly and disassembly
- Compact design and construction
- Range covers all drainage uses
- Versatility
- Fast, safe, and economical
- Suitable for tensile strength and non-tensile strength connections
- Complete range of accessories

In case of questions that are specific to YOUR application please refer to our separate brochure NORMACONNECT® DCS.
NORMACONNECT® – Pipe Connections

**NORMACONNECT® FGR**
Pipe couplings

The NORMACONNECT® range offers weld-free connections for plain-end pipes in pipeline construction, shipbuilding, offshore installation, large engine construction, chemical plants, irrigation and waste water plants etc.

The current range of pipe couplings comprises 6 types, each with individual features:

**Features:**
- Easy assembly and disassembly
- Axial tensile-strength (type GRIP)
- Sealing only (type FLEX)
- Re-usable
- Patented double lip seal
- Standard steel band insert
- Suitable for vacuum and pressure applications
- Connect different pipe materials (type COMBI GRIP)
- Integrated fire protection (type E-FP)

---

**NORMACONNECT® FLEX/FLEX E**
For connecting restrained metal and plastic pipes

**NORMACONNECT® GRIP/GRIP E**
For connecting unrestrained metal pipes

**NORMACONNECT® COMBI GRIP/COMBI GRIP E**
For connecting unrestrained metal with unrestrained plastic pipes

**NORMACONNECT® PLAST GRIP/PLAST GRIP E**
For connecting unrestrained plastic pipes

**NORMACONNECT® REP E**
Repair coupling

**NORMACONNECT® E-FP**
( Flame protection)
Pipe coupling type GRIP-E with integrated fire protection

---

In case of questions that are specific to YOUR application please refer to our separate brochure NORMACONNECT® FGR.
NORMACONNECT® – Pipe Connections

NORMACONNECT® BRS
Wide band hose clamps (NORMACONNECT® BRS) to DIN 3017-5

BRS wide band hose clamps, in combination with a rubber sleeve, are particularly suitable for connecting pipes with smooth ends. Cast iron pipes and steel pipes as well as plastic or glass pipes are joined securely and without welding.

Short description of technical features

The extra wide band is gentle on the hose or the sleeve
- Distribution of clamping force over the complete band width
- No damage to the object to be clamped
- Increased transverse rigidity

Materials

<table>
<thead>
<tr>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

1 Bridge
- Hose or sleeve ends are completely covered
NORMACONNECT® – Pipe Connections

### Screw

<table>
<thead>
<tr>
<th>Band width 48 mm</th>
<th>Sz bei W2</th>
<th>Sk bei W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 6 x 38 Sz</td>
<td>M 6 x 45 Sk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Band width 54 mm</th>
<th>Sz bei W2</th>
<th>Sk bei W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8 x 47 Sz</td>
<td>M 8 x 50 Sk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Band width 65 mm</th>
<th>Sz bei W2</th>
<th>Sk bei W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8 x 47 Sz</td>
<td>M 8 x 50 Sk</td>
<td></td>
</tr>
</tbody>
</table>

NORMACLAMP® BRS sealing clamps are manufactured in standard band widths and materials. Sizes are increasing in steps of 1 mm for single-part clamps. Up to a clamping diameter of 300 mm they are supplied in rolled-up form, from 301 mm clamping diameter they are supplied in open form.

### The advantages at a glance

- Extra wide clamp band
- Large-area distribution of clamping forces
- Increased transverse rigidity
- Single and multi-part versions
NORMACONNECT® – Pipe Connections

Technical features

Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2</td>
<td>Min. 72 h</td>
</tr>
<tr>
<td>W4</td>
<td>Min. 240 h</td>
</tr>
</tbody>
</table>

Band width (mm) | Min. diameter (mm) | Static tightening torque (Nm) | Material thickness (mm) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>50</td>
<td>4</td>
<td>0.4</td>
</tr>
<tr>
<td>54</td>
<td>50</td>
<td>12</td>
<td>0.4</td>
</tr>
<tr>
<td>65</td>
<td>50</td>
<td>12</td>
<td>0.4</td>
</tr>
<tr>
<td>78</td>
<td>50</td>
<td>12</td>
<td>0.5</td>
</tr>
<tr>
<td>100</td>
<td>50</td>
<td>12</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Applications

- Exhaust air systems
- Suction plants
- Laboratory technology
- Waste water technology
### Survey of sizes, band widths & materials

**NORMACONNECT® BRS**

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Diameter (mm)</th>
<th>Screw</th>
<th>BRS</th>
<th>BRSP</th>
<th>W2</th>
<th>W4</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>50–270</td>
<td>M 6</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>54</td>
<td>50–270</td>
<td>M 8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>65</td>
<td>50–270</td>
<td>M 8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>78</td>
<td>50–270</td>
<td>M 8</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>100</td>
<td>50–200</td>
<td>M 8</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Enquiries/ordering:**

When making enquiries or placing orders please indicate as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>BRS</td>
<td>55/</td>
<td>48</td>
<td>W2</td>
</tr>
</tbody>
</table>
ARS exhaust pipe clamps connect pipes fitted into each other securely and reliably. They are also used to connect pipes that are subject to extreme thermal fluctuations and therefore, are especially suitable for connecting, for example, exhaust pipes and silencers in the automotive industry.

**Short description of technical features**

1. Either M8, M10 or M12 bolt
   = depending on the required clamping force

2. One-piece clamp band
   = uniform contact pressure on the pipe circumference
   = high efficiency with regard to system tightness

3. 1 Bolt
   = easy assembly

4. Rounded band edges
   = hose protection and protection against injury

**Materials**

<table>
<thead>
<tr>
<th></th>
<th>W1*</th>
<th>W2*</th>
<th>W3</th>
<th>W4*</th>
<th>W5*</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>x</td>
<td>x**</td>
<td>x**</td>
<td>x**</td>
<td></td>
</tr>
</tbody>
</table>

* Chrome VI-free / ** On request
Bolt types

For information which bolt is supplied for each clamping range please refer to the table of sizes.

<table>
<thead>
<tr>
<th>Bolt</th>
<th>Hammer head/ Flange nut</th>
<th>Hexhead bolt/ Flange nut</th>
<th>Hexhead bolt/ Hexagonal nut</th>
<th>Loose fit washer*</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X**</td>
</tr>
<tr>
<td>M 10</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>M 12</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* underneath the bolt head and the nut
** underneath the bolt head (only applicable to several diameters!)

The advantages at a glance

- Made in one piece
- Persistent contact on the pipe surface
- Uniform contact pressure on the pipe circumference
- No asymmetric deformation of the pipe
NORMACONNECT® – Pipe Connections

Technical features
Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Min. 144 h</td>
</tr>
</tbody>
</table>

Applications

- Connecting pipes that are fitted into each other
- Connecting the exhaust pipe and the silencer
## Survey of sizes, band widths & materials

**NORMACONNECT® ARS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Clamping Range D1–D2 in mm</th>
<th>Packaging (Industrial carton)</th>
<th>S*</th>
<th>B*</th>
<th>Recommended Tightening torque</th>
<th>W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARS M8-27 W1</td>
<td>24–27</td>
<td>100</td>
<td>1.5</td>
<td>10.4</td>
<td>8–10 Nm</td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-33 W1</td>
<td>30–33</td>
<td>100</td>
<td>1.5</td>
<td>10.4</td>
<td>8–10 Nm</td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-36 W1</td>
<td>33–36</td>
<td>100</td>
<td>2.0</td>
<td>12.8</td>
<td>10–15 Nm</td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-39.5 W1</td>
<td>36.5–39.5</td>
<td>100</td>
<td>2.0</td>
<td>12.0</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-42 W1</td>
<td>39–42</td>
<td>100</td>
<td>2.0</td>
<td>12.8</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-45 W1</td>
<td>42–45</td>
<td>100</td>
<td>2.5</td>
<td>13.6</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-46 W1</td>
<td>43–46</td>
<td>100</td>
<td>2.5</td>
<td>12.8</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-47 W1</td>
<td>44–47</td>
<td>100</td>
<td>2.5</td>
<td>13.6</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-49 W1</td>
<td>45–49</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-51 W1</td>
<td>48–51</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-54 W1</td>
<td>51–54</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-55 W1</td>
<td>52–55</td>
<td>100</td>
<td>2.5</td>
<td>13.6</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-58 W1</td>
<td>55–58</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-64 W1</td>
<td>61–64</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M8-71 W1</td>
<td>68–71</td>
<td>100</td>
<td>2.5</td>
<td>13.2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M10-64 W1</td>
<td>60–64</td>
<td>100</td>
<td>3.0</td>
<td>15.0</td>
<td>20–25 Nm</td>
<td>X</td>
</tr>
<tr>
<td>ARS M10-71 W1</td>
<td>67–71,5</td>
<td>100</td>
<td>3.0</td>
<td>15.0</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ARS M12-114 W1</td>
<td>106–114</td>
<td>50</td>
<td>3.0</td>
<td>19.0</td>
<td>35–40 Nm</td>
<td>X</td>
</tr>
</tbody>
</table>

* Refer to diagram on p. 63

### Enquiries/ordering:

When making enquiries or placing orders please indicate as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>ARS</td>
<td>M8</td>
<td>47</td>
</tr>
</tbody>
</table>
RS/DIN clamps offer an alternative to our ARS exhaust pipe clamps. They are used to safely connect pipes which are fitted into each other. Due to its simple design, the clamp can be fitted with an additional bracket and is then suitable for use as a retaining clamp.

**Short description of technical features**

1. Optional attachment of brackets
   - the clamps can be used for fastening and/or retaining objects

2. The clamps are supplied without bolt
   - bolts can be chosen as required

3. Simple design
   - hose protection
   - easy handling

**Materials**

<table>
<thead>
<tr>
<th></th>
<th>W1*</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>x*</td>
<td>x**</td>
<td>x**</td>
<td>x**</td>
</tr>
</tbody>
</table>

* No chromium VI used for surface treatment
** On request

**Bolt**

The clamps are supplied without bolt and nut.
Required bolt sizes: M 8 or M 10
NORMACONNECT® – Pipe Connections

Technical features
Corrosion resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Min. 144 h</td>
</tr>
</tbody>
</table>

Applications

- Connecting pipes that are fitted into each other
- Connecting exhaust pipes and silencers
NORMACONNECT® – Pipe Connections

Survey of sizes, band widths & materials
NORMACONNECT® RS/DIN

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Description</th>
<th>Clamping diameter in mm</th>
<th>Packaging IC</th>
<th>Packaging W1</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>RS 30.2 DIN 71 555 W1</td>
<td>30.2</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>20</td>
<td>RS 32.2 DIN 71 555 W1</td>
<td>32.2</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>20</td>
<td>RS 35.2 DIN 71 555 W1</td>
<td>35.2</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>20</td>
<td>RS 37.2 DIN 71 555 W1</td>
<td>37.2</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 40.3 DIN 71 555 W1</td>
<td>40.3</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 42.3 DIN 71 555 W1</td>
<td>42.3</td>
<td>100</td>
<td>X</td>
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<tr>
<td>25</td>
<td>RS 45.5 DIN 71 555 W1</td>
<td>45.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 48.5 DIN 71 555 W1</td>
<td>48.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 50.5 DIN 71 555 W1</td>
<td>50.5</td>
<td>100</td>
<td>X</td>
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<tr>
<td>25</td>
<td>RS 53.5 DIN 71 555 W1</td>
<td>53.5</td>
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<td>25</td>
<td>RS 58.5 DIN 71 555 W1</td>
<td>58.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 60.5 DIN 71 555 W1</td>
<td>60.5</td>
<td>100</td>
<td>X</td>
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<tr>
<td>25</td>
<td>RS 63.5 DIN 71 555 W1</td>
<td>63.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RS 65.5 DIN 71 555 W1</td>
<td>65.5</td>
<td>100</td>
<td>X</td>
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<tr>
<td>25</td>
<td>RS 68.5 DIN 71 555 W1</td>
<td>68.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 70.5 DIN 71 555 W1</td>
<td>70.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 73.5 DIN 71 555 W1</td>
<td>73.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 75.5 DIN 71 555 W1</td>
<td>75.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 78.5 DIN 71 555 W1</td>
<td>78.5</td>
<td>100</td>
<td>X</td>
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<tr>
<td>30</td>
<td>RS 80.5 DIN 71 555 W1</td>
<td>80.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 85.5 DIN 71 555 W1</td>
<td>85.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 89.5 DIN 71 555 W1</td>
<td>89.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 90.5 DIN 71 555 W1</td>
<td>90.5</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 94.5 DIN 71 555 W1</td>
<td>94.5</td>
<td>50</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 100.5 DIN 71 555 W1</td>
<td>100.5</td>
<td>50</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
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<td>104.5</td>
<td>50</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>RS 110.5 DIN 71 555 W1</td>
<td>110.5</td>
<td>50</td>
<td>X</td>
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</table>

IC = industrial carton

Enquiries/ordering:

When making enquiries or placing orders please indicate as follows:

<table>
<thead>
<tr>
<th>1. Type</th>
<th>2. Clamping diameter</th>
<th>3. DIN</th>
<th>4. Material</th>
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<tbody>
<tr>
<td>Example</td>
<td>RS</td>
<td>30.2</td>
<td>71 555</td>
</tr>
</tbody>
</table>
NORMACONNECT® – Pipe Connections

The NORMACONNECT® SEC is the ideal problem solver for connection points in the central and rear exhaust gas area. During assembly, in combination with flange connections there is the option to swivel the exhaust silencer.

Short description of technical features

1. Torx screw with integrated washer
   = simplified assembly and disassembly

2. Convex-shaped band fitting ball-shaped flanges
   = perfectly adapted to the system

3. Chromium VI-free, non-seizing coating
   = improved clamping force

4. Solid trunnion, Chromium VI-free coating
   = high temperature resistance; withstanding high clamping forces

Materials

<table>
<thead>
<tr>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
NORMACONNECT® – Pipe Connections

Technical features

- System tightness* with new part (start of service):
  Leakage rate $\leq 2$ Ltr./min
- System tightness after temperature ageing (after full load):
  $8 \text{ h} > 400^\circ\text{C}$ Leakage rate $\leq 2$ Ltr./min
- Bending moment: $\geq 150$ Nm
- Torsion moment (twisting) of the joint: $\geq 150$ Nm
- Band material: Steel 1.4301
- Screw: Steel, class 10.9
- Solid trunnion: Steel 1.0718/C45

* The tightness of the connection between pipe ends is achieved without an additional seal.

Corrosion resistance

<table>
<thead>
<tr>
<th>Corrosion resistance in salt spray testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. 144 h</td>
</tr>
</tbody>
</table>

Ball shape

Counter-part

Not tightened

Tightened

Applications

- Connecting pipes in the central and rear exhaust gas area

The advantages at a glance

- Angle compensation in the exhaust gas system
- The silencer can be swiveled during assembly
- Simplified assembly and disassembly owing to the increased system flexibility
- Higher torsion moment as compared to standard ball-type flange connections
- Low leakage rate
- Low weight
## NORMACONNECT® – Pipe Connections

### Survey of sizes, band widths & materials

#### NORMACONNECT® SEC

<table>
<thead>
<tr>
<th>Description</th>
<th>Pipe diameter in mm</th>
<th>Pipe diameter in inch</th>
<th>Flange radius</th>
<th>Clamp Inside diameter</th>
<th>W2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEC 55</td>
<td>55</td>
<td>2 3/16</td>
<td>32.5</td>
<td>63.5</td>
<td>X</td>
</tr>
<tr>
<td>SEC 60</td>
<td>60</td>
<td>2 3/8</td>
<td>35</td>
<td>69.85</td>
<td>X</td>
</tr>
<tr>
<td>SEC 65</td>
<td>65</td>
<td>2 9/16</td>
<td>37.6</td>
<td>74.93</td>
<td>X</td>
</tr>
<tr>
<td>SEC 70</td>
<td>70</td>
<td>2 3/4</td>
<td>ca. 40.2</td>
<td>80.01</td>
<td>X</td>
</tr>
<tr>
<td>SEC 75</td>
<td>75</td>
<td>3</td>
<td>ca. 43</td>
<td>85.73</td>
<td>X</td>
</tr>
</tbody>
</table>

**Enquiries/ordering:**

When making enquiries or placing orders please indicate as follows:

<table>
<thead>
<tr>
<th>1. Type</th>
<th>2. Pipe diameter</th>
<th>3. Flange radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>SEC</td>
<td>55</td>
</tr>
</tbody>
</table>
NORMACONNECT® – Pipe Connections

NORMACONNECT® V
Profile clamps

The V profile clamps are reliable and time-effective connection elements for industrial use.

They are made to customer requirements and can be supplied with various profiles, band widths and closure types.

Short description of technical features

1. Coverband = optimal distribution of clamping forces
2. Closure
3. 3 profile segments = ease of assembly

NORMACONNECT® V
Profile clamp with coverband
Product Advantages

All NORMACONNECT® V profile clamps offer a variety of benefits such as:

- **Easy handling**
  Profile clamps are easy to handle and can be assembled with conventional tooling.

- **Quick assembly**
  Profile clamps are quick to assemble saving time and money. With a single closure design, only one bolt has to be tightened to produce a secure joint.

- **Compact design**
  In contrast to conventional flanges, profile clamps require only minimal space and can therefore be used in critical fitting situations.

- **Light weight**
  Compared to flanges, profile clamps are extremely lightweight. This helps to reduce the total weight of the system.

Product Function

The profile clamp works on the principle of the inclined plane: when the closure is tightened, a circumferential force $F_1$ is exerted on the profile segments. By means of the profile, the two flange parts are pressed together (see drawing opposite). The exerted circumferential force is converted into a considerably higher axial force $F_2$. 
NORMACONNECT® – Pipe Connections

Applications

NORMACONNECT® V profile clamps are quick assembly connecting devices for flanges which offer an economical alternative to conventional bolted flange joints.

Examples for typical applications:

Automotive: Turbocharger/Catalyst connection

Automotive: Exhaust manifold

Industrial: Bulk handling vessel

Industrial: Bypass filter unit
With the STC type closure we offer a cost-effective alternative to conventional T-bolt closures.

**Benefits:**
- Low friction losses
- High strength precision machined components
- Manufactured from consistently high quality materials
- State-of-the-art automated manufacturing
- Highly competitively priced

The revolutionary QRC closure has significant advantages over conventional T-bolt closures.

**Benefits:**
- All benefits of the STC closure

**Plus**
- Quick assembly and release feature
- No loose closure parts
- Substantially reduced assembly time
- Screw secured in place whilst tightening

The SVS closure incorporates an over-centre lever which enables assembly by hand.

**Benefits:**
- Assembly without tool
- Ideal for frequent joint release
## NORMACONNECT® – Pipe Connections

### Product Range Summary

<table>
<thead>
<tr>
<th></th>
<th>STC</th>
<th>QRC</th>
<th>SVS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single closure</strong></td>
<td>[Image]</td>
<td>[Image]</td>
<td>[Image]</td>
</tr>
<tr>
<td>3 profile segments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Double closure</strong></td>
<td>[Image]</td>
<td>[Image]</td>
<td>[Image]</td>
</tr>
<tr>
<td>2 profile segments</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Materials

NORMACONNECT® V profile clamps are available in two material specifications:

<table>
<thead>
<tr>
<th>Material Reference</th>
<th>Closure Types</th>
<th>Closure components</th>
<th>Profile segments / Coverband</th>
</tr>
</thead>
<tbody>
<tr>
<td>STC</td>
<td>QRC</td>
<td>SVS</td>
<td></td>
</tr>
<tr>
<td>W2</td>
<td>•</td>
<td>•</td>
<td>Mild steel, zinc plated</td>
</tr>
<tr>
<td>W4</td>
<td>•</td>
<td>•</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>

#### Stainless steel material cross reference table

<table>
<thead>
<tr>
<th>ISO</th>
<th>DIN</th>
<th>AISI</th>
<th>BS</th>
<th>AFNOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>X5 CrNi 18-10</td>
<td>1.4301</td>
<td>304</td>
<td>304 S 31</td>
<td>Z6 CN 18-09</td>
</tr>
</tbody>
</table>

### Band & Closure Dimensions

NORMACONNECT® V profile clamps are manufactured with band and closure dimensions according to the profile selected.

<table>
<thead>
<tr>
<th>Closure type</th>
<th>Cover band 1.0 x 20 mm</th>
<th>Cover band 1.5 x 25 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>STC</td>
<td>Screw</td>
<td>Screw</td>
</tr>
<tr>
<td>QRC</td>
<td>M 6 x 50</td>
<td>M 8 x 70</td>
</tr>
<tr>
<td>SVS</td>
<td>Screw</td>
<td>Screw</td>
</tr>
<tr>
<td></td>
<td>M 6 x 70</td>
<td>M 6 x 70</td>
</tr>
</tbody>
</table>
Profile Types

This page shows 12 profiles of the NORMACONNECT® V product range. The internal profile diameter can be chosen in millimetre increments. All profiles are available up to ø 999 mm. Please refer to the individual profile sections below for the minimum diameter allowed.

Profile clamps are available in 20 mm or 25 mm coverband width. The individual profile sections below indicate which coverband width is suitable for each profile.

For special applications, please ask for further available profile types.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Ø (mm)</th>
<th>Ø Requirement</th>
<th>Coverband Width</th>
<th>STC</th>
<th>QRC</th>
<th>SVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 b</td>
<td>≥ ø 100</td>
<td>≥ ø 100</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0 a</td>
<td>≥ ø 100</td>
<td>≥ ø 100</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3 b</td>
<td>≥ ø 110</td>
<td>≥ ø 110</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 a</td>
<td>≥ ø 125</td>
<td>≥ ø 125</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5 a</td>
<td>≥ ø 130</td>
<td>≥ ø 130</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.6 b</td>
<td>≥ ø 100</td>
<td>≥ ø 100</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.9 b</td>
<td>≥ ø 100</td>
<td>≥ ø 100</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.2 a</td>
<td>≥ ø 100</td>
<td>≥ ø 100</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.2 b</td>
<td>≥ ø 155</td>
<td>≥ ø 155</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.2 a</td>
<td>≥ ø 130</td>
<td>≥ ø 130</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.4 b</td>
<td>≥ ø 180</td>
<td>≥ ø 180</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.5 a</td>
<td>≥ ø 105</td>
<td>≥ ø 105</td>
<td>20 mm</td>
<td>●</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Flange Design Suggestions**

Typical flanges with required dimensions and tolerances suitable for use with our profiles are shown below. The use of a gasket or sealing can improve the leak rate of the joint.

![Flange Designs](image)

<table>
<thead>
<tr>
<th>Profile Type</th>
<th>Profile ø (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>R (mm)</th>
<th>T (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>R (mm)</th>
<th>T (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>R (mm)</th>
<th>T (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0b</td>
<td>≥ 100</td>
<td>5.1</td>
<td>7.5</td>
<td>2</td>
<td>2</td>
<td>5.1</td>
<td>7.5</td>
<td>1</td>
<td>1</td>
<td>Not recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0a</td>
<td>≥ 100</td>
<td>6.1</td>
<td>4.6</td>
<td>1.5</td>
<td>1.5</td>
<td>6.1</td>
<td>4.6</td>
<td>1</td>
<td>1</td>
<td>6.1</td>
<td>4.6</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>5.3b</td>
<td>≥ 110</td>
<td>6.4</td>
<td>7.3</td>
<td>2</td>
<td>2</td>
<td>6.4</td>
<td>7.3</td>
<td>1.5</td>
<td>1.5</td>
<td>6.4</td>
<td>7.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6.0a</td>
<td>≥ 125</td>
<td>7.1</td>
<td>4</td>
<td>1.5</td>
<td>1.5</td>
<td>Not recommended</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5a</td>
<td>≥ 130</td>
<td>7.6</td>
<td>8.3</td>
<td>2</td>
<td>2</td>
<td>7.6</td>
<td>8.3</td>
<td>1.5</td>
<td>1.5</td>
<td>7.6</td>
<td>8.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6.6b</td>
<td>≥ 100</td>
<td>7.7</td>
<td>6.6</td>
<td>1.5</td>
<td>1.5</td>
<td>7.7</td>
<td>6.6</td>
<td>1.5</td>
<td>1.5</td>
<td>7.7</td>
<td>6.6</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>6.9b</td>
<td>≥ 100</td>
<td>9</td>
<td>6.2</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>6.2</td>
<td>1.5</td>
<td>1.5</td>
<td>9</td>
<td>6.2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>9.2a</td>
<td>≥ 100</td>
<td>10.3</td>
<td>7.3</td>
<td>2</td>
<td>2</td>
<td>10.3</td>
<td>7.3</td>
<td>2</td>
<td>2</td>
<td>10.3</td>
<td>7.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>9.2b</td>
<td>≥ 155</td>
<td>10.3</td>
<td>8.5</td>
<td>9</td>
<td>2</td>
<td>Not recommended</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.2a</td>
<td>≥ 130</td>
<td>11.3</td>
<td>7.3</td>
<td>2</td>
<td>2</td>
<td>11.3</td>
<td>7.3</td>
<td>2</td>
<td>2</td>
<td>11.3</td>
<td>7.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11.4b</td>
<td>≥ 180</td>
<td>12.5</td>
<td>13.3</td>
<td>2</td>
<td>2</td>
<td>12.5</td>
<td>13.3</td>
<td>2</td>
<td>2</td>
<td>12.5</td>
<td>13.8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>14.5a</td>
<td>≥ 105</td>
<td>15.6</td>
<td>7.4</td>
<td>2</td>
<td>2</td>
<td>15.6</td>
<td>7.9</td>
<td>2</td>
<td>2</td>
<td>Not recommended</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations:

- **W** = Total Flange Width
- **H** = Total Flange Height
- **R** = Flange Radius
- **T** = Flange Thickness

Profile ø = Flange ø + 2 x gap
1. **Determine the operating or test pressure** for your application.

2. **Determine the max. operating temperature,** the profile clamp has to withstand. (Please note that the profile clamps in this brochure are designed for a maximum operating temperature of 400 °C).

3. **Calculate the required inside diameter of the profile using the formula:** outer flange diameter + 3 mm

4. **Use the diagrams on the left side to check whether the thickness of profile you have chosen is sufficient:** (Please note that the result only gives a first approximated value for static pressure in ideal operating conditions).

   It can be influenced by further factors, such as:
   - seal shape and material
   - roughness of the flange surface
   - operating temperatures
   - bending loads
   - pressure peaks / vibration
   - required operating safety factors

   It may be necessary to increase the thickness of the profile.

   The SVS closure is recommended for low-pressure (e.g. vacuum) applications only.

5. **For screw tightening torque for the different closure types as well as screw sizes, please see tables below.**

   **5.1. Recommended tightening torque**

<table>
<thead>
<tr>
<th>Band width</th>
<th>Screw size</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 mm</td>
<td>M 6</td>
<td>6 Nm</td>
</tr>
<tr>
<td>25 mm</td>
<td>M 8</td>
<td>12 Nm</td>
</tr>
</tbody>
</table>

   **5.2. Closure for SVS**

<table>
<thead>
<tr>
<th>Screw size</th>
<th>Closure force</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 6</td>
<td>≈ 80 Nm</td>
</tr>
</tbody>
</table>

   **How to use the diagrams:**
   - Operation pressure: 4 bar (static)
   - Temperature: 20 °C
   - Profile type 4.0b
   - Profile thickness: 1.5 mm
   - Flange diameter: ø 197 mm
   - Internal profile diameter: ø 200
   - Max. allowable pressure at 20 °C:
     - 5.4 bar > 4 bar ⇒ a.k.
NORMACONNECT® – Pipe Connections

Order Information

1. Select your profile clamp using the tables.
2. Take down the appropriate 8 digit order code.
3. Calculate the required internal diameter: Outer flange diameter + 3 mm gap
4. Add the calculated diameter to the order code.

Example:

<table>
<thead>
<tr>
<th>Profile type: 4.0 b</th>
<th>Material: W4</th>
<th>Closure: QRC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outer flange diameter + 3 mm gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>103 mm</td>
</tr>
</tbody>
</table>

**Order Code:** 0615 2043 ...

**Internal Profile Diameter:** e.g. 100 mm + 3 mm = 103 mm

**Completed Order Code:** 0615 2043 103

Order Codes

Single closure Design • 3 segments • Coverband • Profile inside ø ≤ 300 mm

<table>
<thead>
<tr>
<th>Profile Type</th>
<th>Min. Profile ø (mm)</th>
<th>W2</th>
<th>W4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STC</td>
<td>QRC</td>
<td>SVS</td>
</tr>
<tr>
<td>4.0b</td>
<td>≥ 100</td>
<td>0611 1043 …</td>
<td>–</td>
</tr>
<tr>
<td>5.0a</td>
<td>≥ 100</td>
<td>0611 1032 …</td>
<td>–</td>
</tr>
<tr>
<td>5.3b</td>
<td>≥ 110</td>
<td>0611 1078 …</td>
<td>–</td>
</tr>
<tr>
<td>6.0a</td>
<td>≥ 125</td>
<td>0611 1004 …</td>
<td>–</td>
</tr>
<tr>
<td>6.5a</td>
<td>≥ 130</td>
<td>0611 3015 …</td>
<td>–</td>
</tr>
<tr>
<td>6.6b</td>
<td>≥ 100</td>
<td>0611 1031 …</td>
<td>–</td>
</tr>
<tr>
<td>7.9b</td>
<td>≥ 100</td>
<td>0611 1099 …</td>
<td>–</td>
</tr>
<tr>
<td>9.2a</td>
<td>≥ 100</td>
<td>0611 3009 …</td>
<td>–</td>
</tr>
<tr>
<td>9.2b</td>
<td>≥ 155</td>
<td>0611 3038 …</td>
<td>–</td>
</tr>
<tr>
<td>10.2a</td>
<td>≥ 130</td>
<td>0611 3081 …</td>
<td>–</td>
</tr>
<tr>
<td>11.4b</td>
<td>≥ 180</td>
<td>0611 3058 …</td>
<td>–</td>
</tr>
<tr>
<td>14.5a</td>
<td>≥ 105</td>
<td>0611 3028 …</td>
<td>–</td>
</tr>
</tbody>
</table>

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NORMACONNECT® – Pipe Connections

Double Closure Design* • 2 segments • No coverband • Profile inside ø 200 – 999 mm

<table>
<thead>
<tr>
<th>Profile Type</th>
<th>W2</th>
<th></th>
<th></th>
<th>W4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STC</td>
<td>QRC</td>
<td>SVS*</td>
<td>STC</td>
<td>QRC</td>
<td>SVS</td>
</tr>
<tr>
<td>4.0b</td>
<td>0609 1043 ...</td>
<td>–</td>
<td>0605 1043 ...</td>
<td>0609 2043 ...</td>
<td>–</td>
<td>0605 2043 ...</td>
</tr>
<tr>
<td>5.0a</td>
<td>0609 1032 ...</td>
<td>–</td>
<td>0605 1032 ...</td>
<td>0609 2032 ...</td>
<td>–</td>
<td>0605 2032 ...</td>
</tr>
<tr>
<td>5.3b</td>
<td>0609 1078 ...</td>
<td>–</td>
<td>0605 1078 ...</td>
<td>0609 2078 ...</td>
<td>–</td>
<td>0605 2078 ...</td>
</tr>
<tr>
<td>6.0a</td>
<td>0609 1004 ...</td>
<td>–</td>
<td>0605 1004 ...</td>
<td>0609 2004 ...</td>
<td>–</td>
<td>0605 2004 ...</td>
</tr>
<tr>
<td>6.5a</td>
<td>0609 3015 ...</td>
<td>–</td>
<td>0605 3015 ...</td>
<td>0609 4015 ...</td>
<td>–</td>
<td>0605 4015 ...</td>
</tr>
<tr>
<td>6.6b</td>
<td>0609 1031 ...</td>
<td>–</td>
<td>0605 1031 ...</td>
<td>0609 2031 ...</td>
<td>–</td>
<td>0605 2031 ...</td>
</tr>
<tr>
<td>7.9b</td>
<td>0609 1099 ...</td>
<td>–</td>
<td>0605 1099 ...</td>
<td>0609 2099 ...</td>
<td>–</td>
<td>0605 2099 ...</td>
</tr>
<tr>
<td>9.2a</td>
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* SVS design with 1 closure and hinge
The V PP profile clamps are reliable and time-effective connection elements.

Short description of technical features

1 Integral clamping device
2 Closure
3 Pressed profile
Product function

The profile clamp works with the principle of the inclined plane: when the closure is tightened, a circumferential force $F_1$ is exerted on the profile segments. By means of the profile, the two flange parts are tightly joined.

The exerted circumferential force is converted into a considerably higher axial force $F_2$.

Typical applications

NORMACONNECT®V profile clamps are quick assembly connecting devices for flanges which offer an economical alternative to conventional bolted flange joints.

Examples for applications

- Exhaust gas systems
- Exhaust gas recirculation (EGR)
- Charged air applications
- Cooling systems
- Filter systems

Exhaust gas recirculation

Exhaust gas recirculation
Technical features

- Material 1.4301 (other materials on demand)
- Internal profile diameters available:*
  - Closure with bolt: 20 mm – 180 mm
  - Snap-in closure: 20 mm – 45 mm

* depending on the closure design and the type of profile

NORMACONNECT® V PP
Profile clamp without cover band

Profile clamps offered in this brochure are designed to function strictly at the operating conditions specified by the customer.

Please note that these clamps are exclusively made to order.
Ordering information

Profile clamps selected from this brochure are designed to function strictly at the operating conditions specified. Please ensure that the full range of operating conditions have been investigated prior to the selection of a clamp.

Subject to technical modifications. Prices on request. All orders are subject to our general terms and conditions of sale.

NORMACONNECT® V PP profile clamps are not available ex stock. As a quality certified company, we guarantee constantly high quality standards. NORMA® products are manufactured using modern production techniques and high quality materials. They function as described if used for the purposes specified by us and if our assembly instructions are followed correctly. If you have any doubts about possible uses and correct assembly, please contact us for advice.
The NORMAFIX® range comprises a wide variety of products for the attachment and retaining of pipes, cables, cable harnesses and hoses to walls, ceilings as well as car bodies.
NORMAFIX® – Retaining Products

**NORMAFIX® RS/RSGU/RLGU**
Pipe retaining clips to DIN 3016

NORMAFIX® RS/RSGU pipe retaining clips are the ideal retaining elements for pipes, cables, cable harnesses, cable protection pipes, hoses and other applications.

**Short description of technical features**

1. Form fitting and adjustable band
   - ease of assembly
   - safe attachment

2. Reinforced band ends
   - prevent the clip from tearing or loosening in cases where there is a high mechanical load

3. Optionally supplied with EPDM profile
   - vibration damping & protection against seepage water
   - sound insulation
   - clip fits tight on object

**Materials**

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* on request
NORMAFIX® – Retaining Products

EPDM profile

Material properties of EPDM profile

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SILICONE profile on demand.

Clip types

The standard version NORMAFIX® RS/RSGU clips (Type 1) are also available in a round shape (NORMAFIX® RS/RSGU Type 0) or open shaped (NORMAFIX® RS/RSGU Type 2).

In addition to the designs already mentioned we offer the NORMAFIX® RV clip. This special design, a variation of the standard RS/RSGU Type 1, is provided with an integrated mounting fastener. When the clip ends are compressed the fastener locks into place and locks the clip. Thus the NORMAFIX® RV can be easily preassembled on the pipe.

Diameters and band widths will be furnished on request.

Recently a new type, the NORMAFIX® RLGU, was added to our NORMAFIX® range. It is also a variation of the standard Type 1, but without reinforced band ends and therefore suitable for use in applications submitted to only slight mechanical loads as, for example, the fastening of cables.

NORMAFIX® RLGU are only available in band width 12 mm.

For the complete programme please refer to the table of sizes.

All NORMAFIX® pipe retaining clips are available with a special sound damping rubber profile as optional equipment.
NORMAFIX® – Retaining Products

Screw

The clips are furnished without screws and nuts. We recommend:

- For NORMAFIX® RSGU band width 12 mm – Screw M 5
- For NORMAFIX® RSGU band width 15 mm – Screw M 6
- For NORMAFIX® RSGU band width 20 mm – Screw M 8
- For NORMAFIX® RLGU band width 12 mm – Screw M 6

Applications

- Any kind of fixing and retaining
## Survey of sizes, band widths & materials

**NORMAFIX® RSGU/RS**

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<th>Clamping Range in Inches</th>
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PU = packaging unit
### Survey of sizes, band widths & materials
#### NORMAFIX® RSGU

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PU = packaging unit

### Enquiries/ordering:

When making enquiries or placing orders please state as follows:

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<th>3. Band width</th>
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### Survey of sizes, band widths & materials

**NORMAFIX® RLGU**

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**PU = packaging unit**
### NORMAFIX® – Retaining Products

#### NORMAFIX® RS 0.
Pipe retaining clip type 0, without rubber sleeve

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#### NORMAFIX® RSGU 0.
Pipe retaining clip type 0, with rubber sleeve

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#### NORMAFIX® RS 1.
Pipe retaining clip type 1, without rubber sleeve

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#### NORMAFIX® RSGU 1.
Pipe retaining clip type 1, with rubber sleeve

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<td>15.0</td>
<td>1.2</td>
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* Standard range
NORMAFIX® – Retaining Products

NORMAFIX® RS 2.
Pipe retaining clips type 2, without rubber sleeve

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<th>l (%) W1</th>
<th>s W2</th>
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NORMAFIX® RSGU 2.
Pipe retaining clip type 2, with rubber sleeve

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NORMAFIX® RLGU
Pipe retaining clip type 1, with rubber sleeve

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1) The increments are in steps of 1 mm.
2) Tool

Bolts and nuts are not included in the delivery.

Abbreviations used in the table entries:

b1 = Width in mm
s2 = Material thickness in mm (see page 89)
NORMAFIX® – Retaining Products

NORMAFIX® BS
Fixing clips

With BS fixing clips, pipes and cables can be fitted fast and easily to any structure. They are suitable for all industrial areas where a low-priced and reliable assembly is required.

Short description of technical features

1. Solid clip band and precise fit
2. Objects are easily and safely retained

Materials

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<th>W4</th>
<th>W5</th>
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* on request
Clip Types

Fixing clip to DIN standard
Light range (BSL)
Thick layer surface protection

Band widths: 10 and 12 mm
Material thicknesses: 1 and 1.5 mm

Fixing clip
Standard range (BSN)
Thick layer surface protection

Band width: 20 mm
Material thickness: 2 mm

Fixing clip to DIN standard
Heavy duty range (BSS)
Thick layer surface protection

Band width: 25 mm
Material thickness: 3 mm

Fixing clip to DIN standard
Thick layer surface protection

Band widths: 16 – 40 mm
Material thicknesses: 1.5 – 4 mm
### Survey of sizes, band widths & materials

**NORMAFIX® BSL**

**For 1 conduit**

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<th>l₂ (mm)</th>
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**For 2 conduits**

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**BSL type 510 to DIN 72571**

Order reference:

- **1 x ø** DIN 72571
- **2 x ø** DIN 72571

### BSL type 512 to DIN 72573

**For 1 conduit**

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Order reference:

- **1 x ø** DIN 72573
### NORMAFIX® – Retaining Products

#### BSL type 512 to DIN 72573

**For 2 conduits**

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#### Order reference:

BSL 2 x ø DIN 72573

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#### BSL type 512 to DIN 72573

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#### Order reference:

BSL 3 x ø DIN 72573

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#### BSL type 512 to DIN 72573

**For 4 conduits**

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#### Order reference:

BSL 4 x ø DIN 72573
### NORMAFIX® – Retaining Products

#### Survey of sizes, band widths & materials

**NORMAFIX® BSL**

BSL type 512 to DIN 72573
For 5 conduits

Order reference:
BSL 5 x ø DIN 72573

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**:b:**

**:d:**

**:s:**

BSL type 512 to DIN 72573
For 6 conduits

Order reference:
BSL 6 x ø DIN 72573

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NORMAFIX® – Retaining Products

Survey of sizes, band widths & materials
NORMAFIX® BSN

BSN Typ 520
For 1 conduit

Order reference:
BSN ø x 20 x 2

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BSN Typ 521
For 1 conduit

Order reference:
BSN ø x 20 x 2, two lugs

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BSN Typ 522
For 2 conduits

Order reference:
BSN 2 x ø x 20 x 2

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### Survey of sizes, band widths & materials

#### NORMAFIX® BSS

#### BSS Typ 530
For 1 conduit

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#### Order reference:
BSS ø x 25 x 3

#### BSS Typ 531
For 1 conduit

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#### Order reference:
BSS ø x 25 x 3, two lugs
**BSS Typ 532**
For **2 conduits**

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### NORMAFIX® – Retaining Products

#### Survey of sizes, band widths & materials

**NORMAFIX® FIXING CLIPS TO DIN**

Fixing clip type 540 to DIN 1596
For 1 conduit

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#### Order reference:
Fixing clip ø DIN 1596

Fixing clip type 541 to DIN 1597
For 1 conduit

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#### Order reference:
Fixing clip ø DIN 1597
NORMAFIX® – Retaining Products

NORMAFIX® HMK
Retaining clamps with brackets

HMK retaining clamps with brackets are used to attach containers or pipes to ceilings and walls. They are also used in mechanical engineering and plant construction.

Short description of technical features

1. Robust closure design
   = safe retention

2. Robust clamp band with rounded edges
   = no risk of injury or hose damage

3. Stable bracket
   = safe retention

Materials

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* on request
**NORMAFIX® HMK**

**Heavy-Duty design**

For HMK heavy-duty clamps the ends of the brackets are folded back and spot welded onto the clamp band. Thanks to this design the clamps are suitable for fastening heavy-weight containers and pipes and they are able to withstand high mechanical loads. The heavy-duty clamps are available in single-part or two-part design and in 30 mm band width. All clamps in this range are equipped with a rubber profile.

**NORMAFIX® HMK**

**Standard design**

HMK standard clamps with “open” bracket are suitable for use in applications where relatively light-weight pipes and containers need to be retained and which involve low mechanical loads. Standard design retaining clamps with brackets are available as single-part or two-part design. The clamp band is either 15, 20 or 25 mm wide. If vibrations need to be absorbed, an additional rubber profile can be supplied which is also suitable for use as gasket against creeping water.

**NORMAFIX® K**

NORMAFIX® K are pre-fabricated steel brackets that are suitable to convert any NORMACLAMP® standard clamp (A, GBS, HD, SP or TORRO®) into a retaining clamp with bracket: Just open the clamp, then push the clamp band through the slot of the bracket – that’s it.

NORMAFIX® K brackets are made from W1 steel and are also available in K1 geometry.
**Survey of sizes, band widths & materials**

**NORMAFIX® HMK** (heavy-duty design)

NORMAFIX® HMK retaining clamps with brackets, heavy-duty design, are exclusively available in band width 30 mm equipped with rubber profile (EPDM).

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* Refer to diagram on page 110
### Diameter (mm) vs. h~* vs. L±1* vs. Single-part vs. Two-part vs. W1

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* Refer to diagram on page 110
NORMAFIX® – Retaining Products

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<th>Two-part</th>
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* Refer to diagram on page 110

NORMAFIX® HMK retaining clamps (heavy-duty design) will be supplied in W4 material on request:

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<th>Part number</th>
<th>Single-part</th>
<th>Two-part</th>
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Enquiries/ordering:

When making enquiries or placing an order please state as follows:

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<td>6011</td>
<td>100/</td>
<td>30</td>
<td>SK</td>
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## NORMAFIX® – Retaining Products

### Survey of sizes, band widths & materials

**NORMAFIX® HMK (Standard Design)**

<table>
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<tr>
<th>Band Width (mm)</th>
<th>Min. ø (mm)</th>
<th>Sz</th>
<th>Sk</th>
<th>Screws</th>
<th>D* (mm)</th>
<th>Rubber Profile</th>
<th>Product Group</th>
<th>s*</th>
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<tr>
<td>15</td>
<td>25</td>
<td>●</td>
<td>–</td>
<td>M 6 x 30</td>
<td>6.5</td>
<td>●</td>
<td>●</td>
<td>W1 0.8</td>
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<tr>
<td>20</td>
<td>30</td>
<td>●</td>
<td>–</td>
<td>M 8 x 40</td>
<td>8.5</td>
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<td>●</td>
<td>W1 1.0</td>
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<td>50</td>
<td>–</td>
<td>●</td>
<td>M 10 x 45</td>
<td>11</td>
<td>●</td>
<td>●</td>
<td>W1 1.5</td>
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* Refer to diagram below

### Enquiries/ordering:

When making enquiries or placing an order please state as follows:

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### Dimensions HMK

**NORMAFIX® HMK Heavy-Duty Design**

**NORMAFIX® HMK Standard Design**
Rubber profile

Depending on the profile type (a or b) the rubber profiles are available either in Silicone or EPDM material.

\[ B \] = Band width of the clamp  
\[ b_1 \] = Width in mm  
\[ s_2 \] = Material thickness in mm

All rubber profiles are fitted at our manufacturing plant. The clamps are delivered ready for use. Please indicate in your enquiry/order which profile type you would like.

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<th>( s_2 )</th>
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Material Properties of Different Rubber Types

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<td>8.5</td>
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<td>Breaking elongation [%]</td>
<td>420</td>
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<tr>
<td>Shore hardness A</td>
<td>70 ± 5</td>
<td>70 ± 5</td>
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<tr>
<td>Temperature [°C]</td>
<td>–60° to +170°</td>
<td>–40° to +120°</td>
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<tr>
<td>Resistance:</td>
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<td></td>
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<tr>
<td>Weather &amp; ozone</td>
<td>Good</td>
<td>Very good</td>
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<tr>
<td>Ageing &amp; sun cracks</td>
<td>Very good</td>
<td>Very good</td>
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<tr>
<td>Petrol</td>
<td>Average</td>
<td>Not resistant</td>
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<tr>
<td>Oil &amp; greases</td>
<td>Good</td>
<td>Not resistant</td>
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<tr>
<td>Alcohols</td>
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NORMAFIX® – Retaining Products

Survey of sizes, band widths & materials
NORMAFIX® K

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<th>B*</th>
<th>S*</th>
<th>d*</th>
<th>E*</th>
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<td>4</td>
</tr>
<tr>
<td>13</td>
<td>391–441</td>
<td>31.5</td>
<td>400</td>
<td>320</td>
<td>290</td>
<td>11</td>
<td>60</td>
<td>48</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>443–493</td>
<td>31.5</td>
<td>400</td>
<td>320</td>
<td>290</td>
<td>11</td>
<td>60</td>
<td>48</td>
<td>32</td>
<td>4</td>
</tr>
</tbody>
</table>

* Refer to diagram below

Enquiries/ordering:

When making enquiries or placing an order please state as follows:

<table>
<thead>
<tr>
<th>1. Type</th>
<th>2. Clamping Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>NORMAFIX® K 1</td>
</tr>
<tr>
<td></td>
<td>40–62</td>
</tr>
</tbody>
</table>

NORMAFIX® K brackets are suitable for use in combination with the following NORMACLAMP® standard clamps:

- NORMACLAMP® TORRO®
  (Band width 12 mm)
- NORMACLAMP® A
  (Band width 14 mm)
- NORMACLAMP® HD
  (Band width 16 mm)
- NORMACLAMP® S
  (Band widths 15, 20, 25, 30 mm)
- NORMACLAMP® GBS
  (Band widths 18, 20, 25, 30 mm)
The NORMAFIX® NORMETTA® clamping system consists of a continuous band which fits nearly any shape and size of the objects to be retained or clamped. In addition there is a choice of five different closure types (buckles).

The NORMAFIX® NORMETTA® clamping system is particularly suitable for fixing and/or repair purposes under difficult or extraordinary conditions.

**Continuous band clamping system**

**Short description of technical features**

- Continuous band, either smooth or stamped worm-drive band
  - flexible and suitable for use in many applications

- 5 different closure types available to fit various applications

**Materials**

<table>
<thead>
<tr>
<th></th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We supply the continuous band in 30 m coils either as smooth band in various band widths or as stamped worm-drive band (only 13 mm) in different material qualities.

You can choose from 5 closure types:

**Buckle type NB-A**
Material: W1
for band width
5, 9 mm

Buckle type **NB-A** is suitable for lighter applications such as fixing smaller signs and sealing low-pressure hoses.
Reusable.

Required tools: Steel pin, 90° offset screw driver or pliers, tin snips.

**Buckle type NB-B**
Material: W1
for band width
9 mm

Buckle type **NB-B**
Application: Same as NB-A.
Reusable.

Required tools: Spanner, SW 8 or screwdriver, tin snips.

**Buckle type NB-D**
Material: W4
for band width
9, 13, 16, 19 mm

Buckle type **NB-D** is suitable for fixing signs, containers and pipes as well as for sealing hoses.

Required tools: Tightening and cutting tool, hammer.
Buckle type **NB-G**
for worm-drive 13 mm band. Suitable for applications in tight conditions.
Reusable.
Required tools: Screwdriver or hexagonal wrench SW 7 and tin snips.

Buckle type **NB-H**
is an adjustable quick-release buckle and enables quick and simple assembly and disassembly.
Reusable.
Required tools: Screwdriver and tin snips.

**Applications**

- Retaining, sealing and repairing pipes
- Retaining signs and containers
- Sealing hoses

**The advantages at a glance**

- Flexible, multi-purpose system
- Ease of assembly even in narrow spaces
Tools

1 Clamping and Cutting Tool

We recommend this high-quality tool for professional use. It is easy to handle and can withstand tension forces of up to approx. 10,000 N (1,000 kp).

2 Mini Repair Kits

- 5 pieces Contents = 8 m band W1, 5 mm wide plus 25 buckles type NB-45. Part number 560 8520 003
- 9 pieces Contents = 8 m band W1, 9 mm wide plus 25 buckles type NB-A9. Part number 560 8520 001

Survey of sizes, band widths & materials

<table>
<thead>
<tr>
<th>Band width (mm)</th>
<th>Band thickness</th>
<th>W1 (zinc plated mild steel)</th>
<th>W3 (1.4016)</th>
<th>W4 (1.4371)</th>
<th>NB-A</th>
<th>NB-B</th>
<th>NB-D</th>
<th>NB-G</th>
<th>NB-H</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.35</td>
<td>560 8500 004</td>
<td>–</td>
<td>–</td>
<td>NB-A5 W1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>0.40</td>
<td>560 8500 001</td>
<td>–</td>
<td>–</td>
<td>NB-A9 W1</td>
<td>NB-B9 W1</td>
<td>NB-D9 W4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>0.55*</td>
<td>–</td>
<td>560 8554 009</td>
<td>–</td>
<td>–</td>
<td>NB-D9 W4</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>13</td>
<td>0.70*</td>
<td>–</td>
<td>560 8553 013</td>
<td>–</td>
<td>–</td>
<td>NB-D13 W4</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>12</td>
<td>0.80</td>
<td>560 8566 001</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>NB-G12 W1</td>
<td>–</td>
</tr>
<tr>
<td>pressed</td>
<td>0.80</td>
<td>–</td>
<td>560 8566 003</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>NB-G12 W3</td>
<td>–</td>
</tr>
<tr>
<td>16</td>
<td>0.70*</td>
<td>–</td>
<td>560 8553 016</td>
<td>–</td>
<td>–</td>
<td>NB-D16 W4</td>
<td>–</td>
<td>NB-H16 W1</td>
<td>–</td>
</tr>
<tr>
<td>19</td>
<td>0.70*</td>
<td>–</td>
<td>560 8553 019</td>
<td>–</td>
<td>–</td>
<td>NB-D19 W4</td>
<td>–</td>
<td>NB-H19 W1</td>
<td>–</td>
</tr>
</tbody>
</table>

* also available in 1.4301 material

Enquiries/ordering:

When making enquiries or placing an order please state as follows:

<table>
<thead>
<tr>
<th>1. Order code/coil</th>
<th>2. Order code/buckle</th>
</tr>
</thead>
<tbody>
<tr>
<td>560 8554 009</td>
<td>NB-D9 W4</td>
</tr>
</tbody>
</table>
“Fit and Forget” for permanent peace of mind

NORMAQUICK® – Quick Connectors

Innovative, secure, and “quickfit” – the NORMAQUICK® range of plug-in connectors made of synthetic material are suitable for most media carrying lines. No matter whether we are dealing with cooling water, oil, air or fuel carrying lines – NORMAQUICK® quick connectors offer the state-of-the-art means of connection. These connectors are specially suited to being matched up with the NORMAFLEX® tube system.
NORMAQUICK® PS3 “Push & Seal” plastic quick connectors are an ideal means for the secure connection of cooling water and heating hoses as well as charged air systems.

Short description of technical features

1. Housing
2. O-ring
3. Retaining ring
4. Retainer (spring)

Standard materials

NORMAQUICK® PS3 quick connectors are made from recyclable materials. For our standard versions we use Polyamide 6.6 with 30% glass fiber content.

The standard material for the O-rings consists of peroxide-cured EPDM which is resistant to hot water. For NORMAQUICK® PS3 connectors that are likely to be used in direct contact with coolants we recommend PA 6.6 with 30% glass fiber content that has been stabilized against heat and hydrolysis.

In case of special applications (e.g. charged air ducts) NORMAQUICK® PS3 connectors can be made from other technical thermoplastic materials with different filler types and contents. Please note, however that special types can only be made when the required minimum quantity is ordered.
Please note that all NORMAQUICK® PS3 connectors are delivered without spigot.

But we will be pleased to offer suitable spigots on request.

**Technical features**

<table>
<thead>
<tr>
<th>Medium/Fluid</th>
<th>Operating Pressure</th>
<th>Operating Temperature</th>
</tr>
</thead>
</table>
| Cooling water | Approx. 1.5 bar excess pressure | Engine compartment: –40 °C to +135 °C  
Short time up to +150 °C (approx. 30 min.) |

**The advantages at a glance**

- Snap assembly without tool = time and cost reduction
- Robot assembly possible = automated processes
- Compact structural dimensions = to be used in extremely narrow spaces
- Integrated seal = optimal tightness
NORMA QUICK® – Quick Connectors

Survey of sizes
NORMA QUICK® PS 3

Two types of NORMA QUICK® PS3 (0° and 90°) are available as standard versions.

<table>
<thead>
<tr>
<th>Nominal diameters in mm (inside diameter of the bore)</th>
<th>0 °</th>
<th>90 °</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>16</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>20</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>26</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>32</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>40</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>50</td>
<td>X</td>
<td>–</td>
</tr>
</tbody>
</table>

Enquiries/ordering:

When making enquiries or placing orders please state as follows:

<table>
<thead>
<tr>
<th>Example</th>
<th>1. Type</th>
<th>2. Nominal width</th>
<th>3. Variant</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAQUICK</td>
<td>PS3</td>
<td>16</td>
<td>0 °</td>
</tr>
</tbody>
</table>

During the last couple of years we have built up a selection of special/customised connector types. The geometries can be substantially modified to customer requirements and it is possible to integrate additional functional elements, e.g. thermo sensors. We would be pleased to answer your questions.
NORMAQUICK® – Quick Connectors

Applications

- Cooling water lines
- Heating lines
- Charged air connections

The following drawings show three practical examples:

NORMAQUICK® PS3 with integrated junction piece, seal and branch

Flow-optimised NORMAQUICK® PS3 with integrated receptacle for thermo sensor

NORMAQUICK® PS3 with integrated junction piece
NORMAQUICK® – Quick Connectors

NORMAQUICK® V2 Quick Connectors

NORMAQUICK® V2 plastic quick connectors are an ideal means to connect media carrying lines as well as ventilation and exhaust lines in the automotive industry.

Short description of technical features

1. Firtree plus O-ring (optional)
2. Secondary O-ring
3. Primary O-ring
4. Locking device (ring)
5. Housing

Standard materials

NORMAQUICK® V2 connectors are made from recyclable materials featuring extremely low permeation values. Our standard versions are made from Polyamide 6 with 30% glass fiber content or Polyamide 12 with 20% glass fiber content. The O-rings are made of NBR, HNBR, FPM and FVMQ as standard equipment.
Connecting spigot

To RASMUSSEN standard (Production drawings will be made available on request) NORMAQUICK® V2 connectors can be used on both plastic and metal spigots. Would you please note that all NORMAQUICK® V2 connectors are delivered without spigot. However, we will be pleased to offer suitable spigots on request.

Insiders’ Tip:

The perfectly matched system is achieved when combining NORMAQUICK® V2 quick connectors and NORMAFLEX® fluid systems.

Technical features

<table>
<thead>
<tr>
<th>Medium/Fluid</th>
<th>Operating Pressure</th>
<th>Operating Temperature</th>
</tr>
</thead>
</table>
| Fuels, air, oil & oil vapours | Approx. 5 bar excess pressure | Engine compartment: \-40 °C up to +135 °C 
\text{Short time up to } +150 °C (approx. 30 min.) |

The advantages at a glance

- Fast assembly without tool = reduced time and cost
- Robot assembly possible = automated processes
- Compact dimensions = to be used in narrow spaces
- Integrated seal = optimal tightness
- The seals can be visually checked = safe assembly work
NORMAQUICK® – Quick Connectors

Survey of sizes
NORMAQUICK® V2

Two types of NORMAQUICK® V2 connectors (0° and 90°) are available as standard versions.

<table>
<thead>
<tr>
<th>Nominal width (mm) (inside diameter of the PA pipe to be connected)</th>
<th>0°</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>15</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>19</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>27</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>33</td>
<td>X</td>
<td>–</td>
</tr>
</tbody>
</table>

Enquiries/ordering:

When making enquiries or placing orders please state as follows:

<table>
<thead>
<tr>
<th>Example</th>
<th>1. Type</th>
<th>2. Nominal width</th>
<th>3. Type</th>
<th>4. Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAQUICK</td>
<td>V2</td>
<td>10</td>
<td>90°</td>
<td>fuel</td>
</tr>
</tbody>
</table>

Special installation dimensions may require the dismantling ring to be oriented at an angle which deviates from that of the standard version. For such cases we supply quick connectors with dismantling rings oriented at the following angles:

- NORMAQUICK® V2-NW 19 with dismantling ring oriented at an angle of 15°, 30°, 45° etc. in steps of 15°
- NORMAQUICK® V2-NW 27 with dismantling ring oriented at an angle of 10°, 20°, 30° etc. in steps of 10°
During the last couple of years we have built up a selection of approx. 200 special/customised connector types. We will be pleased to inform you in more detail on request.
NORMAQUICK® – Quick Connectors

Applications

NORMAQUICK® V2 can be used for both line-to-line as well as line-to-device connections.

- Fuel lines
  - Tank breathing
- Ventilation and exhaust lines
  - Secondary air lines
  - Crank case ventilation lines
- Oil cooler lines
- Vacuum brake lines
NORMAQUICK® S plastic quick connectors are an ideal means to connect media carrying lines on automobiles and have basically been developed for fuel system applications.

Short description of technical features

1. Firtree plus O-ring (optional)
2. Primay O-ring
3. Spacer
4. Secondary O-ring
5. Retainer (spring)
6. Housing

Standard materials

NORMAQUICK® S connectors are made from recyclable materials featuring extremely low permeation values. Our standard versions are made from Polyamide 6 or Polyamide 12 with 20 – 50 % glass fiber content. The O-rings are made of FPM and FVMQ as standard equipment.
NORMAQUICK® – Quick Connectors

Connecting spigot
to SAE J2044, standard worldwide

Please note that all NORMAQUICK® S connectors are delivered without SAE spigot.

However, we will be pleased to offer suitable SAE spigots on request.

1 Housing
2 Firtree plus O-ring (optional)
3 Primary O-ring
4 Spacer
5 Secondary O-ring
6 Retainer (spring)
7 Adapter
8 Diameter of Connecting spigot = Nominal Width (NW)

Insiders’ Tip

The perfectly matched system is achieved when combining NORMAQUICK® S quick connectors and NORMAFLEX® fluid systems.

Technical features

<table>
<thead>
<tr>
<th>Medium/Fluid</th>
<th>Operating Pressure</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>Approx. 10 bar excess pressure</td>
<td>Engine compartment: -40 °C up to +135 °C, Short time up to +150 °C (approx. 30 min.)</td>
</tr>
</tbody>
</table>

Meeting the requirements of SAE J2044

The advantages at a glance

- Fast assembly without tool = time and cost reduction
- Robot assembly possible = automated processes
- Compact building method = employment in extremely close installation conditions possible
- Integrated seal = optimal tightness
- Closing cone principle = NORMAQUICK® S is protected from unintentional opening and cannot be unlocked under pressure
**NORMAQUICK® — Quick Connectors**

**Survey of sizes NORMAQUICK® S**

Two types of NORMAQUICK® S (0° and 90°) are available as standard versions.

<table>
<thead>
<tr>
<th>Nominal width (mm) (outside diameter of the spigot)</th>
<th>0°</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5/16&quot;</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8 mm</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7/16&quot;</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Additional nominal widths on request.

**Enquiries/ordering:**

When making enquiries or placing orders please state as follows:

<table>
<thead>
<tr>
<th>Example</th>
<th>1. Type</th>
<th>2. Nominal width (outside diameter of SAE spigot)</th>
<th>3. Type</th>
<th>4. Application</th>
<th>5. Inside line-diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAQUICK S</td>
<td>5/16&quot;</td>
<td>0°</td>
<td>fuel</td>
<td>6 mm</td>
<td></td>
</tr>
</tbody>
</table>

**Applications**

NORMAQUICK® S can be used to make both line-to-line as well as line-to-equipment connections.

- Fuel lines
  - feed and return lines
  - tank breathing
- Ventilation lines
- Oil cooler lines
- Vacuum control lines
NORMAQUICK® – Quick Connectors

NORMAQUICK® MK
Connecting spigot

NORMAQUICK® MK connectors have been developed with the aim to achieve significantly reduced permeation rates. NORMAQUICK® MK provide a perfect link between the tank and the pipe system in cases where existing standard connectors are prone to a high permeation rate while their tendency to “creep” causes additional micro leakage. NORMAQUICK® MK for the first time combine reinforced and unreinforced materials and thus enable the safe connection of the connector with the plastic fuel tank.

Short description of technical features

1. Chemical bonding
2. Welded ring HDPE
3. Spigot PA 12 (glass fiber reinforced)

Materials

NORMAQUICK® MK combine materials that so far have been incompatible. Welded ring made from HDPE, can be welded onto the plastic fuel tank. Spigot made from Polyamide 12 with 30% glass fiber content.
NORMAQUICK® – Quick Connectors

Connecting spigot

NORMAQUICK® MK are applicable for use with the following connectors:

- SAE (e.g. NORMAQUICK® S)
- VDA (e.g. NORMAQUICK® PS 3)
- NORMAQUICK® V2
- Firtree

Insiders’ Tip:

The perfectly matched system is achieved when combining NORMAQUICK® MK connecting spigots and NORMAFLUX® fluid systems.

Technical features

- Meeting the requirements of ENG standard 016, VW TL 82417, KT-2KDL-0802, STD-SAL 0013

Comparison of permeation rates Shed test to Carb Specification

Reduced permeation achieved by means of MK connectors

The advantages at a glance

- Drastically reduced permeation rates at the connection between the plastic fuel tank and the fuel lines by means of a 2-component material mixture
- Very good physical and chemical properties
The NORMAQUICK® MK is not a standard part. All projects are based on special customer requirements. We shall therefore be pleased to receive a precise description of your application in order to be able to offer you an optimal, customised solution.

Applications

- Fuel tank ventilation systems
- Fuel tank filler systems

Connector types

TB: Firtree
V2: NORMAQUICK® V2
SAE: Connecting spigot to SAE
NORMAFLEX® – Fluid Systems

This programme comprises smooth and corrugated tubes as well as partially corrugated tubes in mono or co-extruded wall thicknesses which, when used with our NORMAQUICK® quick connectors and NORMACLAMP® hose clamps, will provide a complete transfer system for fluids and air.
NORMAFLEX® – Fluid Systems

NORMAFLEX® Fluid Systems

NORMAFLEX® fluid systems consist of plastic tubes that are suitable for being combined with NORMAQUICK® quick connectors and/or NORMACLAMP® hose clamps in order to create perfectly matching systems. Depending on the type of material used and the layer construction, NORMAFLEX® fluid systems are suitable for transporting a wide range of different media such as water, air, oil or fuel.

Short description of technical features

Materials

The components are combined in a way to match the specific requirements of each application and to provide the best possible physical and chemical properties.
## Technical features

### Example: smooth pipe 8 x 1

<table>
<thead>
<tr>
<th>Test</th>
<th>Unit</th>
<th>Single-layer</th>
<th>Multi-layer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PA 6 R 50 HNZ</td>
<td>PA 12 soft L 25 W 40 X</td>
</tr>
<tr>
<td>Tensile strength, standard value</td>
<td>MPa</td>
<td>31–35</td>
<td>22–24</td>
</tr>
<tr>
<td>Elongation at tear, standard value</td>
<td>%</td>
<td>100–150</td>
<td>150–220</td>
</tr>
<tr>
<td>Burst pressure 23 °C, standard value</td>
<td>MPa</td>
<td>9.8</td>
<td>6.5</td>
</tr>
<tr>
<td>Burst pressure 115 °C, standard value</td>
<td>MPa</td>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>Min. bending radius (without internal reinforcement)</td>
<td>mm</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Min. bending radius (with internal reinforcement)</td>
<td>mm</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Pull-off forces (pipe/fitree) NW 6, standard value</td>
<td>N</td>
<td>750</td>
<td>600</td>
</tr>
<tr>
<td>Area of Application</td>
<td></td>
<td>Air, Oil</td>
<td>Fuel, Air, Oil</td>
</tr>
</tbody>
</table>

Note: Conversion of tensile strength: 1 MPa = 1 N/mm²; conversion of burst pressure: 1 MPa = 10 bar

## Survey of sizes

NORMAFLEX® fluid systems are exclusively made to customers’ requirements.

## The advantages at a glance

- Ready-to-fit systems = fast, simple assembly
- Light construction units = weight reduction compared with conventional rubber/metal systems
- Different materials
- Available as mono or co-extruded tube
- Adaptable geometries
- Lines depending upon need; smooth, corrugated or partially corrugated
Variants

Presently we offer fluid systems to be used in the following areas of application:

**NORMAFLEX® SAS**
- to be used in Secondary Air Tube Systems

**NORMAFLEX® HCS**
- to be used in Hydraulic Clutch Tube Systems

**NORMAFLEX® CVS**
- to be used in Crankcase Ventilation Tube Systems either with or without heating

**NORMAFLEX® CWS**
- to be used in Cooling Water Tube Systems
NORMAFLEX® – Fluid Systems

NORMAFLEX® FTS
to be used in
Fuel Transport Tube Systems

NORMAFLEX® OTS
to be used in
Oil Transport Tube Systems

NORMAFLEX® TOC
to be used in
Transmission Oil Cooler Tube Systems

NORMAFLEX® TVS
to be used in
Tank Ventilation Tube Systems
The NORMAFLEX® LET Low Emission Tubes have been developed with the aim to produce a system component achieving significantly reduced permeation rates. As a result of our endeavours we can now offer perfectly matching tank line systems (tube – spigot – quick connector) that enable us to pave the way for the future of efficient low-emission applications.

The advantages at a glance

NORMAFLEX® LET “low emission” tubes are made without fluorthermoplastic resin

- Outstanding mechanical, physical and chemical properties
- Significant reduction in permeation
- High temperature resistance
- High compressive strength
The best way to connect hose and tube

NORMAPLAST® – Plastic Products

Over the years these top quality very versatile connectors have been used in millions of different applications and the product has become an indispensable aid to the domestic, commercial, industrial and automotive market sectors.
NORMAPLAST® SV products are proven plastic hose and tube connectors which connect fluid carrying lines reliably and at a reasonable price.

NORMAPLAST® SV hose and tube connectors can be used in motor vehicles as well as in nearly every industrial application.

Short description of technical features

The advantages at a glance

- High strength
- Toughness
- Low weight
- Shock damping
- Scuff resistance
- High impact resistance
NORMAPLAST® – Plastic Products

Types and Variants

1. Taper thread connector
These NORMAPLAST® SV connectors made of Polyamide 6 feature on one end a tapered thread and on the other end one or two push-on spigots.
The ribbed surface of the push-on spigots ensures that the hoses are tight-fit after assembly.
Three different thread geometries are distinguished by means of colour coding allowing for a quick visual identification:
- Metric taper thread: light grey
- Whitworth pipe thread: charcoal
- NPT thread: black
(Other materials are available on request)

2. Hose connectors
With these NORMAPLAST® SV connectors without thread hoses are connected quickly and easily with one another by just pushing the hose onto the connectors.
The ribbed surface of the push-on spigots ensures that the hoses are tight-fit after assembly.
The NORMAPLAST® SV hose connectors are made of ecru-coloured POM (acetalcopolymerisat); other materials are available on request.

3. Compression
The NORMAPLAST® SV threaded connectors feature on one end a metric thread and on the other end one or two pipe unions.
These compression connectors are made of black polyamide 6 with 30 % glass-fibre reinforcement.

4. Push-on connectors
These NORMAPLAST® SV parts are used for connecting plastic pipes made of PA6 or PA12.
With these connectors safe connections can be achieved even without the use of additional hose clips.
The push-on connectors are made of black polyamide 6 or polyamide 12 containing 30 % glass fibre reinforcement.
The connectors can be supplied with O-rings on request.
**Product & Material Properties**

**Thermal Properties**

For the threaded connecting pieces the coefficient of expansion of 100 x 10^-6 must be considered if there is any exposure to temperature fluctuations. Our standard materials are classified under the UL (Underwriters Laboratories) system:

Flammability (UL94)

POM, PP, PA6, PA6.6, and PA12 : **HB** (Horizontal Burning)

---

### Chemical properties of the plastic materials used

<table>
<thead>
<tr>
<th>No.</th>
<th>Chemical Substance</th>
<th>Concentration</th>
<th>Temperature</th>
<th>POM</th>
<th>PP</th>
<th>PA 6</th>
<th>PA 6.6</th>
<th>PA 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acetone</td>
<td>100%</td>
<td>20 °C/50 °C</td>
<td>1/3</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>2</td>
<td>Formic acid</td>
<td>98–100%</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>1/3</td>
<td>4/4</td>
<td>4/4</td>
<td>4/4</td>
</tr>
<tr>
<td>3</td>
<td>Ammonium hydroxide (spirits of ammonia)</td>
<td>Any</td>
<td>20 °C/50 °C</td>
<td>1/2</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>4</td>
<td>Fuel (Super Unleaded, Normal)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>3/4</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>5</td>
<td>Benzene, B. hydrocarbons</td>
<td>100%</td>
<td>20 °C/50 °C</td>
<td>3/3</td>
<td>3/4</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>6</td>
<td>Bleaching lye (12.5% active chlorine)</td>
<td>Aqueous solution</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>3/3</td>
<td>4/4</td>
<td>4/4</td>
<td>3/3</td>
</tr>
<tr>
<td>7</td>
<td>Brake fluid (DOT4)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>8</td>
<td>Butane</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/2</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
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<tr>
<td>10</td>
<td>Disinfectant phenols</td>
<td>Diluted solution</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>1/1</td>
<td>4/4</td>
<td>4/4</td>
<td>4/4</td>
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<tr>
<td>11</td>
<td>Diesel fuel, Diesel oil</td>
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<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/3</td>
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<td>1/1</td>
<td>1/1</td>
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<tr>
<td>12</td>
<td>Decalculator</td>
<td>Aqueous solution (20 °C/50 °C)</td>
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<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Photographic developer (1:100)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>4/4</td>
<td>4/4</td>
<td>4/4</td>
</tr>
<tr>
<td>14</td>
<td>Town gas (coal gas, natural gas)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>15</td>
<td>Crude oil</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>3/3</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>16</td>
<td>Acetic acid (glacial acetic acid)</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>1/2</td>
<td>4/4</td>
<td>4/4</td>
<td>4/4</td>
</tr>
<tr>
<td>17</td>
<td>Ethyl alcohol</td>
<td>96% (techn. pure)</td>
<td>20 °C/50 °C</td>
<td>1/2</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>18</td>
<td>Photographic emulsion</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/0</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>19</td>
<td>Fruit juices</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>20</td>
<td>Glycerine</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>21</td>
<td>Glysantin</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>3/3</td>
<td>3/3</td>
<td>3/3</td>
<td>3/3</td>
</tr>
<tr>
<td>22</td>
<td>Heating oil</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/3</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>23</td>
<td>Hydraulic fluids</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/0</td>
<td>1/3</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>24</td>
<td>Carbon dioxide, carbonic acid</td>
<td>Technically pure, saturated</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>25</td>
<td>Coolants (based on Glycol)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>3/3</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>26</td>
<td>Methane</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>27</td>
<td>Methanol</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>3/3</td>
</tr>
<tr>
<td>28</td>
<td>Methyl ethyl keton</td>
<td>100%</td>
<td>20 °C/50 °C</td>
<td>3/3</td>
<td>1/3</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>29</td>
<td>HD engine oils</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
</tbody>
</table>
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### No. Chemical Substance Concentration Temperature POM PP PA 6 PA 6.6 PA 12

<table>
<thead>
<tr>
<th>No.</th>
<th>Chemical Substance</th>
<th>Concentration</th>
<th>Temperature</th>
<th>POM</th>
<th>PP</th>
<th>PA 6</th>
<th>PA 6.6</th>
<th>PA 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Sodium hydroxide</td>
<td>40%</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>32</td>
<td>Propanol</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>33</td>
<td>Propane (liquefied gas)</td>
<td>Fluid</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>34</td>
<td>Propane</td>
<td>96%</td>
<td>20 °C/50 °C</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
<tr>
<td>35</td>
<td>Rape oil (RME)</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>2/2 (*)</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>36</td>
<td>Hydrochloric acid</td>
<td>Aqueous, 10%</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>1/1</td>
<td>4/4</td>
<td>4/4</td>
<td>3/3</td>
</tr>
<tr>
<td>37</td>
<td>Lubricating oils with HD or EP</td>
<td>Commercial</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/2</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>38</td>
<td>Sulphuric acid</td>
<td>Aqueous, 10%</td>
<td>20 °C/50 °C</td>
<td>4/4</td>
<td>1/2</td>
<td>3/3</td>
<td>3/3</td>
<td>2/2</td>
</tr>
<tr>
<td>39</td>
<td>De-icing salt (solutions)</td>
<td>Saturated</td>
<td>20 °C/50 °C</td>
<td>1/2</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>40</td>
<td>Soap suds</td>
<td>Solution, diluted</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>2/2 (*)</td>
<td>1/1</td>
<td>1/1</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Water (drinking, river, sea)</td>
<td>Technically pure</td>
<td>20 °C/50 °C</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>42</td>
<td>Citric acid</td>
<td>10%</td>
<td>20 °C/50 °C</td>
<td>2/4</td>
<td>1/1</td>
<td>1/0</td>
<td>1/0</td>
<td>1/0</td>
</tr>
</tbody>
</table>

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   (Change in dimensions: none or negligible and reversible; no damage also after long periods of time)
2 = Very stable / applicable
   (Change in dimensions: none or negligible and reversible after a short period of time; slightly changed dimensions, possibly irreversible changes in the material characteristics after a longer period of time)
3 = Conditionally applicable
   (Change in dimensions: considerable changes; possibly irreversible changes in the material characteristics after a longer period of time)
4 = Not stable / not applicable
   (Soluble or extremely affected after a short period of time)
(*) Moisture expansion

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# Survey of sizes

**NORMAPLAST®** taper thread connectors

## GES

Straight taper thread connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Packaging</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>L1~</th>
<th>SW</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>GES 3 / M 5</td>
<td>100</td>
<td>3</td>
<td>M 5</td>
<td>2.5</td>
<td>19.5</td>
<td>6</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / M 8 x 1</td>
<td>100</td>
<td>4</td>
<td>M 8 x 1 keg</td>
<td>2.5</td>
<td>27</td>
<td>10</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / M 8 x 1.25</td>
<td>100</td>
<td>4</td>
<td>M 8 x 1.25 keg</td>
<td>2.5</td>
<td>27</td>
<td>10</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / M 10 x 1</td>
<td>100</td>
<td>4</td>
<td>M 10 x 1 keg</td>
<td>2.5</td>
<td>27</td>
<td>10</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / M 12 x 1.5</td>
<td>100</td>
<td>4</td>
<td>M 12 x 1.5 keg</td>
<td>2.5</td>
<td>32</td>
<td>14</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / M 14 x 1.5</td>
<td>100</td>
<td>4</td>
<td>M 14 x 1.5 keg</td>
<td>2.5</td>
<td>32</td>
<td>14</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / R 1/8</td>
<td>100</td>
<td>4</td>
<td>R 1/8 keg</td>
<td>2.5</td>
<td>27</td>
<td>10</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / R 1/4</td>
<td>100</td>
<td>4</td>
<td>R 1/4 keg</td>
<td>2.5</td>
<td>32</td>
<td>14</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / 1/8 NPT</td>
<td>100</td>
<td>4</td>
<td>1/8 NPT</td>
<td>2.5</td>
<td>29</td>
<td>10</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 4 / 1/4 NPT</td>
<td>100</td>
<td>4</td>
<td>1/4 NPT</td>
<td>2.5</td>
<td>35</td>
<td>14</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 5 / M 12 x 1.5</td>
<td>100</td>
<td>5</td>
<td>M 12 x 1.5 keg</td>
<td>3</td>
<td>36</td>
<td>14</td>
<td>Polyamide</td>
</tr>
<tr>
<td>GES 5 / M 14 x 1.5</td>
<td>100</td>
<td>5</td>
<td>M 14 x 1.5 keg</td>
<td>3</td>
<td>36</td>
<td>14</td>
<td>Polyamide</td>
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All dimensions in mm. Please refer to the table on Page 163 for further information.
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All dimensions in mm. Please refer to the table on Page 163 for further information.

### BST

Blanking plugs with screw-in thread

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All dimensions in mm. Please refer to the table on Page 163 for further information.
### Survey of sizes

**NORMAPLAST® taper thread connectors**

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All dimensions in mm. Please refer to the table on Page 163 for further information.
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Elbow taper thread connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.
### Survey of sizes

**NORMAPLAST®** push-on connectors

#### GS

**Straight push-on connectors**

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All dimensions in mm. Please refer to the table on Page 163 for further information.

#### GRS

**Reducing straight push-on connectors**

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All dimensions in mm. Please refer to the table on Page 163 for further information.
NORMAPLAST® – Plastic Products

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Equal T push-on connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.

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All dimensions in mm. Please refer to the table on Page 163 for further information.
### Survey of sizes

**NORMAPLAST®** push-on connectors

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Reducing T push-on connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.

#### YRS

Reducing Y push-on connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.
### WS
Elbow push-on connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.

### YS
Equal Y push-on connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.
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**Straight plastic pipe connectors**

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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.

---

### TN
**T plastic pipe connectors**

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<td>36</td>
<td>Polyamide 6 or 12; 30% GF*</td>
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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.
**NORMAPLAST® – Plastic Products**

### WN
Elbow plastic pipe connectors

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All dimensions in mm. Please refer to the table on Page 163 for further information.

### YN
Y plastic pipe connectors

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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.
### EG
**Straight compression connectors**

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<td>M 10 x 1 keg</td>
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<td>13</td>
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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.

### EWS
**Swivel elbow compression connectors**

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<td>M 10 x 1</td>
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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.
### ETS
Swivel T compression connectors

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* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.

### ET
T compression connectors

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<td>R 1/8 keg</td>
<td>19</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
</tr>
<tr>
<td>ET 6 x 1 - R 1/4</td>
<td>100</td>
<td>6 x 1</td>
<td>R 1/4 keg</td>
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<td>23</td>
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<tr>
<td>ET 6 x 1 - M 10 x 1</td>
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<td>6 x 1</td>
<td>M 10 x 1 keg</td>
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<tr>
<td>ET 8 x 1 - R 1/8</td>
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<td>8 x 1</td>
<td>R 1/8 keg</td>
<td>19</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
</tr>
<tr>
<td>ET 8 x 1 - R 1/4</td>
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<td>R 1/4 keg</td>
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<td>23</td>
<td>Polyamide 6; 30% GF*</td>
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<tr>
<td>ET 8 x 1 - M 10 x 1</td>
<td>100</td>
<td>8 x 1</td>
<td>M 10 x 1 keg</td>
<td>19</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
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</tbody>
</table>

* GF = glass fibre content

All dimensions in mm. Please refer to the table on Page 163 for further information.
### EW / WV
Elbow compression connectors

<table>
<thead>
<tr>
<th>Description</th>
<th>Packaging</th>
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<th>D₂</th>
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<th>L₂~</th>
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<td>R 1/8</td>
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<td>Polyamide 6; 30% GF*</td>
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<tr>
<td>EW 6 x 1 - R 1/4</td>
<td>100</td>
<td>6 x 1</td>
<td>R 1/4</td>
<td>23</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
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<tr>
<td>EW 6 x 1 - M 10 x 1</td>
<td>100</td>
<td>6 x 1</td>
<td>M 10 x 1</td>
<td>19</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
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<td>EW 8 x 1 - R 1/8</td>
<td>100</td>
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<td>R 1/8</td>
<td>19</td>
<td>23</td>
<td>Polyamide 6; 30% GF*</td>
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<tr>
<td>EW 8 x 1 - R 1/4</td>
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<td>8 x 1</td>
<td>R 1/4</td>
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<td>23</td>
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<tr>
<td>EW 8 x 1 - M 10 x 1</td>
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<td>M 10 x 1</td>
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<tr>
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<td>8 x 1</td>
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</table>

All dimensions in mm. Please refer to the table on Page 163 for further information.

### VT / VTR
Equal T and reducing T compression connectors

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<td>23</td>
<td>23</td>
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<tr>
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<td>6 x 1</td>
<td>23</td>
<td>23</td>
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</table>

All dimensions in mm. Please refer to the table on Page 163 for further information.
VG / VGR
Straight / reducing compression connectors

<table>
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<tr>
<td>VG 8 x 1</td>
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<td>31</td>
<td>17</td>
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<tr>
<td>VGR 8 x 1 - 6 x 1</td>
<td>100</td>
<td>6 x 1</td>
<td>31</td>
<td>17</td>
<td>Polyamide 6; 30% GF*</td>
</tr>
</tbody>
</table>

All dimensions in mm. Please refer to the table on Page 163 for further information.

Assembly Instructions

Pipe size: Outside ø - x wall thickness
Push the cap onto the pipe, push the pipe onto the sleeve up to the stop. Tighten the cap on the buttress thread up to the stop! (If necessary, use commercially available pliers). The cap is also available as piece part.

Before tightening the cap

After tightening the cap

Cap screwed on up to the stop.

Applications

Depending on the material used NORMAPLAST® hose and pipe connectors are the ideal connectors for lines transporting
- Water
- Air
- Oil
- Fuel
For details please refer to the table “Product and Material Properties” on page 142.
NORMA® Application Recommendations

System requirements:
NORMACLAMP® Hose Clamps
NORMACONNECT® Pipe Connections
NORMAFIX® Retaining Products

Spigot and Bead

- Sufficient spigot stability
- Smooth surface
- Shape as round as possible
- No longitudinal grooves
- No mismatch in mould, if possible

The bead

- The higher the bead, the larger will be the pull-off and the assembly forces
- The lower the bead, the lower will be the pull-off and the assembly forces

Mould mismatch

Change angle towards 1
= lower pull-off forces

Change angle towards 2
= higher pull-off forces

Change angle towards 3
with given length of bead b
= easy assembly, low assembly forces, low pull-off forces

Change angle towards 3
with given bead diameter a
= easier assembly, similar assembly force, same pull-off forces

Change angle towards 4
= vice-versa result
NORMA® Application Recommendations

The hose

- The internal hose diameter shall be smaller than the external diameter of the spigot. The smaller the hose diameter relating to a given spigot size, the higher will be the assembly and/or pull-off forces.
- The aim should be to achieve 0.5 mm up to 1.5 mm (relating to the diameter).
- The wall thickness shall be as even as possible
- As round as possible
- Little tendency to material relaxation

- No requirements as to the external diameter tolerances
- No internal longitudinal grooves
- If possible, even distribution of reinforcing fabric within the hose
- The Shore hardness should not be too low in order to prevent hose damage

For the exact tolerances relating to the wall thickness and the internal diameter please refer to the standard DIN 3017 for hose clamps.

System requirements

NORMAQUICK® Quick connectors

The spigot

- The nominal width (NW) must be exactly defined.
- Please make sure you use the spigot (SAE, VDA, NORMA®) recommended by us.

The line system

- We recommend to use NORMAFLEX® fluid lines with NORMAQUICK® S and NORMAQUICK® V2 quick connectors.
- Depending on the type of application both the material and the nominal width of the tubes/hoses and connectors must be selected with great care.

The quick connectors

- Depending on the type of application and the type of spigot different types of NORMAQUICK® quick connectors will be suitable for use.
NORMA® Application Recommendations

Assembly instructions:
NORMACLAMP® Hose Clamps
NORMACONNECT® Pipe Connections
NORMAFIX® Retaining Products

The selected hose clamp will prove its advantages provided that it is correctly fitted, and provided that it is the correct size, the correct material and the suitable application.

Selecting the appropriate clamp

- Consider the clamping diameter, i.e. make sure the clamp fits on the hose.
- Make sure you select the correct band width matching the existing system parameters.
- In terms of the corrosion resistance make sure you select the appropriate material.
- Allow for possible thermal loads.
- Allow for possible mechanical loads.

Note:
The system pressure shall also be taken into account. In this case, however, the clamp must not be considered separately but as part of a system that needs to be perfectly adjusted in order to reach an optimal performance.

The professional assembly

- The clamp should be fitted in the middle of the joint.
- Make sure the clamp is fitted to sit perpendicular to the joint.
- The clamp should be tightened as slowly as possible.
- The recommended screwdriver speed is based on test results and should be observed.
- Exceeding the recommended tightening torque will not result in a proportionately higher pull-off force and/or clamping force of the clamp.
- Exceeding the test torque may cause permanent damage to the clamp and to the system (e.g. failing of the clamp after re-assembly).
- Retightening the connection once, 1 – 5 minutes after the first assembly, may be useful (depending on a possible relaxation of the hose material*).
- As suitable assembly aids water or a mixture of water and alcohol should be used. Lubricants like soap solution, grease etc. are not recommended.
- It should be possible to place the assembly tool onto the clamp in a perpendicular manner.

* Only applicable to NORMACLAMP® TORRO® and NORMACLAMP® GBS

Example: NORMACLAMP® TORRO® fitted perpendicularly on the joint

For safety reasons, a hexagon screwdriver, a flat wrench or one of the special tools offered by us should be preferred.
Assembly instructions:
NORMAQUICK® Quick connectors

NORMAQUICK® quick connectors are “quickfit” and can be assembled without using a tool – it’s fast and easy.

In most cases automatic robot assembly will be possible. The connector is fitted on the spigot in one axial movement. It clicks into place and the system is ready for use.
Technical Terminology

Tightening torque

The tightening torque describes the recommended torque that is applied in order to tighten a worm drive hose clamp. It is largely defined in the DIN 3017 standard and is measured by means of a torque wrench. However, in addition to the clamp design (form fit), the band tension strength (clamping force) must be seen as the determining factor for the tightness of a joint. Its value can only be determined by means of a special measuring equipment. Other measurements, e.g. the pull-off forces and/or the burst pressure for a given joint can only be accepted as additional, comparative methods. Since the band tension strength (clamping force) of a clamp is not directly influenced by the tightening torque, the clamp design needs to be optimised in a way to reduce the distribution of clamping forces at a given tightening torque to the greatest possible extent. Thus we achieve a uniform distribution of clamping forces and a consistent tightness of the joint. At Rasmussen, we are able to measure the band tension forces. The resultant diagrams are used to show how the applied tightening torque is transformed into a certain band tension strength. The efficiency of a clamp can thus be defined by stating the clamping force at a given nominal torque.

If the band tension at a given nominal torque is increased the efficiency of the hose clamp will be increased accordingly!

Band tension strength

The optimal mechanical retaining strength as well as the tightness of a joint (consisting of hose-spigot-clamp) is determined by means of the band tension strength (cf. explanation under “Tightening torque”). Thanks to ongoing development work the design of the NORMACLAMP® TORRO® clamp could be optimised in a way to achieve exceptionally high band tension values.

Failure and deterioration torque

The failure or deterioration torque defines the tightening torque which, if applied, will result in the destruction of a clamp. Like the test torque, this parameter is an indicator for the robustness of a clamp. It is specially important with regard to commercial vehicles since often suitable assembly or dismantling tools will not be at hand in service. Therefore it is imperative that the clamp can resist manually applied tightening torques that are controlled by “intuition”.

If the value defining the failure and/or destructive torque is high the clamp is very robust.

No-load torque

The no-load torque defines the torque which is required for turning the screw without generating any clamping force. If the value is low and deviations are negligible, the handling of the clamp will be easy during assembly.

Test torque

The test torque which is usually approximately 30% above the tightening torque defines the maximum torque which can be applied to a clamp without causing any permanent damage.

If the value indicating the test torque is high the clamp is very robust.
NORMA® Application Recommendations

Technical features

<table>
<thead>
<tr>
<th>Type</th>
<th>In-house product description</th>
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<tbody>
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<td>ø</td>
<td>Clamping range/diameter in mm</td>
</tr>
<tr>
<td>a</td>
<td>Spigot diameter</td>
</tr>
<tr>
<td>b</td>
<td>Thread size</td>
</tr>
<tr>
<td>c</td>
<td>Spigot diameter</td>
</tr>
<tr>
<td>s</td>
<td>Band thickness in mm</td>
</tr>
<tr>
<td>B</td>
<td>Band width in mm</td>
</tr>
<tr>
<td>C</td>
<td>Screw head size</td>
</tr>
<tr>
<td>M</td>
<td>Thread diameter in mm</td>
</tr>
<tr>
<td>NPT</td>
<td>Type of pipe thread, diameter in inch</td>
</tr>
<tr>
<td>R</td>
<td>Type of pipe thread, diameter in inch</td>
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<tr>
<td>ZWL</td>
<td>With two ears</td>
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<tr>
<td>keg</td>
<td>Tapered thread</td>
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Materials

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<tr>
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<td>W2</td>
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<tr>
<td>W3</td>
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<tr>
<td>W4</td>
<td>All parts completely stainless steel 1.4301</td>
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<tr>
<td>W5</td>
<td>Completely stainless steel 1.4401 NORMACLAMP® TORRO® Stainless steel 1.4751 / 1.4401 NORMACLAMP® GBS</td>
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Materials International Standard Designation

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<tr>
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<th>AFNOR NF</th>
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Screw Types

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<th>Isk</th>
<th>Hexagonal socket screw</th>
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<tr>
<td>M</td>
<td>Screw diameter in mm</td>
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<tr>
<td>Sk</td>
<td>Hexagon head screw</td>
</tr>
<tr>
<td>Sz</td>
<td>Hexagon head screw with slot</td>
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<tr>
<td>Zy</td>
<td>Cylinder head screw</td>
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Purchase Order Quantities

<table>
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<td>IC</td>
<td>Industrial carton</td>
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Special Notice

The minimum contract value is € 500.–.

Small orders have to be either increased by us to the minimum contract value of € 500 or to be passed on to the NORMA®-bases for delivery.

For the minimum quantities to be ordered please refer to the packaging quantities (industrial carton) for each product as stated in this catalogue.

As a quality certified company, we guarantee constantly high quality standards.

NORMA® products are manufactured using modern production techniques and high quality materials.

They function as described if used for the purposes specified by us and if our assembly instructions are followed correctly.

If you have any doubts about possible uses and correct assembly, please contact us for advice.

Certified and/or approved in compliance with:
TS 16949
DIN EN ISO 9001
EAQF ■ FORD Q1
DIN EN ISO 14001
The NORMA®-Product Range

- NORMACLAMP®
  = Hose Clamps
- NORMACONNECT®
  = Pipe Connections
- NORMAFIX®
  = Retaining Products
- NORMAQUICK®
  = Quick Connectors
- NORMAFLEX®
  = Fluid Systems
- NORMAPLAST®
  = Plastic Products

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