V-Band and V-Profile Clamps

Your partner for innovative connections
Eliminating Leakages

For many years, commercial, construction/agriculture and passenger vehicle manufacturers needing high-quality and heavy-duty clamping solutions for their challenging applications have relied on V-Band and V-Profile Clamps engineered and manufactured by NORMA Group.

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V-Band Clamps

Both industrial and OEM manufacturers rely on NORMA Group pipe connecting solutions as a safe means of connecting pipes in various applications that feature different materials and sizes. V-Band clamps are reliable and time-efficient connection elements for industrial and automotive use. They are made to customer requirements and can be supplied with various profiles, band widths and closure types. Both industrial and OEM manufacturers rely on NORMA Group pipe connecting solutions as a safe means of connecting pipes in various applications that feature different materials and sizes.

The advantages at a glance
- Quick assembly
- Compact design
- Lightweight
- No loose closure parts
- Wide range of existing profiles

Why choose a V-Band Clamp?
- Expedited assembly/disassembly
- Heavy-duty structural joint possible – excellent rotational resistance
- Extremely low leak joints possible with gaskets
- Generates the large axial loads necessary for compression of gasket material
- Smaller packaging envelope than bolted flanges; easier access to nut head

METHODS OF OPERATION
- Typical joint is comprised of two metal flanges (machined or formed), an optional gasket and a V-Clamp.
- Clamp is secured by tightening one or two fasteners.
- Optimized for extremely tight packaging spaces.
- The torque applied to the clamp translates into Axial and Radial Load.
- Tension in the band generated by tightening of the fastener creates radial force in the clamp.
- Insert angle of the clamp allows radial load to be translated into axial load.
- Axial load is the load that transfers the force to “squeeze the flanges” together. This is the most important load for sealing a joint.
**EXAMPLES OF TYPICAL APPLICATION AREAS**

V-Band clamps are quick-release connecting elements for flanges and represent an economical alternative to conventional bolted flange connections.

**GENERAL PURPOSE (T-BOLT TRUNNION STYLE)**

The general purpose V-Clamp has a captive (non-removable) T-bolt closure. This style of clamp can develop high axial clamping force with high burst pressure capability in diesel exhaust, turbochargers and other industrial applications. This V-Clamp is available with 2, 3 or 4 V-inserts.

**Applications**
- Pumps
- Diesel engines
- EGR systems
- Truck exhaust connections

**Materials:** Corrosion-resistant and specialty steels

**Sizes:** 2" (51 mm) and larger diameters

**Fasteners:** #10, 1/4", 5/16"

**Options:** Plastic knob and T-handle for hand tightening

**LIGHT-DUTY V-INSERT CLAMP**

The Light-Duty Clamp has three V-Inserts welded to a low-cost stainless steel worm gear clamp and offers a choice of hex screw or thumb screw. This low-cost product is designed for low-pressure applications.

**Applications**
- Diesel engines
- Low-pressure applications

**Materials:** Corrosion-resistant steel

**Sizes:** 1.75" – 7" (2" – 5.50"

**Hardware Sizes:** 5/16" Hex Slotted Head Screw

**Options:** Thumb screw for hand tightening

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**Typical Band and V-Insert Material Options**

<table>
<thead>
<tr>
<th>Band Temperature</th>
<th>Band Material Selection</th>
<th>Comments</th>
<th>V-Insert Temperature</th>
<th>V-Insert Material Selection</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 425°C</td>
<td>301SS Standard (1/4 Hard or 1/2 Hard Temper)</td>
<td></td>
<td>Below 425°C</td>
<td>301SS Standard (Annealed)</td>
<td></td>
</tr>
<tr>
<td>304SS Better Corrosion Resistance than 301SS</td>
<td>304SS Lower Cost than Others, Exhaust</td>
<td>441SS Good Corrosion Resistance, Marine, Higher Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>441SS Lower Cost than Others, Exhaust</td>
<td>316SS Good Corrosion Resistance, Marine, Higher Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 425°C and 700°C</td>
<td>316SS Good Corrosion Resistance</td>
<td></td>
<td>Between 425°C and 700°C</td>
<td>316SS Good Corrosion Resistance</td>
<td></td>
</tr>
<tr>
<td>347SS Good Corrosion Resistance, High Cost</td>
<td>347SS Good Corrosion Resistance, High Cost</td>
<td></td>
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</tbody>
</table>

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**Applications**
- Engines
- Turbochargers
- Exhaust connections
- Bulk material container
- Bypass filter units
- Pumps
- EGR systems
**QUICK CONNECT**

Outer band with a latch that allows the clamp to be installed quickly without removing the nut. This clamp develops high axial clamping force and burst capability.

Applications
- Automotive exhaust systems
- Diesel exhaust
- Heavy equipment
- Aftertreatment

- **Materials:** Corrosion-resistant and specialty steels
- **Sizes:** 2.08" (61 mm and 550 mm+)
- **Fasteners:** 1/4" and 5/16"
- **Options:** Plastic knob and T-handle for hand tightening

**DOUBLE HARDWARE (T-BOLT TRUNNION STYLE)**

The double hardware (closure) clamps are ideal for connections with large diameters where two closures provide an improved clamping force distribution. This clamp is selected for ease of installation and hardware directions available. Also features two straight trunnion closures, full cover band or closure loops.

Applications
- Turbochargers for power generation
- Diesel Particulate Filters (DPF)

- **Materials:** Corrosion-resistant and specialty steel
- **Sizes:** 6"+ (200 mm and larger diameters)
- **Fasteners:** 1/4" and 5/16"

**ROLL FORMED**

Continuous V-Retainer and partial outer band, compact profile to fit flanges having limited clearance.

Applications
- Turbochargers

- **Materials:** Corrosion- and heat-resistant steels
- **Fasteners:** 1/4"
- **Sizes:** 3.5" (89 mm) to 12" and larger diameters
- **Options:** Short loop configuration for added clearance, drain holes in V-Retainer upon request
EURO-STYLE

The Euro-Style V-Band Clamp is a reliable and time-efficient connection element for industrial and automotive use. It is made to customer requirements and can be supplied with various profiles, band widths and closure types. With its compact design, lightweight and quick assembly it is a key component to many applications.

Applications
• Engines
• Turbochargers
• Exhaust manifolds
• Bypass filter units
• Pumps
• EGR systems

• Materials: Mild steel, zinc-plated and stainless steel *
  * Marine Grade Austenitic Stainless Steel on request

EURO-STYLE CLAMP OVERVIEW

Single- and Double-Closures

<table>
<thead>
<tr>
<th>Code</th>
<th>Closures</th>
<th>Closure components</th>
<th>Profile segments/ Cover band</th>
</tr>
</thead>
<tbody>
<tr>
<td>STC</td>
<td>M 6 x 50</td>
<td>Stainless steel</td>
<td>1.0 x 20</td>
</tr>
<tr>
<td>QRC</td>
<td>M 8 x 70</td>
<td>Stainless steel</td>
<td>1.5 x 25</td>
</tr>
</tbody>
</table>

* Available on request

Band widths & closure sizes
V-Band clamps are manufactured in two different band widths and with different closures, depending on the profile type concerned:

STC - Straight Trunnion Closure

Advantages:
• Low-friction losses
• High-strength precision-machined components
• Manufactured from consistently high-quality materials
• State-of-the-art automated manufacturing
• Competitively priced

QRC – Quick-Release Closure

Advantages:
• All the advantages of STC-type closures
• Rapid closing and opening
• Captive closure components
• Significantly shorter installation times
• Closure bolt secured during tightening

EURO-STYLE PROFILE TYPES

All profiles can be supplied with a diameter of up to 300 mm, larger diameters are available upon request. Contact NORMA Group to discuss the flange design and profile selection for the optimal project solution. The table below tells you which cover band is suitable for which profile. In the case of special applications, please ask for information on other profile types.
V-Profile Clamps

NORMA V-Profile Clamps use an optimized design that reduces weight and maximizes space. The result is improved fuel consumption and a more flexible use of space around the application.

Methods of Operation

- The profile clamp’s method of operation is based on the principle of an inclined plane.
- When the closure bolt is tightened, this exerts circumferential force on the profile segments.
- The two halves of the flange are pressed together by means of the profile.
- The circumferential force that is exerted is translated into considerably higher axial force.

The advantages at a glance

- Quick assembly
- Compact design
- Lightweight
- Easy handling
- Wide range of existing profiles

Why choose a V-Profile Clamp?

- Easy to handle and provide ease of assembly
- Compact design requires minimal space
- Quick to assemble – only one bolt to tighten to produce a secure joint
- Lightweight, reducing the total weight of the system
V-Profile clamps are quick-assembly connecting devices for flanges that offer an economical alternative to conventional bolted flange joints.

**Applications**
- Exhaust gas systems
- Exhaust gas recirculation (EGR)
- Charged air applications
- Cooling systems
- Filter systems
- Selective catalytic reduction (SCR)
- Turbocharger manifold connections

**Materials:**
- Corrosion- and heat-resistant steel
- Cold-rolled steel and stainless steel

**Sizes:**
- 2-1/8” – 7” (178 mm) or 1.75” (44.5 mm) to 7” (178 mm)

**Fasteners:**
- 1/4” and 5/16”

The Uni-Flex V-Clamp is a cost-effective continuously formed metal band having two 180° V-Retainer zones and an added hinge point for flexibility with a general purpose style closure.

**Applications**
- Air connections
- Exhaust connections

**Materials:**
- Corrosion-resistant and specialty steels
  - 301SS, 304SS, 316SS

**Sizes:**
- 4” (102 mm) to 9” (229 mm) diameter (limited dimensions)

**Fasteners:**
- 1/4”

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**EXAMPLES OF TYPICAL APPLICATION AREAS**

**V-Profile Clamps**
- SCR injector
- Exhaust gas recirculation
- Gasoline turbocharger application

**Material Options**

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<th>VPP Bridge</th>
<th>V2PP</th>
<th>VPP Compact</th>
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<tr>
<td>Band Material Selection</td>
<td>Corrosion- and heat-resistant steel</td>
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<tr>
<td>Band Material Selection</td>
<td>Corrosion-resistant steel</td>
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<tr>
<td>Band Material Selection</td>
<td>Steel, plated steel, corrosion- and heat-resistant steels</td>
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<tr>
<td>Band Material Selection</td>
<td>Corrosion- and heat-resistant steels</td>
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<tr>
<td>Band Material Selection</td>
<td>Austenitic stainless steel (High temperature and high corrosion-resistant) - Available on request</td>
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<td>Band Material Selection</td>
<td>High temperature and highly corrosion-resistant Austenitic stainless steel - Available on request</td>
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**E-SERIES**

The E-Series is a stamped V-Clamp that is a low-cost and economical continuously formed metal band with a flexible hinge point. The spot-weld-free construction enhances corrosion resistance.

**Applications**
- Air connections
- Exhaust connections

**Materials:**
- Corrosion- and heat-resistant steel
  - (Cold-rolled steel and stainless steel)

**Sizes:**
- 2-1/8” – 7” (178 mm) or 1.75” (44.5 mm) to 7” (178 mm)

**Fasteners:**
- 1/4” and 5/16”

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**UNI-FLEX (T-BOLT TRUNNION STYLE)**

The Uni-Flex V-Clamp is a cost-effective continuously formed metal band with two 180° V-Retainer zones and an added hinge point for flexibility with a general purpose style closure.

**Applications**
- Light-duty Turbocharger connections
- Turbo exhaust outlet
- Diesel exhaust connections

**Materials:**
- Corrosion-resistant and specialty steels
  - 301SS, 304SS, 316SS

**Sizes:**
- 4” (102 mm) to 9” (229 mm) diameter (limited dimensions)

**Fasteners:**
- 1/4”
V-CLAMP HALVES

V-Clamp Halves feature two separate V-retainers with two bolts. This creates a more uniform clamping load than a single bolt clamp. The spot-weld-free construction enhances the corrosion resistance. Available options include carriage, hex head or special bolts, captivated nuts.

Applications
- Air brakes, exhaust connections
- Diaphragm pumps

- Materials: Steel, plated steel, corrosion- and heat-resistant steels
- Fasteners: #10, 1/4", 5/16"
- Sizes: 2” (51 mm) to 1/4” (35 mm) diameter
- Tooling: Application specific
- Options: Carriage, hex head or special bolts, captivated nuts

V-COUPLING (ALSO KNOWN AS VPP CHAIN LINK)

The V-Coupling is designed for limited space applications and has two retainers connected with a hinge for ease of installation. The spot-weld-free construction provides enhanced corrosion resistance.

Applications
- Small turbochargers
- Turbocharger turbine housing
- EGR systems
- Exhaust connections

- Materials: Corrosion- and heat-resistant steels
- Sizes: Diameter range 2” – 7”
- Fasteners: M6

VPP STANDARD

The VPP profile clamps are reliable and time-efficient connection elements.

Applications
- Turbocharger
- Hot end and cold end joints
- EGR, SCR injector and sensor joints

- Internal profile diameters available:
  Diameter 20 – 180 mm (other diameters upon request)

VPP BRIDGE

The VPP bridge clamps offer a connection solution to applications exposed to high temperatures. A typical application is gasoline turbocharger connections.

Applications
- Turbo-gasoline engine manifold, turbocharger and catalyst joints
- High temperature diesel engine manifold and turbocharger joints

- Internal profile diameters available:
  Diameter 69–138 mm (other diameters upon request)
V2PP – TWO-PIECE PROFILE CLAMP

The V2PP two-piece profile clamps enable fast and easy pre-assembly by using only two fingers. The special design is based on a spring element and a hook in the bottom of the clamp, in combination with a pre-assembled bolt.

Applications
• Turbocharger
• Hot end and cold end joints
• EGR, SCR injector and sensor joints

• Internal profile diameters available:
  Diameter 31 mm and 98 mm
  (other diameters upon request)

VPP COMPACT

The VPP compact profile clamps are reliable and time-efficient connection elements.

Applications
• Turbocharger
• Hot end and cold end joints
• EGR, SCR injector and sensor joints

• Internal profile diameters available:
  Diameter 50–98 mm
  (other diameters upon request)
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