



**VECTOR**  
Techlok® clamp connector





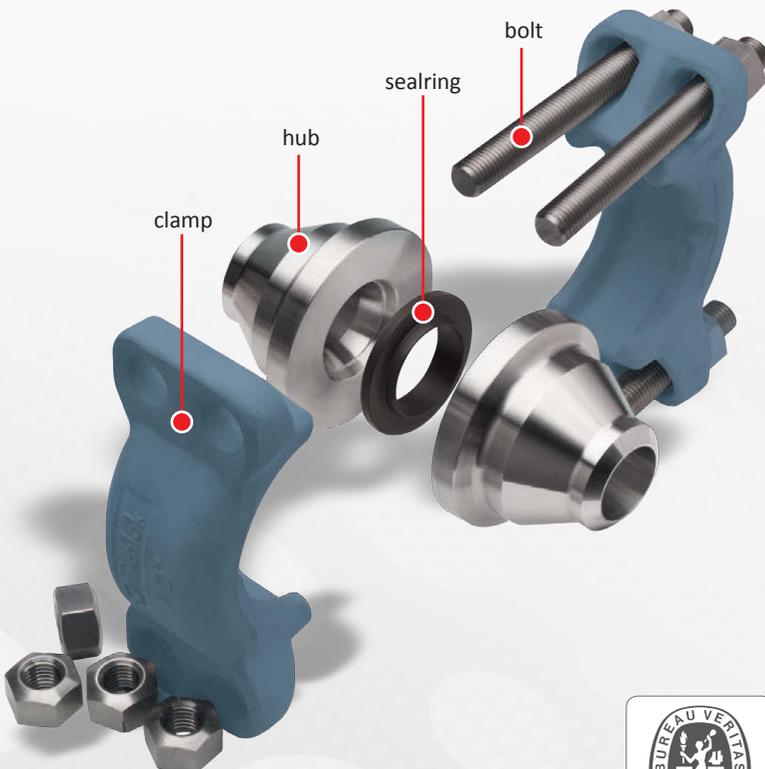
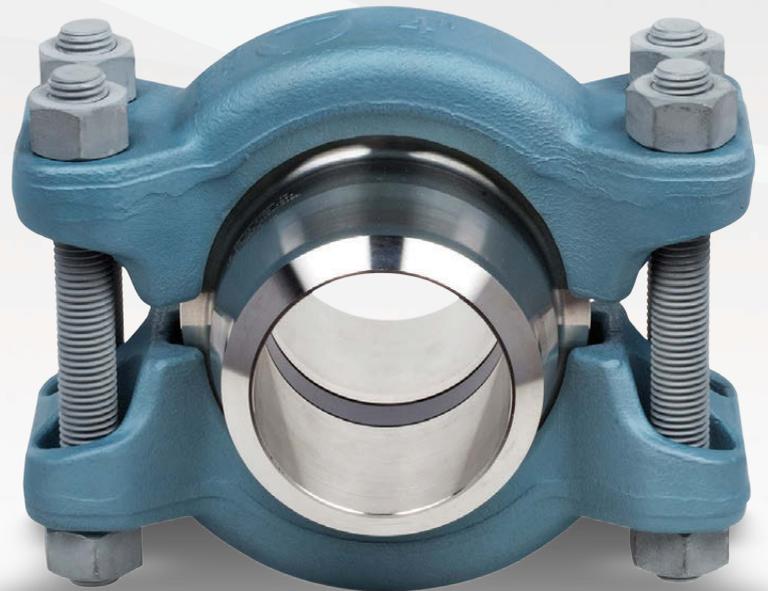
## Vector Techlok® Clamp Connector

A radially-bolted mechanical pipe connection which allows quick make-up and break-out and is ideal where space, weight and joint integrity are critical requirements.

Vector Techlok® clamp connectors are one of the most effective and economical pipe connection systems available today. Typically, several Vector Techlok® joints can be installed in the time it takes to assemble a single standard ANSI or API flange. Conventional flanges are assembled with up to 24 bolts (with a greater bolt torque) compared to the 4 bolts with the Techlok® connector.

External loadings are an inevitable part of any piping system, resulting in high stresses being placed on pipe joints. Independent strain gauges and destructive tests have shown the Vector Techlok® connector can withstand considerable bending moments and axial forces under pressure without leaking or the bolts becoming loose, greatly reducing maintenance costs at the same time as being highly beneficial to the environment.

High pressure systems are not a problem, with Vector Techlok® connectors working in applications where pressures up to 60,000psi are found. For offshore applications, where topside loading is critical, Techlok's low weight is a significant advantage, a factor applicable in any industry where weight and overall installation cost is a consideration.



### Fast track deliveries

**hotshots**

Freudenberg Oil & Gas Technologies (FO&GT) has a modern manufacturing facility located close to the main motorway system and capable of machining components of up to 60" diameter. The company has in-house coating facilities capable of applying a wide array of coating and paint systems and its own NDE facilities allowing most surface and volumetric NDE to be performed.

Additionally, the company maintains a full range of stock materials from carbon steel through to nickel alloys and has an established supply chain that can manufacture and supply materials at short notice. These factors enable FO&GT to maintain an exemplary record of supplying major operators with components on a HotShot basis.



## Many advantages over conventional flanges

As well as high performance, leak-free, competitive price and greater efficiency Vector Techlok® connectors have many other advantages over conventional flanges:

- **Pressure Temperature tables**

Full sets of pressure-temperature tables are available for all sizes and materials. Tables are based in ASME VIII Div. 2 and ASME B31.3. ASME VIII Div.1 calculations can be provided on request.

- **360° rotation**

The clamp can be rotated around the hub for easy bolt orientation and tightening.

- **Less bolting, no alignment**

Only 4 bolts to tighten rather than up to 24 on a conventional flange, with no bolt holes to align.

- **Lower bolt torque**

Typically 50% lower than that for a ring joint flange. Sealing integrity is also unaffected by over-tensioning bolts.

- **Lighter**

Up to 75% lighter than a comparable ANSI or API flange, with greater weight savings achievable in high pressure applications.

- **Smaller**

Close piping and hook-up arrangements are simplified with typical clamp diameters 25% smaller than the flanged equivalent and 40% shorter connection lengths.

- **Leak free : reduce emissions**

A proven track record of gas tight leak free operation when correctly installed. The pressure energized bore seal withstands temperature and load variations, which ultimately can cause conventional flanges to leak.

- **Reusable sealrings**

Unlike spiral wound and RTJ gaskets, reusable sealrings give greater flexibility for hydro-testing and commissioning prior to service.

- **Support / Interface with 3rd party equipment**

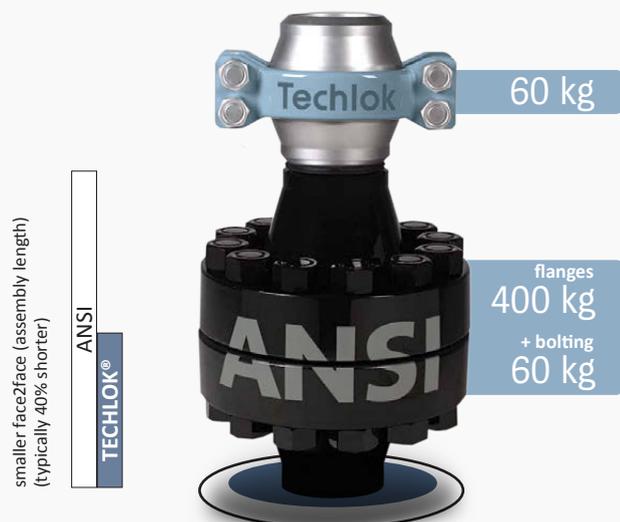
Machining details and support for interface with associated equipment such as valves, pumps and metering equipment can be prepared on request. Ancillary components such as valves and piping layouts can be installed without worrying about bolt hole alignment.

- **Safe and easy installation**

Clamp connectors are typically smaller and lighter in weight than an equivalent rating ANSI flange; this makes them both safer and easier to manoeuvre on site during installation. Additionally the Easilift system has been designed to assist in the assembly of Vector Techlok® blind hub connections.

- **Minimize maintenance downtime**

Quicker and easier make-up and breakout. Where many connections are being assembled or disassembled the unique twintork tool is available for purchase or hire, allowing simultaneous torquing of adjacent bolts.



**SAVE WEIGHT** 6" 2500# comparison (assembly weight)



**SAVE SIZE** compact Vector Techlok® design for choke and kill manifold system

## Proven performance in a variety of industries



- topside & processing
- industrial & power
- subsea & marine

## Product Support

- Dimensional inspection at customer's locations (onshore, offshore and worldwide) or at our premises.
- Assistance on-site ensuring trouble free commissioning.
- On-site inspection and evaluation of damaged connectors, with detailed repair options.
- Manage the most appropriate repair scheme for damaged flanges and connectors, minimizing cost and downtime.



## Vector Techlok® product training

The Vector Techlok® training course covers Introduction, Handling & Protection, Assembly/Disassembly, Operator Safety, Bolting and Damage assessment. Additional components can be addressed, as specified by the client.



## Product supervising

Freudenberg Oil & Gas Technologies Product Support personnel are available at any stage through construction and commissioning to conduct site surveys to promote operator awareness.

Typically the following phases of a project are recognized as key areas for consideration:

- Storage and Preservation: reinforcement of simple best practice to maintain products in a good condition.
- Fabrication: site awareness relating to pipe preparation, welding and heat treatment of Vector Techlok® connectors.
- Shot blast and Coating: protection of product and avoiding contamination of critical surfaces.
- Assembly: site review of assembly methods and equipment.



## other available documentation

electronic versions of our documentation can be found online.

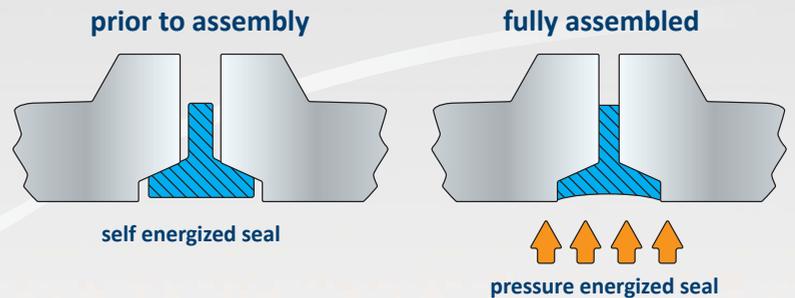
- Product Flyers : stay informed about our latest product developments and applications
- Technical brochures : dimensional data and pressure temperature tables
- Pocket Assembly-Disassembly guide : assembly & disassembly instructions in a handy pocket format



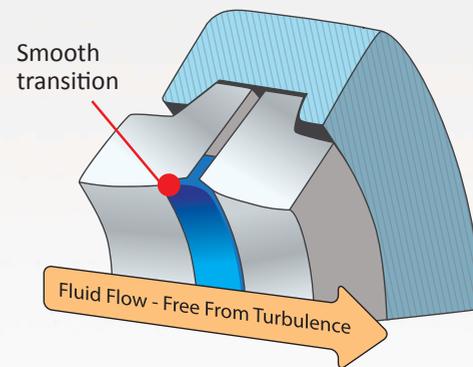
## Vector Techlok® Clamp Connector - how it works

### The heart of the Vector Techlok® Connector - the metal-to-metal sealing

The heart of Techlok's success is the pressure energized seal. Vector Techlok® clamp connectors do not rely on the conventional flange gaskets and correctly tensioned bolts to maintain the integrity of the seal. The four basic elements of the Vector Techlok® clamp connector are hubs, sealing, clamps and bolting. When bolting the assembly, the hubs are drawn together by the twin wedge action of the two clamp segments compressing on the sealing to make the first-stage self-energizing seal.



In service the sealing becomes even more effective as internal pressure reinforces the metal-to-metal seal to the extent that its strength can normally exceed the burst pressure of the connected pipe. The applied bolting loads are transmitted to the clamps through almost 360° contact with the hubs. As the bolts are transversely mounted they are almost completely isolated from the operating loads, resulting in a strong, reliable yet compact connection.



## Assured joint integrity

### Type approval testing

The Techlok® range of connectors has been subjected to extensive strain gauge and destructive testing under independent conditions, both in-house and at recognized test centers. Following combined pressure and external load type testing, full type approval has been awarded by Bureau Veritas.

### External bending forces

Both bending and axial force have no impact on the pressure energization of the Vector Techlok® metal-to-metal seal, in contrast with conventional flange connections.

### Design Codes and Regulations

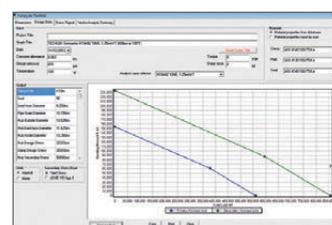
Freudenberg Oil & Gas Technologies are able to design clamp connections in compliance with a range of international codes and standards including ASME B31.3, ASME VIII Div 2 part 5, PD5500, PED, Norsok, as well as to any special customer requirements.

### Vector Analysis proprietary software



Vector Analysis is a proprietary software program used for quickly selecting and calculating reliable performance data for the Vector Techlok® clamp connector. Available to those design and piping engineers regularly working with, and specifying the Techlok® product.

Vector Analysis allows the user to quickly select the full range of Vector Techlok® components compatible with general piping requirements. The data can be saved and manipulated to fit with piping specifications, prior to calculating load performance charts for each size of connector.



### Locations - Vector Products :

Australia (Perth)	+61 8 9324 3880
Brazil (Rio De Janeiro)	+55 21 3544 0030
Malaysia (Kuala Lumpur)	+603 8723 3689
Norway (Drammen)	+47 32 20 93 00
UK (Aberdeen)	+44 1224 775 242
UK (Port Talbot)	+44 1639 822 555
USA (Houston)	+1 713 979 4444

*please consult our website for a more complete contact list.*



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#### Dynamic Product Search "find it the easy way" :

A unique quick way to search for dimensional and weight data.

#### PDF versions of our latest brochures and flyers :

Download electronic printable versions of : additional product flyers, dimension and weight tables, pressure & temperature ratings, assembly & disassembly procedures, designers manual, certificates,...and lots of other documentation.

V003-01-2014



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