Vector Flangelok® connector

Smaller, more reliable alternative to conventional flanges

A bolted flange with a Vector Techlok® sealring

Vector Flangelok® has been developed to offer a smaller, more reliable and higher integrity alternative to conventional flanges. Developed as a derivative of the well established Vector Techlok® product range, Flangelok® employs the same proven, pressure energized Vector Techlok® sealing. When sized to match the pipe bore, Flangelok® allows for a much more compact and/or high performance flange to be engineered. This concept has now been realized as a defined product range for existing ASME pressure classes which provides for significant weight and space reduction without sacrificing external load capacity or code compliance.

Vector Flangelok® is a versatile product with several flange configurations to suit application needs, together with a host of variants of the Techlok® sealring to fulfill all aspects of oilfield and petrochemical operations.

Vector Flangelok® is smaller and easier to handle in confined spaces, utilizing smaller bolting and tightened with standard tooling. This will contribute to significant savings, particularly where exotic materials are specified. Flangelok® is available in sizes 1” to 24” and ASME pressure classes 600lb to 2500lb (larger or bespoke sizes available on request); API 5K and 10K equivalent rated Flangeloks are derived from the 1500lb and 2500lb dimensions respectively.

NASA gas storage facility - Vector Flangelok® manways

- Designed to accept commercially available bolt tensioners (check compatibility with your supplier).
- Proven Seal Technology: Unique sealing system using the well-proven Vector Techlok® sealing for maximum high pressure and high temperature reliability.
- Greatly reduced size over standard API and ANSI flanges of the same rating giving substantial weight and space reductions.

Vector Flangelok® WN Flange 1500lb 6”

- Weight: 181 kg

ANSI WN Flange 1500lb 6”

- Weight: 52.5 kg

- Shorter, lighter, more compact joint assembly makes handling easier.
- Smooth bore profile ensures maximum flow.
- Vector Flangelok® is also available with many seal options for process and metering applications
- Variety of “face-to-face” configurations to suit piping design and operational preferences
- Utilises standard bolts for straightforward speedy bolting procedures. Smaller bolts require reduced assembly torque.
“Every Action has an equal and opposite reaction” - Newton's third law

The diagram (right) shows the forces reacting at the bolt and flange faces under applied bending moment. The reaction force at the flange face must equal the total reaction force at the bolt face, resulting in very high localized contact forces between the flanges. For Vector Flangelok®, this reaction at the flange face is harmless metal-to-metal contact between flanges (or the Vector Techlok® sealing rib), whereas with conventional flanges the reaction serves to locally crush the gasket on the compression side of the joint and cyclic bending will ultimately deteriorate the gasket seal.

**Design codes**
- ASME III, VIII
- ANSI
- API
- BS 5500
- UK Offshore regulations
- Country codes

*Products can also be supplied to meet client’s specific requirements.*

**Vector Flangelok® facing options**

**TYPE 1 : Fully Recessed seat (standard)**
- Features:
  - Full face-to-face contact
  - External contact reduces water ingress
  - High bending capacity
  - Most rigid option
  - Over torque on bolts will not distort flange

**TYPE 2 : Semi Recessed seat**
- Features:
  - Gap available for flange spreading

**TYPE 2 : Non Recessed seat**
- Features:
  - Gap available for flange spreading
  - Sealing visibility
  - Flange separation reduced for disassembly
  - Can fit sealing identification flags if necessary

Small, more reliable alternative to conventional flanges
Benefits

- **Superior Sealing Technology**
  Vector Techlok® sealings are completely confined between the flange sections, and each seal pocket has protective shoulders eliminating fluid impingement. The sealring cannot be damaged by over-tightening bolts; excessive bolt force is reacted at the sealring rib, or flange faces.

- **High integrity**
  Conventional flanges to BS, DIN, ANSI and API standards have low leakage reliability when compared to girth welded pipes. Vector Flangelok® proven high leak integrity means that they not only reduce direct costs caused by leakage, but also reduce environmental impact. Flangelok® flanges are also specified and in use in piping and risers where girth welded pipes would otherwise be the preferred solution.

- **Streamline Bore**
  A streamline bore seat which facilitates a smooth flow throughout the joint. This arrangement makes the flange correspondingly resistant to erosion damage.

- **Reusable sealings**
  Unlike spiral wound gaskets, reusable sealings give greater flexibility for hydro-testing and commissioning prior to service.

- **API compliance**
  The Vector Flangelok® design principles will allow for API design criteria to be satisfied for flanges manufactured from material conforming to API (i.e. 60k materials such as AISI 4130, Duplex and Superduplex grades). Flangelok® flanges will not allow for dimensional inter-changeability with API Flanges, but will provide reduced weight and size for the equivalent pressure ratings.

- **Weld Overlay**
  Vector Flangelok® can be provided with weld overlay in the seat pocket or full weld cladding on all wetted surfaces. Normally weld overlay is provided in Alloy 625; however, other weld materials are also available. Weld overlay Flangelok® provide an excellent means of utilizing carbon steel flanges in potentially corrosive applications.

- **Facing options (see figures opposite page)**
  Vector Flangelok® is available with three facing options:
  - Type 1: Fully-recessed
  - Type 2: Semi-recessed
  - Type 3: Non-recessed

- **Standard bolt grades**
  B7, B16, L7, L7M, B7M and B8.
  Bolts can be tightened using conventional torque or tension tools. A minimum bolt stress of 37500psi (259MPa) is recommended, enabling clients to simplify their bolting procedures by establishing standard methods for each size of bolt.

- **Reduced weight and size**
  Vector Flangelok® flanges are smaller in diameter than conventional flanges, making it possible to construct even closer pipe runs with smaller openings for pipe access, and easier reeling, trenching or burial. They also offer significant weight reductions over conventional flanges, with typical savings in the order of 65-70%.

- **Third party interfacing equipment**
  Readily available machining details and support for interface with associated equipment such as valves, pumps and metering equipment.

- **Solid models can be provided for CAD layouts**
Sealring types

Vector Techlok® Sealing
The standard Vector Techlok® sealing offers assured joint integrity first time, every time. Reduced gasket forces and seal diameter maximize the load capacity of the components and the time-proven pressure energized bore seal gives a high integrity gas-tight metal-to-metal seal. All Techlok® sealings meet NACE hardness requirements.

Transition sealring
Transition sealings are available to seal two different seat sizes. Normally this may accommodate pipe specification breaks of the same nominal size, i.e. 6in46 hub matching a 6in52 hub would require a 46/52 transition ring. Only certain sizes are stocked.

D-Seal compatibility
All Vector Techlok® clamps are compatible with D-seal hub connectors. D-seals are available in all sizes and are incorporated into Vector Analysis software for full load evaluation. D-seals provide an optional low profile sealing system within the standard Techlok® hub geometry providing full face to face contact between hubs. D-seal connectors provide slightly higher load capacities and are compatible with other existing designs. Full Pressure-Temperature tables are available for the Vector Techlok® D-seal connector range.

Blind sealings
Blind sealings are an effective means of blocking off pipe runs and can normally take full line pressure. Vector Techlok® blind sealings are typically used as an auxiliary pressure isolation device, rather than a permanent installation. Blind sealings are not suitable for cyclic pressure.

Strainer/Acoustic sealing
Strainer and acoustic sealings are custom Vector Techlok® sealings, designed and manufactured to the client’s specifications. During start up phases these can be used to protect high value equipment such as valves, pumps and compressors. Strainer and Acoustic sealing can be manufactured from any traditional material associated with the Vector Techlok® sealing.

Reverse Integrity Testing (RIT) rings
Freudenberg Oil & Gas Technologies has developed a means of testing any connector using a Vector Techlok® metal sealing in-situ, either prior to, or in place of, a line leak test which saves time and ensures seal integrity. There are two variations of this product, firstly a modified standard Techlok® ring and secondly, an alternative design for those sealings sizes that cannot be modified. Both designs are available with or without an integral test pipe. The Vector Techlok® RIT-ring with integral test pipe can be “retro-fitted” to existing equipment, whilst RIT-rings without a test pipe are used in hubs/flanges with pre-drilled test ports and joints using recessed seat pockets.