

# VECTOR OPTIMA® SUBSEA CONNECTOR







## **VECTOR OPTIMA® SUBSEA CONNECTOR**

Metal-to-metal sealing connector with enhanced misalignment capability, allowing quick ROV flowline connection, reducing initial CAPEX and installation OPEX

Vector Optima<sup>®</sup> has been developed in collaboration with some of the industry's major operators. By taking into account the Clients need for operational simplicity, Vector Optima<sup>®</sup> has been developed with minimal parts and complexity. This ensures clamp connector makeup times are kept to a minimum.

Innovation is at the very heart of the Vector Optima<sup>®</sup> connector. It is capable of engaging a hub with an angular misalignment of up to 5° or an axial misalignment of 50mm — whichever is the lesser.

Its revolutionary Vector Duoseal<sup>™</sup> technology provides a pressure energized inner seal to seal the pipe medium AND a second pressure energized outer seal to seal against sea water. An annulus test port is readily accessible by ROV to confirm seal integrity as well as providing a detection method for leakage throughout the connector's lifetime. The hubs protect the seal ring from accidental damage during installation whilst both the mass and space envelope are kept to a minimum, ensuring the Vector Optima<sup>®</sup> subsea connector is both efficient and compact.





## FIRST TIME, EVERY TIME RELIABILITY

Engineered for the most demanding deep and ultra deep sea applications, Vector Optima<sup>®</sup> provides first time, every time reliability and has a minimum impact on interfacing equipment. Its single lead screw provides predictable operational times and allows operators a quick disconnect system.

Type Approved by Bureau Veritas and manufactured in accordance with BS EN ISO 9001 Quality Assurance Accreditation Programme, the Vector Optima<sup>®</sup> connector has a typical minimum design life of 25 years.

The Optima<sup>®</sup> provides the perfect remote connection for a broad range of subsea applications including tree and manifold connections, flowline jumper installations, retrievable choke valve connections and pipeline tie in and repair.





## SIMPLE AND EFFICIENT DESIGN

The most efficient, user-friendly deep and ultra-deep sea connector available in today's market

- Developed in close collaboration with some of the industry's major operators
- Proven Technology, in use in the North Sea since 2000
- Simple and efficient design reduces initial cost and installation time
- Engineered for remote operation without special installation tooling
- Unique angular and radial alignment capacity male/female hub profiles ensure accurate alignment during assembly
- Vector Duoseal<sup>™</sup> technology double pressure energized metal-to-metal sealing to prevent internal or external leakage

- Rapid deployment 3-piece clamp c/w single leadscrew
- Greater operational efficiency
- Corrosion resistant alloy weld overlaid seats for extended subsea life (standard supply)
- Annular backseal test capability qualifies joint at point of assembly
- Hubs available in a wide range of material grades
- Fully FAT tested all components of the Vector Optima<sup>®</sup> connector are fully FAT tested







## **VECTOR OPTIMA® TOOLING**

- Standard ROV actuation (picture 1)
- Hydraulic drive actuation (picture 2)
- Hydraulic ram actuation
- Sealring removal tools
- Sealface cleaning tools
- Hot stab systems
- Soft land and pull-in systems
- Horizontal and vertical installation tooling
- Drive plug



picture 1



## ENGINEERING SERVICES

#### **Design Engineering**

- FEA, inhouse assessments to recognized codes
- Full 3D CAD (solidworks) & CAM

#### **Interface Engineering**

- Equipment & ROV interfacing
- 3D models exported to client's requirements
- Prototype testing
- Rapid prototyping

#### **Offshore / Site Assistance**

Qualified / experienced engineer support

## **OTHER AVAILABLE DOCUMENTATION**

- Product Flyers: stay informed about our latest product developments and applications
- Technical documentation

Electronic versions of our documentation can be found online.

## VECTOR OPTIMA® ACCESSORIES

- Pull-in plugs (for subsea riser pull-in operation)
- Pull-in heads
- Pressure test caps
- Static clamps



Dual Bore Vector Optima® system

#### Manufacturing

- Wide range of manufacturing facilities to suit client requirements
- Special forged products, blocks, tees, hooks, anchor flanges, stress joints etc.

#### **Codes & Standards**

- ASME VIII Div 1 Appendix 24
- ASME VIII Div 2 Appendix 4
- ASME IX
- ASME / ANSI B16.5
- NACE MR-0175
- API 6A as appropriate



Vector Optima® full scale pressure and bending test



### **INCREASED EFFICIENCY**

#### From installation to removal

- Standard API 17D & special ROV interfacing
- Simple & efficient design
- Quick connect / disconnect
- External load capability and pull-in capacity
- Visual confirmation when open or closed
- Duoseal<sup>™</sup> sealring retained within male hub: ROV removable
- Bi-directional seal + backseal integrity test
- Optima<sup>®</sup> clamp can be rotated around hub: easy ROV access
- Available in sizes from 2" 36" NPS
- Qualified up to 15,000psi
- Qualification tested to 13,125ft (4,000m) water depth (temp. range –50°C up to +150°C)
- Available in all material specifications for subsea service

#### HUB MISALIGNMENT CAPABILITY

- Angular misalignment up to 5° or 50mm axial hub separation
- Male-female configuration controls misalignment
- Accurate radial misalignment provided by male-female hub
- Radiused profile of male hub prevents binding during makeup
- Angular and radial misalignment controlled to prevent any damage to sealing surfaces during makeup





## The ONLY dual-acting metal-to-metal seal in the subsea connector world!

The advanced Vector Duoseal<sup>™</sup> system is both effective and highly flexible. The seal ring can be installed, removed and replaced remotely. An external test port also allows for a Reverse Integrity Test to be conducted. The complete connector is removable from the hubs by ROV and there is also an allowance for a contingency seal option to be deployed in case of failure or seat damage. Duoseals have been qualified delivered for 15,000psi applications up to 34" inside diameter.



Alignment controlled in 3 stages		
STAGE 1	Coarse alignment provided by pull-in system	
STAGE 2	Mid-range alignment provided by integral guide funnel (or similar)	
STAGE 3	Fine alignment provided by male/female hub system	







## UNITED STATES UNITED KINGDOM UNITED ARAB EMIRATES

CANADA MALAYSIA

## NORWAY SINGAPORE

#### VECTOR

PRODUCT LOCATIONS

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