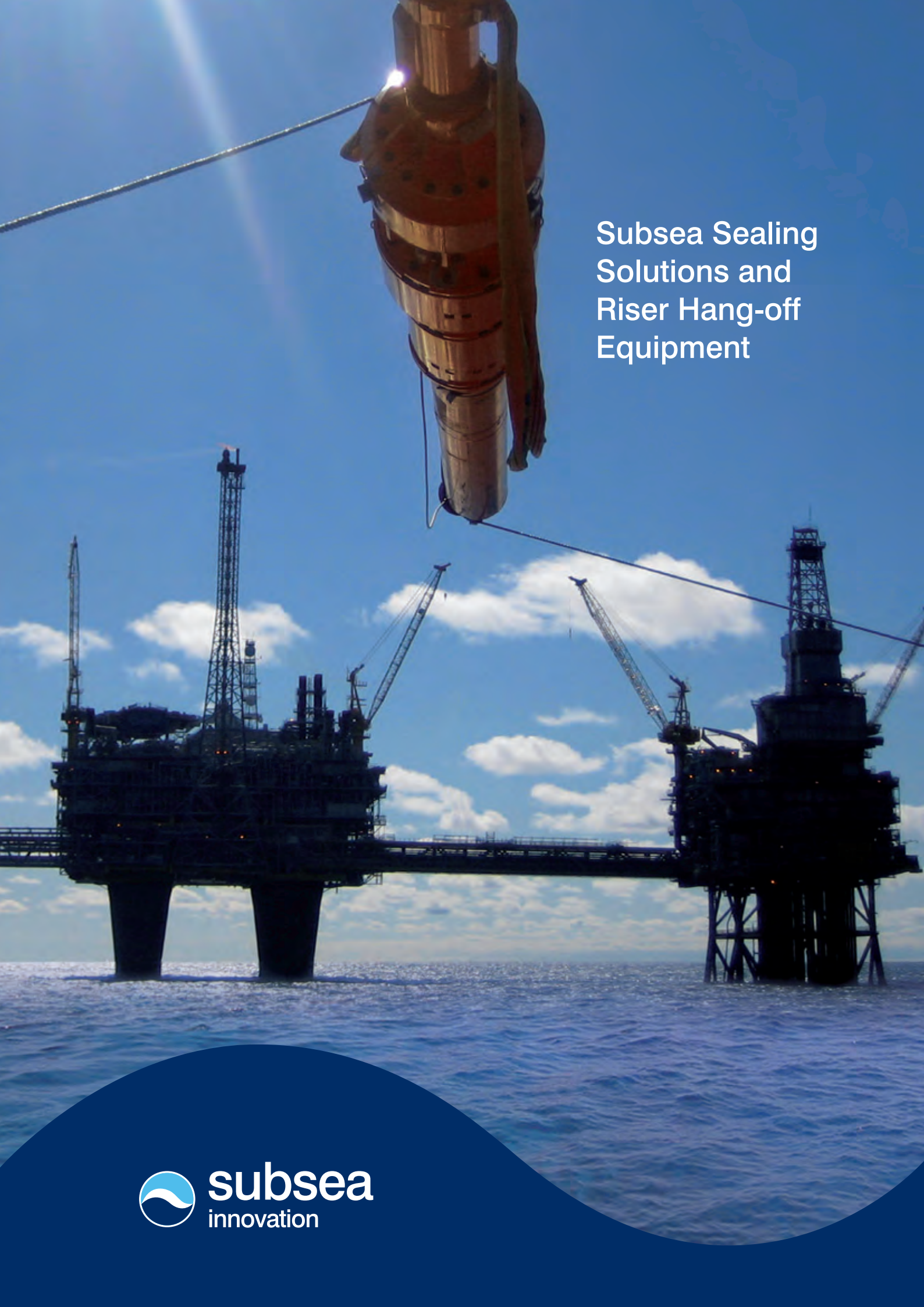
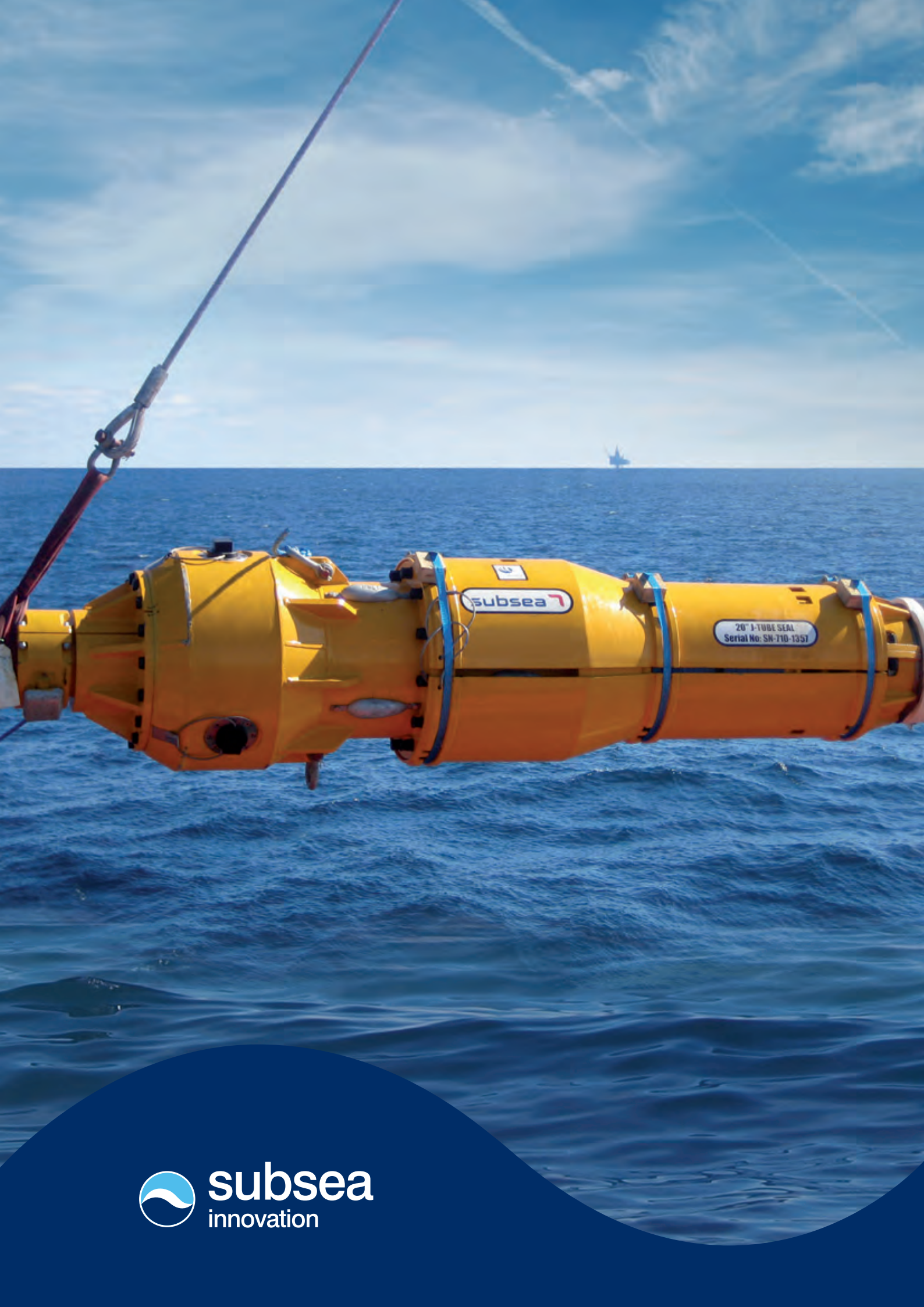


Subsea Sealing Solutions and Riser Hang-off Equipment

subsea innovation



subsea
innovation

Subsea Sealing Solutions and Riser Hang-off Equipment

With over 25 years industry experience, Subsea Innovation designs and manufactures an extensive range of standard and bespoke subsea sealing solutions to suit clients' specific project requirements.

All design work is performed in-house by our team of engineers using Autodesk Inventor.

Subsea Innovation manufactures elastomeric seals to exacting standards of quality and precision. Sealing solutions can be provided for applications with operating temperatures between -40°C to +180°C using elastomeric seals. Higher temperatures can be accommodated using graphite seals.

Subsea Innovation seals are also designed and tested to operate in pressures between 0 and 500 bar.g.

Seal activation methods can vary from an active design which incorporates a self sealing principle (which requires no external activation force) to mechanical or hydraulic methods.

Subsea Innovation supplies an extensive range of sealing options which can be fitted with ROV torque tool receptacles or alternatively ROV hot stabs and receptacles for hydraulic activation.

Examples of typical sealing solutions are -

- ROV activated j-tube seals
- Passive j-tube seals
- Diver installed j-tube seals
- Waterstop seals
- Topside riser hang-off equipment

With in-house control of design, component manufacture and assembly, Subsea Innovation is able to tailor seals to individual project requirements or provides a specialist bespoke service for one-off designs.

Riser Hang-off Equipment

The purpose of a riser hang-off system is to provide a structural support between the riser or umbilical and the outer j-tube.

Systems can also be supplied with a seal module that provides full sealing capability in the annulus between the riser and the j-tube.

The clamp module is fitted with the Tekgrip® high integrity collet system. The collets are energised using a low activation torque and then become self-energising.

The hang-off assembly is fitted with a continuous housing that is pre-installed prior to riser pull-in. Once the pull-in is complete Subsea Innovation service engineers perform the final assembly of the unit. It is essential to perform a seal verification test prior to leaving the worksite.

Designs are subjected to third party verification and a factory acceptance test that verifies both load holding and sealing capability in a test rig that simulates offshore conditions.

Technical Specification

- Riser sizes: 2” NS up to 20” NS or to suit client requirements
- J-tube sizes: 8” NS up to 40” NS or to suit clients requirements
- Axial loads: 0 to 1,500 kN
- Sealing pressures: 0 to 200 bar.g
- Design temperature: -20 to +100°C
- System coating: Norsok M501 system no: 7

Passive J-Tube Seals

The Tekseal® ROV passive j-tube seal provides a lower cost alternative to the ROV activated j-tube seal. The purpose of this seal is to provide a permanent seal between an existing j-tube and the newly installed riser/umbilical/cable to provide an annulus which can be treated with corrosion inhibitor and maintain an over pressure.

The seal assembly is pre-installed onto the riser/umbilical on the vessel. This assembly comprises of a series of high integrity elastomeric sealing elements which seal against the inside of the bellmouth and the outside of the riser/umbilical.

The disadvantage of this system over the ROV activated seal is that a re-intervention cannot be performed. Should any unforeseen problem arise and a leak occurs, the system cannot be reactivated to achieve a seal.

All Tekseal® assemblies are designed in-house and subjected to a factory acceptance test at Subsea Innovation to a client approved procedure. This test is performed on Subsea Innovation’s j-tube seal simulator. A full representation of the bellmouth and riser/umbilical is manufactured and pull in tests and activation pressures reproduced.

Technical Specification

- Riser/umbilical diameters: 2” to 36”
- Bellmouths: 4” to 48”
- Test pressures: 0 to 10 bar.g
- Seal material: Tekthane
- Activation: automatic during riser pull in
- Installation onto riser: topside
- Installation into bellmouth: automatic during riser pull-in

subsea innovation

Diver Installed J-Tube Seals

The Tekseal® diver installed j-tube seal provides an alternative method of installation into the j-tube. The purpose of this seal is to provide a permanent seal between an existing j-tube and the newly installed riser/umbilical/cable to provide an annulus which can be treated with corrosion inhibitor and maintain an over pressure. This assembly is installed after the riser/umbilical has been pulled into the j-tube.

This assembly comprises of a series of high integrity elastomeric sealing elements which seal against the inside of the bellmouth and the outside of the riser/umbilical. Once the seal is fitted into the j-tube the riser/umbilical is centralised and the final sealing segment is installed. Seal activation and integrity verification test is performed by the diver using equipment supplied by Subsea Innovation.

The seal assembly is fitted with cathodic protection which is designed for the operating lifetime of the assembly.

All Tekseal® assemblies are designed in-house and subjected to a factory acceptance test at Subsea Innovation to a client approved procedure. This test is performed on Subsea Innovation's j-tube seal simulator. A full representation of the bellmouth and riser/umbilical is manufactured and pull in tests and activation pressures reproduced.

Technical Specification

- Riser/umbilical diameters: 2" to 36"
- Bellmouths: 4" to 48"
- Test pressures: 0 to 10 bar.g
- Seal material: Tekthane
- Activation: diver
- Installation onto riser: post installation
- installation into bellmouth: post riser pull-in

ROV Activated J-Tube Seals

The Tekseal® ROV installed j-tube seal provides a field proven solution for providing a permanent seal between an existing j-tube and the newly installed riser/umbilical/cable to provide an annulus which can be treated with corrosion inhibitor and maintain an over pressure.

Subsea Innovation has installed over 40 j-tube seal assemblies worldwide.

The seal assembly is pre-installed onto the riser/umbilical on the vessel by Subsea Innovation service engineers. Hydraulic verification checks are performed pre-dive to ensure successful activation. A heavy duty protection cover is fitted onto the elastomeric seals to give protection to the seal as it is deployed from the vessel.

The pull-in operation pauses just prior to installing the seal into the j-tube and the ROV removes the protection cover.

Following seal installation and riser/umbilical lay down, the seal assembly is activated. This can be achieved from the topside by a downline system which integrates via an ROV dual hotstab or alternatively by hydraulic power from the ROV itself. Once activated the hydraulic medium is removed and the seal remains activated via Subsea Innovation specifically designed mechanical locking nuts.

Using the same activation system a seal verification test is then performed. This test pressurises between the two elastomeric seals to ensure a successful seal has been achieved.

The advantage of this system is that a re-intervention can be performed on the hydraulics should a leak be evident. With other passive systems this is not possible.

The seal assembly is fitted with cathodic protection which is designed for the operating lifetime of the assembly.

All Tekseal® assemblies are designed in house and subjected to a factory acceptance test at Subsea Innovation to a client approved procedure. This test is performed on Subsea Innovation's j-tube seal simulator. A full representation of the bellmouth and riser/umbilical is manufactured and pull in tests and activation pressures reproduced.

Technical Specification

- Riser/umbilical diameters: 2" to 36"
- Bellmouths: 4" to 48"
- Test pressures: 0 to 20 bar.g
- Seal material: Tekthane
- Activation: hydraulic after riser pull-in
- Installation onto riser: topside
- Installation into bellmouth: automatic during riser pull-in

Project and Risk Management

As a leading supplier of equipment and services to the international offshore energy and subsea sectors, Subsea Innovation is committed to providing systems which comply with highest levels of quality management standards.

Management system standard: BS-EN-ISO 9001:2008
Accredited by Det Norske Veritas
Certificate number: 09840-2006-AQ-LDN-UKAS

Subsea Innovation Project Management is carried to the international standard of DNV ISO 9001.

A fully dedicated project leader manages the design and manufacture of each project from initial acceptance through to final system deployment. Generally the process requires a biweekly sign off with Subsea Innovation providing relevant electronic reports.

Project schedule charts are supported by master documentation and an ongoing activity register which relate to the initial activity schedule as described in the accepted proposal.

Subsea Innovation systems perform in some of the most challenging engineering environments in the world where component failure can be catastrophic.

Our dedication to ensuring the implementation of quality procedures at every stage of the design, build and installation process is clearly demonstrated by the ongoing performance of our systems in the field.

subsea
innovation

Subsea Innovation Limited

Unit 3, Roundhouse Road, Faverdale East Business Park
Darlington, Co Durham DL3 0UR United Kingdom
Tel +44 (0) 1325 385270 Fax +44 (0) 1325 385285
Email info@subsea.co.uk www.subsea.co.uk