



Product

AQC-SR - Subsea high-pressure drilling riser systems

Product Application

- Jack-up deployed subsea well operations – drilling, interventions and subsea abandonments

Key Features

- Designed, qualified and manufactured in accordance with ISO 13628-7
- Suitable for 13 5/8" and 18 3/4" subsea wellheads and trees 5,000, 10,000 and 15,000 PSI rated
- Big-bore to prevent running clearance issues
- Suitable for high-pressure and high-temperature wells
- Reduced installation time
- Designed for sour service applications
- Connector make-up confirmation pressure test on assembly
- Fast make-up with no loose parts
- Patented testable dual seal arrangement
- Gas tight metal-to-metal seals with back-up elastomeric seal

Technical brochure: AQC-SR Subsea high-pressure drilling riser & connector system

The AQC-SR been specifically designed and qualified for high fatigue multiple make-up and break-out, jack-up deployed, high-pressure subsea drilling riser applications. It has excellent fatigue performance using metal-to-metal gas tight seals and an elastomeric back-up seal used primarily for connection testing. The connector can be made-up and broken out hundreds of times; if damage is identified the seal face can be cold weld repaired, whilst dogs and drive bolts can be replaced easily offshore.

Designed with service life in mind, the connector is inspectable, measurable and repairable, with replaceable components for long life performance that makes servicing and five yearly overhauls simple and transparent. Our design approach has drastically reduced the riser weight, whilst maintaining excellent strength and fatigue performance - making riser handling and top tensioning easily achievable, even on lower specification jack-up units.

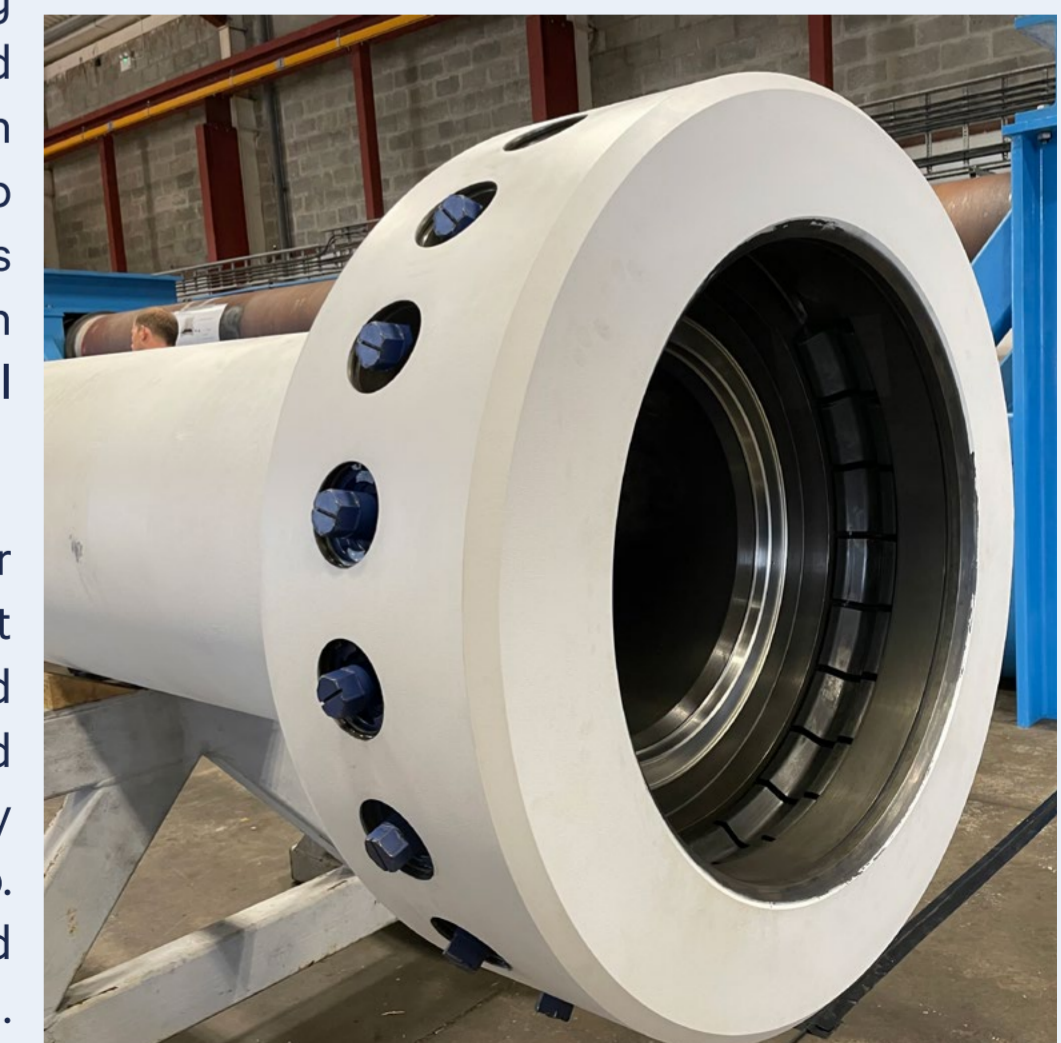
The AQC-SR can be supplied with an automatic riser spider and drive bolt make-up device, or can be made-up manually via the low torque drive bolts. The connector is run pin up box down, with the metal-to-metal seal ring complete with elastomeric back up seal insert. The riser string is supported during make-up on a lower pin load shoulder within our riser spider - this approach also improves fatigue performance as no slip damage occurs, improves safety and makes deployment and recovery significantly faster than traditional bowl/slips by eliminating the removal and installation of master bushings.

The AQC-SR is run on standard side door elevators. The box swallows 98% of the pin as it is lowered into position. Once the box has landed out, the radial dog drive bolts are torque loaded in controlled progressive steps, in a diametrically opposing pattern to ensure even make-up. The drive bolt design has been engineered and qualified to resist back-off and loss of preload.

Once the drive bolts have reached full torque they will be flush to the body and the underside of the box will be flush with the indicator groove, confirming correct make-up. This design provides a large connector preload making it well suited for high load and fatigue sensitive applications, such as top tensioned subsea high-pressure drilling riser operations.

Design features within the AQC-SR have been carefully engineered and tested to reduce stress and damage to seal faces, dogs and thread profiles to pro-long life and fatigue performance. Once made up, an optional back seat seal ring test can be performed via the specially designed and patented box test port.

The design allows confirmation of both the metal to metal and elastomeric seals as well as the ability to test the test port plug itself for well control compliance. Break-out of the AQC-SR is performed via a controlled reverse procedure, once the connector has been broken out it is cleaned, inspected and protective storage grease applied. Inspection results are recorded on our unique asset and fatigue management tracking system, which is reviewed and approved by our independent riser analysis team.



Subsea high-pressure drilling riser system

A HP subsea drilling riser allows a subsea well to be drilled, completed, abandoned or supports subsea work-overs from a jack-up rig.

With the addition of a subsea HP drilling riser, it is possible access almost 60% of the total number of subsea wells worldwide with a Jack Up.

- Jack-ups are predominantly cheaper than a semi-sub, and have less downtime, typically, systems are designed to withstand 100-year storm conditions under a well control situation – exaggerated in shallow water, with no need to disconnect.
- Loading on Subsea Components = top tension riser and lower offset imparts less load into the wellhead (and therefore less fatigue damage)
- Environmental = all metal-to-metal seals with no potential leaking slip joint packer
- BOP Reliability = less complex BOP & overall package system
- Flexibility = complete platform and subsea operations using the same rig and drilling team (reduced cost)

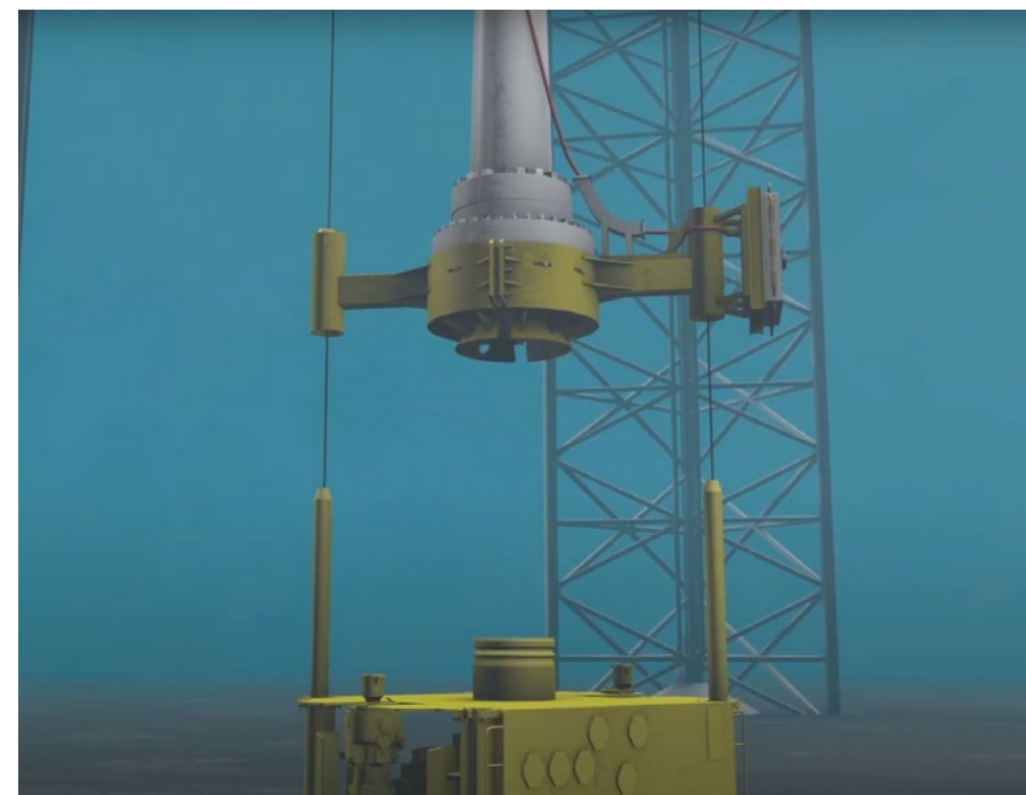
We can provide a complete jack-up shallow water subsea service, including:

- Riser analysis and FEED
- Interface engineering (surface and subsea)
- Rig modification
- Subsea connectors
- Riser joints, tension and stress joints
- Complete running and control system

Semi Sub: 70 Day Campaign
(\$300K/Day x 70 Days) = \$21,000,000

Jack Up: 70 Day Campaign (\$100K/Day
Including HPR x 70 Days) = \$7,000,000

Approx. saving of \$14,000,000 per 70
day well



AQC-SR Connector

Inspectable, measurable, repairable, and replaceable components for long life and repeat make and break

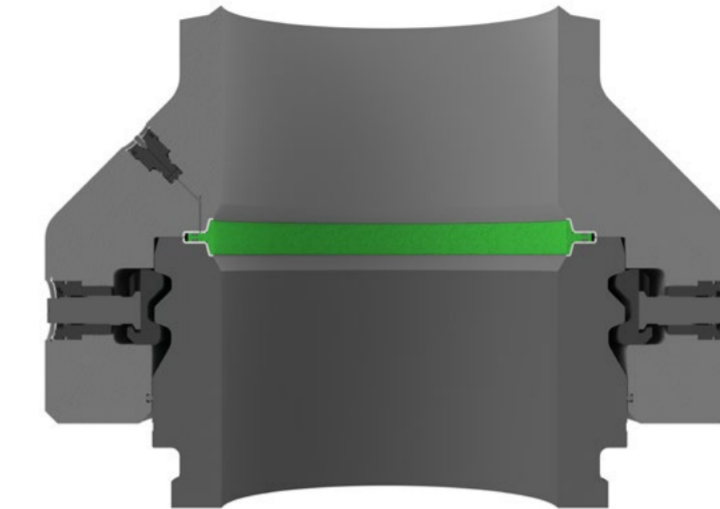
Back seat integral make-up confirmation pressure test

Marinised seals

Make-up indicator band

Anti-vibration dog drive bolt lock

FEA linked to real world conditions and qualification results

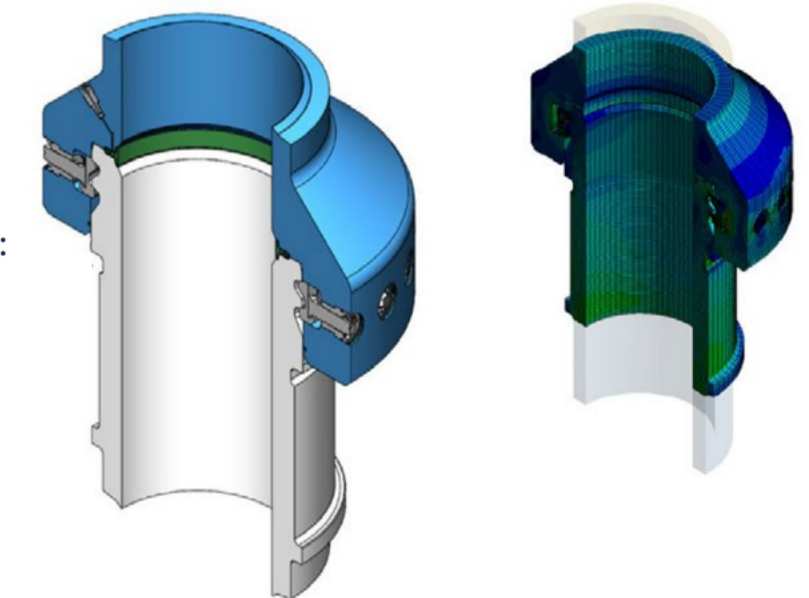


Fatigue enhancement features

Preloaded static connection designed and qualified for dynamic loading

Integral components, no loose parts or dropped object risk

Gas tight metal-to-metal seal with qualified back-up elastomeric seal

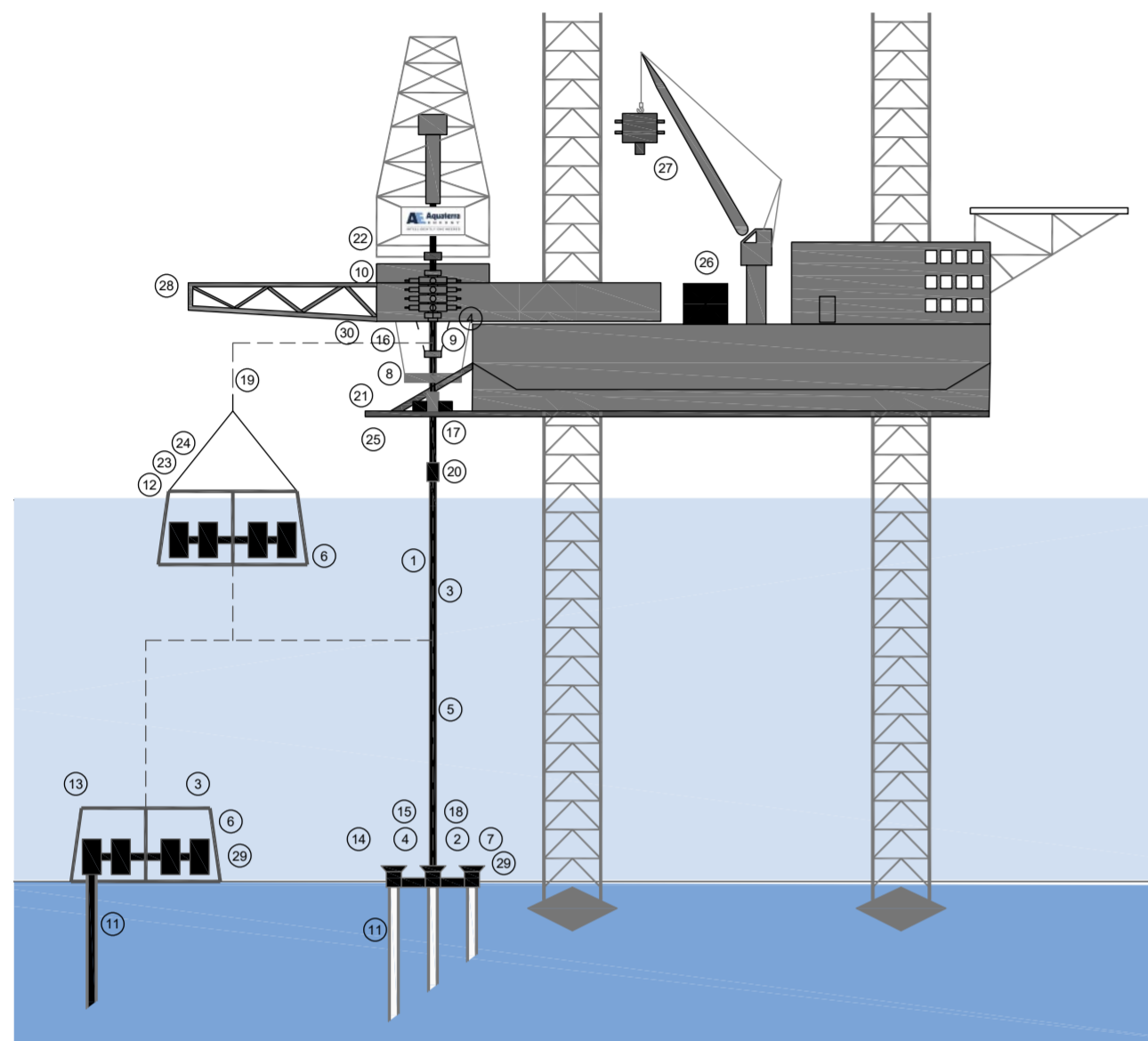


Upper and lower running shoulders: fastriser spider operation, no time consuming, manual bowl and slips

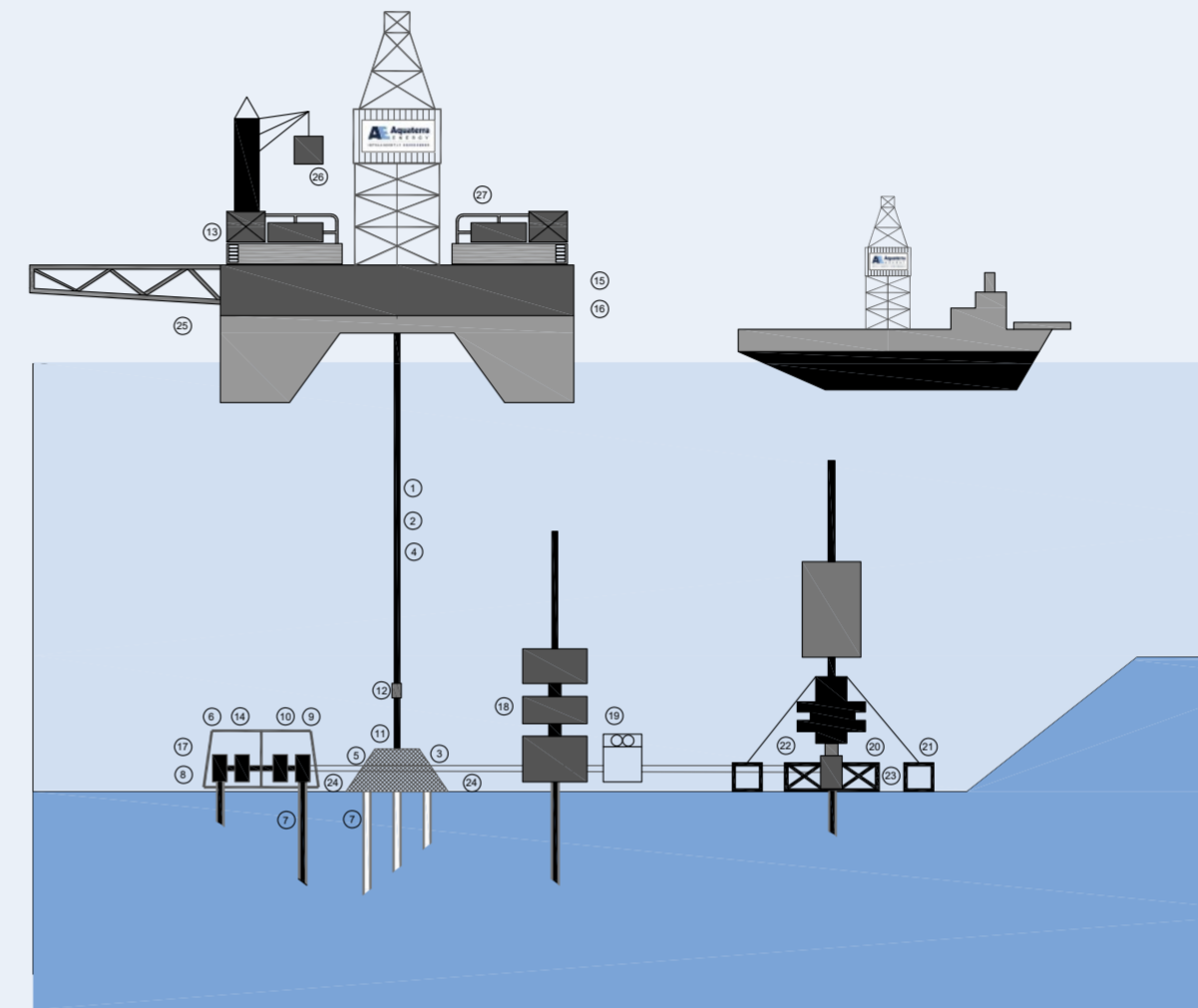
AQC-SR connector technical specifications

AE Part Number:	02230-001
Primary Design Code:	BS EN ISO 13628-7 2006 DNVGL-OS-E101 Latest Edition Offshore Standard for Drilling Plant
Qualification:	BS EN ISO 13628-7 2006 Combined loading, fatigue tested and multiple make/break cycle Hydro and gas qualified Vibration back off qualification
Pressure Rating:	5,000, 10,000 and 15,000 PSI rated
Temperature Rating:	- 29°C to elevated temperatures above 121°C for HPHT applications available
Connector Type:	AQC-SR HP subsea drilling riser (AQC-SR)
Outside Diameter:	AQC-SR for 13-5/8" subsea wells - 30-1/4" (box) AQC-SR for 18-3/4" subsea wells - 41" (box)
Inside Diameter:	AQC-SR for 13-5/8" subsea wells - 14" Drift AQC-SR for 18-3/4" subsea wells - 20" Drift
Joint Weight:	12m Joint circa 11.5 metric Te 20" Bore 15,000 PSI system
Service:	NACE MR0175/ISO 15156 region 3
Number and type of seals:	Metal-to-metal gas tight seal areas within seal ring and 1 off elastomeric seal (back up seal and for make-up test)
Est. No. of Makes & Breaks:	>500
Repair Method:	Cold weld repair seal face, replaceable dogs, regional service centres available
Coating:	Thermally Sprayed Aluminium (TSA) OD Corrosion resistant seal face (CRA) Component Xylan subsea coating

Related Products and Services



Item No	Description
1	Riser & Conductor Analysis
2	Tieback Engineering & Tooling
3	Subsea HP Drilling Riser Systems
4	Subsea & Surface Connectors - NT2 , H4 & AQC
5	VIV Suppression Systems
6	Subsea Drill Centre templates
7	Subsea pre-drilling templates
8	Tension decks
9	Suregrip Tension ring
10	Rig floor Tension system
11	Cement top-up systems
12	Disposable camera systems
13	Conductor Whipstocks
14	Trash caps
15	Gyroscopes
16	Proten Riser tension system -Pull
17	Proten Riser tension system -Push
18	Aquascope Subsea Camera system
19	Heavy Lift equipment
20	Rig & Riser monitoring systems
21	Low pressure overshot systems
22	Piling analysis
23	Structural Engineering
24	Bespoke offshore structures
25	Conductor Tension Decks
26	3rd party interfaces/deck layout/grillages & sea fastening
27	Tree handling & Heavy lift assessment
28	Flareboom handling, installation & load testing
29	Mudline centraliser & drill bushing
30	BOP & topside quick connectors & Test stumps



Item No	Description
1	Riser & Conductor Analysis
2	Completion & Workover Risers / Landing Strings
3	Subsea connectors - NT2, H4 & AQC
4	VIV Suppression systems
5	Subsea Protective Structures
6	Subsea Drill Centre Templates
7	Cement Top-Up Systems
8	Conductor Whipstock
9	Trash Caps
10	Gyroscopes
11	Aquascope Subsea Camera Systems
12	Rig & Riser Monitoring Systems
13	Hydraulic Power Units
14	Structural Engineering
15	Instrument & Controls Management
16	Subsea Heavy Lift Equipment
17	Bespoke Offshore Structures
18	Tree Crossover & Tree Running Tool / Internal Stingers
19	Subsea Jumper Deployment Frames (SJDF)
20	Wellhead Fatigue Assessments / Monitoring
21	BOP Tethering Systems
22	BOP Wellhead Fatigue Mitigation Assessment
23	Abandonment Support Frame
24	Mudline Centraliser & Drill bushing
25	Flareboom Handling, Installation & Load Testing
26	Tree Handling & Heavy Lift Assessment
27	3rd Party Interfaces/Deck Layout/Grillages & Sea Fastening



Supporting the full offshore energy ecosystem