HPHT, Downhole and Subsea Valve Engineering
Severn Subsea Technologies specialises in the research and development of subsea valves and high integrity pressure protection systems (HIPPS), HPHT downhole tools, stab plates, and smart tools for oil and gas exploration and production applications. ISO 9001 registered, the company is IEC 80079-34 compliant, enabling the manufacture of ATEX Zone 0 and IECEx intrinsically safe systems.

Our systems integration competencies include: mechanical, electrical and software engineering. We are a clear technology leader in high temperature electronics, control systems and heat shielding – all key skills needed to develop resilient and reliable HPHT downhole tools.

The engineering and manufacturing insights gained from working in extreme HPHT environments are now being applied to the development of ‘next generation’ subsea directional control valves (DCV), and valve systems integration.

As demands on subsea exploration, monitoring and production systems continue to grow, there is a need for the innovative and multi-disciplinary approach to subsea engineering provided by Severn Subsea Technologies.
Severn Subsea Technologies has a wealth of experience in designing and building systems for harsh offshore exploration and production environments where our modus operandi is “High Reliability Engineering.”

Drilling & Intervention – Tool Detection Alarm
Using Zone 0 rated sensor technology, the Tool Detection Alarm (TDA) reduces the risk of damage to the riser assembly during drilling and intervention operations, as the tool string is recovered to the surface. The portable, battery-powered TDA, including the control box and re-chargeable battery, is ATEX and IECEx certified intrinsically safe equipment for use in Zone 0 gas environments.

Badger Explorer – Field Evaluation Tool
Severn Subsea Technologies is playing a leading role in developing the Badger Explorer autonomous field evaluation tool. This innovative tool will enable exploration and monitoring of the subsurface without the need for a conventional drilling rig.

SST’s expertise in mechanical, electronics and software design and engineering together with the ability to handle the modular tool’s many interfaces has been critical to the development of the project. Project highlights include: hydraulic power systems, tubing conveyed systems, and development of DC-DC converters to provide the high voltage needed for drilling, and the ability to step down power when the tool is monitoring the subsurface and drilling is no longer required.

Renewable Wave Devices – Control & Telemetry System
An integrated telemetry and control system for wave power devices developed by SST is enabling researchers to correlate wave movement with power generated, and thus optimise power generating conditions offshore. Power systems management together with in-house developed software and communications have demonstrated SST’s ability to quickly develop new ways of managing offshore wave devices.

Camera and Video Systems
Camera and video tools using industry leading, bespoke image capture technology to give engineers unprecedented access to full HD images during the internal inspection of risers and pipelines. SST camera and video inspection systems include lens technology providing fisheye lens with 180° field of view, HD quality image resolution and ‘live’ streaming of black and white QVGA compressed video.

Heat Shielding
Downhole thermal protection systems based on Dewar technology for sensors and logging tool electronics. We offer Dewar flasks up to 4.5m (15ft) in length with operational temperature limits of 400°C (752°F).

Stab Plates
Severn Subsea Technologies offers full hydraulic stab plate assembly, flushing and test facilities, manufactured to individual customer specifications and ISO 13628-8.
High reliability valve engineering

Larger subsea infrastructure, deeper waters, remote subsea production and the need for greater valve integrity management are driving manifold and Christmas tree valve developments. Severn Subsea Technologies is applying its specialized engineering skills to the development of ‘next generation’ valve systems.

Directional Control Valves
Developed for use in subsea control module of Christmas trees and manifolds, our directional control valves (DCVs) control the application of hydraulic pressure for large valves via an electronic signal. Compact, with high flow capability value, the DCV valves can be supplied as enhanced mono and bi-stable, latching and de-latching in line with customer requirements.

Increased levels of subsea processing has prompted Severn Subsea Technologies to develop next generation DCVs capable of handling higher pressures and temperatures, at water depths in excess of 1100m.

SST has a dedicated DCV production unit, for the manufacture of DCVs; this includes the Class 7 (ISO 14644-1) cleanroom for assembly and flushing the DCVs, and a hyperbaric chamber for proof testing the valve’s delatching pressure.

Dual Redundancy Integrated HIPPS system
Severn Glocon offers High Integrity Pressure Protection Systems (HIPPS) for oil and gas topside and subsea applications. The subsea HIPPS is the first to combine independent electronic and mechanical systems, providing a dual redundancy, pipeline pressure protection system.

Rated SIL 1 – 4, the electronic and mechanical HIPPS systems are designed and built in accordance with IEC 61508 and IEC 61511 safety instrumented systems (SIS) standards. Severn Glocon’s mechanical HIPPS comprises two pairs of pressure sensors linked to two final elements, each controlled by two independent hydraulic control sub-systems.

Until now subsea HIPPS has been exclusively electronic, relying on pressure transducers and logic analyser voting logic to activate the two final elements. However, concerns over wax deposition and hydrate formation desensitising the transducers have limited the take up of the pipeline pressure protection system.

The Severn Glocon subsea HIPPS adds a mechanical HIPPS alongside the electronic HIPPS, providing a second, independent, pressure protection system. The mechanical HIPPS system is more resistant to hydrate and heavy wax build-up, and significantly less likely to be impaired by such deposits.
Precision manufacture, assembly and test

With our specialist production capabilities, Severn Subsea Technologies offers product development support through to major projects requiring extensive research and development, manufacture and testing. Our strength lies in the ability to understand our clients’ multifaceted project requirements and translate them into workable solutions.

We offer a precision engineering and manufacturing facility specialising in materials for harsh environments such as stainless steels, aluminium alloys, nickel alloys, cobalt alloys, plastics, elastomers and ceramics.

**High Pressure Testing**

Our 557m² (6,000ft²) Redruth manufacturing centre comprises lathes, mills, grinders and wire eroder. It also includes a Class 7 (ISO 14644-1) cleanroom for assembly and flushing operations, and a hyperbaric chamber for proof testing.

Built to the latest PED standard, the HPHT hyperbaric chamber is capable of testing up to 25,000psi (1,724barg) and from -2°C to 200°C. It has a capacity of 15.9 litres (150mm x 900mm internal dimensions), and can be used with either mineral oil or water glycol testing mediums. In addition, the manufacturing centre includes a test facility for valves, as well as a hydraulic flushing and testing system for stab plates.

A dedicated inspection area with a large coordinate measuring machine (CMM) and a comprehensive range of metrology equipment calibrated to national standards supports the manufacturing process to ISO-9001:2008. In addition to temperature and pressure testing, our research facility also includes a 135m (450ft) deep borehole, which can be used for tool testing and for third party use. A base line set of well logs has been performed to enhance the test facility.

Severn Subsea Technologies complies with test procedures as defined by ISO / API standards. However, our experience of HPHT tool development tells that these set minimum levels of testing to validate a product. We expect to work with customers to define a more specific test programme – one that more accurately reflects the anticipated tool life-cycle.

**Software Engineering**

Severn Subsea Technologies has an extensive software engineering capability, including system analysis, programme development and testing: validation, verification and qualification. In a nutshell, “We make smart devices smart.”

We use a scrum-based, agile software development methodology for managing control and test projects: turnkey and one-off projects. Our experience tells us that new product and systems developments, can sometimes seem like a moving target where ‘requirements churn’ is an inevitable part of the process. Our methodology allows us to keep the project on track, and ensures we meet system’s performance requirements.
European regional development support

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The Department for Communities and Local Government is the managing authority for the European Regional Development Fund Programme, which is one of the funds established by the European Commission to help local areas stimulate their economic development by investing in projects which will support local businesses and create jobs.

For more information visit www.communities.gov.uk/erdf

Contact

We understand the challenges of subsea production and are well able to work with customers to assist with the development and manufacture of new, high integrity equipment and systems.

We are part of Severn Glocon Group’s global valve engineering network.

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The Severn Glocon Group policy is one of continuous improvement and we reserve the right to modify these specification details without notice.