

Rotary Throttling Valve Test Rig

INDUSTRY

Subsea Oil & Gas Industry

LOCATION

UK

PROJECT

LB Bentley Ltd - Rotary Throttling Valve Test Rig

THE CHALLENGE

As part of the Severn Glocon Group product development, programme Severn Subsea Technologies were approached by LB Bentley to design and manufacture a system to test and validate their Rotary Throttling Valve (RTV).

The specification for the RTV Flow Test Rig was as follows:

- ✓ Circulate fluid at a pressure of at least 250 bar
- ✓ Circulate fluid at a flow rate of at least 200l/hr
- ✓ Measure and record flow rates in the range of 0.2 - 200l/hr
- ✓ Measure and calculate a pressure differential across the valve
- ✓ Capable of performing automated life cycle testing
- ✓ Capable of testing the valve with application of back-pressure
- ✓ Compatible with all water glycols
- ✓ Maintain a constant set temperature
- ✓ Rig can be flushed through whilst bypassing the valve to achieve a cleanliness level of SAE AS 4059 Class 6 or better
- ✓ The rig must be designed for testing of other valves and components as required



THE SOLUTION

A modular test rig system was designed to not only meet our customer's specific goals but also be adaptable to any possible future testing requirements. The test rig was split into four subsystem modules each of which has specific functionality and can be combined in various configurations to form multiple testing solutions. These comprise of the following modules; Hydraulic Power Unit, Valve Test, Flow Measuring and Fluid Conditioning. In the RTV application all four modules are utilised.

At the heart of the test rig system is the programmable logic controller (PLC) control system which allows manual, semi-autonomous and fully autonomous procedures to be pre-programmed and run through either local control via use of a touch screen or remotely controlled via an Ethernet link. The PLC provides full data logging capability of any measurable outputs from the test rig system.

For the RTV testing, data for flow rate, hydraulic pressure and temperature will be continuously logged and saved to a format that will allow the operator to quickly compile and analyse for results.

The overall mechanical design utilises medium pressure (20,000psi) pipe work and components with pneumatically operated valves to control the flow around the system. A hydro-pneumatic pump provides the pressure and flow requirements whilst a secondary electric pump provides fluid circulation. The hydraulic system is designed to fail safe under any potential operating scenario and has a two-stage pressure relief design to eliminate any risk of system over-pressurisation. Pneumatic and electrical terminal connectors as well as high pressure hydraulic quick release hoses allow quick and simple connection between test rig modules.

For more information on Severn Subsea Technologies call +44 (0)1209 312 000, email sales@severnst.com or visit www.severnst.com

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THE SOLUTION ...

Whilst all subsystem modules are dependent on the Hydraulic Power Unit, each have their own specific functionality as follows:

Hydraulic Power Unit

- ✓ System power and control
- ✓ Centrally located fluid reservoir with integrated heating capability and pneumatically operated pressure pump
- ✓ Pressure capability of 20,000 psi
- ✓ Flow capability of 19l/min
- ✓ IP 55 rated enclosures for pneumatic control components and electrical and PLC control components

Valve Test Module

- ✓ Integrated valve bypass capability
- ✓ In-line needle valve for pressure differential control
- ✓ Pressure monitoring capability on both inlet and outlet ports of test valve

Flow Measuring Module

- ✓ Two in-built flow measuring technologies
- ✓ Extension to include a third flow measurement process in series allowing greater measurement capability which can be specified by the client
- ✓ Potential to use extension to test and analyse prototype flow meter technology against a known calibrated baseline
- ✓ Pressure monitoring capability on both inlet and outlet ports of flow meter units

Fluid Conditioning Module

- ✓ Continuous fluid circulation to prevent fluid and additive separation
- ✓ In-line 3 stage fluid filtration capable of maintaining fluid cleanliness to SAE AS4059F Class 4
- ✓ In-line air blast cooler for fluid temperature regulation

THE OUTCOME

The RTV Flow Test Rig design was completed at the end of 2016. Testing is planned for the beginning of 2017.

This project showcases all of Severn Subsea Technologies' strengths on mechanical, electrical and software engineering and shows once again that we are able to design and manufacture bespoke products to surpass our clients' high expectations.

