

Offshore High-Rate Compact Well Test Package

For high-pressure, high-flow-rate wells during well testing and cleanup operations

Applications

- Handles well testing and cleanup operations of high-pressure, high-flow-rate wells
- Services wells with flow rates up to 105-MMcf/d gas and 12,000-bbl/d oil
- Offers modular setup for rigs with limited deck space
- Operates in onshore, offshore, and deepwater environments

How it improves well testing and cleanup operations

- Controls high-flow-rate wells efficiently
- Reduces required deck space
- Improves process safety
- Minimizes tripping hazards due to rig-up design: customized structural frame under setup with all piping arranged in frames below the equipment

Efficiency and reliability for high-pressure, high-flow-rate wells

Using advanced technologies and aligned with high industrial standards, the innovative offshore high-rate compact well test package is more efficient than conventional arrangements.

All equipment modules are compact to accommodate limited offshore deck space. The entire installation's customized structural frame is manufactured as part of the rig. The frame ensures that deck loading limits for the well testing area are adhered to.

The **shell and tube heat exchanger** is vertical, making it suitable for restricted rig space. Its enhanced heating capacity replaces three conventional heat exchangers, reducing the required space by 7.5 times. The leaner package enables sufficient heating duty, avoiding hydrates risk and improving process safety.

The package consists of a module containing two **15,000-psi-rated remote-actuated choke manifolds**. The dual-choke system enables a dual pressure drop with temperature elevation in between. The unit comprises a combination of fixed and adjustable production chokes, giving additional reliability to efficient and safer control of the pressure profile.

A high-rate, high-pressure three-phase separator (105 MMcf/d, 12,000 bbl/d capacity)—equipped with Coriolis meters, radars, level detection triggers, and two independent built-in level control systems—enables accurate flow rate measurements and effluent monitoring.

Enhanced flow control and safety are achieved through a remote-operated valve manifold skid, which can be disconnected from the main separator skid for swift transportation.

A module that consists of four single-compartment **surge tanks** stacked with locks is designed to handle and degas high-volume well fluid through true multistage separation. Radar detection and fully automated level control, in addition to the standard pressure control, increase operational efficiency. The frames are optimized by integrating inline chokes and custom spools, reducing the module's deck space footprint.

The safety integrity level (SIL) 2-rated **electrical emergency shutdown system** achieves fast and reliable well control, mitigating risks associated with high-flow-rate wells. It secures the process in case of emergency, and it is integrated with additional safety devices, including the blowdown assembly, reducing the exposure of the crew to highly pressurized equipment. The package uses electrical emergency shutdown (EESD), working via a logic system rather than a total shutdown of all valves. This differentiator enables improved safety during high-pressure and high-flow-rate operations.



The package is pictured with the choke manifold, surge tanks, separator, and steam exchangers.

A customized data acquisition system designed with a production facility setup includes interactive mimic boards, controlling operations remotely and triggering abnormal parameters. It constantly monitors fluid flow conditions with specific attention to hydrate formation and erosional velocities, enabling critical decision-making in real time. It also includes an electronic status board where valve statuses are updated via wireless signals from valve positioners. Other features include fire or flame detectors, subsea data integration, production tree valve status monitoring, and chemical injection monitoring with multiple monitors installed outdoors, so the entire crew can view data and trends. Additionally, manual data entry of measurements on a tablet automatically updates the system, increasing effective communications.