

DataSphere® LinX® Monitoring System

B-ANNULUS PRESSURE/TEMPERATURE MONITORING

OVERVIEW

Operators are increasingly under pressure to reduce costs while maximizing the safety and control of their wells. Optimizing flow to casing design limitations and subsequently monitoring wellbore integrity over a well's lifetime are more critical than ever before.

The ability to continuously monitor for leaks and operator-induced pressures behind casing has not been possible on subsea wells. Well integrity is verified periodically at the expense of production, flow is often restricted due to casing design limitations, and casing designs have costly safety factors. When barrier integrity is compromised, costly workovers or plug and abandonment (P&A) may be the only alternatives.

The DataSphere® LinX® monitoring system is a step change in well integrity monitoring enabled by wireless through-casing power and communication. With the LinX system, sensors are continuously communicating from behind the well barriers – right where they need to be – without compromising well integrity or changing the well design, and without major revisions to the drilling program.

Here's how

The LinX monitoring system is a wireless through-wellbore technology that enables the placement of a permanent pressure/temperature gauge behind the production casing in Annulus-B. The system uses electromagnetic power and communication to drive and communicate with sensors without the need for batteries or extra barrier penetrations. Power down hole and communication with the surface is provided by industry-standard cable and an IWIS interface card, enabling the LinX system to be combined with traditional downhole monitoring on a single cable.

Why B-Annulus Monitoring?

Today's subsea wells have enclosed volume in the B-Annulus, which is prone to operator-induced pressure buildup due to temperature changes induced by the flow. Many of today's subsea wells make use of the A-annulus for gas injection, moving the barrier from the A- to the B-annulus. This makes managing the pressure integrity of the wellhead more complex since the B-annulus on subsea wells is sealed off at the wellhead. The system picks up any pressure/ temperature fluctuations, enabling the operator to detect pressure buildups while producing. This new knowledge drives revenue up, while less costly casing programs drive CAPEX down, thus helping ensure safe operation of the well and reducing the risk of costly interventions and non-productive time.



The Halliburton LinX® B-annulus
Permanent Monitoring System

How it works

LinX® system B-annulus monitoring is a three-step process powered by electromagnetic currents powering quartz pressure and temperature (P/T) gauge sensors.

1. One sensor and coil are fitted on the casing using a custom casing pup
2. Another sensor and coil are fitted on the tubing using a custom tubing joint. The tubing-conveyed sensor is then connected to surface via a traditional downhole cable.
3. Using the two coils, electromagnetism powers and communicates with the casing-conveyed sensor.

The electromagnetic transfer of power, does not have the limitations of batteries, enabling unlimited transfer of data over the life of the well as needed for permanent monitoring.

Gauge Specifications

Pressure range / Temperature range	0-20,000 PSIA / -20 – 200°C (14 – 392°F)
Calibration ranges	200 - 10,000 PSIA / -10 – 150°C (-4 – 302°F) 200 - 20,000 PSIA / 25 – 200°C (77 - 392°F)
Stated accuracy in calibrated range	1.5 psi / 0.5 °C
Typical accuracy in calibrated range	1.2 psi / 0.15 °C
Resolution (per sec)	< 0.006 psi / < 0.005 °C
Drift at maximum pressure and temperature (per year)	0.02% FS / < 0.1 °C
Cable type	1/4" OD Mono-conductor/TEC
Gauge material	MP-35N / Per NACE MR-0175
Electrical wellhead requirements	1-pin conductor
Maximum downhole capacity	7 gauges / 21 sensors
Seals and terminations	Dual metal-to-metal Field pressure testable
Space out tolerance	1 foot

BENEFITS

- » Requires no periodic integrity tests, saving testing costs, reducing risk and helping eliminate the cost of deferred production
- » Optimizes flow to casing rating and reads the actual pressure while flowing
- » Provides real-time barrier status monitoring
- » Enables identification of potentially more low-cost remediation options before progressing to workover intervention
- » Less need to compensate insecurity with costly casing programs
- » Customizable to any well design – single, multi-zone, intelligent, standard, subsea, dry tree
- » Compatible with the Halliburton DataSphere® Opsis® permanent downhole gauges as both can be run on the same interface card and downhole cable

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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