

StethoScope 825

Formation pressure-while-drilling service

APPLICATIONS

- Optimization of mud weight
- Selection of optimal casing points
- Estimation of reserves
- Identification of fluids and their contacts
- Reservoir model refinement
- Well placement

BENEFITS

- Mitigated risk through reservoir pressure management
- Improved prediction of reserves using fluid typing
- Enhanced drilling performance through optimal mud weight
- Time and cost savings by eliminating need for tool orientation
- Minimized nonproductive time using TOP* time-optimized pretest

FEATURES

- Accurately measures formation pressure in drilling environment
- Provides direct pore pressure and mobility data for fluid typing and mud-weight optimization
- Performs in any hole orientation (vertical or deviated)
- Optimizes pretest volume and drawdown to formation characteristics
- Provides validated real-time measurements with quality control indicators

Designed to work in large hole sizes, the StethoScope 825* formation pressure-while-drilling (FPWD) service enables accurate and efficient measurement of formation pressure in the drilling environment. It provides direct pore pressure and mobility data for fluid typing, reservoir pressure management, and mud-weight control and optimization. Time savings are achieved through a focus on operational efficiency and measurement versatility, accuracy, and quality.

OPTIMIZED TOOL OPERATING DESIGN

StethoScope 825 reliability has several sources; among them are the successful StethoScope 675* FPWD service, knowledge gained from leadership in the LWD industry, and Schlumberger experience with the wireline MDT* modular formation dynamics tester.

The probe is sealed against the formation by two mechanical setting pistons. The pistons extend from the tool directly opposite the probe. This configuration ensures the integrity of the seal by preventing the tool from moving while the probe sets and acquires the pressure data. Because the weight of the collar is not needed to establish and maintain the probe-to-formation seal, the tool can be set in any hole orientation—vertical or deviated. The mechanical setting pistons are effective in boreholes up to 3 in larger than the tool's OD. The setting pistons and packer designed for field replacement save the time and cost of replacing the entire StethoScope 825 tool and eliminate time spent waiting on parts.



The StethoScope 825 service uses an 8¼-in collar with a 12-in integral blade stabilizer for 12¼-in boreholes. An optional collar with a 10⅝-in stabilizer is available for 10⅝-in boreholes.

StethoScope 825 versatility provides the choice to perform a measurement with the pumps on or off. A pumps-on, or circulating, test is available if sticking is a concern or there is a need to monitor data in real time. In this case, the sequence can be interrupted at any time, thus not wasting time on a dry test or lost seal. A pumps-off, or static, measurement provides a noise-free environment and reduces the supercharging effect evident in tight formations as a result of circulating. Measurement data are available in real time during circulating or are sent uphole immediately following a static measurement.

Power to operate the StethoScope 825 service comes from either a battery pack or the MWD turbine. Under normal conditions, the battery pack can provide power for up to 150 pretests. There are two principal pressure gauges in the StethoScope 825 service—an ACQG* advanced crystal quartz gauge and a strain gauge. The ACQG gauge is the same gauge used in the MDT tester, well known for its reliability and accuracy and ruggedized to withstand the drilling environment. In addition, an annular pressure gauge continuously monitors mud column changes.

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OPTIMIZED PRETEST DESIGN

The downhole controls and intelligent interpretation incorporated in the tool optimize the pretest volume and drawdown rate to the formation characteristics. The pretest volume is fully adjustable up to 25 cm³, and the drawdown rate can be set from 0.1 to 2.0 cm³/s.

The StethoScope 825 FPWD service offers two pretest options. Pretests can be customized using client-defined settings or can be acquired in the fully automated TOP mode. The TOP mode adjusts to formation properties to optimize the pretest in the prescribed time. Although defined settings must be preset at surface, once the tool is downhole, either option is available at any time. Also, test length can be extended for either option.

HIGH-QUALITY DATA IN REAL TIME

Substantial quality indicators are provided with the final formation pressure. The indicators include an analysis of the pretest to determine its validity and compute the final buildup rate and gauge variance. These indicators are available in real time to validate formation pressure data and provide the detail needed to have confidence in the measurement.

Real-time data can be transmitted to surface in different phases ranging from real-time present information to poststation data, analysis, and decimated image of the entire pretest sequence. Data is also stored in memory and can be downloaded at surface for further processing.

StethoScope 825 Specifications

Tool design

Measurement type	Probe pretest
Pressure gauges	High-precision ACQG and strain
Power supplies	Battery, MWD turbine power

Measurement specifications

Probe dimension, in [mm]	2.94 [74.67] OD × 0.56 [14.22] ID
Pretest	
Volume, cm ³	0 to 25, fully adjustable
Drawdown rate, cm ³ /s	0.1 to 2.0
Delta pressure, psi [MPa]	>6,000 [>41]
Setting piston reach, in [mm]	3.00 [76.20] more than tool stabilizer OD
Memory capacity	50 pretests of 5-min duration
Battery capacity	150 pretests (1 cm ³ /s at 3,200-psi [22-MPa] drawdown at 275 degF [125 degC])

General specifications

Tool nominal diameter, in [mm]	8.25 [209.55]
Tool maximum OD, in [mm]	12.00 [304.8], 10.375 [263.53] with optional stabilizer
Tool length, ft [m]	31.5 [9.6]
Weight, lbm [kg]	4,300 [1,950]
Upper connection	6 $\frac{5}{8}$ FH box
Lower connection	6 $\frac{5}{8}$ FH box
Operating temperature, degF [degC]	300 [150]

Mechanical specifications

Maximum dogleg severity	
Rotary mode, °/ft [°/m]	7/100 [7/30]
Sliding mode, °/ft [°/m]	13/100 [13/30]
Maximum shock	30 min at Shock Level 3 (50 g _n) 200,000 cumulative shocks above 50 g _n

Hydraulics

Maximum external pressure, psi [MPa]	20,000 [138], 25,000 [172] optional
Flow range, galUS/min [L/min]	0 to 1,600 [0 to 6,056]

Note: Specifications are subject to change.

THREE MODES OF OPERATION

Because the BHA must be stationary for the StethoScope 825 measurements, the tool design incorporates protection against accidental probe deployment while the BHA is moving. A downlink sequence is required to change from one of the three modes of tool operation (sleep, standby, and deploy) to another. In sleep and standby modes, the tool can be rotated between pressure points.

When the deploy mode is activated, the tool automatically sets, performs the pressure test, retracts after the specified time, and returns to standby mode, ready for the next pretest. This sequence takes approximately 5 min, with a short downlink to trigger the next measurement, if necessary. Each step in the sequence provides feedback to surface. The deploy mode is cancelled by simply cycling the pumps.

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