Schlumberger

NeoSteer CLx

Extreme curve and lateral at-bit steerable system

APPLICATIONS

- Pad and batch drilling operations
- Wells with curved sections that require high dogleg severity (DLS)
- Horizontal wells with long lateral sections

BENEFITS

- Enables single-run drilling of vertical, curve, and lateral sections with a single BHA
- Achieves high build rates while meeting lateral length requirements
- Improves control and reaction time
- Lowers overall well tortuoristy by leveraging closed-loop automation

FEATURES

- Proprietary cutting structures from Smith Bits, a Schlumberger company
- Application-specific bit design (as required)
- Dual hydraulically activated pistons
- Hold inclination and azimuth (HIA) closed loops to provide advanced automated tangent control
- Near-bit measurements including
  - Inclination
  - Azimuth
  - Gamma ray
  - Azimuthal gamma ray
  - High-definition surveying

NeoSteer CLx ABSS.

NeoSteer CLx* extreme curve and lateral at-bit steerable system (ABSS) enables operators to drill multiple sections in a single run while achieving high build rates and extended lateral lengths. Especially where vertical, curve, and lateral sections are the same hole size, the NeoSteer CLx ABSS eliminates the need to change out the BHA for every section.

With the NeoSteer CLx ABSS, operators are able to achieve high build rates without having to compromise on performance in the lateral in a single BHA. The NeoSteer CLx ABSS uses piston technology to push against the borehole wall for steering; the pistons are fully integrated with the cutting structure for greater curvature leverage. With this, the NeoSteer CLx ABSS achieves higher build rates for the same hydraulic force applied, enabling it to meet both the build requirements in the curve section and the directional control requirements in the lateral section.

The NeoSteer CLx ABSS steering unit incorporates metal-to-metal hydraulic seals, which reduce erosion and increase hydraulic design capability for improved performance. In a motor-assisted BHA configuration, the NeoSteer CLx ABSS can perform at speeds up to 350 rpm while maintaining precise directional control and consistent steerability.

Multiaxis measurements and automatic trajectory control for accurate well placement

The NeoSteer CLx ABSS includes comprehensive six-axis continuous inclination and azimuth measurements. The multiaxial component enables automatic HIA capability for precise well positioning. This feature, along with self-steering capabilities and closed-loop automation, helps provide smooth tangents with minimal tortuosity. Near-bit extended-range gamma ray measurements provide additional well positioning data for improved real-time decision making.

Azimuthal image gamma ray for improved steering

The NeoSteer CLx ABSS can be configured with an onboard azimuthal image gamma ray cartridge to improve in-zone percentage and enable steering within the reservoir sweet spot. With an azimuthal gamma ray cartridge just 6 ft behind the cutting structure, operators can identify signs of changing lithology earlier and enact instant steering corrections.

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Specifications		
Nominal OD (API)		6¾ in
Hole size		8½–8¾ in
Overall length		13,636 ft [4,156 m]
Maximum (Max.) collar dogleg	sliding	16°/100 ft [16°/30 m]
	rotating	15°/100 ft [15°/30 m]
Max. operating torque†		16,000 ft.lbf [21,700 N.m]
Max. operating load		1,100,000 lbf [4,900,000 N]
Max. weight on bit		As per Smith Bits specifications
Max. lost circulation material		1.5 lbm/galUS [179.74 kg/m³] medium nut plug
Flow range‡		250–650 galUS/min [946–2,460 L/min]
Lateral vibrations		Shock level‡ (>10 counts/s above 50-g_n threshold), 30-min limit
Stick/slip		±100% mean rotational speed, 30-min limit
Max. rotational speed		350 rpm
Max. temperature§		302 degF [150 degC]
Max. hydrostatic pressure		20,000 psi [138 MPa]
Recommended pressure drop across bit		300–1,200 psi [2–8.3 MPa]
Mud sand content		1% by volume
Rotary connections		
Collar upper connection		4½ IF box
Bit box		Bit cutting structure is incorporated into the tool
Sensors		
Bit face to gamma ray††		6.98 ft [2.13 m]
Bit face to accelerometers††		7.91 ft [2.41 m]
Bit face to magnetometers††		10 ft [3 m]
Inclination accuracy		0.11 (at 1 sigma level)
Azimuth accuracy		1.8 at 90° inclination (at 1 sigma level)
Gamma ray accuracy, azimuth 4-quadrant		±5% (30-s averaging window)
Shock detector threshold, radial		50 g_n ±5 g_n (±500 g_n max peak)

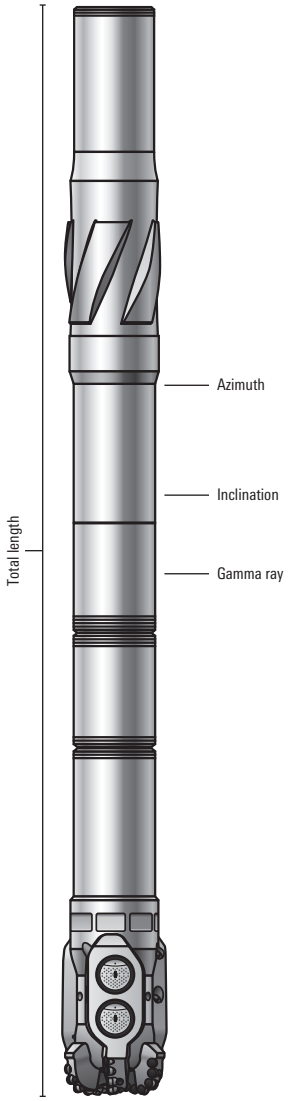
Engineered BHA and bit design is required to deliver optimal system performance.

† Depending on WOB.

‡ Depending on mud weight values.

§ Optional 350 degF [175 degC] available.

†† Measurements will vary slightly depending on the cutting structure used.



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