

PowerV

Vertical drilling rotary steerable system

APPLICATIONS

- Efficient vertical drilling in one run
- Rig sites with minimal or no directional drilling supervision
- Hard formations and formations with high dip angle

BENEFITS

- Automatically maintained vertical wellbore
- Optimized postdrilling operations and increased completions and lift equipment durability
- Reduced rigsite supervision
- Reduced lost-in-hole incidents
- Increased drilling efficiency
- Reaming, backreaming, and shoe drillout permitted

FEATURES

- Remotely monitored automatic steering control
- Functional without MWD tool systems
- Automatic downhole correction of deviation
- Availability in PowerDrive vortex* powered RSS configuration

PowerV* vertical drilling RSS is part of the PowerDrive* RSS family of fully rotating steerable systems that minimize the risk of sticking. The entire family has a complete direction and inclination sensor package close to the bit for precise well placement and independently generates power for 3D steering and control.

In any drilling environment, the PowerDrive RSS family delivers the power required to place wells accurately with superior borehole quality while ensuring maximum drilling efficiency.

Efficient vertical drilling from spud to total depth

The PowerV RSS is the reliable and efficient solution for vertical drilling applications. It provides cost-efficient drilling while automatically and continuously maintaining a vertical wellbore. The fully rotating system improves hole cleaning efficiency and wellbore quality in vertical wells, reducing risk of costly correction runs. With the PowerV RSS, the potential for lost-in-hole incidents and mechanical and differential sticking is minimized. Its high rpm capacity makes it suitable for the PowerDrive vortex RSS configuration.

Wide operating range for ultimate adaptability

The PowerV RSS actively and automatically steers the well path downward while drilling, regardless of the azimuth of any inclination present. Once verticality is achieved, any tendency to build angle is automatically corrected downhole. The automatic steering control requires minimal supervision from surface and needs no MWD system to function. There is no need for dedicated rigsite supervision, lowering potential HSE risks. If direction and inclination monitoring is critical, an MWD tool can be added to the BHA.

The PowerV RSS can be adapted to run on almost any rig. It covers most hole sizes and is a perfect application for hard formation and formations with a high dip angle.



| Specifications | PowerV 475 RSS | PowerV 675 RSS | PowerV 825 RSS | PowerV 900 RSS | PowerV 1100 RSS | |
|----------------------------------|---|---------------------|-----------------------|-------------------------|-------------------------|-------------------------|
| Mechanical | Nominal OD, in [mm] | 4¾ [120.7] | 6¾ [171.5] | 8¾ [209.6] | 9 [228.6] | 11 [279.4] |
| | Overall length, ft [m] | 13.65 [4.16] | 13.47 [4.11] | 13.84 [4.22] | 13.84 [4.22] | 15.22 [4.64] |
| | Hole sizes, in [mm] | 5½–6¾ [139.7–171.5] | 7¾–9¾ [200.0–250.8] | 10¾–11¾ [269.9–295.3] | 12–18½ [304.8–469.9] | 20–28 [508.0–711.2] |
| | Bit speed, rpm | 0–220 | 0–220 | 0–220 | 0–220 | 0–125 |
| | Maximum weight on bit, lbf [N] [†] | 31,000 [137,894] | 180,000 [800,679] | 270,000 [1,201,019] | 370,000 [1,645,841] | 225,000 [1,000,849] |
| | Maximum torque on bit, ft.lbf [N.m] [‡] | 9,000 [12,202] | 18,500 [25,082] | 45,000 [61,011] | 45,000 [61,011] | 70,000 [94,907] |
| | Maximum overpull, lbf [N] | 340,000 [1,512,395] | 1,100,000 [4,893,044] | 1,100,000 [4,893,044] | 1,800,000 [8,006,799] | 2,500,000 [11,120,554] |
| | Passthrough (DLS sliding), ° | 30 | 16 | 12 | 10 | 4 |
| | Bit connection (box) | 3½ Reg | 4½ or 6¾ Reg | 6¾ Reg | 6¾ or 7¾ Reg | 7¾ Reg |
| Hydraulics ^{††} | Flow range, galUS/min [L/min] [§] | 170–310 [643–1,173] | 210–970 [794–3,671] | 280–2,000 [1,059–7,571] | 280–2,000 [1,059–7,571] | 280–2,000 [1,059–7,571] |
| | Maximum mud density, lbm/galUS [kg/L] | 24 [2.88] | 24 [2.88] | 24 [2.88] | 24 [2.88] | 24 [2.88] |
| | Maximum sand content, % | 1 | 1 | 1 | 1 | 1 |
| | Lost circulation material (LCM), lbm/bbl [kg/L] ^{††} | 35 [0.13] | 50 [0.19] | 50 [0.19] | 50 [0.19] | 50 [0.19] |
| | Acidity level, pH | 9.5–12 | 9.5–12 | 9.5–12 | 9.5–12 | 9.5–12 |
| | Oxygen, ppm | 1 | 1 | 1 | 1 | 1 |
| Pressure and temperature | Maximum temperature, degF [degC] | 302 [150] | 302 [150] | 302 [150] | 302 [150] | 302 [150] |
| | Maximum pressure, psi [MPa] | 20,000 [137.9] | 20,000 [137.9] | 20,000 [137.9] | 20,000 [137.9] | 20,000 [137.9] |
| Measurements ^{§§} | Inclination offset to tool bottom, ft [m] | 6.76 [2.06] | 7.13 [2.17] | 7.60 [2.32] | 7.70 [2.35] | 9 [2.74] |
| | Azimuth offset to tool bottom, ft [m] | 8.86 [2.70] | 9.33 [2.84] | 9.80 [2.99] | 9.90 [3.02] | 11.20 [3.41] |
| | Azimuthal gamma ray | Four bin | Four bin | Four bin | Four bin | Four bin |
| | Average gamma ray | Yes | Yes | Yes | Yes | Yes |
| | Gamma ray offset to tool bottom, ft [m] | 5.86 [1.79] | 6.33 [1.93] | 6.80 [2.07] | 6.90 [2.10] | 8.20 [2.50] |
| | Vibration range (axial), g _n | 0–35 | 0–35 | 0–35 | 0–35 | 0–35 |
| | Vibration range (radial), g _n | 0–75 | 0–75 | 0–75 | 0–75 | 0–75 |
| | Shock range, g _n | 625 | 625 | 625 | 625 | 625 |
| | Shock axis | Triaxial | Triaxial | Triaxial | Triaxial | Triaxial |
| Magnetic field cone of exclusion | None | None | None | None | None | |
| Specifics | Automated loop | Vertical | Vertical | Vertical | Vertical | |

[†] Maximum at 0-ft.lbf torque on bit; bit recommendations should be considered.

[‡] Maximum at 0-lbf weight on bit.

[§] Dependent on mud density.

^{††} Special configuration available for silicate muds.

^{†††} Depends on the type of LCM.

^{§§} Sensor offsets and tool weight vary depending on hole size configuration.

Refer to the Schlumberger Shock and Vibration references for details regarding axial, lateral, and torsional limits of tools.