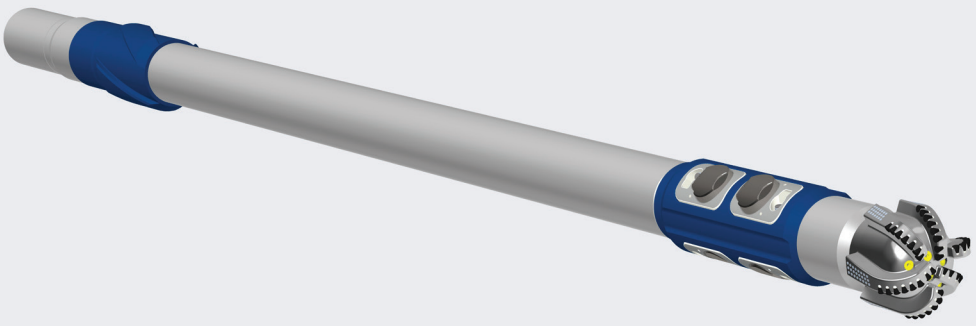
# Rotary Steerable System (RSS)

## Low-Maintenance, Streamlined System Maximizes Drilling Performance and Value



D-Tech's low-risk, high-return RSS has been engineered to meet/overcome unconventional formation drilling challenges, with an emphasis on reliably reaching total depth quickly, accurately, and with reduced financial risk. At an average of 12 to 13 feet in length, D-Tech's RSS is one of the shortest, most streamlined system on the market, reducing the risk of getting hung up while moving through extreme doglegs.

The push-the-bit system delivers consistent, predictable build rates to drill a high-quality wellbore that can improve production over the long term. Because it was designed to eliminate as many failure points as possible, the fully contained system includes only 10 moving parts and requires no connections—even to MWD/LWD sensors—making it truly plug-and-play in virtually any BHA.

To further reduce nonproductive time (NPT), all programming is completed by D-Tech before it arrives onsite, reducing the chance of incorrect data entry. The system does not have a data port; thus, eliminating the potential for fluid invasion through the port.

It is extremely robust, so it can withstand high-shock events and operate in harsh drilling applications, reducing the risk of damage seen with other rotary steerables. The potential for stuck pipe or excessive reaming has also been reduced since everything rotates.

The RSS facilitates pinpoint accuracy with a three-axis, near-bit directional package. This continuously records inclination and azimuth, which is used to maintain control on target and allows the operator to drill to and remain in the sweet spot longer.

D-Tech understands that drilling high-performing wells requires more than technology. To further improve performance and avoid NPT, an experienced onsite D-Tech technician and 24/7 remote support are available when tools are downhole. A post-run report and analysis to maximize performance on future jobs is also provided.

### Applications

- High-angle tangents, vertical, curve, and lateral drilling environments
- Harsh drilling environments

### Benefits

- Reduces risk and costs since the streamlined, robust design has minimal moving parts, experiences less damage, and keeps you in the hole longer
- Adds value because it can operate in harsh drilling environments for longer periods
- Increases flexibility with a universal plug-and-play system that is compatible with virtually any bit, motor, MWD/LWD sensor, fluid system, etc.
- Decreases NPT and risk of setup errors since it requires no programming at surface
- Improves your ability to get in and out of the hole without excessive preplanning and/or wiper trips
- Reduces safety risks by eliminating lithium batteries

### Features

- Full 3D directional control with build, drop, and turn capabilities
- Rugged design decreases maintenance costs and turnaround times
- Solids-control system increases tool longevity in high-LCM applications
- Ruggedized pistons provide longer life in harsh, abrasive formations
- Closed loop control and power system allows for operations at high hours without risk of power loss
- Data capture allows for post-run analysis and program optimization
- Onsite D-Tech technician, 24/7 remote support, and post-well analysis available

# Rotary Steerable System Specifications

| | RST475 | RST675 | RST900 |
|---|---|---|---|
| Hole size, in. (mm) | 6 to 6 ¾<br>(152.4 to 171.5) | 8 ½ to 8 ¾<br>(215.9 to 222.25) | 12 ¼ to 12 ½<br>(311.15 to 317.5) |
| Tool length, ft (m) | 11.5 (3.50) w/out stabilizer | 13 (3.96) with stabilizer | 12.87 (3.92) w/out stabilizer |
| Nominal OD, in. (mm) | 4.75 (120.65) | 6.75 (171.45) | 9 (228.6) |
| Maximum overpull, lb (N) | 400,000 (1,800,000) | 1,200,000 (5,300,000) | 1,500,000 (6,700,000) |
| Maximum torque-at-bit, ft·lbf (Nm) | 6,000 (8,134) | 16,000 (21,693) | 55,000 (75,000) |
| Maximum weight-on-bit, lb (N) | Drill bit limited | Drill bit limited | Drill bit limited |
| Bit connection, in. | 3 ½ Reg | 4 ½ Reg | 6 5/8 Reg |
| Max DLS passthrough - nonrotating, (rotating), °/30m [1] | 25 (15) | 16 (10) | 10 (7) |
| Flow range*, gpm (lpm) [2] | 170 to 400 (643 to 1,514) | 300 to 670 (1,135 to 2,540) | 410 to 1,200 (1,552 to 4,550) |
| Max mud density, lb/gal US (Kg/L) | 20 (2.39) | 20 (2.39) | 20 (2.39) |
| Chlorides, ppm [3] | Material dependant | Material dependant | Material dependant |
| Maximum LCM concentration, lb/bbl (kg/L) [4] | 30 (0.13) | 50 (0.19) | 50 (0.19) |
| pH [5] | 9 to 12 | 9 to 12 | 9 to 12 |
| Max sand content, % | 1 | 1 | 1 |
| Max pressure, PSI (Mpa) | 20,000 (137.9) | 20,000 (137.9) | 20,000 (137.9) |
| Max temperature, °F (°C) | 302 (150) | 302 (150) | 302 (150) |
| Max operational RPM [6] | 230 | 230 | 230 |
| Max DLS capability, °/100 ft (°/30m) [7] | 8 | 8 | 5 |
| Up-hole/top connection, in. [8] | 3 ½ IF (NC38) | 4 ½ IF (NC46) | 6 5/8 API Reg |

[1] Contact your D-Tech rep if your DLS exceeds what is provided.
[2] Dependant on mud density.
[3] >50,000 ppm require surface flushing/external cleaning of RSS with freshwater post run. High chloride-resistant material options available; contact D-Tech.
[4] Subject to type of lost circulation material (LCM), medium sized LCM. For specific materials please conatct D-Tech.
[5] D-Tech should be contacted for silicate fluid systems.
[6] For higher RPMs, please contact D-Tech.
[7] Dependent on application, formation, bit design, run parameter, etc.
[8] Alternative top connections are available on request.

The D-Tech RSS has been run reliably in every shale play in North America. It has consistently delivered value by reducing risk, drilling time, and cost-per-foot while providing high directional accuracy and overall reliability to total depth. To learn how we can help you on your next drilling campaign, contact your local D-Tech representative to take control of your well.

D-TECH ROTARY STEERABLE

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