CTDirect MWD coiled tubing measurement-while-drilling service

Provides enhanced drilling mechanics to optimize drilling performance and production potential

**Temperature:**
up to 347 degF [175 degC]

**Dogleg capability:**
up to 50°/100 ft

Where it is used
- Vertical, horizontal, and directional wells
- Underbalanced and overbalanced drilling
- Reentry drilling
- Thru-tubing drilling
- High-temperature applications

How it improves operations
- Maximizes reservoir contact
- Improves production potential in reentry wells
- Increases ROP in underbalanced applications
- Eliminates cost of removing completions
- Avoids risk of taking well offline during reentry drilling
- Enables better geosteering with full 3D directional capability
- Lowers maintenance cost and service turnaround time

Key measurements
The CTDirect MWD* coiled tubing measurement-while-drilling service uses enhanced drilling mechanics to optimize drilling performance and production potential. Using torque-on-bit (TOB) calculations, the service enables early motor and turbine stall detection and prevention. TOB also indicates the torsional load on the BHA to better locate and mitigate stuck pipe incidents. Weight-on-bit (WOB) calculations provide the surface weight transferred to the bit, helping to improve ROP and drilling performance.

What else I should know
In addition to TOB and WOB calculations, the CTDirect MWD service provides measurements of pressure and temperature, shock and vibration, inclination, azimuth, gamma ray, and toolface data. The system seamlessly transmits real-time data to the surface, where it is continuously monitored at the wellsite for precise directional control and immediate drilling performance decision making.

The service also optimizes underbalanced drilling by eliminating the need for drillpipe connections and minimizing reservoir damage.

*CTDirect MWD service*
## CTDirect MWD Service Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal OD</td>
<td>3.12 in [79.25 mm]</td>
</tr>
<tr>
<td>Hole size</td>
<td>3.625–4.75 in [92.08–120.65 mm]</td>
</tr>
<tr>
<td>Max. allowable operational overpull</td>
<td>30,000 lbf [133,447 N]</td>
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<tr>
<td>Max. WOB</td>
<td>11,500 lbf [51,155 N]</td>
</tr>
<tr>
<td>Max. dogleg severity</td>
<td>50°/100 ft [50°/30 m]</td>
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<tr>
<td>Max. orienter torque</td>
<td></td>
</tr>
<tr>
<td>Forward</td>
<td>500 lbf.ft [678 N.m]</td>
</tr>
<tr>
<td>Reverse</td>
<td>1,900 lbf.ft [2,576 N.m]</td>
</tr>
<tr>
<td>Nominal length, including motor†</td>
<td>60 ft [18.3 m]</td>
</tr>
<tr>
<td>Max. internal pressure</td>
<td>15,000 psi [103.4 MPa]</td>
</tr>
<tr>
<td>Max. annular pressure</td>
<td>10,000 psi [68.9 MPa]</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>14 to 302 degF [–10 to 150 degC]</td>
</tr>
<tr>
<td>Max. flow rate</td>
<td>130 galUS/min [492 L/min]</td>
</tr>
<tr>
<td>Produced fluids</td>
<td>Gas and water</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>Up to 20%</td>
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</tbody>
</table>

### Operational

- **Cable requirement**: Heptacable inside coil
- **Pressure barriers**: Multiple

### Measurements

- **Inclination**: Industry standard
- **Azimuth**: Industry standard
- **Toolface**: Gravity and magnetic
- **Natural gamma ray range**: 0 to 250 gAPI
- **Shock and vibration sensor peak range**: 500 g
- **Annular and internal pressure sensor range**: 0 to 10,000 psi [0 to 68.9 MPa]
- **Resistivity**: Optional arcVISION® array resistivity compensated service in recorded mode
- **Surface formation evaluation**: Optional quantitative hydrocarbon analysis with FLAIR® real-time fluid logging and analysis service

### Fluid Compatibility

- **Nitrogen**: Up to 99% nitrogen, 1% water
- **Lubricant**: Radiagreen® lubricant, up to 3%
- **Methanol or ethylene glycol**: 40% methanol or 100% ethylene glycol
- **Caustics**: Sodium hydroxide
- **Corrosion inhibitor**: ASTM International SA193 (amine based)
- **Potassium chloride**: Up to 2%

† Dependent upon motor