



Evolution and Greene Tweed Partner to Develop Rugged Rotatable Connectors That Withstand Vibration and Shock



Greene Tweed and Evolution successfully developed a custom-engineered female rotatable electrical connector that can withstand excessive shock and vibration drilling environments.

Evolution Engineering's (Evolution) EvoOne™ MWD tool provides EM and Mud Pulse telemetry in a single Unified Telemetry™ system, enabling users to choose how and when telemetries should operate. With its on-the-fly adaptability to changes in fluid, flow rate, and formation, users gain operational flexibility and higher ROP regardless of formation.

The Unified Telemetry™ platform significantly improves reliability by eliminating the need to pull out of a hole for lost telemetry signals, dramatically increasing rig uptime. To maximize performance and reliability, Evolution works closely with partners to develop next-generation components that can withstand increasingly aggressive drilling conditions while maximizing tool reliability.

Challenge

Industry demand for higher ROP and extended reach laterals continues to increase the level of shock and vibration experienced by downhole tools. Evolution, a leader in MWD (Measurement While Drilling), partnered with Greene Tweed to improve the performance of female rotatable connectors in harsh drilling conditions.

Solution

Evolution looked to Greene Tweed for their applications engineering expertise and success in engineering high-performance electrical connectors for challenging oilfield environments. The rotatable connector was re-engineered and Greene Tweed's Seal-Connect® electrical connectors were chosen for their ability to provide secure, reliable measurement transmission in rugged environments in MWD, LWD, and wireline applications. Seal-Connect® connectors use Arlon® engineering thermoplastic (PEEK) to protect electronics and minimize thermal expansion.

Evolution undertook lab testing to “shake and vibrate the connector until it broke.” The laboratory testing included 21 days at up to 40G



RMS and approximately 50 shock cycles at ~ 290G, all with cycling temperatures to 150°C/302°F. In addition, the redesigned rotatable connector passed several phases of rigorous testing, including:

- Halt testing averaged 125 hours at 40G RMS vibration, 150°C/302°F to -40°C/-40°F thermal cycling, 15.7°C/60°F minimum up and 9°C/48°F minimum down, with a 1-hour soak for each.
- Concurrent, vertical testing was conducted with 180 shock events, over a range of 185G to 2,800G, in increments of 20 shock events per shock level tested, within a temperature range between room temperature and 130°C/266°F.
- During make-break testing the male/female rotatable pair was assembled and disassembled 550 times (one cycle is make and break).

Note: For all testing, contact resistance measurements were conducted between each test cycle to ensure negligible change of less than 5 percent.

Results

Greene Tweed and Evolution successfully developed a custom-engineered female rotatable electrical connector that can withstand excessive shock and vibration drilling environments. These improvements are being integrated into EvoOne™ and are anticipated to contribute to the tool's reliability and performance when operating in high shock and vibration conditions.

For more information on Evolution's EvoOne™ Unified Telemetry™ tool, visit www.evolutioneng.com.

About Evolution

Evolution delivers purpose-built MWD products that exceed today's drilling requirements for performance and reliability. The company's flagship MWD system, EvoOne™, was built to provide a single, highly reliable MWD tool suitable for every drilling requirement. By designing extremely reliable, high data rate, large bandwidth communication technology, Evolution is at the forefront of providing EM Everywhere™ and developing the Subsurface Internet™. Evolution is headquartered in Calgary, Alberta, and Conroe, Texas. For more information, visit www.evolutioneng.com.

About Greene Tweed

Greene Tweed, a leading global manufacturer of high-performance materials and products, leverages extensive engineering, design, and manufacturing expertise to provide solutions that provide exceptional performance in the challenging environments of the energy market.

Combining more than 150 years of technical capabilities and commercial knowledge in a variety of markets, Greene Tweed has been at the forefront of innovation, and is proud to deliver leading products, including Chemraz®, Fusion®, Arlon®, Orthtek®, and Xycomp®, which are sold worldwide. For more information, call +1.215.256.9521, or visit www.gtweed.com.

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