



Wolverine
Oilfield Technologies



COMPANY PROFILE

ABOUT US

Wolverine Oilfield Technologies is a MWD-LWD and drilling tool technology design and manufacturing company providing high-tech solutions to oil and gas customers since 2015. Based in Houston and comprising of industry leading mechanical, electrical and software engineers, Wolverine Oilfield Technologies was created to put leading edge technology solutions within the grasp of industry directional services companies and operators.



We deliver High Tech tools

Our team of engineers work to create some of the industry's most technologically advanced drilling systems. Wolverine OFT has specialized engineers and technicians supporting you through every turn.



High Performance Platform

Neutrino™ MWD-LWD High Data Rate Technology

Starting Point

Wolverine OFT offers clients the entire package for MWD-LWD and Rotary Steerable technologies.

- Top Mount Pulsers
- MWD Telemetry
- Rotary Steerable Tools
- Resistivity
- Litho Neutron Density



Integrated Logging Solutions

Powerful logging suite fit for any and all project needs.



Wolverine Oilfield Technologies Integrated Logging Suite

Quantum db™ is a fully integrated logging suite, capable of producing professional, accurate and complete data logging for any geological



IMMEDIATE INSIGHT

Neutrino Logs offer real time analysis of logging and drilling dynamic data.



HIGH QUALITY

Quantum db allows users to locate historic logs and tool service information at the push of a button.

Innovative Combinatorial Encoding

Introducing a smarter, more capable MWD surface telemetry system.



Neutrino™ includes simple upgrade components for your downhole tool and surface system that allow you to receive data at 2 bits/sec. You get differentiation while your customers get to drill faster, save time, and stay on plan.

Neutrino Top Mount Pulser

Rugged and robust mechanical and electrical design, tested far beyond industry standards for years of

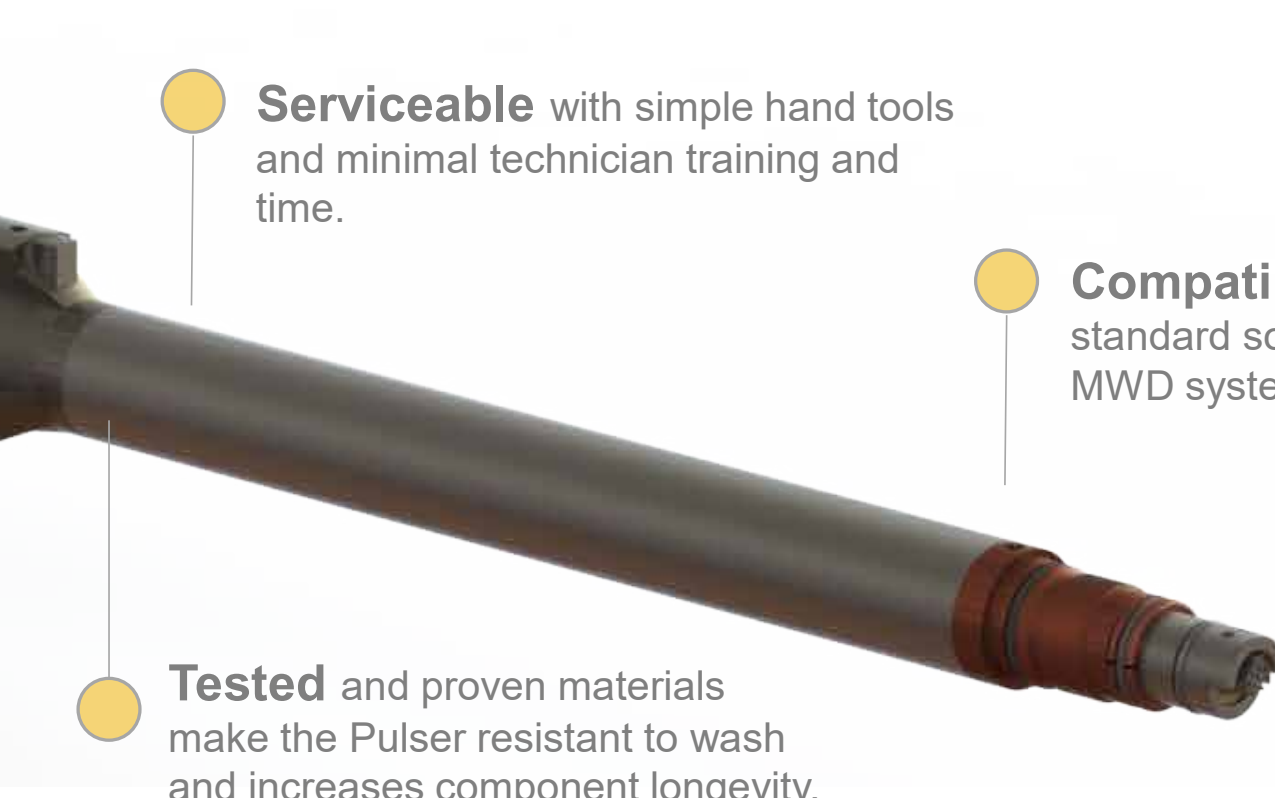
Proprietary Screen ensures larger solids and foreign objects don't enter the flow channel.

Easy View window allows fast and clear view of Pulser oil compensation blatter.

Removeable flow sleeves make it easy to configure Pulser to fit a variety of collar sizes.



UNIQUE DESIGN FEATURES



Serviceable with simple hand tools and minimal technician training and time.

Compatible with standard sonde based MWD systems.

Tested and proven materials make the Pulser resistant to wash and increases component longevity.

Battery Usage

Get up to two times more distance drilled with your batteries. *Depending on bit rate programed.*

200 Hrs
per battery

Neutrino Top Mount Pulsers

Proprietary design and special algorithms are utilized to make a Pulsar that is smarter and can anticipate the position of the poppet shaft to utilize less power to drive the data to surface at 2 bits per second for 200 hours per battery pack.



40%

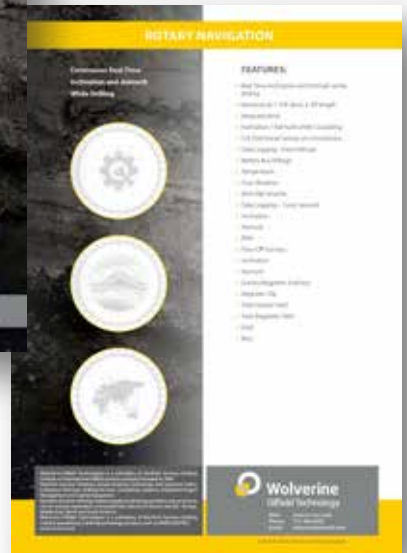
Less Power consumption due to revolutionary design and pulse pattern recognition that sends 4 times more data per pulse than legacy top mount designs.

R-NAV TOOL

The Wolverine R-Nav™ tool provides continuous real-time inclination and azimuth while drilling to give the drilling team the information needed to accurately position the well.

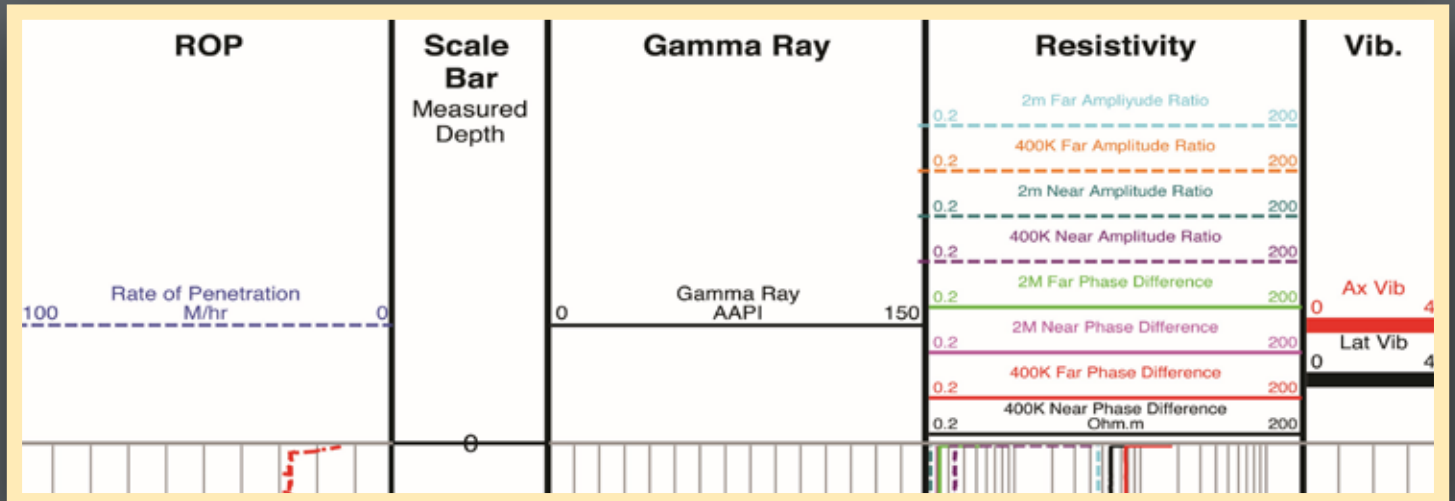
- Mechanical: 1.875" diam. x 39" length
- Full Directional Survey on Connection

Data Logging - Every Minute	Data Logging – Every Second
Battery Voltage	Inclination
Temperature	Azimuth
Flow Vibration	RPM
Stick-Slip Severity	



COMPLETE PLATFORM

Wolverine Oilfield Technologies offers a complete tool suite, perfectly assembled to offer a total package for any drilling need. A combination of tools can be ran to match logging and drilling asset needs.



Neutrino MWD



WPR*

* Manufactured by Remote Measurements Systems Limited, a subsidiary of NewTech Services Holding Limited

Resistivity MFPWR*

- Dual frequency (400 kHz & 2 MHz)
- Dual spacing device designed for wireline-equivalent Logging-While-Drilling (LWD)
- Services in all well types.
- Applications include Geo-steering, correlation, casing point selection, wireline replacement, logging while tripping.
- Operates in all mud types
- Provides real-time resistivity to surface via Neutrino High Speed mud pulse telemetry system.
- High-resolution data is stored in downhole memory which can be retrieved and processed at surface.



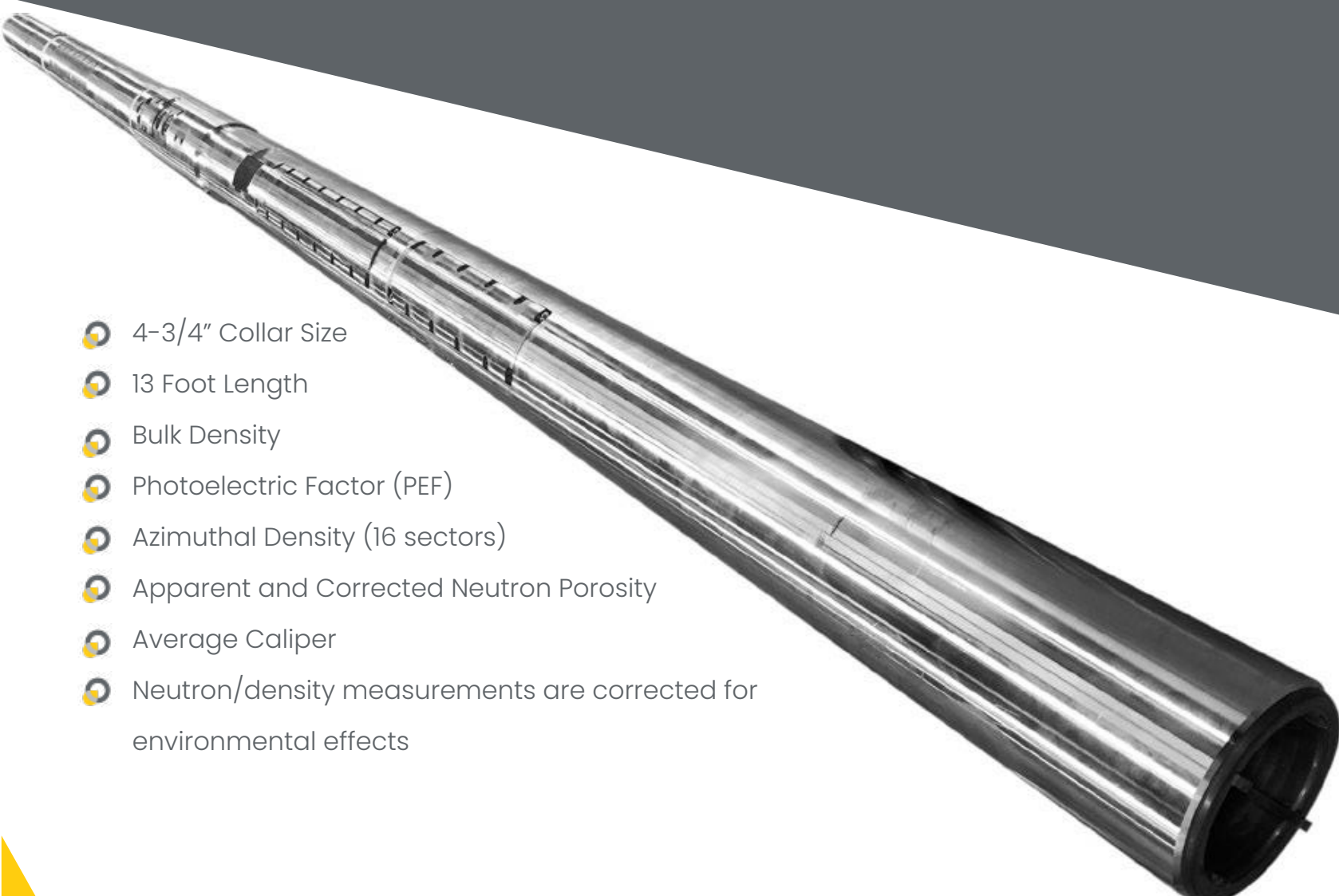
Available in 4.75, 6.75 and 8.00 inch collar applications.

* Manufactured by Remote Measurements Systems Limited, a subsidiary of NewTech Services Holding Limited

LITHO NEUTRON DENSITY

REAL TIME MEASUREMENTS

Our LNDC (Litho Neutron Density Caliper) Tool offers measurements of formation density, porosity, borehole caliper, and formation imaging. Determine lithology, reservoir properties, and wellbore stability while drilling. When used with other formation evaluation measurements, such as gamma ray and resistivity, as a “triple combo” users can analyze the geological structure of the asset. Evaluate oil/water saturation and identify type of hydrocarbons, reserves in place, and total recoverable hydrocarbons.



- 4-3/4" Collar Size
- 13 Foot Length
- Bulk Density
- Photoelectric Factor (PEF)
- Azimuthal Density (16 sectors)
- Apparent and Corrected Neutron Porosity
- Average Caliper
- Neutron/density measurements are corrected for environmental effects

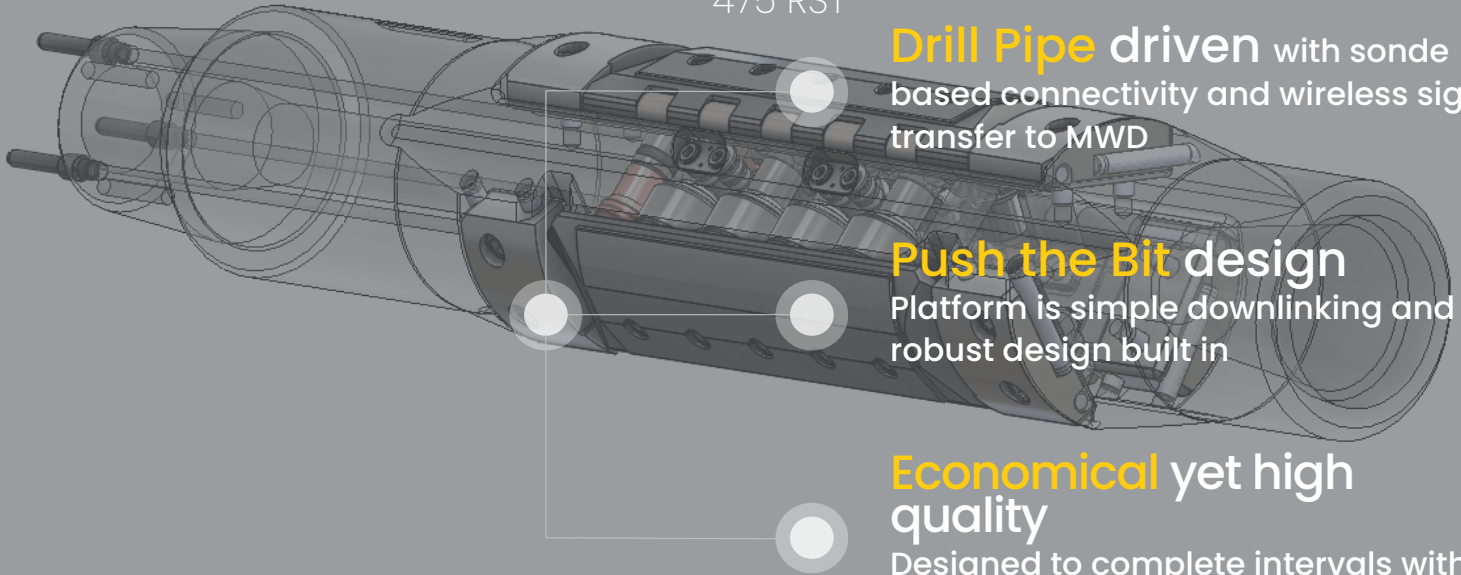
Rotary Steerable

475 RST

Drill Pipe driven with sonde based connectivity and wireless signal transfer to MWD

Push the Bit design Platform is simple downlinking and robust design built in

Economical yet high quality
Designed to complete intervals with minimal service time and resources



High Quality Design

Rugged and robust mechanical and electrical design, tested far beyond industry standards for years of dependable use.

UNIQUE DESIGN FEATURES

Optimal length makes sensor distances closer to bit.

Field replaceable wear parts allow for ultra fast servicing and repair without sending tool off job site.

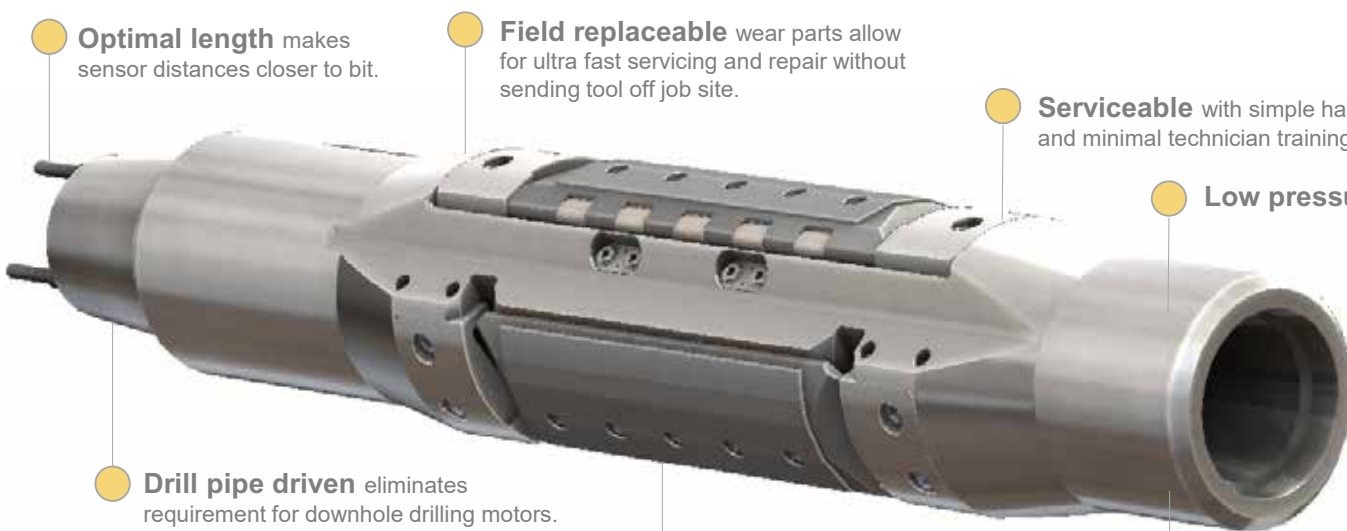
Serviceable with simple hand tools and minimal technician training.

Low pressure drop requirements.

Drill pipe driven eliminates requirement for downhole drilling motors.

Independent pad control offers users full control of use of all three pads simultaneously.

Compatible with standard and long gauge PDC bit designs.



475 ROTARY STEERABLE

DESIGN BENEFITS

Push the Bit Rotary Steerable

The Wolverine RST (Rotary Steerable Tool) was specifically designed to provide a cost effective tool capable of producing complex well trajectories. The RST is continuously rotating push-the-bit tool, utilizing mud powered electronically controlled thrust pads located close to the bit to create the steering vector.



Drill Pipe Driven

Eliminates the need for downhole mud motors. 120-160 RPM



Communication

RST has bi-directional communication with surface system for continuous updates and control.



Downlinking

No need to stop drilling to change steering vector. Steer on-the-fly.



Wireless Link

Connects and communicates to MWD sounds wirelessly. Reducing risk of mechanical connection failures.

13FT

Sensor to Bit

When distance matters, the 475 Series Directional Sensors will get you near bit measurements you can count on.

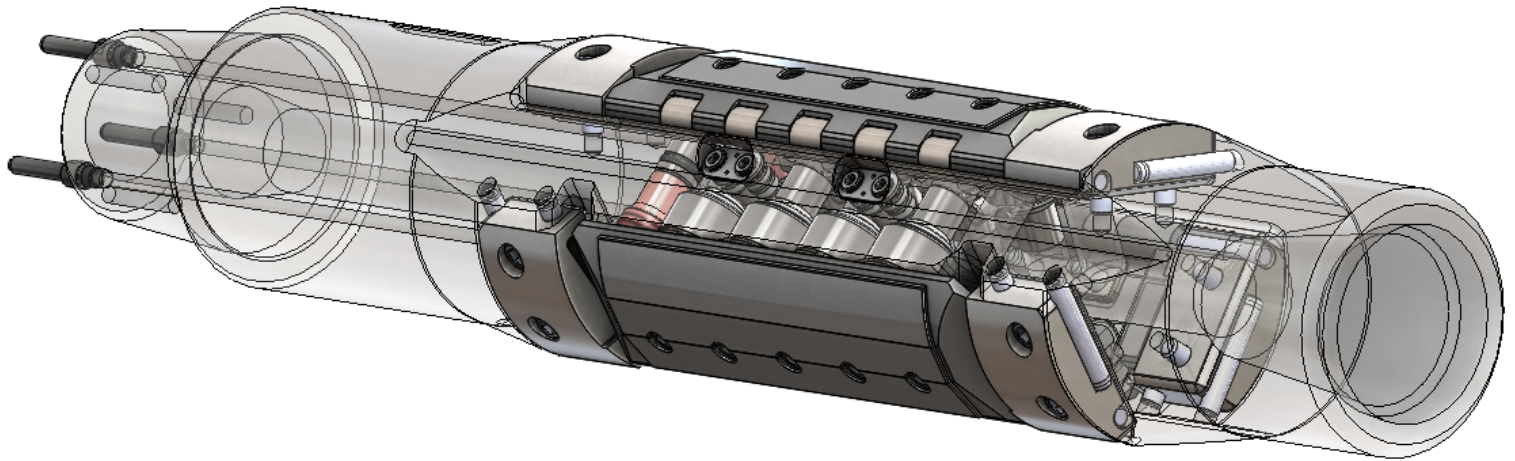
12FT

Gamma Location

With precise and near bit Gamma sensors, your team can make accurate steering decisions.

475 PILOT SERIES

CAPABILITIES



Operational Parameters

- Operating Temperature: 150°C
- Survival Temperature: 175°C
- Rotation Speed: 40 - 120 rpm
- Weight on Bit: 2,000 - 25,000 lbs
- Flow Rate: 100 - 450 gpm
- Pressure drop (Bit): 200 - 600 psi

Mechanical

- 4.75" Collar Size
- 5.875 - 6.75" Integral Stab Sizes
- Design Scalable to 6.75" & 8.00"
- Fully Rotatable
- Does not rely on thrust bearings.
- Length: 33 Feet
- Weight: 1,400 lbs

Benefits

- Reduced Stick-slip
- Improved ROP
- Lower Wellbore Tortuosity
- Improved Wellpath Positioning
- Improved Hole Cleaning
- Reduced Service Costs
- Faster Maintenance Times
- Low Cost Ownership
- Integrate to any MWD System

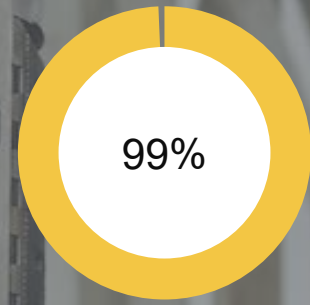
Capabilities

- Dogleg Severity: 0 - 8deg / 100ft
- Dogleg Max (Rot): 15 Degrees
- Dogleg Max (Pass): 18 Degrees
- Overpull Max: 1.1 Million Pounds
- Pressure: 20,000 PSI
- Torque: 10,000 lbs/ft

ENGINEERING EXCELLENCE

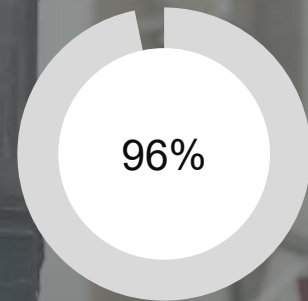
RSS TRIAL SUCCESS

Wolverine has dedicated significant financial, mechanical and electrical engineering resources to prove out its 475 Pilot Series RST. The 475 RST was placed in real world well trials where wellbore navigation objectives were set and achieved successfully.



↗ DOWNLINKING

All trial downlinking attempts resulted in a 99% success rate



↘ STEERING ACCURACY

The RST was able to steer well effectively in all directions within 3 Degree Tool Face.



Trial footage drilled

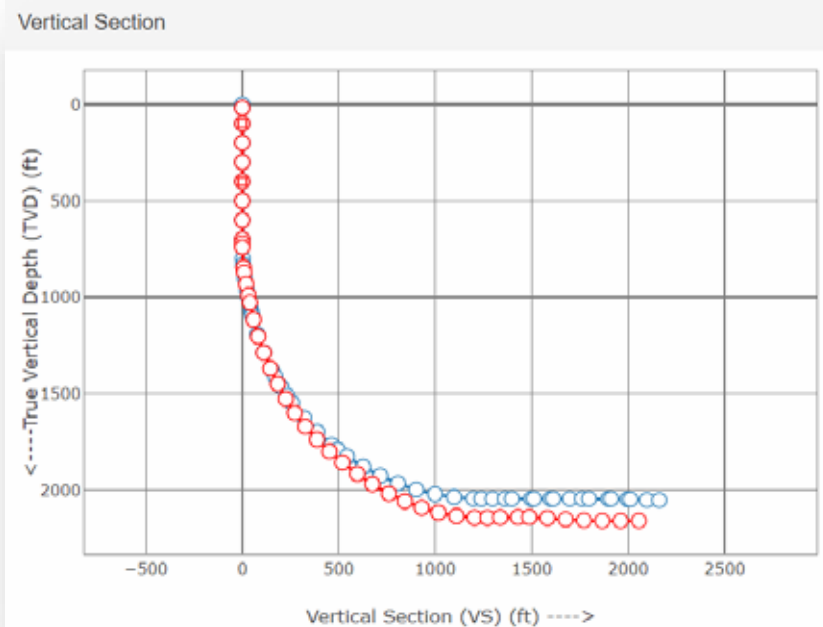
4 WELLS 12 RUNS

Built for Productivity

Rugged yet economical. Built with the industry's most durable and tested materials, the RST was designed to successfully achieve wellbore steering objectives in the most economically feasible way. Reducing the need for complex repair and maintenance so you can get back to drilling in less time.

BUILD & LATERAL SECTION

FIELD RESULTS



Wolverine has invested heavily in the manufacturing of complex facility flow loop testing equipment that can simulate downhole force, pressure attenuation and rotational speeds. After hundreds of hours of facility testing our RST technology, our team was able to commercialize the 475 RST with minimum field trials and prove the capabilities in record time.

All results from field trials were successful in establishing the technology as a durable, economical and reliable drilling solution for steering complex well profiles. Our latest field trial resulted in a successful single run to drill the build and lateral section of a well to TD with minimal repair.

When: July 2019

Where: Catoosa, Oklahoma USA



BI-DIRECTIONAL COMMUNICATION

MICRO-HOP INNOVATION

The Wolverine Patented Micro-hop

Allows seamless two way communication between the MWD and RST. This is accomplished wirelessly through Micro-hop sensors positioned on the lower MWD Sonde and the upper RST Sonde.



On Fire Performance

The Wolverine Micro-hop can transmit data up to 50 bits per second at distance of 12 inches. The Micro-Hop is extremely efficient as well, utilizing as little as one watt of electricity.

TECHNICAL STAFF

Wolverine OFT has well trained, experienced and professional technicians available for training, servicing and supporting your business needs.

- Software Engineering
 - Mechanical Engineering
 - Electrical Engineering
 - Technical SOP Writing
 - Lab Technicians
 - Machining Support

FIELD AND
LAB

TRAINING PRO-

Wolverine Oilfield Technologies is your partner in training and support.

Our experienced staff and engineers are available 24/7 and 365 days a year for training and support. Our staff are experts in global support operations and are prepared to assist you with a successful integration and continued support for the life of your assets.

Located in The United States



Our team is based right here in the great state of Texas and central to the industry's energy capital. You can count on us to be there when you need us.

Our manufacturing is sourced from the best machine shops in the US and Canada. This allows Wolverine OFT to deliver the best quality parts and components.



Houston Texas

Research and
Development

100% Tools Assembled
Houston, Texas

75% Components Made
United States

Wolverine Oilfield Technologies is a subsidiary of NewTech Services Holding Limited, an international oilfield services company founded in 2009. NewTech Services Holding Limited develops technology and expertise within 4 Business Divisions: Drilling Services, Completion Systems, Integrated Project Management and Capital Equipment. NewTech Services Holding Limited supplies technology products and services to the oil and gas exploration and production industry in Russia and CIS, Europe, Middle East, North and South America. Wolverine Oilfield Technologies is a subsidiary of NewTech Services Holding Limited specializing in drilling technology products such as MWD/LWD/RSS.

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