

## Newsco TuffShot ( Top Mounted MWD )

### About Newsco

Newsco's diverse directional drilling experience is a key driver for its success. Established in 1994, Newsco's technology has been proven in extreme drilling conditions on five continents and is trusted to exceed expectations in high temperature, LCM and high shock/vibration environments.

Newsco's core capabilities are born out of its internal R&D teams who are continually innovating to exceed the expectations of today's Exploration and Production companies.

### About the TuffShot

Built with the Bakken in mind, Newsco's Tuffshot has been engineered to be run in high shock high vibration environments. The TuffShot is a collar mounted MWD system which can be easily adapted to RSS LWD drilling tools.

This means operators can have confidence in their MWD when running RSS and LWD, and the convenience from one an all encompassing mud pulse system.

Coupled with Newsco's state of the art DRILL-WELL™ surface networks, the Newsco TuffShot becomes a powerful logging and dependable top mount MWD system.

### Newsco TuffShot Applications

- All directional well profiles
- Onshore & Offshore wells
- Geosteering (resistivity& azm gamma)
- Medium & short radius drilling
- Performance drilling
- Deep, high shock and vibration wells
- Horizontal sections over 14,000' (3000m)
- Well temperatures up to 350°F (177°C)
- RSS compatibility
- Extreme LCM tolerance



### Features

Industry leading precision
Self-cleaning high LCM tolerance
The DRILLWELL™ ultimate logging solution
Downlink capability improves telemetry rates while in hole
RSS / LWD compatibility

### Benefits

Ensures confident wellbore placement
Maximize on bottom drilling time
Seamlessly logs all telemetry and W.I.T.S. data securely
Adds flexibility and avoid unnecessary trips
Adaptability for multiple drilling programs

# Newsco TUFFSHOT (Top Mount) MWD

Technical Data Reference

Tool Specifications		Imperial Units	SI Units
MWD Telemetry Type		Positive Pulse	
Wireline Retrievable / Re-Seatable		Yes / Yes	
Downlink Capable		Yes, Mud Flow Time Sequencing	
Programmable Modes of Operation		4 Static, 2 Dynamic	
Survey Capability While Sliding, Rotating		Yes, No	
Continuous INC Capable		Yes	
Tool Outside Diameter		1.88"	47.8 mm
Overall Length of Tool <sup>i</sup>	D&I Only	25'	7.62 m
	D&I + Gamma Ray	32'	9.75 m
Measurement Depths <sup>ii</sup>	D&I Only Electronics Sensor	8.75'	2.67 m
	D&I + GR Gamma Sensor	8.1'	2.47 m
	D&I + GR Electronics Sensor	12.1'	3.68 m
Flow Ranges	3 <sup>1</sup> / <sub>2</sub> in.	75-165 gpm	0.28 - 0.625 m <sup>3</sup>
	4 <sup>3</sup> / <sub>4</sub> in.	100-300 gpm	0.37 -1.1 m <sup>3</sup>
	6 <sup>3</sup> / <sub>4</sub> in.	150-600 gpm	0.55 - 2.2 m <sup>3</sup>
	8 in.	400-1,200 gpm	1.5 - 4.5 m <sup>3</sup>
	9 <sup>5</sup> / <sub>8</sub> in.	450-1,500 gpm	1.7 - 5.6 m <sup>3</sup>
Pressure Drop	@ 250 gpm (0.9 m <sup>3</sup> )	80 psi	550 kPa
	@ 500 gpm (1.9 m <sup>3</sup> )	110 psi	750 kPa
	@ 1000 gpm (3.8 m <sup>3</sup> )	220 psi	1,500 kPa
Gamma Ray Sensor Specifications			
Gamma Ray Detector Type		Telemetrix™ Ruggedized Chassis Mounted NaI Scintillation	
Gamma Measurement Range		0 to 500 cps	
Power Specifiactions			
Power Source		Lithium Thionyl Chloride Batteries	
Operating Time Per Battery Probe <sup>iii</sup>		> 400 Hours	
Vibration Sensor Specifications		Imperial Units	SI Units
Measurement Range (lateral)		± 50 g	500 m/s <sup>2</sup>
Frequency Response		20 to 500 Hz	
Temperature Sensor Specifications		Imperial Units	SI Units
Measurement Range		32 to 302, [32 to 350] degF <sup>iv</sup>	0 to 150, [0 to 177] degC <sup>iv</sup>
Sensor Accuracy		± 5.0 degF	± 2.5 degC
Resolution		± 4.0 degF	± 2.0 degC
Transmission Time Specifications			
Pulse Length, s	0.2	0.4	0.6
Static Survey, s	45	90	135
Toolface, s	11	22	33
Gamma Ray, s	3	6	9
Toolface and Gamma Ray, s	8	16	24
Environmental Specifications		Imperial Units	SI Units
Maximum Vibration		20 g	200 m/s <sup>2</sup>
Maximum Shock		500 g, 0.5ms 1/2 Sine	5,000 m/s <sup>2</sup> 0.5ms 1/2 Sine
Operating Temperature Range		32 to 302, [32 to 350] degF <sup>iv</sup>	0 to 150, [0 to 177] degC <sup>iv</sup>
Maximum Operating Pressure		25,000 psi	172,000 kPa
Mud Sand Content		2%	
Maximum Bit Pressure Drop		No Limit	
Lost Circulation Material Size		0.5 inch (12.5mm) solids in slurry	
Lost Circulation Material Weight		100 ppb	225 kg/m <sup>3</sup>
Surface Network Specifications			
Network Platform		Telemetrix DRILLWELL™ ver. 2.60	
Remote Terminal Operating Temperature Range		-40 to 122 °F	-40 to 50 °C

<sup>i</sup> Tool will fit into one standard length (30') NMDC provided by Newsco.

<sup>ii</sup> Sensor depths measured from top of motor dump sub to sensor points.

<sup>iii</sup> Battery Life is directly proportional to Pulse Timing used.

<sup>iv</sup> Indicates time with all checks and counts confirmed, data rate dependant.

<sup>iv</sup> Standard tool configuration 32 to 302 degF [0 to 150 degC], optional Newsco350HT rating 32 to 350 degF [0 to 177 degC].

