

WPR™ sub is a spatially compensated, dual frequency (400 kHz & 2 MHz), dual spacing device designed for wireline-equivalent Logging-While-Drilling (LWD) and Measurements-After-Drilling (MAD) services in all well types. Applications include geosteering, correlation, pore pressure trend analysis, casing point selection, wireline replacement, logging while tripping and logging with and without the flow switch enabled (for air- and foam-drilled wells).

WPR's symmetrical design, with centrally located receiver antennas, provides realtime compensation, eliminates invasion effects due to measurement delays, and improves accuracy by canceling variations in receiver channels.

WPR operates in all mud types including oil-based and salt-saturated and provides real-time resistivity with flexible transmission formats. High-resolution data is stored in downhole memory which can be retrieved and processed during trips.

Provided with WPR is a complete set of software-enabled borehole corrections and applications, including a dipping bed model for geosteering.

For more information, contact your Scientific Drilling sales representative or visit: <http://scientificdrilling.com/>



4.75 in.
(121 mm)
WPR

GENERAL SPECIFICATIONS

TOOL SIZE	BOREHOLE SIZE	DOG LEG SEVERITY		CONNECTION	MAX FLOW RATE
		Sliding	Rotating		
3.750 in. (95.25 mm)	4.75 - 5.63 in. (121 - 143 mm)	38°	15°	2 7/8 AOH	200 gpm ^[1, 5] (12.61 L/sec)
4.750 in. (121 mm)	5.625 - 6.125 in. (142 - 165 mm)	25°	13°	NC38	280/350 gpm ^[2, 5] (17.7/22.1 L/sec)
6.750 in. (172 mm)	8.375 - 9.875 in. (213 - 251 mm)	24°	10°	NC50	700 gpm ^[3, 5] (44.2 L/sec)
8.000 in. (204 mm)	12.125 - 14.75 in. (308 - 375 mm)	15°	8°	6 5/8 Reg	900/1,200 gpm ^[4, 5] (63.1/75.1 L/sec)

1. Operating above 200 gpm (12.61 L/sec) will accelerate erosion and will reduce service life.
2. Operation from 280 - 350 gpm (17.7 - 22.1 L/sec) will accelerate erosion and will reduce service life. Operating above 350 gpm (22.1 L/sec) will result in severe erosion.
3. Operating above 700 gpm (44.2 L/sec) will result in severe erosion.
4. Operation from 900 - 1,200 gpm (63.1 - 75.7 L/sec) will accelerate erosion and will reduce service life. Operating above 1,200 gpm will result in severe erosion.
5. Sand Content: < 1% by volume recommended.

ENVIRONMENTAL SPECIFICATIONS

OPERATIONAL TEMPERATURE

0° to 302°F; 347°F option (-18° to 150°C; 175°C option)

PRESSURE

20,000 psi (138 MPa)

COMPENSATED RESISTIVITY MEASUREMENTS

FREQUENCY	MEASUREMENT	RANGE	ACCURACY
2 MHz	Phase Difference All Spacings	0.1 - 4,000 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.5 mmho/m [above 25 ohm-m]
	Attenuation Near Spacing	0.1 - 300 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.1 mmho/m [above 25 ohm-m]
	Attenuation Far Spacing	0.1 - 500 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.1 mmho/m [above 25 ohm-m]
400 kHz	Phase Difference All Spacings	0.1 - 4,000 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.5 mmho/m [above 25 ohm-m]
	Attenuation Near Spacing	0.1 - 300 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.1 mmho/m [above 25 ohm-m]
	Attenuation Far Spacing	0.1 - 500 ohm-m	± 2% [0.1 - 25 ohm-m] ± 0.1 mmho/m [above 25 ohm-m]

TRANSMITTER / RECEIVER SPACINGS

	MEASURE POINT					
	UH					DH
	T ₁	T ₂ *	R ₁	R ₂	T ₃ *	T ₄
IN.	-36.00	-22.50	-4.25	+4.25	+22.50	+36.00
MM	-914.4	-571.5	-107.9	+107.9	+571.5	+914.4

DEPTH OF INVESTIGATION, VERTICAL RESOLUTION

	DEPTH OF INVESTIGATION		VERTICAL RESOLUTION**
	Short Spacing Radius	Long Spacing Radius	
R_r = 1 ohm-m R_{so} = 0.5 Ohm-m			
2 MHz Phase Difference	21 in. (533 mm)	28 in. (711 mm)	8 in. (203 mm)
400 kHz Phase Difference	30 in. (762 mm)	39 in. (991 mm)	12 in. (305 mm)
2 MHz Attenuation	34 in. (866 mm)	44 in. (1,118 mm)	8 in. (203 mm)
400 kHz Attenuation	52 in. (1,321 mm)	66 in. (1,676 mm)	12 in. (305 mm)
R_r = 10 ohm-m R_{so} = 0.5 Ohm-m			
2 MHz Phase Difference	26 in. (660 mm)	37 in. (940 mm)	8 in. (203 mm)
400 kHz Phase Difference	36 in. (914 mm)	49 in. (1,245 mm)	12 in. (305 mm)
2 MHz Attenuation	40 in. (1,016 mm)	53 in. (1,346 mm)	8 in. (203 mm)
400 kHz Attenuation	60 in. (1,524 mm)	76 in. (1,930 mm)	12 in. (305 mm)

*Not included in 3.75 in. size. **90% response in conductive beds.



3.5 in.
(89 mm)
WPR