



**Geo-Vista**

## Complete Logging While Drilling System (ComLWD)

Wireless Measurement While Drilling (MWD)

Gyroscope Measurement While Drilling  
(GyroMWD)

Electromagnetic Propagation Resistivity (EPR)

Inclination and Gamma Ray (IGR)

Near-Bit Azimuth Gamma Ray (NB-AGR)

Caliper Corrected Neutron Porosity (CCN)

Rotary Azimuthal Density (RAD)

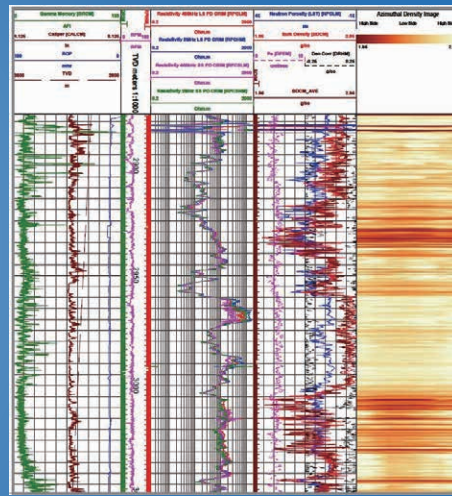
Acoustic While Drilling (AWD)

Pressure Unit While Drilling (PWD)

Pressure & Caliper Measurement While  
Drilling (PCD)

Ultrasonic Caliper Measurement While  
Drilling (CWD)

Generator Caliper Corrected Neutron  
Porosity (GCN)



[www.RenheSun.com](http://www.RenheSun.com)  
[www.geovista.cn](http://www.geovista.cn)

ComLWD



MWD

CCN /  
GCN + CWD

RAD

AWD

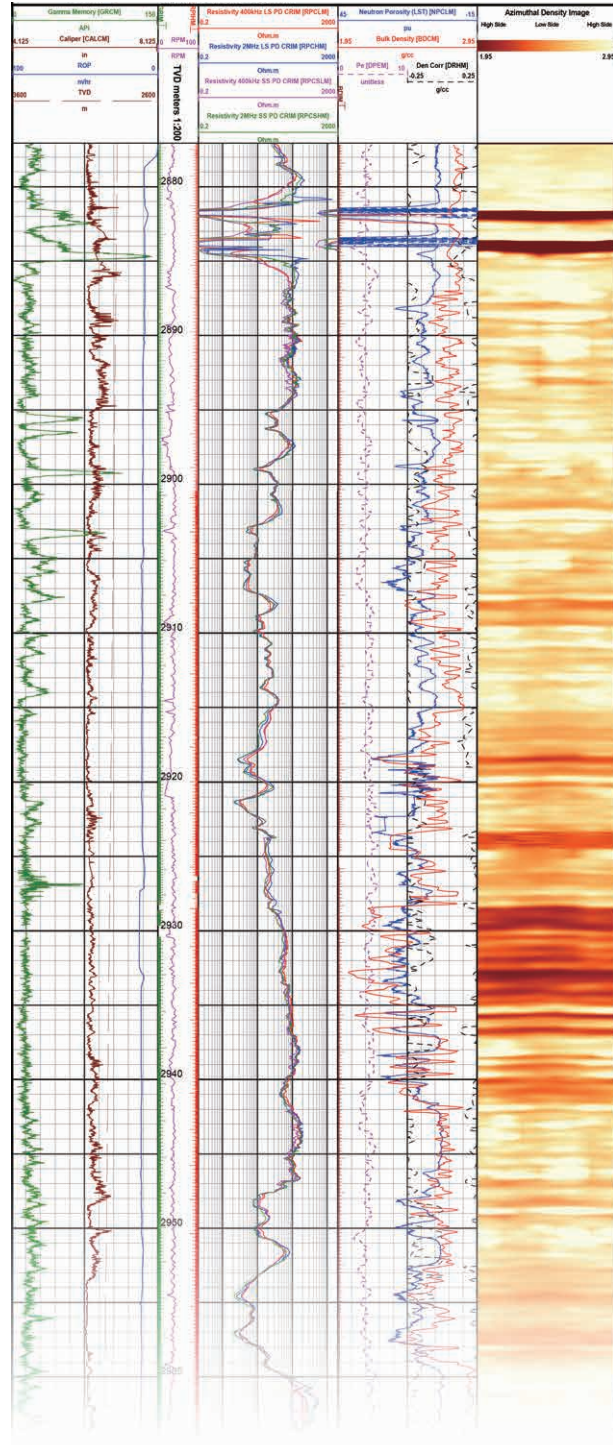
PWD/PCD

EPR

IGR

Downhole  
Motor

NB-AGR



## Applications

- Use generator model, in one run can drill long time without replacement battery, and security
- Insert mode, different sizes of instruments, electronic circuit are interchangeable, saving the cost
- Two kinds of pulser, have more choice to save cost
- Have 3.375 in. slim-hole instruments, can meet the requirements of slim-hole
- Can be connected to neutron density and acoustic instruments to logging more project
- Have Gamma inclination, it is easy to do direction drilling job

## Introduction

LWD has the advantage of measuring properties of a formation before drilling fluids invade deeply. Further, many wellbores prove to be difficult or even impossible to measure with conventional wireline tools, especially highly deviated wells. In these situations, the LWD measurement ensures that some measurement of the subsurface is captured in the event that wireline operations are not possible. Timely LWD data can also be used to guide well placement so that the wellbore remains within the zone of interest or in the most productive portion of a reservoir, such as in highly variable shale reservoirs.

## Specifications

### General Tool Specifications

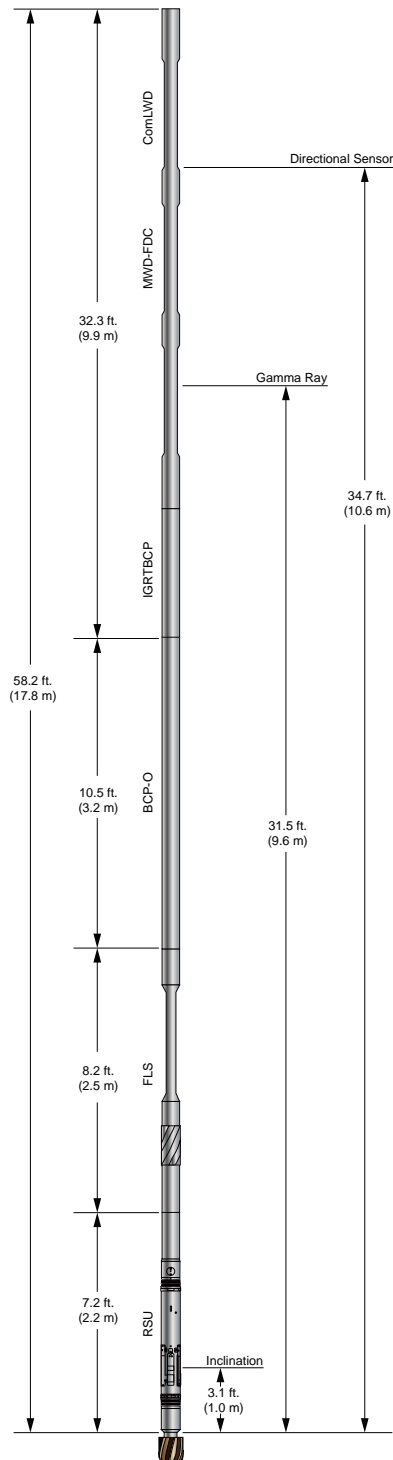
Tool OD	3.375 in.	4.75 in.	6.75 in.	8.25 in.	9.5 in.
Well OD.	3-3/4 in. to 5-7/8 in. (96-150 mm)	5-7/8 in. to 6-3/4 in. (150-172 mm)	8-1/2 in. to 9-7/8 in. (216-251 mm)	9-7/8 in. to 12-1/4 in. (251 mm-311 mm)	12-1/4 in. to 26 in. (311 mm-660 mm)
Connections	3 in. CDP box up and 3 in. CDP pin down	3-1/2 in. I.F. box up and 3-1/2 in. I.F. pin down	4-1/2 in. I.F. box up and 4-1/2 in. I.F. pin down	6-5/8 in. Reg. box up and 6-5/8 in. Reg. pin down	7-5/8 in. Reg. box up and 7-5/8 in. Reg. pin down
Dogleg Severity	Max. Rotating 20°/100 ft. (20°/30 m)	Max. Rotating 12°/100 ft. (12°/30 m)	Max. Rotating 9°/100 ft. (9°/30 m)	Max. Rotating 8°/100 ft. (8°/30 m)	Max. Rotating 8°/100 ft. (8°/30 m)
	Max. Sliding 45°/100 ft. (45°/30 m)	Max. Sliding 30°/100 ft. (30°/30 m)	Max. Sliding 16°/100 ft. (16°/30 m)	Max. Sliding 8°/100 ft. (8°/30 m)	Max. Sliding 8°/100 ft. (8°/30 m)
Mud Flow Range	Battery 80-160 gpm	160-320 gpm	300-675 gpm	400-900 gpm	600-1350 gpm

### General Tool Specifications

Max. Temperature	300°F (150°C)
Max. Pressure	20000 psi (138 MPa)
Sand Content	Max. volume recommended <1%
Lost Circulation Material	Fine to medium nut plug
Pulsation Dampener	Recommended set to 1/3 stand pipe pressure
Data Acquisition	Mud pulse telemetry to surface and downhole memory
Telemetry Type	Positive pulse
Mud Pumps	Either duplex or triplex
Downhole RPM	± 80% max. deviation from the mean Operating rpm (e.g., 100 rpm: Operation Range = 20-180 rpm)
Pulser Pressure Drop	Pressure drop dependent upon mud weight, flow rate, MWD tool valve gap, and data transmission rate.
DP at Bit	No restrictions
Mud Filter (Uphole)	Most sizes supplied
Full Survey Transmission	55 seconds from Pumps-On

## Upgrade ComLWD with Rotary Steering System

Realize rotary steering with minimum BHA using steering unit connecting with probe directional sensor and gamma. Reduce the drilling cost and improve economic benefit.



### ComLWD Crossover Sub (IGRTBCP)

Using the IGRTBCP to combine ComLWD with Rotary Steering System



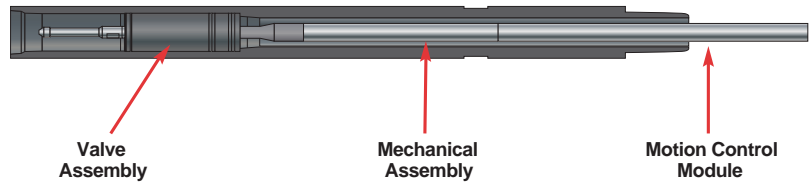
## Applications

- Steering drilling systems for re-entry and horizontal wells
- Directional control
- Relief well drilling
- Precision geosteering in high angle wells

## Introduction

MWD provides directional-drilling measurements. It helps for decision support for the smooth operation of the drilling by collected wellbore data in real-time like as deviation, azimuth, BHA tool face.

### Rotary Pulsar

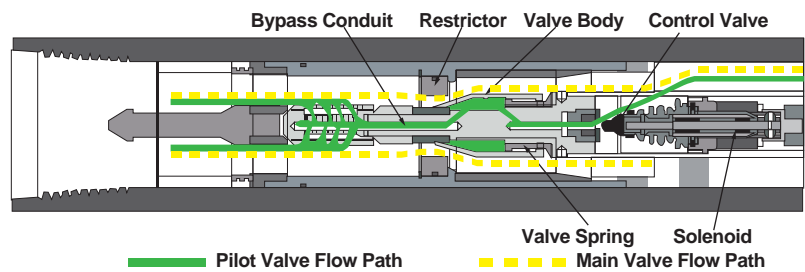


### Features

Rotary Pulsar:

- Increased reliability pulser.
- An ultra-reliable, high-efficiency DC brushless motor and controller.
- More durable shafts and seals, and better serviceability.

### Solenoid Pulsar



### Features

Solenoid Pulsar:

- Easy for maintenance
- Anti-corrosion
- Wide range flowrate

## Applications

- Steering drilling systems for re-entry and horizontal wells
- Directional control
- Relief well drilling
- Precision geosteering in high angle wells

## Introduction

Max. Pressure		20000 psi (137.9 MPa) / 25000 psi (172 MPa) (option)
Max. Temperature		300°F (150°C)/350°F (175°C) (option)
Tool O.D.	Battery	3.375 in.
	Generator	4.75 in./6.75 in./8.25 in./9.5 in.
Pulser Type		Rotary Pulser/Solenoid Pulser
Transmission Rates	Solenoid Pulser	0.2 bit/s~3 bit/s Pulse Width Selectable: 3.0/2.0/1.5/1.0/0.8/0.5/0.36/0.32/0.24 sec
	Rotary Pulser	0.2 bit/s~2 bits/s Pulse Width Selectable: 3.0/2.0/1.5/1.0/0.8/0.5/0.36 sec
Pulse Width Selectable		3.0/2.0/1.5/1.0/0.8/0.5/0.36/0.32/0.24 sec
Vibration Measurement		Shock and vibration measurements using a Triaxial Accelerometer arrangement
Sensors		Min., Max., and Ave. RPM measurements using dual Magnetometers

Measurement	Range	Resolution	Accuracy
Inclination	0° - 180°	0.1°	± 0.15°
Azimuth <sup>1,2</sup>	0° - 360°	0.35°	± 1.0°
Toolface			
Magnetic <sup>1</sup>	0° - 360°	1.4°	± 1.5°
Gravity <sup>2</sup>	0° - 360°	1.4°	± 1.5°
Temperature	150°C / 175°C (option)	2°C	±3.0°C
Dip Angle <sup>1</sup>	-90° - 90°	0.044°	± 0.3°
MTF/GTF Switching Inclination Degrees: Operator Selectable (default set at 5°)			

1 Assumes typical magnetic field values at 30° latitude.

2 Accuracy applies to inclinations greater than 5.0°.

Tool Size	Restrictor ID	Flow Range (gpm)	Flow Range (lpm)
3-3/8 in.	40mm	80-160 gpm	302-605 lpm
4-3/4 in.	49 mm (standard)	160-320 gpm	606-1,211 lpm
	47 mm (low Flow)	160-220 gpm	606-833 lpm
6-3/4 in.	52 mm (standard)	300-675 gpm	1,136-2,555 lpm
	50 mm (low flow)	300-450 gpm	1,136-1,703 lpm
8-1/4 in.	54 mm (standard)	400-900 gpm	1,514-3,407 lpm
	53 mm (low flow)	400-600 gpm	1,514-2,271 lpm
9-1/2 in.	57 mm (standard)	600-1,350 gpm	2,271-5,100 lpm
	55 mm (low flow)	600-900 gpm	2,271-3,407 lpm





## Applications

- Drilling through magnetic rock
- Wells in close proximity to others
- Whipstock orientation and window milling
- Single-shot and continuous measurement

## Introduction

The gyro tool provides a North-seeking gyro for applications where magnetic interference dictates gyroscopic instruments for directional surveying and BHA orientation. This gyro provides the inclination, azimuth and gyro tool face survey data in a magnetic environment, it can work in stationary and continuous measurement mode. One battery sub can be used for 250 hours.



## Specifications

Maximum Temperature	185°F (85°C)
Maximum Pressure	20,000 psi (137.9 MPa)
Probe OD	1.75 in. (44.5 mm)
Inclination Range	0 ~ ± 90°
Inclination Accuracy	± 0.15°
Azimuth Range	0 ~ 360°
Azimuth Accuracy	± 2° (@ Inclination > 3°)
Gyro Toolface Range	0 ~ 360°
Gyro Toolface Accuracy	± 2°
North-seeking Time	≤ 2 min
Power Supply	Battery



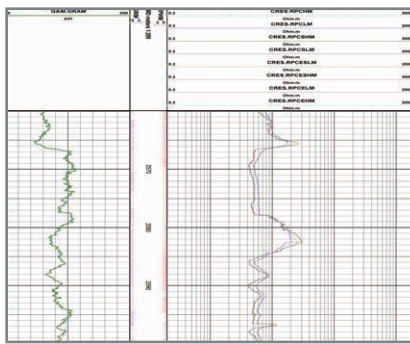


## Applications

- Provides formation resistivities
- Provide realtime formation evaluation services
- Provide wellbore placement
- Improve geosteering capabilities

## Features

- Operates at frequency of 2 MHz and 400 kHz Compensated antenna design with dual spacing transmitter pairs
- 8 quantitative resistivities with separate depths of investigation (3.375 in. provides 4 quantitative resistivities) Works in all mud types



## Introduction

Transmits electromagnetic waves into formation and measures the change in physical character of the wave on its return. The change in physical character of wave gives an indication of the Resistivity of the drilled formation.

## Specifications

Tool O.D.	3.375 in.	4.75 in.	6.75 in.	8.25 in.	
Hole Sizes	3.75 in. to 5.875 in. (96-150 mm)	5.875 in. to 6.75 in. (150-172 mm)	8.5 in. to 9.875 in. (216-251 mm)	10 in. to 12.25 in. (254-311 mm)	
Max. Pressure	20,000 psi (137.9 MPa)				
Max. Temperature	300°F (150°C)				
Length	7.4 ft. (2.3 m)	12 ft. (3.7 m)	12 ft. (3.7 m)	12 ft. (3.7 m)	
Weight	175 lbs. (79 kg)	600 lbs. (272 kg)	1,280 lbs. (581 kg)	1,595 lbs. (725 kg)	
Connections	3 in. CDP Box Uphole 3 in. CDP Pin Downhole	3-1/2 in. I.F. box up and 3-1/2 in. I.F. box down	4-1/2 in. I.F. box up and 4-1/2 in. I.F. box down	6-5/8 in. Reg box up and 6-5/8 in. Reg box down	
Dogleg	Max. Rotating	20°/100 ft. (20°/30 m)	12°/100 ft. (12°/30 m)	9°/100 ft. (9°/30 m)	8.2°/100 ft. (8.2°/30 m)
Severity	Max. Sliding	45°/100 ft. (45°/30 m)	30°/100 ft. (30°/30 m)	16°/100 ft. (16°/30 m)	8.2°/100 ft. (8.2°/30 m)
Lost Circulation Material	Fine to medium nut plug				
Pulsation Damper	Recommended, 1/3 Standpipe Pressure				
Data Acquisition	Mud pulse telemetry to surface and downhole memory				
Telemetry Type	Positive Pulse				



		2 MHz Resistivity	400 kHz Resistivity
Phase Difference	Range	0.1 to 3,000 ohm-m	0.1 to 1,000 ohm-m
	Accuracy	±1% (0.1 to 50 ohm-m) ± 0.5 mmho/m (> 50 ohm-m)	± 1% (0.1 to 25 ohm-m) ± 1.0 mmho/m (>25 ohm-m)
Attenuation	Range	0.1 to 500 ohm-m	0.1 to 200 ohm-m
	Accuracy	± 2% (0.1 to 50 ohm-m) ± 1.0 mmho/m (> 50 ohm-m)	± 5% (0.1 to 10 ohm-m) ± 5.0 mmho/m (>10 ohm-m)
	Vertical	8 in. (20 cm) for 90%	12 in. (30 cm) for 90%
	Resolution	response in conductive beds	response in conductive beds



## Applications

- Shale content evaluation
- Stratigraphic Correlation
- Lithology determination
- Bed boundaries estimation

## Introduction

The Gamma instruments measures the natural radioactivity emanating from the formation.

## Specifications

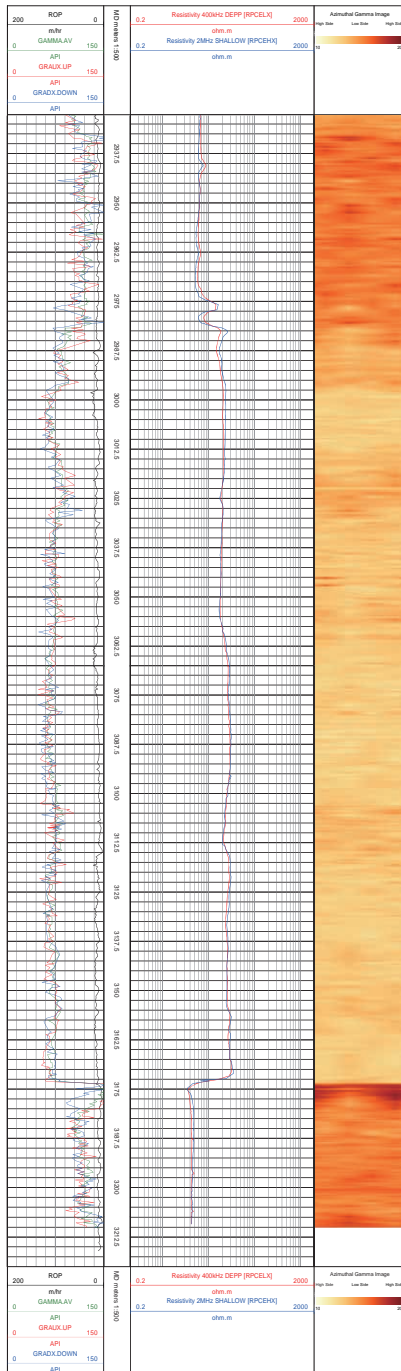
Tool OD	3.375 in./4.75 in./6.75 in./8.25 in./9.5 in.
Max. Pressure	20000 psi (137.9MPa)/25000 psi (172 MPa) (option)
Max. Temperature	300°F (150°C)/350°F (175°C) (option)
<b>Gamma Specification</b>	
Type	Scintillation
Measurement	API GR
Range	0 - 250 API
Accuracy	±3% API of full scale
Vertical resolution	6 in. (153 mm)
<b>Inclination Specification</b>	
Max. Temperature	150°C/175°C (option)
Sensor Type	Z axis accelerometer
Range	0 - 180° degrees
Accuracy	±1°@INC>30°





## Applications

- Horizontal well geosteering and formation evaluation
- Achieve precise window-in target
- Accurately identify the change direction of the geological structure of the drilled reservoir and increase the rate of drilled encounters
- Reduce cycle and waiting time
- Improve drilling efficiency

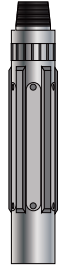


## Introduction

Near-bit azimuth gamma can accurately measure near-bit inclination and gamma, and provide early formation recognition during drilling.

## Specifications

Tool Size	4.75 in.	6.75 in.
Max Pressure	20000 psi (137.9 Mpa)	
Max Temperature	300°F (150°C)	
<b>Gamma Specification</b>		
Crystal Type	Scintillation	
Measurement	API GR	
Measuring Range	0 - 250 API	
Measuring Accuracy	±3% API of full scale	
Vertical Resolution	6 in. (153 mm)	
<b>Inclination Specification</b>		
Sensor Type	X-Y axis accelerometer Z axis accelerometer	
Measuring Range	0 - 180°	
Measuring Accuracy	±1°@INC>30°	
<b>Electromagnetic Wave Type</b>		
Tool Length	914 mm	
Tool OD	5.4 in. (138 mm)	7.25 in. (184 mm)
Modulation Type	ASK	
Baud Rate	20 Baud	
Supply Voltage	7.3 V	
Current and Power	470 mA @ 7.3 V (3.43 W)	
Connection	4-1/2 REG	
Transmission Distance	20 m	
Battery working time	150 hours	
Inclination and gamma measurement points	450 mm (Behind the drill bit)	
<b>Electric Current</b>		
Tool Length	914mm	
Tool OD	5.4 in. (138 mm)	7.25 in. (184 mm)
Modulation Type	GMSK	
Baud Rate	20 Baud	
Supply Voltage	+12 V to +24 V	
Current and Power	120 mA @ 22 V (2.64 W)	
Connection	4-1/2 REG	
Transmission Distance	20 m	
Battery working time	240 hours	
Inclination and gamma measurement points	450 mm (Behind the drill bit)	



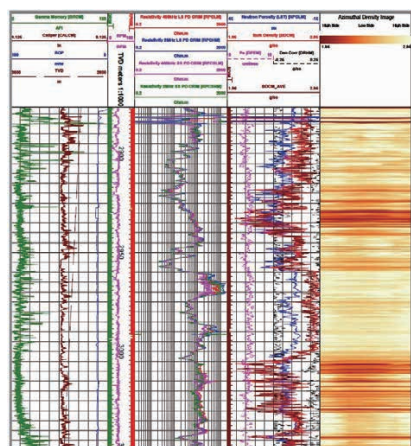
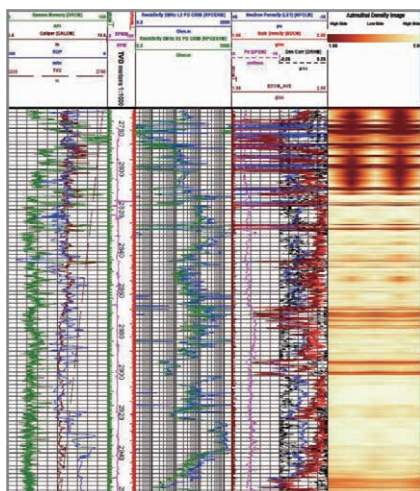


# Caliper Corrected Neutron Porosity- Rotary Azimuthal Density-4.75 (CCN-RAD-4.75)

**Geo-Vista**

## Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas-oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.



## Introduction

CCN-RAD offers measurement of formation density, neutron porosity, borehole caliper, and formation imaging. That provides geosteering for maximum reservoir exposure. Neutron porosity and bulk density are critical for the quantification of hydrocarbons in the reservoir.

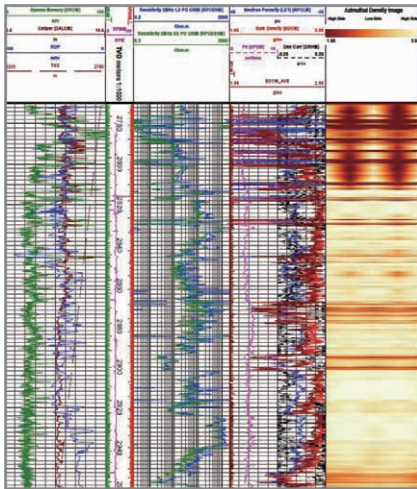
## Specifications

Diameter	4.75 in. With 5.59 in. upset
Max. Pressure	20000 psi (137.9 MPa)
Max. Temperature	300°F (150°C)
Weight	1100 lbs. (498 kg) (CCN-RAD 4)
Max. Dogleg Severity	15°/100 ft. (15°/30 m) Rotating 30°/100 ft. (30°/30 m) Sliding
<b>CCN</b>	
Service	Formation Porosity
Tool Type	Caliper Corrected Neutron
Detectors	Lithium-6 Iodide Crystal with Photomultiplier tube for both Near and Far detectors
Porosity Accuracy	0.5 pu below 10 pu, 5% of reading for 10-50 pu
Vertical Resolution	24 in. (61 cm)
Statistical Repeatability	± 0.6 pu@20 pu @ 200 ft./hr.
Max. Logging Speed	180 ft./hr (@2 points/ft.)
Depth Of Investigation	10 in. estimated for 8.5 in. 10 pu borehole
Radioactive Source	Am 241-Be Strength: 5 Curies (185 GBq)
Measure Point	4.6 ft. (1.4 m) (From downhole tool end)
Voltage	30 Vdc
Current Draw	160-170 mA
<b>RAD</b>	
Service	Formation Bulk Density Service with Hole Caliper
Tool Type	Rotational Azimuthal Density
Detectors	Nal Scintillation Crystal with photomultiplier tube for both Long and Short Spaced detectors
Density Specifications	
Range	1.6-3.1 g/cc
Accuracy	± 0.025 g/cc@200 ft./hr (60 m/hr) and 2.5 g/cc
Statistical Repeatability	18 in. (45 cm) (full resolution)
Downhole End Measure Point	5.1 ft. (1.5 m)
Photoelectric Factor Specifications	
Range	1-10 Barnes/electron (B/e)
Accuracy	± 0.25 B/e from 2-5 B/e
Statistical Repeatability	± 0.25 B/e@200 ft./hr (60 m/hr)
Vertical Resolution	6 in. (150 mm) (full resolution)
Downhole End to Pe Measure Point	5.1 ft. (1.5 m)
Acoustic Standoff Caliper Specifications	
Range	0-2 in. (Out of housing)
Accuracy	±0.075 in. (0 to 0.5 in.) ±0.125 in. (0.5 to 1.0 in.) ±0.25 in. (1.0 to 2.0 in.) Out of housing
Max. Logging Speed	180 ft./hr (@2 points/ft.)
Radioactive Source	Cs137 Strength: 2 Curies (74 GBq)
Voltage	30 V
Current Draw	350 mA-390 mA



## Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas-oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.

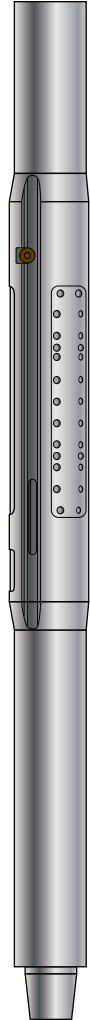


## Introduction

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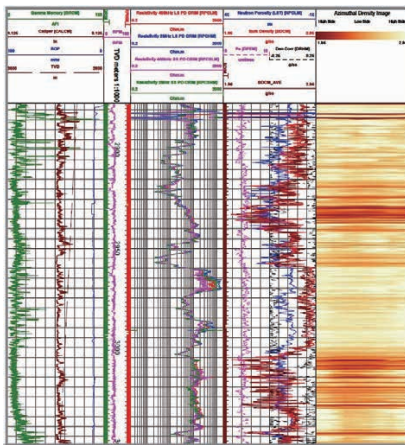
## Specifications

Diameter	6.75 in. with 7.50 in. upset	8.25 in. With 10.125 in. upset
Max. Pressure	20000 psi (137.9 MPa)	
Max. Temperature	300°F (150°C)	
Weight	893 lbs. (405 kg)	1325 lbs. (600 kg)
Service	Formation Porosity	
Tool Type	Caliper Corrected Neutron	
Dogleg Severity	9°/100 ft. (9°/30 m) Rotating	6.5°/100 ft. (6.5°/30 m) Rotating
	16°/100 ft. (16°/30 m) Sliding	12°/100 ft. (12°/30 m) Sliding
Detectors	Lithium-6 Iodide Crystal with Photomultiplier tube for both Near and Far detectors	
Porosity Accuracy	0.5 pu below 10 pu, 5% of reading for 10-50 pu	
Vertical Resolution	24 in. (61 cm)	
Statistical Repeatability	± 0.6 pu @ 20 pu @ 200 ft./hr.	
Max. Logging Speed	180 ft./hr (@2 points/ft.)	
Depth Of Investigation	10 in. estimated for 8.5 in. 10 pu borehole	
Radioactive Source	Am 241-Be Strength: 5 Curies (185 GBq)	
Measure Point	4.6 ft. (1.4 m) (From downhole tool end)	
Voltage	30 Vdc	
Current Draw	160-170 mA	



## Applications

- Accurate, real-time quantification of porosity and gas identification for saturation calculations.
- Reservoir Navigation using high-resolution imaging and gas-oil/water identification in real-time.
- Wellbore stability analysis using azimuthal caliper and density imaging in real-time.
- Structural formation dip analysis and updating reservoir models from density imaging.
- 8 or 16 sector azimuthal density, Pe and borehole caliper measurements.

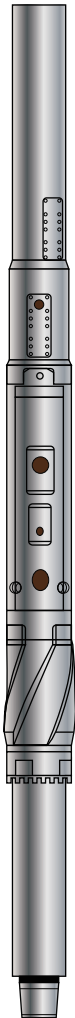


## Introduction

CCN-RAD offers measurement of formation density, neutron porosity, borehole caliper, and formation imaging. That provides geosteering for maximum reservoir exposure. Neutron porosity and bulk density are critical for the quantification of hydrocarbons in the reservoir.

## Specifications

Diameter	6.75 in.	8.25 in.
Max. Pressure	20000 psi (137.9 MPa)	
Max. Temperature	300°F (150°C)	
Weight	1092 lbs. (495 kg)	1945 lbs. (881 kg)
Service	Formation Bulk Density Service with Hole Caliper	
Tool Type	Rotational Azimuthal Density	
Max. Dogleg	Rotating	9°/100 ft. (9°/30 m)
Severity	Sliding	16°/100 ft. (16°/30 m)
		12°/100 ft. (12°/30 m)
Detectors	NaI Scintillation Crystal with photomultiplier tube for both Long and Short Spaced detectors	
<b>Density Specifications</b>		
Range	1.6-3.1 g/cc	
Accuracy	± 0.015 g/cc	
Statistical Repeatability	± 0.025 g/cc@200 ft./hr (60 m/hr) and 2.5 g/cc	
Vertical Resolution	18 in. (45 cm) (full resolution)	
Downhole End Measure Point	5.1 ft. (1.5 m)	
<b>Photoelectric Factor Specifications</b>		
Range	1-10 Barnes/electron (B/e)	
Accuracy	± 0.25 B/e from 2-5 B/e	
Statistical Repeatability	± 0.25 B/e@200 ft./hr (60 m/hr)	
Vertical Resolution	6 in. (150 mm) (full resolution)	
Downhole End to Pe Measure Point	5.1 ft. (1.5 m)	
<b>Acoustic Standoff Caliper Specifications</b>		
Range	0-2 in. (Out of housing)	
Accuracy	±0.075 in. (0 to 0.5 in.)	
	±0.125 in. (0.5 to 1.0 in.)	
	±0.25 in. (1.0 to 2.0 in.) Out of housing	
Max. Logging Speed	180 ft./hr (@2 points/ft)	
Radioactive Source	Cs137 Strength: 2 Curies (74 GBq)	
Voltage	30 V	
Current Draw	350 mA~390 mA	



## Applications

- Optimize mud-weight selection
- Predict pore pressure independent of temperature and salinity effect.
- Identify top-of-cement
- Understand rock mechanical properties
- Measure porosity sourceless
- Position bit-on-seismic using synthetics
- Identify gas influx or formation gas.
- Perform many other standard sonic applications.

## Introduction

Acoustic While Drilling (AWD) provides real-time compressional and shear wave travel-time measurements in slow and fast formations. Shear and compressional slowness with computed semblance values are acquired using a state-of-the-art acoustic source combined with multiple arrays of receivers. Advanced downhole processing and waveform stacking techniques ensure reliable and fully compensated measurements.

## Specifications

Diameter		4.75 in.	6.75 in.
Tool O.D.		4.82 in. (122.43 mm)	6.9 in. (175.26 mm)
Hole Size		5.625 in. to 8 in. (143 to 203 mm)	8.5 in. to 10.625 in. (216 mm to 270 mm)
Max. Operating Temperature		300°F (150°C)	
Max. Operating Pressure		20,000 psi (137.9 MPa)	
Length		30 ft. (9 m)	23.8 ft. (7.254 m)
Weight		1,760 lbm (798 kg)	2,500 lbm (1,134 kg)
Thread	HbuildLWD	GT4 box up/ GT4 pin down	GT6 box up/ GT6 pin down
	ComLWD	NC38 box up/ NC38 pin down	NC46 box up/ NC46 pin down
Connections			
Makeup Torque		8845 ft.-lbf (11,984 N.m)	25,000 ft.-lbf (33,895 N.m)
Max. Dogleg Severity	Rotating	15°/100 ft. (15°/30 m)	8°/100 ft. (8°/30 m)
	Sliding	30°/100 ft. (30°/30 m)	16°/100 ft. (16°/30 m)
Max. Flow Rate		400 gal US/min. (1,514 L/min.)	800 gal US/min. (3,028 L/min.)
Max. Sand Content		3%	
Max. LCM Size		0.63 in. (16 mm)	
Average Inertia		62 in.	
Transmitters Number		1	
Receivers Number		4	
Measurement Type		Compression Wave & Shear Wave	
Accuracy, us/ft. (us/0.305 m)		± 1	
Measurement Range		All tools 40-230 us/ft. dependent on mud type	
Max. Shock		250 g for 100,000 cycles	
Measure Point From Tool Bottom		14 ft. (4.267 m)	





## Applications

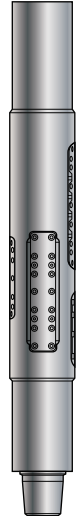
- Conductive to the control of well safety
- Optimizing the acquisition period
- Minimizing the total time required to accurately measure annular pressure

## Introduction

PWD can accurately detect the annular pressure, the borehole pressure and temperature. Used to judge the underground complex situation, such as well leakage, blowout, well inflow and monitoring well, and conducive to the control of well safety.

## Specifications

Tool O.D.	4.75 in. / 120 mm	6.75 in. / 172 mm	8.25 in./210 mm
Max. Pressure	20000 psi (137.9MPa)/25000 psi (172 MPa) (option)		
Max. Temperature	300°F (150°C)/350°F (175°C) (option)		
Length	5 ft.-6.93 in. (1.7 m)	4 ft.-3.18 in. (1.3 m)	4 ft.-8 in. (1.424 m)
Flow range	160-320 gpm	300-675 gpm	400-900 gpm
Data Acquisition Type	Real-time & Downhole Record		
Data Transmit Type	Data Transmit Type Positive pulse		
Pressure Measurement Range	0 - 25000 psi		
Accuracy	Accuracy ± 0.25% full scale		





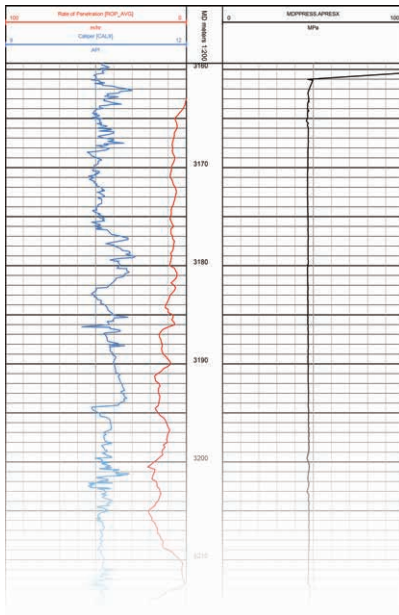


# Pressure & Caliper Measurement While Drilling (PCD) Ultrasonic Caliper Measurement While Drilling (CWD)

**Geo-Vista**

## Features

- Accurate downhole measurement of equivalent circulating density.
- Swab/surge pressure monitoring while tripping and reaming.
- Accurate downhole measurement of hydrostatic pressure and effective mud weight.
- Accurate measurement of caliper



## Introduction

PCD can accurately detect the annular pressure, the caliper, the borehole pressure and temperature. If PCD has no pressure measurement function, it is CWD (Ultrasonic Caliper Measurement While Drilling). It is used to judge the underground complex situation, such as well leakage, blowout, well inflow and monitoring well, and conducive to the control of well safety.

## Specifications

Tool Diameter	4.75 in. (120mm)/6.75 in. (171 mm)/ 8.25 in. (210 mm)
Max. Pressure	20,000 psi (137.9 MPa)
Max. Temperature	300°F (150°C)
Make-up Length	6 ft.-2.8 in. (1.9 m)
Operating Time Real-Time	No Limited
Flow Range	100-300 gpm
Data Acquisition Type	Real-time & Downhole Record
Data Transmit Type	Positive pulse
Pressure Measurement Range	0-25000 psi
Caliper Measurement Range	0-2 in. (Out of housing)
Caliper Accuracy	±0.075 in. (0 to 0.5 in.)
	±0.125 in. (0.5 to 1.0 in.)
	±0.250 in. (1.0 to 2.0 in.)
	Out of housing





### Features

- Safety, environmental protection, non-radioactive to operator
- High pulse neutron energy, high count rate, it can be extended for full spectrum measurement
- With open bus structure, it can be combined with other LWD tools

### Introduction

The GCN is a logging-while-drilling tool that uses a pulsed neutron generator instead of a chemical source. The instrument only use one drill collar, it uses an open bus structure can be combined with other LWD tools. It is used to monitor formation porosity during drilling to achieve “chemical source free logging”. It consists of pulsed neutron generator, neutron detector, processing circuit It needs to be combined with PCD (Pressure & Caliper measurement while drilling) for neutron porosity corrected.

### Specifications

Tool Diameter	4.75 in. (120 mm)/6.75 in. (171 mm)/8.25 in. (210 mm)
Max. Pressure	20,000 psi (137.9 MPa)
Max. Temperature	300°F (150°C)
Make-up Length	15 ft.-8.98 in. (4.8 m)
Vibration	20 G, random frequency range 20~100,100 ~200 Hz
Shock	500 G, 11 ms semi-sine wave
Neutron Energy	2.5 MeV
Neutron Yield	> 1*10 <sup>8</sup> n/s
Measurement Range	0 to 100 p.u.
Measurement Accuracy	0.5 p.u. below 10 p.u.; 5% of measurement otherwise
Repeatability	± 0.6 p.u. @ 20 p.u. @ 200 ft./hr.





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