

Slim Hostile Logging System (HostileLog)

DEoRC Slim Hostile Logging System (HostileLog)

Introduction

HostileLog is used in logging under high temperature, high pressure, small borehole and harsh mud environments. The instrument has high temperature sensors and corrosion-resistant components, and operated at 400°F(204°C) / 25000 psi (172.4 MPa) high temperature and high pressure conditions for 8 hours . Without the temperature flask, HostileLog works continuously at 350°F(177°C) for more than 36 hours, and providing high-quality logging data with PIDAS data acquisition system. HostileLog is combined pipe conveyed logging (PCL) system for horizontal well operations.

Features of Optional Special Tools

*TST-HL (95 mm) has a constant temperature adjustment function. During the logging process, the cooling system cools the inside of the tools by 30-50 °C, and the higher the well temperature, the greater the cooling rate. Make it work for a long time at 400°F(204°C) high temperature conditions TST-HL completes the energy spectrum logging under the conditions of high temperature and high pressure slim hole.

*The maximum diameter of ZDT-IH is 92 mm, which can be used in a 4.5-inch borehole. The radioactive source is conventional density radioactive sources. The stable spectrum measurement completes the grand slam logging.

*FAC-SH (70 mm) has four independent arms. The four independent arms measure four independent calipers, which can measure the caliper more accurately.



Slim Hostile Logging System (HostileLog) General Specifications

Applications & Benefits

Formation evaluation and lithology identification: slim boreholes, high pressure and high temperature wells, extended-reach wells, reentry wells.

Pipe Conveyed Logging (PCL)

High temperature and high pressure (HPHT) formation evaluation method in slim hole well.

Reduce operating costs by improving reliability, combinability and quick assembly / disassembly.

General Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Maximum Logging Speed	18 m/min

* Continuously long time work with no flask under the temperature of 350° F(177°C).

DOWNHOLE TOOLS

- Cablehead-Slim (CHS)
- Temperature/Tension/Mud Resistivity Tool-Slim Hostile (TTR-SH)
- Casing Collar Locator-Slim Hostile (CCL-SH)
- Telemetry/Gamma Ray Tool-Slim Hostile (TGT-SH)
- Telemetry/Spectrolog Tool-Hostile Longtime (TST-HL)
- Orientation Tool-Slim Hostile (ORT-SH)
- Compensated Neutron Tool-Slim Hostile (CNT-SH)
- Litho-Density Logging Tool-Slim Hostile (ZDT-SH)
- Motor Push Sub-Slim Hostile (MPS-SH)
- Litho-Density Logging Tool-Integrated Hostile (ZDT-IH)
- Acoustic Tool-Slim Hostile (ACT-SH)
- Dual Lateral log Tool-Slim Hostile (DLT-SH)
- Micro Spherical Focused Laterolog Tool-Slim Hostile (MSF-SH)
- Array Induction Tool-Slim Hostile (AIT-SH)
- Four Arms Caliper-Slim Hostile (FAC-SH)
- Mass Isolator Sub-Slim Hostile (MIS-SH)
- Insulation Sub-Slim Hostile (ISS-SH)
- Swivel Sub-Slim Hostile (SWS-SH)
- Four Arms Centralizer Sub-Slim Hostile (FCS-SH)
- Flex Joint Sub-Slim Hostile (FJS-SH)

Optional tools

- Double Knuckle Joint-Slim Hostile (DKJ-SH)
- Single Knuckle Joint-Slim Hostile (SKJ-SH)
- Pressure Isolated Sub-Slim Hostile (PIS-SH)
- Decentralizer Sub-Slim Hostile (DCS-SH)



The PI Data Acquisition System (PIDAS) is designed for data acquisition and processing in combination with Open-hole and Cased Hole tool. This PIDAS is based on portable notebook as a host and remote transmission system with high-speed data communication. Software is based on Windows OS with multi-task & multi-user, and using a large number of modern image processing technology. By equipment array, imaging and large information, real-time logging data acquisition, control and processing achieve multi-parameter acquisition and multi-task time-sharing processing.



Specifications

Physical Dimensions & Weights

Height	29.13 in. (740 mm)
Depth	29.33 in. (745 mm)
Width	27.56 in. (700 mm)
Shipping Weight	160.9 lbs (73 kg)

Environmental Characteristics

Operating Temperature	0°C~+50°C
Storage Temperature	-20°C~+75°C
Relative Humidity	< 95%

Vibration (3D)	3g 10~60 Hz (When not working)
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Shock (3D)	3g 10~60 Hz (When not working)
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System Power Supply 85~265 Vac, 43Hz~70Hz

Downhole Instrument Power Supply

AC Power ACP-2 0~1400 Vac, 1200W

DC Power DCP-2 0~600 Vdc, 1.7A

Introduction

It is used to connect 7 conductor cable and downhole tool string in logging construction. It has the advantages of small type, easy connection operation, simple maintenance and safe use, high efficiency and low cost.

Specifications

Maximum Temperature	430°F (220°C)
Maximum Pressure	29,000 psi (200 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Make-up Length	2 ft.-1.32 in. (0.64 m)
Shipping Length	3 ft.-4.27 in. (1.02 m)
Weight	27.1 lbs (12.3 kg)
Maximum Tensile Force	100,000 lbs.





Temperature/Tension/Mud Resistivity Tool -Slim Hostile (TTR-SH)

Introduction

The TTR-SH is a sub containing three types of transducers for measurement of cablehead tension/compression force, borehole temperature, and mud resistivity.

Specifications

Maximum Temperature	400°F(204°C) 430°F(220°C) Optional
Maximum Pressure	29,000 psi (200 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Make-up Length	5 ft.-1.3 in. (1.56 m)
Shipping Length	6 ft.-4.28 in. (1.94 m)
Weight	45.2 lbs (20.5 kg)
Maximum Logging Speed	100 ft./min (30 m/min)
Measurement Range	
Cablehead Tension	0 to 12,000 lbs Tension 0 to 10,000 lbs Compression
Borehole Temperature	32°Fto 450°F(0°C to 230°C)
Mud Resistivity	0.01 ohmm to 10 ohm
Maximum Tensile Force	50,000 lbs
Maximum Compressive Force	18,000 lbs



Casing Collar Locator-Slim Hostile (CCL-SH)

Introduction

The CCL-SH tool measurement is based upon the principle that a changing magnetic flux within the tool sensor coil generates a voltage across the terminals of that sensor coil. The magnetic field of a CCL-SH magnet is affected by any magnetically sensitive material close to it, such as the casing in a borehole. A collar or joint in the casing changes the magnetic flux field including the flux passing through the sensor coil ends adjacent to the magnets, causing an electric voltage to be generated.

Specifications

Maximum Temperature	430°F (220°C)
Maximum Pressure	29,000 psi (200 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Make-up length	1 ft.-10.42 in. (0.57 m)
Shipping length	3 ft.-1.38 in. (0.95 m)
Weight	25.05 lbs. (11.36 kg)
Source Type	Magnets
Sensor Type	Coil
Maximum Tensile Force	100,000 lbs
Maximum Compressive Force	100,000 lbs



Introduction

This tool is the downhole telemetry interface tool. The primary function of the TGT-SH is to act as a repeater of the telemetry channels and to create the telemetry tool Bus . A secondary function is to acquire data from several sensors located in its electronic cartridge and outside of it. It can acquire the signal of natural gamma-ray, and it can acquire the data from the downhole temperature/tension/mud resistivity.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Make-up Length	9 ft.-0.12 in. (2.75 m)
Shipping Length	10 ft.-3.08 in. (3.13 m)
Weight	75.85 lbs. (34.4 kg)
Maximum Tensile Force	100,000 lbs
Maximum Compressive Force	100,000 lbs
Maximum Logging Speed	200 ft./min (60 m/min)
Gamma Ray Energy Range	0.06 to 3.5 MeV
GR Accuracy	±3% of measured value
Wireline Requirements	7-conductor cable



Introduction

TST-HL is thermostatic regulation tool, it is fully competent of work continuously and stably for 36 hours under the harsh environment of 400°F(204°C), in high temperature environment, TST-HL needs continuous supply power to achieve the effect of cooling. TST-HL acquires data and communicates between downhole tools and surface system. It transmits downhole temperature/tension/ mud resistivity data to surface system at the same time. It also measures natural gamma-ray and digital spectralog.

Specifications

Max Temperature	400°F(204°C) > 36 hours
Max Pressure	25,000 psi (172.4 MPa)
Tool Diameter	3.75 in. (95.2 mm)
Minimum Hole Diameter	4.50 in. (114.5 mm)
Make-up Length	10 ft.-4.96 in. (3.174 m)
Shipping Length	11 ft.-9.44 in. (3.592 m)
Weight	132.3 lbs. (60 kg)
Maximum Logging Speed	30 ft./mim (9 m/min)
Maximum Tensile Force	78,000 lbs (35,381 kg)
Maximum Compressive Force	78,000 lbs (35,381 kg)
Gamma Ray Accuracy	±3% of measured value
Gamma Ray Energy Range	0.06 to 3.5 MeV
Spectralog Measuring Range	0.04 to 3.5 MeV



Introduction

This tool is a general-purpose borehole orientation logging device. It continuously establishes the position of the tool string with respect to vertical and magnetic north. It acquires digital signals of three orthogonal accelerometers, three orthogonal magnetometers, and temperature, which comprises the sensor package.

Specifications

Maximum Temperature	400°F(204°C)
Maximum Pressure	25,000 psi (172.4 MPa)
Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Logging Speed	125 ft./min (38.1 m/min)
Sensor Accuracy	
Azimuth	± 1.5 degrees
Deviation	± 0.25 degrees
Drift Azimuth	± 1.5 degrees
Maximum Tensile Force	100,000 lbs
Maximum Compressive Force	100,000 lbs



Introduction

The CNT-SH measures the hydrogen index of downhole formations. The measurements are converted to porosity values, which in combination with density tool measurements provide an indication of lithology and gas in zones of interest.

The CNT-SH contains a radioactive source that bombards the formation with fast neutrons. Detectors count the slowed neutrons deflected back to the tool. Because the CNT-SH responds primarily to the hydrogen content of the formation, the measurements are scaled in porosity units. CNT-SH uses two thermal detectors to produce a borehole-compensated thermal neutron measurement.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa) / 29,000 psi (200 MPa)(optional)
Tool Diameter	2.75 in. (70 mm)
Hole Size	3.5 in. (88.9 mm) to 12 in. (305 mm) (limited by decentralizer)
Make-up Length	8.0 ft.-9.0 in. (2.67 m)
Weight	106.26 lbs (48.2 kg)
Logging Speed	60 ft./min (18 m/min)(Max) / 30 ft./min (9 m/min)(Typical)
Measuring Range	-3 to 70 Limestone Porosity Units (p.u.)
Accuracy	± 0.5 p.u. below 7 p.u. porosity ± 7% of recorded value above 7 p.u. porosity
Repeatability	± 1.5 p.u. @ 15% Limestone porosity
Depth of Investigation	12 in. (304.8 mm)



Introduction

The motor push sub is a decentralizer for use with litho-density logging tool mandrel, it make the density measurement accuracy and measure the borehole caliper.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	11 in. (280 mm)
Make-up Length	6 ft.-6.35 in. (1.99 m)
Shipping Length	7 ft.-9.31 in. (2.37 m)
Weight	88.2 lbs. (40 kg)
Maximum Tensile Force	49,000 lbs
Maximum Compressive Force	8,000 lbs
Absolute Accuracy	± 0.30 in. (7.6 mm) from 6.0 to 11.0 in. (152.4 to 280 mm)
Caliper Range	2.75 in. (70 mm) to 11 in. (280 mm)



Introduction

The ZDT-SH measures formation density, photoelectric factor (a lithology indicator), borehole diameter with MPS. The density data are used to calculate porosity and determine the lithology. The combination of density and CNT-SH data is used to indicate the presence of gas.

The ZDT-SH has a gamma ray source and two detectors. Magnetics shielding and high-speed electronics ensure excellent measurement stability. It records the full-pulse-height gamma ray spectra from both detectors and processes them into windows.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa) / 29,000 psi (200 MPa) optional
Tool Diameter	2.75 in. (70 mm)
Hole Size	3.5 in. (88.9 mm) to 11.0 in. (280 mm)
Make-up Length	18 ft.-2.75 in. (5.56 m)
Weight	153 lbs (69.3 kg)
Maximum Logging Speed	60 ft./min (18 m/min) <30 ft./min (9 m/min)(Recommended)
Measuring Range	1.3-3.0 g/cc
Absolute Accuracy	Den: ± 0.025 gm/cc (2.0 to 3.0 gm/cc) Pe: ± 0.3 B/e (1.3 to 6.0 B/e)
Depth of Investigation	8.0 in. (203.2 mm) Estimated



Litho-Density Logging Tool -Integrated Hostile(ZDT-IH)



Introduction

ZDT-IH measures formation density, photoelectric factor, borehole diameter. The density data are used to calculate porosity and determine the lithology. The combination of density and CNT-SH data is used to indicate the presence of gas. ZDT-IH has a gamma ray source and two detectors. Magnetics shielding and high-speed electronics ensure excellent measurement stability. It records the full-pulse-height gamma ray spectra from both detectors and processes them into windows.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	3.625 in. (92 mm)
Hole Size	4.5 in. (114.3 mm) to 17.5 in. (444.5 mm)
Make-up Length	1.3 ft.-4.43 in (4.08 m)
Weight	335 lbs (152 kg)
Maximum Logging Speed	30 ft./min (9 m/min)
Caliper	4.5 in.-17 in.
Measuring Range	1.3-3.0 g/cc
Repeatability	Den: ± 0.015 g/cc (from 2 to 3 g/cc) Pe: ± 0.2 B/e (Absence of mudcake)
Absolute Accuracy	Den: ± 0.025 gm/cc (2.0 to 3.0 g/cc) Pe: ± 0.2 B/e (13 to 60 B/e) Caliper: ± 0.30 in. (76mm) from 4.5 to 1.7 in.
Depth of Investigation	8.0 in. (203.2 mm) Estimated

Introduction

ACT-SH primary application for this service is measurement of compressional Δt . This tool was developed to provide high quality compressional Δt measurement with minimal operations investment in a relatively small physical tool package.

The ACT-SH-EA is compatible and simultaneously acquires up to 4 waveforms from up to 4 receivers. The ACT-SH-PA & MA is the portion of the Digital Acoustilog sonde which excites, receives and routes the acoustic signatures recovered by the tool.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Size	3.5 in. (88.9 mm)
Maximum Hole Size	12.0 in. (305 mm)
Make up Length	
ACT-SH-EA	6 ft.-0.8 in. (1.85 m)
ACT-SH-PA	6 ft.-9.5 in. (2.07 m)
ACT-SH-MA	8 ft.-11.3 in. (2.73 m)
Weight	
ACT-SH-EA	66.8 lbs (30.3 kg) , Estimated
ACT-SH PA&MA	175.7 lbs (79.7 kg)
Logging Speed	60 ft/min (18 m/min) max.
Repeatability	+/- 1%
Vertical Resolution	0.5 ft. (15.24 cm)



DEoRC Dual Lateral log Tool-Slim Hostile (DLT-SH)

Introduction

The DLT-SH tool measures formation resistivity and is designed primarily for use in boreholes filled with highly conductive drilling fluids. DLT-SH provides two resistivity measurements: a Shallow reading to investigate the formation near the borehole and a Deep reading to measure farther out where the formation is less disturbed by drilling fluids. These two readings are used to estimate the amount of hydrocarbon in a formation and the ease of recovering that hydrocarbon.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.875 in. (73 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	16 in. (406.4 mm)
Make-up Length	22 ft. - 1.37 in. (6.74 m)
Weight	
Electronics	118.6 lbs. (53.8 kg)
Mandrel	129.8 lbs. (58.9 kg)
Measurement Range	0.2 to 40,000 ohm-m
Radius of Investigation	Deep Standard Return Mode 55 in. (1.397 m) Shallow Standard Mode 18 in. (0.457 m)
Maximum Tensile Force	42,000 lbs
Maximum Compressive Force	7,400 lbs



Introduction

Micro Spherical Focused Laterolog Tool-Slim Hostile (MSF-SH) is applicable to medium-deep well logging with water-based mud (fresh water or brine), sand shale or limestone. In combination with dual laterolog, MSF-SH can effectively judge the oil, gas and water-bearing properties of formations.

MSF-SH allows the measured flush zone resistivity R_{xo} not to be affected by both low resistance mud cakes and original formation resistivity and can measure out formation flush zone resistivity more accurately.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.75 in. (70 mm) 3.625 in. (92 mm) in pad
Minimum Hole Diameter	4 in. (101.6 mm)
Maximum Hole Diameter	16 in. (406 mm)
Make-up Length	14 ft.- 1.45 in. (4.30 m)
Weight	
MSF-SH-EA	92.6 lbs. (42 kg)
MSF-SH-MA	94.4 lbs. (42.8 kg)
R _{xo} record range	0.2 to 2000 Ohm·m
Depth of Investigation	3.94 in. to 5.9 in.(100 mm to 150 mm)
Caliper Range	4 in. to 16.54 in.



DEoRC Array Induction Tool-Slim Hostile (AIT-SH)

Introduction

The AIT-SH uses multi-spacing and multi-frequency measurements to acquire a complete set of data from the formations surrounding the borehole. The multi-spacing measurements allow improved conductivity measurements in complex environments. The short-spacing measurements (as short as 6-inch spacing) allow improved correction for borehole, rugosity and invasion effects. The long-spacing measurements (up to 94-inch spacing) are useful in deep invasion situations. AIT-SH allows us to characterize invasion profiles, even in oil-based muds.

Specifications

Maximum Temperature	400°F(204°C) for 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.875 in. (73 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	20.0 in. (508 mm)
Make-up Length	32 ft. -7.69 in. (9.95 m.)
Recommended Logging Speed	30 ft/min
Measurement Accuracy (homogenous formation)	
60, 90, 120 in. depth of investigation	± 1 mS/m, ±2% of reading
30 in. depth of investigation	± 2 mS/m, ±2% of reading
20 in. depth of investigation	± 4 mS/m, ±2% of reading
10 in. depth of investigation	± 10 mS/m, ±2% of reading
Sample Rate (S)	4 samples per ft. (recommended) 2 samples per ft. (high speed)



DEoRC **Four Arms Caliper-Slim Hostile (FAC-SH)**

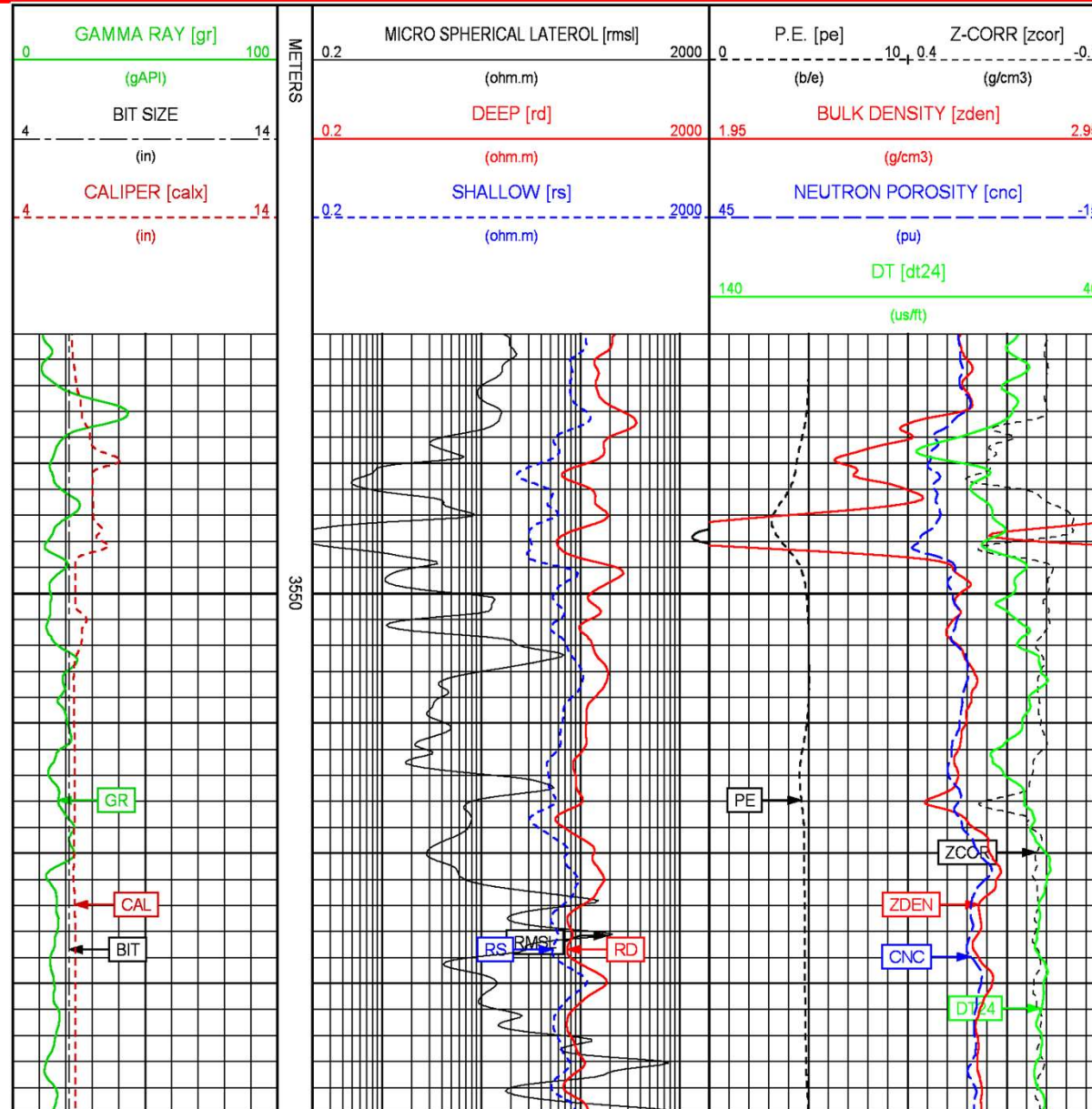
Introduction

Four independent arm caliper meter, is the engineering logging and logging data borehole environment correction essential tool. Four arm are respectively connected with four independent potentiometer, and the relative two points series get a diameter data, achieve accurate measure of hole diameter functions.

Specifications

Maximum Temperature	400 °C (204 °C) 8 hours
Maximum Pressure	25,000 psi (172.4 MPa)
Tool Diameter	2.75 in. (70 mm)
Minimum Hole Diameter	3.5 in. (88.9 mm)
Maximum Hole Diameter	21 in. (533.4 mm)
Make-up Length	11 ft.-1.98 in. (3.40 m)
Shipping Length	12 ft.-6.43 in. (3.82 m)
Weight	30.9 kg
Caliper Accuracy	2%
Maximum Tensile Force	50,000 lbf.
Maximum Compressive Force	8,000 lbf.





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