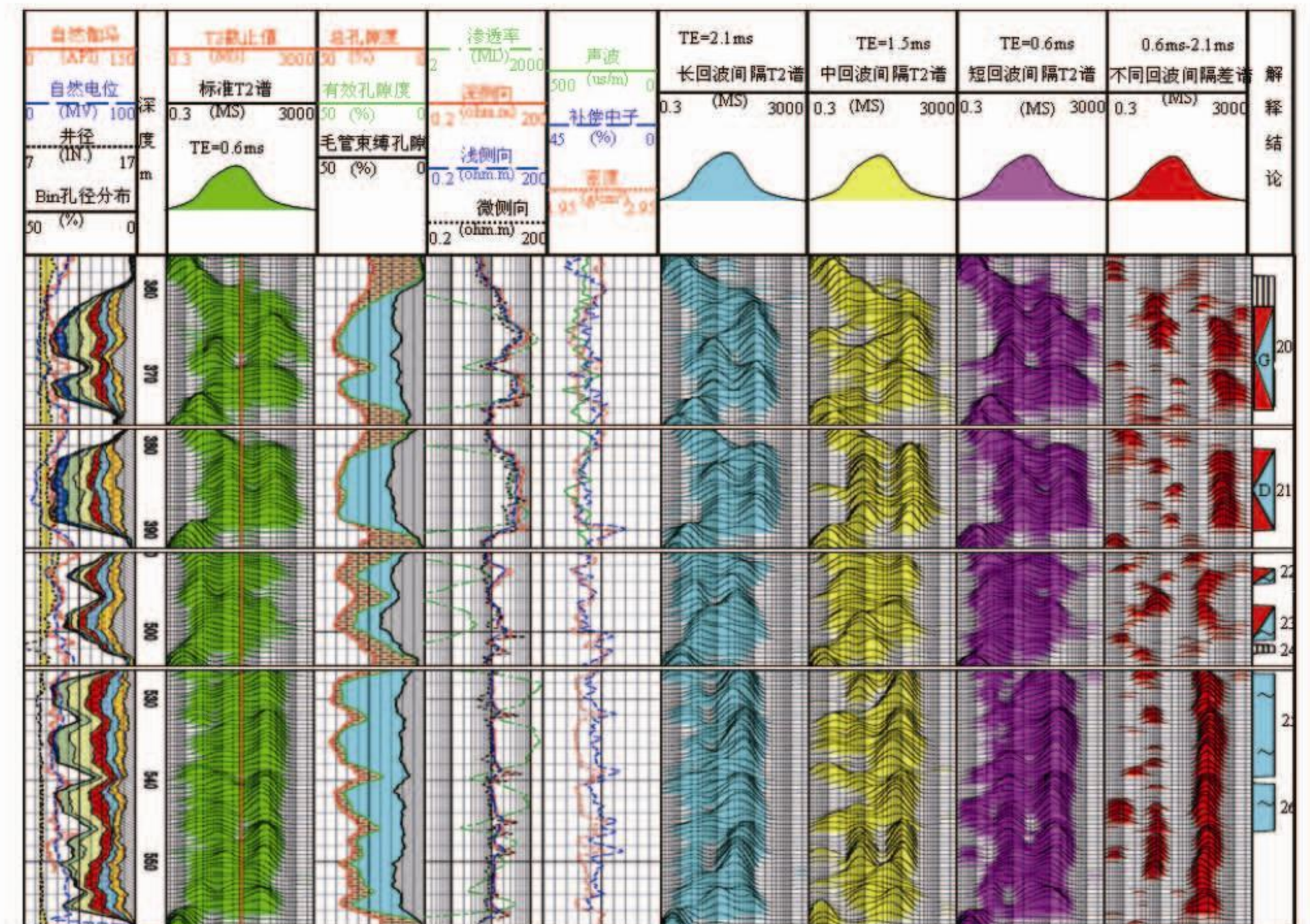


Nuclear Magnetic Resonance Tool (NMR-M)

The NMR-M tool measures hydrogen for porosity and relaxation rates of protons. This tool is primarily a digital device. NMR experiments are a measurement of time required for protons to either align with an external magnetic field or for processing protons to de-phase, or relax (T2 measurement).

Specifications

Maximum Temperature	350°F (175°C) for 2 hrs
Maximum Pressure	20,000 psi
Logging Speed:	
Standard T2, hydrocarbon typing:	logging: > 6 fpm target: 20fpm in low loss environment.
Total porosity:	logging: > 3fpm BVI logging: >30 fpm target: 60 fpm in low loss environment. Stationary Measurements possible
Tool Bandwidth:	
1200 echoes per second	22 Kbit/sec
Depth of investigation beyond borehole wall (depends on frequency)	2.6 – 4.5 in
Investigation shell thickness:	0.06 in. (1.3 mm.)
Investigation shell arc length	120 deg.
Static Field Gradient	10 – 24 gauss/cm
Measurement range:	
Porosity	0 – 100 p.u
Per Echo noise level (rms). Rm>0.2 ohm-m	4 p.u.
Maximum Pulse rate	1200 echoes per sec.
Minimum TE	0.6 msec target < 0.4 msec
Measurement accuracy:	1 p.u.
Antenna aperture	24 in.
Wireline requirements	7 conductor
Operating power	AC Power (180VAC) <150mA DC Motor Power (-600VDC) < 1.2A



Make-up length:	<17 ft.
Shipping length:	<18 ft.
After disassembly at lab joint	10 ft.
Instrument weight:	500lbs (227 kg.)
Instrument Diameter	5.0 in.
Minimum Hole Diameter	6.0 in.
Maximum Hole Diameter	14.0 in.
Ring diameter	1 inch below bit size
This means that if external equipment is required such as stand-offs, decentralizers, or external shields, it will close down to a diameter less than the ring size.	
Operating position	Decentralized
Hole deviation	Vertical to horizontal
Minimum Dogleg Radius (no tool bending)	
6" hole	337 ft (17 deg/100 ft.)
8" hole	112 ft (51 deg/100 ft.)
12.25" hole	47 ft (120 deg/100 ft.)
14" hole	37 ft (153 deg/100 ft.)
Minimum Dogleg Radius (bending, with safety factor 2)	
6" hole	173 ft (33 deg/100 ft.)
8" hole	85 ft (67 deg/100 ft.)
12.25" hole	42 ft (136 deg/100 ft.)
14" hole	33 ft (169 deg/100 ft.)
Tensile strength (safety factor 2)	35,000 lb.
Compressive Strength (with safety factor 2)	
unsupported	4300 lbs.
6" hole	48,000 lbs.
8" hole	16,000 lbs.
12.25" hole	6700 lbs.
14" hole	5300 lbs.
Bending strength of mandrel (safety factor 2)	4,000ft-lbf

