

# Protherma™ PTS



The Protherma™ PTS is a production logging tool that provides pressure, temperature, flowrate, gamma ray and casing collar measurements on either Memory or Surface Readout mode for ultra-high-temperature environments.

The Protherma tool, by Kuster®, is designed specifically for operation in geothermal and other high-temperature wells. The tool contains essential production logging sensors for pressure, temperature and flow rate measurements, as well as natural gamma ray for correlating geological features and a casing collar locator (CCL). The tool can be operated on slickline with the addition of the memory module, or in surface readout (SRO) mode on e-line.

Pressure measurements are made using a quartz pressure sensor, and a fast-response resistance temperature detector (RTD) is exposed to the well bore to accurately detect temperature variations. Flow rate is measured using interchangeable flow meters and impellers. The electronics section is encased within a pressure housing which includes an integrated scintillation-based gamma detector and a casing collar locator.

Based on renowned Kuster® technology, the Protherma tool can operate for up to 6 hours at 300°C in real-time mode, and up to 4 hours at 350°C in memory mode. All material used within the downhole suite meet NACE MRO175 specifications for corrosive well bore environments.



	1.69 in. UHT PTS-GR/CCL	1.83 in. UHT PTS-GR/CCL
<b>Mechanical Specifications</b>		
Outside diameter, in [cm]	1.688 [4.29]	1.830 [4.60]
Length, ft [cm]	SRO: 7.33 [223.52] Memory: 9.00 [274.32]	
Weight, lb [kg]	SRO: 55 [25.0] Memory: 60 [27.2]	SRO: 60 [27.2] Memory: 65 [29.5]
Temperature rating, °F [°C]	6 h/482 [250]	4 h/662 [350] 6 h/572 [300]
Pressure rating, psi [MPa]	18,000 [124.1]	18,000 [124.1]
<b>Measurement Specifications</b>		
Output	Pressure, temperature, flowrate, gamma ray and casing collar measurements	
Minimum Sampling Rate, samples/sec	Pressure, Temperature, Flowrate, Gamma: 1 CCL: 20	
<b>Pressure</b>		
Resolution	0.00006% F.S.	
Accuracy	0.02% F.S.	
<b>Temperature</b>		
Resolution	0.002% F.S.	
Accuracy	0.15% F.S.	
Response time, sec/18°F [sec/10°C]	1.5	
<b>Flowmeter/Spinner</b>		
Outside diameter, in [cm]	Continuous spinner: 1.6888, 2.125 or 3.000 [4.29,5.40 or 7.62] Fullbore spinner: 4.500 or 7.500 [11.43 or 19.05]	
Resolution, RPM	1	
Accuracy	2% @ < 2 RPS 0.75% @ >2 RPS	
Minimum threshold, RPS [RPM]	0.5 [30]	
<b>Hardware Characteristics</b>		
Sensor type	Pressure: Quartz (Quartzdyne) Temperature: RTD Gamma ray/Casing collar locator: Scintillation Flowmeter/Spinner: Reed switch/Magnetic	
Acquisition systems	Kuster® SRO Panel Warrior - SDS	