

Core Barrel Temperature Tool

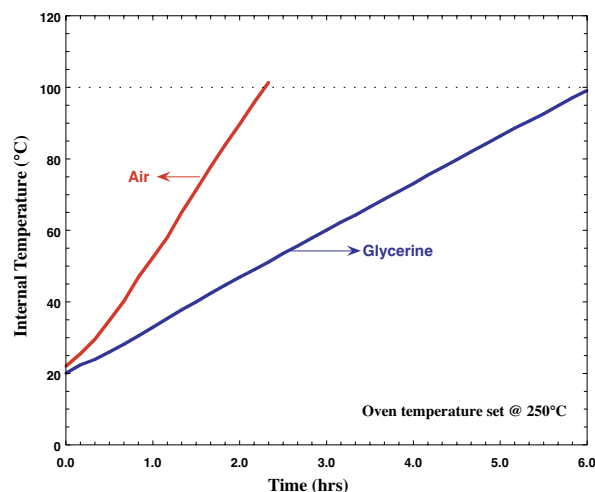
Description

The Core Barrel Temperature Tool (CBTT) was developed by the Borehole Research Group in order to assess temperature conditions while drilling and determine if conditions are favorable for subsequent wireline and Logging-While-Drilling operations in hydrothermal environments. Along with the Drill String Acceleration Tool (DSA), the CBTT enables the acquisition of digital measurements while coring. The CBTT's measurements of borehole temperatures while drilling can then be correlated to pump rates used during coring operations in order to determine the feasibility of performing logging operations in the high temperature conditions associated with superheated water adjacent to hydrothermal vents. The CBTT contains a thermocouple and a battery-operated electronics board encased in a single dewar inside the pressure case that was designed for the DSA. It was first deployed during Leg 193.

Applications

- ◆ Borehole temperature assessment while drilling
- ◆ Comparison of pumping rates to temperature
- ◆ Estimation of borehole thermal rebound while drilling

CBTT Dewar Tests
Air vs. Glycerine



Tests performed at the Lamont-Doherty Earth Observatory showing the effectiveness of the insulating properties of the dewar system with and without glycerin.

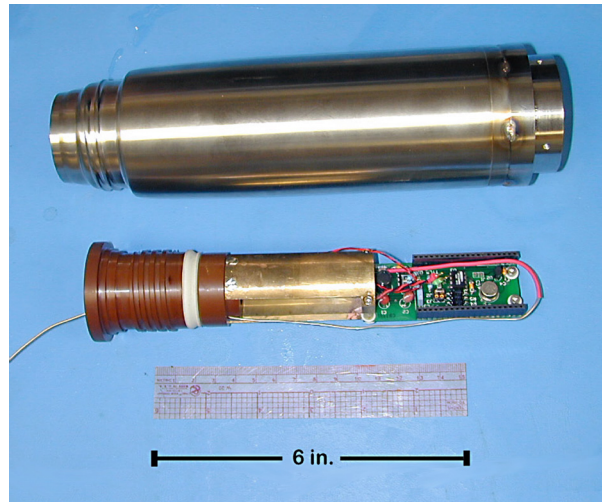


The CBTT was designed, manufactured, assembled and tested at the LDEO-BRG facility. Here, the thermocouple is subjected to boiling water during calibration and performance tests of the entire tool assembly. In addition, the dewar was placed in an oven at 120°C.

Specifications

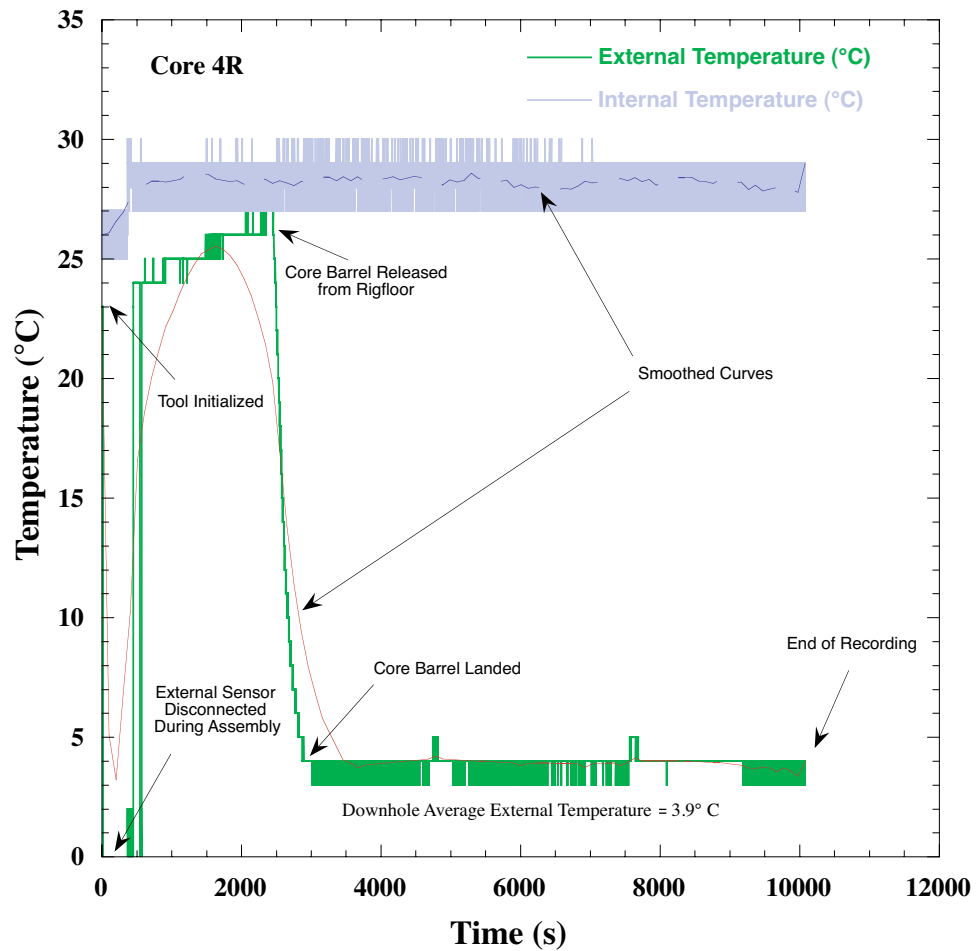
Tool length:	47 in. (119.4 cm)
Tool weight:	~60 lbs (27.3 kg)
Maximum pressure:	10,000 psi
Maximum temperature:	120° C for 6 hours
Batteries:	Lithium
Battery life:	12 hours
Memory:	4 MB
Thermocouple range:	0° - 315° C
Thermocouple accuracy:	1° C
Pressure measurement range:	0 - 10,000 psi
Pressure resolution:	1 psi





The primary components of the CBTT are the thermocouple, logic board and batteries. The electronics are housed in an inexpensive dewar and submerged in glycerine to improve heat resistance.

Hole 1188A



The fluid temperature gradient and tool interval temperature as recorded by the CBTT in a borehole.