

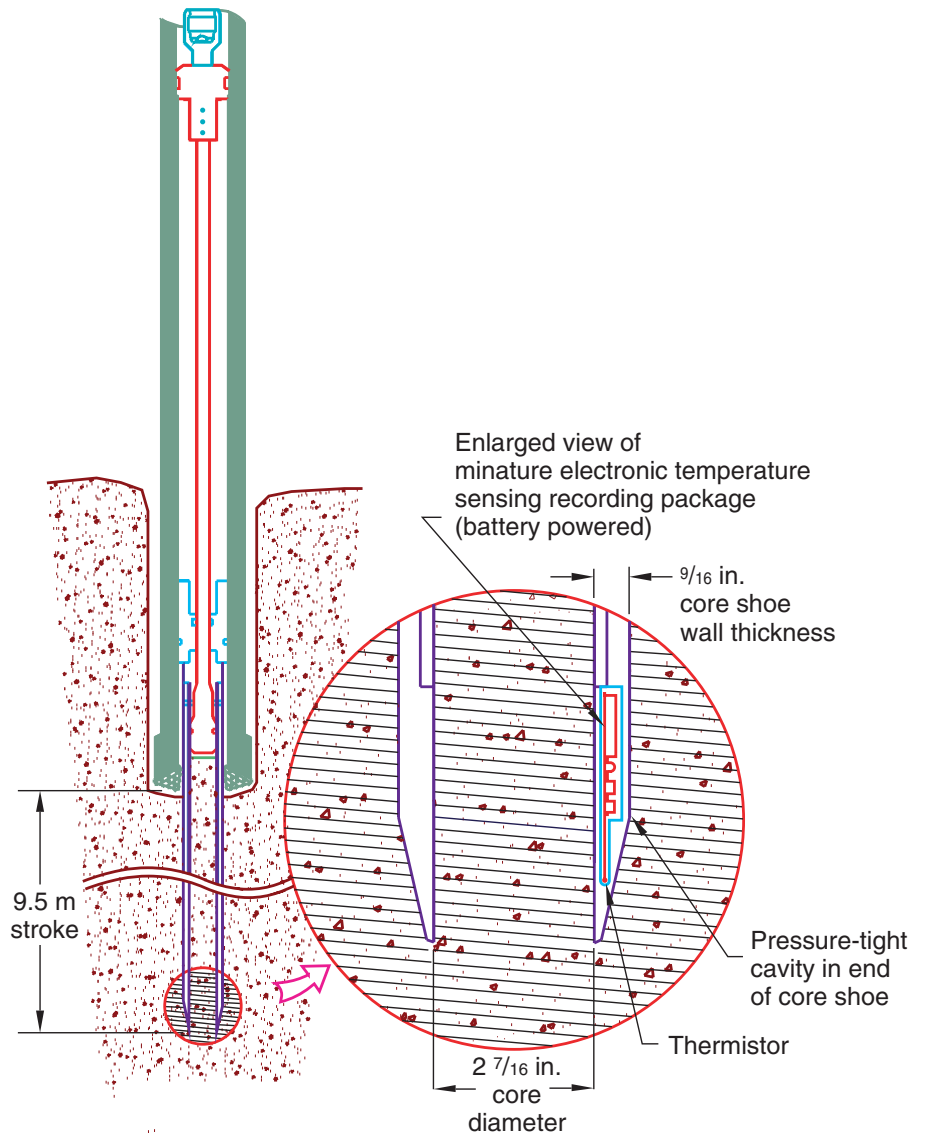
Advanced Piston Corer Temperature-3

Scientific Application

The Advanced Piston Corer Temperature-3 (APCT-3) tool is the third generation of an instrumented version of the coring shoe that is run on the Advanced Piston Corer (APC). It is deployed in soft sediments to obtain formation temperatures to determine the heat flow gradient and is essential in determining hydrocarbon maturity for pollution prevention purposes.

Operation

The APCT-3 is deployed on an APC core barrel and provides a precise in situ temperature measurement while adding only 10 min to each core barrel run. Typically, the tool is run starting at 30 m below seafloor (mbsf) and then run after every other core until four good readings are obtained. The shoe is hydraulically stroked 9.5 m into the sediment and remains stationary for ~10 min. The APC inner core barrel is then retrieved, the instrumented shoe is removed, and the data are downloaded into a computer.



Features

Temperature Measurement Without Wireline Trip

The APCT-3 sensor, electronics, and memory are contained in an annular cavity inside the APCT-3 coring shoe. Temperature measurements can be obtained without a special wireline trip with a temperature tool.

Continuous temperature measurements are recorded with the APCT core shoe embedded in the sediment.



APCT-3 shoe (left) has a pocket to accept electronics, memory board, and battery (right) for temperature measurements while taking an APC core.

Minimal Time Impact

The APCT-3 provides a precise in situ temperature while adding only 10 min to each core barrel run.

Rapid Data Download

The instrumented shoe is removed as soon as the APC inner core barrel is retrieved, and the data are downloaded into a computer program for immediate processing. Hydrocarbon maturity evaluations can proceed during coring to avoid delays for data handling.

Specifications

Atmel 8-bit microcontroller with integrated real-time clock

Programmable sampling rate with up to 20 hours of data storage at 1 s sampling rate

16-bit analog-to-digital converter

Thermistor probe with better than $\pm 0.01^\circ\text{C}$ accuracy

Typical Operating Range

-5°C to $+55^\circ\text{C}$ temperature measurement range

Up to $+85^\circ\text{C}$ electronics environmental range

Limitation

Can only be used in soft sediments appropriate for piston coring