

# Basic Detail Report

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**00055915**

**Title**

Conductivity Temperature and Depth Profiler

**Date**

after 1974

**Medium**

Metal, Plastic

**Dimensions**

Overall: 783 × 99 mm

**Name**

CTD Profiler

**History**

There are smaller, low-powered versions of CTD sensors that are used on autonomous instruments like the moored profiler, gliders, profiling floats and AUVs. However, these recordings can be less precise if they lose calibration while being deployed for a long time. Unlike the packaged ship deployments, they don't benefit from being cross-referenced with water samples taken at the same depth as the sensor recordings. Bruce Hamon was the first physical oceanographer appointed to the CSIRO. In the early 1950s, he began work on the first CTD (conductivity, temperature and depth) recorder. Early designs were based on radio valves and met with limited success. Further development in the United States in the following decades saw refinement of the design, but it was slow to be adopted in Australia given limited staff and vessels. In September 1956, the Hamon/Brown Salinity-temperature-depth recorder was lowered into the water by crane for the first time during a research voyage on the Derwent on RV Derwent Hunter. In the interim, salinity was measured by portable temperature-salinity bridge and inductive salinometer (represented in the collection, donation from DSTG). The portable bridge used conductive cells in seawater. The salinometer (post 1958) was designed by Neil Brown. The first two were made in 1958. The overall design used an inductive cell for temperature compensation to allow for high accuracy without temperature control. Water samples were analysed in the CSIRO Cronulla laboratory and transferred to the Data Processing System. Before 1951, this was represented by one woman and increased to three women, titled Technical Assistants, by 1954. Chlorinity was converted to salinity using a 3 x 2 foot Masonite-based nomograph and yard-long cursor. Density was read from a slide rule after the temperature and salinity figures were recorded. Oxygen equivalent was read from thiosulphate strength and titration value. The phosphate figure was obtained by conversion using Freidan and Marchant calculating machines. After the 1970s, the CTD (abbreviated) was designed as an electronic instrument that measures very accurate, nearly continuous profiles of conductivity, temperature, and pressure (depth) in the water column. The CTD measures the saltiness of the ocean (conductivity) which allows for conclusions to be drawn such as

the density of the water tested. CTDs are packaged with other sensors and attached to a water sampling setup like a metal rosette in contemporary use. This is deployed into the ocean using a conducting cable through which the real-time measurements are transmitted to a recorder/computer on the ship. Today there are also self-contained instruments (i.e., with an internal memory). Salinity is computed subsequently from the conductivity and temperature measurements. Accuracies are typically  $\pm 0.005$  psu, 0.005 K, and 0.15% full scale for conductivity, temperature, and depth, respectively.