

The NIST absorbed dose standard water calorimeter being constructed at UTSWMC is based on the prototype built at NIST by Steve Domen . Several design modifications have been made to enhance its performance and ease data collection and analysis. The essential design of the calorimeter is in two microbead thermistors that are incorporated into opposite legs of a bridge circuit. These thermistors are sealed in a cylindrical glass core containing pure water that has been purged with Hydrogen gas. To limit convection effects the diameter of the core has been kept below 35 mm. Prefabricated 0.4 mm glass capillaries are used to seal the thermistors which keeps the non-water material in the measurement area small. An AC wave form generator and lock-in amplifier are used to excite the bridge circuit and measure voltage changes with temperature. Use of AC reduces the noise problems of measuring signals in the μ volt range. Automation of the data collection process has been achieved using a commercially available PC interface software package.