

gold (1063°C.), silver (960.8°C.), antimony (630.5°C.) and zinc (419.5°C.). These metals, especially gold and silver, must be extremely pure.

Depending on the degree of accuracy required and the range covered, thermocouples are compared with standard resistance thermometers, standard platinum thermocouples, or calibrated at the fixed points mentioned.

NBS also calibrates thermocouple materials such as wires and potentiometers and supplies standard samples of various metals for use as freezing point standards.

In calibrating in the range of 0 to 1450°C. , platinum and platinum-rhodium thermocouples are used. Base metal alloys are used to cover less extreme ranges, particularly at lower temperatures where the e.m.f. of the platinum type is low. A variety of liquid baths is used in the temperature range from -190 to 538°C.

Baths consist of liquid nitrogen and liquid oxygen (-190 to -140°C.); liquid nitrogen-cooled baths containing carbon tetrachloride-chloroform, chloroform-methylene chloride-ethyl bromide, *trans*-dichloro ethylene, and trichloroethylene (-140 to 0°C.); water (0 to 100°C.); oil (100 to 300°C.); and liquid tin (538°C.).

NBS is studying new combinations such as iridium-rhodium and tungsten-rhenium to extend the upper limit to 2000°C.

NBS is working in the range of -183 to -253°C. (90 to 20°K) to provide higher precision and to provide a calibration service for secondary thermometers in the 20 to 2°K range. Although gas thermometers may be used for calibrating below 90°K , they are impractical for regular use and so platinum resistance types are used. These work well from 90 to 11°K .

To calibrate in the 20 to 2°K range, NBS has studied changes in the velocity of sound in helium. Carbon and germanium resistors are promising secondary thermometers in this range.

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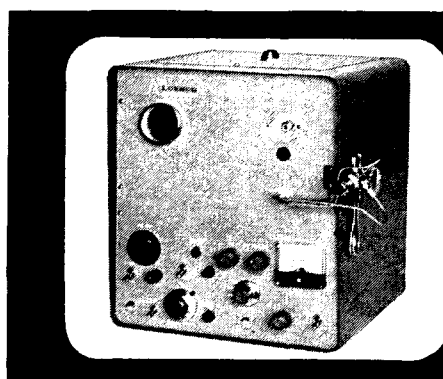
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