

brought out to ambient pressure through a frozen gas U-tube seal which is immersed in liquid nitrogen. Argon, which is used as the pressure medium, is solid in liquid nitrogen and therefore acts as the pressure seal around the wires coming out of the U-tube. The temperature of this seal is therefore fixed at 78°K.

The high-temperature seal is made by silver soldering the thermocouple wire a small distance into the high-pressure tubing. Since this region of tubing is maintained strictly isothermal, no error in the thermal emf is produced by shorting out this section of the thermocouple wire with another material. The high-pressure tubing in this region is surrounded with a tight-fitting, thick-walled copper cylinder which insures that no temperature gradients will exist across the silver solder seal. The thermocouple circuit is grounded at this point while the rest of the circuit and the potentiometer are insulated from ground.

Pressure was generated with a 3-stage intensifier system and was measured with a strain gage transducer which had been calibrated against a manganin coil. The maximum temperature was limited to 300°C due to the strength of the silver solder plug. At the dry ice point the pressure was limited to 5 kilobars due to the freezing of argon. At all higher temperatures the maximum pressure used was 8 kilobars. A space was provided between the low and high temperature ends for some slack wire so that straining of the wires due to movement in the cold seal would be minimized.

The piston cylinder measurements were made in an apparatus of standard design and of dimensions 1.27 cm diameter x 5.08 cm long. The