Swenson's relationship between the tin superconducting transition temperature and pressure (eq. 1) is not valid at pressures greater than 10 kbar. However, Smith *et al.* [12] proposed an extrapolation formula up to 100 kbar in the form of a polynomial derived from the theory of Birch.

Again we used the superconducting temperature of tin as our pressure gauge. The tin sample of 99.9% purity was rolled to a thickness of 0.03 mm and was annealed at 150°C for two hours. From the relationship of Smith *et al.* [12], we calculated the clamped-cell pressure at low temperature as shown in figure 3.

Although the pressure applied to the sample at room temperature was determined accurately, the corrections for relaxation during the clamping process and the effects of differential thermal contraction coupled with changes in elastic properties caused the pressure to drop appreciably with temperature. At low temperature the pressure relaxation was about 25%.

4 — Conclusion

We have discussed the superconducting transition temperature of tin as a possible pressure gauge at low temperatures. In the direct piston-displacement apparatus, the pressure loss was 45% at 10 kbar because of frictional effects in the piston and cylinder and in the pressure transmitting medium itself. In the clamped cell, the pressure loss was about 25% because of relaxation in the clamp and effects associated with the thermal and elastic properties of the apparatus.

Acknowledgment

The authors are indebted to Dr. S. Minomura for valuable discussions and to H. Saito for help during the experiments.

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