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The Inductive Coil Technique for High-Pressure Measurements: An Analysis of Nonhomogeneous Material Environment as a Source of Irreproducibility and Error

A. A. GIARDINI

Professor of Geology, The
University of Georgia,
Athens, Ga. Assoc. Mem. ASME.

Significant sources of error independent of the apparatus are analyzed on the basis of experimental experience and elastic theory. All are mechanical in nature and subject to corrective action. The most serious are found to be self-generating internal pressure differences which result from differential elastic and dimensional values in multicomponent assemblies. High-pressure data on elastic constants, relative critical yield stresses, radial displacements, and ratios of external to internal pressure for various compositional arrangements of pyrophyllite, MgO, NaCl, and AgCl, are given in graphical form. Observance of suggested corrective measures can render the inductive coil technique capable of operational accuracies of 2 percent or better in compressibility and resistivity measurements.

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