

THE PRECISION OF GRAIN VOLUME POROSIMETERS

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Abstract

The precision of grain volumes determined by a gas expansion porosimeter is examined by both a theoretical method (stochastic modelling) and an experimental method (repeat experimentation). The results show that the porosimeter is more accurate than would be expected based on published "precisions" for the pressure transducer that it uses. This is because this "precision" is actually an accuracy. Because systematic errors are calibrated out during operation of the instrument, the true precision of the device is much better than the quoted precision of the transducer. The results indicate that a reference chamber to sample chamber volume of 0.25 to 0.50 is optimal, and that grain volume to sample chamber volume should be greater than 0.5. Experimental evidence is given to show that grain volumes found using helium are consistently larger than those found using nitrogen. This is likely due to adsorption effects.