


Original Paper

Volume Determination of Vacuum Vessels by Gas Expansion Method

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Abstract

This paper presents a practical procedure for the determination and precision calibration of the volume ratio and absolute value of the volume of vacuum chamber by using static expansion method. Such systems for calculations of volume ratio consist from two vessels connected via a valve called the expansion valve. For determination of absolute value of the volume we added another volume with simple shape (determined by dimensional measurements). In such systems, under the isothermal conditions, the gas pressure is reduced by the ratio of the small volume to the sum of the first volume (small volume) and second volume. The uncertainty of measurement of the volume ratio and absolute volume is calculated as well. Relative volume calibration is performed with uncertainties below 0.75 %.

Keywords

Gas expansion – Volume ratio – Absolute volume – Capacitance diaphragm gauge – Uncertainty