

STABILITY OF THE EFFECTIVE ACCOMMODATION COEFFICIENT OF SPINNING ROTOR GAUGES

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Abstract

A spinning rotor gauge (SRG) is a popular transfer standard in the pressure range of 0.001 Pa to 1 Pa. The popularity stems from the fact that the effective accommodation coefficient of SRGs, which is directly tied to its calibration, has shown remarkable stability. At the National Institute of Standards and Technology (NIST), SRGs, submitted by companies requesting calibration, as well as our internal check standards, are calibrated with a primary vacuum standard and the calibration results are entered in a database. A general picture of the stability of the accommodation coefficient can be obtained by analyzing the past calibration records. The analysis of past customer calibration records over seventeen years, involving 59 SRGs and more than 180 calibrations, shows that the absolute value of the changes in their accommodation coefficient between two successive calibrations (typically 2 to 3 years) had a mean of 1.0 %. But for our check standards, which remain on the vacuum chamber at all times, the mean change is less than 0.20%. We are interested in the cause or causes of these changes and we have identified and quantified a few effects that may result in a shift in the accommodation coefficient. The results will be presented and discussed.