Ensuring a High Level Confidence in Sonic Test Equipment Used to Certify Domestic Gas Meters

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# Abstract

The validation and verification of sonic nozzle volumetric test equipment are typically conducted over several days on an annually basis. This involves the comprehensive calibration of multiple transmitter’s pressure, temperature and relative humidity as well time measurement, calculation of sonic nozzle factors and an overall system accuracy calibration.

When manufacturing and certifying domestic gas meters to a very tight tolerance, it is common to utilise a check meter to ensure the continued accuracy of sonic nozzle test equipment since its last verification. Analysing the error percentage drift of the check meter over time, allows the organisation to determine the level of confidence of the test equipment between successive equipment verifications. But when considering the uncertainty of the test equipment combined with the repeatability of a check meter, what variation in error percentage of the check meter does one consider acceptable?

This paper analyses the effects of pressure, temperature, relative humidity and time measurement on overall equipment accuracy which has led to the development of an equipment verification system. The equipment verification system is a tool which enables the earliest possible detection of any critical sensor drift which in turn ensures, with a high level of confidence that the sonic nozzle test equipment is working as designed and as close to calibration specifications as possible.