national gas transmission

Turbine & Ultrasonic Meter Uncertainty and Error Analysis Tool

Value Tracking Case Study

Turbine & Ultrasonic Meter Uncertainty and Error Analysis Tool

Background

The cost of springing, recalibrating off-site and re-instating a typical ultrasonic meter is £25-30k (including cranes, transport, and calibration charge). This cost is getting close to the cost of a new ultrasonic meter, so the 'fit and forget' concept and associated cost benefit advantage of selecting an ultrasonic meter could easily disappear unless something is done to improve confidence in longer calibration intervals (e.g. 2 -4 years, instead of 12 months). This project seeks to reduce the frequency of the above recalibration cost for installed ultrasonic meters and turbine meters, by increased confidence in the meter accuracy.

Initially a prototype model was developed for calculating the maximum permissible bias (MPB), maximum permissible error (MPE) and uncertainty in volume and energy of flange-tapped orifice plate meters. Work proposed under this project looks to develop the tool further for turbine and ultrasonic meter technologies.

What's new?

The tool for assessment of MPE and MPB for Orifice Plate, Turbine and Ultrasonic Metering systems has been successfully developed. The tool has been characterised and assessed using actual validation data from National Grid Gas Metering Systems to evaluate MPE and MPB limits. These limits have been checked back to National Grid Gas connection specification T/SP/ME/1 and have also been incorporated into worked examples of the European Standard EN1776 to gain wider understanding acceptance of MPE and MPB limits.

The tool has proved to be useable in two modes – design and calibration mode.

The benefits

The technique will allow error and bias to be monitored against MPE (maximum permissible error) and MPB (maximum permissible bias), to avoid costly annual re-calibrations where these are demonstrated to be unnecessary.

Financial savings

Outputs of the project led to reduced requirements for calibration equipment with a logged saving of £100k.

Implementation

The concepts of MPE and MPB have been included in the latest release of T/SP/ME/1. All metering contracts going forward will quote MPE and MPB; the tool developed during this project will enable such calculations to be carried out. The tool is available now to all NIA licensees and will be used by National Gas Transmission going forward to assess existing and new customer connections to the National Gas Network.