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Requirements for Certification
Engineering Guideline

GS-ENG-07-09: Guideline for the Preparation of Measurement Uncertainty documentation for the Certification of Level 3 Gas Measuring Apparatuses used to Calibrate Domestic Diaphragm Meters

Version 1.0

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Record of Change

Revision	Date	Description
0.1	Oct 12, 2007	DRAFT for consultation only
0.2	Oct 19, 2007	Editorials
1.0	Jan 23, 2008	Issued for use

1.0 Scope

This guideline documents the general administrative and technical requirements for the submission of an estimate of a measuring apparatuses' measurement uncertainty to Measurement Canada (MC). This document outlines the flow of information, the responsibilities of the participants and general content of these documents.

2.0 Applicable Reference Documents

GS-ENG-03-06: *Certification of Gas Measuring Apparatuses Containing Rotary Meters Used for The Purpose of Calibrating Diaphragm Meters*

GS-ENG-04-01: *The Calibration and Certification of Gas Measuring Apparatus – Atmospheric Pressure Turbine Meter Proving Systems*

GS-ENG-04-06*: Guideline for The Determination of Measurement Uncertainty: Automated Master Bell Provers*

GS-ENG-06-01: *Guideline for the Determination of Measurement Uncertainty in Meter Inter-Comparisons*

GS-ENG-07-03: *Administrative Process for the Certification of Measuring Apparatuses*

GS-ENG-07-06: *Technical Instructions and Engineering Guidelines Determination of Short-term Repeatability and Long-term Reproducibility of Bell Provers Using Diaphragm Transfer Meters*

GL-CP-002: *Calibration Procedure for the Certification of Reference Meters Used In Low Pressure Transfer Provers*

GEN-09: Measurement Canada General Bulletin: *Delegation of Authorities*

S-G-01: *Specifications for the Calibration, Certification and Use of Gas Measuring Apparatus - Working Level Sonic Nozzle Provers*

3.0 Authorization

The contents of this document will form the basis of the administrative process performed by Measurement Canada Gas Specialists' on behalf of the Senior Engineer – Gas Measurement to certify measuring apparatuses.

The apparatus will be certified under the delegated authority and supervision of the Senior Engineer - Gas Measurement.

4.0 Determination of Measurement Uncertainty

4.1 General

The determination of the measurement uncertainty for the process of calibration of a MUT shall be the responsibility of the owner of the measuring apparatus.

The owner/applicant should provide a complete written Statement of Measurement

Uncertainty for the meter-under-test (MUT) determined in the manner prescribed in ISO Guide to the Expression of Uncertainty in Measurement and Measurement Canada Gas Engineering Guidelines and Recommendations to the Measurement Canada Gas Specialist prior to the commencement of the testing for certification of the gas measuring apparatus.

The local Gas Specialist should review the documentation for applicability and completeness and forward with the *Measuring Apparatus, Verification and Conformation Report* to the Senior Gas Engineer for review. This documentation should include:

1) Measuring Apparatus Verification and Conformation Report,
2) Statement of intended use for the Measuring Apparatus,
3) An explanation of the traceability to National Standards of the measuring process,
4) Completed measurement uncertainty template(s),
5) Details relating to the determination of each uncertainty variable contained in the Statement of Uncertainty an accounting of each of the major contributors to the measurement uncertainty, (refer to the Guidelines referenced in section 2.0)
6) Control limits established for each variable,
7) A copy of the statistical process control (SPC) charts used for process monitoring,
8) A copy of the repeatability studies used to establish MUT and Prover repeatability,
9) Copies of the certificates of calibration for any transmitters and/or meters used in the measuring apparatus,
10) Any previous certificates of calibration for the measuring apparatus.

4.2 Simplifications for Working Level(3) Measuring Apparatuses

It is the responsibility of the applicant to demonstrate that any simplifying assumptions used in the determination of the measurement uncertainty of the process are valid. The assumptions should be reviewed by MC Gas Specialists and Engineering prior to implementation by the applicant.

Generally, for a Working Level Measuring Apparatuses used in a production environment, the measurement uncertainty may be determined for each class of meter (refer to S-G-01 for definition of meter classes) listed in the Statement of Intended Use, in a manner that represents the intended use of the measuring apparatus.

Where the applicant has multiple measuring apparatuses in a single room which are, for all intents and purposes, considered identical, the applicant may use a single estimate of the measurement uncertainty for each class of MUT for all of the apparatuses. The estimate must be conservative enough to represent all of the provers listed.

Where the applicant uses Measurement Canada authorized, predetermined/developed templates to estimate the uncertainty, the applicant shall demonstrate that the measurement uncertainty template is suitable for use and represents the particular calibration process.