AGA Report No. 9

Measurement of Gas by Multipath Ultrasonic Meters

Third Edition
July 2017

Prepared by
Transmission Measurement Committee
Operations & Engineering Section

AGA
American Gas Association

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This report is the cumulative result of years of experience of many individuals and organizations acquainted with the measurement of natural gas. However, changes to this report may become necessary from time to time. If changes to this report are believed appropriate by any manufacturer, individual or organization, such suggested changes should be communicated to AGA by completing the last page of this report titled, **"Form for Proposal on AGA Report No. 9."**

FOREWORD

This report is a revision of the previous AGA Report No. 9, 2007 edition. It is a performance-based specification for multipath ultrasonic meters for gas flow measurement. AGA's Transmission Measurement Committee (TMC) worked diligently for several years on its revision. It is the result of a collaborative effort of users, meter manufacturers, independent consultants, flow-measurement service providers and research organizations. This report was made available for comments from other relevant AGA committees, the Committee on Gas Fluid Measurement (COGFM) of the American Petroleum Institute (API), Section H of the GPA Midstream Association (GPA), ISO/TC 30/SC 5/WG 1 of the International Organization for Standardization, and the committee for Measurement of Fluid Flow in Closed Conduit of the American Society of Mechanical Engineers (ASME - MFC).

This version of AGA Report No. 9 is intended to supersede all prior versions of this document. However, this document does not reference existing multipath ultrasonic meter installations. The decision to apply this document to existing installations shall be at the discretion of the parties involved.

Research conducted in support of this report and cited herein has demonstrated that multipath ultrasonic meters can accurately measure gas flow and, therefore, should be able to meet the requirements specified in this report when calibrated and installed according to the recommendations contained herein. In consultation with a competent professional, users should follow appropriate installation, use and maintenance of an ultrasonic meter as applicable in each case.

Flow-calibration guidelines are provided for occasions when a flow calibration is requested or required to verify the meter's performance or to apply a calibration factor to minimize the measurement uncertainty. (See Appendix A (Informative))

Unlike most traditional gas meters, multipath ultrasonic meters inherently have an embedded microprocessor system. Therefore, this report includes, by reference, a standardized set of testing specifications applicable to electronic gas meters. These tests, summarized in Appendix B (Normative), are used to demonstrate the acceptable performance of the multipath ultrasonic meter's electronic system under different influences and disturbances.

The flow metering package and/or flow conditioner performance verification test found in Appendix C (Normative) is intended to provide a method by which they can be shown to perform under varying test flow conditions within the limit set in this Appendix.

An example of overall measurement uncertainty calculations is provided in Appendix D (Informative) with assumed numerical values for estimating measurement uncertainty for sites using ultrasonic gas flow meters.

In this document the words shall, should and recommended are to be used to mean as follows:

"Shall" means a requirement to conform to the specific task.

"Should" and "recommended" are used synonymously to indicate good practices to follow, but not required to conform to the specific task.

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