ASME MFC-14M–2003
(Revision of ASME MFC-14M–2001)

MEASUREMENT OF FLUID FLOW USING SMALL BORE PRECISION ORIFICE METERS

REAFFIRMED 2018

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda issued to this edition.

ASME will issue written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

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FOREWORD

Before the publication of this Standard, there was no standard covering the measurements of fluid flows using small bore precision orifice meters (nominal line sizes of ¼ in. through 1½ in.) using differential pressure devices. Most people have used ASME fluid meters for guidance or obtained information from the manufacturers of proprietary devices.

This Standard has been prepared by the ASME Committee on Measurement of Fluid Flows in Closed Conduit (MFC).

Suggestions for improvement of this Standard should be sent to: Secretary, MFC, The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016.

This Standard was approved as an American National Standard on February 26, 2003.

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Measurement of Fluid Flow in Closed Conduits

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CORRESPONDENCE WITH THE MFC COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending committee meetings. Correspondence should be addressed to:

Secretary, MFC Standards Committee
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Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Interpretations. Upon request, the MFC Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the MFC Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include plans or drawings which are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve", "certify", "rate", or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The MFC Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the MFC Standards Committee.

MEASUREMENT OF FLUID FLOW USING SMALL BORE PRECISION ORIFICE METERS

1 SCOPE AND FIELD OF APPLICATION

This Standard specifies the geometry and method of use (installation and flowing conditions) for orifice meters of 6 mm to 40 mm ($\frac{1}{4}$ in. to $1\frac{1}{2}$ in.) line size when they are inserted in a conduit running full. It also gives necessary information for calculating flow rate and its associated uncertainty.

It applies only to differential pressure devices in which the flow remains subsonic throughout the measuring section, flow is steady or varies only slowly with time, and the fluid is considered single-phase. In addition, the uncertainties are given in the appropriate sections of this Standard for each of these devices within the pipe size and Reynolds number limits, which are specified.

This Standard covers devices for which sufficient calibrations have been made to enable the specification of coherent systems of application and to enable calculations to be made with certain predictable limits of uncertainty.

The devices introduced into the pipe are called primary devices. The term *primary device* also includes the pressure taps and the associated upstream and downstream piping. All other instruments or devices required for the measurement or transmission of the differential pressures are known as secondary elements and in combination are referred to as the secondary devices. This Standard covers the primary devices, the secondary devices will be mentioned only occasionally, as and when necessary for the proper operation of the primary device.

The different primary devices covered in this Standard are

(a) orifice plates used with corner pressure taps;

(b) orifice plates used with flange pressure taps;

(c) specially designed orifice meters with integral fittings.

2 REFERENCES AND RELATED DOCUMENTS

ASME MFC-1M Glossary of Terms Used in the Measurement of Fluid Flow in Pipes

ASME MFC-2M Measurement Uncertainty for Fluid Flow in Closed Conduits

ASME MFC-8M Fluid Flow in Closed Conduits — Connections for Pressure Signal Transmissions Between Primary and Secondary Devices

Filban, T.J. 1961. The Orifice Flow Section for Metering Low Rates of Flow. *Instruments and Control Systems* (February).

Filban, T.J. 1958. Orifice Metering of Small Volumes in Meter Tubes of $\frac{1}{2}$ in., $\frac{3}{4}$ in., and 1 in. Sizes. Paper presented at the ASME Application Gas Measurement Short Course.

Filban, T.J., and W.A. Griffin. 1959. Small-Diameter-Orifice Metering. *Transactions of the ASME — Journal of Basic Engineering*. Paper No. 59-A-101.

Fluid Meters, Their Theory and Application. 1971. 6th ed.

Publisher: American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007

ISO 3186 Fluid Flow in Closed Conduits — Connections for Pressure Signal Transmissions Between Primary and Secondary Devices

ISO 4006 Measurement of Fluid Flow in Closed Conduits — Vocabulary and Symbols

ISO 4185 Measurement of Liquid Flow in Closed Conduits — Weighing Method

ISO 5168 Measurement of Fluid Flow — Evaluation of Uncertainties

ISO/DIS 8316 Measurement of Liquid Flow in Closed Conduits — Method by Collection of the Liquid in a Volumetric Tank

Publisher: International Organization for Standardization (ISO), 1 rue de Varembé, Case Postale 56, CH-1211, Genève, Switzerland/Suisse

3 SYMBOLS AND DEFINITIONS

The vocabulary and symbols used in this Standard are defined in ASME MFC-1M and ISO 4006. The SI and customary (U.S.) measurement units are used throughout, with the SI units listed first and the customary units following in parentheses, whenever stated.

3.1 Symbols

Table 1 reproduces the symbols and their respective SI and customary dimensional units that are used in this Standard.