ASME MFC-1–2014
[Revision of ASME MFC-1M–2003 (R2008)]

Glossary of Terms Used in the Measurement of Fluid Flow in Pipes

AN AMERICAN NATIONAL STANDARD

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Two Park Avenue • New York, NY • 10016 USA

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FOREWORD

The greatest aid to communication, whether verbal or written, is a common vocabulary. Even within a single technical discipline, the same word can have different meanings to different people. In order to help overcome this obstacle in the field of fluid flow measurement, this Standard consists of a collection of terms and their definitions so that a common base of reference is available, so we can speak a common language.

To this end, we need to understand that language is fluid and the definitions given here provide a snapshot of usage at the time of publication. In the preparation of this Standard, an attempt has been made to standardize suitable terms and not to perpetuate unsuitable ones, merely because they have been used in the past. Recognition of terms in common parlance is acknowledged and less ambiguous ones are suggested. Self evident and irrelevant terms have been excluded, as have those terms that are unique to methods of measurement not widely used.

The international standard vocabulary and symbols concerning the measurement of fluid flow in closed conduits prepared by ISO/TC30 has been considered, as well as many other reference sources, both national and international, have been used in order to make this glossary as useful as possible to a broad segment of the measurement community. This Standard varies from earlier revisions in that all terms are listed alphabetically.

The first edition of this Standard was approved by the American National Standards Institute on October 15, 1979. It was subsequently reaffirmed, without change, on August 7, 1986. The previous edition of this Standard was approved by the American National Standards Institute (ANSI) on September 10, 2003. It was subsequently reaffirmed, without change, in 2008.

Suggestions for improvement of this Standard are welcome. They should be sent to Secretary, ASME MFC Standards Committee, Two Park Avenue, New York, NY 10016-5990.

This revision was approved by the American National Standards Institute on August 1, 2014.

ASME MFC COMMITTEE
Measurement of Fluid Flow in Closed Conduits

(The following is the roster of the Committee at the time of approval of this Standard.)

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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 or a Case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, MFC Standards Committee
The American Society of Mechanical Engineers
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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.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the MFC Standards 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 at go.asme.org/Inquiry.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her 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 any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Request that are not in this format may be rewritten in the appropriate 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 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the MFC Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at go.asme.org/MFCcommittee.

GLOSSARY OF TERMS USED IN THE MEASUREMENT OF FLUID FLOW IN PIPES

1 GENERAL

1.1 Scope

This Standard consists of a collection of definitions of those terms that pertain to the measurement of fluid flow in pipes. The definitions provided also give guidance for recommended usage in the application of flow measurement devices.

1.2 Organization

This Standard is organized alphabeticlly. Symbols normally applied to various quantities are tabulated in section 3.

1.3 References

This Standard was compiled from many sources, including various reports and standards from The American Society of Mechanical Engineers (ASME), the American Gas Association (AGA), the American Petroleum Institute (API), the International Society of Automation (ISA), the British Standards Institute (BSI), the International Organization for Standardization (ISO), the National Institute for Standards and Technology (NIST), and the International Organization of Legal Metrology (OIML).

2 GLOSSARY OF TERMS

absolute pressure: algebraic sum of the atmospheric pressure and gauge pressure.

absolute static pressure of a fluid: static pressure of a fluid measured with reference to a perfect vacuum.

acceptance test: the evaluating action(s) to determine if an instrument satisfactorily meets its performance criteria, permitting the owner/purchaser to formally accept it from the supplier.

accuracy of measurement: the extent to which a given measurement agrees with a reference for that measurement; often used by manufacturers to express the performance characteristics of a device.

NOTE: "Accuracy" is not the same as "uncertainty" (see "uncertainty of measurement").

acoustic matching layer: material comprising one or more layers, selected to maximize the acoustic coupling coefficient between two media.

acoustic path: the path that the acoustic signals follow as they propagate through the measurement section between the transducer elements.

acoustic ratio: the differential pressure ratio divided by the isentropic exponent (compressible fluid).

air: mixture of gases and associated water vapor surrounding the earth; dry air plus its associated water vapor. The term is used synonymously with atmosphere.

air, dry: mixture of dry gases present in the atmosphere.

ambient temperature: temperature of the atmosphere measured in the immediate vicinity of the point of measurement and unaffected by wind or other atmospheric phenomena.

annular chamber: piezometer ring integral with the pipe or the primary device that simplifies the construction of annular pressure taps.

annular space: area between the tapered tube and the float that normally increases as the float rises.

area meters: flowmeter in which a variation in the cross section of the fluid stream under constant head is used as an indication of the rate of flow, e.g., a float is suspended in a vertical tapered tube and as the fluid flow rate changes, the position of the float in the tube changes.

arithmetic mean: the sum of values divided by the number of values, also called "average."

NOTES:

(1) The term "mean" is used generally when referring to a population parameter, and the term, "average," when referring to the result of a calculation on the data obtained in a sample.

(2) The average of a simple random sample taken from a population is an unbiased estimator of the mean of this population. Other estimators, such as the geometric or harmonic mean, the median, or the mode are sometimes used.

atmospheric pressure: force per unit area exerted by the atmosphere.

NOTE: Standard atmospheric pressure is 760 mm of mercury at 0°C. This is equivalent to 101.325 kPa and 14.696 psia.

average value: arithmetic mean of n readings of the quantity x. The average value $\bar{x}$ is calculated using the following formula

$$\overline{X}_w = \frac{1}{n}\sum_{i=1}^{n} x_i$$