

ASME PTC 19.5-2004

Flow Measurement

Performance Test Codes

AN AMERICAN NATIONAL STANDARD



The American Society of
Mechanical Engineers

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CONTENTS

Notice	ix
Foreword	x
Committee Roster	xi
Correspondence With the PTC 19.5 Committee	xii
Section 1 Object and Scope	1
1-1 Object	1
1-2 Scope	1
Section 2 Definitions, Values, and Descriptions of Terms	2
2-1 Primary Definitions and Systems of Units	2
2-2 Historical Definitions of Units of Measurement	2
2-3 Symbols and Dimensions	3
2-4 Thermal Expansion	4
2-5 Sources of Fluid and Material Data	4
Section 3 Differential Pressure Class Meters	19
3-0 Nomenclature	19
3-1 General Equation for Mass Flow Rate Through a Differential Pressure Class Meter	19
3-2 Basic Physical Concepts Used in the Derivation of the General Equation for Mass Flow	20
3-3 Theoretical Flow Rate — Liquid as the Flowing Fluid	20
3-4 Theoretical Flow Rate — Gas or Vapor as the Flowing Fluid	21
3-5 Errors Introduced in Theoretical Mass Flow Rate by Idealized Flow Assumptions	21
3-6 Discharge Coefficient C in the Incompressible Fluid Equation	21
3-7 Discharge Coefficient C and the Expansion Factor ϵ for Gases	21
3-8 Calculation of Expansion Factor ϵ	22
3-9 Determining Coefficients of Discharge for Differential Pressure Class Meters	22
3-10 Thermal Expansion/Contraction of Pipe and Primary Element	23
3-11 Selection and Recommended Use of Differential Pressure Class Meters	23
3-12 Restrictions of Use	24
3-13 Procedure for Sizing a Differential Pressure Class Meter	24
3-14 Flow Calculation Procedure	24
3-15 Sample Calculation	25
3-16 Sources of Fluid and Material Data	27
Section 4 Orifice Meters	28
4-0 Nomenclature	28
4-1 Introduction	28
4-2 Types of Thin-Plate, Square-Edged Orifices	28
4-3 Code Compliance Requirements	28
4-4 Multiple Sets of Differential Pressure Taps	28
4-5 Machining Tolerances, Dimensions, and Markings for Orifice Plate	28
4-6 Machining Tolerances and Dimensions for Differential Pressure Taps	32
4-7 Location of Temperature and Static Pressure Measurements	34
4-8 Empirical Formulations for Discharge Coefficient C	34
4-9 Limitations and Uncertainty of Eqs. (4-8.1) Through (4-8.7) for Discharge Coefficient C	35

4-10	Uncertainty of Expansion Factor ϵ	35
4-11	Unrecoverable Pressure Loss	35
4-12	Calculations of Differential Pressure Class Flow Measurement Steady State Uncertainty	35
4-13	Procedure for Fitting a Calibration Curve and Extrapolation Technique	39
4-14	Sources of Fluid and Material Data	42
Section 5	Nozzles and Venturis	44
5-1	Recommended Proportions of ASME Nozzles	44
5-2	Pressure Tap Requirements	46
5-3	Installation Requirements	46
5-4	Coefficient of Discharge	47
5-5	The ASME Venturi Tube	49
5-6	Design and Design Variations	50
5-7	Venturi Pressure Taps	51
5-8	Discharge Coefficient of the ASME Venturi	52
5-9	Installation Requirements for the ASME Venturi	52
5-10	Sources of Fluid and Material Data	53
Section 6	Pulsating Flow Measurement	54
6-1	Introduction	54
6-2	Orifices, Nozzles, and Venturis	54
6-3	Turbine Meters in Pulsating Flow	58
6-4	Sources of Fluid and Material Data	61
Section 7	Flow Conditioning and Meter Installation Requirements	64
7-1	Introduction	64
7-2	Flow Conditioners and Meter Installation	65
7-3	Pressure Transducer Piping	69
7-4	Installation of Temperature Sensors	70
7-5	Sources of Fluid and Material Data	70
Section 8	Sonic Flow Nozzles and Venturis - Critical Flow, Choked Flow Condition	72
8-1	Introduction	72
8-2	General Considerations	75
8-3	Theory	76
8-4	Basic Theoretical Relationships	78
8-5	Theoretical Mass Flow Calculations	78
8-6	Designs of Sonic Nozzles and Venturi Nozzles	86
8-7	Coefficients of Discharge	87
8-8	Installation	90
8-9	Pressure and Temperature Measurements	93
8-10	Sources of Fluid and Material Data	94
Section 9	Flow Measurement by Velocity Traverse	97
9-0	Nomenclature	97
9-1	Introduction	97
9-2	Traverse Measurement Stations	97
9-3	Recommended Installation Requirements	99
9-4	Calibration Requirements for Sensors	101
9-5	Flow Measurement Procedures	105
9-6	Flow Computation	107
9-7	Example of Flow Computation in a Rectangular Duct	109
9-8	Sources of Fluid and Material Data	112
Section 10	Ultrasonic Flow Meters	113
10-1	Scope	113
10-2	Applications	113
10-3	Flow Meter Description	114
10-4	Implementation	116

10-5	Operational Limits	117
10-6	Error Sources and Their Reduction	118
10-7	Examples of Large (10–20 ft) Pipe Field Calibrations and Accuracies Achieved	121
10-8	Application Guidelines (See Also ASME PTC 19.1, Test Uncertainty)	121
10-9	Installation Considerations	122
10-10	Meter Factor Determination and Verification	122
10-11	Sources of Fluid and Material Data	123
Section 11	Electromagnetic Flow Meters	124
11-1	Introduction	124
11-2	Meter Construction	124
11-3	Calibration	127
11-4	Application Considerations	128
11-5	Sources of Fluid and Material Data	130
Section 12	Tracer Methods Constant Rate Injection Method Using Nonradioactive Tracers	131
12-0	Nomenclature	131
12-1	Introduction	131
12-2	Constant Rate Injection Method	131
12-3	Tracer Selection	131
12-4	Mixing Length	132
12-5	Procedure	134
12-6	Fluorimetric Method of Analysis	135
12-7	Flow Test Setup	135
12-8	Errors	137
12-9	Sources of Fluid and Material Data	137
Section 13	Radioactive Tracer Technique for Measuring Water Flow Rate	138
13-1	Tracer Requirements	138
13-2	Measurement Principles	138
13-3	Locating Injection and Sample Taps	138
13-4	Injection and Sampling Taps	139
13-5	Sampling Flow Rate	140
13-6	Timing and Sequence	140
13-7	Sources of Fluid and Material Data	140
Section 14	Mechanical Meters	142
14-1	Turbine Meters	142
14-2	Turbine Meter Signal Transducers and Indicators	142
14-3	Calibration	143
14-4	Recommendations for Use	144
14-5	Pipes, Installation and Disturbances	145
14-6	Positive Displacement Meters	148
14-7	Sources of Fluid and Material Data	150
Figures		
4-2-1	Location of Pressure Taps for Orifices With Flange Taps and With D and $D/2$ Taps	29
4-2-2	Location of Pressure Taps for Orifices With Corner Taps	30
4-5	Standard Orifice Plate	31
4-5.1	Deflection of an Orifice Plate by Differential Pressure	32
4-13.3	Orifice-Metering Run Calibration Points and Fitted Curves (Test Data Versus Fitted Curves)	43
5-0	Primary Flow Section	44
5-1	ASME Flow Nozzles	45
5-3-1	Boring in Flow Section Upstream of Nozzle	46
5-3-2	Nozzle With Diffusing Cone	47

5-5	Profile of the ASME Venturi	50
6-2.1	Measured Errors Versus Oscillating Differential Pressure Amplitude Relative to the Steady State Mean	55
6-2.2	Fluid-Metering System Block Diagram	56
6-2.6	Experimental and Theoretical Pulsation Error	59
6-3.1	Semi-Log Plot of Theoretical Meter Pulsation Error Versus Rotor Response Parameter for Sine Wave Flow Fluctuation, $D_2 = 0.1$, and Pulsation Index, $I = 0.1$ and 0.2	60
6-3.5	Experimental Meter Pulsation Error Versus Pulsation Index	61
7-2.1	Recommended Designs of Flow Conditioner	67
7-3	Methods of Making Pressure Connections to Pipes	71
8-1-1	Ideal Mach Number Distribution Along Venturi Length at Typical Subcritical and Critical Flow Conditions	70
8-1-2	Definition of Critical Flow As the Maximum of the Flow Equation, Eq. (8-1.1)	71
8-2-1	Requirements for Maintaining Critical Flow in Venturi Nozzles	75
8-2-2	Mass Flow Versus Back-Pressure Ratio for a Flow Nozzle Without a Diffuser and a Venturi Nozzle With a Diffuser	76
8-3-1	Schematic Representation of Flow Defects at Venturi Throat	78
8-3-2	Schematic Diagram of Sonic Surfaces at the Throat of an Axially Symmetric Critical Flow Venturi Nozzle	78
8-5-1	Generalized Compressibility Chart	81
8-5-2	Error in Critical Flow Function C^*_i for Air Using Method 2 Based on Ideal Gas Theory With Ratio of Specific Heats Corresponding to the Inlet Stagnation State	82
8-5-3	Error in Method 3 for Air Based on Critical Flow Functions [15] When Using Air Property Data	84
8-5-4	Calculation Processes for the Isentropic Path From Inlet to Sonic Throat for a Real Gas Using the Method of Johnson	85
8-6-1	Standardized Toroidal Throat Sonic Flow Venturi Nozzle	87
8-6-2	Standardized Cylindrical Throat Sonic Flow Venturi	88
8-6-3	ASME Long-Radius Flow Nozzle	88
8-7-1	Composite Results for Toroidal Throat Venturi Nozzles	90
8-7-2	Mean Line Discharge Coefficient Curves for Toroidal-Throat Venturi Nozzles	91
8-7-3	Composite Graph of Discharge Coefficients for the ASME Low- β Throat-Tap Flow Nozzles	92
8-8-1	Standardized Inlet Flow Conditioner and Locations for Pressure and Temperature Measurements	92
8-8-2	Comparison of the Continuous Curvature Inlet With the Sharp-Lip, Free- Standing Inlet	93
8-9	Standardized Pressure Tap Geometry	93
9-2.1	Probe Velocity Measurement Loci	98
9-4	Pitot Tubes Not Requiring Calibration (Calibration Coefficient = 1.000)	102
9-4.1	Pitot Tubes Needing Calibration But Acceptable	103
9-4.2	Cole Reversible Pitometer Structural Reinforcements	104
9-5.1	Laser Doppler Velocimeter System	105
9-5.1-1	Pitot Rake	106
9-5.1-2	Impact Pressure Tube Rake	106
9-6.5	Velocity Traverse Measurement Loci for a 3×3 Array	108
9-7.1	Inlet Duct With Pitot-Static Rake Installed	109
10-3.1.2	Wetted Transducer Configuration	114
10-3.1.3-1	Protected Configuration With Cavities	115
10-3.1.3-2	Protected Configuration With Protrusions	115
10-3.1.3-3	Protected Configuration With Smooth Bore	116

10-4	Acoustic Flow Measuring System Block Design	116
10-4.1.3	Acoustic Path Configurations	117
10-6.1.4	A Typical Crossed-Path Ultrasonic Flow Meter Configuration	119
11-1.1-1	Magnetic Flow Meter	125
11-1.1-2	Weighting Function of the Magnetic Flow Meter	126
11-2.1.1	AC and Pulsed DC Excitation Voltages	127
11-3	Typical Flow Calibration Data	128
12-2	Schematic Control Volume	132
12-4.1-1	Plot of Equations for Central Injection	133
12-4.1-2	Variation of Mixing Distance With Reynolds Number	133
12-4.4.1	Experimental Results	134
12-6.3	Typical Fluorometer Calibration Curves	136
12-7.1	Dye Injection Schematic	135
12-7.2	Sampling System	136
12-7.3	Fluorometer Signal Versus Time	137
13-3.2	Injection Tap Detail	139
13-3.3	Sampling Tap Detail	139
13-6	Schematic of Typical Radioactive Tracer Application	141
14-5.2-1	Flow Conditioner to Damp Out High-Level Disturbances	145
14-5.2-2	Alternative Flow Conditioner Configuration to Damp Out High-Level Disturbances	146
14-6	Positive Displacement Volumeters	149
14-6.3	Method of Interpolation or Extrapolation of Positive Displacement Meter Performance From Calibration Data to Other Fluid Viscosity and Operating Conditions	150
Tables		
2-3.1-1	Conversions to SI (Metric) Units	5
2-3.1-2	Conversion Factors for Pressure (Force/Area)	7
2-3.1-3	Conversion Factors for Specific Volume (Volume/Mass)	8
2-3.1-4	Conversion Factors for Specific Enthalpy and Specific Energy (Energy/Mass)	9
2-3.1-5	Conversion Factors for Specific Entropy, Specific Heat, and Gas Constant [Energy/(Mass \times Temperature)]	10
2-3.1-6	Conversion Factors for Viscosity (Force \times Time/Area \sim Mass/Length \times Time)	11
2-3.1-7	Conversion Factors for Kinematic Viscosity (Area/Time)	12
2-3.1-8	Conversion Factors for Thermal Conductivity (Energy/Time \times Length \times Temperature Difference \sim Power/Length \times Temperature Difference)	13
2-4.2-1	Thermal Expansion Data for Selected Materials — SI Units	14
2-4.2-2	Thermal Expansion Data for Selected Materials — U.S. Customary Units	16
2-4.3	Coefficients for Thermal Expansion Equation in $^{\circ}\text{C}$	18
3-1	Values of Constants in the General Equation for Various Units	20
3-11.3	Summary Uncertainty of Discharge Coefficient and Expansion Factor	24
3-5	Natural Gas Analysis	25
4-5	Minimum Plate Thickness, E , for Stainless Steel Orifice Plate	32
4-12.1	Sensitivity Coefficients in the General Equation for Flow-Through Differential Pressure Meters	36
4-12.2.1	Example 1: Steady State Uncertainty Analysis for Given Steam Flow Orifice-Metering Run	37
4-12.2.2	Example 2: Steady State Uncertainty Analysis for Given Steam Flow Orifice-Metering Run	37
4-12.2.3	Steady State Uncertainty Analysis for Given Gas Flow and Orifice-Metering Run	38

4-12.4-1	Total Steady State Uncertainty, 0.075% Accuracy Class Differential Pressure Transmitter	39
4-12.4-2	Total Steady State Uncertainty, 0.075% Accuracy Class Static Pressure Transmitter	39
4-12.5	Steady State Uncertainty Analysis for Given Gas Flow-Metering Run With a Laboratory Calibration	40
4-13.3	Example Coefficient Curve Fit and Extrapolation for an Orifice-Metering Run	41
6-2.1	Error Threshold Versus Relative Amplitude of ΔP	55
7-1.2-1	Recommended Straight Lengths for Orifice Plates and Nozzles	65
7-1.2-2	Recommended Straight Lengths for Classical Venturi Tubes	66
7-2.1	Loss Coefficients for Flow Conditioners	66
7-3	Recommended Maximum Diameters of Pressure Tap Holes	69
8-5-1	Critical Flow Function C^*_i and Critical Property Ratios [Ideal Gases and Isentropic Relationships, Eqs. (8-1.7) Through (8-1.9)] Versus Type of Ideal Gas	82
8-5-2	Percentage Error in Method 3 Based on Critical Flow Functions [19] and Air Property Data [17]	83
8-7-1	Summary of Points Plotted in Fig. 8-7-1 and Coefficients for Eq. (8-7.2)	89
8-7-2	Discharge Coefficients for Cylindrical-Throat Venturi Nozzles	91
9-2.1-1	Abscissas and Weight Factors for Gaussian Integration of Flow in Pipes	98
9-2.1-2	Abscissas and Weight Factors for Tchebycheff Integration of Flow in Pipes	99
9-2.1-3	Abscissas and Weight Factors for the Log-Linear Trapezoidal Method of Flow Measurement in Pipes	99
9-2.2-1	Loci for the Lines of Intersection Determining Measurement Stations for Flow Measurement in Rectangular Conduits Using Gaussian Integration	100
9-2.2-2	Abscissas for Equal Weight Chebyshev Integration	101
9-7.4	Transducer Calibration Linearized Calibration Data	110
9-7.6	Test Data Summary	110
9-7.7-1	Numerical Error Analysis for Gaussian Model Flow	111
9-7.7-2	Effect of 0.060-in. Misalignment on Gauss Flow	112
9-7.7-3	Effect of Uncertainty in Pressure Measurements	112
9-7.7-4	Summary of Uncertainty Analysis	112
12-6.2	Temperature Exponents for Tracer Dyes	135
Mandatory Appendix		
I	Recent Developments in the Equations for the Discharge Coefficient of an Orifice Flow Meter	151
Nonmandatory Appendices		
A	Critical Flow Functions for Air by R. C. Johnson	159
B	Deviation of Johnson C^* Values	160
C	Real Gas Correction Factors	161

NOTICE

All Performance Test Codes must adhere to the requirements of ASME PTC 1, General Instructions. The following information is based on that document and is included here for emphasis and for the convenience of the user of the Supplement. It is expected that the Code user is fully cognizant of Sections 1 and 3 of ASME PTC 1 and has read them prior to applying this Supplement.

ASME Performance Test Codes provide test procedures that yield results of the highest level of accuracy consistent with the best engineering knowledge and practice currently available. They were developed by balanced committees representing all concerned interests and specify procedures, instrumentation, equipment-operating requirements, calculation methods, and uncertainty analysis.

When tests are run in accordance with a Code, the test results themselves, without adjustment for uncertainty, yield the best available indication of the actual performance of the tested equipment. ASME Performance Test Codes do not specify means to compare those results to contractual guarantees. Therefore, it is recommended that the parties to a commercial test agree before starting the test and preferably before signing the contract on the method to be used for comparing the test results to the contractual guarantees. It is beyond the scope of any Code to determine or interpret how such comparisons shall be made.

FOREWORD

The history of this Instruments and Apparatus Supplement began with the Research Committee on Fluid Meters being organized in 1916. One of its stated objectives was “the preparation of a textbook on the theory and use of fluid meters sufficient as a standard reference.” In carrying out this objective, the first edition of Part 1 of this report was published in 1924, received immediate approval, and was widely referenced by the users of fluid meters and educators. As originally planned by the Committee, the report was to be issued in three parts: Part 1, Theory and Application, was the first one published; followed by Part 2, Description of Meters; and Part 3, Installation. Part 1 was so well received that the second and third editions of this Part were needed before the preparation of the other two parts could occur. The second edition of Part 1 was considerably different from the first, though it followed about the same format and arrangement; the third edition was very similar to the second. These were published in 1927 and 1930, respectively.

Part 2 of the report was published in 1931 and contained a complete description of the physical characteristics of the meters then being manufactured. However, it was found that the material in this Part became obsolete rapidly and it was decided to inform anyone interested in these descriptions that they should be secured from the manufacturers, since their literature must necessarily be up to date.

Part 3, published in 1933, gave instructions for correct installation of meters and discussed the effect of incorrect installation. However, Part 3 was abandoned also because the Committee decided the material in it should be an integral part of the complete report of the Committee.

The fourth edition of Part 1 was prepared in 1937 and was a completely new draft of this Part of the report. It was altered because there had been considerable criticism of the fact that the material presented was difficult to put to practical use. The changed format and additional material presented apparently corrected this condition, since this edition went through many printings.

The fifth edition, issued in 1959, followed the same general format as the fourth and included material gained in the long interval since the last edition. Another publication by the Committee was a manual, Flowmeter Computation Handbook, which was issued in 1961. The procedures in it could be adapted to computer programming.

The format of the sixth edition differed slightly from that of the fourth and fifth editions. Each section by itself was complete so that altering one section would not affect preceding or following sections.

The sixth edition, somewhat like the third edition and its Part 3, was divided into two parts. The material on installation and application were both a part of the complete report and a separate publication, which became ASME PTC 19.5, Flow Measurement, in accordance with an agreement made between the Research Committee on Fluid Meters and the Performance Test Code Committee in 1964. Practically all of the material in ASME PTC 19.5 was taken from Fluid Meters, and most of the writers also were members of the Research Committee on Fluid Meters. It was the decision of the two committees that combining the material into one publication, in such a way that the sections dealing with specifications and instructions could be published separately, would reduce the work of the committees and the number of separate publications. However, this publication prompted considerable criticism that the material presented was difficult to put to practical use. Consequently, the Board on Performance Test Codes formed a committee to address these concerns, and the result is the current version of ASME PTC 19.5, Flow Measurement.

This edition includes a much broader range of methods of flow measurement than any of its predecessors. Even so, it does not include every method — only those that were judged at the time to meet the requirements and needs of Test Codes by providing results of the highest level of accuracy consistent with the best engineering knowledge and practice currently available.

This edition was approved by the Board of Performance Test Codes on April 16, 2001 and February 18, 2004 and by the ANSI Board of Standards Review as an American National Standard on July 10, 2002 and March 10, 2004.

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

The Committee welcomes proposals for revisions to this Supplement. 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.

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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 Supplement 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, 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 PTC 19.5 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the PTC 19.5 Standards Committee or check our Web site <http://www.asme.org/codes/>.

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FLOW MEASUREMENT

Section 1 Object and Scope

1-1 OBJECT

The object of this Supplement is to define and describe the proper measurement of any flow required or recommended by any of the Performance Test Codes. Flow measurements performed as specified herein satisfy the requirements of all relevant ISO flow measurement standards in effect at the time of publication.

by the Performance Test Codes. Newer flow measurement techniques of comparably high accuracy are included to provide alternative flow measurements for special situations in which deviations from the requirements of a code are agreed to be necessary. This is a supplementary document that does not supersede the mandatory requirements of any code unless such an agreement has been expressed in writing prior to testing.

1-2 SCOPE

This Supplement describes the techniques and methods of all flow measurements required or recommended