Manual of Petroleum Measurement Standards Chapter 14.14

Venturi Metering of Natural Gas and Other Related Hydrocarbon Fluids

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Venturi Metering of Natural Gas and Other Related Hydrocarbon Fluids

1 Scope

This standard provides engineering equations, uncertainty estimations, installation requirements, and standardized implementation recommendations for the calculation of flow rate of single-phase fluids, liquid or gas, through concentric differential-pressure-producing Venturi meters.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API *MPMS* Chapter 21.1, *Flow Measurement Using Electronic Metering Systems—Electronic Gas Measurement*

API *MPMS* Chapter 21.2, *Flow Measurement Using Electronic Metering Systems—Electronic Liquid Volume Measurement Using Positive Displacement and Turbine Meters*

ASME MFC-3M,[1] *Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi*

ISO 5167-4,[2] *Measurement of Fluid Flow by Means of Pressure Differential Devices Inserted in Circular Cross-Section Conduits Running Full, Part 4: Venturi Tubes*

3 Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1
absolute viscosity (μ)
The measure of resistance to shear per unit of time of a fluid's intermolecular cohesive force.

3.2
axial flow velocity (V)
The component of liquid flow velocity at a point in the measurement section that is parallel to the measurement section's axis and in the direction of the flow being measured.

3.3
calibration
A set of operations that establish, under specified conditions, the relationship between the values indicated by a measuring device and the corresponding known values indicated when using a suitable measuring standard.

3.4
custody transfer measurement
Provides quantity and quality information for the physical and fiscal documentation of a change in ownership and/or a change in responsibility for commodities.

3.5
density (ρ)
The mass contained in a unit volume.

[1] American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016, www.asme.org.
[2] International Organization for Standardization, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, www.iso.org.