



Measurement of Gas Flow by Bellmouth Inlet Flowmeters

Standards for Engineers Worldwide

ASME MFC-26-2011

This Standard covers the steady flow of single-phase gases and gas mixtures and applies only to bellmouth inlet flowmeters in which the flow remains subsonic throughout the measuring section and the flow is steady or varies only slowly with time. It also addresses procedures by which calibration of the device can be made to allow for application with consistent conclusions and within known limits of uncertainty.

ASME MFC-26 outlines the general geometry and method of use of bellmouth inlet flowmeters to determine the mass or volumetric flow rate of the gas or gas mixture flowing through the device. It also gives necessary information for calculating the flow rate and its associated uncertainty.

Key Features:

Fundamentals and usage

Benefits:

Used extensively in aerospace test facilities for gas turbine engines for flow conditioning and flow measurement. Inlet flare design and measurement considerations are provided.

Instrumentation

Non-mandatory appendix provided for the development of calculation with derivation.

Options for instrumentation methods are provided and the impact on calculation and calibration are discussed. Also provided are total pressure, static pressure, and total temperature measurements and how they must be consistent in calibration and use.

Calibration and uncertainty

Various methods for developing NIST traceable results for calculated air flow rate in velocity, volumetric and mass flowrates are discussed. Overview of boundary layer growth and other contributors to calibration results are considered.

Computational fluid dynamics (CFD) analysis is mentioned as significant impact to calibration result.

Also provided is an overview of the approach for developing uncertainty statement (data quality) with practical steps for determination.

Intended for engineers and other users of gas-flow measurement devices in such industries as energy, automotive and aerospace.

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