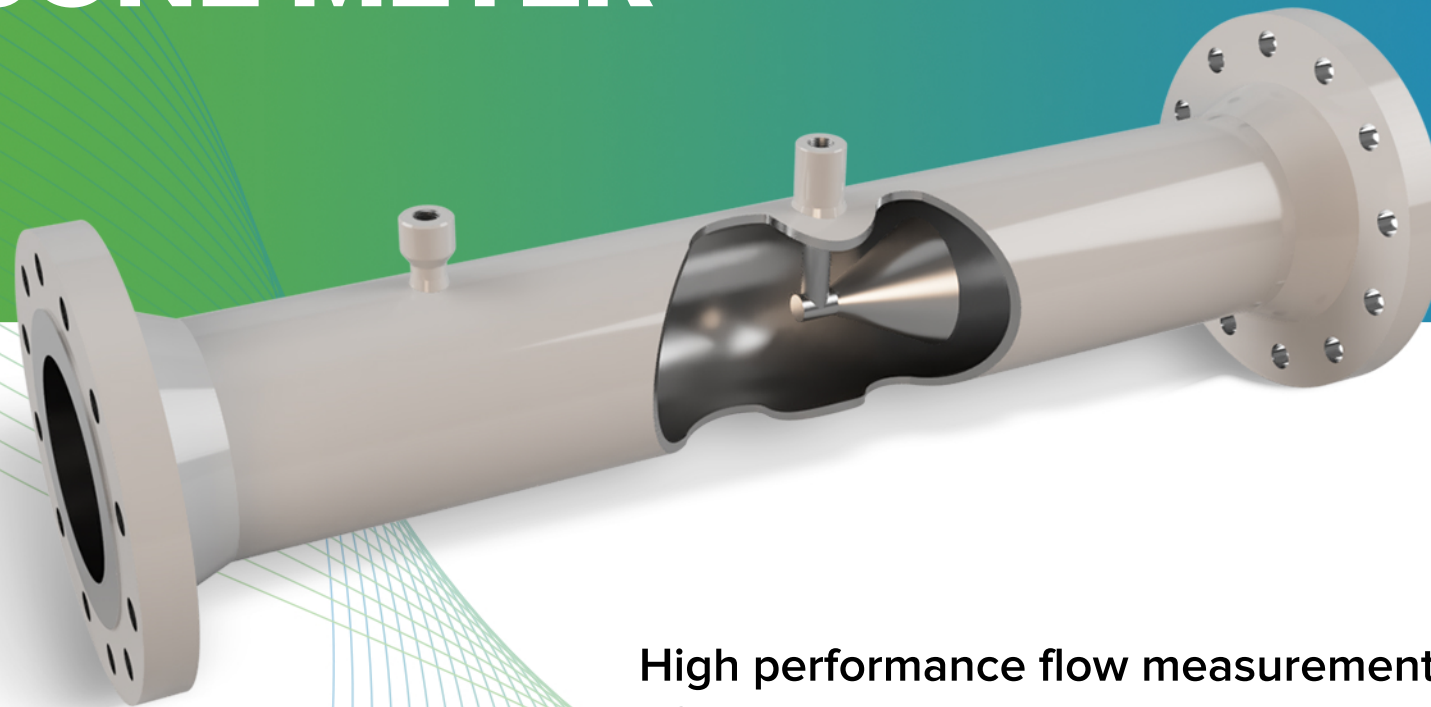


FPD400 DATA SHEET

McMENON CONE METER



**High performance flow measurement solution
for liquids and gases with short entry length.**

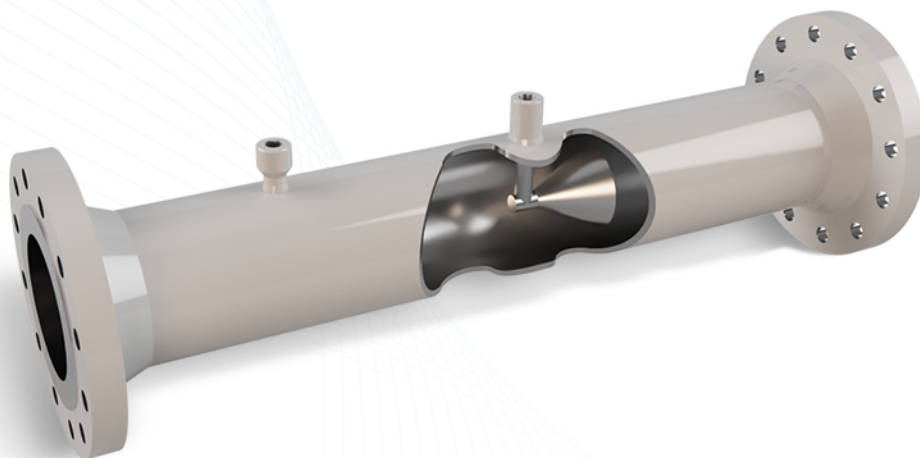
A key enabling technology for the energy transition
and ensuring a safer, greener world.

FPD400 DATA SHEET

McMENON CONE METER

High performance flow measurement solution
for liquids and gases with short entry length.

- Lowest entry and exit straight lengths for any DP meter
- Simple sizing using McMenon Solve
- Material selection to match your piping specification



Performance specs:

- Liquids, dry gases, and wet gases
- 0.5% or better calibrated uncertainty
- 5% uncalibrated
- 0.2% repeatability
- 10:1 turndown
- Short entry length

Applications:

- Feed water supplies
- Renewable fuels
- Wet and dry Steam
- Power industry
- Food and drink measurements

McMenon Cone Meter

Theory of Operation

Cone flowmeters form one of the family of primary elements that are used to measure the flowrate of fluids using differential pressure.

The meters are designed in accordance with ISO 5167-5:2016 and have been rigorously tested over decades to ensure they meet the requirements of a wide range of industries.

Differential pressure meters use a primary element to restrict the area available for flow. This reduction in area at the throat of the primary element still has the same mass flowrate but owing to the reduced area, the fluid flows much faster i.e., it has a higher velocity. From the Bernoulli equation, this increase in velocity coincides with a measurable drop in static pressure at the meter throat.

For cone flowmeters, the restriction is a cone primary element that is suspended centrally in the pipe through a main support with additional supports included as required.

By measuring the differential pressure between the upstream pipe and meter throat it is possible to calculate the volumetric flowrate of the fluid by

$$q_v = \frac{C}{\sqrt{1 - \beta^2}} \varepsilon \frac{\pi}{4} (D\beta)^2 \sqrt{\frac{2\Delta p}{\rho_1}}$$

q_v	Volumetric flowrate	m ³ /s
C	Discharge coefficient	-
β	$\beta = \sqrt{1 - \frac{d_c^2}{D^2}}$ and is known as beta	-
d_c	Cone diameter	m
D	Pipe diameter	m
ε	Expansibility	-
Δp	Differential pressure	Pa
ρ_1	Density of fluid in upstream pipe	kg/m ³

McMenon Cone Meter

Specifications

Pipe sizes	2-6 inch	Other sizes available upon request
Pipe schedule	Sch 40 to XXS	
Betas	0.45, 0.6 and 0.75	Cone sizes to these betas for pipe and schedule
Process connections	Flanged, welded, hubs	Wide range of pressure ratings and types available
Tapping connections	¼", ½" or ¾" pipe taps	Wide range of pressure ratings and types available
Materials	See order code for full list	Other materials not on list considered
Uncertainty	Calibrated – better than 0.5%. Uncalibrated – 5%	Calibrated internally at McMenon or special calibration can be sourced
Repeatability	0.2%	
Permanent pressure loss	48% - 72% of Δp	β dependent
Certification	PED Weld procedures NDT Calibration	All available upon request. McMenon have a wide range of certification for manufacturing.

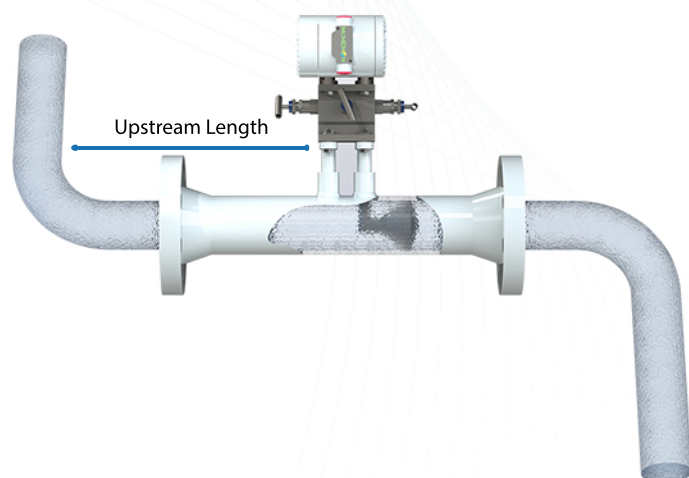
McMenon Cone Meter

Installation

Cone flowmeters benefit from a reduced entry length requirement and can be used without adverse performance effects in close proximity to flow disturbances.

Entry and exit lengths of a cone flowmeter

Disturbance	Upstream Length	Downstream Length
Single 90° Bend	$0.45 \leq \beta < 0.6$ 3D $0.6 \leq \beta \leq 0.75$ 6D	2D
Two 90° Bends	$0.45 \leq \beta < 0.6$ 3D $0.6 \leq \beta \leq 0.75$ 6D	2D
Concentric Expander	0.75D to D expander is 3D with 0.5% additional uncertainty	2D
Partially Closed Valve	10D	2D




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"Sizing DP devices is difficult and time consuming..." Not anymore

McMenon Solve is the ultimate tool for DP flowmeter sizing and more, used on-line or off-line.

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