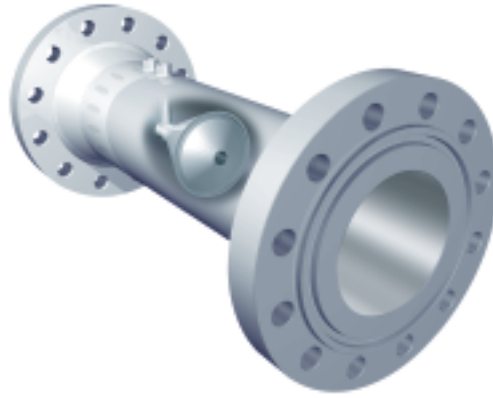


**Proven Flow
Measurement
Solutions for the
Oil and Gas Industry**





The V-Cone is an advanced flowmeter that takes differential pressure flow measurement to a new level. The V-Cone has proven its performance in the oil and gas industry in some of the harshest operating conditions and for the widest variety of fluid types. In these applications, the V-Cone consistently outperforms traditional dP devices and other major flow technologies.

Low Installed Cost

Because it does not require long straight pipe runs or flow conditioning devices, the V-Cone can fit into tight spaces. When retrofitting existing applications, the V-Cone typically fits right in place without having to re-engineer the piping layout.

This installation flexibility saves cost, space and minimizes weight penalty problems without compromising the accuracy of the measurements. Future changes to upstream or downstream piping configurations will not affect the performance of the V-Cone.

Wide Range of Flows and Fluids

The V-Cone handles most every flow condition because it acts as its own flow conditioner. This not only allows maximum installation flexibility, but accurate measurement of disturbed or swirling flows. In addition, the V-Cone is designed to withstand abrasive, dirty and particle-laden flows without significant wear.

Ideal for Wet Gas and Steam

The V-Cone's ability to measure wet gas, steam, or condensate is unique in the industry. In side-by-side tests with other dP technologies, only the V-Cone provided accurate measurement of these challenging flow regimes.

Superior Performance

The V-Cone delivers an accuracy to $\pm 0.5\%$ of rate and $\pm 0.1\%$ repeatability (depending on fluid type) under a variety of conditions. It also handles turndowns of 10:1 and greater, without loss of accuracy. The V-Cone has an unprecedented long life of twenty-five years or more.

Meeting the Needs of the Oil & Gas Industry

| Applications | Fluid Types |
|---|---|
| Allocation Measurement | Natural Gas / Crude Oil / Water / Air / Steam |
| Blending | Liquid Hydrocarbons / Chemicals |
| Burners | Natural Gas / LPG / LNG |
| Chimney Stack | Flue Gas |
| Coal Bed Methane / Shale Gas | Dirty / Wet Natural Gas |
| Compressors (Inlet / Outlet, Loop / Anti-Surge Control) | Natural Gas |
| Custody Transfer | Natural Gas / Crude Oil / Water / Air / Steam |
| Feed Lines to Flare | Natural Gas |
| Firewater Pumps Testing | Water / Seawater |
| Fuel gas | Natural Gas / LPG / LNG |
| Gas Lift | Natural Gas |
| Injections / Reinjections | Natural Gas / Water / Steam / CO ₂ (Gas & Liquid) / Chemical |
| Oil Sands | Steam / Natural Gas / Crude Oil |
| Produced Liquids | Liquid Hydrocarbons / Condensate / Waer |
| Production and Test Separators (Inlet / Outlet) | Natural Gas / Wet Natural Gas / Crude Oil / Water |
| Lift Pumps | Water / Seawater |
| Steam | Saturated / Super Saturated / Super Heated |
| Wellhead Measurement | Natural Gas / Wet Natural Gas / Crude Oil / Water |
| Wet Gas (with Known Liquid Volume) | Wet Natural Gas |

So Innovative. . .

It Created An Entirely New Category

After more than twenty years, McCrometer's V-Cone remains the most innovative dP meter available today. The self-conditioning cone is a simple, yet powerful way to provide accuracy you can count on regardless of flow dynamics. This results in maximum installation flexibility and unsurpassed performance.

Low Total Cost of Ownership

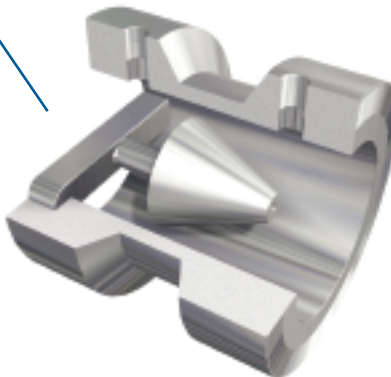
With no moving parts to replace or maintain, the V-Cone assures long-term performance without the operating costs of other flowmeters. The contoured aerodynamic shape of the cone profiles the flow in the pipe without impacting it against a sharp beta edge. Instead, a boundary layer forms along the cone, directing fluid away from the beta edge. The V-Cone beta edge does not change dimensionally, thus allowing extremely long usage without physical re-calibration.

Design Flexibility

The V-Cone is available in line sizes from 0.5" to greater than 120" in an extensive variety of construction materials with beta ratios to suit any application. The V-Cone can be jacketed, painted, coated, or treated like any other piece of piping. The V-Cone is regularly calibrated, tested and certified to the most demanding specifications.



The Wafer-Cone is the ideal low cost solution, offering exceptional flexibility for natural gas, coal bed methane, and shale gas wellheads. Also ideal for small process lines, and many other plant infrastructure applications.



The Wafer-Cone is available in line sizes from 1 to 6 inches and can be oil or gas flow calibrated. Featuring a removable cone and flangeless design, cones with different beta ratios can be easily exchanged to accommodate changing flow conditions without the need for recalibration.

To place an order or learn more about the V-Cone, contact our experts

V-Cone Specifications

Standard Accuracy: $\pm 0.5\%$ of rate (certain fluids and Reynolds number applications may require specific calibrations to achieve this value).

Repeatability: $\pm 0.1\%$ or better.

Flow Ranges: 10:1 and greater.

Standard Beta Ratios: 0.45 through 0.80, custom betas available.

Head Loss: Varies with beta ratio and dP.

Installation Piping Requirements: Typically 0-3 diameters upstream and 0-1 diameter downstream of the cone are required, depending on fittings or valves in the adjacent pipeline.

Materials of Construction Include: Duplex 2205, 304, or 316 stainless steel, Hastelloy C-276, 254, SMO, carbon steels. Special materials and testing available on request.

Line Sizes: 0.5" to 120" or larger.

End Fittings: Flanged, threaded, hub or weld-end standard. Others on request.

Configurations: Precision flow tube and wafer-type.

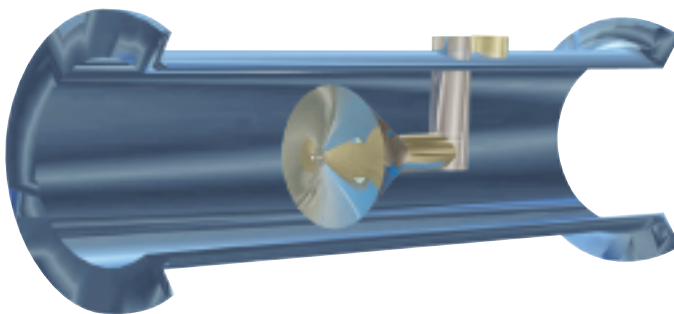
- Calibrated for customer application.
- ASME B31.3 construction available.

Approvals for the V-Cone:

- Canadian custody transfer approved.
- In-Metro approved.
- Meters in compliance with PED97/23/EC are available upon request.
- ISO 9001:2008 certified quality management system.
- Conforms to API 22.2 testing protocol.

McCrometer's innovative V-Cone Flowmeter is designed for high performance in mild to harsh environments.

This proven flowmeter measures the widest range of fluids from liquids to gases, including wet gas, condensate, and dirty or abrasive flows, as well as other typical flow measurement conditions. The V-Cone offers easy installation, superior accuracy and repeatability, and long-term, low-cost operation for refinery and onshore/offshore production and delivery applications.



**minimal straight
pipe requirements**

•

**high accuracy and
repeatability**

•

low headloss

•

easy installation

– ideal retrofit!

•

conditions

disturbed flows

•

**measures dirty and
abrasive flows**

•

virtually no

maintenance

•

no recalibration

•

unprecedented

long life

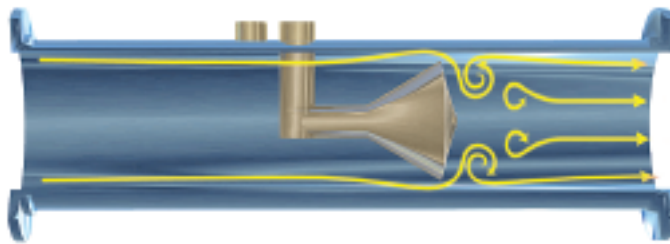
Advanced Differential Pressure Flowmeter Technology

Pipe flow profiles are rarely ideal. Practically any change to the piping can disturb the flow. The contoured shape of the centrally located cone in the V-Cone flowmeter overcomes this by reshaping the velocity profile.



As the flow approaches the cone, the flow profile “flattens” toward the shape of a well developed profile—even in extreme flow conditions.

The V-Cone forms very short vortices as the flow passes the cone. These short vortices create a low amplitude, high frequency signal for excellent signal stability. The clean signal enables a wide measurement range and quick response time for control.



The V-Cone’s contour-shaped cone directs the flow towards the outside wall away from the cone. As a result, the beta edge is not subject to wear by particle laden fluids and remains unchanged. Therefore, V-Cones rarely, if ever, require recalibration or replacement.

For over two decades, the oil and gas industry has turned to the V-Cone for flow measurement solutions. Consistently, this advanced flowmeter has provided a level of performance thought unachievable in real-world environments.

Whether your application is straight-forward or challenged by limited installation space, disturbed flow, high turndowns, wet gas, or dirty or abrasive fluids, McCrometer’s knowledgeable staff can accurately evaluate your application and specify the best meter to meet your needs.



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