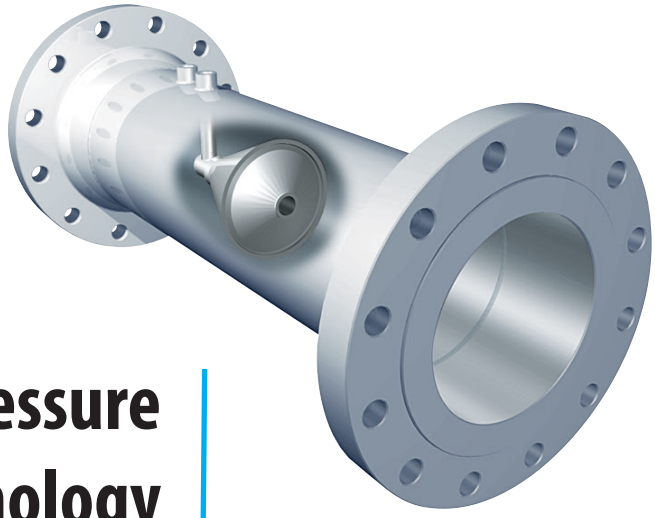
McCROMETER



VCONE

Advanced Differential Pressure Flow Meter Technology

For The Real World.

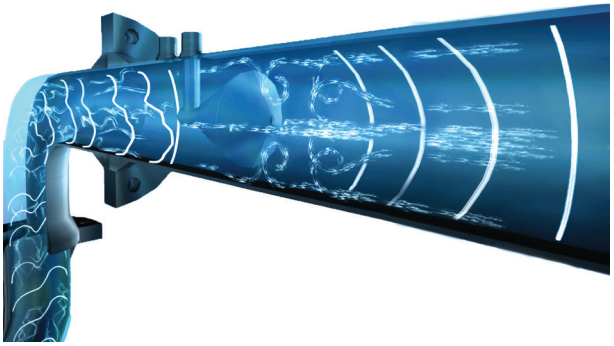
- Oil & gas production and delivery
- Petroleum refining
- Municipal water & wastewater
- Chemical and pharmaceutical processing
- Power/co-generation
- Mining
- Pulp & paper
- Industrial manufacturing
- Food & beverage

Proven Performance In Real World Measurement Applications

The McCrometer V-Cone® flow meter technology accurately measures flow over a wide range of Reynolds numbers, under many conditions and for a variety of fluids. It operates on the same physical principle as other differential pressure-type flow meters, using the theory of conservation of energy in fluid flow through a pipe. The V-Cone flow meter's remarkable performance characteristics are the result of its unique design. It features a centrally-located cone inside the tube. The cone interacts with the fluid flow, reshaping the fluid's flow profile and creating a region of lower pressure immediately downstream of itself. The pressure difference, exhibited between the static line pressure and the low pressure created downstream of the cone, can be measured via two pressure sensing taps. One tap is placed slightly upstream of the cone, the other is located in the downstream face of the cone itself. The pressure difference is then incorporated into a derivation of the Bernoulli equation to determine the fluid flow rate.

Advanced DP Technology: Principles of Operation

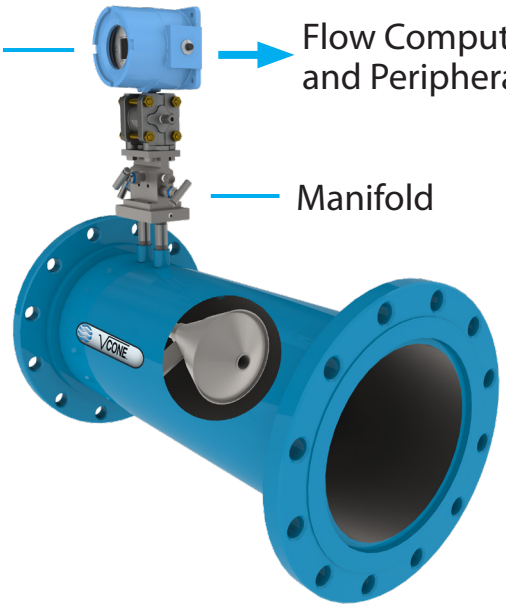
The V-Cone flow meter typically requires only 0-2 pipe diameters even in disturbed flow applications.



V-Cone Flow Meter Design Advantages

The contoured shape and location of the suspended cone in the V-Cone flow meter reshapes the velocity profile upstream. As the flow approaches the cone, the flow profile "flattens" toward the shape of a well-developed profile - even in extreme flow conditions.

The cone's central position in the line optimizes the velocity of the flow at the point of measurement, assuring highly accurate, reliable flow measurement regardless of the flow condition upstream of the meter.



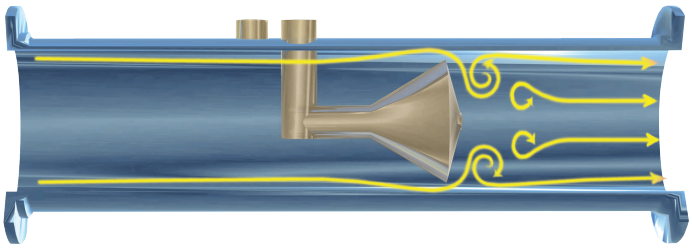
High Performance in Challenging Applications

McCrometer's V-Cone® flow meter is an innovative system that takes differential pressure flow measurement to another level. Designed for mild to harsh operating environments, and for a wide variety of fluids, this advanced flow meter consistently outperforms traditional DP devices and other flow technologies. The V-Cone flow meter offers better accuracy and repeatability, wider rangeability, installation flexibility, and reduced maintenance.

More than 70,000 Meters & 30+ Years Experience

The V-Cone flow meter 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 centrally-located cone directs flow to the outside wall, effectively conditioning disrupted flows.



Acts As Own Flow Conditioner

The V-Cone flow meter's enhanced performance is due to the shape and position of the cone in relation to the measurement ports. This allows the V-Cone flow meter to act as its own flow conditioner by disrupting all centralized flow disturbances. This fully mixed and conditioned flow results in a low amplitude, high frequency signal with little "signal noise." Readings are always precise and reliable, including low pressure flow situations.

Maximum Installation Flexibility

The V-Cone flow meter's ability to condition the flow prior to measurement results in another significant benefit: installation flexibility. Because the V-Cone flow meter can accurately measure disturbed flow, it doesn't require the upstream or downstream straight pipe runs of many other flow meters. This key feature means the V-Cone flow meter can be installed virtually anywhere in a piping system or easily retrofit into an existing piping layout.

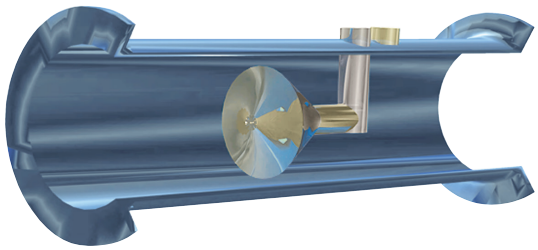
The result can be significant cost savings. It also means the V-Cone flow meter can fit where other flow meters can't due to limited space or weight requirements.

Low-to-No Operating Costs

The V-Cone flow meter assures long-term performance. It has no moving parts to replace and maintain. In addition, the contoured shape of the cone directs the flow without impacting it against an abrupt surface. Instead, a boundary layer forms along the cone, directing fluid away from the beta edge. Because the beta remains unchanged, the calibration of the meter is accurate for a much longer time than other flow meter technologies

Flexible Design Meets Range of Needs

The V-Cone flow meter offers exceptional sizing flexibility. It can be sized for line diameters of 1/2" to over 120". An extensive variety of construction materials are also available.



Accuracy You Can Count On

The key benefit to the V-Cone flow meter's unique design is its ability to provide repeatable accuracy of up to ±0.5% of rate under even the most difficult flow conditions. The V-Cone flow meter has been proven to be accurate over a wide range, from very low to extremely high Reynolds numbers. Whether measuring swirling fluids or low pressure flows, the V-Cone flow meter delivers the accuracy and reliability other devices only achieve under laboratory conditions. The V-Cone flow meter also has low headloss when compared to other dP technologies.

- **Ideal for tough applications**
- **High accuracy**
- **High repeatability**
- **Self conditioning**
- **Minimum straight pipe requirements**
- **Broad rangeability**
- **Low headloss**
- **Clean or dirty liquids, wet gases, slurries**
- **Low signal noise**
- **Virtually no maintenance**

Standard Accuracy:	From ± 0.5% of actual flow (certain fluids and Reynolds number applications require special calibrations to achieve this value)
Repeatability:	±0.1% or better
Flow Ranges:	10:1 and greater
Standard Beta Ratios:	0.45 through 0.85, special betas available
Head Loss:	Varies with beta ratio and DP
Installation Piping Requirements:	Typically 0-3 diameters upstream and 0-1 diameters downstream of the cone are required, depending on fittings or valves in the adjacent pipeline
Materials of Construction Include:	Duplex, 304, or 316 stainless steel, Hastelloy C-276, 6MO, carbon steels Other materials 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 standard • ASME 31.1, PP Stamp, B31.4, B31.8, API 6A and other standards available on request
Approvals for the V-Cone Flow Meter:	• Russian compliance EAC • Canadian custody transfer approved • Meters in compliance with PED 2014/68/EU Annex III, Module H are available upon request • ISO 9001:2015 certified quality management system
Performance Verification Testing	• Tested at an API Registered MPMS Test Facility according to the requirements of API MPMS Chapter 22.2

McCrometer Application Support

At McCrometer, we have been innovating flow meters for over 60 years. Our knowledgeable staff can accurately evaluate your flow application and specify the best meter for your job. For an evaluation of your flow application or to find out about our other flow meter products, contact your McCrometer representative today.

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