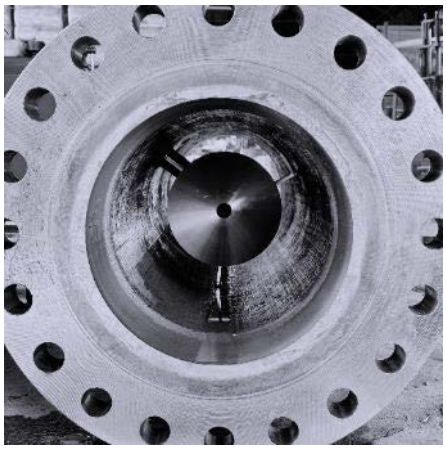
VENTURI CONE METERS

The Venturi Cone Meter is a differential pressure device to measure flow rate in a closed conduit with the minimum pipe straight length and with high rangeability.

TECHNICAL SPECIFICATIONS	
APPLICATIONS	Oil & Gas / Petrochemical Industries / Power Stations / Off Shore Platforms
TYPE AND CONSTRUCTION	Manufactured by bar stock Manufactured by welded plate
MATERIAL	As per Customer's requirements Main material Reference: ASTM-ASME Code
DIMENSIONS	Nominal Diameter of Pipeline: over 2"
FLOW CALCULATION	Main Reference code: ISO 5167 -5



TECNOMATIC® FLOW ELEMENTS SRL - www.tmtecnomatic.com
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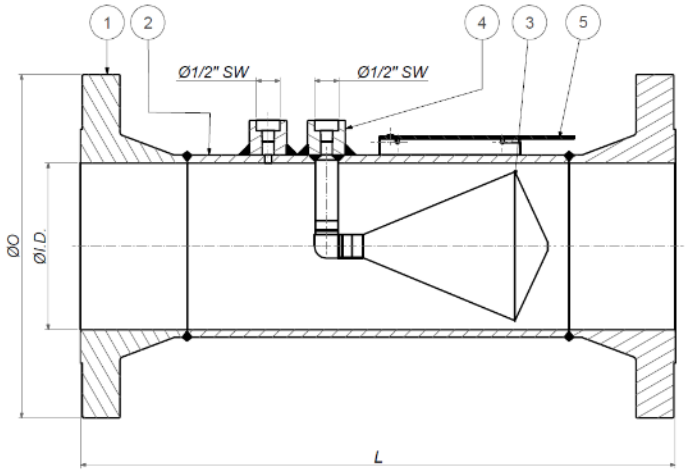
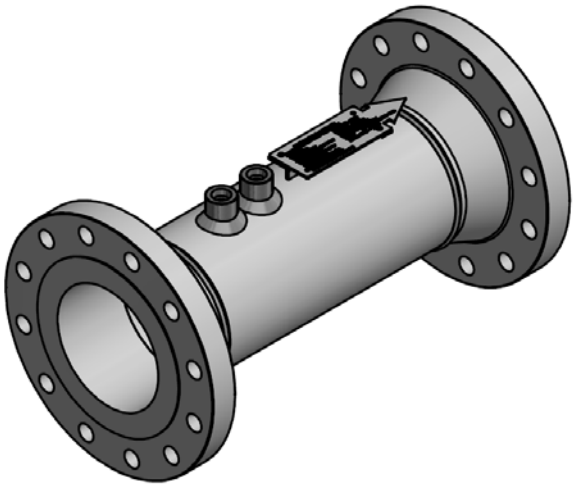
Mod DS-VCM ED08-25

STANDARD LIMITS & APPLICATION FIELDS	
BETA V-CONE RATIO	0.45 ÷ 0.85
REYNOLDS NUMBER RANGE	Over 200.000
DIAMETER	0.893 ÷ 0.526
PERFORMANCES	Accuracy (referred to flow coefficient): as per ISO Code Rangeability: 1-10 Repeatability: (+/- 0.1%) Max PPL: 20÷40% of full-scale differential pressure Required straight length: 3 I.D. (upstream); 2 I.D. (downstream) in the worst conditions
CALIBRATION	Accuracy (referred to the discharge coefficient) after calibration in accredited laboratory: +/- 0.25%
NOTES	Flow Meters can be manufactured according to all Customer Specifications. Flow Meter can be supplied with all suitable accessories (valves / manifold / condensing pot / transmitter / fitting / tubing).
PROPERTY	Venturi Cone meters are proprietary meters and are essentially an inverted Venturi tube. Instead of a contraction in the pipe, the fluid flows around a central cone as shown in the following diagram. Unlike Venturi tubes, orifice plates, and nozzles, which are manufactured to tolerances specified in ISO 5167, cone meters are not manufactured to a specified tolerance and rely on the know-how of very few manufacturers in the world that has gained such expertise in the past decades.

SAMPLE OF VENTURI CONE METER





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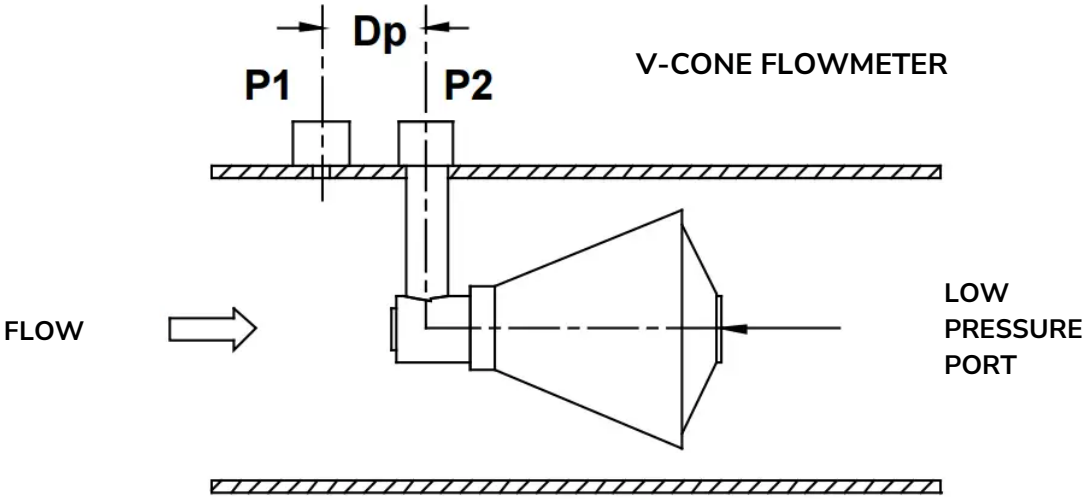
PRINCIPLE OF FLOW MEASUREMENT	By measuring the upstream pressure, the temperature, and the difference in the static pressure between the upstream and the minimum cross-sectional areas, the flow rate can be determined as long as the fluid properties are known. The flow rate determination is done by applying the laws of conservation of mass and energy. The V-Cone flow meter is a differential pressure type flow meter. Basic theories behind differential pressure-type flow meters have existed for over a century.
CONSERVATION OF ENERGY	The principal theory among these is Bernoulli's theorem for the conservation of energy in a closed pipe. This states that for a constant flow, the pressure in a pipe is inversely proportional to the square of the velocity in the pipe. Simply, the pressure decreases as the velocity increases. For instance, as the fluid approaches the V-Cone flow meter, it will have a pressure of P1. As the fluid velocity increases at the constricted area of the V-Cone, the pressure drops to P2, as shown in Figure 1. Both P1 and P2 are measured at the V-Cone flow meter's taps using a variety of differential pressure transducers.



PRINCIPLE OF VENTURI CONE	The DP created by a V-Cone flow meter will increase and decrease exponentially with the flow velocity. As the constriction takes up more of the pipe's cross-sectional area, more differential pressure will be created at the same flow rates. The beta ratio equals the flow area at the largest cross-section of the cone (converted to an equivalent diameter) divided by the meters inside diameter
ADVANTAGES	These differences give the V-Cone and the others DP meter give important performance advantages. These advantages include the ability of the V-Cone meter to operate with very short upstream and downstream straight pipe lengths, to create a low total pressure (or "head loss"), to create a very stable DP, to give a large turndown, to create relatively low signal noise and to cope well with liquid and particulates in the gas stream.

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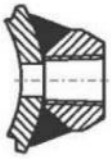
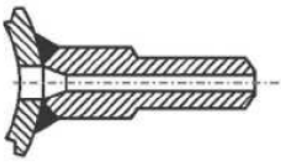
END CONNECTIONS	Venturi Cone Meters are available with ends prepared for welding to the pipeline, or fitted with flanges.
PRESSURE TAPPINGS	Venturi Cone Meters can be supplied with a wide variety of pressure tappings, including threaded connections, socket weld connections and welding nipples. The pressure taps can be welded directly on the body.

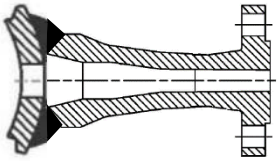
Screwed



Socket weld



Welding nipple



Flangeolet

SPECIAL REQUIREMENTS	For applications requiring high accuracy flow measurement, Venturi Cone Meters can be individually calibrated, using water, air or natural gas, to obtain accurate discharge coefficients for the device over a range of Reynolds numbers. Tecnomatic also offers 'in-house' testing including dye penetrant inspection, hydrostatic pressure testing, radiographic inspection, magnetic particle inspection, ultrasonic inspection and Positive Material Identification PMI. ASME IX/EN 15614 welding procedures and qualifications involving standard and special materials are also available. Finishing of devices with standard painting cycles or as per customer requests.
EXTRA	Tecnomatic can also supply isolation valves, condensate pots and manifolds, as the application demands.

EXAMPLE OF CODIFICATION

VENTURI CONE METER	VCM	B	16	03	RF	05	001	ID NUMBER

TYPE OF VENTURI:
W - WELDED SHEET
B - BARSTOCK

NOMINAL DIAMETER:
01 - 1 INCH
02 - 2 INCHES
...
90 - 90 INCHES

RATING:

01 – 150	04 - 900
02 – 300	05 – 1500
03 – 600	06 - 2500

TYPE OF FACE:
FF – FLAT FACE
RF – RAISED FACE
RJ – RING JOINT
SW – SOCKET WELD

PIPE MATERIAL:
01 – CS A105/A105N
02 – CS LF2
03 – F11/F22
04 – SS 304/SS 316
05 – DUPLEX
06 – INCONEL ALLOY
07 – MONEL ALLOY
08 – HASTELLOY

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