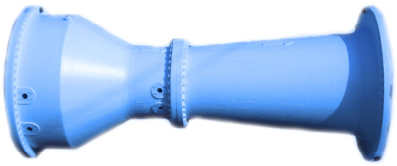
Primary Flow Signal

Well Field Flow Measurement

Comparative Analysis of Three Meter Types

In order to assist the user in selecting the best long term, accurate and defendable flow metering solution, the following comparison is made between three types of flow metering technologies that may be considered for this application. Information on the venturi meter technology is based on over 25 years of laboratory flow calibration and field installation results: information on the magnetic and propeller type meters is based on available literature for these devices.



Venturi Meter:	Magnetic Meter:	Propeller Meter:
a. Accuracy of the Flow Metering Technology		
+/-0.5% of actual rate	+/-1.0% of actual rate	+/-2.0% of reading
b. Repeatability of the Flow Metering Technology		
+/-0.25%	+/-0.25%	+/-0.25%
c. Life Expectancy		
50 years	15 years	10 years
d. Warranty		
25 years from date of installation	5 years after shipment	2 years after installation
e. Upstream Straight Pipe Requirements		
5 to 9 diameters depending on meter beta ratio and the first upstream disturber.	5 to 10 diameters	≥ 10 diameters
f. Downstream Straight Pipe Requirements		
No downstream straight pipe is required	1 to 2 diameters	≥1 diameter

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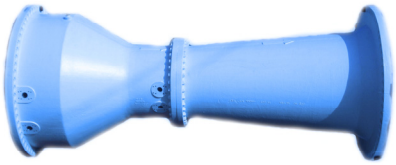
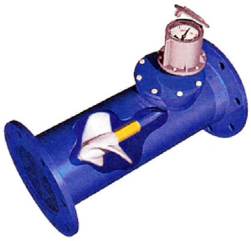
(continued Pg.2)





Venturi Meter:	Magnetic Meter:	Propeller Meter:
g. Wear Factors		
The Venturi meter has no moving parts and appropriate materials of construction can be used to eliminate change in the internal tolerances. The DP transmitter portion of the system is electronic, just like the magnetic meter electronics, however, unlike the magmeter electrodes and coils, the DP transmitter is simple to replace at a very low cost.	Magnetic meter is fully electronic thus may be subjected to lightening hits and general electronic degradation.	Mechanical design is affected by frictional wear particularly if there is abrasive material.
h. Field Calibration:		
Interior condition of the Venturi meter can be checked easily for internal wear: DP transmitter can be easily field calibrated.	Flowmeter cannot be field calibrated unless there is an accurate drawdown or fill-up possibility. The electronic circuit can be checked but that has nothing to do with the flow measurement signal.	Flowmeter cannot be field calibrated unless there is an accuracy drawdown or fill-up possibility.

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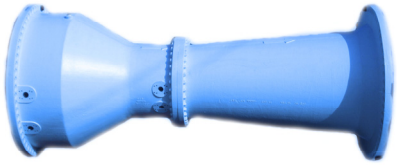

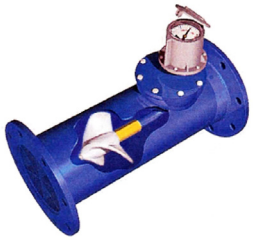

Venturi Meter:	Magnetic Meter:	Propeller Meter:
i. Limitations and Requirements:		
1. Requires Full Pipe Flow.	1. Requires Full Pipe Flow.	1. Requires Full Pipe Flow.
2. 25 VDC power supply required for 4-20mA output signal. Optional battery powered local flow rate and totalization is available.	2. 120 VAC power required for all operations. No battery powered options available.	2. No power required if local totalization only: power is required for 4-20mA output.
3. Operates accurately on any flowing material.	3. Material being measured must be conductive.	3. Can stand up to 5% solid content.
4. Taps can be easily cleaned without stopping the flow or removing any parts.	4. Electrodes must be clean, if any coating were to adhere to the electrodes, their signal will be affected.	4. If propeller develops any build-up the accuracy of the meter will be affected in the direction of under-registration.
j. Cost Comparison: 6.0” line size		
$3,500.00 for complete system.	$2,950.00 for complete system.	$4,050.00 for complete system.

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