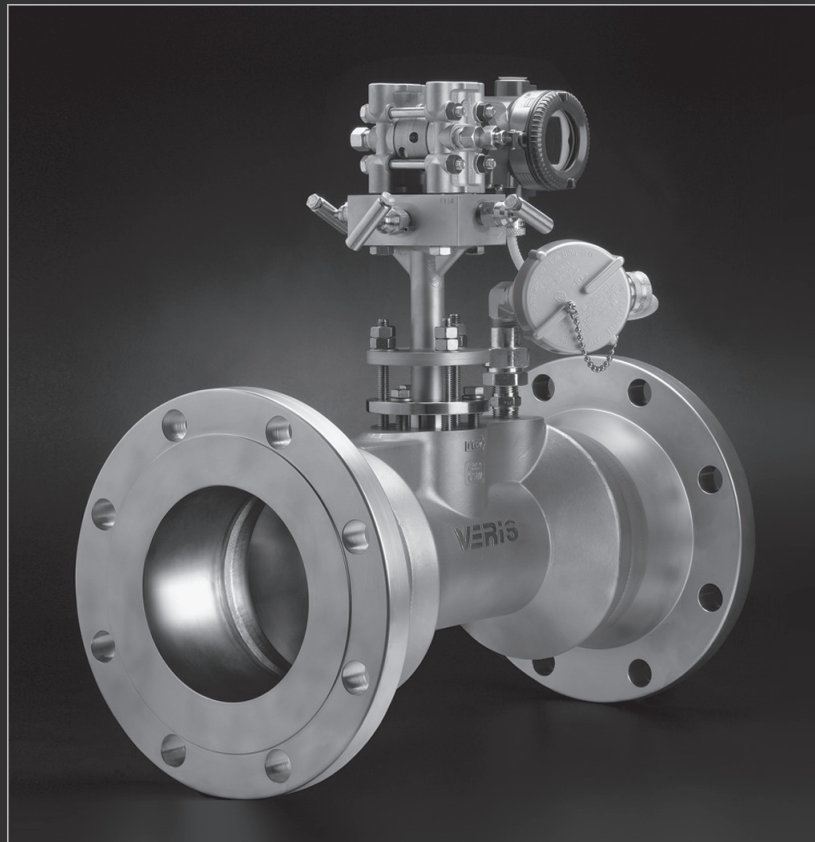




VERIS ACCELABAR®
SUPERIOR FLOW MEASUREMENT ACCURACY

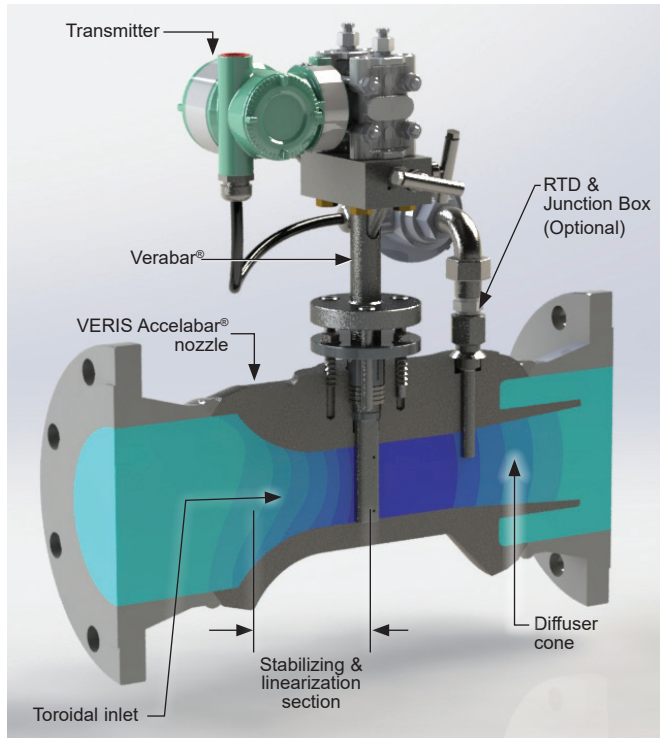




VERIS Accelabar® ...A New Idea in Flow Measurement

The Unique VERIS Accelabar® Flow Meter

The VERIS Accelabar® is a new and unique DP primary flow element that combines two differential pressure technologies to measure flow at operating ranges never before attainable in a single DP flow meter. It is capable of generating high differential pressures for measuring gas, liquids and steam at turndowns previously unattainable—with no straight run requirements.



How the VERIS Accelabar® Works

The VERIS Accelabar® consists of a unique toroidal nozzle design and the VERIS Verabar® averaging pitot. The nozzle has a patented geometry that accelerates, linearizes and stabilizes the velocity profile sensed by the VERIS Verabar®. The VERIS Verabar® located after this “settling distance” and in the throat of the VERIS Accelabar® accurately measures and significantly increases the differential pressure to increase the operating range (turndown). The VERIS Accelabar® has a linear, Reynolds number Independent flow coefficient with an accuracy of up to $\pm 0.50\%$.

Other manufacturers claim high accuracy, but over a limited turndown.

No Straight Run Required

The VERIS Accelabar® can be used in extremely limited straight run piping configurations. The straight run is integral to the meter. The stabilization and linearization of non-uniform velocity profiles within the throat of the nozzle eliminates the need for any upstream run.

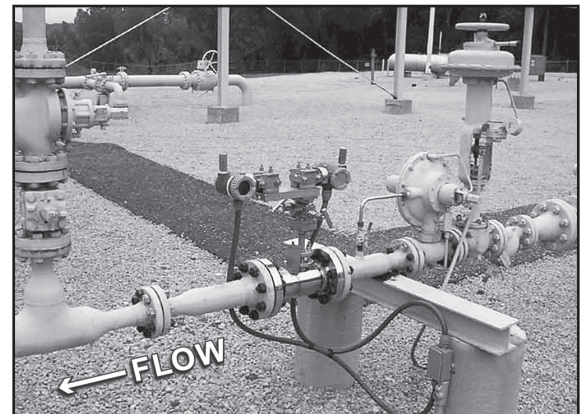
US Patent No. 6,868,741 B2 and various foreign patents pending.

Engineering Specifications

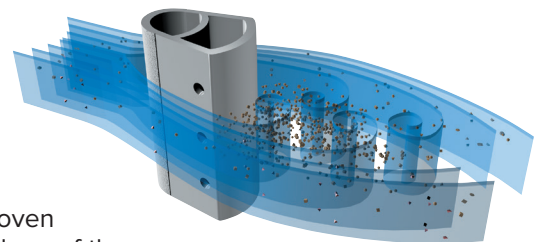
- Low velocity pipe flow rates
- High flow coefficient accuracy: to $\pm 0.50\%$
- Repeatability: $\pm 0.050\%$
- Linear, Independently Verified flow coefficients
- No calibration of primary flow element required
- Wide range of flow with extended turndowns
- No straight run requirements
- Mass or volumetric flow

Actual Application (see data on page 3)

Application:	3" Sch 40 Natural Gas
Operating Pressure/ Temperature:	50 PSIG/70°F
Max/Min Flow Rate:	60,000 SCFH/1,000 SCFH
Flow Turndown:	60:1 (Stacked Transmitters)
Straight Run:	0"



VERIS Verabar® Provides the Accuracy



The proven technology of the VERIS Verabar® makes the VERIS Accelabar® work. It accurately measures the flow rate within the nozzle. Its unique bullet shape, constant flow coefficient, solid one-piece construction, non-clog design and signal stability make it the only design capable of producing the overall performance.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com/veris for up-to-date information.

VERIS Accelabar® ...Performance Characteristics

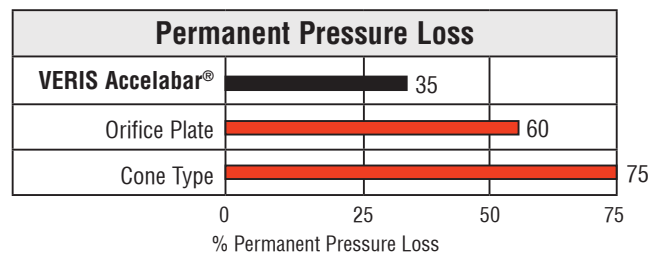
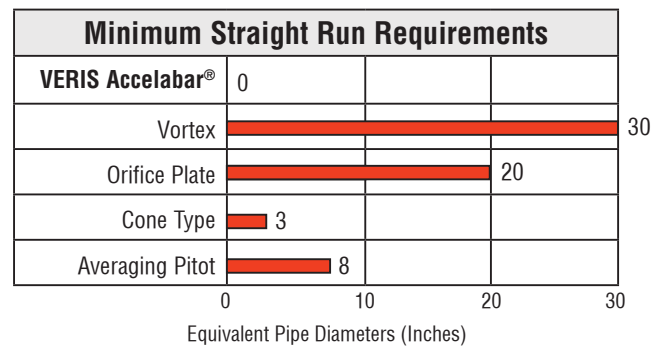
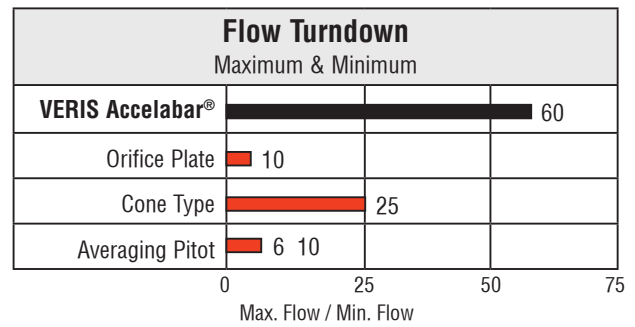
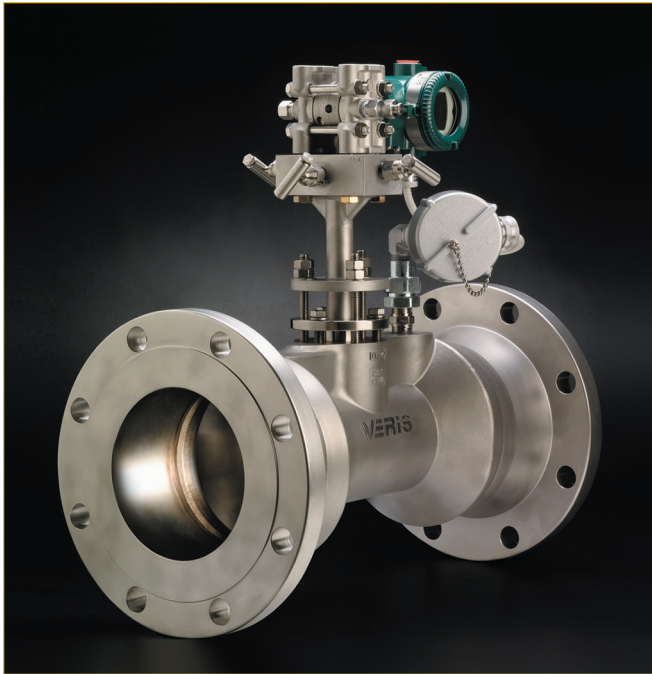
Comparative Analysis vs. Other Flow Meters

The VERIS Accelabar® fills the need not presently being filled by other flow meters for applications that:

- Do not have sufficient velocity to produce a readable signal or sufficient turndown
- Require the highest accuracy over an extended range
- Have little or no straight run piping before the meter

The VERIS Accelabar® performance characteristics far exceed those of other DP primary elements, vortex meters and many other types of flow meters.

These charts show the actual performance characteristics of the VERIS Accelabar® versus other flow meters based on the following flow conditions:





VERIS Accelabar® ...Test Data

Verified Accuracy and Flow Coefficients

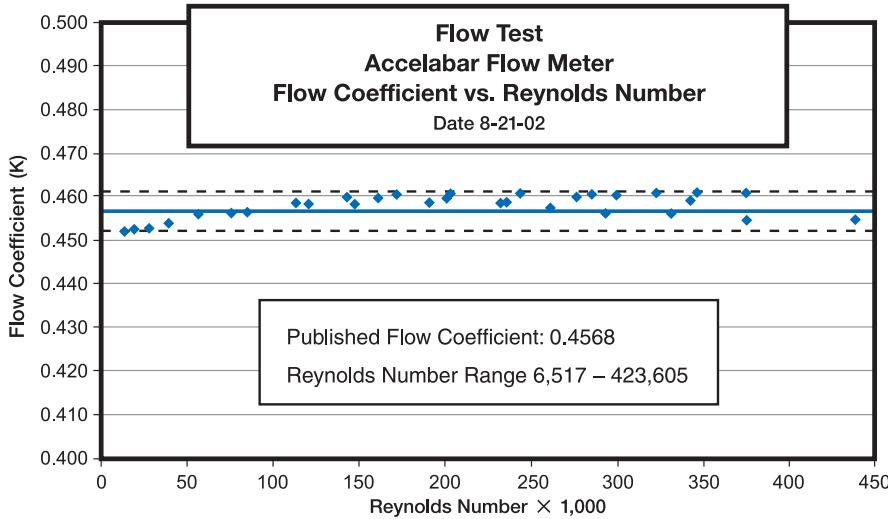
Empirical TEST DATA from independent laboratories verified an analytical model and flow coefficients as constant and independent of Reynolds Number, and within +/- 0.5% of the predicted value over an extended turndown in flow.

This eliminates the need for calibration.

The Proof Is In The Data

Many flow meters claim high accuracy and rangeability or turndown. However, few manufacturers define their limitations and even fewer can support it with actual test data. The tests below show the performance capabilities of the VERIS Accelabar®.

Tested at CEESI (an independent Flow Lab)



*Independent, NIST traceable tests were performed as follows:

- Air tests in 3", 4", 6" and 12" pipes
 - NIST traceable water tests
 - Large turndown natural gas testing
 - Short straight-run testing
- Consult factory for a copy of certified tests.

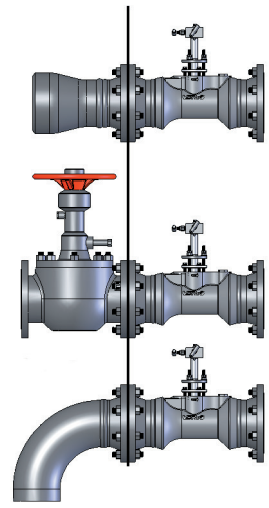
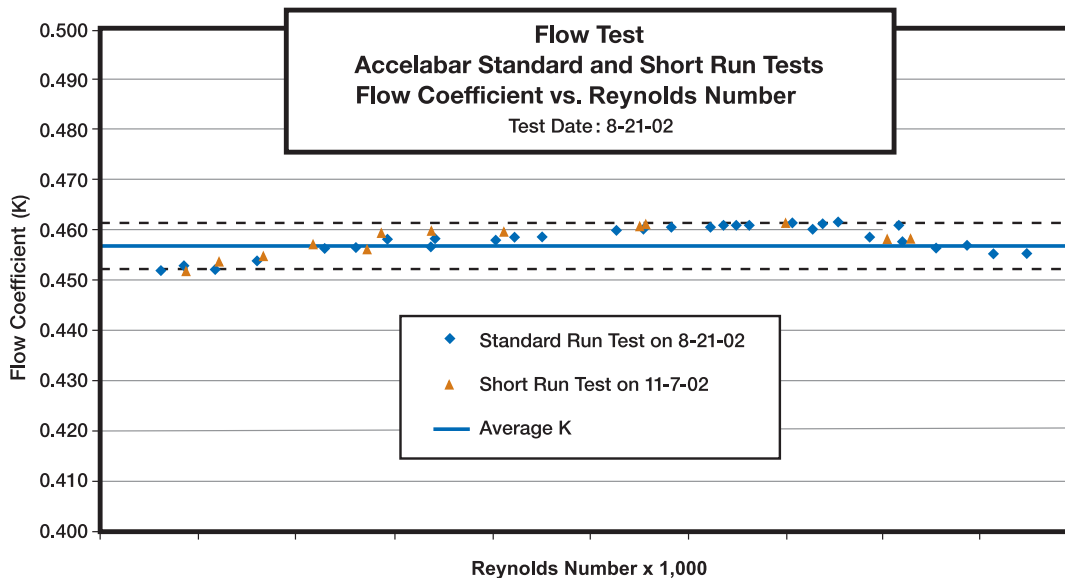
No Straight Run Test Comparison

Test Specifications

The VERIS Accelabar® was tested immediately downstream of a valve, tee elbow, and expander assembly with no straight run upstream.

Results

The short run test plotted with the standard straight run test verifies there is no shift in the flow coefficient.



VERIS Accelabar® ...Models and Specifications

Ready to Install

The VERIS Accelabar® is a complete flow meter ready to install. It comes complete with single or dual transmitters depending on the turndown and accuracy requirements.

An optional RTD is supplied in a welded Thermowell assembly for dynamic, real time compensation (required for use with multivariable transmitter).

Specifications

Accuracy	Repeatability	Sensor, Body & Flange
to ± 0.50%	±0.050%	316SS

VERIS Accelabar® Model Selection

- Furnish your flowing conditions. A flow calculation is required to determine the DP and verification of the operating limits.
 - Each meter size has a standard beta ratio sized for the optimal operating range.
 - The maximum operating limits are determined by the VERIS Accelabar® flow calculation.
- If your flowing conditions exceed or limit selection of the body that matches the line size, a larger or smaller Accelabar® body can be selected for optimal operating results..

Flowing Conditions

General Data	Fluid Parameters	Maximum	Normal	Minimum	Units
Tag number	Flow Rate				
Pipe size & schedule or exact ID & wall thickness	Pressure				
	Temperature				
Fluid name:	Density*				

*Density is not required for steam applications.

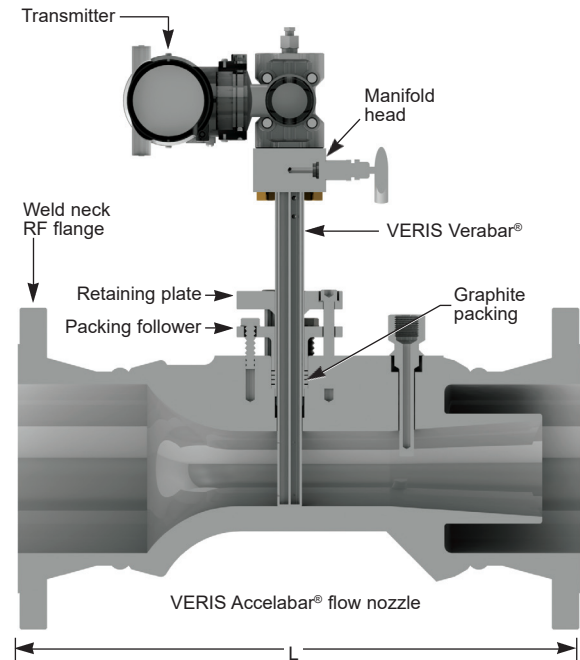
Chart A

Meter Size	Verabar Sensor	Face to Face "L"							
		Class 150#	Class 300#	Class 600#	PN10	PN16	PN40	PN63	PN100
1" (DN35)	-03 1/4"	7.50" (190.5mm)	8.25" (209.6mm)	8.75" (222.3mm)	N/A	N/A	10.15" (257.8mm)	N/A	11.57" (293.5mm)
2" (DN50)	-05 1/2"	8.75" (222.3mm)	9.38" (238.2mm)	10.13" (257.1mm)	11.54" (293.2mm)	11.54" (293.2mm)	11.78" (296.2mm)	12.88" (327.2mm)	13.35" (339.2mm)
3" (DN80)	-05 1/2"	13.78" (350.0mm)	14.53" (369.0mm)	15.28" (388.1mm)	12.31" (312.8mm)	12.31" (312.8mm)	12.94" (328.8mm)	14.04" (356.8mm)	14.52" (368.8mm)
4" (DN100)	-05 1/2"	15.15" (384.8mm)	15.90" (403.9mm)	17.65" (448.3mm)	13.34" (338.9mm)	13.34" (338.9mm)	14.36" (364.9mm)	15.39" (390.9mm)	16.34" (414.9mm)
6" (DN150)	-10 1/2"	19.15" (486.4mm)	19.90" (505.5mm)	21.90" (556.3mm)	16.58" (421.1mm)	16.58" (421.1mm)	18.15" (461.1mm)	19.73" (501.1mm)	21.30" (541.1mm)
8" (DN200)	-10 1/2"	21.40" (543.6mm)	22.15" (562.6mm)	24.40" (619.7mm)	18.38" (466.9mm)	18.38" (466.9mm)	20.42" (518.9mm)	22.16" (562.9mm)	23.74" (602.9mm)
10" (DN250)	-10 1/2"	23.15" (588.0mm)	24.40" (619.8mm)	27.65" (702.31mm)	20.60" (523.3mm)	20.76" (527.3mm)	23.51" (597.3mm)	25.09" (637.3mm)	27.61" (701.3mm)
12" (DN300)	-10 1/2"	26.17" (664.7mm)	27.78" (705.6mm)	29.67" (753.6mm)	22.62" (574.6mm)	23.41" (594.6mm)	26.32" (668.6mm)	28.29" (718.6mm)	30.65" (778.6mm)



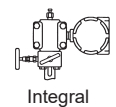
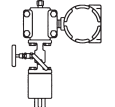
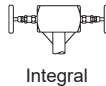




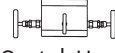

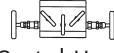



*Face to face dimensions nominal. Custom lengths available.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com/veris for up-to-date information.

AF Flanged Model



VERIS Accelabar® ...Ordering Information

Model	VERIS Accelabar 316SS										
AFS ABS ATS	Flanged Connections Bevel for Weld MNPT Threaded Ends (2" meter only)										
User Mating Pipe Size and Schedule or Exact ID and Wall Thickness											
Code	User Mating Flange (Model AFS Only)										
150 300 600	150# ANSI Class 275 psig @ 100°F, 80 psig @ 800°F (19 Bars @ 38°C, 5.5 Bars @ 426°C) 300# ANSI Class 720 psig @ 100°F, 330 psig @ 800°F (49.6 Bars @ 38°C, 22.8 Bars @ 426°C) 600# ANSI Class 1440 psig @ 100°F, 660 psig @ 800°F (99.3 Bars @ 38°C, 45.5 Bars @ 426°C) If other than ANSI, specify Standard (DIN, JIS) Size and Rating										
Code	Flange Material										
304 316 CS	Stainless Steel (Standard) Stainless Steel (Optional) Carbon Steel (Consult Factory)										
VERIS Accelabar Meter Size											
<i>Important: If the selected meter size is larger or smaller than the user's mating pipe and flange, expanders or reducers are required. Consult the factory for price and delivery.</i>											
	1" (25mm)	2" (50mm)	3" (75mm)	4" (100mm)	6" (150mm)	8" (200mm)	10" (250mm)	12" (300mm)			
Code	VERIS Verabar Size										
05 10	7/16" (11mm) 7/8" (22mm)										
Code	Pipe Orientation										
H V	Horizontal Vertical										
Instrument Head Connections (Select Remote or Direct Mount Transmitter—Sold Separately)											
 Direct Mount Transmitter (Flanged 450°F/232°C Max.)					 Remote Mount Transmitter (1/2" NPT)						
Manifold	Transmount	Valve	Regular	Parallel							
											
M	F	T	R	P							
Manifolds (Optional)					Instrument Valves (Optional)						
 Direct Mount					 Remote Mount						
3-Valve		5-Valve		Needle	Gate						
											
Soft Seat	Hard Seat	Soft Seat	Hard Seat	1/2" NPT		1/2" NPT					
F3SC (CS)	F3HC (CS)	F5SC (CS)	F5HC (CS)	C2NC (CS)		C2GC (CS)					
F3SS (SS)	F3HS (SS)	F5SS (SS)	F5HS (SS)	C2NS (SS)		C2GS (SS)					
Code	RTD in Thermowell										
H1 HT	Hazardous Location, Class 1 Div 1, Explosion Proof High Temperature (500°F to 900°F, 260°C to 482°C)										
Code	Connection Cable to Transmitter (Direct Mount Only)										
XP N4	Explosion Proof (hazardous locations) NEMA 4										
AFS	6" Sch40	150	SS	4"	05	H	R	C2NC	H7	XP	For Transmitter Selection, see Page 7.

VERIS Accelabar® ...The Best Choice in Flow Meters

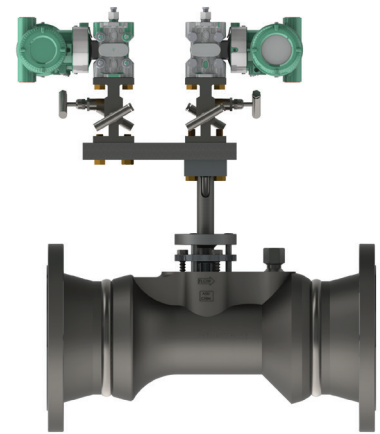
Transmitter Selection

VERIS Accelabar® primary flow coefficient accuracy is percent of rate. The VERIS Accelabar® maintains a constant flow coefficient over a wide range of flow rates and differential pressures.

DP transmitter accuracy is percent of scale. While most VERIS Accelabar® installations are equipped with one DP transmitter, some applications requiring superior accuracy over an extreme DP turndown, may require a dual DP transmitter installation.



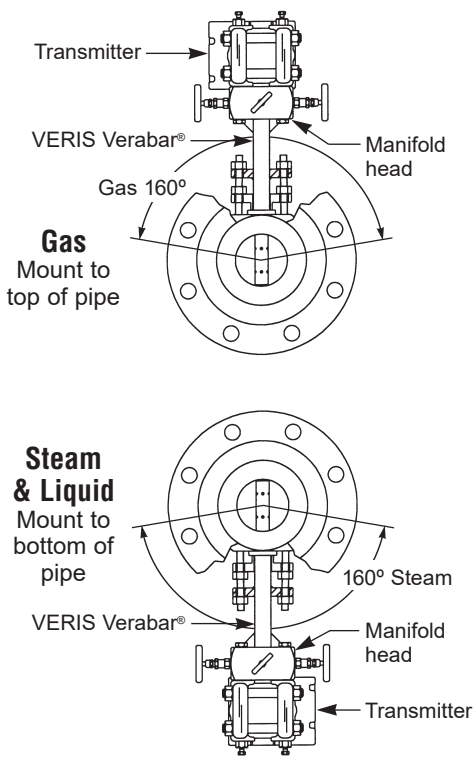
Single Transmitter



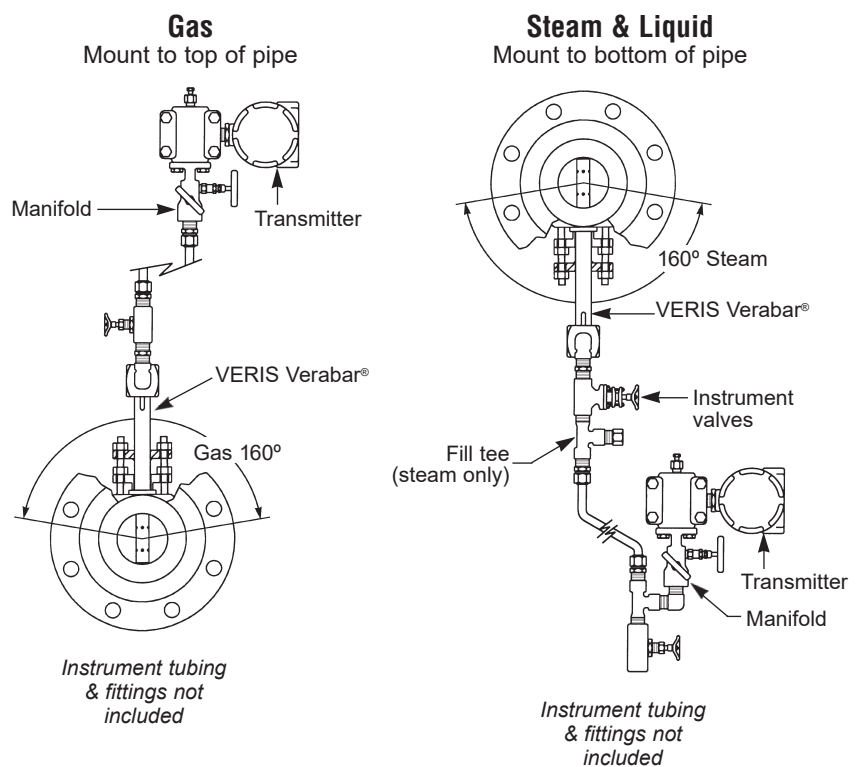
Dual Transmitter

Installation Orientation

Direct Mount



Remote Mount



VERIS Accelabar®
...True Performance in Flow Measurement





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