

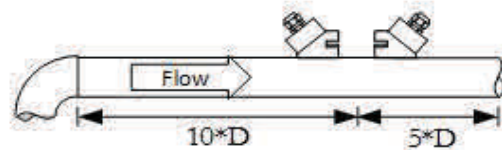
Water Flow Application Quick Select Guide

	Water Flow					Energy			
Meter Series	Turbine Meter		Disc Meter	Electromagnetic Meter	Ultrasonic Meter	Turbine Meter		Electromagnetic Meter	Ultrasonic Meter
Meter Model 	SDI	250	M25-M170	M2000	TFXL TFXB Ultra	SDI with RTD's and 3050 Monitor	380 with 3050 Monitor	M2000 with RTD's and 3050 Monitor	TFXE Ultra
Installation Type	Insertion	Inline	Inline	Inline	Clamp-On	Insertion	Inline	Inline	Clamp-On
Size Range	1-1/2" - 36"	1/2" - 1-1/2"	5/8" - 2"	1/4" - 54"	1/2" - 24" 1/2" - 96"	1-1/2" - 36"	3/4" - 2"	1/4" - 54"	1/2" - 96"
Accuracy (% of reading)	1%	1%	1.50%	0.25%	1%	1%	2%	0.25%	1%
Bi-Directional Flow Capability	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes
Requires System Shutdown to Install	No	Yes	Yes	Yes	No	No	Yes	Yes	No
Overall Flow Range	0.5-20 FPS	0.3-15 FPS	0.25-170 GPM	0.1-39.4 FPS	1-40 FPS	0.5-20 FPS	1.0-15 FPS	0.1-39.4 FPS	0.1-40 FPS

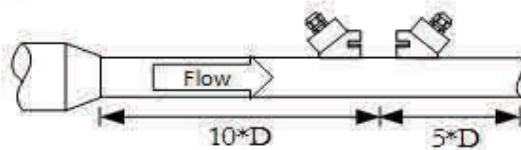
Flow Application

Chilled Water	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hot Water	✓	✓		✓	✓	✓	✓	✓	✓
Hot Water > 280°F				✓	✓				
Condenser Water Closed Loop	✓	✓		✓	✓	✓	✓	✓	✓
Condenser Water Open Loop				✓	✓				
Domestic (Potable) Water	✓	✓	✓	✓	✓	✓	✓	✓	✓
Grey Water / Surface Water				✓					
Make-Up Water	✓	✓	✓	✓	✓				
Steam Condensate (Pumped)	✓			✓	✓	✓	✓	✓	✓

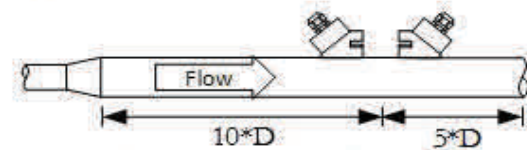
Ultrasonic – TFX, TFXL, DXN Portable



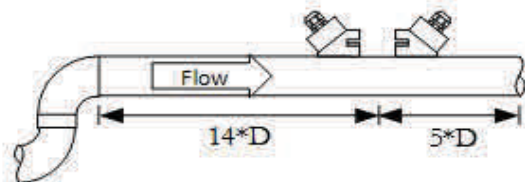
90° Elbow Before Flow Meter



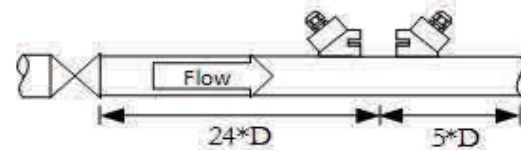
Reduction Before Flow Meter



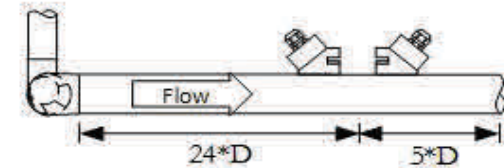
Expansion Before Flow Meter



Two 90° Elbows Before Flow Meter



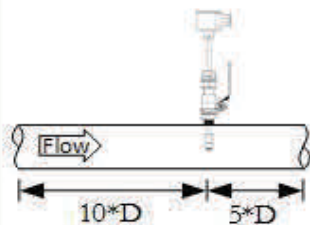
Regulator, Valve, or Header Before Flow Meter



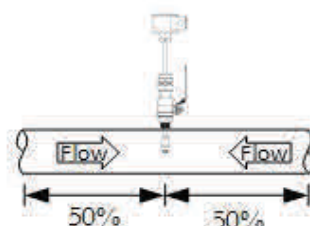
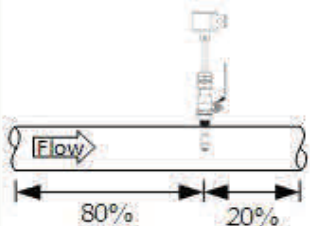
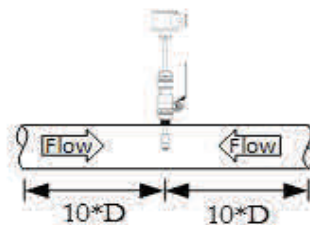
Two 90° Elbows Out of Plane Before Flow Meter

SDI Insertion

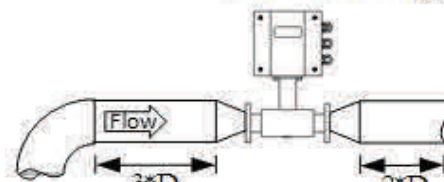
Uni-Directional



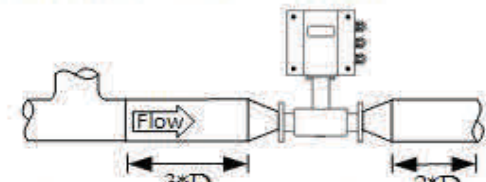
Bi-Directional



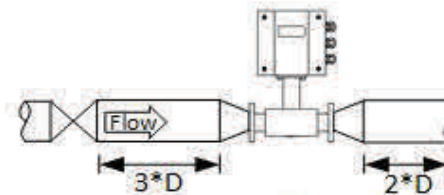
Electromagnetic Meters – M – 2000



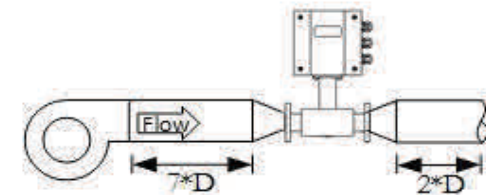
90° Elbow Before Flow Meter



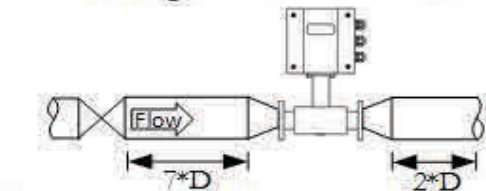
T Connection Before Flow Meter



Check/Globe/Butterfly Valve Before Flow Meter



Pump Before Flow Meter

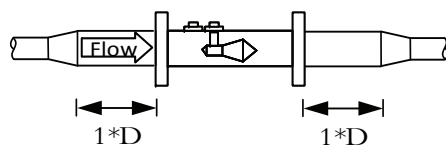


(Fully Open) Gate Valve Before Flow Meter

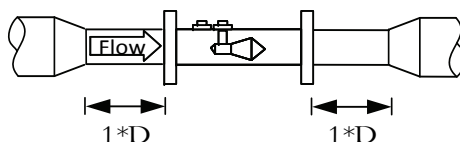
Application Quick Select Guide

Steam				Natural Gas and Compressed Air				
Meter Series	Vortex Meter		Δ P Meter	Meter Series	Thermal Mass Meter			
Badger Meter Model 	VN2000 Hot Tap	VN2000 Compact	Preso Gemini	Sage Meter Model 	5100 Series SIP	5100 Series SRP Remote Display	5200 Series SIP	5200 Series SRP Remote Transmitter
Installation Type	Insertion	Insertion	Inline	Installation Type	Insertion	Inline	Insertion	Inline
Size Range	2" - 36"	2" - 24"	1/2" - 24"	Size Range	1 1/2"- 8"	1" - 4"	1 1/2"- 8"	1" - 4"
Accuracy (% of reading)	1%	1%	0.5%	Accuracy (% of reading)	1%	1%	1%	1%
Pressure Range	Up to 1000 psi	Up to 1000 psi	Up to 6000 psi	Turndown	100 to 1	100 to 1	100 to 1	100 to 1
Std. Temperature Range °F	400 °F	400 °F	655 °F	Resolution	1000 to 1	1000 to 1	1000 to 1	1000 to 1
Requires System Shutdown to Install	No	Yes	Yes	Low End Sensitivity	5 sfpm	5 sfpm	5 sfpm	5 sfpm
				Flow Conditioner	Optional	Standard	Optional	Standard

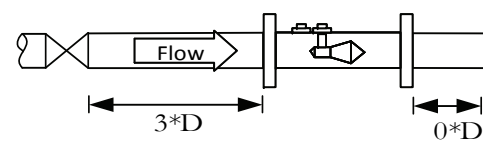
Steam – Gemini



Expansion

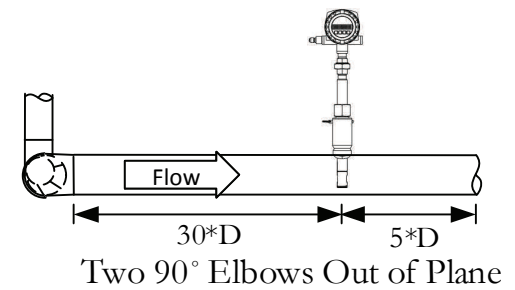
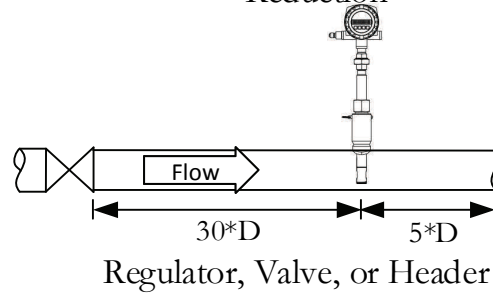
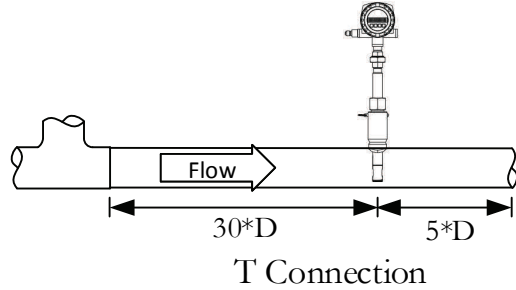
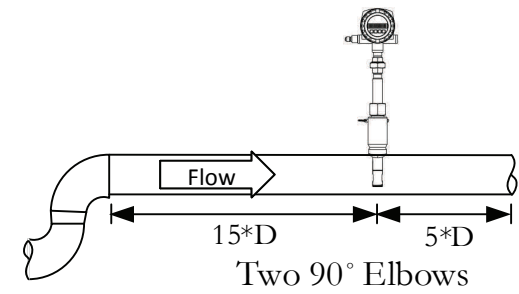
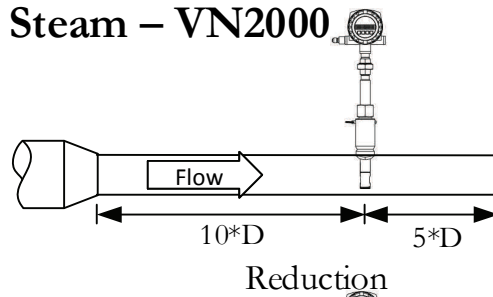
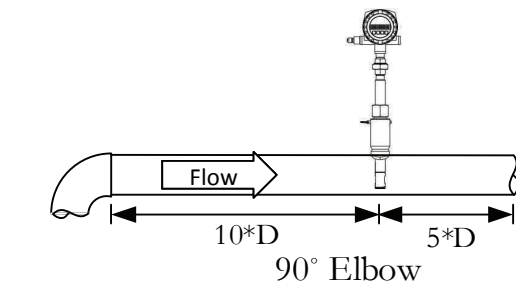


Reduction



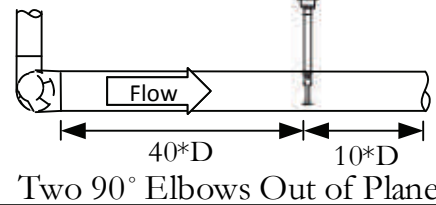
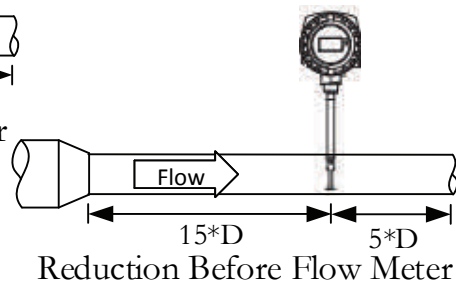
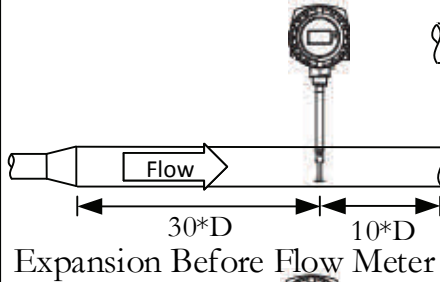
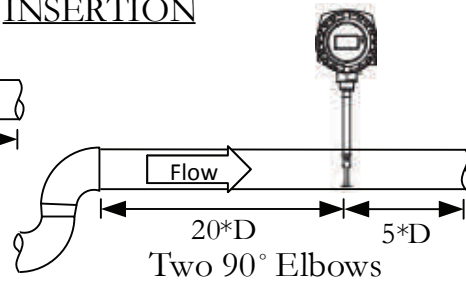
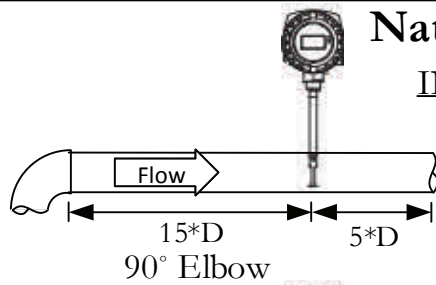
Gate/Globe Valve Fully Open

Steam – VN2000



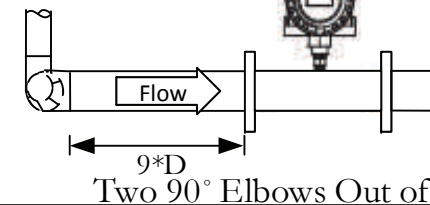
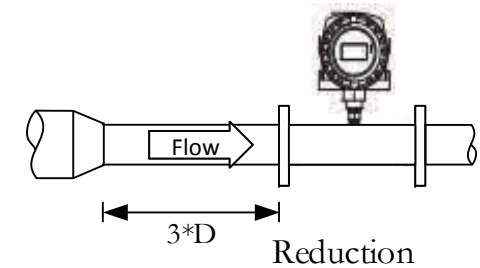
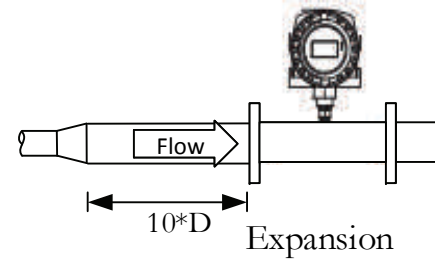
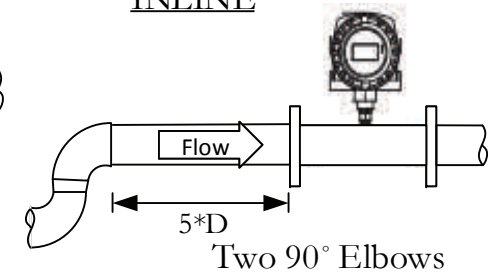
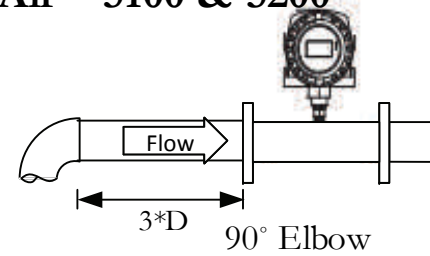
Natural Gas & Compressed Air – 5100 & 5200

INSERTION



*Note: Insertion Meters With Flow Conditioning Have Same Minimum Requirements As Inline Meters

INLINE



Flow Instrumentation Selection Chart

	Technology	Product	Liquids								Air & Gases	Steam	Multi-phase	Low Flows	High Flows	High Temp Rating	High Pressure Rating	Pipe Diameters (inches)
			Clean	Dirty	Corrosive	Viscous	Abrasive	Oil-Based Liquids	Ultra-Pure Water	Cryogenic	Fibrous Slurries							
Badger Meter® • Market leader in positive displacement meter technology • Rugged hand-held liquid dispensing options	Positive Displacement	Oval Gear	✓	①	▲	✓	①	✓	-	-	-	-	-	0.67 gpm	185 gpm	240° F	3000 psig	1/4...3
		RCDL Nutating Disc	✓	-	▲	✓	-	✓	✓	-	-	-	-	0.5 gpm	170 gpm	250° F	150 psig	1/2...2
		Pistol Grip Hand-held	✓	①	-	✓	①	✓	-	-	-	-	-	0.4 gpm	4 gpm	110° F	1000 psig	1/2
		Universal Series	✓	-	-	✓	-	✓	-	-	-	-	-	0.4 gpm	4 gpm	150° F	1000 psig	1/2
	PD Plus Turbine	RCDL Compound	✓	①	-	-	①	-	-	-	-	-	-	0.25 gpm	1500 gpm	120° F	150 psig	2...6
	Turbine	RCDL Turbo	✓	①	-	-	①	-	-	-	-	-	-	4 gpm	19,800 gpm	120° F	150 psig	1-1/2...20
		Industrial Turbo	✓	①	▲	▲	①	✓	①	-	-	-	-	8 gpm	2000 gpm	250° F	150 psig	2...6
		Vision	✓	-	①	-	-	✓	✓	-	-	-	-	0.03 gpm	9.25 gpm	212° F	363 psig	1/4...3/8
ModMAG® • Complete line of mag meters for general purpose, sanitary and intrinsically-safe environments • 7500 Models feature built-in batch capability	Electromagnetic	M1000	✓	✓	▲	①	✓	-	-	-	-	-	-	0.01 gpm	6,279 gpm	140° F	ANSI 150 psig flange rating	1/4...8
		M2000	✓	✓	▲	①	✓	-	-	-	-	-	-	0.06 gpm	1,100,000 gpm	311° F		1/4...54
		M3000	✓	✓	▲	①	✓	-	-	-	-	-	-	0.02 gpm	53,778 gpm	248° F		1/4...24
		M4000	✓	✓	▲	①	✓	-	-	-	-	-	-	0.02 gpm	13,444 gpm	122° F		1/4...12
		M5000	✓	①	-	-	-	-	-	-	-	-	-	0.11 gpm	53,778 gpm	212° F		1/4...24
Impeller • Proven flow metering solution • Full line of PVC and metal in-line designs support a wide range of facility applications from HVAC to submetering to irrigation • Some insertion models include hot-tap options	Impeller In-line	380 Btu Meter	✓	▲	-	-	-	-	-	-	-	-	-	1.7 gpm	157 gpm	260° F	400 psig	3/4...2
		735	✓	▲	-	-	-	-	-	-	-	-	-	1.2 gpm	49 gpm	110° F	160 psig	1/2...1
		4000	✓	▲	✓	-	-	①	✓	-	-	-	-	0.2 gpm	49 gpm	220° F	350 psig	1/2...1
		228PV	✓	▲	①	-	-	-	-	-	-	-	-	2.8 gpm	1175 gpm	221° F	100 psig	1-1/2...4
		228 Metal	✓	▲	①	-	-	-	-	-	-	-	-	0.3 gpm	459 gpm	221° F	300 psig	2...2-1/2
		250B	✓	▲	-	-	-	-	-	-	-	-	-	1.2 gpm	110 gpm	221° F	400 psig	1/2...1-1/2
	Impeller Insertion	SDI	✓	▲	①	-	-	-	-	-	-	-	-	0.3 fps	20 fps	300° F	1000 psig	1-1/2...36
		220	✓	▲	①	-	-	①	-	-	-	-	-	0.3 fps	20 fps	221° F	400 psig	2...40+
		220PVS	✓	▲	①	-	-	-	①	-	-	-	-	0.3 fps	20 fps	140° F	100 psig	2...40+
		225	✓	▲	-	-	-	-	-	-	-	-	-	0.3 fps	20 fps	221° F	400 psig	2...40+
		226	✓	▲	①	-	-	①	①	-	-	-	-	0.3 fps	20 fps	221° F	400 psig	2...40+
Hedland® • Installation at any angle • Special scales available • Quick delivery	In-line Variable Area	High Pressure	✓	▲	✓	▲	-	▲	▲	-	-	✓	-	0.02 gpm	400 gpm	500° F	6000 psig	1/4...3
		EZ-View	✓	▲	▲	①	-	▲	▲	-	-	-	-	0.5 gpm	275 gpm	250° F	325 psig	1/2...3
Dynasonics® • Ultrasonic Technology • No process shutdown on clamp-on • Large turndown ratio • Btu metering and data logging options	Transit Time	TFX-5000	✓	①	▲	①	①	①	✓	-	-	-	-	0.07 gpm	33,000 gpm	350° F	N/A	1/2+
		TFX-500w	✓	-	-	-	-	-	✓	-	-	-	-	0.07 gpm	3,450 gpm	250° F	N/A	1/2...10
	Doppler	DFX	①	✓	▲	▲	▲	①	-	-	▲	-	-	0.3 fps	30 fps	400° F	N/A	1/4+
	Hybrid Portable	DXN	✓	✓	▲	▲	▲	①	✓	-	▲	-	-	0.001 fps	40 fps	350° F	N/A	1/4+
	Inline Transit Time	U500w	✓	✓	-	-	-	-	-	-	-	-	-	0.1 gpm	1100 gpm	140° F	175 psig	5/8...4
	Open Channel	iSonic 4000	✓	-	-	-	-	-	-	-	-	-	-	10 gpm	40,000 gpm	140° F	N/A	N/A

✓ Designed for this Service

▲ Normally Applicable

① Consult Factory

- Not Applicable or Suitable

Flow Instrumentation Selection Chart

	Technology	Product	Liquids								Air & Gases	Steam	Multi-phase	Low Flows	High Flows	High Temp Rating	High Pressure Rating	Pipe Diameters (inches)
			Clean	Dirty	Corrosive	Viscous	Abrasive	Oil-Based Liquids	Ultra-Pure Water	Cryogenic	Fibrous Slurries							
Flo-tech • Single device measures flow, pressure, and temperature • High pressure capability • Rugged design	In-line Turbines	Activa, Ultima, Classic, Quad	✓	-	①	①	-	✓	-	-	-	-	-	0.4 gpm	350 gpm	300° F	6000 psig	1/4...2
	Portable Hydraulic Testers	PFM, Flo-Check	✓	-	①	①	-	✓	-	-	-	-	-	1 gpm	200 gpm	300° F	6000 psig	3/4...1-1/2
		MC4000	✓	-	①	①	-	✓	-	-	-	-	-	0.4 gpm	160 gpm	392° F	5800 psig	1/4...1-1/4
Blancett® • Rugged, 316 SS w/tungsten carbide internal parts • ±1% accuracy liquid meters • Easy-to-install • Field-replaceable internal repair kits	In-line Turbines	1100	✓	▲	①	①	①	▲	▲	-	-	-	-	0.6 gpm	5000 gpm	350° F	5000 psig	1/2...10
		QuikSert	✓	▲	①	①	①	▲	▲	-	-	-	-	0.6 gpm	5000 gpm	350° F	3705 psig	3/8...10
		FloClean	✓	▲	①	①	①	①	▲	-	-	-	-	0.6 gpm	400 gpm	350° F	1000 psig	1...3
		Gas QuikSert	-	-	-	-	-	-	-	-	-	✓	-	7 acfm	350 acfm	330° F	2220 psig	2
	Positive Displacement	B1750	✓	-	①	✓	-	▲	①	-	-	-	-	0.003 gpm	120 gpm	400° F	5000 psig	1/4...1-1/4
Cox • High accuracy (up to ±0.10%) • Cost effective alternative to electronic metering options of similar accuracy • Suitable for high-vibration environments	High-Precision Turbine	Single Rotor	✓	-	▲	①	①	✓	✓	✓	-	-	-	0.007 gpm	310 gpm	500° F	7000 psig	1/4...2
		Dual Rotor	✓	-	▲	①	①	✓	✓	✓	-	-	-	0.025 gpm	1500 gpm	300° F	3000 psig	1/4...4
Vortex • No moving parts • Corrosion resistant (RVL) • Stainless steel insertion (VN2000)	Vortex Shedding	RVL	✓	①	▲	-	-	-	✓	-	-	-	-	0.6 gpm	300 gpm	203° F	150 psig	1/2...3
		VN2000	✓	▲	①	-	①	①	①	-	-	✓	✓	1.32 fps	250 fps	400° F	1000 psig	2...36
Preso® • Ellipse Pitot tube has highest turndown ratio (17:1) and lowest permanent pressure loss among competitors • Very low Reynolds number (COIN meter)	DP Venturi	SSL, SSM, LPL	✓	▲	①	①	①	✓	✓	▲	①	✓	✓	Application Dependent		1500° F	9000 psig	1/2...60
		CV	✓	▲	①	①	①	✓	✓	-	①	✓	-			250° F	300 psig	2...16
	DP Pitot Tubes	Ellipse	✓	①	▲	①	-	▲	✓	-	-	✓	✓			800° F	5500 psig	2...42
	DP Segmented Wedge	COIN	✓	✓	▲	✓	✓	✓	✓	▲	▲	✓	✓			1500° F	9000 psig	1/2...48
	DP Cone	Cone	✓	①	▲	①	①	✓	✓	▲	①	✓	✓			1000° F	9000 psig	1...16
Research Control® Valves • Low-flow control valves up to 2 inches • Wide variety of alloys • Engineered solutions	Control Valves	General Industrial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.0000018 Cv	54 Cv	1800° F	60,000 psig	1/4...2
		Sanitary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.05 Cv	90 Cv	300° F	1500 psig	1/2...3
Coriolis • Unobstructed open flow design • High accuracy (up to ±0.10%) • Advanced fluid diagnostic tools	Mass Flow	RCT1000	✓	✓	①	✓	①	✓	-	①	-	-	-	0.05 lb/min	5200 lb/min	392° F	3000 psig	1/16...3
Flow Dynamics® • Primary Standard Calibration Service • Liquid calibration uncertainty: ±0.025% to ±0.05% of reading • Gas calibration uncertainty: ±0.20% to ±0.25% of reading • NVLAP (Lab Code 200668-0) accredited traceable to NIST (ISO/IEC 17025 - ANSI/NCL Z540) • Liquids: water, solvent (1.2 cSt), and oil blends (0.7 to 1300 cSt); consult factory above 1300 cSt • Gases: Air, Nitrogen, Helium, Argon, Methane, Propane, and others	Positive Displacement Calibrations	Liquid Calibration Service	✓	-	-	✓	-	✓	✓	-	-	-	-	0.0025 gpm	1500 gpm	140° F	120 psig	1/4...4
	Bell Provers, Glass Tube & Sonic Nozzles	Air/Gas Calibration Service	✓	-	-	-	-	-	-	-	-	✓	-	0.00035 scfm	1000 scfm	N/A	500 psia	1/4...4

Note: NVLAP accreditation applies only to the Badger Meter Flow Dynamics calibration Lab, located in Racine, WI.

✓ Designed for this Service

▲ Normally Applicable

① Consult Factory

- Not Applicable or Suitable