

DESCRIPTION

The RVL liquid flow meter uses vortex-shedding technology with embedded piezoelectric pressure sensors. The meter has no moving parts, and any potential for fluid contamination is eliminated by the non-metallic corrosion-resistant body materials. The meter includes a compact plug-in transmitter module with 2-wire or 3-wire 4...20 mA, 0...5V DC or pulse output. All electronics are housed in a corrosion-resistant enclosure. Units can be re-calibrated and reprogrammed in the field.

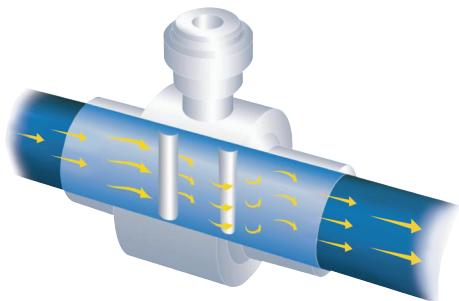
APPLICATION

The RVL is perfect for aggressive or easily contaminated fluids.

- Ultra-pure water distribution
- RO/DI skids
- Cooling water
- Chemical injection
- Nonabrasive slurries

OPERATING PRINCIPLE

Operation of the RVL vortex flow meter is based on the vortex shedding principle. As fluid moves around a strut, vortices (eddies) are formed and move downstream. They form alternately, from one side to the other, causing pressure fluctuations that are sensed by a piezoelectric crystal in the sensor tube. The frequency of the vortices is directly proportional to the flow rate.



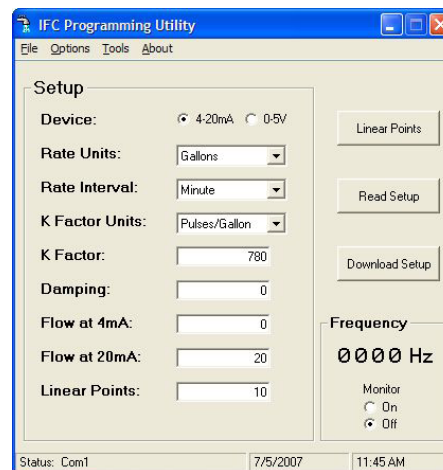
CONSTRUCTION

The precision machined bodies provide quality end fittings, while avoiding ionic contamination. There are no metallic wetted parts, gaskets or elastomers in the meter. The body material selected is homogeneous throughout the flow path.



OPTIONAL SOFTWARE

An optional software utility kit is available to configure the RVL 4...20 mA or 0...5V DC outputs. (The pulse output is not field configurable.) Part number RVS220-954 contains a RS232 nine-pin cable, software CD, TTL to RS232 converter and a board interface cable. The program enables easy configuration of span, damping and units of measurement.



MATERIAL SELECTION

When choosing the best flow meter for a process, review the concentration, operating temperatures and operating pressure of the fluid being measured. In a thermoplastic piping system, choose the same material for the meter and the pipe wherever possible to maintain fluid compatibility and aid in bonding the materials. The table below shows the compatibility of fluid types with thermoplastic materials.

Chemical	PVC	PVDF	CPVC	Polypropylene
Aluminum Hydroxide	A	A	A	A
Chlorine Water	A	B	A	D
Fuel Oils	A	B	—	A
Hydraulic Oil	A	A	—	D
Hydrochloric Acid 37%	B	A	A	C
Hydrochloric Acid 20%	B	A	C	A
Isopropyl Alcohol	A	—	C	A
Nitric Acid (Concentrated)	B	A	D	D
Phosphoric Acid (>40%)	B	B	A	A
Potassium Hydroxide	A	A	A	A
Propylene Glycol	C	—	C	A
Sulfuric Acid (10...75%)	A	A	A	A
A= Excellent B= Good C= Fair D= Severe effect				

FLUID CONSIDERATIONS

In vortex flow meters, fluids with high viscosities tend to dampen the formation of vortices and reduce the effective range. Viscosities above 1 cSt raise the minimum readable flow rate, reducing rangeability. The effect is linear to viscosity. Particles and internal bubbles do not usually affect vortex meters. In slurry services, PVDF models typically work very well. Slurries containing grit can wear down the bluff body over a period of time and long fibers can catch and build up on the bluff, decreasing accuracy.

Liquids with specific gravities higher than 2.0 adversely affect the permissible amount and duration of over-flow range.

Reduction of Range Based on Viscosity			
Viscosity	Minimum	Maximum	Flow Range
1 cSt	1	12	12:1
2 cSt	2	12	6:1
3 cSt	3	12	4:1
4 cSt	4	12	3:1
5 cSt	5	12	2.4:1
6 cSt	6	12	2:1

Meters are calibrated with tap water at 1 cSt (32 SSU) at ambient temperature

SPECIFICATIONS

Measured Fluids	Liquids
Connections	Butt or NPT thread
	Wafer (mounted between flanges)
	Tube (flare ends)*
Accuracy	±1% of full scale, 4...20 mA and 0...5V DC; ±2% of full scale, frequency pulse
Repeatability	±0.25% actual flow
Response Time	2 seconds minimum, step change in flow
Input Power	13...30V DC
Signal Output	4...20 mA, 0...5V DC or frequency pulse (source-sink driver; 1A source/1.5A sink; typical output resistance 10 Ω)
Enclosure	NEMA 4X (IP 66)
Certifications	CE: EN50082-1:1992

*Requires two flare tubing nuts (not included)

Pressure vs Temperature Ratings

NPT/Butt End Fittings

Maximum Fluid Temperature	Maximum Operating Pressure		
	PVC	CPVC	PVDF
203° F (95° C)*	—	24 psig (1.6 bar)	40 psig (2.7 bar)
150° F (66° C)	—	63 psig (4.3 bar)	130 psig (8.9 bar)
100° F (38° C)	93 psig (6.4 bar)	120 psig (8.3 bar)	150 psig (10.3 bar)
70° F (21° C)	150 psig (10.3 bar)	150 psig (10.3 bar)	150 psig (10.3 bar)

*Reduces low flow rate on 1/4 in. (6 mm) meter

Wafer End Fittings

Maximum Fluid Temperature	Maximum Operating Pressure			
	PVC	PP	CPVC	PVDF
203° F (95° C)	—	—	24 psig (1.6 bar)	40 psig (2.7 bar)
150° F (66° C)	—	90 psig (6.2 bar)	100 psig (6.9 bar)	130 psig (8.9 bar)
100° F (38° C)	130 psig (8.9 bar)	130 psig (8.9 bar)	130 psig (8.9 bar)	150 psig (10.3 bar)
70° F (21° C)	150 psig (10.3 bar)	150 psig (10.3 bar)	150 psig (10.3 bar)	150 psig (10.3 bar)

Flare End Fittings

Maximum Fluid Temperature	Maximum Operating Pressure	
	PVDF	
203° F (95° C)	20 psig (1.4 bar)	
140° F (60° C)	37 psig (2.6 bar)	
100° F (38° C)	67 psig (4.6 bar)	
70° F (21° C)	150 psig (10.3 bar)	

FLOW RANGES**NPT/Butt End Fittings**

Meter Size	Minimum Flow	Maximum Flow	Turndown Ratio
1/4 in. (6.3 mm)	0.6 gpm (2.3 lpm)	5 gpm (19 lpm)	8:1
1/2 in. (12.7 mm)	1.3 gpm (4.7 lpm)	15 gpm (56.8 lpm)	12:1
3/4 in. (19.1 mm)	2.1 gpm (7.9 lpm)	25 gpm (94.6 lpm)	12:1
1 in. (25.4 mm)	4.2 gpm (15.8 lpm)	50 gpm (189 lpm)	12:1
1-1/2 in. (38.1 mm)	8.3 gpm (31.5 lpm)	100 gpm (379 lpm)	12:1
2 in. (50.8 mm)	16.7 gpm (63.1 lpm)	200 gpm (757 lpm)	12:1

Wafer End Fittings

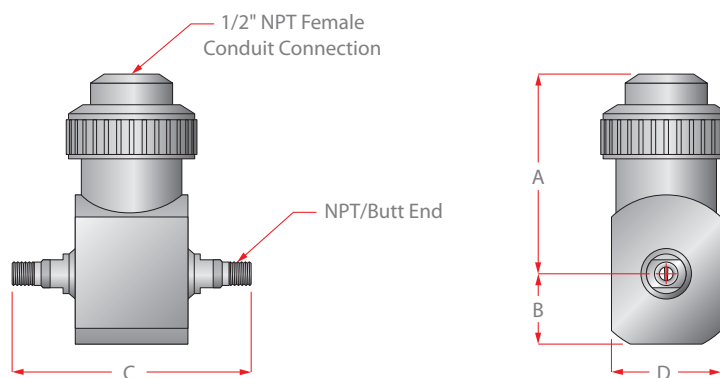
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1/2 in. (12.7 mm)	1.3 gpm (4.7 lpm)	15 gpm (56.8 lpm)	12:1
3/4 in. (19.1 mm)	2.1 gpm (7.9 lpm)	25 gpm (94.6 lpm)	12:1
1 in. (25.4 mm)	4.2 gpm (15.8 lpm)	50 gpm (189 lpm)	12:1
1-1/2 in. (38.1 mm)	8.3 gpm (31.5 lpm)	100 gpm (379 lpm)	12:1
2 in. (50.8 mm)	16.7 gpm (63.1 lpm)	200 gpm (757 lpm)	12:1
3 in. (76.2 mm)	25 gpm (94.6 lpm)	300 gpm (1136 lpm)	12:1

Flare End Fittings

Tube Size	Minimum Flow	Maximum Flow	Turndown Ratio
1/2 in. (12.7 mm)	0.6 gpm (2.3 lpm)	5 gpm (19 lpm)	8:1
3/4 in. (19.1 mm)	1.3 gpm (4.7 lpm)	15 gpm (56.8 lpm)	12:1
1 in. (25.4 mm)	2.1 gpm (7.9 lpm)	25 gpm (94.6 lpm)	12:1

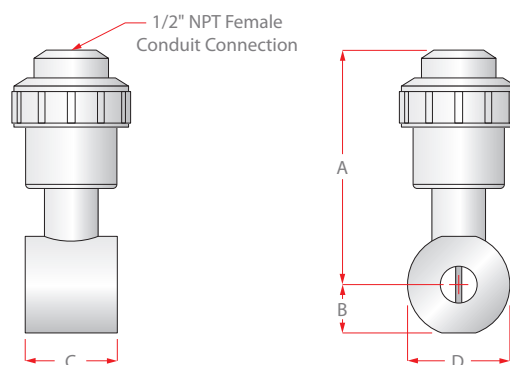
DIMENSIONS

NPT/Butt End Fittings



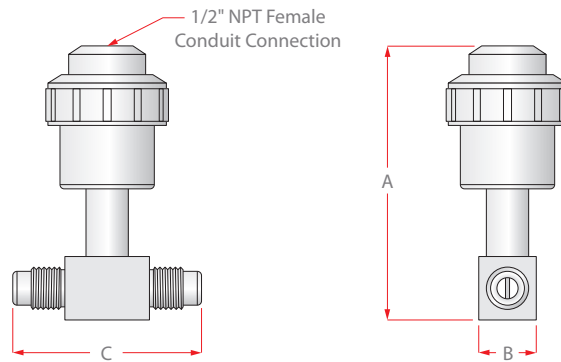
Meter Size	PVC/CPVC in. (mm)				PVDF (Butt) in. (mm)			
	A	B	C	D	A	B	C	D
1/4 in. (6.3 mm)	3.81 (97)	1.75 (45)	5.25 (133)	2.5 (64)	5.9 (150)	0.63 (16)	4.87 (124)	1.31 (33)
1/2 in. (12.7 mm)	3.81 (97)	1.75 (45)	7.13 (181)	2.5 (64)	5.75 (146)	0.78 (20)	4.87 (124)	1.31 (33)
3/4 in. (19.1 mm)	3.81 (97)	1.75 (45)	7.63 (194)	2.5 (64)	5.75 (146)	0.94 (24)	4.87 (124)	1.44 (37)
1 in. (25.4 mm)	3.92 (100)	1.75 (45)	8.03 (204)	2.5 (64)	5.88 (149)	1.19 (30)	5.09 (129)	2 (51)
1-1/2 in. (38.1 mm)	3.9 (99)	2 (51)	8.37 (213)	2.5 (64)	6.21 (158)	1.50 (38)	6.24 (158)	2.50 (64)
2 in. (50.8 mm)	4.31 (109)	2 (51)	8.37 (213)	2.5 (64)	6.6 (168)	1.88 (48)	6.77 (172)	3 (76)

Wafer End Fittings



Meter Size	PVDF			
	A	B	C	D
1/2 in. (12.7 mm)	5.85 in. (149 mm)	0.78 in. (20 mm)	2.03 in. (52 mm)	1.75 in. (44 mm)
3/4 in. (19.1 mm)	5.90 in. (150 mm)	0.94 in. (24 mm)	2.03 in. (52 mm)	2.13 in. (54 mm)
1 in. (25.4 mm)	5.69 in. (145 mm)	1.19 in. (30 mm)	2.25 in. (57 mm)	2.47 in. (63 mm)
1-1/2 in. (38.1 mm)	6.00 in. (152 mm)	1.50 in. (38 mm)	2.63 in. (67 mm)	3.25 in. (83 mm)
2 in. (50.8 mm)	6.37 in. (162 mm)	1.88 in. (48 mm)	3.22 in. (82 mm)	4.00 in. (102 mm)
3 in. (76.2 mm)	6.88 in. (175 mm)	2.50 in. (64 mm)	4.25 in. (108 mm)	5.24 in. (133 mm)

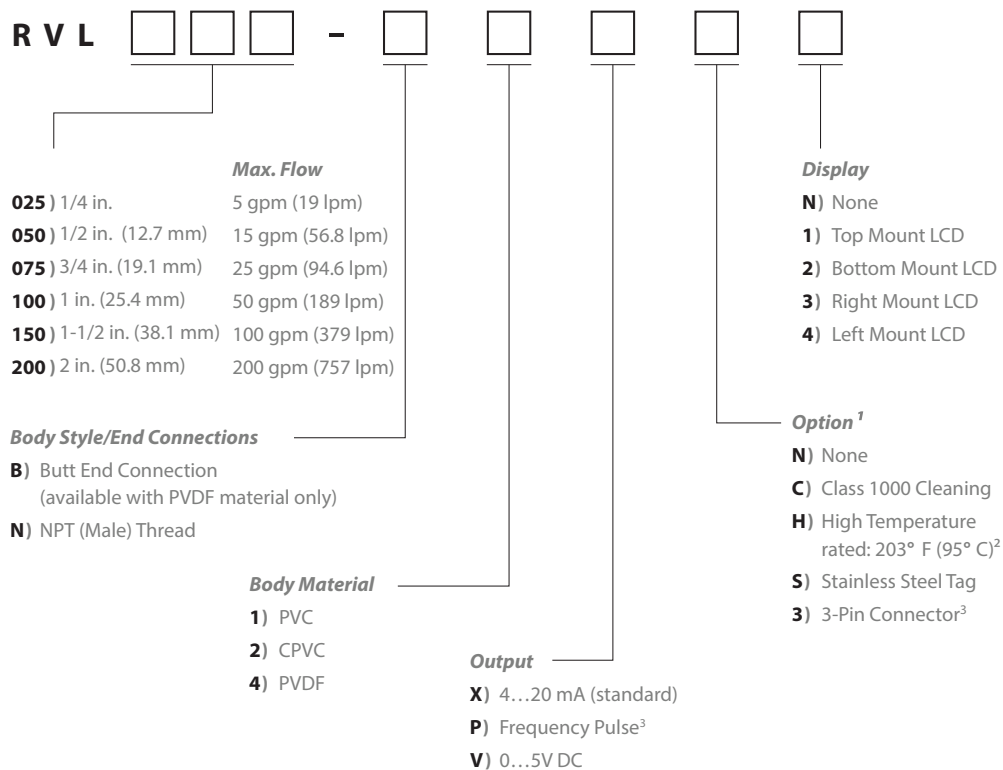
Flare End Fittings



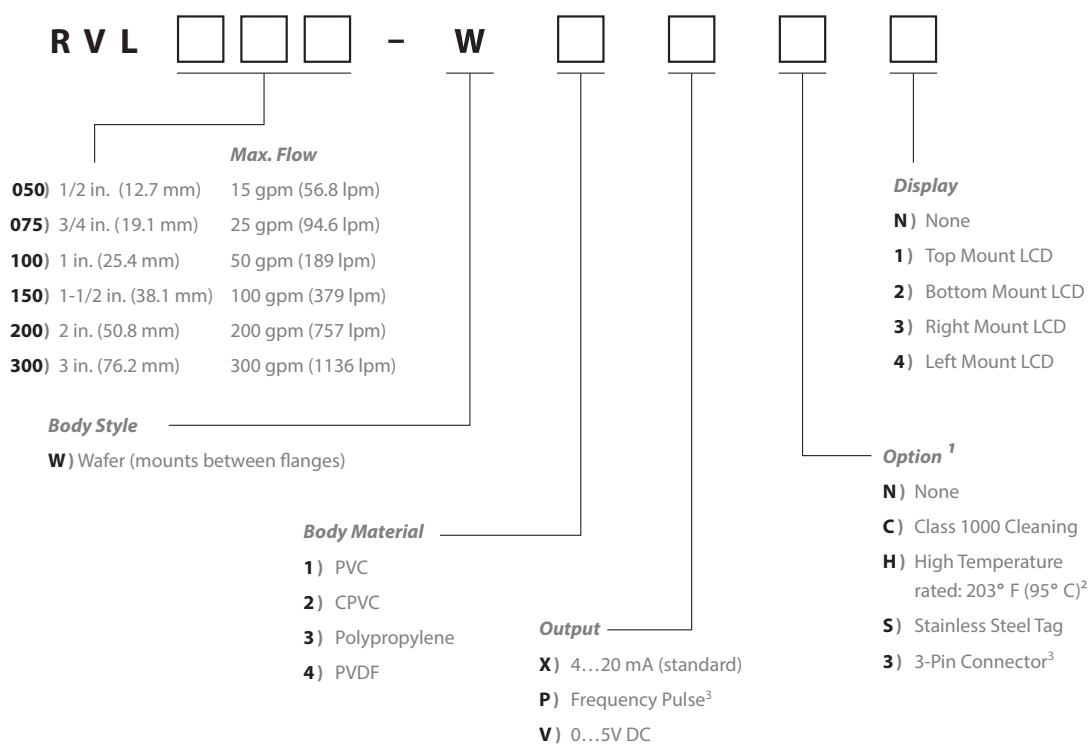
Meter Size	PVDF		
	A	B	C
1/2 in. (12.7 mm)	6.25 in. (159 mm)	1.31 in. (33 mm)	4.87 in. (124 mm)
3/4 in. (19.1 mm)	6.25 in. (159 mm)	1.31 in. (33 mm)	4.66 in. (118 mm)
1 in. (25.4 mm)	6.59 in. (167 mm)	1.44 in. (37 mm)	5.42 in. (138 mm)

PART NUMBER CONSTRUCTION

NPT/Butt End Fittings

¹ Multiple options may be selected² High Temperature option ONLY available with CPVC and PVDF body materials³ Not available with display

Wafer End Fittings

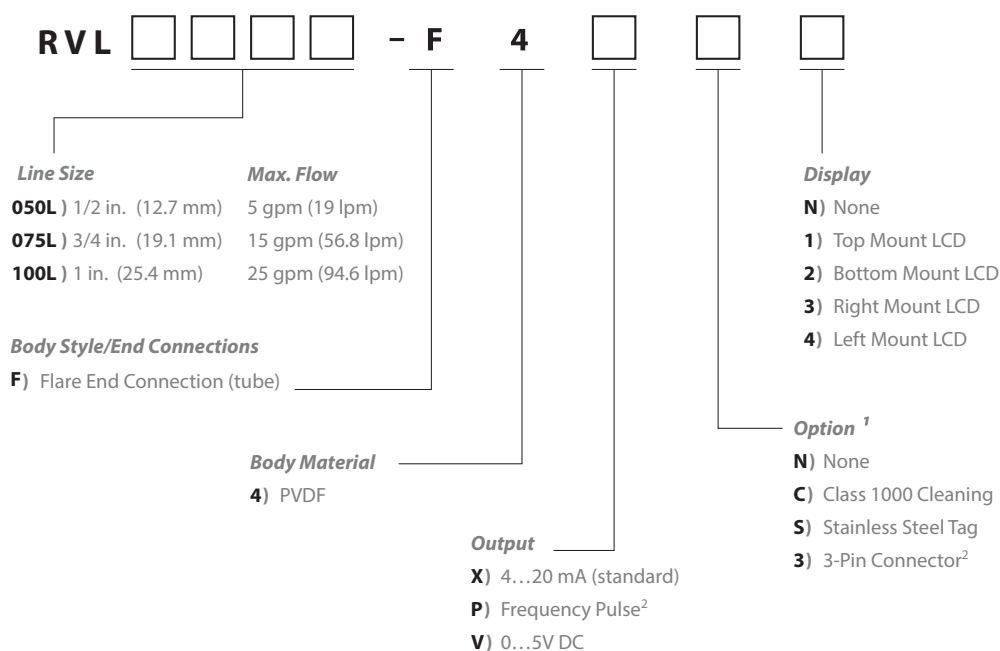


¹ Multiple options may be selected

² High Temperature option ONLY available with CPVC and PVDF body materials

³ Not available with display

Flare End Fittings

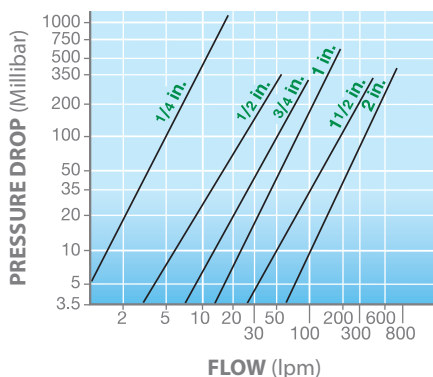
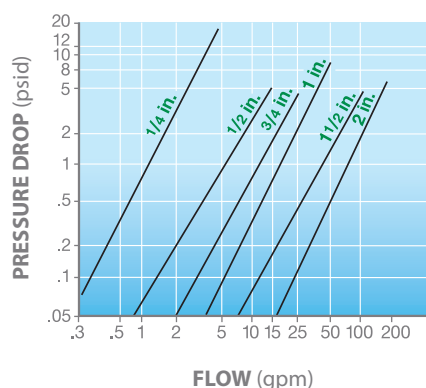


¹ Multiple options may be selected

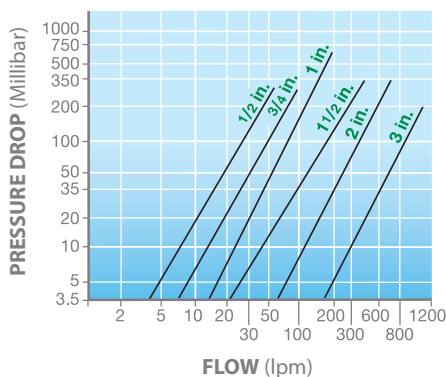
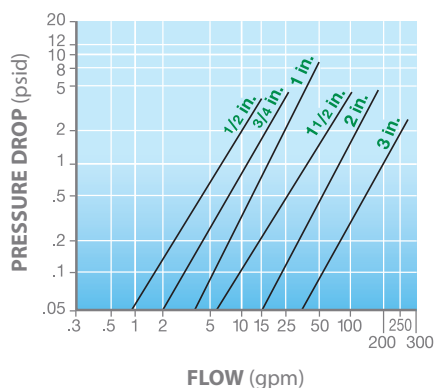
² Not available with display

PRESSURE DROP VS FLOW RATE

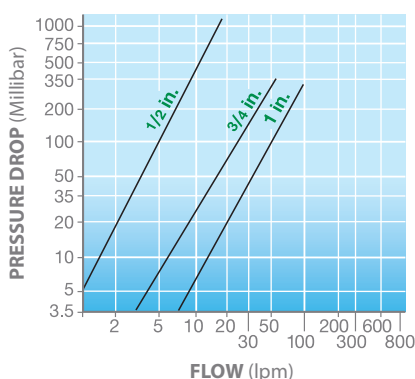
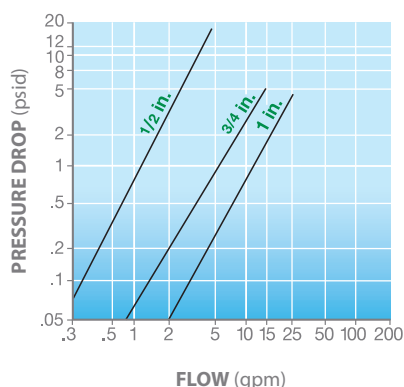
NPT/Butt End Fittings



Wafer End Fittings



Flare End Fittings



Control. Manage. Optimize.

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