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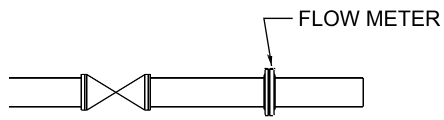
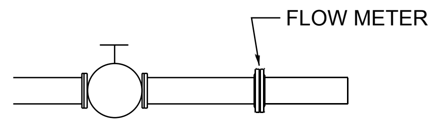
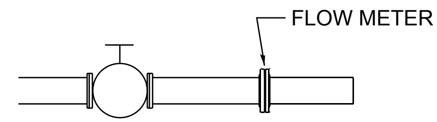
FLOW METER PIPING REQUIREMENTS

"Diameters" of straight pipe required for various types of flow meters

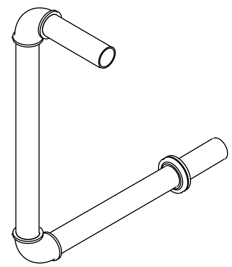
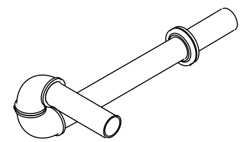
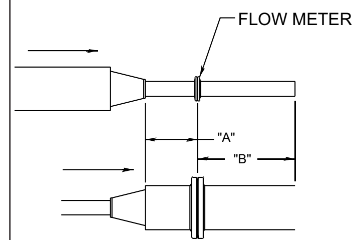
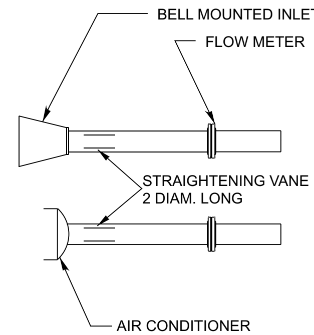
Diameter (D) = nominal Pipe Size Example: 13 Diameters of 6" pipe = 78" 13 Diameters of 10" pipe = 130" **Beta** = (Bore I.D./Pipe I.D.) Bore is the smallest diameter of an orifice or nozzle **Up** = Upstream Diameters **Down** = Downstream Diameters			**Fully Open Gate Valve (Unless Another Upstream Fitting Needs More)**	**Fully Open Globe or Non-Return Valve (Unless Another Upstream Fitting Needs More)**	**Partially Open Valve or Regulator**
					
Orifice/Nozzle	Beta = 0.5	Up	6	11	26
		Down	3	3	3
	Beta = 0.7	Up	10	15	38
		Down	4	4	4
Venturi	Beta = 0.5	Up	5	7	7
		Down	2	2	2
	Beta = 0.7	Up	9	26	26
		Down	4	4	4
Vortex		Up	25	25	30
		Down	5	5	5
Thermal		Up	15	15	40
		Down	5	5	5
Turbine		Up	10	10	10
		Down	5	5	5
Annubar		Up	8	9	24
		Down	3	3	4

Note:

1. The straight runs shown above are conservative minimums. Longer upstream straight pipe lengths provide better accuracy.
2. If the indicated straight run is not available, Consult Factory. Detailed Factory analysis will require accurate fluid data, flow data, and a sketch detailing the piping system 50 diameters upstream and 10 diameters downstream from the proposed meter location.
3. Internal straightening vanes can be used to reduce straight pipe length requirements, Consult Factory.
4. **Positive Displacement and Coriolis Effect Meters** are not influenced by upstream and downstream fittings.

FLOW METER PIPING REQUIREMENTS

"Diameters" of straight pipe required for various types of flow meters

Diameter (D) = nominal Pipe Size Example: 13 Diameters of 6" pipe = 78" 13 Diameters of 10" pipe = 130" **Beta** = (Bore I.D./Pipe I.D.) Bore is the smallest diameter of an orifice or nozzle **Up** = Upstream Diameters **Down** = Downstream Diameters			**Two Elbows, > 10 Diameters, Fittings in Different Planes**	**Two Elbows, < 10 Diameters, Fittings in Different Planes**	**Reducer or Expander (Unless Another Upstream fitting Needs More)**	**Atmospheric Intake**
						
Orifice/Nozzle	Beta = 0.5	Up	16	20	9	8
		Down	3	3	3	3
	Beta = 0.7	Up	23	30	12	9
		Down	4	4	4	4
Venturi	Beta = 0.5	Up	21	21	5 (reducer), 2 (expander)	—
		Down	2	2	2	—
	Beta = 0.7	Up	21	21	8 (reducer), 4 (expander)	—
		Down	2	2	4	—
Vortex		Up	30	45	25	—
		Down	5	5	5	—
Thermal		Up	15	40	15 (reducer), 30 (expander)	—
		Down	5	10	5 (reducer), 10 (expander)	—
Turbine		Up	10	10	10	—
		Down	5	5	5	—
Annubar		Up	9	19	8	—
		Down	3	4	3	—

Note:

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2. If the indicated straight run is not available, Consult Factory. Detailed Factory analysis will require accurate fluid data, flow data, and a sketch detailing the piping system 50 diameters upstream and 10 diameters downstream from the proposed meter location.
3. Internal straightening vanes can be used to reduce straight pipe length requirements, Consult Factory.
4. **Positive Displacement and Coriolis Effect Meters** are not influenced by upstream and downstream fittings.

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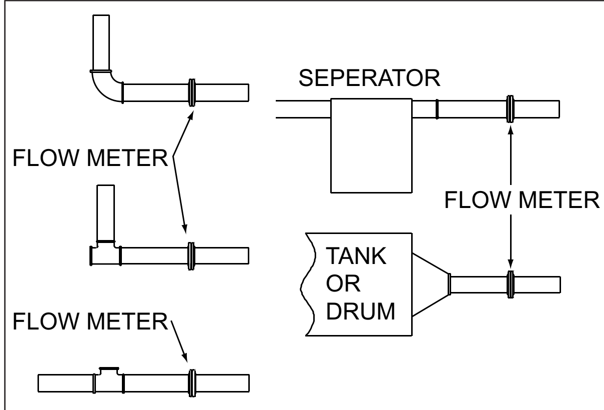
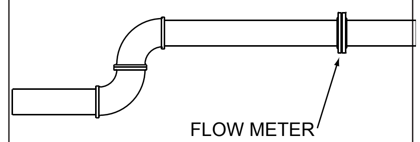
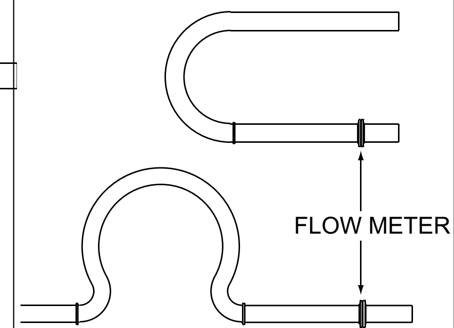
"Diameters" of straight pipe required for various types of flow meters

			One Elbow, T, Y, or Tank Exit (Fittings in the Same Plane)	Two Elbows (Fittings in the Same Plane)	Long Radius Bends (Fittings in the Same Plane)
Diameter (D) = nominal Pipe Size Example: 13 Diameters of 6" pipe = 78" 13 Diameters of 10" pipe = 130" **Beta** = (Bore I.D./Pipe I.D.) Bore is the smallest diameter of an orifice or nozzle **Up** = Upstream Diameters **Down** = Downstream Diameters				 (For Two Elbows >10D separation, use One Elbow Data)	
Orifice/Nozzle	Beta = 0.5	Up	7	10	8
		Down	3	3	3
	Beta = 0.7	Up	13	18	16
		Down	4	4	4
Venturi	Beta = 0.5	Up	4	4	4
		Down	2	2	2
	Beta = 0.7	Up	4	4	8
		Down	2	2	4
Vortex		Up	30	30	30
		Down	5	5	5
Thermal		Up	15	20	20
		Down	5	5	5
Turbine		Up	10	10	10
		Down	5	5	5
Annubar		Up	7	9	—
		Down	3	3	—

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