

Table 1: Flowmeter Evaluation Table

FLOWMETER	PIPE SIZE, in. (mm)	GASES (VAPORS)				LIQUIDS						REVERSE FLOW	PULSATING FLOW	HIGH TEMPERATURE	CRYOGENIC	SEMI-FILLED PIPES	NON-NEWTONIANS	OPEN CHANNEL	TYPICAL Accuracy, uncalibrated (Including transmitter)	TYPICAL Reynolds number † or viscosity	TEMPERATURE °F (°C)	PRESSURE psig (kPa)		
		STEAM CLEAN	DIRTY	HIGH PRESS	LOW PRESS	CLEAN	HIGH	LOW	DIRTY	CORROSIVE	VERY CORROSIVE												FIBROUS	SLURRIES
SQUARE ROOT SCALE: MAXIMUM SINGLE RANGE 4:1 (Typical)**																								
Orifice																								
Square-Edged	+1.5 (40)	✓	✓	X	✓	✓	✓	X	?	X	?	X	X	SD	?	✓	✓	X	?	X	±1-4% URV	Process temperature to 1000°F (540°C); Transmitter limited to -30-250°F (-30-120°C)	To 4,000 psig (41,000 kPa)	
Honed Meter Run	0.5-1.5 (12-40)	✓	✓	X	✓	✓	?	?	X	?	X	X	SD	?	✓	✓	X	?	X	±1% URV				
Integrated	+0.5 (12)	?	✓	X	✓	✓	✓	X	?	?	X	X	SD	?	?	X	X	?	X	±2-5% URV				
Segmental Wedge	+12 (300)	✓	✓	?	✓	✓	✓	?	?	?	X	?	SD	?	✓	✓	X	?	X	±0.5% URV				
Eccentric	+2 (50)	?	?	?	✓	✓	?	X	?	?	?	X	SD	?	✓	✓	X	?	X	±2-4% URV				
Segmental	+4 (100)	?	?	?	✓	✓	?	X	?	?	?	X	SD	?	✓	✓	X	?	X	±2-4% URV				
V-Cone	0.5-72 (12-1800)	✓	✓	?	✓	✓	?	?	?	X	?	?	X	?	?	?	X	?	X	±0.5-1% of rate				
Target***	+0.5(12)	?	✓	✓	✓	✓	?	✓	✓	X	X	X	X	?	X	?	X	?	X	±0.5-5% URV				
Venturi	+2 (50)	✓	✓	?	✓	✓	?	?	?	X	?	?	X	?	?	?	X	?	X	±0.5-2% URV				
Flow Nozzle	+2 (50)	?	?	?	✓	✓	?	?	?	X	X	X	X	?	?	?	X	?	X	±1-2% URV				
Low Loss Venturi	+3 (75)	✓	✓	X	✓	✓	✓	X	?	X	✓	X	X	X	?	?	X	?	X	±1.25% URV				
Pitot	+3 (75)	X	✓	X	✓	✓	✓	X	?	X	X	X	X	X	?	?	X	X	X	±3-5% URV				
Averaging Pitot	+1 (25)	✓	✓	SD	✓	✓	✓	X	?	SD	?	X	X	SD	X	?	X	X	X	±1-2% URV				
Elbow	+2 (50)	X	✓	?	✓	✓	✓	X	?	?	X	X	X	X	?	?	X	?	X	±5-10% URV				
Laminar	0.25-16.6 (6-400)	?	✓	X	✓	✓	✓	?	?	X	?	X	X	X	✓	✓	X	?	X	±1% of rate				
LINEAR SCALE TYPICAL RANGE 10:1 (Or better)																								
Magnetic*	0.1-72 (2.5-1800)	X	X	X	X	X	✓	?	✓	✓	✓	✓	✓	✓	?	X	?	?	?	±0.5% of rate	R _D + 4,500	360 (180)	±1,500 (10,800)	
Positive Displacement																								
Gas	+12 (300)	X	✓	X	?	?	X	X	X	X	X	X	X	X	X	X	X	X	X	±1% of rate	-	250 (120)	±1,400 (10,000)	
Liquid	+12 (300)	X	X	X	X	X	✓	?	X	?	X	X	X	X	?	X	X	X	X	±0.5% of rate	No R _D limit; ± 8,000 cS	600 (315)	±1,400 (10,000)	
Turbine																								
Gas	0.25-24 (6-600)	SD	✓	X	✓	✓	X	X	X	X	X	X	SD	SD	?	?	X	X	?	±0.5% of rate	-	-450-500 (268-260)	± 3,000 (21,000)	
Liquid	0.25-24 (6-600)	X	X	X	X	X	✓	X	?	X	?	X	SD	SD	SD	?	?	X	X	±0.5% of rate	R _D + 5,000, ±15 cS	-450-500 (268-260)	± 3,000 (21,000)	
Ultrasonic																								
Time of Flight	+0.5 (12)	X	SD	SD	SD	SD	?	?	?	X	✓	?	?	✓	✓	X	?	X	X	±1% of rate to ffl5% URV	R _D + 10,000	-300-500 (-180-260)	Pipe rating	
Doppler	+0.5 (12)	X	X	X	X	X	?	?	✓	✓	✓	✓	✓	✓	✓	X	X	X	X	±1% of rate to ffl5% URV	R _D + 4,000	-300-500 (-180-260)	Pipe rating	
Variable-Area (Rotameter)	±3 (75)	?	✓	X	✓	✓	X	X	?	?	X	X	X	?	?	X	X	X	X	±1% of rate to ffl10% URV	No R _D limit, < 100 cS	Glass: 400 (200) Metal: 1000 (540) 400 (200)	Glass: 350 (2,400) Metal: 720 (3,000) ±1,500 (10,500)	
Vortex Shedding	1.5-16 (40-400)	✓	✓	?	✓	✓	✓	X	?	?	?	X	X	X	X	?	?	X	X	±0.75-1.5% of rate	R _D + 10,000, +30 cP	R _D + 10,000, +5 cP	Pipe rating	
Vortex Precession (Swirl)	+16 (400)	✓	✓	?	✓	✓	✓	X	?	X	?	X	X	X	X	?	X	X	X	±0.5% of rate	R _D + 10,000, +5 cP	536 (280)	Pipe rating	
Fluidic Oscillation (Coanda)	+1.5 (40)	X	X	X	X	X	✓	X	X	?	?	X	X	X	?	?	X	X	X	±2% of rate	R _D + 2,000, + 80 cS	350 (175)	±720 (5,000)	
Mass																								
Coriolis	0.25-6 (6-150)	?	?	?	✓	✓	✓	✓	✓	?	?	?	?	?	?	?	X	✓	X	±0.15-10% of rate	No R _D limit	-400-800 (-224-427)	±5,700 (39,900)	
Thermal Probe	+72 (1800)	X	✓	?	✓	✓	?	?	?	?	?	?	?	X	?	?	X	X	X	±1-2% URV	No R _D limit	1,500 (816)	Pipe rating	
Solids Flowmeter	+24 (600)	X	X	X	X	X	SD	X	?	X	X	SD	SD	X	SD	SD	X	✓	X	±0.5% of rate to ffl4% URV	-	750 (400)	±580 (4,000)	
Correlation																								
Capacitance	+8 (200)	X	X	X	X	X	✓	✓	✓	✓	✓	✓	✓	X	?	?	X	?	?	No data available	No data available	300 (149)	±580 (4,000)	
Ultrasonic	+0.5 (12)	X	X	X	X	X	?	✓	✓	✓	✓	✓	✓	X	?	X	X	X	?	X	±6% of ??	No data available	-300-250 (-180-120)	Pipe rating

cP = centi Poise ? = Normally applicable (worth consideration) URV = Upper Range Value † According to other sources, the minimum Reynolds number should be much higher * Liquid must be electrically conductive
cS = centi Stokes ✓ = Designed for this application (generally suitable) X = Not applicable ** Range 10:1 for laminar, and 15:1 for target
SD = Some designs *** Newer designs linearize the signal