

SPONSLER PRECISION TURBINE FLOWMETERS



- Flowrates from .25 to 12000 GPM and .35 to 12000 ACFM
- Temperature Range -430 to +1000°F
- Compact, Light-weight Construction
- Linear Output
- High Resolution
- Standard and Custom Design
- Variety of End Fitting Choices

Design Applications

- Liquid and Gas Measurement
- Batching
- Blending
- Filling
- Process Control



SPONSLER CO., INC.

Flow Measuring Devices and Controls

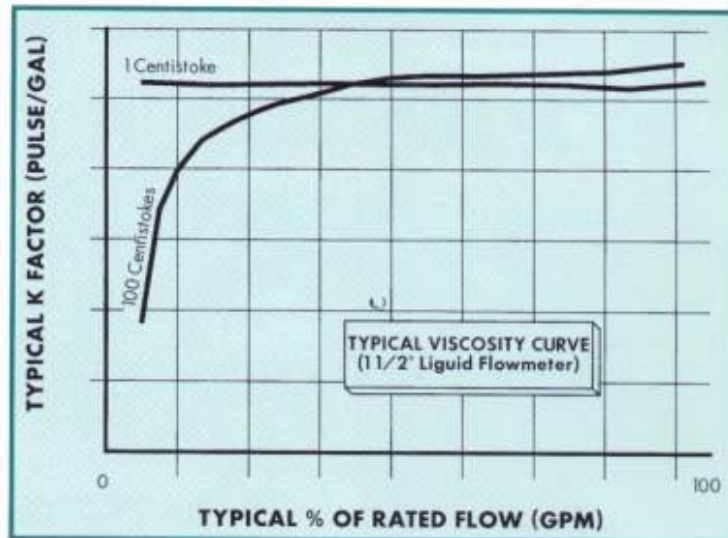
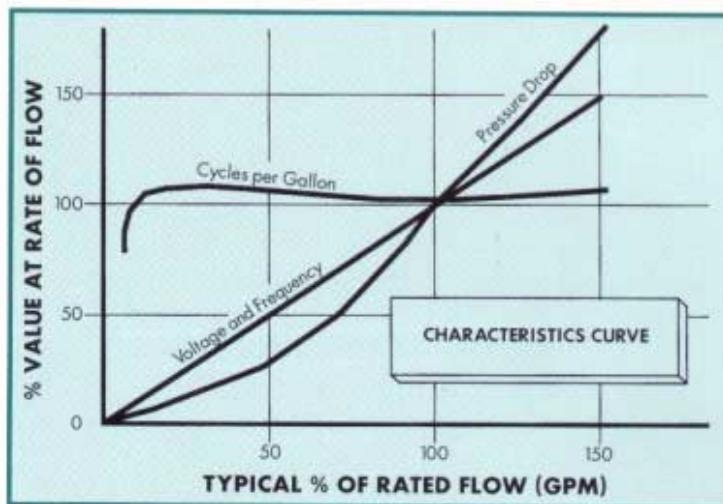
SPONSLE CO., INC.

The Sponsler Precision Turbine Flowmeter...

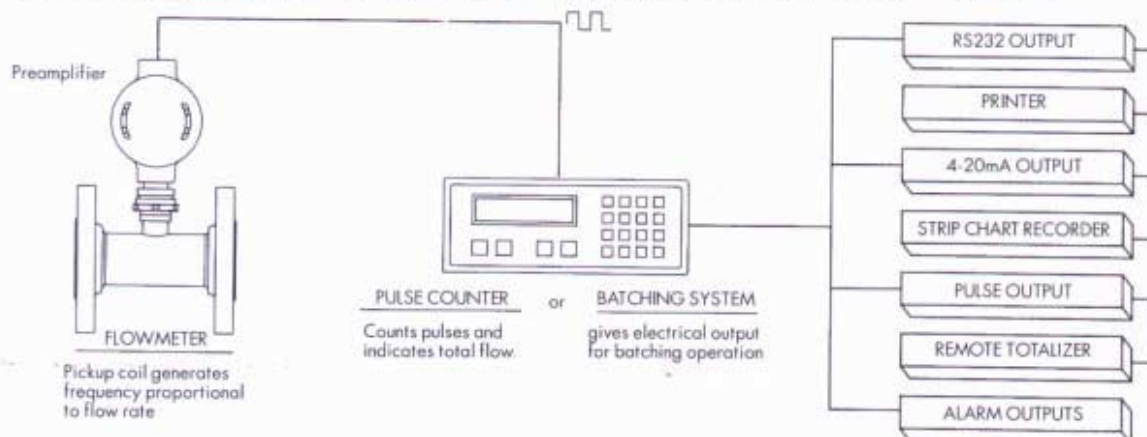
measures volume by a contour mounted turbine in the flow stream. The AC signal output is detected by a transducer and interpreted by various electronic devices used for flow rate indication and totalization. Sponsler Precision Turbine Flowmeters are manufactured to handle problems of viscosity, corrosive media, extreme temperature and hazardous materials. Its compact and rugged design has established a new criteria for flow measurement meeting today's need for higher accuracy and reliability under severe operating conditions.

Design Applications

Sponsler engineers can design flow systems to meet customer specifications. These can be automatic, semiautomatic or manual for batch or process control, blending and filling systems including simple rate indication and totalization. Standard or custom electronic instrumentation is available for a wide range of applications.



Typical Arrangement of Flowmeter and Readout Instrument



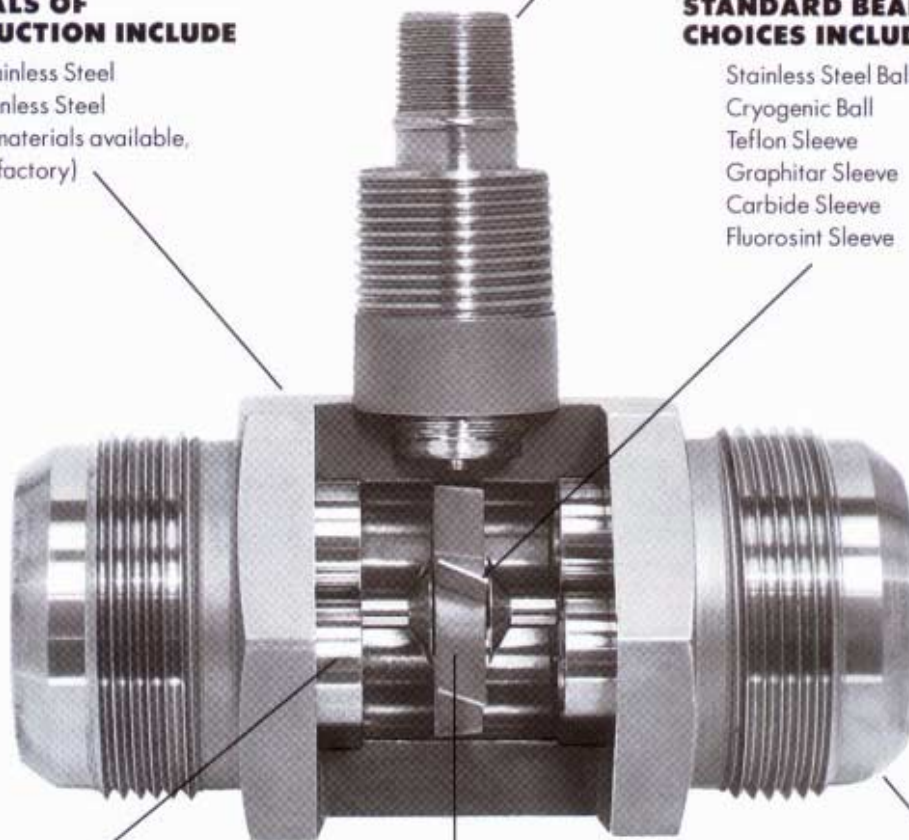
MATERIALS OF CONSTRUCTION INCLUDE

304 Stainless Steel
316 Stainless Steel
(Other materials available,
consult factory)

Pickup coil temperature from -450°F
to +450°F (optional to 1000°F)

STANDARD BEARING CHOICES INCLUDE

Stainless Steel Ball
Cryogenic Ball
Teflon Sleeve
Graphitar Sleeve
Carbide Sleeve
Fluorosint Sleeve



**STANDARD FLOW
STRAIGHTENER
UPSTREAM AND
DOWNSTREAM FOR
ACCURACY**

**LIGHTWEIGHT
HYDRAULICALLY
BALANCED
ROTOR.**

Materials Include:

304 Nickel Liquid
17-4 PH-SS

END FITTINGS INCLUDE:

Male NPT
37° Flare
Flanged
High Pressure
Tube Fitting

Features

- High pressure applications
- Custom and standard designs
- Wide choice of bearings including carbide for compatability
- Interfaces with manual, semiautomated or completely automated systems
- Material compatible with application
- Custom design and system engineering service
- Manufactured in the USA

LIQUIDS

Specifications

- **Linearity:** +/- .5%
- **Premium Linearity:** +/- .25% (over a specified range)
- **Repeatability:** +/- .05%
- **Premium Repeatability:** +/- .02% (over a specified range)
- **Temperature:** -450°F to +450°F std., +1000°F available
- **Materials:** Precision Turbine Flowmeters are constructed of 300 and 400 series stainless steel. A variety of other materials are available to satisfy most applications including CPVC for corrosive applications (See Bulletin 5003)
- **Electrical Output:** A minimum of 30 mV peak to peak at the minimum repeatable flow.
- **Pressure Drop:** 4 psi at nominal rated flow range.
- **End Fittings:** Include AN series 37°, flare tube (MS-33656), NPT, and ANSI flanges. Other End Fittings available upon request.
- **Operating Pressure:** Accommodates unlimited pressures depending on end fittings.
- **Calibration:** Precision Turbine Flowmeters furnished with standard fluid calibration. Special calibrations available.
- **Flow Ranges:** From .25 to 12,000 GPM
- Specifications based on ball bearings. Altering bearing selection may alter specification performance, consult factory.

Typical Applications for Liquids

Cryogenic
 Allyl Chloride
 Adipic Acid
 Chloride Leftovers
 Gasoline
 LPG
 Brine
 Anhydrous Ammonia
 Mercaptans
 Ethylene Diamine (EDA)
 Ethylene Dichloride
 Asphalt
 Water, Fresh
 Water, DI
 Water, Salt
 Perchlorophenylene
 Carbon Tetrachloride
 Fuel Oils
 Freon

Liquid Sizing Chart

NOMINAL METER SIZE	NOMINAL FLOW RANGE				METER FACTOR "K" PULSES/U.S. GAL.	* APPROX. METER WT.
	U.S. Gallons Per Minute					
	MINIMUM REPEATABLE	MINIMUM LINEAR	NOMINAL MAXIMUM	EXTENDED MAXIMUM		LBS / Kg
1/4	0.25	0.5	2.5	3	15000	2 / 1
3/8	0.35	0.75	5	7.5	3160	2 / 1
1/2	0.6	1.25	9.5	12	3160	2 / 1
5/8	0.9	1.75	16	18	1875	2 / 1
3/4	1.75	2.5	29	35	1035	4 / 2
1	3	4	60	75	500	5 / 2.5
1 1/4	4	6	93	115	322	7 / 3
1 1/2	6	8	130	175	230	8 / 3.5
2	12	15	225	275	133	13 / 6
2 1/2	15	25	400	500	75	18 / 8
3	30	40	650	800	46.1	19 / 8.5
4	50	75	1250	1500	20.7	36 / 6
5	100	140	2000	2500	9.0	47 / 21
6	125	200	2900	3600	5.6	58 / 26
8	280	330	5200	6400	2.4	119 / 54
10	550	650	8000	9800	5.95	226 / 103
12	800	900	12000	15000	5.95	345 / 157

GASES

SPONSLER PRECISION TURBINE GAS FLOWMETERS

are designed to measure actual cubic feet or actual volume passing through the meter. Before sizing a flowmeter it is necessary to convert flow units (i.e. SCFM, LPM, etc.) to actual units. To convert to actual measured volume (ACFM) from standard volume (SCFM) use the following formula.

$$\text{ACFM} = \text{SCFM} \times 14.7 / \text{Pa} \times \text{Ta} / 530$$

Where:

ACFM = Actual cubic feet per minute measured gas flow

SCFM = Standard cubic feet per minute gas flow

Pa = Operating pressure in (PSIA)

= PSIG + 14.7

Ta = Temperature in degrees Rankine = F + 460

NOTE: For specific examples, consult factory

Specifications

- Accuracy +/- 1% of full scale
- Repeatability +/- .25%
- Temperature range -450°F to 450°F STD (+1000°F optional)

Typical Applications For Gases

Argon
Nitrogen
Oxygen
Air
Ammonia
CO2
Ethylene
Helium
Hydrogen
Methane
Methylchloride
Nitric Oxide
Nitrous Oxide
Steam (Consult Factory)
Acetylene
Sulfur Dioxide

Gas Sizing Chart

METER SIZE	FLOW RANGE (ACFM) (MAGNETIC PICKUP)		EXTENDED FLOW RANGE (ACFM) (MC PICKUP WITH AMP)*		APPROX. METER WT.
	MIN. LINEAR	MAX. LINEAR	MIN. LINEAR	MAX. LINEAR	LBS/Kg
1/4	0.35	3.5	.2	3.5	2 / 1
3/8	0.75	5.0	.5	10.0	2 / 1
1/2	1	10.0	.8	12.0	2 / 1
5/8	2.0	20.0	1.5	20.0	2 / 1
3/4	2.5	28.0	2.0	30.0	4 / 2
1	4	60.0	2.8	60.0	5 / 2.5
1 1/4	6	100.0	2.0	100.0	7 / 3
1 1/2	8	130.0	2.0	150.0	8 / 3.5
2	15	250.0	4.0	250.0	13 / 6
2 1/2	25	450.0	5.0	500.0	18 / 8
3	40	650.0	---	---	19 / 8.5
4	75	1200.0	---	---	36 / 16
5	150	1800.0	---	---	47 / 21
6	250	2900.0	---	---	58 / 26
8	330	5000.0	---	---	119 / 4
10	650	7500.0	---	---	226 / 103
12	900	12000.0	---	---	345 / 157

* SP717 Amplifier

INSTALLATION DIMENSIONS

SERIES 5000

End Flanged

Meter size is based on nominal inside diameter of pipe.

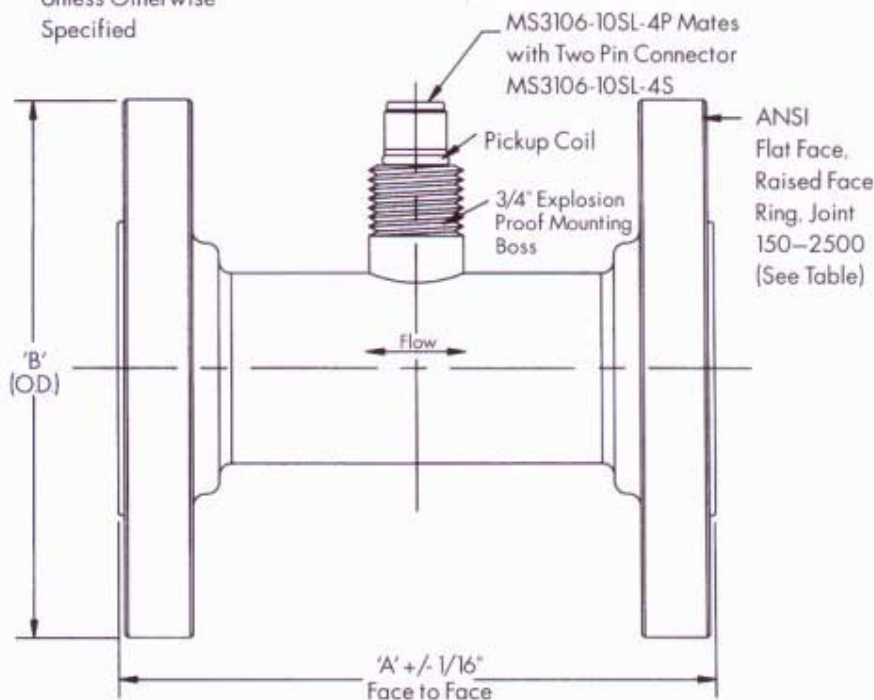
Special Flanges can usually be provided to specification.

For hazardous areas, pick up coils with explosion proof housings can be provided.

All flowmeters 1/2" and smaller will be provided with 1/2" End Connections unless otherwise specified.

Sizes 1/2" – 12"

Stainless Steel
Unless Otherwise Specified



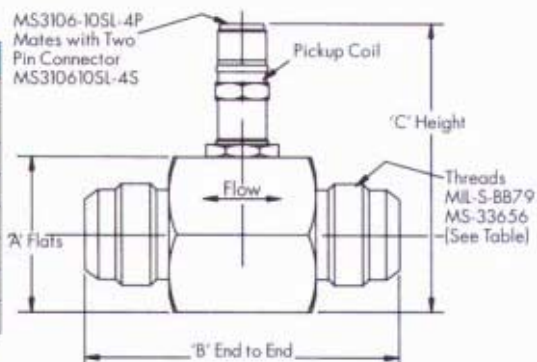
LINE SIZE	150# ASA (ANSI)		300# ASA (ANSI)		400# ASA (ANSI)		600# ASA (ANSI)		900# ASA (ANSI)		1500# ASA (ANSI)		2500# ASA (ANSI)	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1/4"-1/2"	5	3 1/2	5	3 3/4	5	3 3/4	5	3 3/4	7	4 3/4	7	4 3/4	7	5 1/4
* 5/8"	5 1/2	3 1/2	5 1/2	3 3/4	5 1/2	3 3/4	5 1/2	3 3/4	7	4 3/4	7	4 3/4	7	5 1/4
3/4"	5 1/2	3 7/8	5 1/2	4 5/8	5 1/2	4 5/8	5 1/2	4 5/8	7	5 1/8	7	5 1/8	7	5 1/2
1"	5 1/2	4 1/4	5 1/2	4 7/8	5 1/2	4 7/8	5 1/2	4 7/8	8	5 7/8	8	5 7/8	8	6 1/4
1 1/4"	6	4 5/8	6	5 1/4	6	5 1/4	6	5 1/4	8	6 1/4	8	6 1/4	8	7 1/4
1 1/2"	6	5	6	6 1/8	6	6 1/8	6	6 1/8	9	7	9	7	9	8
2"	6 1/2	6	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	9	7	9	7	9	8
2 1/2"	7	7	7	7 1/2	7	7 1/2	7	7 1/2	10	9 5/8	10	9 5/8	10	10 1/2
3"	10	7 1/2	10	8 1/4	10	8 1/4	10	8 1/4	10	9 1/2	10	10 1/2	11	12
3 1/2"	12	8 1/2	12	9	12	9	12	9	-	-	-	-	-	-
4"	12	9	12	10	12	10	12	10 3/4	12	11 1/2	12	12 1/4	12	14
5"	14	10	14	11	14	11	14	13	14	13 3/4	14	15 1/2	16	19
6"	14	11	14	12 1/2	14	12 1/2	14	14	14	15	14	15 1/2	16	19
8"	16	13 1/2	16	15	16	15	16	16 1/2	16	18 1/2	16	19	18	21 3/4
10"	20	16	20	17 1/2	20	17 1/2	20	20	20	21 1/2	20	23	22	26 1/2
12"	24	19	24	20 1/2	24	20 1/2	24	22	24	24	24	26 1/2	24	30

* Mates to 1/2" ANSI Flange

INSTALLATION DIMENSIONS

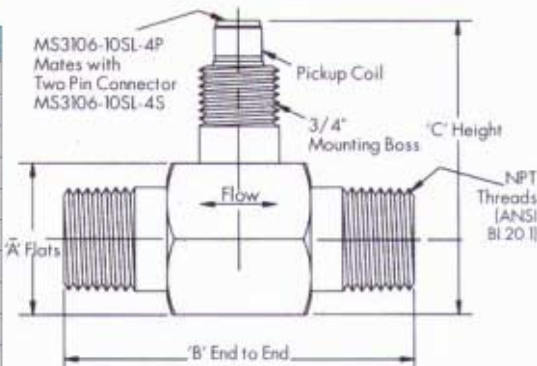
MS FLARED TUBE (Sizes 1/4"-2")

Size	DIMENSIONS (inches)			END CONNECTIONS	APPROX. WT. LBS/Kg
	A	B	C		
1/4-1/2"	1 1/8"	2 9/16"	3"	3/4-16UNJF-3A	.38/.173
5/8"	1 1/8"	2 3/4"	3"	7/8-14UNJF-3A	.75/.341
3/4"	1 5/8"	3 1/4"	3 1/2"	1 1/16-12UNJ-3A	.75/.341
1"	1 5/8"	3 1/2"	4"	1 5/16-12UNJ-3A	1.3/.627
1 1/4"	2"	3 7/8"	4 3/8"	1 5/8-12UNJ-3A	1.75/.795
1 1/2"	2 1/8"	4 3/8"	4 5/8"	1 7/8-UNJ-3A	2.31/1.05
2"	2 3/4"	4 3/4"	5 3/8"	2 1/2-12UNJ-3A	3/1.36

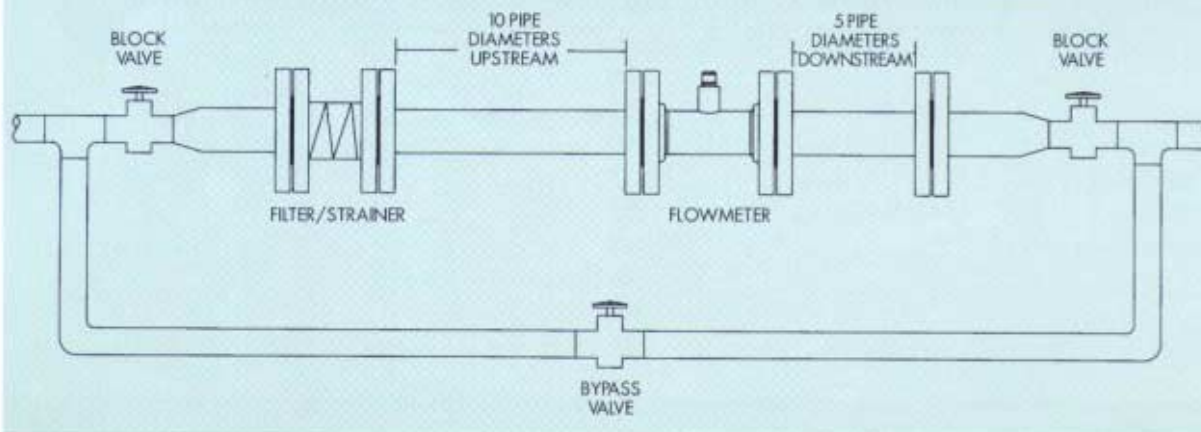


MNPT (Sizes 1/4"-3")

Size	DIMENSIONS (inches)			END CONNECTIONS	APPROX. WT. LBS/Kg
	A	B	C		
1/4-1/2"	1 1/8"	3"	3"	1/2"	.38/.173
5/8"	1 1/8"	3"	3"	1/2"	.75/.341
3/4"	1 5/8"	3 1/4"	3 1/2"	3/4"	.75/.341
1"	1 5/8"	3 1/2"	4"	1"	1.3/.627
1 1/4"	2"	3 7/8"	4 3/8"	1 1/4"	1.75/.795
1 1/2"	2 1/8"	4 3/8"	4 5/8"	1 1/2"	2.31/1.05
2"	2 3/4"	4 3/4"	5 3/8"	2"	3/1.36
2 1/2"	3 1/4"	6 1/16"	5 3/8"	2 1/2"	5.5/2.50
3"	3 1/2"	10"	5 5/8"	3"	10/4.54



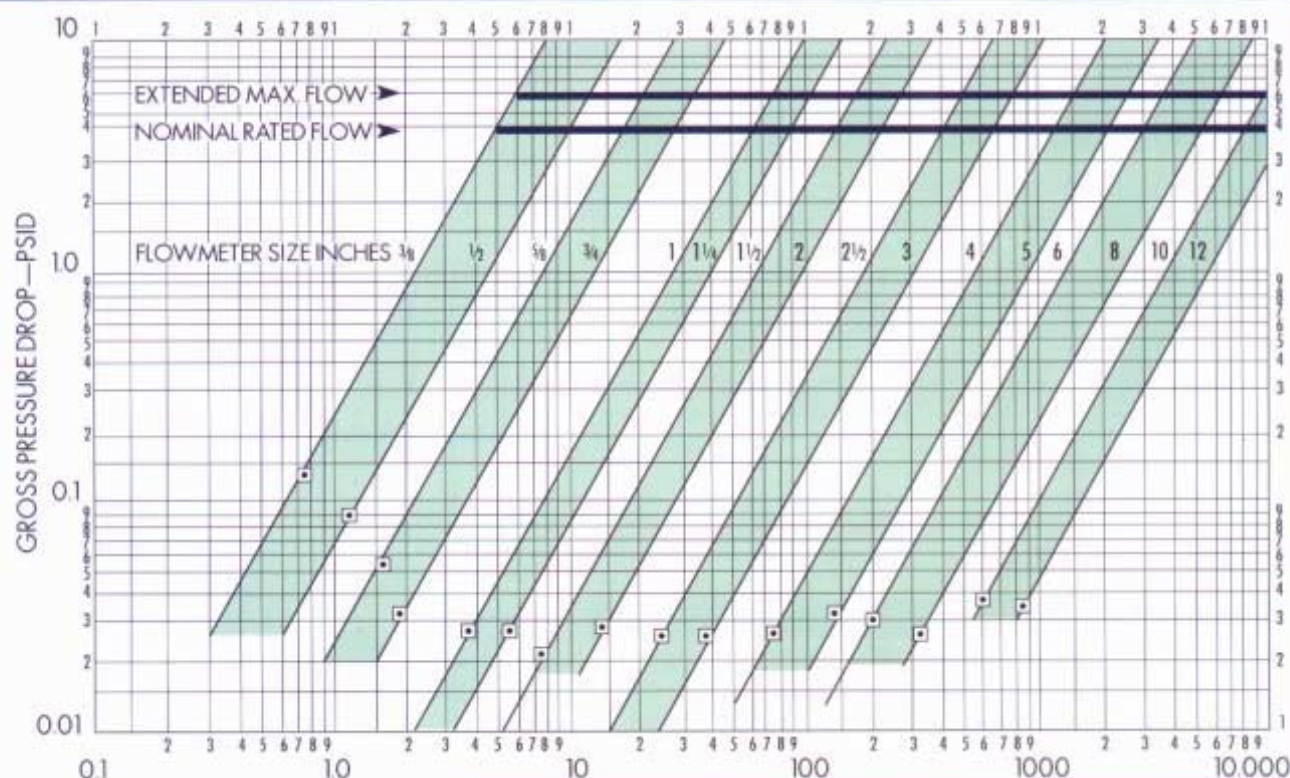
TYPICAL FLOWMETER SYSTEM INSTALLATION



For more information or to discuss your specific needs,
call Sponsler Co., Inc. today at 1-800-258-1165 or (864) 647-2065.
FAX (864) 647-1255

Turbine Flowmeters Size Selections

GROSS PRESSURE DROP CHARACTERISTICS



VOLUMETRIC FLOW RATE—

GPM/ACFM
 □ = MIN. LINEAR FLOW

For estimating pressure drop on liquids other than water at room temperature:

$$P = \Delta \text{ Visc}^* (\text{Cpse})^{1/4} \times \text{Sp. Gr.}^{3/4} \times \Delta P_{H_2O} \text{ (from Curve)}$$

*Absolute Visc (C'poise) = Kinematic Visc (C'stokes) X Sp. Gr.

For estimating Gross Pressure on gases at densities other than 1 pound/FT³:

$$\Delta P = \text{Density} \#/\text{FT}^3 \times \Delta P \text{ on chart.}$$

Model Selection Guide

Meter Model Numbering System

EXAMPLE:	SP(Size) - (Bearing Type) - (Rotor Type) - (Endfitting) - (Material) - (Options)				
	SP(1/4)	(CB)	(PHL)	(A)	(4)
BEARING TYPE:	ROTOR TYPE:		ENDFITTING TYPE:		OPTIONS
Cryo Ball =	CB	304 Nickel Liquid =	NL	NPT =	A
				* FNPT =	FA
Metal Ball =	MB	17-4 PH-SS Liquid =	PHL	AN Flare =	B
Teflon Sleeve =	TS	17-4 PH-SS 15 Degree =	PH15	150C =	C
Graphitar Sleeve =	GS	17-4 PH-SS 12 Degree =	PH12	150S =	D
Carbide Sleeve =	CS	17-4 PH-SS 7 Degree =	PH7	300C =	E
Fluorosint Sleeve =	FS			300S =	F
				600C =	J
				600S =	K
				* High Pressure =	H
				* Tube fitting =	I

* Overall lengths vary
 Consult Factory



SPONSLER CO., INC.

Flow Measuring Devices and Controls

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