

## North American Turbine Flowmeter For Gas Service

### FEATURES

- Outstanding accuracy
- High turndown
- Shielded, self-lubricating ball bearings
- 150# raised face steel flanges or male NPT ends
- Magnetic or modulated carrier pickup
- A variety of display and electrical output options



Turbine type flowmeters have long been recognized as the economical choice when high accuracy and reliable operation are required in gas flow measurement applications. Fives turbine flowmeters are available with a wide variety of electronic signal conditioning and indicators. Fives can provide standard and custom engineered packages for transmitting and displaying flow rate and totalized fuel consumption.

The bearings, key to reliable operation and long life, are 440C stainless steel rolling in a high grade polymer raceway. The design of these bearings was developed within NASA for cryogenic use and has proven to be excellent for natural gas service as well.

### SPECIFICATIONS

<b>Materials of construction:</b>	304 stainless steel
<b>Bearing material:</b>	440C stainless steel, polymer low friction raceways
<b>End fittings:</b>	Flanged or NPT
<b>Rotor:</b>	Hydraulically balanced, 304 stainless steel
<b>Flow straightener:</b>	Upstream and downstream
<b>Linearity:</b>	±1.0% over full range
<b>Repeatability:</b>	±0.25%
<b>Turndown:</b>	10-25:1, depending on options and operating conditions
<b>Overrange:</b>	150% of maximum flow intermittently
<b>Fluid temperature range:</b>	+450° to -450°F
<b>Display, operating temperature range:</b>	-22° to +167°F
<b>Max. Static Pressure:</b>	Flanged: 240 psig MNPT: 1000 psig
<b>Power supply:</b>	5-48 V dc, 4-20 mA loop power, or internal battery (D Lithium, approx. 4 year life without output)

The stainless steel construction of the meter assures years of corrosion-free operation. The meter is available with either NPT or flanged ends to mate appropriately to any piping system.

Two methods of signal pickup are offered. Magnetic is less expensive and suitable for turndown requirements of 10:1 for small meters and up to 16:1 for larger ones. Modulated carrier pickup is useful if greater turndowns are needed. Refer to the Meter Sizing Table on page 2 for details.

Explosion proof signal conditioners and display units are standard. If needed, the add-on 8123D Flow Rate Indicator and Totalizer is rated NEMA 4X for the surface mounted unit.

### FLOWMETER SIZE CALCULATION\*

1. Calculate the maximum actual cfh flow rate (acfh) required. Note that this converts from standard flow per hour to actual flow per hour. This number will be used to enter the chart below.

$$acfh = \frac{scfh \times 14.7 \times (Tf + 460)}{(Pg + 14.7) \times 530}$$

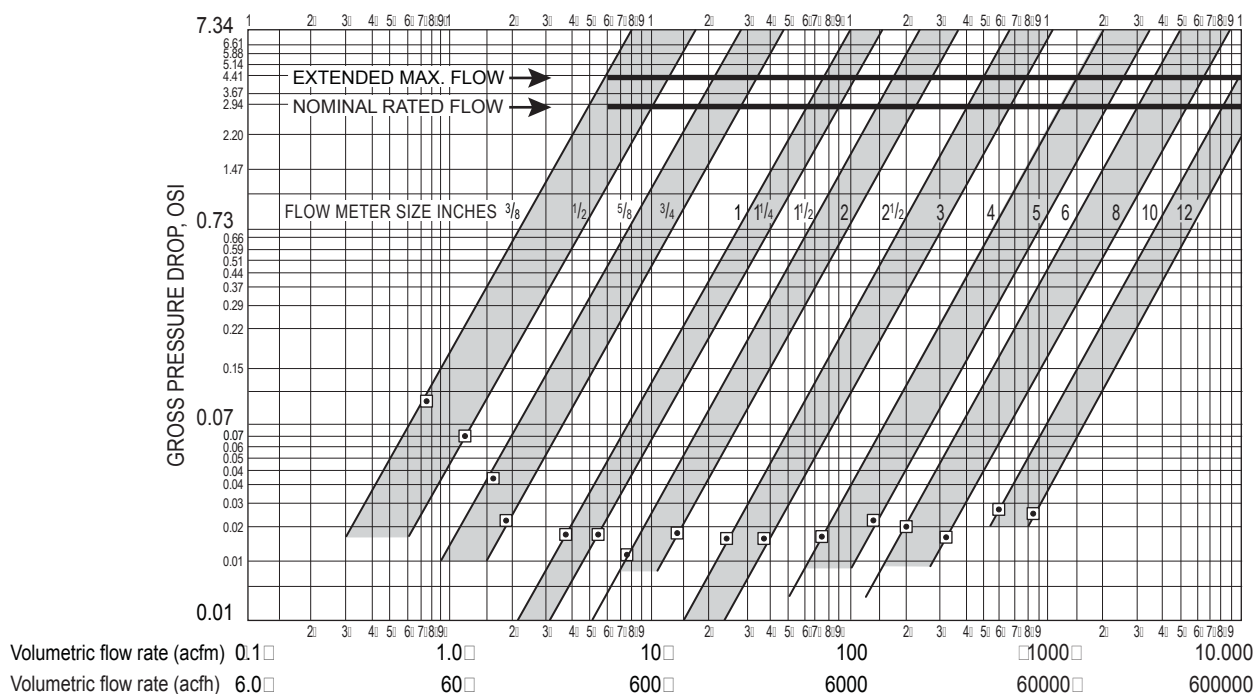
where scfh = your desired flow maximum in scfh  
Pg = operating pressure in psig, and  
Tf = operating temperature, Fahrenheit.

2. Repeat the calculation for the minimum needed flow.
3. Look in the Meter Sizing Table below for the meter size that most closely matches the needs.
4. Next check the Gross Pressure Drop Chart to determine the expected maximum drop across the meter in osi differential. Note that the horizontal axis is in acfm, not acfh. Actual cfh is shown at each major flow level for reference.

### METER SIZING TABLE\*

Meter size, inches	Flow range, acfh (Magnetic Pickup)		Extended flow range, acfh (MC Pickup with Amplifier)		Approx. Meter Wt. lb/kg
	min. linear	max. linear	min. linear	max. linear	
3/4	150	1680	90	2100	4/2
1	240	3600	120	4500	5/2.5
1 1/4	360	6000	180	6000	7/3
1 1/2	480	7800	300	9000	8/3.5
2	900	15000	660	15000	13/6
3	2400	39000	—	—	19/8.5

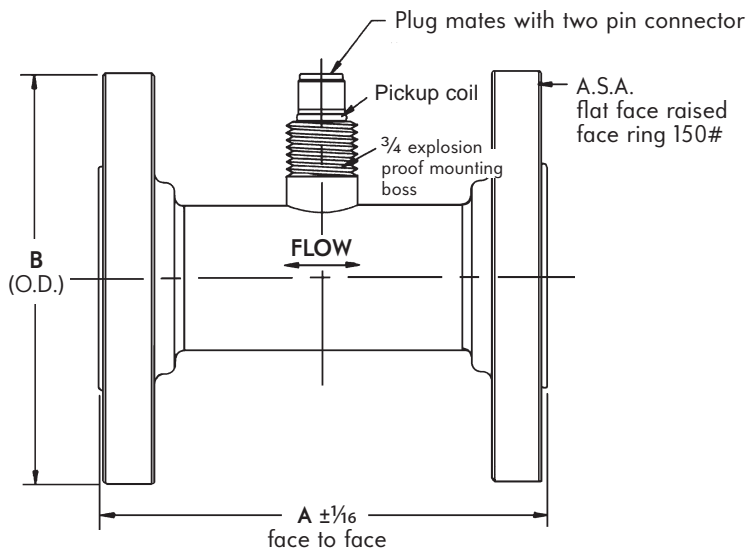
### GROSS PRESSURE DROP CHARACTERISTICS\*



\* Table and chart pertain to natural gas only. (0.0459 #/ft<sup>3</sup> density)

■ = MIN. LINEAR FLOW

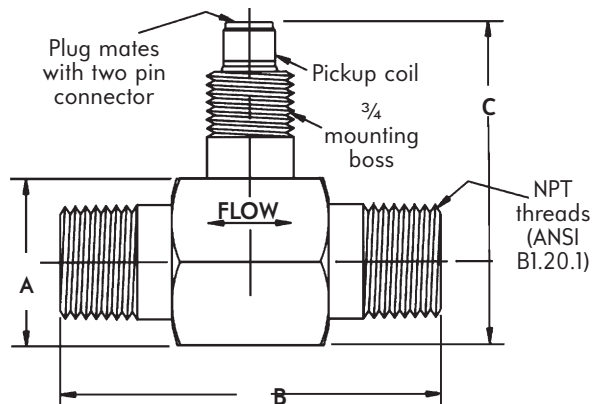
## INSTALLATION DIMENSIONS (inches)



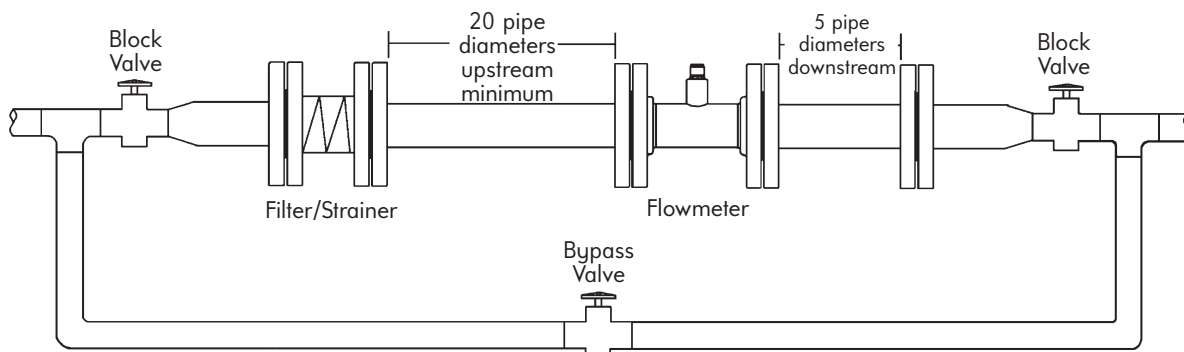
Meter size is based on nominal inside diameter pipe.

Line Size	150# ASA	
	A	B
3/4	5 1/2	3 7/8
1	5 1/2	4 1/4
1 1/4	6	4 5/8
1 1/2	6	5
2	6 1/2	6
3	10	7 1/2

Size	dimensions, inches			End connections NPT	Approx. wt. (oz.) S.S.
	A	B	C		
3/4	1 5/8	3 1/4	3 1/2	3/4	12
1	1 5/8	3 1/2	4	1	22
1 1/4	2	3 7/8	4 3/8	1 1/4	28
1 1/2	2 1/8	4 3/8	4 5/8	1 1/2	37
2	2 3/4	4 3/4	5 3/8	2	48
3	3 1/2	10	5 3/8	3	160

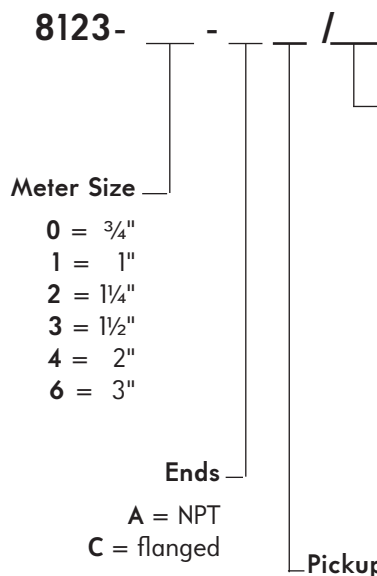


## TYPICAL FLOWMETER SYSTEM INSTALLATION



## METER PART NUMBER GENERATION

The format of the part number is



**Electronic option with magnetic pickup**

- IT400** = analog (4-20 mA) or pulse output, rate and resettable totalizer display, NEMA4, NEMA 7 for Class 1, Div. 1, Groups B, C, and D
- AO** = analog (4-20 mA) output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D
- FO** = pulse output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D (see note 1)

**Electronic option with modulated carrier pickup (see note 2)**

- AO** = analog (4-20 mA) output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D
- FO** = pulse output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D (see note 1)

- M** = magnetic
- C** = modulated carrier

**Note 1:** Select this option for use with 8123D Flow Rate Indicator and Totalizer (resettable and non-resettable totals). This instrument is not rated NEMA 7. It is NEMA 4X in surface mount and has a NEMA 4 front for panel mounting.

**Note 2:** The only display option with modulated carrier is 8123D.

*Examples:* **8123-4-CM/IT400** - 2" meter with flanged ends, magnetic pickup and analog or pulse output with rate and totalizer display.

**8123-4-AC/FO** - 2" meter with NPT ends, modulated carrier pickup, pulse output.  
Order 8123D separately for display option

Optional power supply: Order R650-2504 (24 V dc power supply unit).

DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSTION, INC. IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

**WARNING:** Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Parts of this product may exceed 160F in operation and present a contact hazard. Fives North American Combustion, Inc. urges compliance with National Safety Standards and Insurance Underwriters' recommendations, and care in operation.



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