



# Vortex Flow Meters

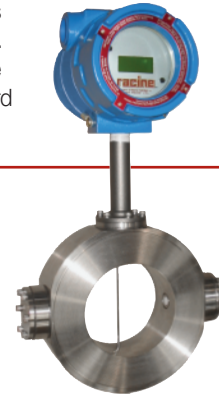
## RWG & RWBG Series Wafer-Style Gas Flow Meter

- **Applications:**
  - Combustion air
  - Compressed air
  - Incineration gas
  - Natural gas
  - Nitrogen
  - Digester gas (BioGas: CH<sub>4</sub> + CO<sub>2</sub>)
  - Chemical processing
- Low pressure drop
- NIST traceable calibration
- HART® Communications Protocol



# RWG & RWBG Series Wafer-Style Gas Flow Meter

The RWG and RWBG Series meters are wafer-style in-line flow meters designed to offer high accuracy measurements with extremely low pressure drop. The meters have no moving parts and are virtually maintenance-free once installed. The RWG series is suitable for most gas types. The RWBG series is similar in construction but optimized for low-pressure "BioGas" applications, typically CH<sub>4</sub> + CO<sub>2</sub> mixtures. All meters in these series are loop-powered devices with standard HART® communications for ease of field programming and system integration.

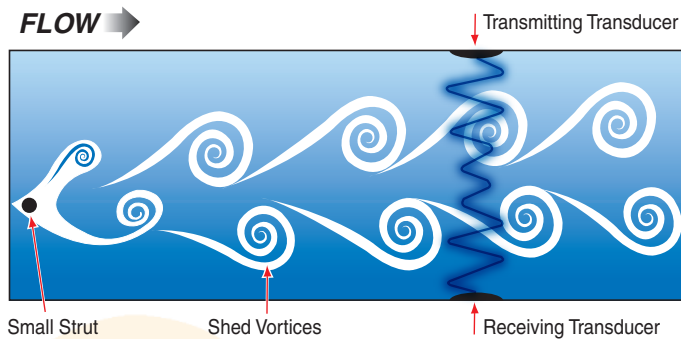


## Operating Principle

An everyday example of a vortex shedding phenomenon is a flag waving in the breeze: the flag waves due to the vortices shed by wind moving across the flagpole. Within the flow meter as flowing media moves across the strut or "bluff bar," vortices are also shed but on a smaller scale. The meter transmits an ultrasonic beam through the vortex pattern downstream of the strut. As vortices are shed the carrier wave of the ultrasonic signal modulates. The modulation of the carrier wave is measurable and proportional to the number of vortices shed. Digital processing enables the vortices to be counted, and this value is converted into a velocity. Software converts velocity into a volumetric flow rate, in units of measure selected by the operator.

Racine Vortex flow meters utilize the smallest strut in the industry, which allows for high levels of sensitivity; superior performance at low flow rates; high turndown ratios; and low pressure drop.

Through the use of an internal RTD and an external pressure sensor (optional), the flow meter software will compensate for changes in pressure and temperature, to achieve an accurate mass flow measurement.



## Specifications

<b>Measured:</b>	Gas/Air
<b>Flow Ranges:</b>	0.4 to 16 through 20 to 600 acfm
<b>Operating Temperature:</b>	-20 °F to 360 °F (-28 °C to 182 °C)
<b>Ambient Temperature Limits:</b>	-20 °F to 155 °F (-28 °C to 68 °C)
<b>Operating Pressure:</b>	-5 to 250 PSIG (-.34 to 17.2 Barg)
<b>Accuracy:</b>	±1% of reading over the upper 90% of the flow range
<b>Repeatability:</b>	0.5% of reading
<b>Input Power:</b>	24 VDC
<b>Signal Output:</b>	2-wire, 4-20 mA loop
<b>Construction:</b>	Stainless steel wetted parts with ceramic transducers (Teflon® in RWBG Series), Vitor® o-rings, NEMA 7 XP enclosure standard
<b>Communications:</b>	HART® Protocol (via PC with HART Modem)
<b>Certifications:</b>	CE: EN61326-1:2002 Optional Intrinsically Safe conforms to: ATEX  II 2G Ex ib IIB T4 Zone 1 Group IIB T4 (Canada) and AEx ib IIB T4 (USA)
<b>Options:</b>	2 line, 8-digit rate/totalizer display Integral RTD temperature compensation for mass flow measurement Remote mount electronics Wafer body suitable for DN Flange installation

## Flow Ranges\*

Based on air, 60 °F (16 °C)

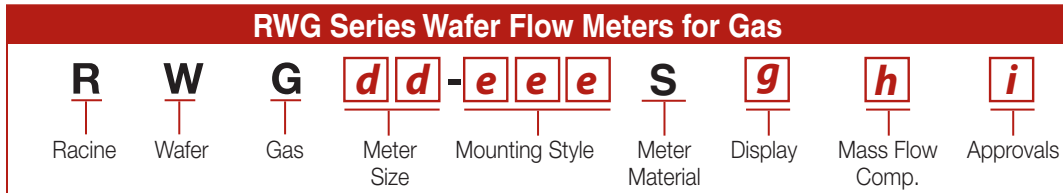
Pipe Size	Flow Range	PRESSURE PSIG (Barg)															
		0 (0)		25 (1.7)		50 (3.4)		75 (5.2)		100 (6.9)		150 (10.3)		200 (13.8)		250 (17.2)	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
½"	SCFM	0.4	16	1	43	2	70	2	81	3	81	4	81	6	81	7	81
	Nm³/Hr	1	27	2	73	3	120	4	138	5	138	8	138	10	138	12	138
1"	SCFM	1	45	3	122	6	198	8	275	10	351	14	498	18	498	23	498
	Nm³/Hr	3	76	6	207	9	337	13	467	17	597	24	846	31	846	38	846
1½"	SCFM	3	100	7	270	11	440	15	610	20	780	28	1121	37	1229	45	1229
	Nm³/Hr	4	170	11	459	19	748	26	1037	33	1326	48	1904	62	2089	77	2089
2"	SCFM	5	200	14	540	22	880	31	1221	39	1561	56	1991	73	1992	90	1992
	Nm³/Hr	9	340	23	918	37	1496	52	2074	66	2652	95	3384	124	3384	153	3384
3"	SCFM	10	400	27	1080	44	1761	61	2441	78	3122	112	4247	146	4247	180	4247
	Nm³/Hr	17	680	46	1836	75	2992	104	4148	133	5305	190	7217	248	7217	306	7217
4"	SCFM	20	600	54	1621	88	2641	122	3662	156	4683	224	6724	292	7898	360	7898
	Nm³/Hr	34	965	92	2754	150	4488	207	6223	256	7957	381	11426	496	13420	612	13420

\*Consult RACINE Flow Meter Sizing Software (available at [www.racinevortex.com](http://www.racinevortex.com)) for temperature and pressure conditions other than those listed here

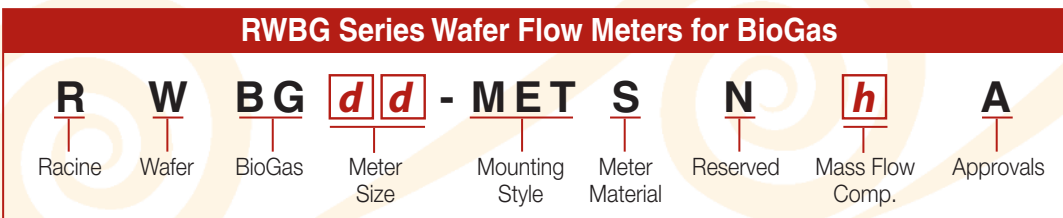
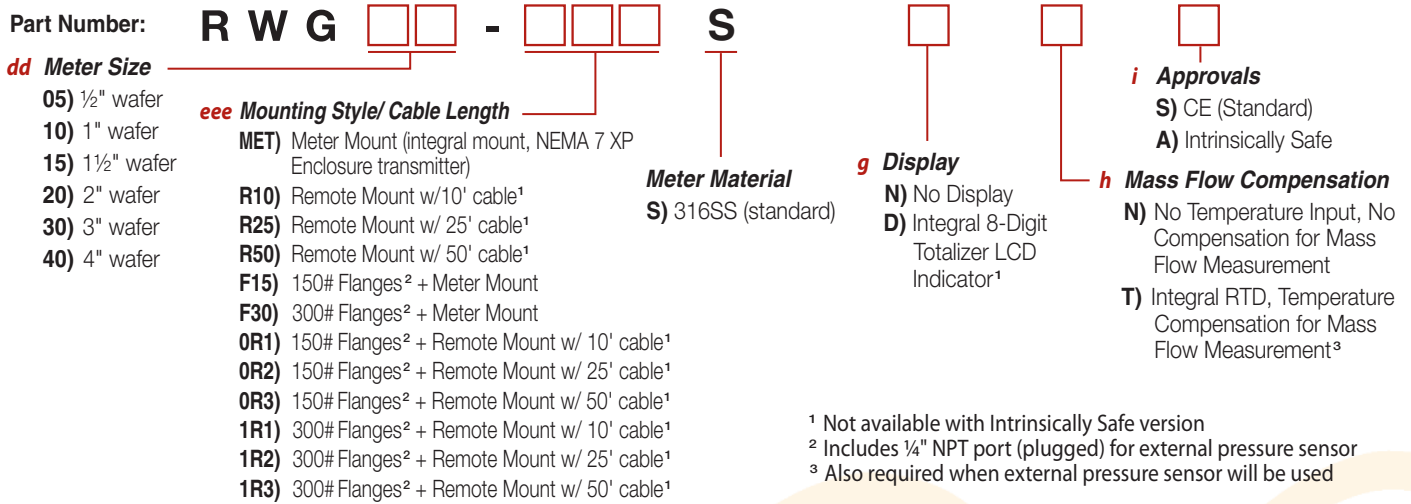
Pressure Drop  
At Full Flow (1 STP)

Size	Inches H <sub>2</sub> O		kPa	
	Air	CH <sub>4</sub>	Air	CH <sub>4</sub>
0.5	12	7	3	1.7
1.0	5	2.7	1.2	0.7
1.5	2.3	1.3	0.6	0.3
2.0	2.7	1.5	0.7	0.4
3.0	1.3	0.7	0.3	0.2
4.0	0.5	0.3	0.13	0.07

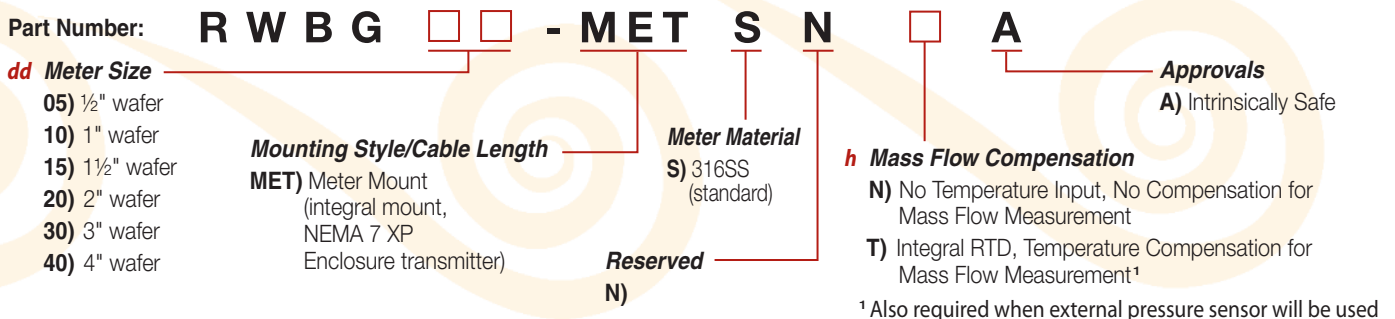
Part Number Construction



All meters include 4-20 mA output, HART communications protocol and NEMA 7 XP Transmitter Enclosure



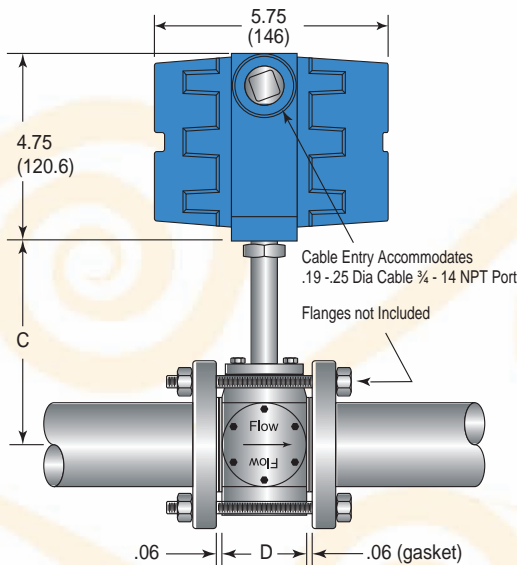
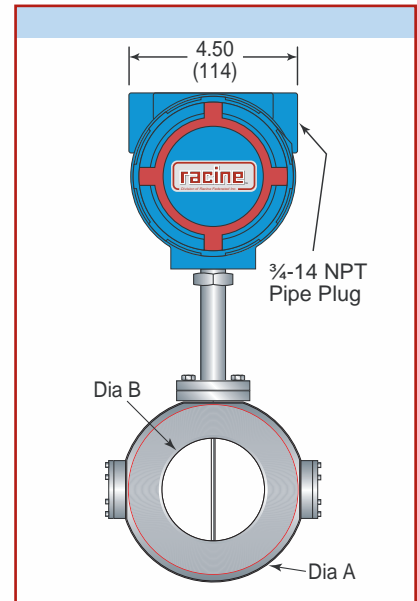
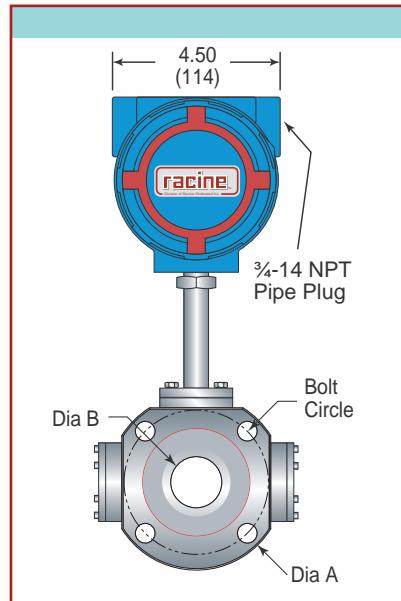
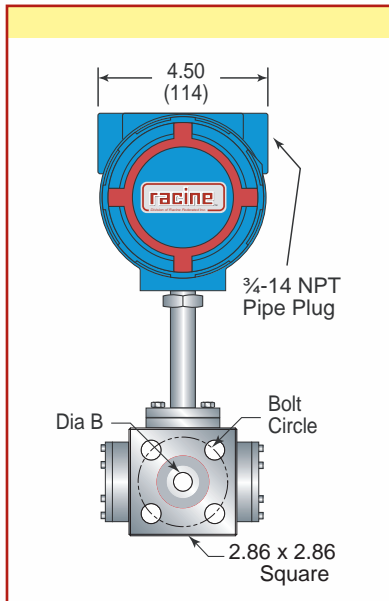
Optimized for BioGas (CH<sub>4</sub> + CO<sub>2</sub>) Applications  
All meters include ATEX approval, 4-20 mA output and HART communications protocol



# Dimensional Drawings

Inches (mm)

Model	Meter Size	Inches (mm)				
		Dia. A	Dia. B	Dim. C	Dim. D	Bolt Circle
RWG/RWBG05	½" (13)	2.86 x 2.86 (Square) (72.6 x 72.6)	0.50 (12.7)	2.4 (61)	2.25 (57.2)	2.38 (60.5)
RWG/RWBG10	1" (25)	3.97 (100.8)	0.875 (22.2)	3.1 (78)	2.25 (57.2)	3.125 (79.4)
RWG/RWBG15	1½" (38)	4.72 (119.9)	1.375 (34.9)	3.9 (99)	2.25 (57.2)	3.875 (98.4)
RWG/RWBG20	2" (51)	4.00 (101.6)	1.75 (44.5)	5.9 (150)	2.25 (57.2)	—
RWG/RWBG30	3" (76)	5.25 (133.4)	2.75 (69.9)	6.6 (168)	2.25 (57.2)	—
RWG/RWBG40	4" (102)	6.75 (171.5)	3.75 (95.3)	7.5 (191)	2.25 (57.2)	—

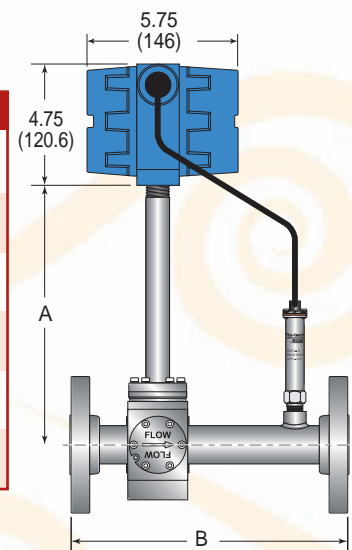


## Flanged Series Meters\*

Inches (mm)

SIZE	DIM A	DIM B
½" (13)	RWG 05-F15 5.60 (142.1)	9.88 - 10.0 (250 - 254)
1" (25)	RWG 10-F15 5.78 (146.7)	9.88 - 10.0 (250 - 254)
1½" (38)	RWG 15-F15 6.34 (160.9)	9.88 - 10.0 (250 - 254)
2" (51)	RWG 20-F15 5.92 (150.2)	9.88 - 10.0 (250 - 254)
3" (76)	RWG 30-F15 6.62 (168.0)	11.88 - 12.0 (301 - 304)
4" (102)	RWG 40-F15 7.52 (190.8)	11.88 - 12.0 (301 - 304)

\*150 lb RF ANSI Flange - standard  
300 lb RF ANSI Flange - optional



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