

RWS Series Wafer-Style Steam Flow Meter

The RWS Series meter is a wafer-style in-line flow meter designed to offer high accuracy measurements of saturated steam flow in a variety of applications. The meter has no moving parts and is virtually maintenance-free once installed. All meters in these series are loop-powered devices with standard HART® communications for ease of field programming and system integration.

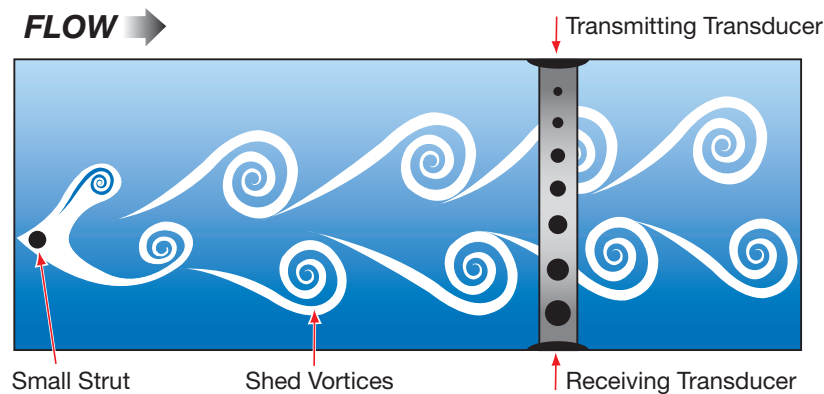
Operating Principle

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 steam moves across the tiny 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 is modified. This change in the carrier wave is measurable and moves in proportion 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 very 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



Measured:	Saturated steam
Flow Range:	See flow range table (page 3)
Operating Temperature:	-20 °F to 360 °F (-28 °C to 182 °C)
Ambient Temperature Limits:	-20 °F to 155 °F (-28 °C to 68 °C)
Operating Pressure:	-5 to 125 PSIG
Accuracy:	1% of reading over dynamic range of meter
Repeatability:	0.5% of reading
Response Time:	150 milliseconds maximum
Input Power:	15-24 VDC
Signal Output:	2-wire, 4-20 mA loop
Construction:	Stainless steel wetted parts, NEMA 7 enclosure standard
Communications:	HART Protocol
Certifications:	CE Optional ATEX (EEx ib IIB T4) Zone 1, Group IIB, T4 (Equiv. to N.A. Class I, Div 1, Groups C & D, T4)
Options:	2 line, 8 digit rate/totalizer display Internal RTD, temperature compensation for mass flow measurement Remote electronics

Flow Ranges*

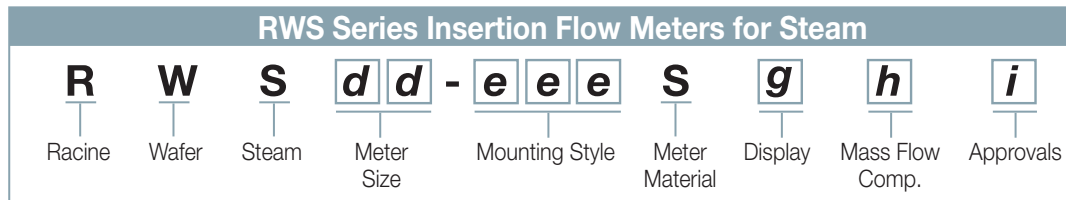
 Flow Range in LBS/HR in STEAM
 Flow Range in KG/HR in STEAM

Wafer Size	PRESSURE IN PSIG (BARg)										Pressure Drop (Inches H ₂ O) at 50% Max. Flow**
	25 (1.7)		50 (3.4)		75 (5.2)		100 (6.9)		150 (10.3)		
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
1/2" 13 mm	2	57	4	90	5	122	6	154	9	217	1.4
	1	26	2	41	2	55	3	70	4	99	
1" 25 mm	7	199	11	315	15	428	19	540	27	762	1
	3	90	5	143	7	194	9	245	12	346	
1-1/2" 38 mm	14	568	22	899	31	1222	39	1542	54	2176	0.65
	6	258	10	408	14	555	18	700	25	988	
2" 51 mm	28	908	45	1438	61	1955	77	2467	109	3482	0.35
	13	412	20	653	28	888	35	1120	49	1581	
3" 76 mm	57	1816	90	2876	122	3910	154	4934	218	6964	0.25
	26	824	41	1306	56	1775	70	2240	99	3162	
4" 102 mm	113	2723	180	4314	244	5865	308	7400	435	10446	0.25
	52	1236	82	1959	111	2668	140	3360	198	4743	
Temp °F (°C)	267 (130)		297 (147)		320 (160)		338 (170)		366 (186)		

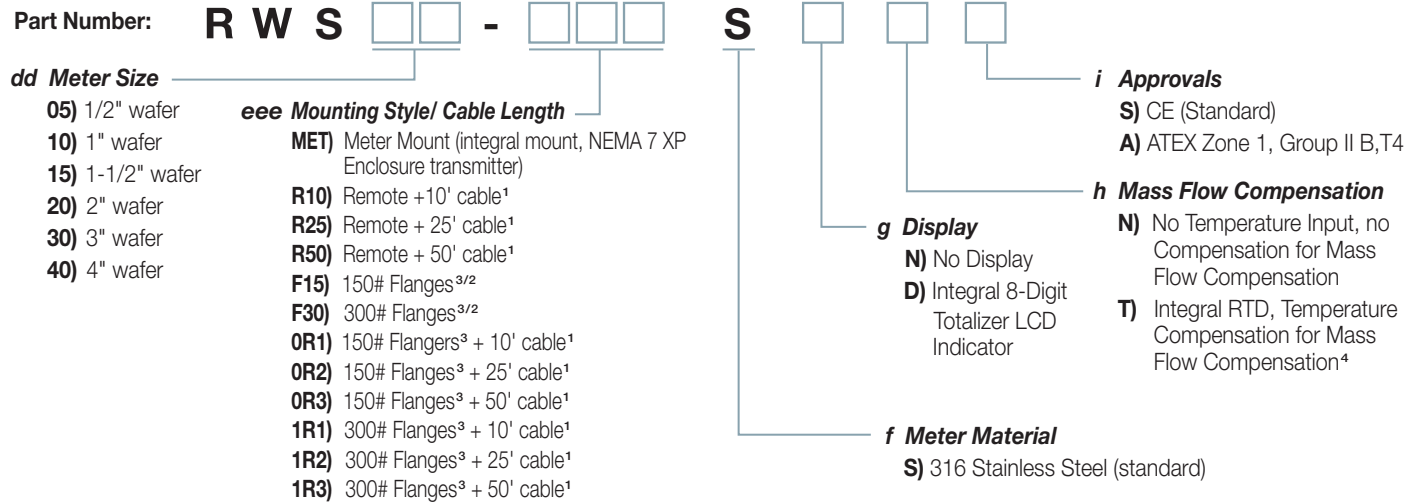
*Consult RACINE Flow Meter Sizing Software for temperature and pressure conditions other than those listed here

**Pressure drop data references air at 14.7 psi and 60 °F (0 BARg and 16 °C)

Part Number Construction



All meters include 4-20 mA output, HART communications protocol and NEMA 7 Explosion-proof enclosure

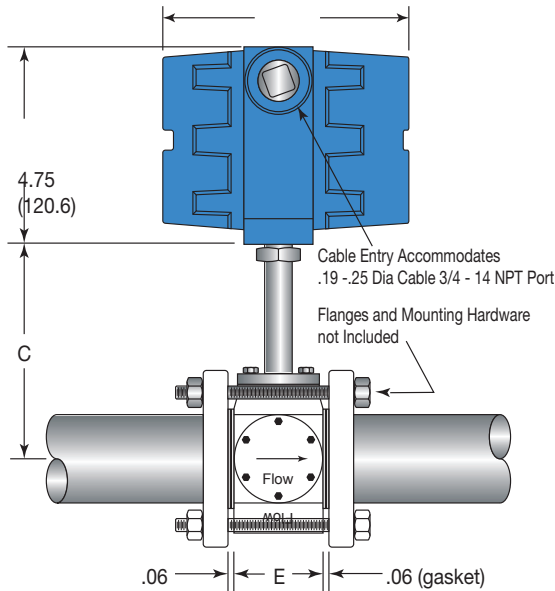
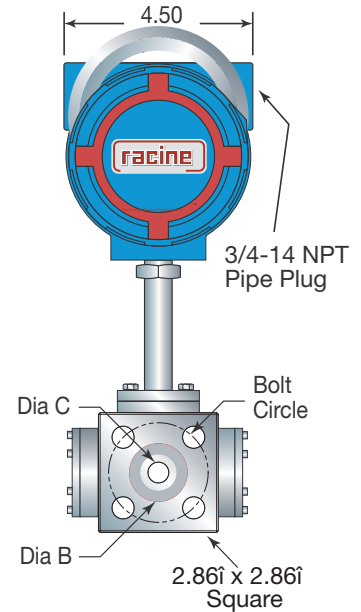
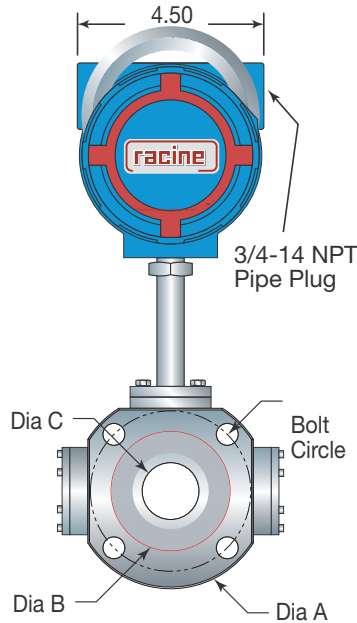
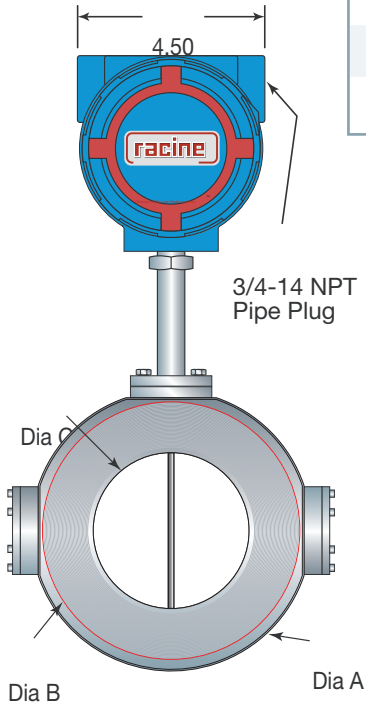


¹ Remote NEMA 7 XP enclosure transmitter (Not available with ATEX version)
² Integral mount NEMA 7 XP enclosure transmitter (Not available with ATEX version)
³ Includes 1/4" NPT port (plugged) for external pressure sensor
⁴ Also required when external pressure sensor will be used

Dimensional Drawings

Inches (mm)

Model	Meter Size	Inches (mm)					
		Dia. A	Dia. B	Dia. C	Dim. C	Dim. E	Bolt Circle
RWS05	1/2" (12.7)	2.86 x 2.86 (Square) (72.6) x (72.6)	1.375 (34.9)	0.5 (12.7)	2.38 (60.4)	2.25 (57.1)	2.375 (60.32)
RWS10	1" (25.4)	3.97 (100.8)	2.0 (50.8)	0.875 (22.2)	3.12 (79.1)	2.12 (53.8)	3.125 (79.37)
RWS15	1-1/2" (38.09)	4.72 (119.8)	2.875 (73.0)	1.375 (34.9)	3.88 (98.4)	2.12 (53.8)	3.875 (98.42)
RWS20	2" (50.8)	4.0 (101.6)	3.15 (80)	1.75 (44.4)	5.92 (150.2)	—	—
RWS30	3" (76.19)	5.25 (133.3)	4.55 (115.5)	2.75 (68.8)	6.62 (168.0)	—	—
RWS40	4" (101.6)	6.75 (171.4)	6.19 (157.2)	3.75 (95.2)	7.52 (190.8)	—	—

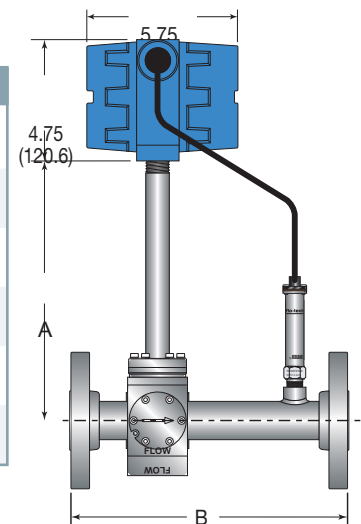


Flanged Series Meters*

Inches (mm)

SIZE	DIM A	DIM B
1/2" (13 mm)	RWG05-F15 5.60 (142.1)	9.88 - 10.0 (250 - 254)
1" (25 mm)	RWG10-F15 5.78 (146.7)	9.88 - 10.0 (250 - 254)
1-1/2" (38 mm)	RWG15-F15 6.34 (160.9)	9.88 - 10.0 (250 - 254)
2" (51 mm)	RWG20-F15 5.92 (150.2)	9.88 - 10.0 (250 - 254)
3" (76 mm)	RWG30-F15 6.62 (168.0)	11.88 - 12.0 (301 - 304)
4" (102 mm)	RWG40-F15 7.52 (190.8)	11.88 - 12.0 (301 - 304)

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



Amber Instruments Ltd

Dunston House, Dunston Road, Chesterfield, Derbys, S41 9QD

Tel: 01246 260250 Fax: 01246 260955

e-mail: sales@amberinstruments.com web: www.amberinstruments.com

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