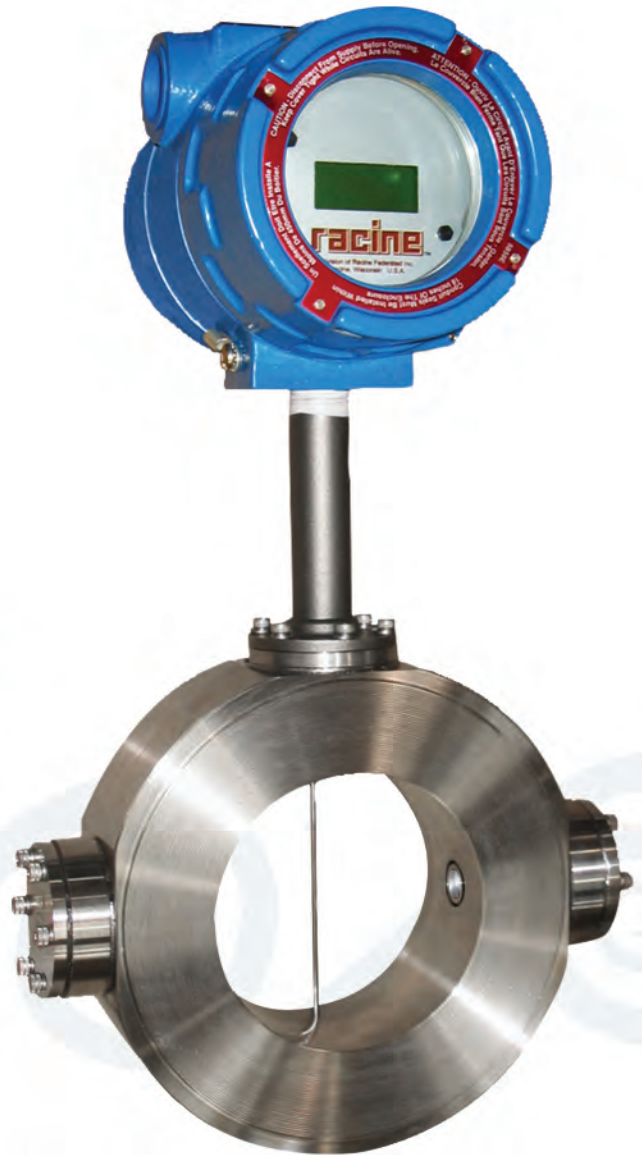




Vortex Flow Meters

RWS Series Wafer Steam Flow Meter

- **Applications:**
 - Non-condensing steam
 - Process steam (saturated)
 - Energy and boiler monitoring
 - Building and facilities management
- 316SS wetted parts
- Extremely small bluff bar results in negligible pressure drop
- NIST traceable calibration
- HART® Communication Protocol



RWS Series Wafer Steam Flow Meter

The RWS Series meter is an in-line wafer 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 this series are loop-powered devices with standard HART® communication for ease of field programming and system integration.

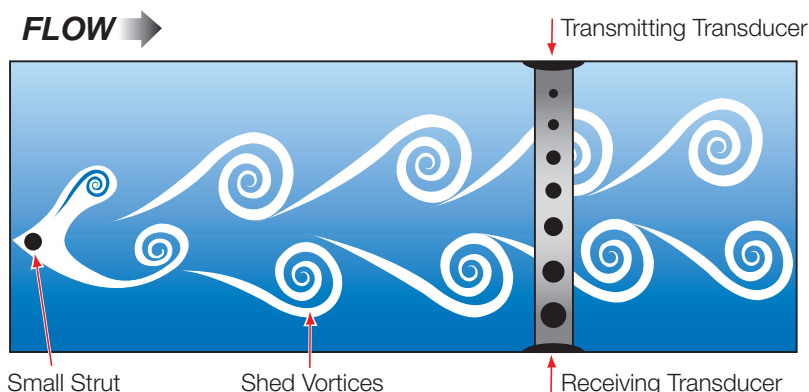
Operating Principle

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 modulates. The modulation in 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.


RWS meters contain an integrated RTD that is utilized to compensate for mass rate in saturated steam systems. Superheated steam requires the use of an external pressure transducer (not included).



Specifications



Model RWS40 Meter shown with optional digital display

Measured:	Saturated steam
Flow Range:	See flow range table (page 3)
Operating Temperature:	-20 °F to +366 °F (-28 °C to +186 °C)
Ambient Temperature Limits:	-20 °F to +155 °F (-28 °C to +68 °C)
Operating Pressure:	-5 to 150 PSIG
Accuracy:	±1% of reading over the upper 90% of the flow range
Repeatability:	0.5% of reading
Input Power:	24 VDC
Signal Output:	2-wire, 4-20 mA loop
RTD:	Platinum, PT-100, high accuracy temperature measuring element
Construction:	316 Stainless steel, PEEK™, INCONEL®, AFLAS®, Viton® wetted parts, Type 4x (IP66) transmitter enclosure standard
Communications:	HART® Protocol (via PC or HART Modem)
Certifications:	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)
Options:	2 line, 8 digit rate/totalizer display Remote electronics

Flow Ranges*

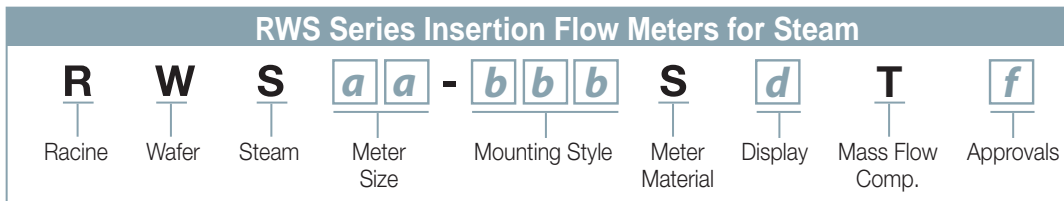
Flow Range in LBS/HR in STEAM Flow Range in KG/HR in STEAM

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 1	57 26	4 2	90 41	5 2	122 55	6 3	154 70	9 4	218 99	1.4
1" 25 mm	7 3	199 90	11 5	315 143	15 7	428 194	19 9	540 245	27 12	762 346	1
1-1/2" 38 mm	14 6	568 258	22 10	899 408	31 14	1222 555	39 18	1542 700	65 30	2176 978	0.65
2" 51 mm	28 13	908 412	45 20	1438 653	61 28	1955 888	77 35	2467 1120	109 49	3482 1579	0.35
3" 76 mm	57 26	1816 824	90 41	2876 1306	122 56	3910 1775	154 70	4934 2240	283 128	6964 3159	0.25
4" 102 mm	113 52	2723 1236	180 82	4314 1959	244 111	5865 2668	308 140	7400 3360	501 227	10447 4739	0.25
Temp °F (°C)	267 (130)		297 (147)		320 (160)		338 (170)		366 (186)		

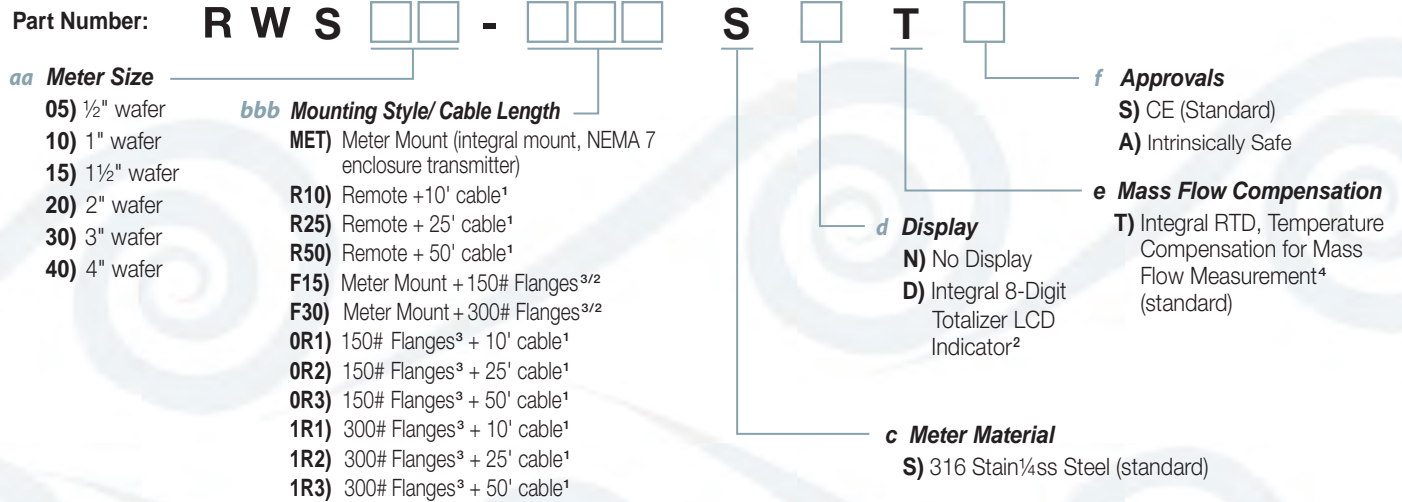
*Consult RACINE Flow Meter Sizing Software for temperature and pressure conditions other than those listed here.

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

Part Number Construction



All meters include 4-20 mA output, HART Communication Protocol and Type 4x (IP66) enclosure.



¹ Remote mount transmitter not available with Intrinsically Safe version

² Not available with Intrinsically Safe version

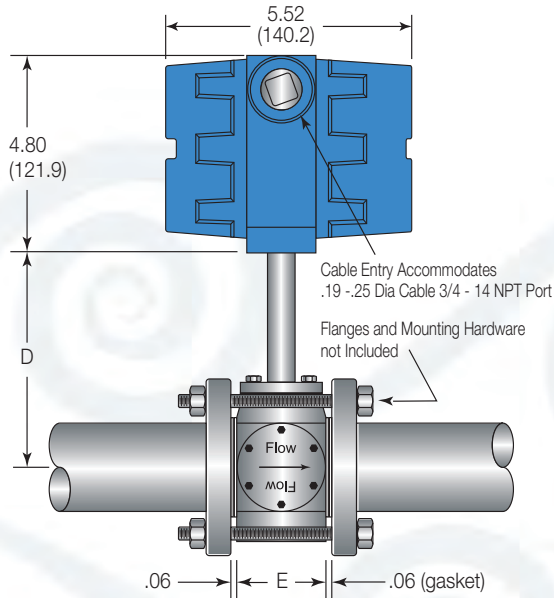
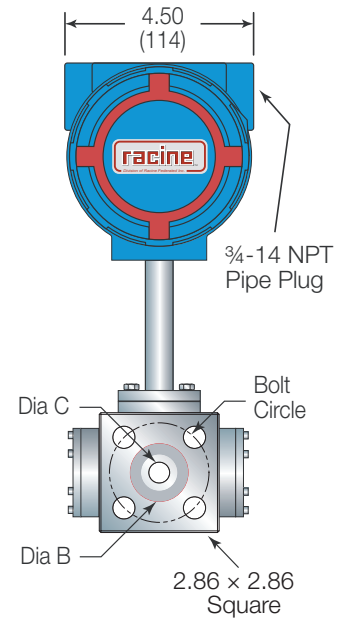
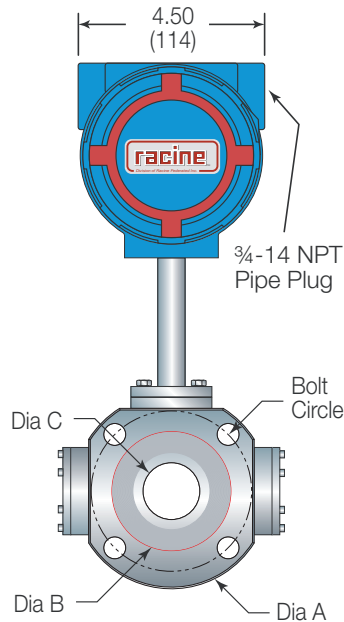
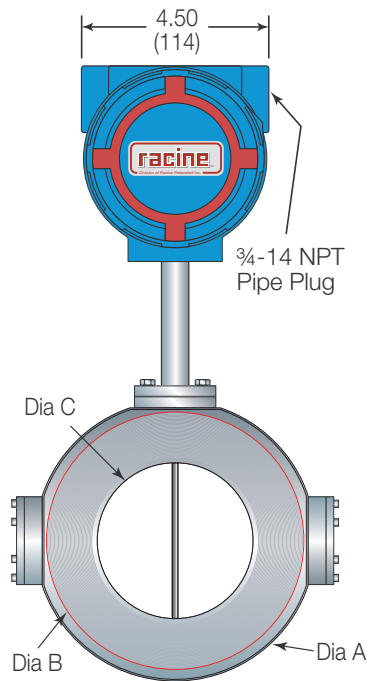
³ Includes 1/4" NPT port (plugged) for external pressure sensor

⁴ Meter also accepts a 4-20 mA signal from an external pressure sensor (not included)

Dimensional Drawings

Inches (mm)

Inches (mm)							
Model	Meter Size	Dia. A	Dia. B	Dia. C	Dim. D	Dim. E	Bolt Circle
RWS05	1/2" (12.7)	2.86 × 2.86 (Square) (72.6) × (72.6)	1.375 (34.9)	0.5 (12.7)	8.68 (220.4)	2.25 (57.1)	2.375 (60.32)
RWS10	1" (25.4)	3.97 (100.8)	2.0 (50.8)	0.875 (22.2)	8.79 (223.2)	2.25 (57.1)	3.125 (79.37)
RWS15	1 1/2" (38.09)	4.72 (119.8)	2.875 (73.0)	1.375 (34.9)	9.25 (235.0)	2.25 (57.1)	3.875 (98.42)
RWS20	2" (50.8)	4.0 (101.6)	3.15 (80)	1.75 (44.4)	8.93 (226.8)	2.25 (57.1)	—
RWS30	3" (76.19)	5.25 (133.3)	4.55 (115.5)	2.75 (68.8)	9.63 (244.6)	2.25 (57.1)	—
RWS40	4" (101.6)	6.75 (171.4)	6.19 (157.2)	3.75 (95.2)	10.45 (265.4)	2.25 (57.1)	—

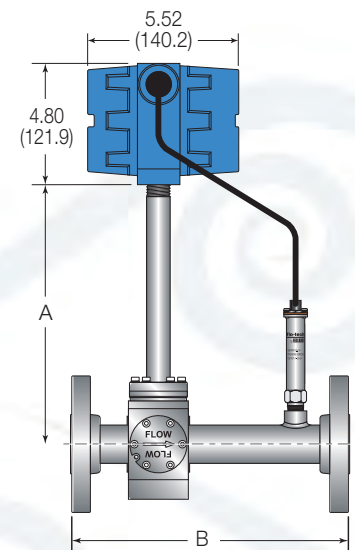


Flanged Series Meters*

Inches (mm)

SIZE	DIM A	DIM B
1/2" (13 mm)	RWS 05-F15 5.60 (142.1)	9.88 - 10.0 (250 - 254)
1" (25 mm)	RWS10-F15 5.78 (146.7)	9.88 - 10.0 (250 - 254)
1 1/2" (38 mm)	RWS15-F15 6.34 (160.9)	9.88 - 10.0 (250 - 254)
2" (51 mm)	RWS 20-F15 5.92 (150.2)	9.88 - 10.0 (250 - 254)
3" (76 mm)	RWS 30-F15 6.62 (168.0)	11.88 - 12.0 (301 - 304)
4" (102 mm)	RWS 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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