



# Coriolis Mass Flowmeters

Flow rate 68.04 to 6804 kg/min  
(150 to 15,000 lb/min)

## DESCRIPTION

The **m**<sup>®</sup> m400 provides accurate, continuous direct measurement of mass, density, temperature and percent solids over the flow range 68.0 to 6804 kg/min (150 to 15,000 lb/min).

## DESIGN FEATURES

### ACCURACY

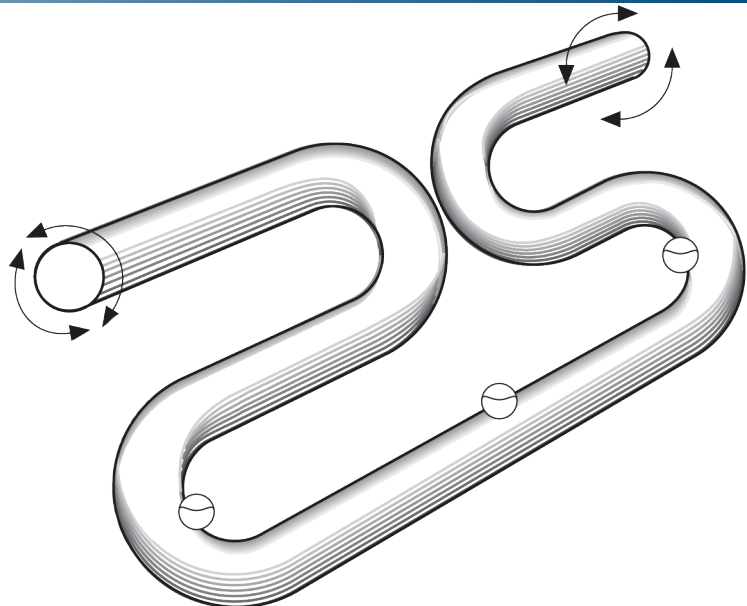
Patented dual omega-shaped tubes provide outstanding sensitivity to Coriolis forces. **m**<sup>®</sup> mass flow accuracy is  $\pm 0.10\%$  and the mass flow rate repeatability is  $\pm 0.10\%$ . Its density accuracy is  $\pm 0.008$  g/cc over its operating range.

### LOW PRESSURE DROP AND 100:1 TURNDOWN

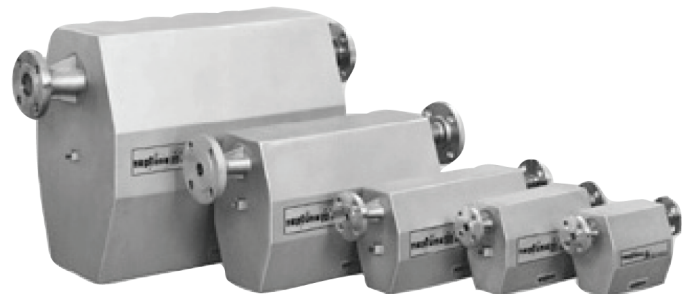
The **m**<sup>®</sup> transducer is more sensitive to Coriolis forces than conventional mass flowmeters, providing a greater mechanical gain. Fluid velocity requirements are much lower to produce a given signal. This results in a lower pressure drop and unequaled 100:1 turndown. Therefore, accuracy never has to be compromised to obtain an acceptable pressure drop.

### RELIABILITY

The smooth-bore, non-obtrusive flow path is free from moving parts, seals and bellows. The omega shapes produce torsional loading instead of bending loading or improved reliability.



ISO 9001 Certified Manufacturing Facility



- Direct mass, density and temperature measurement
- Patented omega-shaped flowtubes provide unequaled sensitivity to Coriolis force
- Wide 100:1 turndown
- Lowest pressure drop
- Smooth-bore, non-obtrusive flow path free from moving parts
- 6804 kg/min (15,000 lb/min) capacity
- Ideal for liquid sugar, viscous fluids, caustic liquors, lime slurries, desulfurization slurries, kiln feeds, lube oil blending, bulk loading/unloading

## MATERIALS OF CONSTRUCTION

Wetted parts: 316L stainless steel  
 Sensor housing: 304L stainless steel

## ELECTRONICS

DATAMATE 2200™ Mass Flow Computer:  
 (Complete information is available in  
 Technical Specification No. TS-612)

NexGen® SFT100 Mass Flow Transmitter:  
 (Complete information is available in  
 Technical Specification No. TS-620)

NexGen® SFT200 Mass Flow Transmitter:  
 (Complete information is available in  
 Technical specification No. TS-621)

## HAZARDOUS AREA CLASSIFICATION TABLE

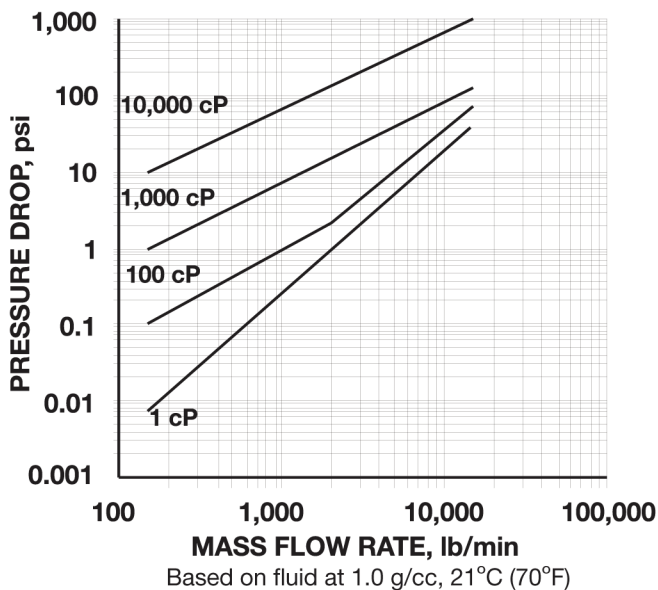
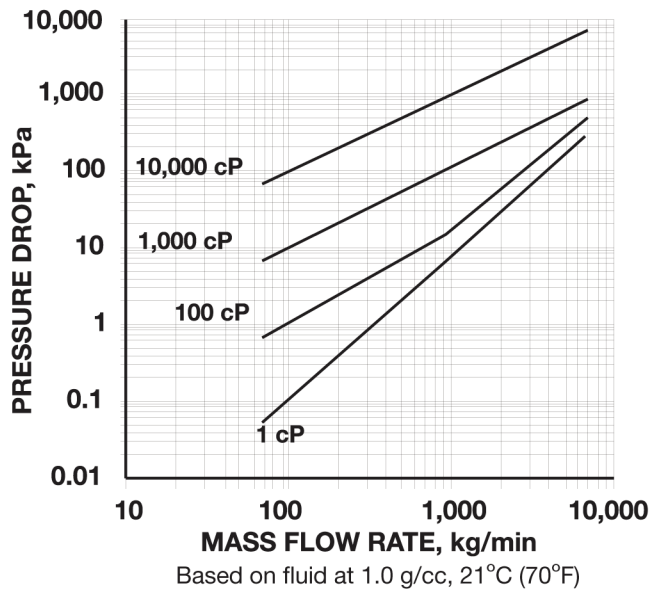
Agency	Components	Method	Class	Div/ Zone	Group	Temp. Class	Ambient Temp.
CSA	Transducer	Intrinsic Safety	I, II, III	1, 2	C, D, E, F, G	T5	Note 1
	Datamate 2200	Non-incendive	I	2	A, B, C, D	T3C	Note 5
	NexGen	Explosion Proof	I, II, III	1	C, D, E, F, G	T6	Note 2
		Non-incendive	I	2	A, B, C, D	T4	Note 2
LCIE	Transducer	EX ia		0, 1, 2	IIB	T5, T4, T2	Note 3
	Nexgen	EX id		1, 2	IIB	T6	Note 4

Note 1: -20°C to 40°C (-4°F to 104°F)  
 Note 2: -20°C to 65°C (-4°F to 149°F)  
 Note 3: T5 where ambient temperature is: -20°C to 40°C (-4°F to 104°F)  
 T4 where ambient temperature is: +40°C to +60°C (104°F to 140°F)  
 T2 where ambient temperature is: +60°C to +200°C (140°F to 392°F)  
 Note 4: -20°C to 65°C (-4°F to 149°F)  
 Note 5: +65°C ambient

## m400 OPERATING SPECIFICATIONS

METERING ELEMENT	
Connections: Connection type	ANSI: 4", 6", 8"; 150#, 300#, 600#, Raised Faced DIN: PN40, DN100, DN150, DN200
Meter: Tube material Tube shape Housing Hazardous area classification  Mass accuracy <sup>1</sup> Mass Repeatability Mass zero stability Turndown ratio Density range Density accuracy Density repeatability Temperature measurement Temperature accuracy Signal output	316L SST Omega 304L SST Transducer is intrinsically safe when connected to an approved mass flow computer (See table above for approval rating) ±0.10% of rate ± zero stability ±0.10% of rate ±0.7516 kg/min (0.0087 lb/min) 100:1 0.4 to 2.0 g/cc ±0.0008 g/cc ±0.0002 g/cc 100 ohm platinum resistance sensor 0.56°C (±1°F) 8-core shielded twisted pair
Fluid: Flow rate Max. temperature Min. temperature Max. operating pressure Max. pressure drop	6804 kg/min (15,000 lb/min) 204°C (400°F) -45°C (-50°F) 103 bar (1500 psi); limited by flange rating Less than 2.76 bar (40 psi) for water at 20°C (68°F) at 6804 kg/min (15,000 lb/min)
ASSOCIATED INSTRUMENT	
Max. Length of signal cable Electrical connections Manufacturer Meter model number Instrument model number	300m (1000ft.) 8 core Belden 89892 shielded twisted pair RSM, Inc. m400-XXXX Refer to electronics Technical Specification Form Datamate 2200: TS-612 NexGen SFT100: TS-620 NexGen SFT200: TS-621
<sup>1</sup> All calibration equipment traceable to N.I.S.T.	

# PRESSURE DROP VERSUS FLOW RATE



## DETERMINING PRESSURE DROP

1. Flow rate vs. pressure drop varies with viscosity. To approximate m400 pressure drop for fluids with viscosity approximating that of water, locate the point on the 1-cP curve corresponding with your desired flow rate.
2. From that point, locate the nearest horizontal line and follow it to the vertical scale on the left, which indicates pressure drop for the flow rate you selected.
3. Divide the pressure drop indicated on the graph by the specific gravity (S) of the process fluid:  

$$\Delta P_{\text{actual}} = \Delta P_{\text{plotted}} / \text{Sp. gr.}$$

## CALCULATING ACTUAL ACCURACY

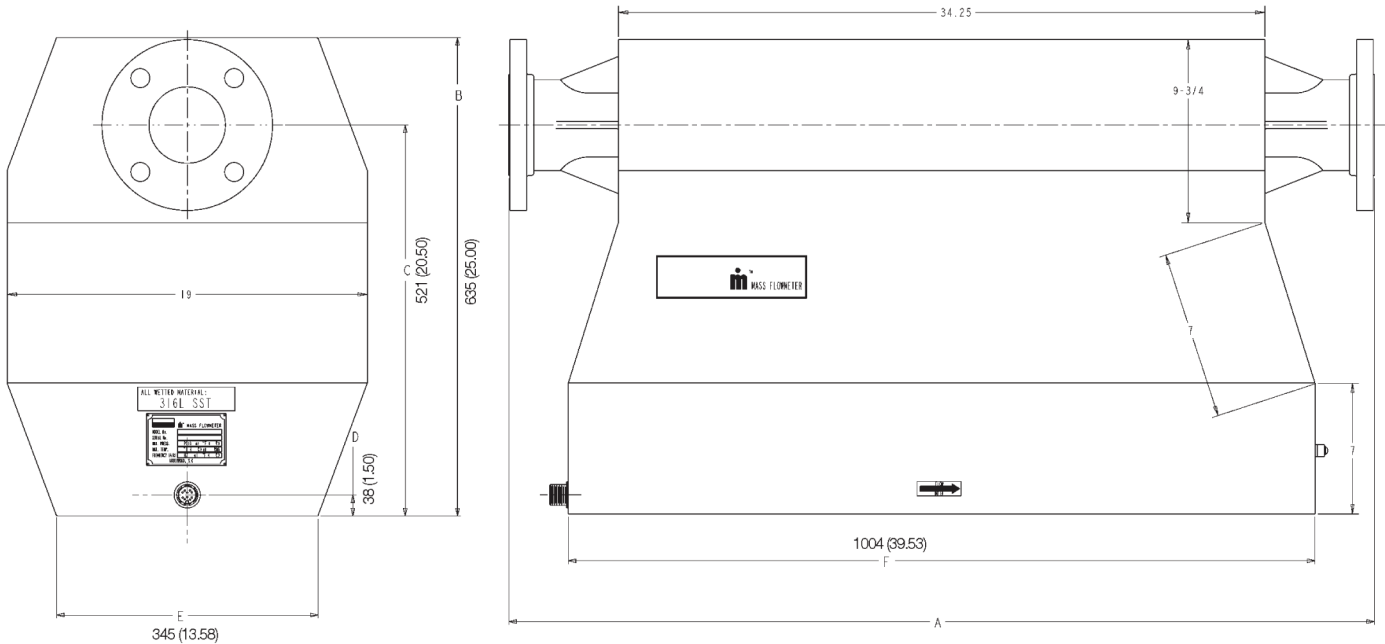
Use the following formula to calculate accuracy for your selected flow rate:

$$\% \text{ accuracy, } \pm_{\text{actual}} = \{[(0.0010 \text{ m}) + S_0]/\text{m}\} \times 100\%$$

where:

- m = mass flow rate, kg/min or lb/min  
 S<sub>0</sub> = mass zero stability, kg/min or lb/min for the m400 flowmeter

# DIMENSIONAL DATA, mm (in.)



DIMENSIONS <sup>1</sup>									
ANSI	4"	4"	4"	6"	6"	6"	8"	8"	8"
FLANGES	150#	300#	600#	150#	300#	600#	150#	300#	600#
DIN	DN100,			DN150,			DN200,		
FLANGES	PN40			PN40			PN40		
OVERALL	1178	1178	1257	1178	1178	1257	1178	1178	1257
LENGTH, "A"	(46.38)	(46.38)	(49.50)	(46.38)	(46.38)	(49.50)	(46.38)	(46.38)	(49.50)

<sup>1</sup>Dimensions shown are for 316L SST Flowmeter.

## WEIGHTS OF COMPONENTS

- Transducer: approx. shipping wt. 163.2 kg (360 lbs), depending on flanges
- Datamate 2200: approx. 5.2 kg (11.5 lbs)
- NexGen SFT100:
  - Blind approx. 6.4 kg (14.1 lbs)
  - w/Display/keypad approx. 7.1 kg (15.6 lbs)
- NexGen SFT200: approx. 1.8 kg (4 lbs)

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