

CORIOLIS METER K-FACTOR CALCULATION

Coriolis flowmeters do not have a fixed K-factor (number of pulses output per unit of flow). The number of pulses output per unit of flow (e.g. pulses per barrel) from a Coriolis meter is instead an adjustable parameter that can be set to any desired value within the range of the meter pulse output channel(s) up to the maximum of the field device to which the transmitter is connected. API MPMS Chapter 5.6 Measurement of Liquid Hydrocarbons by Coriolis Meters defines a pulse scaling factor (PSF) as the number of pulses output by a Coriolis meter per unit of flow. In this way, a Coriolis meter PSF is similar to a mechanical meter's K-factor, but with the additional value of being adjustable.

Micro Motion® Series 1000, 2000 and 3000 Series transmitters have a maximum frequency output of 10,000 Hz or 10,000 pulses per second. Many field device pulse input specifications have a similar maximum pulse input rate of 10,000 Hz. For field devices with a maximum number of pulses less than 10,000 per second, the number of pulses output by the Coriolis flowmeter per unit flow can be adjusted to meet the field device requirements. These maximum frequency limitations determine a maximum PSF value per an equation below.



Micro Motion® Series 1000 transmitters

CORIOLIS METER K-FACTOR

$$\text{Max. PSF} = (10,000 \times 3600) / \text{Max. Rate}$$

Where:

- Max. PSF = maximum PSF in pulses per unit mass or volume to prevent exceeding 10,000 Hz
- 10,000 = maximum frequency output in Hz
- 3600 = conversion factor for seconds from hours**
- Max. Rate = maximum flow rate in barrels or lbs per hour

The equation above can be rearranged to determine the output frequency at a given flow rate.

$$\text{Freq} = (\text{Max. Rate} / 3600) \times \text{PSF}$$

Where:

- Freq = frequency output in Hz
- Max. Rate = maximum flow rate in barrels or lbs per hour
- 3600 = conversion factor for seconds from hours**
- PSF = pulse scaling factor in pulses per unit mass or volume

** Time conversion will be different if operating in unit of flow per minute or unit of flow per day. For flow per minute use 60 as the conversion factor. For flow per day, use 86400 as the conversion factor.



Micro Motion® Series 2000 transmitters



Micro Motion® Series 3000 transmitters



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