



## Turbine Flow Meter

### B16N Series FloClean Tri-Clover End Fitting

#### DESCRIPTION

The B16N Series FloClean Tri-Clover turbine flow meter was developed for pre-process food and beverage applications that require high accuracy without 3-A approval. The 316L stainless steel construction provides a durable and cost efficient flow measurement system that offers excellent accuracy and repeatability.

FloClean B16N Series meters have removable thrust bearings for ease of cleaning and inspection.

The FloClean output signal is a sine-wave that is proportional to volumetric flow. With optional Blancett electronics, FloClean provides local flow rate and volume totalization and interfaces with most displays, PLCs and computers.



#### INSTALLATION

Install the flow meter with the flow arrow, which is etched on the exterior of the meter body, pointing in the direction of fluid flow. Install the meter horizontally with the magnetic pickup facing upward. For optimum performance, the flow meter should be installed with a minimum of 10 diameters upstream straight pipe length and 5 diameters downstream straight pipe length.

#### REPAIR KITS

Factory calibrated replacement kits are available for field or factory service. Both of the FloClean models are designed to allow for quick, easy disassembly and replacement of internal components. The repair kit contains two retaining rings, two rotor supports, one rotor assembly and a K-factor tag.

## OPERATING PRINCIPLE

Fluid entering the meter first passes through an inlet flow straightener that reduces its turbulent flow pattern. Fluid then passes through the turbine, causing the turbine to rotate at a speed proportional to fluid velocity. As each turbine blade passes through the magnetic field generated by the meter's magnetic pickup, an AC voltage pulse is generated. These pulses provide an output frequency that is proportional to volumetric flow.

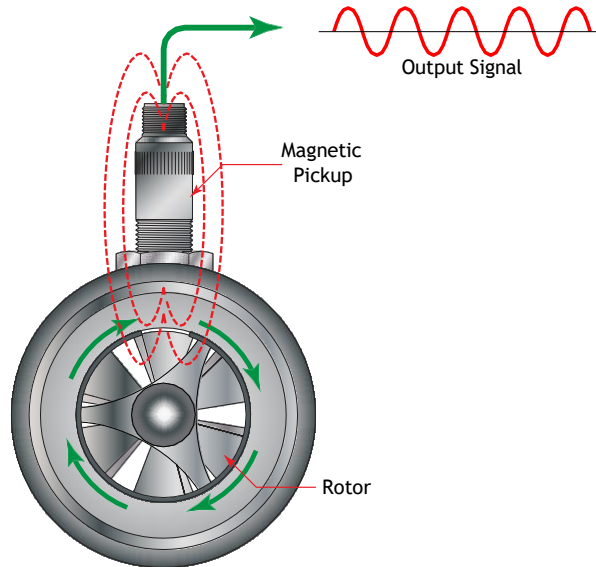


Figure 1: B142 turbine flow meter

## K-FACTOR

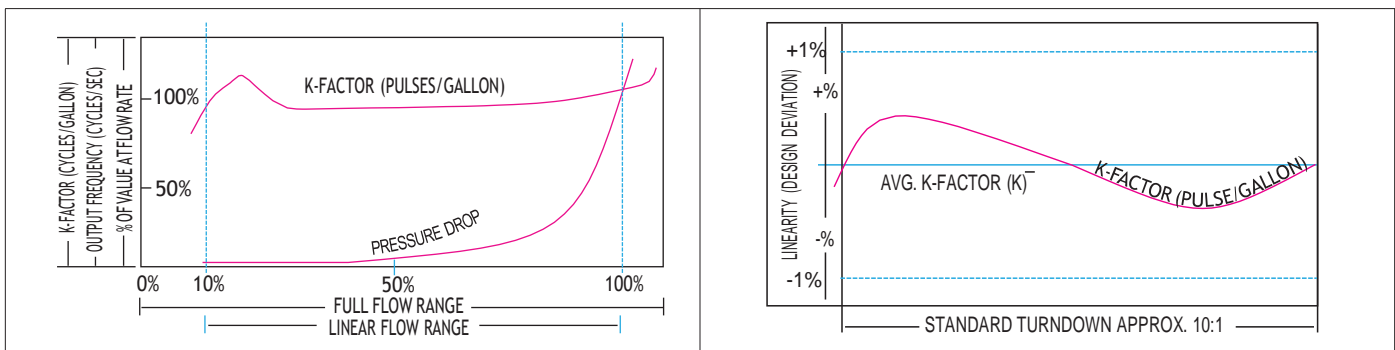
The K-factor represents the number of output pulses transmitted per gallon of fluid passing through the turbine meter. Each turbine has a unique K-factor. However, turbine meters are not functionally consistent throughout the full flow range of the meter.

There are several forms of friction inherent in turbine meters that slow down the rotational movement of the turbine rotor. These frictional forces include: magnetic drag, created by electromagnetic force of pickup transducers; mechanical drag, due to bearing friction; and viscous drag, produced by flowing fluid.

See charts below.

As flow increases, the frictional forces are minimized and the free-wheeling motion of the turbine rotor becomes more linear (proportional to flow). The K-factor becomes relatively constant and linear throughout the balance of the linear flow range. This is approximately a 10:1 turndown ratio from the maximum flow rate down to the minimum flow rate.

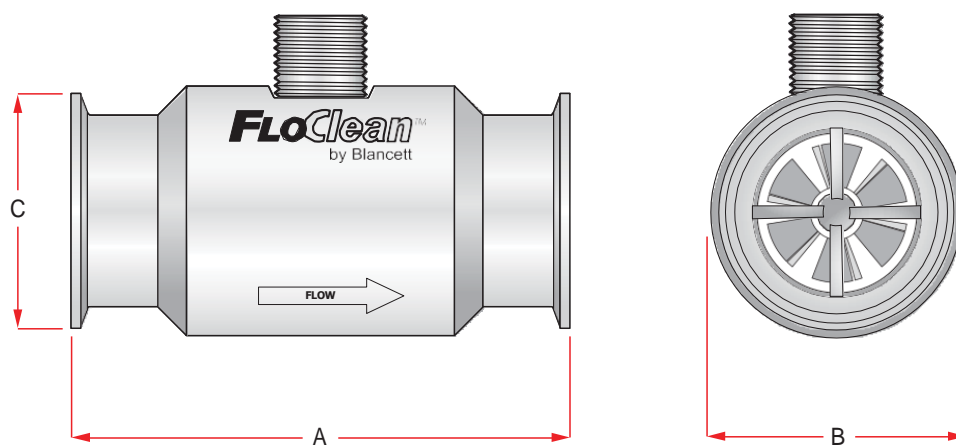
## Typical K-factor Curve (Pulse per US Gallon)



## SPECIFICATIONS

<b>Materials of Construction</b>	<b>Body</b>	316L stainless steel
	<b>Rotor</b>	Nickel plated CD4MCU stainless steel
	<b>Bearings</b>	Standard-nickle bindery tungsten carbide
	<b>Rotor Shaft</b>	Nickel bindery tungsten carbide
	<b>Rotor Support</b>	—
<b>Operating Temperature</b>	-150...300° F (-100...149° C)	
<b>Pressure Rating</b>	1,000 psi (Rating based on tri-clamp sanitary connection)	
<b>End Connections</b>	Tri-clover end fittings	
<b>Turndown Ratio</b>	—	
<b>Accuracy</b>	±1.0% of reading	
<b>Repeatability</b>	±0.1%	
<b>Calibration</b>	Water (NIST traceable calibration)	
<b>Mag Pickup</b>	NEMA 6; -150...300° F (-100...149° C)	
<b>Certifications</b>	—	

## DIMENSIONS



Part Number	Part Number Code	A End to End Length	B Diameter	C Ferrule Size
B16N-0XXA-XXX	003 005 007	3.00 in. (76.2 mm)	1.46 in. (37.1 mm)	0.984 in. (25.0 mm)
B16N-1XXA-XXX	105 107 108 110	4.00 in. (101.6 mm)	2.00 in. (50.8 mm)	1.984 in. (50.4 mm)
B16N-1XXA-XXX <sup>1</sup>	115 1	6.25 in. (158.8 mm)	2.33 in. (59.2 mm)	1.984 in. (50.4 mm)
B16N-2XXA-XXX	220	6.50 in. (165.1 mm)	3.20 in. (81.3 mm)	3.047 in. (77.4 mm)

<sup>1</sup> 15.0...180.0 gpm flow range only.

## PART NUMBER INFORMATION

Part Number Code	Bore Size in. (mm)	End Connections	Max PSI	Flow Rate			Strainer Mesh	Approx. K-Factor Pulse/US Gal	Meter Weight (lb)	End to End Length in. (mm)	Ferrule Size in. (mm)
				gpm (lpm)	bpd	m3/d					
003	3/8 (9.53)	0.984 in. (24.99 mm)	1000	0.60...3.00 (2.27...11.36)	20.57...102.86	3.27...16.35	—	20,000	—	3.00 (76.20)	0.984 (24.99)
005	1/2 (12.70)	0.984 in. (24.99 mm)	1000	0.75...7.50 (2.84...28.39)	21.71...257.14	4.09...40.88	—	13,000	—	3.00 (76.20)	0.984 (24.99)
007	3/4 (19.05)	0.984 in. (24.99 mm)	1000	2.00...15.00 (7.57...56.78)	68.57...514.29	10.90...81.76	—	2750	—	3.00 (76.20)	0.984 (24.99)
105	1/2 (12.70)	1.984 in. (50.39 mm)	1000	0.75...7.50 (2.84...28.39)	21.71...257.14	4.09...40.88	—	13,000	—	4.00 (101.60)	1.984 (50.39)
107	3/4 (19.05)	1.984 in. (50.39 mm)	1000	2.00...15.00 (7.57...56.78)	68.57...514.29	10.90...81.76	—	2750	—	4.00 (101.60)	1.984 (50.39)
108	7/8 (22.23)	1.984 in. (50.39 mm)	1000	3.00...30.00 (11.36...113.56)	102.86...1028.57	16.35...163.53	—	2686	—	4.00 (101.60)	1.984 (50.39)
110	1 (25.40)	1.984 in. (50.39 mm)	1000	5.00...50.00 (18.93...189.27)	171.43...1714.29	27.25...272.55	—	870	—	4.00 (101.60)	1.984 (50.39)
115	1-1/2 (38.10)	1.984 in. (50.39 mm)	1000	15.00...180.00 (56.78...681.37)	514.29...6171.43	81.76...981.18	—	330	—	6.25 (158.75)	1.984 (50.39)
220	2 (50.80)	3.047 in. (77.39 mm)	1000	40.00...400.00 (151.42...1514.16)	1371.43...13714.29	218.04...2180.40	—	52	—	6.50 (165.10)	3.047 (77.39)

## Repair Kits

Bore Size	Ferrule Size	Repair Kit Fits Meter Part Number	Part Number Code	Repair Kit Part Number
3/8 in. (9.53 mm)	0.984 in. (24.99 mm)	B16N-003A-XXX	003	B16C-K03A
1/2 in. (12.70 mm)	0.984 in. (24.99 mm)	B16N-005A-XXX	005	B16C-K05A
3/4 in. (19.05 mm)	0.984 in. (24.99 mm)	B16N-007A-XXX	007	B16C-K07A
1/2 in. (12.70 mm)	1.984 in. (50.39 mm)	B16N-105A-XXX	105	B16C-K05A
3/4 in. (19.05 mm)	1.984 in. (50.39 mm)	B16N-107A-XXX	107	B16C-K07A
7/8 in. (22.23 mm)	1.984 in. (50.39 mm)	B16N-108A-XXX	108	B16C-K08A
1 in. (25.40 mm)	1.984 in. (50.39 mm)	B16N-110A-XXX	110	B16C-K10A
1-1/2 in. (38.10 mm)	1.984 in. (50.39 mm)	B16N-115A-XXX	115	B16C-K15A
2 in. (50.80 mm)	3.047 in. (77.39 mm)	B16N-220A-XXX	220	B16C-K20A

**PART NUMBERING CONSTRUCTION**

**FloClean**

**Tri-clover End Fitting**



**FERRULE & METER SIZE**

Ferrule: 0.984 in.   3/4 in. Clamp x 3/8 in. Bore	003
Ferrule: 0.984 in.   3/4 in. Clamp x 1/2 in. Bore	005
Ferrule: 0.984 in.   3/4 in. Clamp x 3/4 in. Bore	007
Ferrule: 1.984 in.   1-1/2 in. Clamp x 1/2 in. Bore	105
Ferrule: 1.984 in.   1-1/2 in. Clamp x 3/4 in. Bore	107
Ferrule: 1.984 in.   1-1/2 in. Clamp x 7/8 in. Bore	108
Ferrule: 1.984 in.   1-1/2 in. Clamp x 1 in. Bore	110
Ferrule: 1.984 in.   1-1/2 in. Clamp x 1-1/2 in. Bore	115
Ferrule: 3.047 in.   2-1/2 in. Clamp x 2 in. Bore	220

**BEARING**

Nickel Bindery; Tungsten Carbide	A
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**PICKUP**

Magnetic   <i>NEMA 6</i>	0
Magnetic with Pre-Amplifier   <i>NEMA 6</i>	1
<sup>1</sup> Magnetic   <i>Standard</i>	2
<sup>1</sup> Magnetic with Pre-Amplifier   <i>Standard</i>	3
<sup>1</sup> Magnetic with F/I Converter (Active 4...20 mA Output)	4
<sup>1</sup> Magnetic   <i>High Temperature (-450...450° F/-268...232° C)</i>	6
Magnetic with Pre-Amplifier   <i>NEMA 6 (Less Zenor)</i>	7
<sup>1</sup> Magnetic with F/V Converter (Active 0...5V DC Output)	8
No Pickup	9

**METER BODY HUB**

With Hub   1/2 in. Hub for Ferrule Size 0.984; 1 in. Hub for 1.984 in. and 3.047 in	A
No Hub	B

**CALIBRATION**

5-Point   <i>Standard</i>	A
10-Point	B
20-Point	C

<sup>1</sup> For Indoor Use Only

Example Part Number: B16N-110A-2AA

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