Turbine Flow Meter

Model BP1100 Flanged Connections

DESCRIPTION

The Model BP1100 turbine flow meter is designed to withstand the demands of the most rigorous flow measurement applications. Originally developed for the secondary oil recovery market, the Model BP1100 flow meter is an ideal meter for liquid flow measurement on or off the oil field.

The meter features a rugged 316 stainless steel housing and rotor support assemblies, 304 stainless steel flanges CD4MCU stainless steel rotor, and abrasive-resistant tungsten carbide rotor shaft and journal bearings. The Model BP1100 meter maintains measurement accuracy and mechanical integrity in the corrosive and abrasive fluids commonly found in oil field water flood projects and many industrial applications.

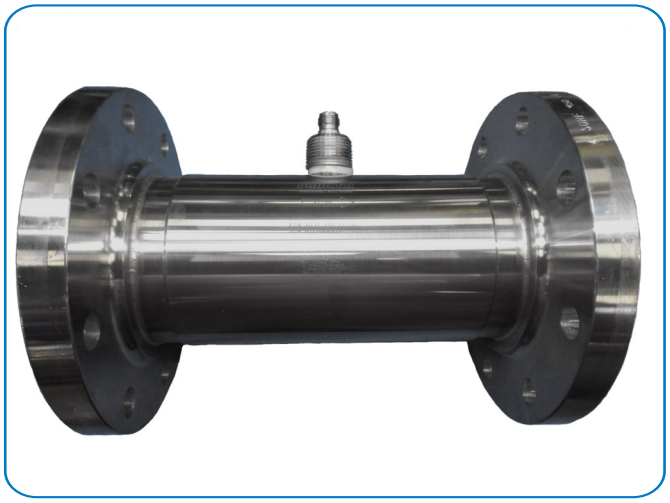
When paired with a Pembina Controls flow monitor, the Model BP1100 turbine meter meets a wide range of measurement requirements. This makes it ideal for applications such as pipelines, production/injection fields, mining operations, offshore facilities, and other industrial applications. For a full list of Pembina flow monitors, see *www.pem-controls.com.*

FEATURES

- Cost-effective solution for turbine flow meter applications
- Rugged 316 stainless steel body and 304 stainless steel flange construction offers long service life in severe operating environments
- Flange end connections
- NIST traceable calibration
- Installation in pipe sizes from 1…10 in.
- Can integrate electronically with a Pembina Controls flow monitor
- K-factor Scaler, or the F to I/F to V Intelligent Converter Field replaceable repair kits allow for turbine replacement without loss of accuracy

INSTALLATION

The Model BP1100 turbine meter is simple to install and service. It operates in any orientation (horizontal to vertical) as long as the "flow direction" arrow is aligned in the same direction as the actual line flow. 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.



OPERATING PRINCIPLE

Fluid entering the meter passes through the inlet flow straightener that reduces its turbulent flow pattern and improves the fluid's velocity profile. Fluid then passes through the turbine, causing it to rotate at a speed proportional to fluid velocity. As each turbine blade passes through the magnetic field at the base of the transducer, an AC voltage pulse is generated in the pickup coil. These pulses produce an output frequency proportional to the volumetric flow through the meter.

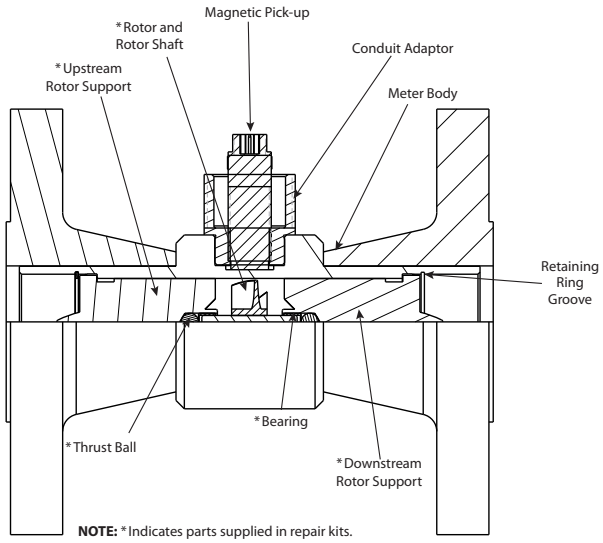


Figure 1: Meter components

Product Data Sheet

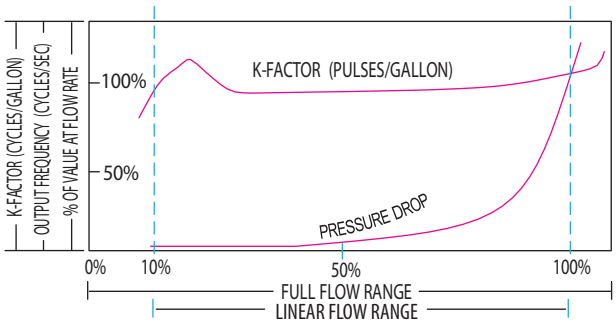
K-FACTOR

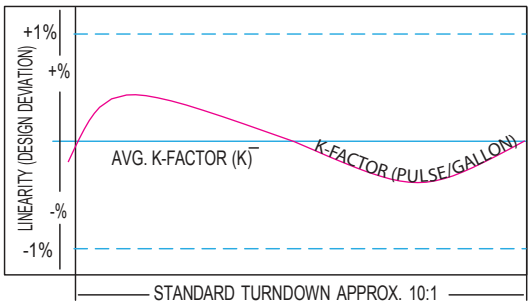
The K-factor represents the number of output pulses transmitted per gallon of fluid passing through the turbine meter. Each turbine has a unique K-factor. However, turbine meters are not functionally consistent throughout the full flow range of the meter.

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

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 the 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

Construction Materials	**Body**	316 stainless steel
	Rotor	CD4MCU stainless steel
	Rotor Support	316 stainless steel
	Rotor Shaft	Tungsten carbide
	Flanges	304 stainless steel
Turndown Ratio	10:1	
Flow Accuracy	± 1.0% of reading	
Repeatability	±0.1%	
Calibration	Water (NIST traceable calibration)	
Pressure Rating	See pressure rating table below	
Turbine Temperature	–150…350° F (–101…177° C)	
Flange End Connections	150, 300, 600, 900, 1500; PN 40	
Certifications (see NOTE below)	CSA Class I Div 1, Groups C & D Class II Div 1, Groups E, F & G: intrinsically safe*	
	CSA Class I Div 1, Groups C & D; complies with UL 1203 and CSA 22.2 No. 30	
	Met Labs File No. E112860 (for explosion-proof models only)	

* Contact factory for ordering options

Note: Certifications do not apply to DIN flange models.

Pressure Rating

The pressure rating of the meter is dependent upon the class of ANSI flanges between which the meter is to be mounted. The pressure rating chart below is based on Stainless Steel at 100° F (37.8° C).

Flange Class (ANSI)	**150#**	**300#**	**600#**	**900#**	**1500#**
Working Pressure (psi)	275	720	1440	2160	3600
Working Pressure (MPa)	1.90	4.96	9.93	14.89	24.82

PART NUMBER CONSTRUCTION

Model BP1100 Turbine Flow Meters with 304 SS Flange

Connections

BP xxx-xxx - F

Insert Flow Meter Part Number

Flange Size

A	1″	DN 25
B	1½″	DN 40
C	2″	DN 50
D	3″	DN 80
E	4″	DN 100
F	6″	DN 150
G	8″	DN 200
H	10″	DN 250

Flange Rating

A	150#
B	300#
C	600#
D	900#
E	1500#
K	PN 40

Flange Type

A	Raised Face
D	Din Flange

A

Part Number	Meter Size	Bore Size	Flow Ranges			Strainer	Approx. K-factor	Meter Weight (lb)	End-to-End Length
			GPM (LPM)	BPD	M^3/D	Mesh	Pulse/Gal		
BP111-110	1 in.	1 in. (25.4 mm)	5…50 (18.9…189.3)	170…1700	27.25…272.5	40	870	8…20	6 in. (152.4 mm)
BP111-115	1-1/2 in.	1-1/2 in. (38.1 mm)	15…180 (56.8…681.4)	515…6000	82…981	20	330	12…32	7 in. (177.8 mm)
BP111-121	2 in. LF	1-1/2 in. (38.1 mm)	15…180 (56.8…681.4)	515…6000	82…981	20	330	15…55	7 in. (177.8 mm)
BP111-120	2 in.	2 in. (50.8 mm)	40…400 (151.4…1514.2)	1300…13000	218…2180	20	52	18…58	8.5 in. (215.9 mm)
BP111-130	3 in.	3 in. (76.2 mm)	60…600 (227.1…2271.2)	2100…21000	327…3270	10	57	30…108	10 in. (254.0 mm)
BP111-140	4 in.	4 in. (101.6 mm)	100…1200 (378.5…4542.5)	3400…41000	545…6540	10	29	43…163	12 in. (304.8 mm)
BP111-160	6 in.	6 in. (152.4 mm)	200…2500 (757.1…9463.5)	6800…86000	1090…13626	4	7	89…380	12 in. (304.8 mm)
BP111-180	8 in.	8 in. (203.2 mm)	350…3500 (1324.9…13248.9)	12000…120,000	1363…19076	4	3	127…587	12 in. (304.8 mm)
BP111-200	10 in.	10 in. (254 mm)	500…5000 (1892.7…18927.1)	17000…171,000	2725…27252	4	1.6	172…958	12 in. (304.8 mm)

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