

### DESCRIPTION

The Model 1100 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 1100 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 1100 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.

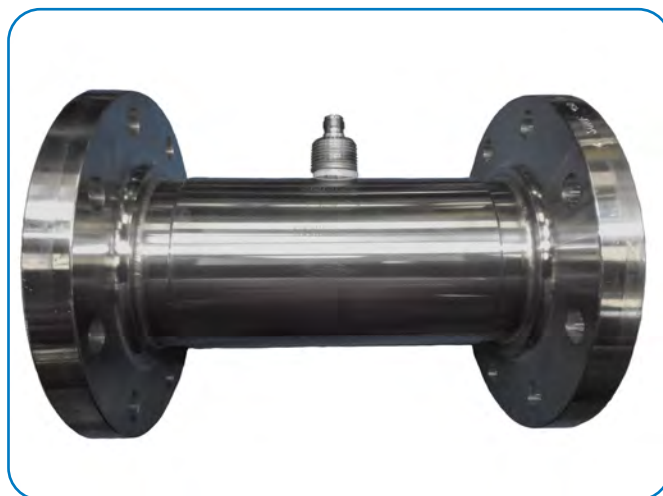
When paired with a Blancett flow monitor, the Model 1100 turbine meter meets a wide range of measurement requirements. This makes it ideal for applications such as pipelines, production/injection fields, mining operations, offshore facilities, and other industrial applications.

### FEATURES

- Offers accurate and repeatable flow measurement in ranges from 5...5000 gpm (170...170,000 bpd)
- 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 Blancett 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 1100 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.

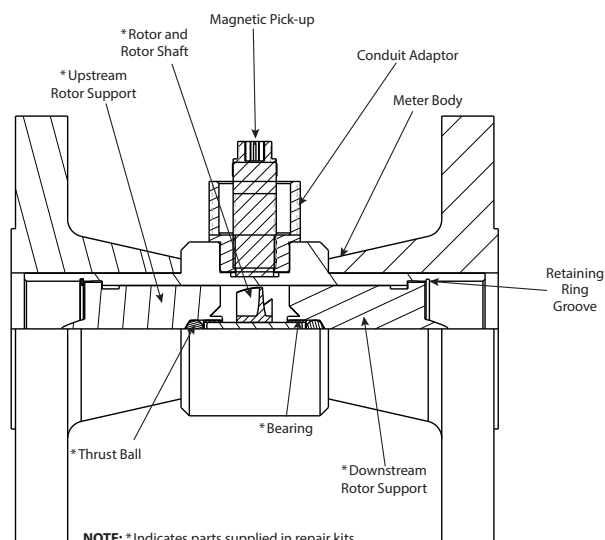


Figure 1: Meter components

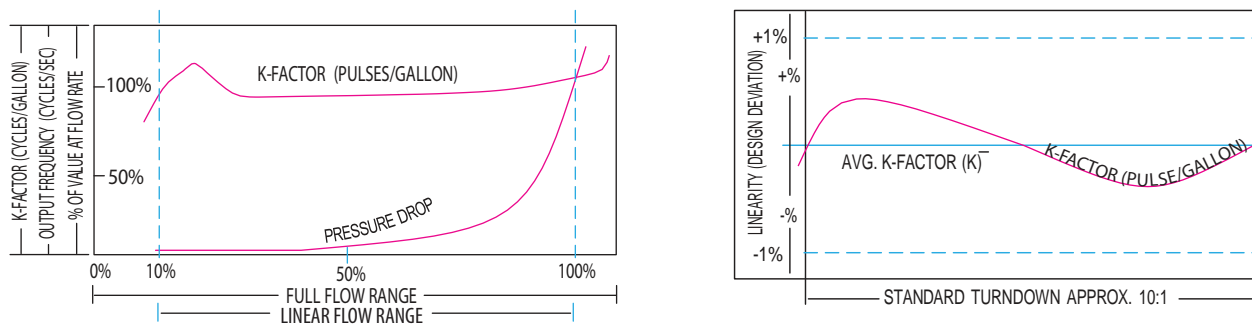
## K-FACTOR

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

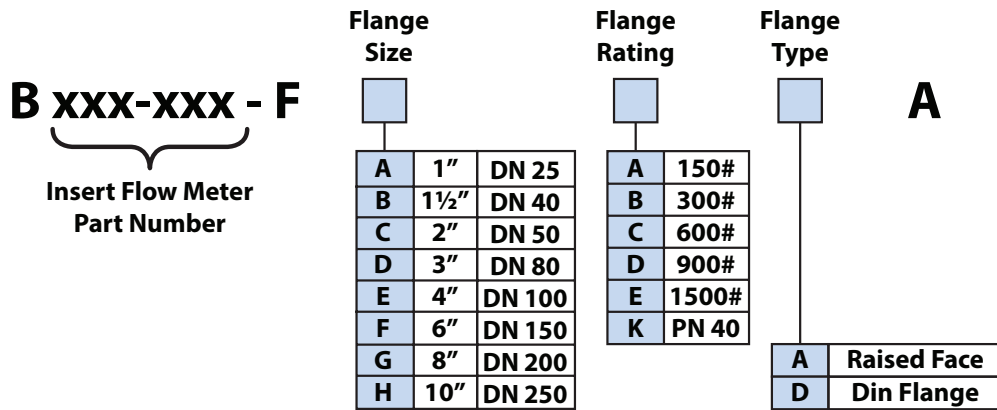
|   |   |                        |
|---|---|------------------------|
| <b>Construction Materials</b>             | <b>Body</b>   | 316 stainless steel    |
|   | <b>Rotor</b>  | CD4MCU stainless steel |
|   | <b>Rotor Support</b>  | 316 stainless steel    |
|   | <b>Rotor Shaft</b>  | Tungsten carbide       |
|   | <b>Flanges</b>  | 304 stainless steel    |
| <b>Turndown Ratio</b>                     | 10:1  |                        |
| <b>Flow Accuracy</b>                      | ±1% of reading  |                        |
| <b>Repeatability</b>                      | ±0.1%   |                        |
| <b>Calibration</b>                        | Water (NIST traceable calibration)  |                        |
| <b>Pressure Rating</b>                    | 5000 psi max.   |                        |
| <b>Turbine Temperature</b>                | -150...350° F (-101...177° C)   |                        |
| <b>Flange End Connections</b>             | 150, 300, 600, 900, 1500; PN 40   |                        |
| <b>Certifications</b><br>(see NOTE below) | CSA Class I Div 1, Groups C & D<br>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.

## PART NUMBER CONSTRUCTION

## Model 1100 Turbine Flow Meters with 304 SS Flange Connections



| Part Number | Meter Size | Bore Size              | Flow Ranges                      |                 |               | Strainer | Approx. K-factor | Meter Weight (lb) | End-to-End Length     |
|-------------|------------|------------------------|----------------------------------|-----------------|---------------|----------|------------------|-------------------|-----------------------|
|             |            |                        | GPM (LPM)                        | BPD             | M³/D          | Mesh     | Pulse/Gal        |                   |                       |
| B111-110    | 1 in.      | 1 in.<br>(25.4 mm)     | 5...50<br>(18.9...189.3)         | 170...1700      | 27.25...272.5 | 40       | 870              | 8...20            | 6 in.<br>(152.4 mm)   |
| B111-115    | 1-1/2 in.  | 1-1/2 in.<br>(38.1 mm) | 15...180<br>(56.8...681.4)       | 515...6000      | 82...981      | 20       | 330              | 12...32           | 7 in.<br>(177.8 mm)   |
| B111-121    | 2 in. LF   | 1-1/2 in.<br>(38.1 mm) | 15...180<br>(56.8...681.4)       | 515...6000      | 82...981      | 20       | 330              | 15...55           | 7 in.<br>(177.8 mm)   |
| B111-120    | 2 in.      | 2 in.<br>(50.8 mm)     | 40...400<br>(151.4...1514.2)     | 1300...13000    | 218...2180    | 20       | 52               | 18...58           | 8.5 in.<br>(215.9 mm) |
| B111-130    | 3 in.      | 3 in.<br>(76.2 mm)     | 60...600<br>(227.1...2271.2)     | 2100...21000    | 327...3270    | 10       | 57               | 30...108          | 10 in.<br>(254.0 mm)  |
| B111-140    | 4 in.      | 4 in.<br>(101.6 mm)    | 100...1200<br>(378.5...4542.5)   | 3400...41000    | 545...6540    | 10       | 29               | 43...163          | 12 in.<br>(304.8 mm)  |
| B111-160    | 6 in.      | 6 in.<br>(152.4 mm)    | 200...2500<br>(757.1...9463.5)   | 6800...86000    | 1090...13626  | 4        | 7                | 89...380          | 12 in.<br>(304.8 mm)  |
| B111-180    | 8 in.      | 8 in.<br>(203.2 mm)    | 350...3500<br>(1324.9...13248.9) | 12000...120,000 | 1363...19076  | 4        | 3                | 127...587         | 12 in.<br>(304.8 mm)  |
| B111-200    | 10 in.     | 10 in.<br>(254 mm)     | 500...5000<br>(1892.7...18927.1) | 17000...171,000 | 2725...27252  | 4        | 1.6              | 172...958         | 12 in.<br>(304.8 mm)  |

**NOTE:** If the meter repair kit part number ends in NCC (no calibration), it was not factory calibrated. For these repair kits, use the nominal K factor supplied.

## REPAIR KIT PART NUMBER INFORMATION

| Flow Meter Size          | Replacement Kit Fits Meter Part Number | Repair Kit Part Number |
|--------------------------|--|------------------------|
| 3/8 in.                  | B110-375, B110-375-1/2                 | B251-102               |
| 1/2 in.                  | B110-500, B110-500-1/2                 | B251-105               |
| 3/4 in.                  | B110-750, B110-750-1/2                 | B251-108               |
| 7/8 in.                  | B110-875                               | B251-109               |
| 1 in.                    | B111-110                               | B251-112               |
| 1-1/2 in.                | B111-115                               | B251-116               |
| 2 in. Low                | B111-121                               | B251-116               |
| 2 in.                    | B111-120                               | B251-120               |
| 3 in.                    | B111-130                               | B251-131               |
| 4 in.                    | B111-140                               | B251-141               |
| 6 in.                    | B111-160                               | B251-161               |
| 8 in.                    | B111-180                               | B251-181               |
| 10 in.                   | B111-200                               | B251-200               |
| Standard Magnetic Pickup | All Meter Sizes                        | B111109                |

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