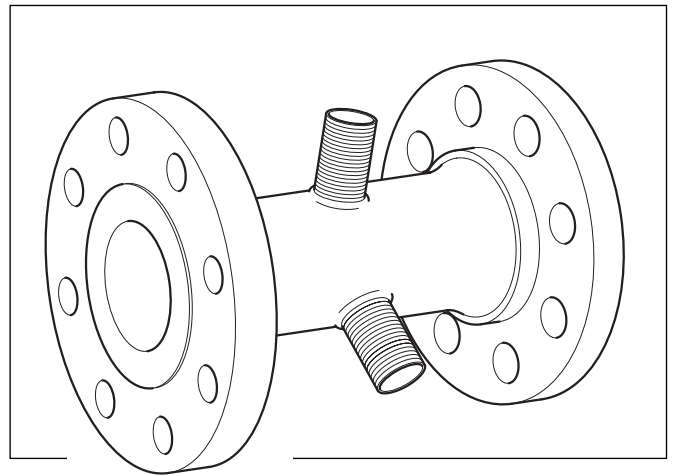


*Specification DataFile*

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- **Wide flow range**
  - up to 40:1
- **Intrinsically Safe and Flameproof versions available**
  - increases range of applications
- **Excellent linearity and repeatability**
  - meets fiscal metering standards
- **Linear frequency or analogue output**
  - ensures maximum system compatibility
- **Meters available in sizes 12 mm to 100 mm (1/2" to 4")**
  - for flow rates from 0.4 to 284m<sup>3</sup>/h (1.46 to 1043 gal/min)
- **Full chemical and mechanical material certification**
  - to NACE MR-01-75 with release to DIN 50049.3.1B as standard on meters 40 mm diameter and larger
- **Long life tungsten carbide bearings**
  - provide high reliability with minimal maintenance



*PTF meter – for guaranteed reliability and high accuracy in a turbine meter*

## Introduction

The new PTF meter offers exceptional flow range capability with good linearity and repeatability.

ABB Turbine Meters are in use throughout the world in many applications where high accuracy and guaranteed reliability are essential: critical metering on notable pipelines; in breweries; on offshore oil platforms; in refineries; on road tankers and in numerous process control applications.

## Principle of Operation

The basic construction of an ABB Turbine Meter is a bladed rotor suspended in the fluid stream with its axis of rotation parallel to the flow direction.

The rotor is driven by impingement of the liquid on the blades. Angular velocity is proportional to the fluid velocity, which in turn is proportional to the volumetric flow rate.

The rotation of the rotor is detected by a pick-off coil fitted to the outside of the meter housing. The output signal is a continuous train of voltage pulses of sinusoidal form, with each pulse representing a small discrete volume of liquid.

At the heart of the PTF Turbine Meter performance is the unique multistage hydraulic balancing of the rotor. The internal geometry of the meter causes the rotor's position relative to the upstream and downstream thrust faces to change with flowrate. The self-compensating action results in exceptional accuracy and rangeability.

Associated ABB secondary electronics instrumentation is available to provide a display of total volumetric flow, flowrate indication, preset batching, recording, etc.

## Specification

**Sizes** 12mm (1/2"); 20 mm (3/4"); 40 mm (1 1/2"); 50 mm (2") 80 mm (3"), 100 mm (4")

## Performance Data

Nom. Bore Size		Max. Linear Flow		Min. Linear Flow		Abs. Min. Flow	
mm	in	m <sup>3</sup> /h	lgpm	m <sup>3</sup> /h	lgpm	m <sup>3</sup> /h	lgpm
12	1/2	4	14.7	0.8	3.0	0.4	1.5
20	3/4	11	40.5	1.1	4.0	0.7	2.6
40	1 1/2	40	147	4.0	14.7	1.0	3.7
50	2	71	261	7.1	26.1	1.5	5.5
80	3	155	570	15.5	57.0	4.0	14.7
100	4	284	1044	28.4	104.4	10.0	36.6

### Note.

All 'Performance Data' apply to liquids of viscosity 5cSt or less and specific gravity 900kg/m<sup>3</sup> or greater.

Calibration is carried out on water (1 Centistoke). An increase in viscosity will tend to increase the minimum linear flow figure. For details of calibration at viscosities which differ from that of water, consultation with ABB is advised.

Low specific gravities also tend to increase the minimum linear flow figure.

Maximum Linear Flow –

is the normal max. continuous rating of the meter.

Minimum Linear Flow –

is the minimum flow at which the 'k' factor (pulses per unit volume) will be maintained within the specified limits.

Absolute Minimum Flow –

is the minimum detectable flowrate.

Repeatability –

Repeatability is the ability of the turbine meter to reproduce its output during consecutive proving runs under constant operating conditions within the normal linear flow range.

## Linearity

Maximum flow to linear minimum flow:

12 mm (1/2"), 20 mm (3/4"): ±0.5% of reading

Other sizes: ±0.25% of reading

('k' factor: pulses/unit volume)

Below linear minimum flow to absolute minimum flow:

12 mm size: ±0.1% full scale

All other sizes: ±0.05% full scale  
(see diagram opposite)

## Repeatability

±0.1% of reading

## End Connections

Depending on meter diameter, one or more of the following alternative end connections may be available:

1. Flanges - carbon steel flanges to mate with ANSI B16.5 Class 150 or ANSI B16.5 Class 300 or 10 to 40 bar metric flanges (40 to 100mm).
2. Screw Connection (12 to 50mm).
3. Wafer style (12 to 100mm).

## Operating Temperature

-50°C to +150°C process fluid.

## Maximum Operating Pressure

Flanged meters – limited by flange pressure rating (40 to 100mm)

Screwed meters – Male coupling: 16 bar (12 to 50mm)

Female coupling: 350 bar (12 & 20mm)

or as limited by screw couplings

Wafer meters – 100 bar (12 to 100mm)

The following minimum pressure conditions must be attained in order to avoid cavitation.

Upstream pressure >  $3PD + 1.3 VP$   
(Gauge units)

Where PD is the net meter pressure loss (inlet/outlet)

VP is the liquid vapour pressure.

## Materials

### Wafer meters

Bearings and thrust washer – tungsten carbide.

Rotor – stainless steel AISI 410 or AISI 430.

All other components – stainless steel AISI 316 or equivalent.

### Screw Connection Meters

Bearings and thrust washer – tungsten carbide.

Rotor – stainless steel AISI 410 or AISI 430.

Couplings – mild steel, stainless steel.

All other components – stainless steel AISI 316 or equivalent.

### Flange Meters

Bearings and thrust washer – tungsten carbide.

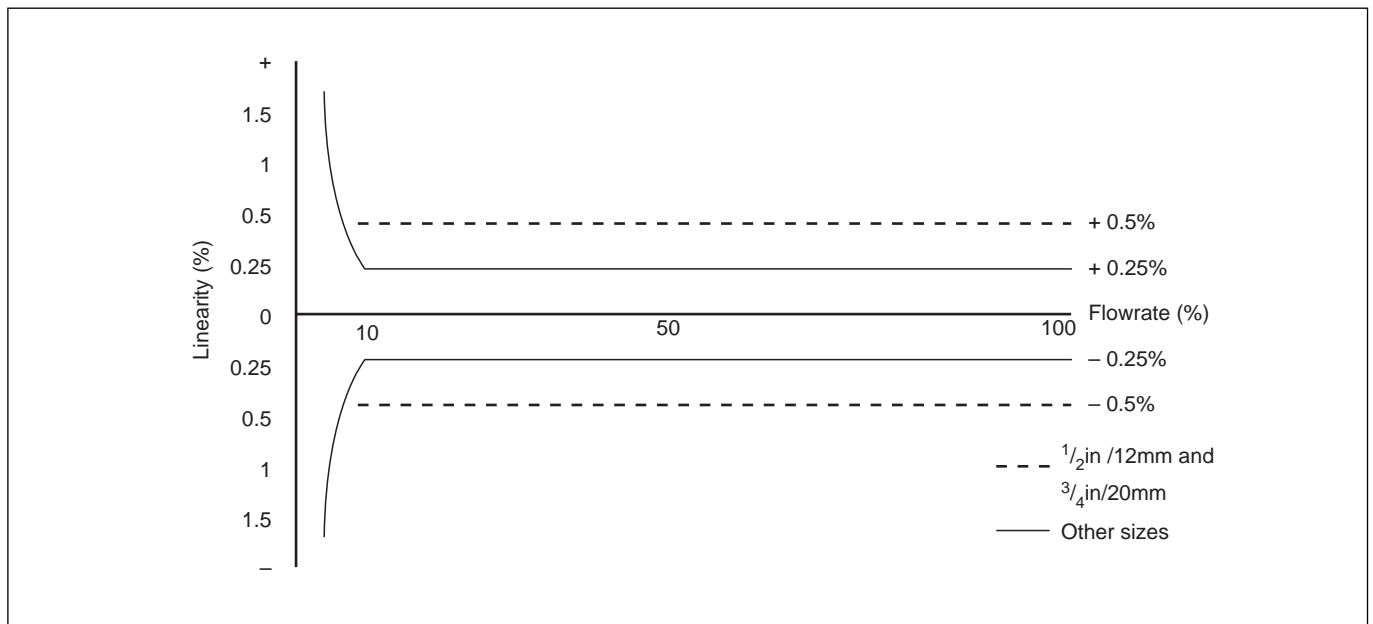
Rotor – stainless steel AISI 410 or AISI 430.

Housing – Austenitic stainless steel to AISI 316.

Flanges – carbon steel to ASTM A105.

### Flow

Unidirectional.



## Material Certification

All flanged meters 1½" (40 mm) to 4" (100 mm) are supplied with full chemical and mechanical material analysis certification to satisfy specification NACE MR-01-75 released to Spec. DIN 50049 3.1B over stamped by Lloyds Inspectorate at source.

This certification is applicable to the housing only.

All welding procedures and welder qualifications are approved to A.S.M.E. Code IX.

Additional tests which can be performed at extra cost and extended delivery are:

Liquid Penetrant Inspection qualified to C.S.W.I.P.

Magnetic Particle Inspection qualified to A.S.M.E. Code.

Ultrasonic Tests on material at source.

Radiography on Welds qualified to A.S.M.E. Code.

## Output

Sine wave signal of approximate amplitude 1mV per Hz peak-to-peak into 600 ohms.

Nominal Size		Meter Factor	
in	mm	Pulses/m <sup>3</sup>	Pulses/gal
1/2	12	1,530,000	6955
3/4	20	510,000	2318
1 1/2	40	64,000	290
2	50	37,000	168
3	80	10,500	48
4	100	4,500	20

## Electrical Connector

Mating connector supplied with each pick-off coil.

## Coil Protection Box

All flanged meters are fitted with a threaded boss to accept a coil protection box. Two bosses are fitted to meters 2" diameter and over (M32 conduit thread). Coil protection boxes are not fitted to screw-end connection meters or wafer meters.

## Outlet Connection

M20. Environmental Protection to IP66.

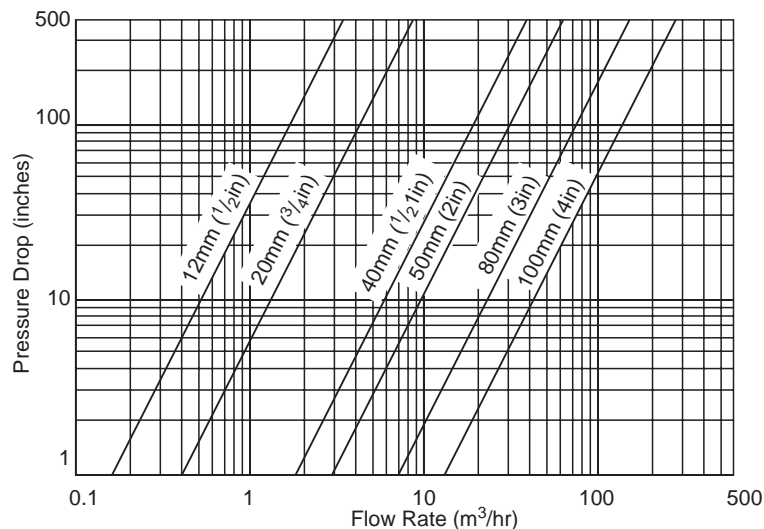
## Recommended Cables

Two core 16/0.2 mm twisted screened cable PVC covered with tinned copper braid.

## Signal Transmission

Readout equipment may be located up to 500m from the turbine meter.

Pressure Drop (Meter Inlet/Outlet)



## Hazardous Area Installations

### Intrinsically Safe Systems

Optional intrinsically safe version complying with BASEEFA standard SFA 3012: 1972 for Zone 1 Group IIC and Temperature Class T6.

The meter must be installed in accordance with the BASEEFA installation conditions using any BASEEFA certified Ex(ia) IIC two-wire shunt zener diode safety barrier configuration, with maximum open circuit voltage and short circuit current not exceeding 40V and 500mA respectively.

Pick-Off Coil Certification:  
BASEEFA Certification No. BAS 822382 X

System Certification:  
BASEEFA Certificate No. Ex. 84348

### Flameproof System

Alternatively, the pick-off coil can be fitted into a flameproof conduit box to BS4683 Part 2 for Zone 1 Group IIB Temperature Class T6. Extension to existing BASEEFA Certificate No. Ex 82170 Code Ex dIIB T6 has been applied for.

## Filtration

The use of a strainer upstream of the turbine meter is recommended to prevent damage caused by solids. ABB can make recommendations against plant details.

## Installation

Full instructions for the correct mechanical and electrical installation of the equipment are contained in the comprehensive user's handbook supplied with each instrument.

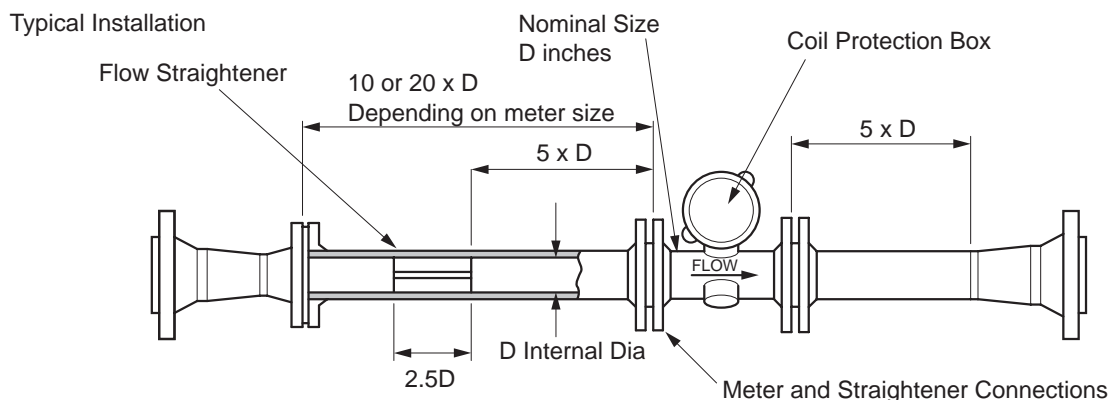
## Mating Pipe Bore

The mating pipe bore diameter D must be within the following tolerances.

## Wafer, Flanged and Screwed Meters

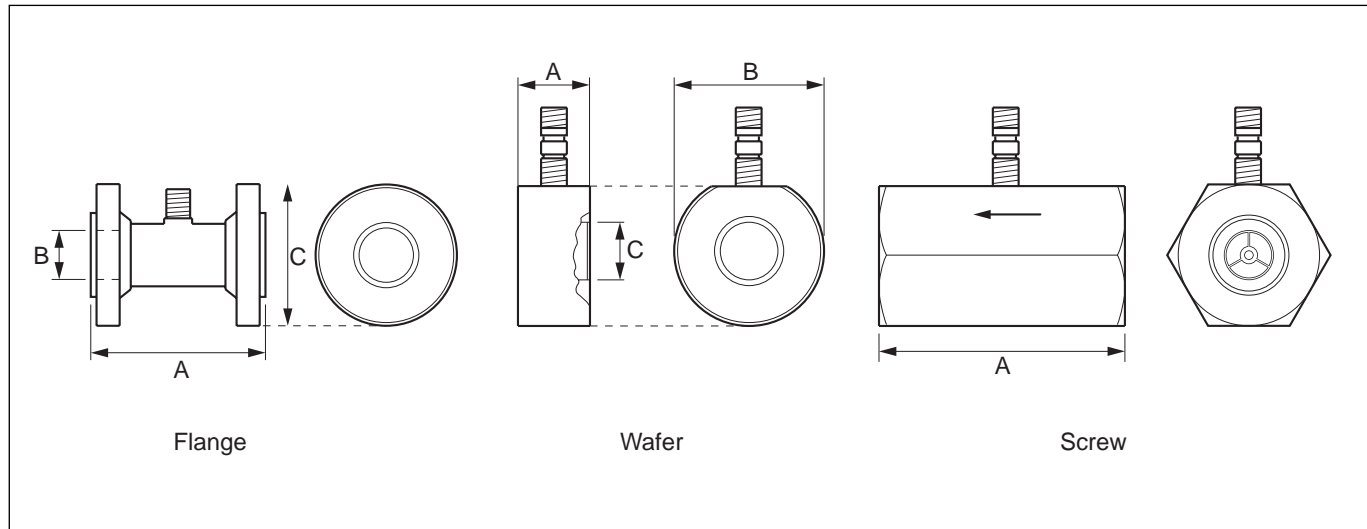
Size Nominal Bore of Meter		PERMITTED INTERNAL DIAMETER OF MATING PIPEWORK			
		Minimum		Maximum	
mm	in	mm	in	mm	in
12	1/2	12	0.47	13.5	0.53
20	3/4	18	0.71	23	0.91
40	1 1/2	38	1.50	43	1.69
50	2	49	1.93	55	2.17
80	3	73	2.87	83	3.27
100	4	97	3.81	109	4.29

### Typical Installation



**Note: Meters must be installed in accordance with Operating Instructions.**

## Dimensions & Weights



### Flanged Type

Size Nominal Bore		Dim. A Overall Length		Dim. B Metering Bore at Inlet		Dim. C Flange O.D. (ANSI 300)		Approx. Weight ANSI 300	
mm	in	mm	in	mm	in	mm	in	kg	lb
40	1.5	210	8.27	34	1.34	156	6.14	8.41	18.5
50	2	210	8.27	45	1.77	165	6.50	8.6	19.00
80	3	210	8.27	68	2.68	210	8.27	16.8	37.00
100	4	210	8.27	90.6	3.57	254	10.0	25.9	57.00

### Wafer Type

Size Nominal Bore		Dim. A Overall Length		Dim. B		Meter Bore C		Approx. Weight	
mm	in	mm	in	mm	in	mm	in	kg	lb
12	0.5	45	1.77	44	1.73	12	0.47	0.53	1.2
20	0.75	45	1.77	54	2.16	17	0.66	0.80	1.8
40	1.50	53	2.09	83	3.27	34	1.34	2.0	4.4
50	2	63	2.48	102	4.02	45	1.77	3.4	7.5
80	3	85	3.35	133	5.24	68	2.68	6.9	15.2
100	4	109	4.29	159	6.26	91	3.58	12.0	26.4

### Screw Type

Size Nominal Bore		Dim. A Overall Length		Threads	Approx. Weight	
mm	in	mm	in		kg	lb
12	0.5	80	3.15	Female 1/2" - 14 dryseal NPSI	0.36	0.8
		74	2.91	Male 1" ISS	0.36	0.8
20	0.75	80	3.15	Female 3/4" - 14 dryseal NPSI	0.54	1.2
		74	2.91	Male 1" ISS	0.54	1.2
40	1.5	74	2.91	Male 1 1/2" ISS	1.5	3.3
50	2.0	94	3.70	Male 2" ISS	1.7	3.74

## Ordering Code:

PTF     $\frac{XX}{T}$      $\frac{XX}{T}$      $\frac{X}{T}$      $\frac{O}{T}$      $\frac{X}{T}$      $\frac{X}{T}$   
          A        B        C        D        E        F

### A Size

- 11 12 mm ( $1/2$ "
- 13 20 mm ( $3/4$ "
- 21 40 mm ( $1\frac{1}{2}$ "
- 23 50 mm (2")
- 27 80 mm (3")
- 31 100 mm (4")

### B End Connections

- 01 Wafer
- 11 Female thread to suit high pressure stud coupling<sup>1</sup>
- 12 Male ISS thread<sup>2</sup>
- 22 ANSI B 16.5 300 lb flange - carbon steel<sup>3</sup>
- 23 ANSI B 16.5 150 lb flange - carbon steel<sup>3</sup>
- 24 BS 4504 metric flanges to mate with 10 bar<sup>3</sup>
- 25 BS 4504 metric flanges to mate with 16 bar<sup>3</sup>
- 26 BS 4504 metric flanges to mate with 25 bar<sup>3</sup>
- 27 BS 4505 metric flanges to mate with 40 bar<sup>3</sup>

### C Pick-Off Coil & Connector

- 1 1 off standard
- 2 1 off intrinsically safe
- 3 2 off standard<sup>4</sup>
- 4 2 off intrinsically safe<sup>4</sup>

### D Not Allocated (Enter O)

### E Protection Box(es)

- 1 None
- 2 One mech. prot. box<sup>5</sup>
- 3 Two mech. prot. boxes<sup>4</sup>
- 4 One flameproof box<sup>5</sup>
- 5 Two flameproof boxes<sup>4</sup>

### F Calibration

- 1 Standard
- 2 Standard - Witnessed

### Notes

1. Only available with size code 11 and 13
2. Only available with size code 11 to 23
3. Only available with size code 21 to 31
4. Only available with size code 23 to 31 and with flanged end connections
5. Only available with flanged end connections. Code 22 and 23.



The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.  
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