

The Enduro family of water meters provides the means to accurately measure water at a wide range of flows. A small diameter Spectrum meter is placed inside the Enduro body in the central axis of water flow and proportionally measures the total water flow through the meter. This unique system allows for unparalleled accuracy and durability at both high and low flows.

Enduro features include:

- High accuracy
- Wide range – 1000:1 turndown
- Superior low flow registration
- Minimal pressure loss
- No maintenance
- Excellent performance in adverse conditions
- Unaffected by sand or small debris in line
- No straight pipe requirements upstream or downstream of meter
- No strainer requirement
- 5-year flange-to-flange warranty
- 15-year register warranty
- Universal AMR compatibility

Physical Specifications

Model – MP-3

Body – Low lead Brass: ASTM C875

Impeller – Polypropylene

Register – Optically-encoded straight read register. Magnetically coupled to shielded gear-box in meter body.

Impeller Bearing – Tungsten Carbide

Impeller Pivots – 440C Stainless Steel

Dimensions – See Table 2

Weight – See Table 2



Functional Specifications

Fluids measured – Potable cold water
(hot water optional)

Flow Range – See Table 1.

Accuracy – $\pm 1.5\%$ See Table 1.

Pressure Loss – See Table 1.

Repeatability – 0.5 % of flowrate

Maximum operating Pressure –

360 PSI (Enduro 1100)

230 PSI (Enduro 2000, 2400, 2800)

Maximum Operating Temperature –

140° F (60°C)

194° F (90° C) optional

End Connections – See Table 2

Registration – See Register Information.

100,000,000 Gallons

2 Gallon dial resolution

10,000,000 Cubic Feet

.2 Cubic Ft. dial resolution

Warranty – 5 Yr. – Flaws and defects

5 Yr. - Register

Standards

ISO - 4064-1, Class C Approved

NSF-61 Approved

FM Approved (as documented)



Operation

Water enters the meter passing over an in-line water conditioner that directs the water through a small diameter Spectrum meter that proportionally measures the total water flow. This incoming water rotates a suspended impeller that is directly linked to the counting mechanism. A low friction pivot bearing supports the impeller at low flow rates while a thrust bearing provides the support at high flow rates. The impeller is linked to a direct transmission mechanism through a hydraulic watertight joint. Through this joint the rotating impeller transmits rotation to the counting mechanism.

All MP-3 model water meters utilize the OER (optically-encoded register) register. The OER utilizes a light transmitter and light-pipe to detect the various positions of the encoder wheels. This non-mechanical sensing technology offers many advantages, including extremely low drag on the measuring element and minimal chance of mechanical wear/failure.

The OER is a field replaceable register available in indoor and outdoor materials and in multiple output configurations. Reference the OER technical specifications for more information.

Automatic Meter Reading

All Model MP-3 water meters utilize the OER register and thus can be utilized within virtually any AMR system. The OER employs defacto communications standards for 2-wire (touchpad) and 3-wire (radio) interfaces. Reference the OER technical specifications and AMR application notes for more information.

Installation

The Enduro meter should be stored as shipped with register face down until installation. To maintain accuracy, the meter is to be installed horizontally ($\pm 10^\circ$) in the direction of water flow, with the register face up. In most applications, no straight pipe length, upstream or downstream is necessary. Under normal usage conditions the Enduro is not affected by sand or suspended particles and does not require a strainer.

Detailed reference sheets for meter installation can be provided by Metron-Farnier upon request.

Accuracy Testing

For optimal performance during meter accuracy tests observe the following:

1. Register is level to the horizontal
2. Upstream pipe should be the same diameter or larger than meter connection
3. Upstream valve should be fully opened during test, use downstream valve to regulate flow rates
4. Inspected for leaks between the Enduro and downstream volumetric tank or reference meter
5. Time low flow test to confirm accuracy of flowrate indicator

Detailed reference sheets for meter testing can be provided by Metron-Farnier upon request. The next revision of the AWWA M6 manual will include testing methods for single-jet meters.

Table 1

Flow Specifications
Enduro Water Meters

Model	Size	Minimum Test Flow (95%-101.5%) gpm	Normal Operating Range (98.5%-101.5%) gpm	Maximum Continuous Duty 1 gpm	Max Intermittent Flow 2 gpm	Peak Flow 3 gpm	Head Loss @ Max Continuous Flow psi
Enduro 1100"	4"	10.00	12.00	1,100	1,350	1,500	6.40
Enduro 1100"	6"	10.00	12.00	1,100	1,350	1,500	6.40
Enduro 2000"	6"	5.00	6.00	2,000	1,800	2,000	4.00
Enduro 2000"	8"	5.00	6.00	2,000	1,800	2,000	4.00
Enduro 2400"	6"	12.00	14.00	2,400	2,800	3,400	6.52
Enduro 2400"	8"	12.00	14.00	2,400	2,800	3,400	6.52
Enduro 2800"	6"	8.00	10.00	2,400	2,800	2,800	6.40
Enduro 2800"	8"	8.00	10.00	2,400	2,800	2,800	6.40

All flow specifications assume typical, consistent system pressure conditions. Adverse pressure conditions will effect the performance of the meters.

1 Max Continuous Flow: This is defined as the flow rate which can be maintained 24 hrs/day for 7 days/week

2 Peak Flow: This is defined as the flow rate which can be sustained for approximately 1 hr per day average.

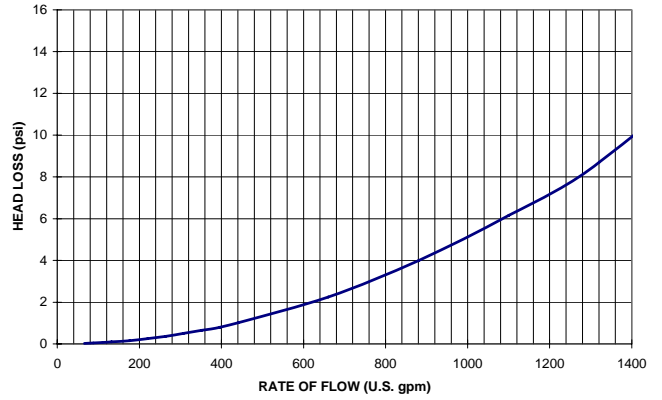
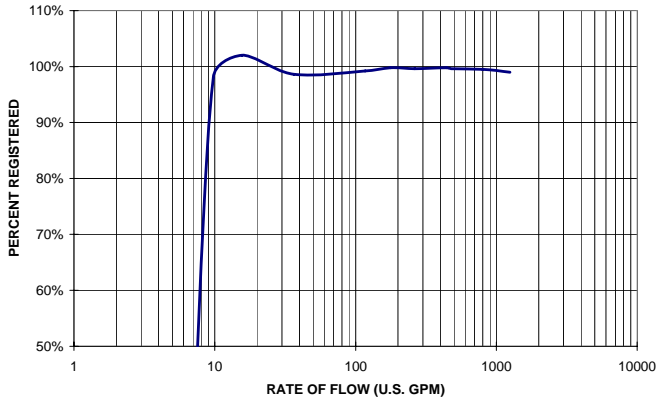
3 Peak Test Flow: This is defined as the absolute maximum test flow rate which can be sustained for very brief periods under controlled conditions.

A downstream pressure of >20 psi should be maintained to prevent cavitation

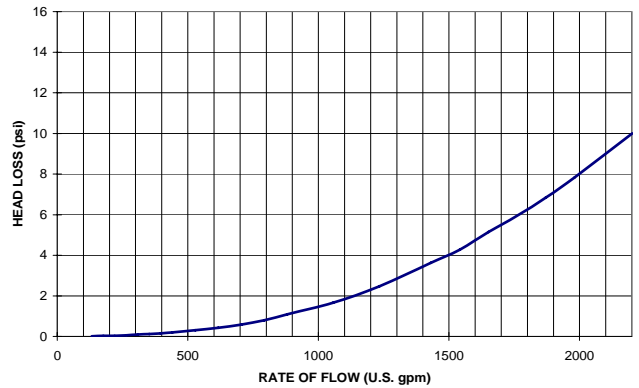
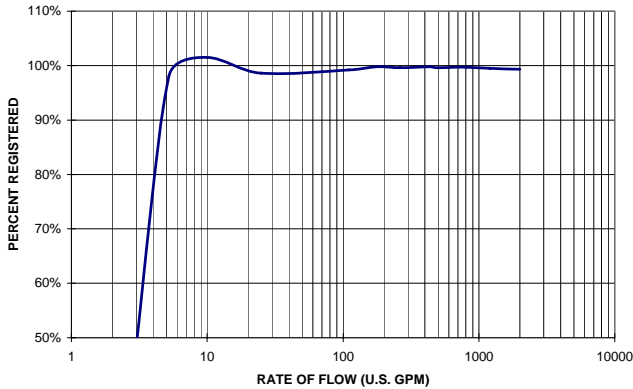
Accuracy Curves

Pressure Loss Curves

Enduro 1100



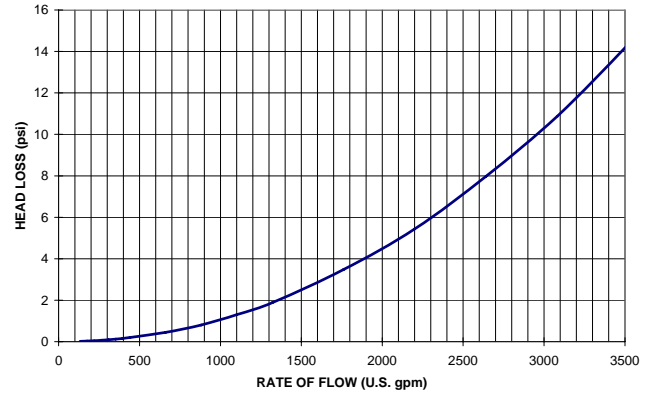
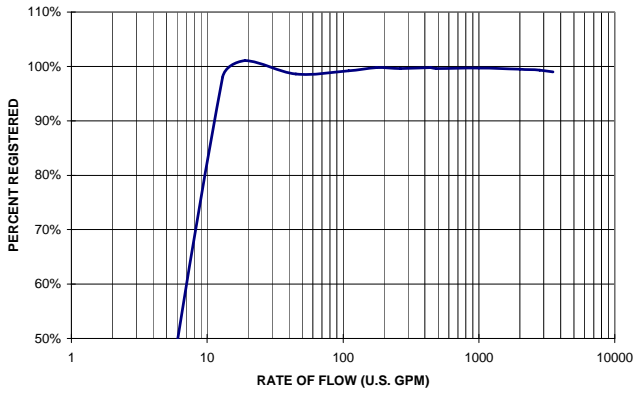
Enduro 2000



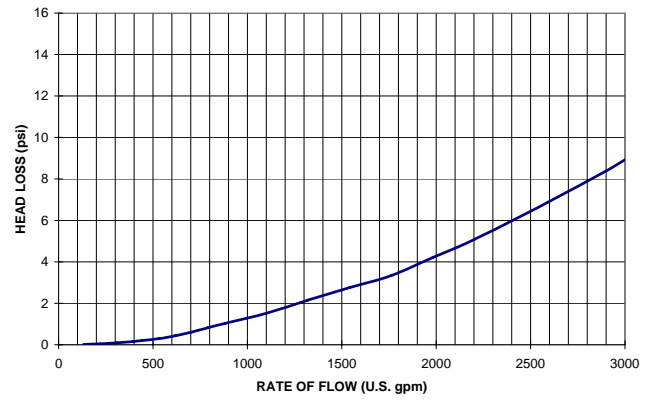
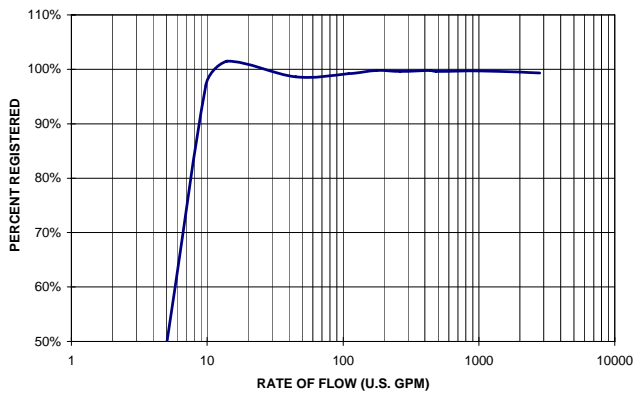
Accuracy Curves

Pressure Loss Curves

Enduro 2400



Enduro 2800



Meter Dimensions

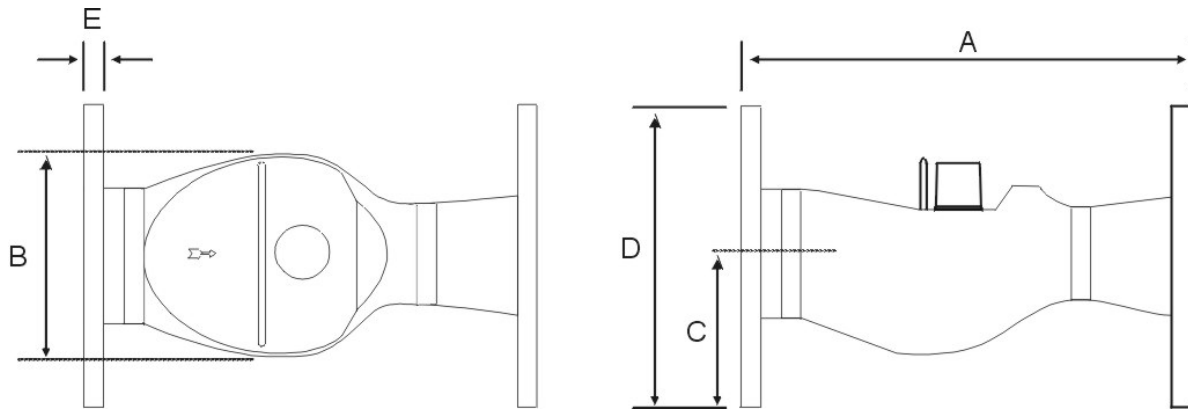
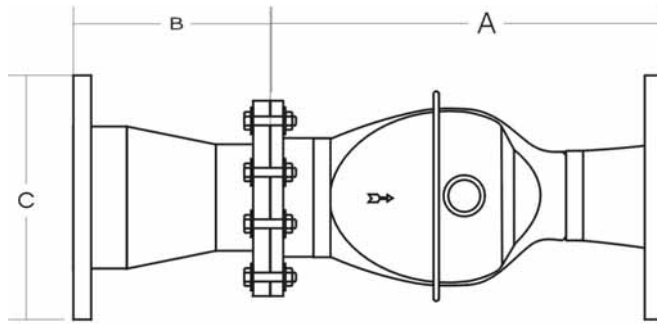


Table 2

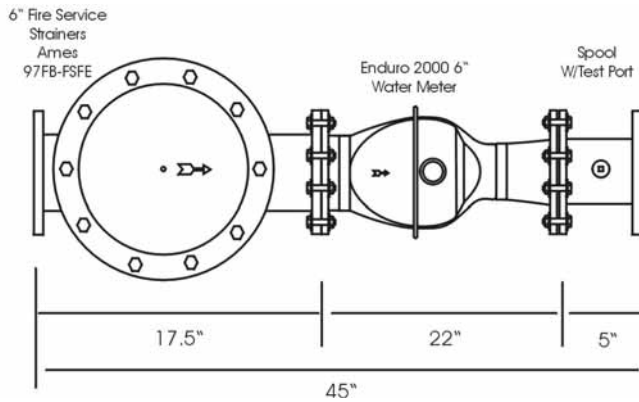
Meter Type Pipe Size	Length A	Width B	Centerline C	Pipe Connections	Net Weight
Enduro 1100 - 4"	14.8" (376 mm)	8.7" (221 mm)	4.4" (112 mm)	4" 8-Bolt 150# ANSI	49 lbs (22 kg)
Enduro 1100 - 6"	23.8" * (605 mm)	9" (229 mm)	4.5" (114 mm)	6" 8-Bolt 150# ANSI	67 lbs (30.2 kg)
Enduro 2000 - 6"	22" (559 mm)	11.2" (284 mm)	5.6" (142 mm)	6" 8-Bolt 150# ANSI	109 lbs (49.5 kg)
Enduro 2000 - 8"	33" * (838 mm)	13.75" (349 mm)	6.9" (175 mm)	8" 8-Bolt 150# ANSI	162 lbs (73.5 kg)
Enduro 2400 - 6"	22" (559 mm)	11.2" (284 mm)	5.6" (142 mm)	6" 8-Bolt 150# ANSI	109 lbs (49.5 kg)
Enduro 2400 - 8"	33" * (838 mm)	13.75" (349 mm)	6.9" (175 mm)	8" 8-Bolt 150# ANSI	162 lbs (73.5 kg)
Enduro 2800 - 8"	22" (559 mm)	11.2" (284 mm)	5.6" (142 mm)	8" 8-Bolt 150# ANSI	149 lbs (67.6 kg)

Flow Conditioner Configuration

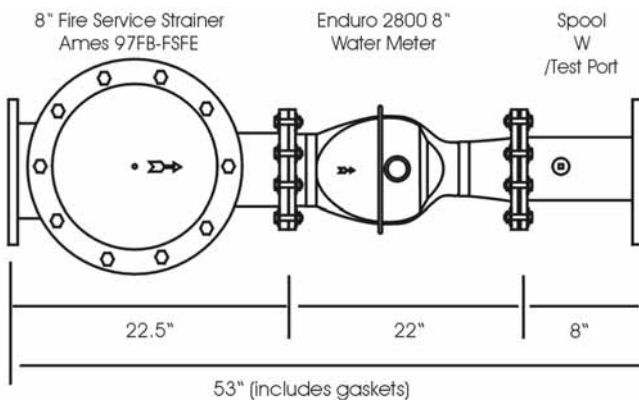


METER	A METER	B REDUCER	C FLANGE SIZE
ENDURO 1100	14.8"	8.5"	6"
ENDURO 2xxx	22"	10.75"	8"

Fire Service Configurations



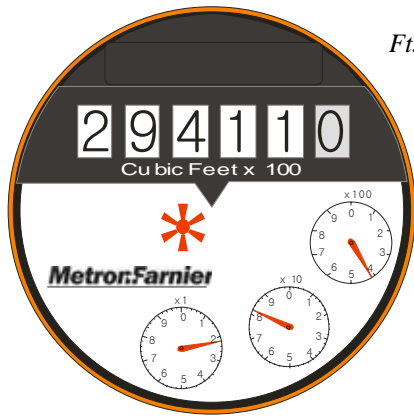
6-inch Assembly
45-inch LL
See Fire Service
Brochure for
more information



8-inch Assembly
53-inch LL
See Fire Service
Brochure for
more information

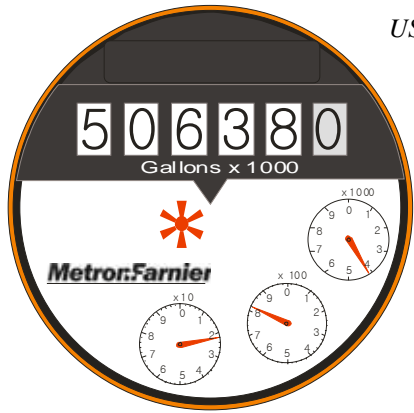


Register Information



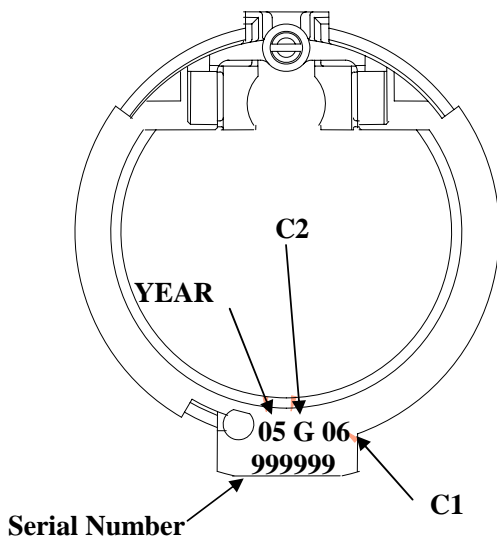
Ft3 Register

Resolution:	0.2 Ft ³
Registration:	1000 Ft ³
Capacity:	100M Ft ³
Sample:	294,411,000 Ft ³
Billing:	294,110 in 100's Ft ³



USG Register

Resolution:	2 G
Registration:	10000 G
Capacity:	1000M G
Sample:	506,380,000 G
Billing:	506,380 in 1000's G



C1 - Model	C2 - Units
19 Enduro 1100	1 M ³ - Cold Water
31 Enduro 2000	2 M ³ - Hot Water
21 Enduro 2400	3 Ft ³ - Cold Water
23 Enduro 2800	4 Ft ³ - Hot Water
	5 USG - Cold Water
	6 USG - Hot Water

Electronic Output: Default output will be in the format:
C1##### (where # is SN)