

Enduro Meters

Model 2800-D 6" and 8"

The Enduro family of water meters provides the means to accurately measure water at a wide range of flows. The Model-D meters utilize a top-loading chamber to insert a small diameter Spectrum meter into the Enduro body. The Spectrum meter is installed 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
- Strainers available for FM Fire Service
- 5-year flange-to-flange warranty
- Compatible with OER absolute encoder and innov8 electronic registers
- Universal AMR compatibility

Physical Specifications

Model – D (MP5)

Body – Low lead Brass: ASTM C917

Impeller – Polypropylene

Register – OER or innov8 electronic

Impeller Bearing – Tungsten Carbide

Impeller Pivots – 303 SS with Nivaflex tip

Dimensions – See Table 3

Weight – See Table 3



Functional Specifications

Fluids Measured – Potable Cold Water
(hot water optional)

Flow Range – See Table 1

Accuracy – $\pm 1.5\%$ (See Table 2)

Pressure Loss – See Table 2

Repeatability – 0.5 % of Flowrate

Maximum Operating Pressure –
230 PSI (15.9 bar)

Maximum Operating Temperature –
140° F (60°C)
194° F (90° C) Optional

End Connections – See Table 3

Registration – See Table 4

100,000,000 Gallons

2 Gallon Dial Resolution

10,000,000 Cubic Feet

.2 Cubic Ft. Dial Resolution

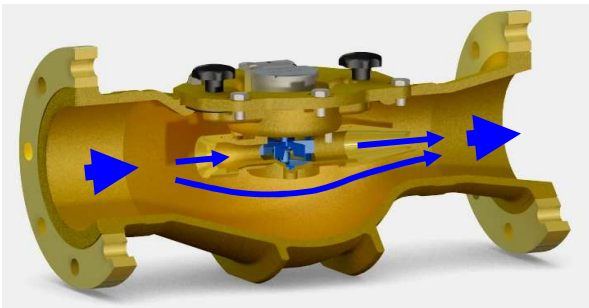
1,000,000 Cubic Meters

.002 Cubic Meter Dial Resolution

Warranty – 5 Years on Flaws and Defects
5 Years on Register

Operation

Water enters the meter passing over an in-line water conditioner. Conditioned water is directed through a small diameter Spectrum meter that proportionally measures the total water flow. This incoming water rotates a suspended impeller in the measuring chamber. A low friction pivot bearing supports the impeller at low flow rates while an upper thrust bearing provides the support at high flow rates. The impeller has an attached magnet at its top for the register interface.



All bearing materials are fortified for minimal wear during high-flow stress. The impeller shaft utilizes tungsten tips to minimize wear and ensure long-term accuracy.

The Enduro Model-D meters come with integral flanges (either 6" or 8") and test port.

AMR/AMI Interfaces

All Metron Model-D water meters utilize the OER or innov8 register and thus can be utilized within virtually any AMR/AMI system. Both the OER and innov8 employ defacto communications standards for 2-wire (touchpad) and 3-wire (radio) interfaces which can be configured for typical utility billing systems.

Reference the OER and innov8 technical specifications and AMR application notes for more information.

Registers

All Metron Model D water meters utilize the OER (optically-encoded register) or innov8 electronic register. Both models are field replaceable with configurable outputs.

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 HFO (High Frequency Output) is an attachment device for a high frequency pulse for SCADA and datalogging applications.

Reference the OER technical specifications for more information.

The innov8 is a fully electronic register which utilizes a highly sensitive magnetic field sensor to measure the magnet within the measuring element of the Enduro meter. This sensing method exerts virtually no drag on the measuring element. The innov8 offers high resolution datalogging which detects down to individual magnet rotations.

The innov8 has an 8-digit display, flow-rate display and configurable AMR outputs. The innov8 also



offers multiple SCADA outputs and an embedded T2 900 MHz radio for datalogging and AMR.

Reference the innov8 technical specifications for more information.

Installation

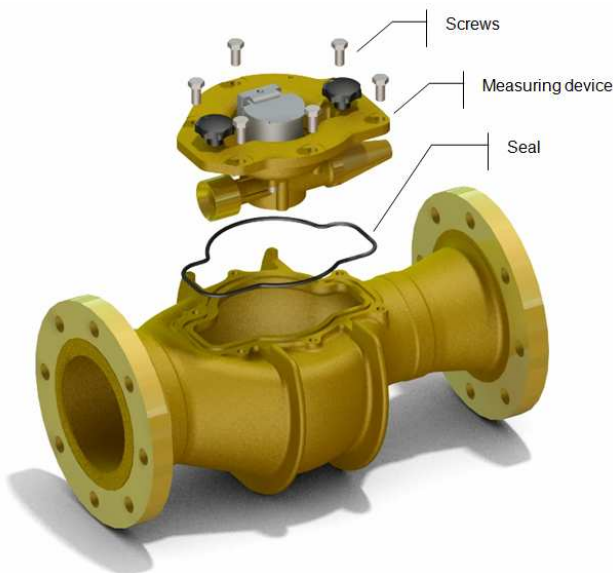
To maintain accuracy, the meter is to be installed horizontally ($\pm 10^\circ$) in the direction of water flow, with the register face up. In most applications, no straight pipe length, upstream or downstream is necessary. Under normal usage conditions the Enduro is not affected by sand or suspended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

The Enduro meter has two eye-bolts on the top-side of the meter to provide a simple method for lowering/raising the meter during installation.

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

Maintenance

The measuring chamber of the Enduro meter can be removed without requiring the meter being removed from service. Once the meter is isolated with no water pressure, the six bolts can be removed to allow the chamber to be lifted from the primary meter body.



Detailed reference sheets for meter repair and spare parts can be provided by Metron-Farnier upon request.

Accuracy Testing

The Enduro Model-D meters have a built-in 2" test port towards the outlet of the meter. This port can be used for low-to-mid flowrate tests. The tester should be aware that mid-to-high flow tests can be inaccurate due to turbulence in the measuring chamber. Consult your Metron sales representative for information on separate spool pieces with test ports.

For optimal performance during meter accuracy tests observe the following:

1. Register should be 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. Inspect 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 current AWWA M6 manual will include testing methods for single-jet meters.

Table 1: Flow Specifications

Flow Specifications		Minimum Test Flow (95%-101.5%)	Normal Operating Range (98.5%-101.5%)	Maximum Continuous Duty ¹	Max Intermittent Flow ²	Peak Flow ³	Head Loss @ Max Continuous Flow
Model	Size	gpm m3/h	gpm m3/h	gpm m3/h	gpm m3/h	gpm m3/h	psi bar
Enduro 2800"	6"	4.40 gpm 1.00 m3/h	6.00 2,800 gpm 1.36 636 m3/h	2,400 gpm 545 m3/h	2,800 gpm 636 m3/h	3,400 gpm 772 m3/h	6.40 psi 0.44 bar
	8"	4.40 gpm 1.00 m3/h	6.00 2,800 gpm 1.36 636 m3/h	2,400 gpm 545 m3/h	2,800 gpm 636 m3/h	3,400 gpm 772 m3/h	6.40 psi 0.44 bar

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

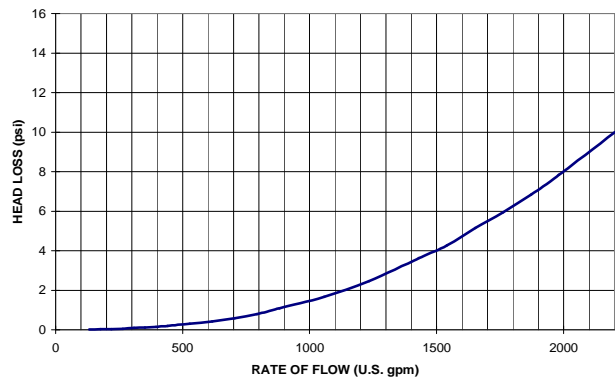
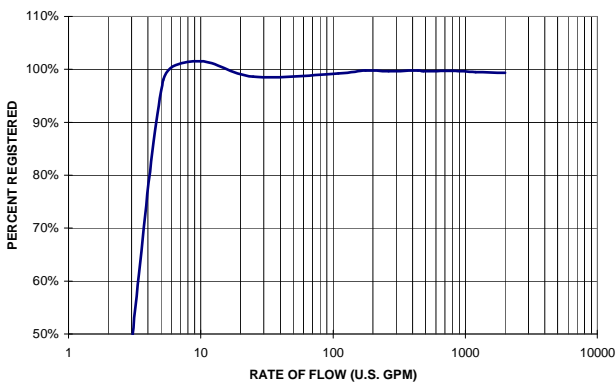
3 Peak Flow: Spikes in flowrate and deluge flow

Table 2: Performance Curves

Accuracy Curves

Pressure Loss Curves

Enduro 2800 6"



Enduro 2800 8"

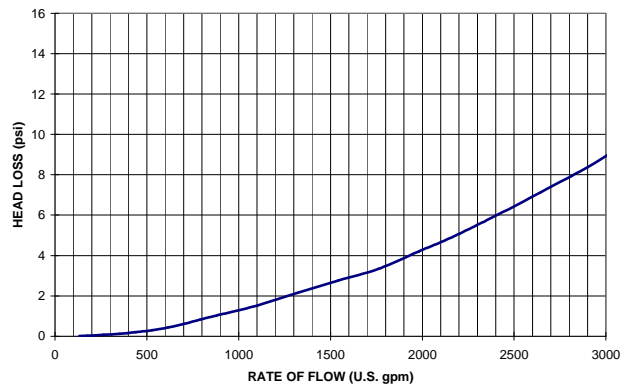
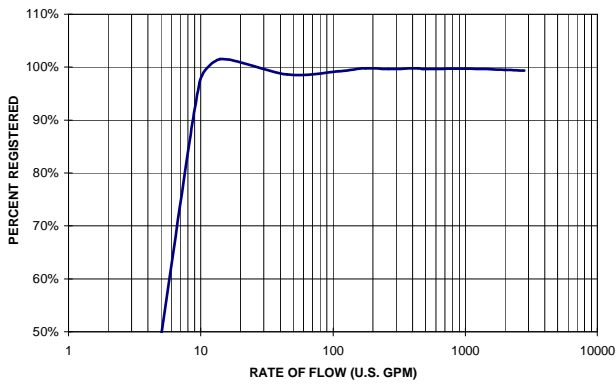
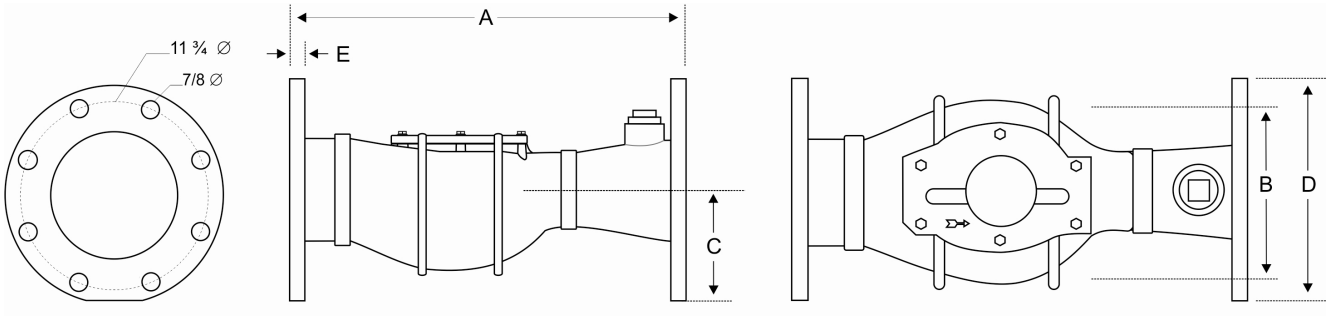


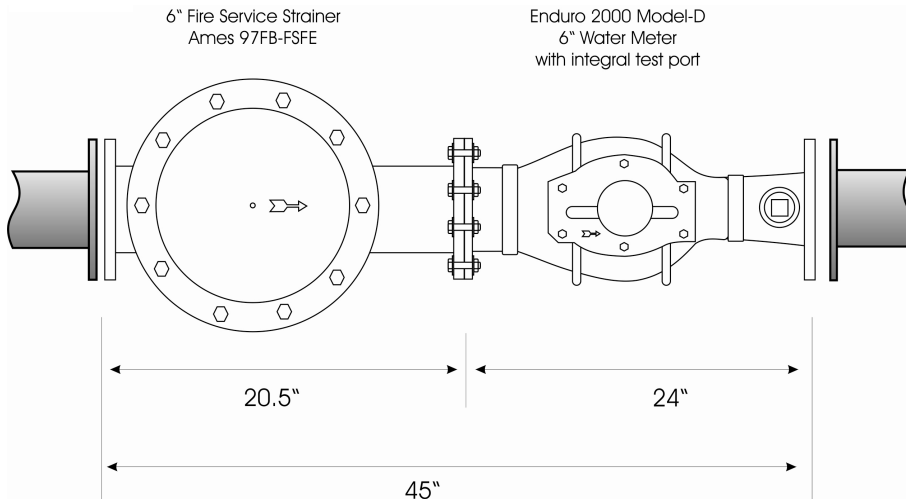
Table 3: Meter Dimensions



	Length	Meter Width	Centerline	Total Width	Flange Width	Pipe	Net
Model / Size	A	B	C	D	C	Connections	Weight
Enduro 2800 - 6"	24" (610 mm)	11.2" (284 mm)	5.6" (142 mm)	10.875" (276 mm)	0.875" (22.2 mm)	6" 8-Bolt 150# ANSI	109 lbs (49.5 kg)
Enduro 2800 - 8"	24" (610 mm)	11.2" (284 mm)	6.5" (165 mm)	13.5" (343 mm)	1.125" (28.6 mm)	8" 8-Bolt 150# ANSI	138 lbs (67.6 kg)

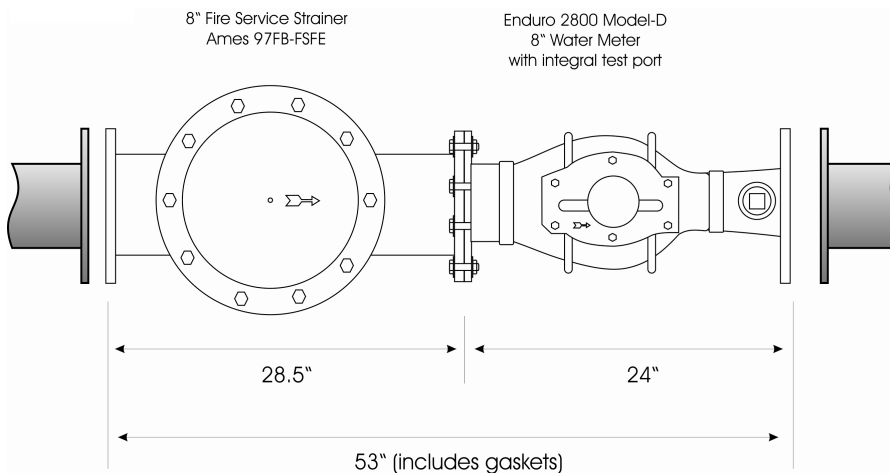
Fire Service Configurations

FSA6



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

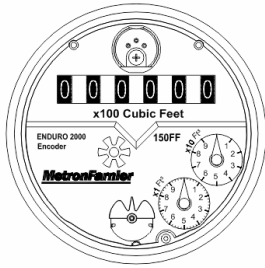
FSA8



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

Table 4: Register Information

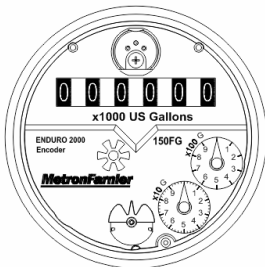
OER - Ft3 Register



Resolution:	0.2 Ft ³
Registration:	1000 Ft ³
Capacity:	100M Ft ³
Sample:	29,411,000 Ft ³
Billing:	294,110 100's Ft ³

Consult the Hawkeye OER datasheet and Manual for additional information.

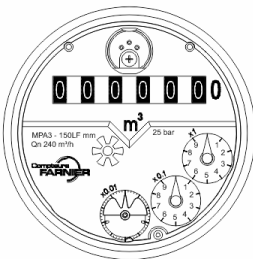
OER - USG Register



Resolution:	2 G
Registration:	10000 G
Capacity:	1000M G
Sample:	506,380,000 G
Billing:	5,063,800 1000's G

Consult the Hawkeye OER datasheet and Manual for additional information.

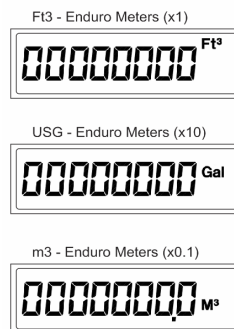
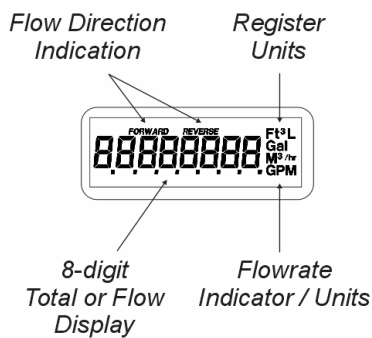
OER - M3 Register



Resolution:	0.002
Registration:	10 m3
Capacity:	1M m3
Sample:	40,128 m3
Billing:	40,128 m3

Consult the Hawkeye OER datasheet and Manual for additional information.

innov8 - Register



Consult the innov8 DataSheet and Manual for additional information.