BM SERIES METERS®

PRECISION POSITIVE DISPLACEMENT METERS

THE LEADER IN ACCURATE, LONG-LIFE, FUEL METERING

INDUSTRY LEADING ACCURACY (+/- .05%)*

110 TO 3870 LPM (30 TO 1000 GPM) FLOW RATES

* subject to meter size

Avery-Hardoll®

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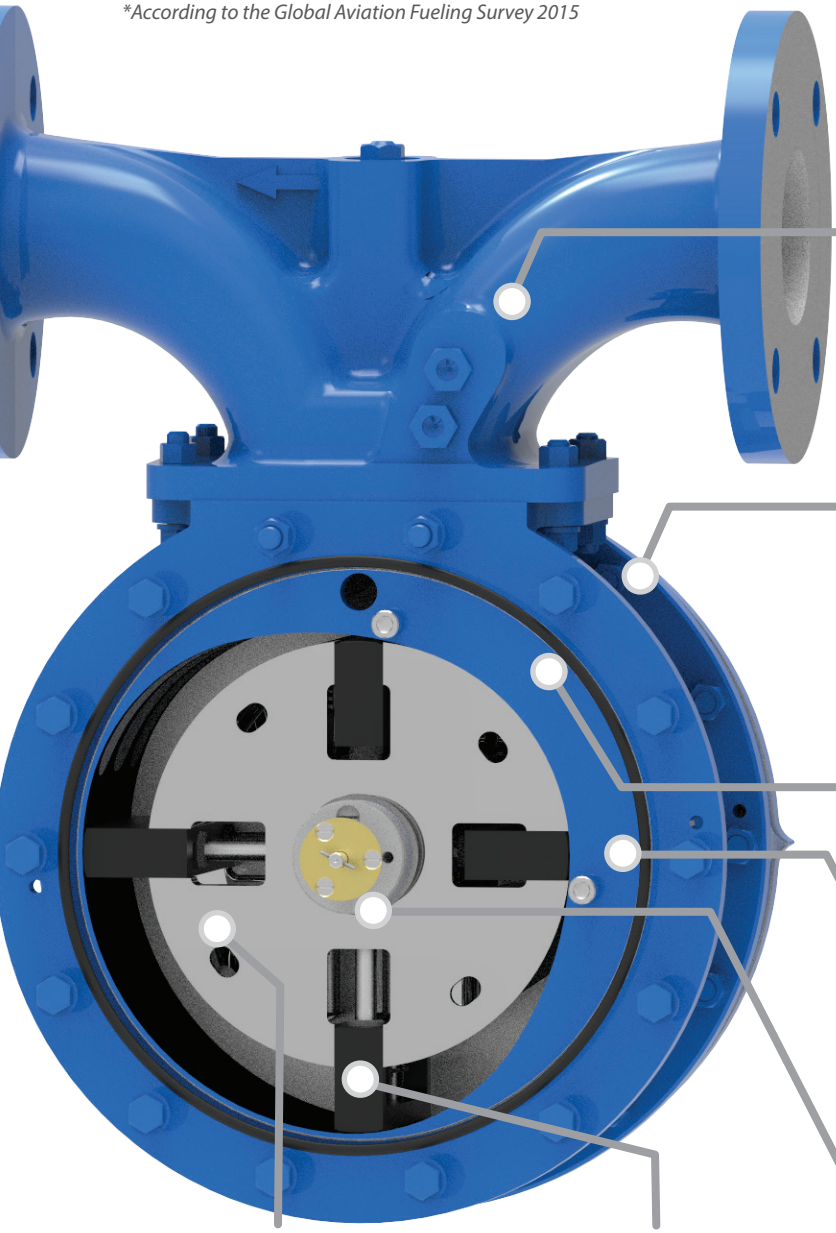
FEATURES & BENEFITS

THE MOST ACCURATE AVIATION FUEL METERS IN THE WORLD

Avery-Hardoll BM Series flowmeters are precision made, positive displacement, liquid measuring instruments that maintain the higest level of accuracy over a lifetime of operation. Simplicity of design and accuracy has resulted in the Avery-Hardoll BM Series meters to being **the most preferred meters by aviation fueling operators and airlines** in internatonal markets.*

**According to the Global Aviation Fueling Survey 2015*



Cast and machined iron or aluminum manifolds

Aluminium or Ni-Resist cast iron outer covers

Precision machined housing for perfect seal and maxiumum measurement accuracy

Working pressure: 150 psi (10.3 bar)

Hydrostatic test pressure: 300 psi (20.7 bar)

Instrument grade machined rotor for perfect balance

Precision carbon vanes for maximum measurement accuracy

Stainless steel bearings for maximum operational life

DIMENSIONAL DRAWINGS

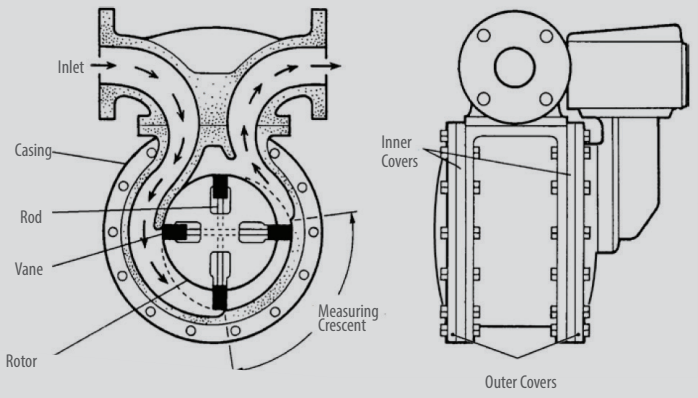
MECHANICAL METER ASSEMBLY DIAGRAM AND CROSS-SECTION

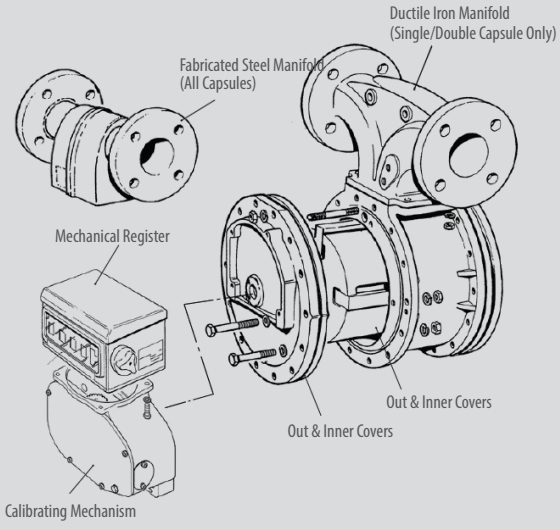
AVAILABLE MODELS

BM Series bulkmeters are manufactured in three basic sizes with different ratings identified by a series number. The series numbers, sizes, flow rates, and a brief description of each series of meter are shown below.

TYPES OF BULKMETER

Series Number	Manifold		Flow Rate		General Description
	Inches	Millimeters	Imperial Gallons	Liters	
BM250	2 - 2½	63	25 - 250	115 - 1140	Single Capsule Meters
BM950	3	76	30 - 300	130 - 1370	
BM450	3	76	45 - 450	200 - 2050	Double Capsule Meters
BM550	4	102	50 - 500	220 - 2280	
BM350	4	102	55 - 550	250 - 2500	
BM650	4	102	65 - 650	300 - 3000	Triple Capsule Meters
BM750	6	152	65 - 650	300 - 3000	
BM850	6	152	85 - 850	387 - 3870	Special Application Only for Low Viscosity / Clean Aviation Fuel





BULKMETER MAIN COMPONENTS

- The BM Series bulkmeters consist of three main assemblies: the manifold, body assembly and rotor assembly
- The higher rating of the larger meters is achieved by bolting two or three body capsules together and fitting double or triple rotor assemblies with a larger manifold to suit
- A calibrating mechanism and mechanical register are also attached to the front end cover
- The calibrating mechanism can be replaced by a front cover incorporating a pulse transmitter when required for electronic systems, such as MASTERLOAD II™ or MASTERLOAD III™ registers

BM METERS SPECIFICATIONS

PRECISION POSITIVE DISPLACEMENT BULK FUEL METERS

Single Capsule Meter

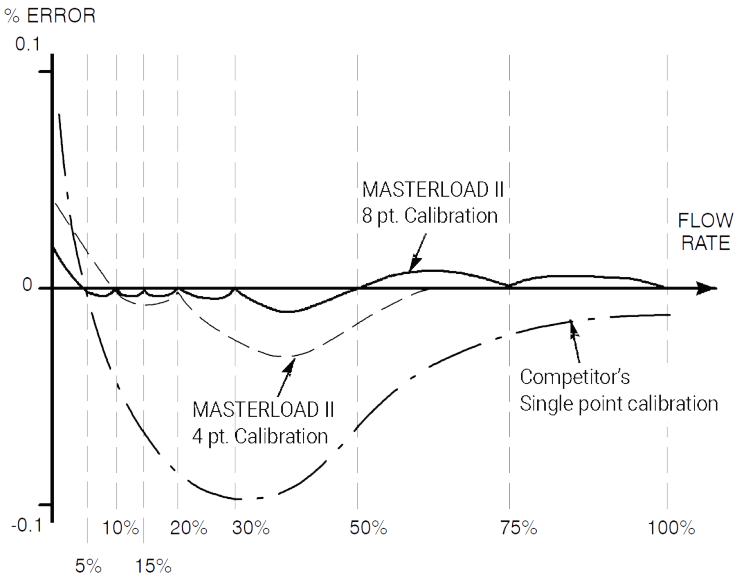
Meter Series	Pipeline Size	Flow Rate			Flanges	
		Imp. Gal.	lpm	M^3/h	Conform To	Material
BM250	2-2½" (63mm)	25 to 250	115 to 1140	7 to 68	ASA 150 FF	Ductile Iron Steel
BM950	3" (76mm)	30 to 300	130 to 1370	8 to 82	ASA 150 FF	Ductile Iron Steel

Double Capsule Meter

Meter Series	Pipeline Size	Flow Rate			Flanges	
		Imp. Gal.	lpm	M^3/h	Conform To	Material
BM450	2-2½" (63mm)	25 to 250	115 to 1140	7 to 68	ASA 150 FF	Ductile Iron Steel
BM550	3" (76mm)	30 to 300	130 to 1370	8 to 82	ASA 150 FF	Ductile Iron Steel
BM350	4" (102mm)	55 to 550	250 to 2500	15 to 150	ASA 150 FF	Ductile Iron Steel
		615	2800	168	Intermittent Use	

Triple Capsule Meter

Meter Series	Pipeline Size	Flow Rate			Flanges	
		Imp. Gal.	lpm	M^3/h	Conform To	Material
BM650	4" (102mm)	65 to 650	300 to 3000	18 to 177	ASA 150 FF	Steel
BM750	6" (152mm)	30 to 300	300 to 3000	18 to 177	ASA 150 FF	Steel
BM850	6" (152mm)	85 to 850	387 to 3870	23 to 232	ASA 150 FF	Steel
					Used on Aviation Kerosene	

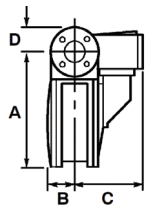


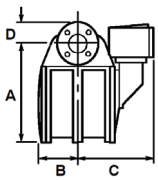
ELECTRONIC REGISTER CALIBRATION

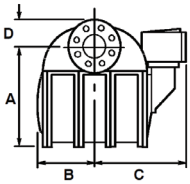
While conventional meters are calibrated at only one flow rate, MASTERLOAD II™ and MASTERLOAD III™ calibration is corrected at a range of flow rates to provide the highest level of accuracy. With a multitude of calibration points across the full flow range, the system allows the user the flexibility to configure each system to suit the requirements of their specific application.

PHYSICAL CHARACTERISTICS

DIMENSIONS AND CALIBRATION TESTING

Single Capsule Meter	Flange Bolt Holes			Manifold Overall Dimensions		Meter Dimensions								Approx. Weight of Basic Meter	
		Size				A		B		C		D			
	No. Off	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	kg.	lbs.
	4	19	.75	356	14	408	16.1	107	4.2	285	11.2	89	3.5	70	54
	4	19	.75	400	15.75	427	16.8	107	4.2	285	11.2	89	3.5		
	4	19	.75	356	14	408	16.1	107	4.2	285	11.2	95	3.75	70	54
	4	19	.75	400	15.75	427	16.8	107	4.2	285	11.2	95	3.75		

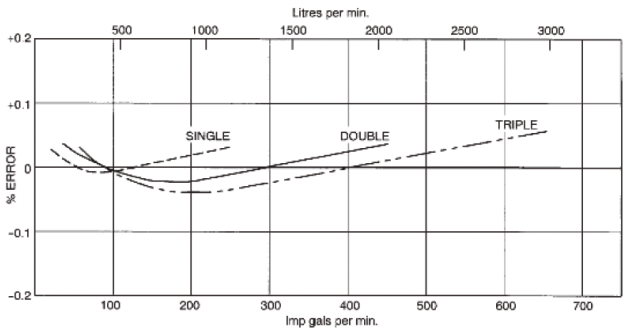
Double Capsule Meter	Flange Bolt Holes			Manifold Overall Dimensions		Meter Dimensions								Approx. Weight of Basic Meter	
		Size				A		B		C		D			
	No. Off	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	kg.	lbs.
	4	19	.75	400	15.75	405	15.9	170	6.7	348	13.7	95	3.75	100	220
	4	19	.75	400	15.75	427	16.8	170	6.7	348	13.7	95	3.75		
	8	19	.75	400	15.75	420	16.5	170	6.7	348	13.7	115	4.5	112	247
	8	19	.75	400	15.75	427	16.8	170	6.7	348	13.7	115	4.5		

Triple Capsule Meter	Flange Bolt Holes			Manifold Overall Dimensions		Meter Dimensions								Approx. Weight of Basic Meter	
		Size				A		B		C		D			
	No. Off	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	kg.	lbs.
	8	19	.75	400	15.75	427	16.8	233	9.2	411	16.2	115	4.5	126	278
	8	22	.875	400	15.75	427	16.8	233	9.2	411	16.2	140	5.5	136	300

MECHANICAL CALIBRATION

Calibration adjustment is stepless, with no necessary gear changing. All meters are tested at a range of flow rates before dispatch. Test certificates available upon request.

- Fluid used for testing: Odorless kerosene
- Specific gravity: at 60/60°F, 15/15°C = 0.8
- Viscosity at 60°F, 15°C = 2.4 centistokes.



Typical accuracy curves for the basic meter build (10:1 turndown)

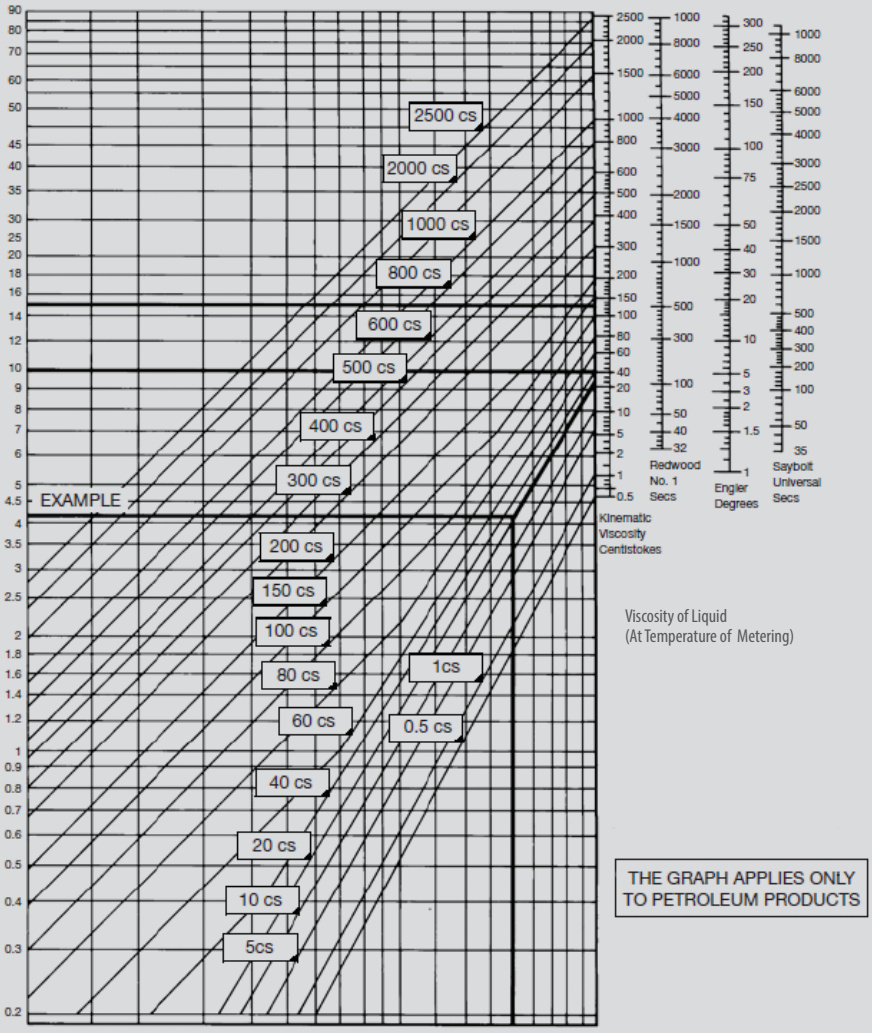
WORKING SPECIFICATIONS

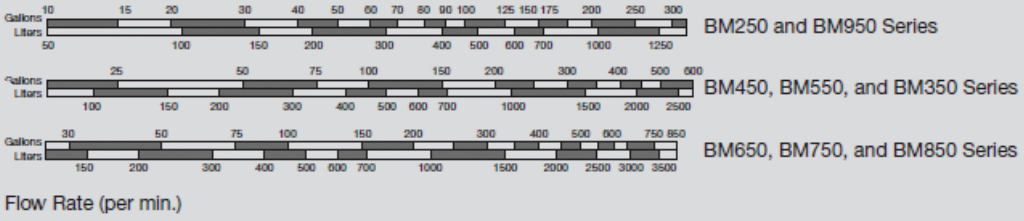
- Maximum working pressure: 150 psi (10.3 bar)
- Test pressure: 300 psi (20.7 bar)
- Temperature range: -28°C to 100°C
- Volume per revolution:
  - 2.27 litres (single capsule)
  - 4.54 litres (double capsule)
  - 6.82 litres (triple capsule)
- Typical accuracy: +/- 0.05%
- Repeatability: 0.02%

PERFORMANCE

PERFORMANCE AND PRESSURE DROP CALCULATIONS

PRESSURE DROP CHART (PSI)





VISCOUS PRODUCTS

Avery-Hardoll bulkmeters can be used on all petroleum products of all viscosities. However, there is an increase in pressure drop with more viscous fuels, which under normal circumstances will limit the maximum flow rate obtainable.

It is recommended that the pressure drop through a bulkmeter should not exceed 15 psi (1 bar), above which the load on the bearings will start to cause wear.

Consequently when using products with viscosities above 100 centistokes (at operating conditions), it is necessary to reduce the maximum permitted flow rate. As a guide, it is suggested that the pressure drop through the meter should not exceed 10 psi (0.7 bar) for continuous running at maximum speed or 15 psi (1 bar) for continuous running at half speed.

The low pressure drop for the BM Series of Avery-Hardoll bulkmeters is displayed on the left.

REGISTRATION & ACCESSORIES

ELECTRONICS REGISTRATION

MASTERLOAD II™ REGISTER

A highly accurate and versatile microprocessor-based electronic controller. The industry standard in simplicity and reliability for aviation fueling applications.

MASTERLOAD III™ REGISTER

- Increased accuracy with multi-point calibration
- Easy to operate along with secure protected data
- Automated fueling with FlightConnect® (option)
- Long-life durability in harsh environments

ACCESSORIES

FlightConnect®

Automated Fueling - Wireless Data System
(for MASTERLOAD III™ or LCR 600)

Temperature Volume
Compensation (TVC)

Differential Pressure Transducer

2 Channel LC POD pulser

3 Channel Avery-Hardoll Pulser

Large Digital Remote Display

Paper Receipt Printer

Avery-Hardoll®

BULK FUEL FLOWMETERS

Avery-Hardoll flowmeters are precision made, positive displacement, liquid measuring instruments; considered the most accurate aviation fuel flowmeters in the world.

ELECTRONIC REGISTRATION

MASTERLOAD II™ is an intrinsically safe microprocessor based electronic controller that enhances the performance and operation of positive displacement and turbine meters.

MASTERLOAD III™ is an advanced dual microprocessor based electronic meter register for Zone 1 hazardous areas that is "FlightConnect Ready" for automated fueling and wireless data reporting.

To learn more about Avery-Hardoll products, visit: **AveryHardoll.com**

LIQUID CONTROLS®

Liquid Controls offers a full range of:

- M Series Meters
- MS Series Meters
- Electronic Registration
- Valves
- Air Eliminators & Strainers
- Fueling Accessories
- Wireless Data Management

To learn more about what LC can offer you visit: **LCMeter.com**

Liquid Controls proudly manufactures the Avery-Hardoll and LC brand meters and is the leading manufacturer of positive displacement flowmeters and fuel data management systems in the world.

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