

# BM SERIES METERS®

PRECISION POSITIVE DISPLACEMENT METERS



THE LEADER IN ACCURATE,  
LONG-LIFE, FUEL METERING

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

115 TO 3870 LPM  
(30 TO 1022 USGPM) FLOW RATES

\* subject to meter size

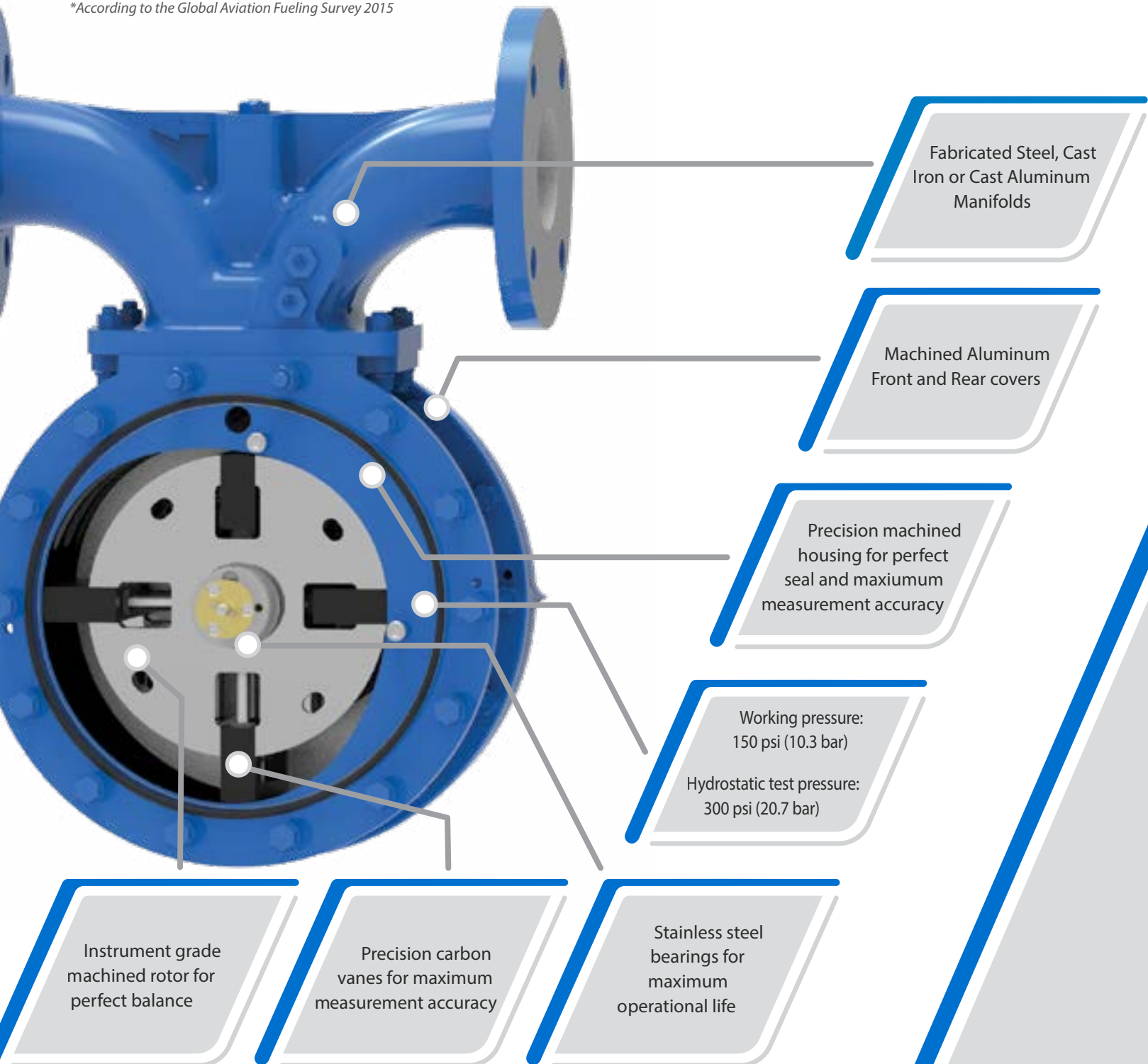


# FEATURES & BENEFITS

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 highest 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 international markets.\*

*\*According to the Global Aviation Fueling Survey 2015*



# DIMENSIONAL DRAWINGS

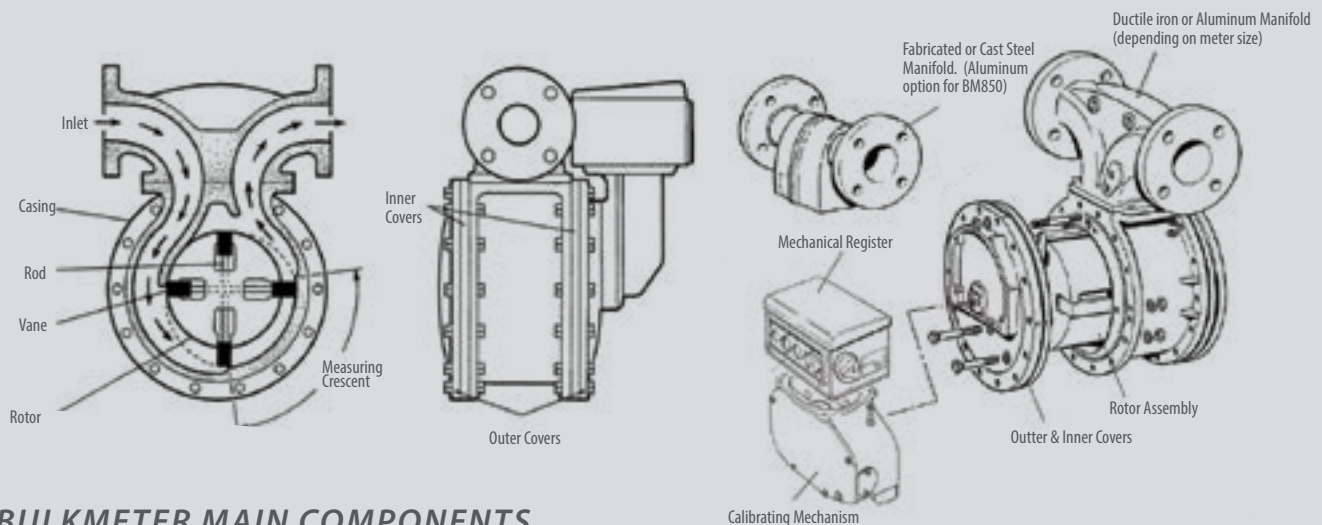
## MECHANICAL METER ASSEMBLY DIAGRAM AND CROSS-SECTION

### AVAILABLE MODELS (INCLUDING DM SERIES)

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 FLOWMETERS

| Series Number | Manifold |             | Flow Rate  |              | General Description  |
|---------------|----------|-------------|------------|--------------|--|
|               | Inches   | Millimeters | USGPM      | Liters / Min |  |
| BM250         | 2½       | 63          | 30 - 301   | 115 - 1140   | Single Capsule Meters  |
| BM950         | 3        | 76          | 34 - 361   | 130 - 1370   |  |
| BM450         | 3        | 76          | 52 - 541   | 200 - 2050   | Double Capsule Meters  |
| BM550         | 4        | 102         | 58 - 602   | 220 - 2280   |  |
| BM350         | 4        | 102         | 66 - 660   | 250 - 2500   |  |
| BM650         | 4        | 102         | 79 - 792   | 300 - 3000   | Triple Capsule Meters  |
| BM850         | 6        | 152         | 102 - 1022 | 387-3870     | Triple Capsule Meter w/Aluminum Manifold for Aviation Applications                     |
| DM Series     | 4        | 102         | 66 - 660   | 250 - 2500   | All Steel Meter, single body<br>Intermittent flow rate 800 USGPM or<br>3000 Liters/Min |



### 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

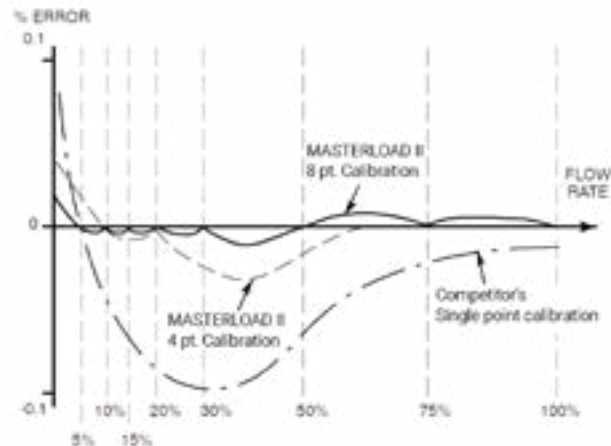
|                      | Meter Series | Pipeline Size | Flow Rate |             |                   | Flanges           |                    |
|----------------------|--------------|---------------|-----------|-------------|-------------------|-------------------|--------------------|
|                      |              |               | USGPM     | lpm         | M <sup>3</sup> /h | Conform To        | Material           |
| Single Capsule Meter | BM250        | 2½" (63mm)    | 30 to 301 | 115 to 1140 | 7 to 68           | ANSI 150 FF or RF | Ductile Iron Steel |
|                      | BM950        | 3" (76mm)     | 34 to 361 | 130 to 1370 | 8 to 82           | ANSI 150 FF or RF | Ductile Iron Steel |

|                      | Meter Series | Pipeline Size | Flow Rate        |                     |                   | Flanges           |  |
|----------------------|--------------|---------------|------------------|---------------------|-------------------|-------------------|--|
|                      |              |               | USGPM            | lpm                 | M <sup>3</sup> /h | Conform To        | Material                               |
| Double Capsule Meter | BM450        | 3" (76mm)     | 52 to 541        | 200 to 2050         | 12 to 123         | ANSI 150 FF or RF | Ductile Iron Steel                     |
|                      | BM350        | 4" (102mm)    | 66 to 660<br>740 | 250 to 2500<br>2800 | 15 to 150<br>168  | ANSI 150FF or RF  | Ductile Iron Steel<br>Intermittent Use |

|                      | Meter Series | Pipeline Size | Flow Rate   |             |                   | Flanges          |                                    |
|----------------------|--------------|---------------|-------------|-------------|-------------------|------------------|------------------------------------|
|                      |              |               | USGPM       | lpm         | M <sup>3</sup> /h | Conform To       | Material                           |
| Triple Capsule Meter | BM650        | 4" (102mm)    | 79 to 792   | 300 to 3000 | 18 to 160         | ANSI 150FF or RF | Steel                              |
|                      | BM850        | 6" (152mm)    | 102 to 1022 | 387 to 3870 | 23 to 232         | ANSI 150FF or RF | Aluminum FF Only<br>Aviation Fuels |

## ELECTRONIC REGISTER CALIBRATION

While conventional meters are calibrated at only one flow rate, MASTERLOAD II™ and MASTERLOAD III™ calibrates a range of flow rates to provide the highest level of accuracy allowing flexibility to configure each system to suit the requirements of their specific application.



## ELECTRONIC AND MECHANICAL OPTIONS



BM950 with POD pulser



BM950 with POD pulser and MASTERLOAD.iQ



BM950 with LC Mechanical Calibrator and Register

# PHYSICAL CHARACTERISTICS

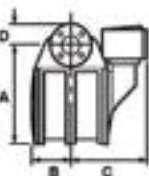
## DIMENSIONS AND CALIBRATION TESTING

Single Capsule Meter



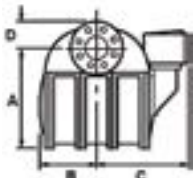
| BM  | Flange Bolt Holes |      |     | Manifold Overall Dimensions |       | Meter Dimensions |      |     |     |     |      |    |      | Approx. Weight of Basic Meter |      |
|-----|-------------------|------|-----|-----------------------------|-------|------------------|------|-----|-----|-----|------|----|------|-------------------------------|------|
|     | No. Off           | Size |     | mm.                         | in.   | A                |      | B   |     | C   |      | D  |      | kg.                           | lbs. |
|     |                   | mm.  | in. |                             |       | mm.              | in.  | mm. | in. | mm. | in.  |    |      |                               |      |
| 250 | 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  |                               |      |
| 950 | 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



| BM  | Flange Bolt Holes |      |     | Manifold Overall Dimensions |       | Meter Dimensions |      |      |     |     |      |      |      | Approx. Weight of Basic Meter |      |
|-----|-------------------|------|-----|-----------------------------|-------|------------------|------|------|-----|-----|------|------|------|-------------------------------|------|
|     | No. Off           | Size |     | mm.                         | in.   | A                |      | B    |     | C   |      | D    |      | kg.                           | lbs. |
|     |                   | mm.  | in. |                             |       | mm.              | in.  | mm.  | in. | mm. | in.  |      |      |                               |      |
| 450 | 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 |                               |      |
| 350 | 8                 | 19   | .75 | 400                         | 15.75 | 420              | 16.5 | 170  | 6.7 | 348 | 13.7 | 115  | 4.5  | 112                           | 247  |
|     | 550               | 8    | 19  | .75                         | 400   | 15.75            | 427  | 16.8 | 170 | 6.7 | 348  | 13.7 | 115  |                               |      |

Triple Capsule Meter



| BM  | Flange Bolt Holes |      |      | Manifold Overall Dimensions |       | Meter Dimensions |      |     |     |     |      |     |     | Approx. Weight of Basic Meter |      |
|-----|-------------------|------|------|-----------------------------|-------|------------------|------|-----|-----|-----|------|-----|-----|-------------------------------|------|
|     | No. Off           | Size |      | mm.                         | in.   | A                |      | B   |     | C   |      | D   |     | kg.                           | lbs. |
|     |                   | mm.  | in.  |                             |       | mm.              | in.  | mm. | in. | mm. | in.  |     |     |                               |      |
| 650 | 8                 | 19   | .75  | 400                         | 15.75 | 427              | 16.8 | 233 | 9.2 | 411 | 16.2 | 115 | 4.5 | 126                           | 278  |
|     |                   |      |      |                             |       |                  |      |     |     |     |      |     |     |                               |      |
| 850 | 8                 | 22   | .875 | 400                         | 15.75 | 427              | 16.8 | 233 | 9.2 | 411 | 16.2 | 140 | 5.5 | 136                           | 300  |
|     |                   |      |      |                             |       |                  |      |     |     |     |      |     |     |                               |      |

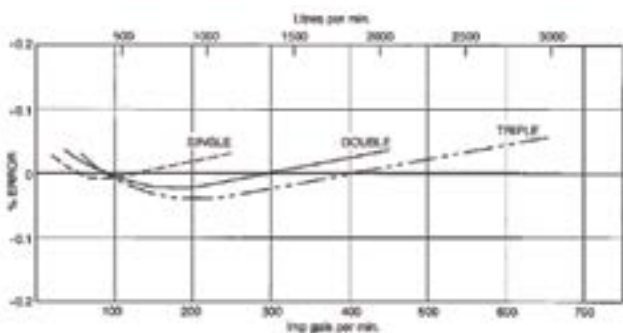
### MECHANICAL CALIBRATION

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: Kerosene
- Specific gravity: at 15°C = 0.8
- Viscosity at 15°C = 2.4 centistokes.

### WORKING SPECIFICATIONS

- Maximum working pressure: 150 psi (10.3 bar)
- Test pressure: 300 psi (20.7 bar)
- Temperature range: -40°C to 100°C
- Volume per revolution:
  - 2.27 litres / 0.60 USG (single capsule)
  - 4.54 litres / 1.20 USG (double capsule)
  - 6.82 litres / 1.80 USG (triple capsule)
- Typical accuracy: +/- 0.05%
- Repeatability: 0.02%



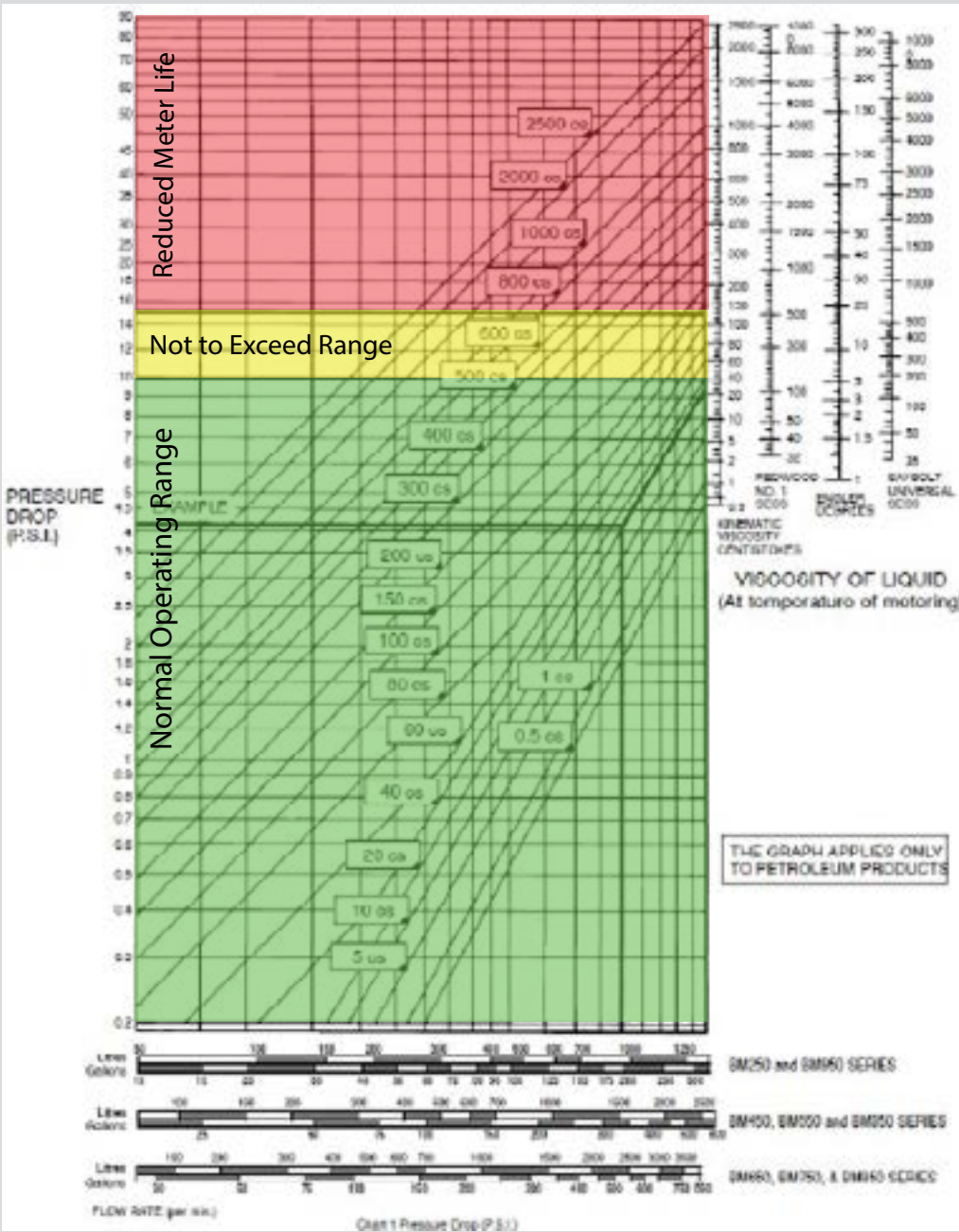
Typical accuracy curves for the basic meter build (10:1 turndown)



# 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.iQ™ REGISTER

- ATEX ZONE 2 approved register
- Configurable screens and user prompts
- dP, DENSITYiQ, water detection with SENSEiQ
- Wireless communication via Bluetooth and Wi-Fi



### MASTERLOADx.iQ™ REGISTER

- ATEX ZONE 1 approved register
- Configurable screens and user prompts
- dP, DENSITYiQ, water detection with SENSEiQ technology
- Wireless communication via Bluetooth and Wi-Fi

## ACCESSORIES



FUELiQ Android Application  
for ultimate control of fueling data



Temperature Volume  
Compensation (TVC)



Differential Pressure Transducer



2 Channel LC POD pulser



Large Digital Remote Display



Paper Receipt Printer



### **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.iQ™ the latest innovation in electronic registration approved to ATEX Zone 2 hazardous areas.



MASTERLOADx.iQ™ is the ATEX Zone 1 extension to MASTERLOAD.iQ for Zone 1 hazardous areas.

To learn more about Avery-Hardoll products, visit: [AveryHardoll.com](http://AveryHardoll.com)



Silea also offers a full range of:

- Loading arms
- Floating suctions
- Pumps & pump units
- Folding stairs
- Skids

Silea was born in 1968, sensing the future development of the oil sector, both in the distribution and in the transfer of products.

Located in the district of Bologna, in Ozzano dell'Emilia, over the years, the company specialized in the transfer of hydrocarbons, producing loading and unloading arms, floating suctions, pumps, folding stairs for tank trucks, etc.

Today, thanks to over 50 years of experience, Silea has also expanded and developed its market in other sectors, such as food, chemical and bitumen; obviously, without losing sight of the most historic Oil & Gas sector, within which Silea remains a point of reference, for the quality of the products and the historicity of the brand.

To learn more about us: [www.silea.it](http://www.silea.it)

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