

# AGAR CORPORATION

Process Measurement & Control



## MPFM-50 SERIES

*Multiphase Flow Meter (Oil/Water/Gas)*

The AGAR MPFM-50 is a low cost multiphase meter that continues the long tradition of excellent multiphase meters provided by Agar for over 15 years, which include our 300, 401 and 408 series.

### ADVANTAGES OF THE AGAR MPFM-50 SERIES:

- Gas void fraction 0-100%; 0-100% Water
- Not affected by flow regimes
- High accuracy, real-time flow measurement
- No Maintenance required other than basic instrumentation check-up
- No nuclear (radioactive) sources
- Compact, portable, and easy to transport and install



*Typical 2" MPFM-50. Trailer Mounted Version*

[www.agarcorp.com](http://www.agarcorp.com)



## MPFM-50 Series Features

The AGAR MPFM-50 is a multiphase flow meter that provides on-line, real-time well production information for the entire production flow stream. It eliminates the need for expensive, secondary equipment such as phase separators, valves, and pumps for flow measurement. The MPFM-50 Series is fully self-contained and compact for use in rugged field conditions and can easily be trailer mounted for portable service.

The AGAR MPFM-50 is a multiphase flow meter that provides on-line, real-time well production information for the entire production flow stream from liquids with gas under-carry to wet gas (liquid over-carry); i.e. 0 - 100% Gas Volume Fraction. It is also the only meter which currently is unaffected by flow regimes.

The AGAR MPFM-50 combines advanced coriolis technology with traditional flow-measurement devices such as AGAR water cut sensor to achieve superior accuracy in the full GVF range: 0-100% including the wet gas regime from 95-100%. The AGAR MPFM-50 is a low cost compact multiphase flow meter that can accurately measure oil, water, and gas flow rates without separation of the production stream. The AGAR oil/water monitor provides the capability for measuring water cuts from 0-100% even in the presence of changing salinities.

### **MPFM-50 COMPRISES THREE PRIMARY SUBSYSTEMS:**

- The **mass flow and density measurement** are based on Coriolis and other ancillary sensors. Engineering advances allow Agar to utilize these sensors outside their normal operating ranges. The mass flow momentum and density data are fed into the AGAR Data Analysis System (DAS), which determines the net gas flow rate and net liquid flow rate.
- The **AGAR Water-cut meter (OW-201 or OW-301)** is used to measure water content accurately over the full range of 0-100% in both oil and water-continuous phases. Accuracy is not affected by changes in velocity, salinity, pH, viscosity, temperature, or density. Water-cut data is fed into the DAS and used to determine the individual oil and water flow rates from the net liquid flow rate.
- The **AGAR Data Analysis System (DAS)** performs on-line analysis of data acquired from the above sub-systems to determine the oil, water, gas, and total fluid flow rates. It also supports a variety of PVT calculations that convert the flow from process conditions to standard conditions. It also has the ability to accept user-defined PVT relations.

# MPFM-50 General Specifications



## PERFORMANCE:

Gas Void Fraction	0 to 100%
Water cut	0 to 100%
Flow Regimes	All: (e.g. Bubbly, Wavy, Slug, Annular, etc.)
Pressure	Up to 1500#
Ambient Temperature	-4°F to 160°F (-20°C to 70°C) Optional Low Temp -40°F to 160°F (-40°C to 70°C)
Process Temperature	Standard Model 32°F to 212°F (0°C to 100°C) High Temperature Model 32°F to 450°F (0°C to 232°C)
Liquid Viscosity	Low Viscosity Model: 0.1-30 cP High Viscosity Model: 0.1-2000 cP
Salinity	0 to 20% NaCl by weight (up to saturation)
Sand/Particulate	Up to 5% by volume and less than 1mm particle size
Max. Pressure Drop	Low Viscosity Model: Less than 15 psi (1 bar) <sup>†</sup>
Wetted Parts	Standard: 3/6 Stainless Steel; Hastelloy, Carbon steel piping, and other materials available on special order; According to ASME B31.1 and B31.3. PEEK; Ceramics Isolators

**PREFERRED INSTALLATION:** Vertical upward flow

## ELECTRICAL:

Power Supply: 110, 220 VAC, 24 VDC (Optional)

Power Requirements: 36 Watts

## SAFETY CERTIFICATIONS:

ATEX: Ex ia IIB T4, Ex II 1G - OW

Ex is IIC T6-T1, Ex II 1G - Coriolis<sup>†</sup>

Ex d ia IIB T4, Ex II 2G - DAS<sup>†</sup>

CSA: Class 1, Div 1 and 2, Groups C & D

## DATA COMMUNICATION: (STANDARD AND OPTIONAL)

Standard: 5 x 4-20 mA (Oil flow rate, Water flow rate, Gas flow rate, Temperature, Pressure)

Standard: 3 x Pulses 0-5V square shape (Oil flow rate, Water flow rate, Gas flow rate)

Standard: RS485 or RS232 with MODBUS Protocol

Standard: RS232 communication with Laptop, or Industrial PC, Using Agar WINDOWS application

Optional: HART Protocol

Optional: Modem or wireless communication

## TYPICAL DIMENSIONS:

Approximate Weight for 2" meter#: 600 lb (270 kg)  
Approximate Dimensions# (F/FXWXH): 60 in X 40 in X 80 in (150 cm X 100 cm X 175 cm)

## ACCURACY:

Accuracies are not affected by changes in salinity, viscosity, density, temperature, pressure, or pH.

Worst case instantaneous results for a 2" meter (quoted to 2 sigma):  
(FS<sub>L</sub>\* = Liquid Full Scale, R = Reading)

<b>Water Flow Rate Error:</b>	± 2% FS <sub>L</sub> ± 5% R
<b>Oil Flow Rate Error:</b>	± 2% FS <sub>L</sub> ± 5% R
<b>Gas Flow Rate Error:</b>	± 2% FS <sub>L</sub> ± 5% R

¶	Pressure drop across the meter depends on the viscosity of the fluids, meter size, flow rate, etc. The value quoted here in is for a 2" meter, assuming 100% liquid, of 30 cP viscosity, flowing at 5000 bbl/day (795 m <sup>3</sup> /day). For a fluid of viscosity 100 cP, the pressure drop will be about 30 psi (2 bar).
†	Applied For
#	Weights and Dimensions will vary according to options chosen. Example shown is for a 2" meter.
*	FS <sub>L</sub> is the maximum liquid flow rate at zero gas volume fraction. FS <sub>L</sub> depends on the size of the meter. The errors quoted are for a 2" meter for which FS <sub>L</sub> = 5000 bbl/day (800 m <sup>3</sup> /day).

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ER No. 4967: SL0001 Rev 2: 04/2009