



BAGGI



AGAR TECHNOLOGY

Process Measurement & Control Solutions



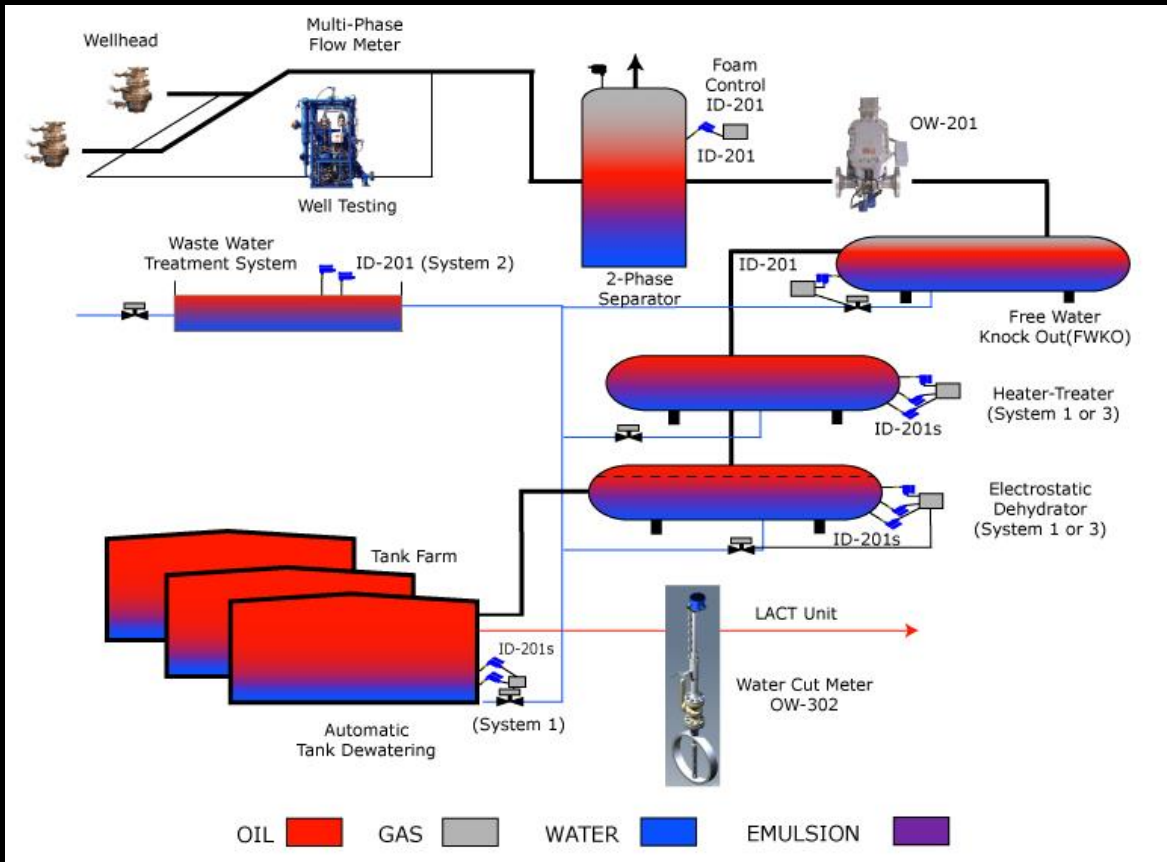
www.agarcorp.com



Agar Technology Introduction

- Agar Technology is a world leader in providing uniquely innovative hydrocarbon/water/gas measurement and control systems.
We have become an important player in the field of wet gas and multiphase flow measurement and have supplied our metering solutions for Onshore, Offshore stationary and Portable well testing measurement applications.
- Our more than 30 years experience in Water Cut metering has been used for a variety of applications such as control measurement in upstream and downstream applications, well testing, and fiscal allocation metering systems.

Upstream Oil & Gas Production



- **Multiphase Flow Meter Well Testing**
- **Two-Phase Test Separators**
- **Watercut Meters**
- **Production Separator**
- **Foam Detection & Control**
- **Amine Contactors, Glycol Dehydration**
- **Free Water Knockout**
- **Heater Treaters, Dehydrators**
- **Automatic Tank Dewatering**
- **Waste Water Treatment**
- **BS & W Monitor**

Multiphase Flow Measurement

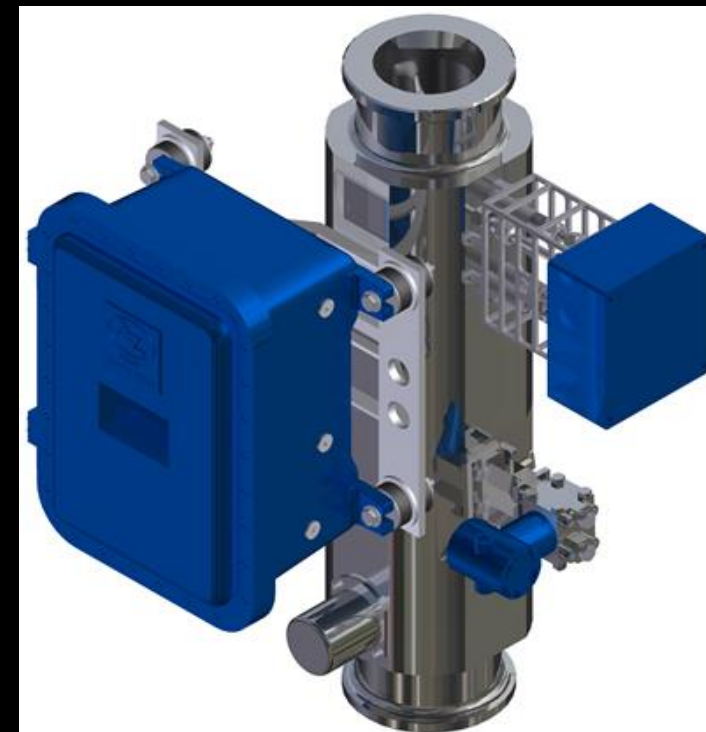
■ Agar MPFM

- Non-nuclear, versatile, three-phase flow meter
- Measure the oil/water/gas without separation of the phases at the well head, and offers an economical alternative to permanent and portable well test separator systems, which are required for both production optimization and regulatory compliance



Agar MPFM Design Approach

- Non nuclear
- No salinity affect
- Independent from:
 - ✓ Flow pattern
 - ✓ Flow rate
 - ✓ Temperature
- Minimal Field Adjustment required
- Real time Data acquisition



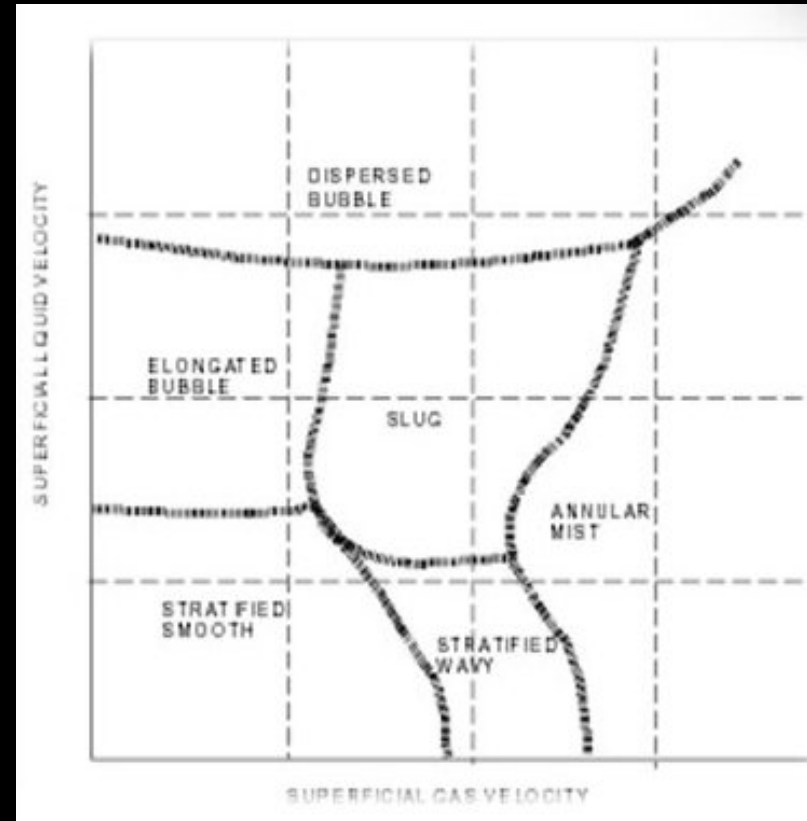
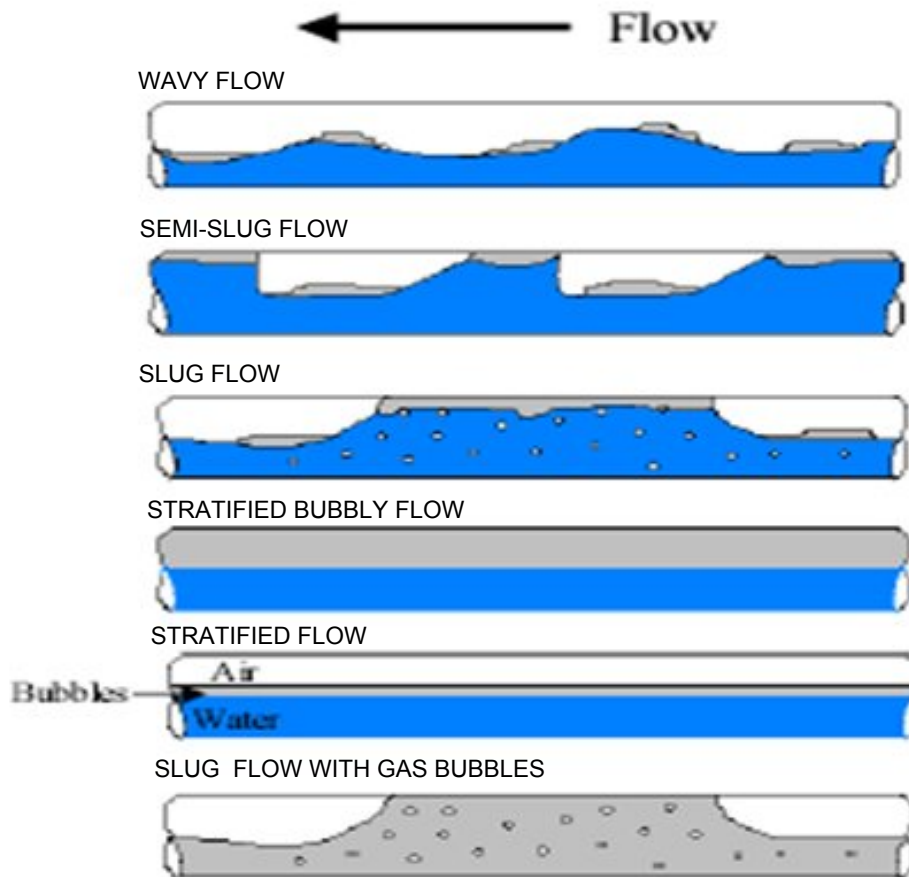


Multiphase Flow measurement

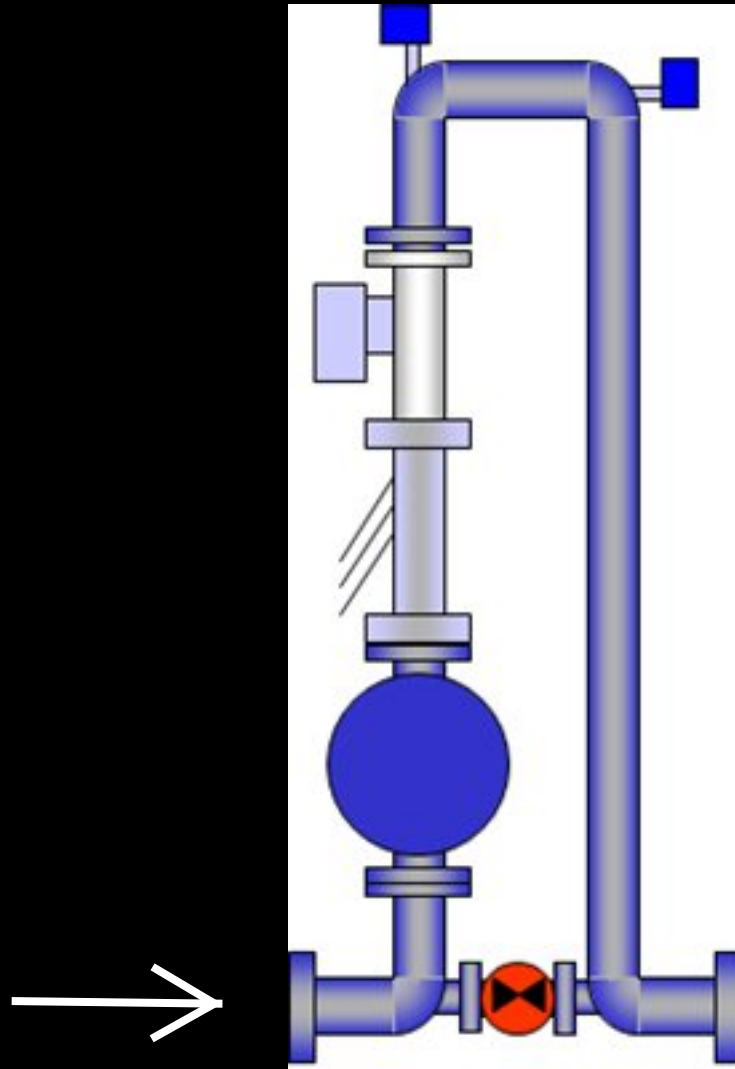
Benefits:

- Eliminate test separators and Test devices
- Provide real time continuous data
- Optimize well production for extended recovery
- Improve Production allocation
- Huge reduction on the CAPEX and OPEX in long term

Multiphase Flow Patterns



Agar MPFM Principle



Multiphase Flow Meter



MPFM-400



MPFM-300



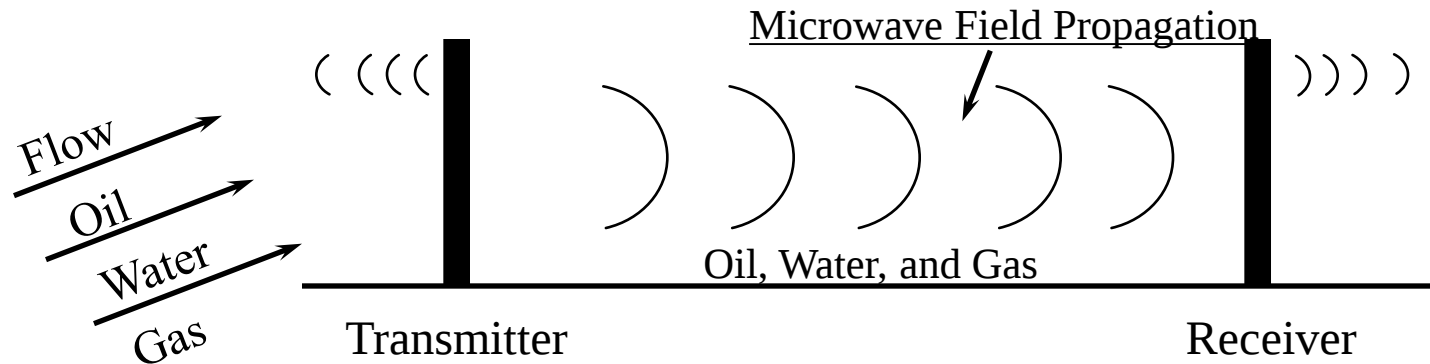
MPFM-50E



Microwave measurement

PAMS

Phase and Amplitude Measuring System



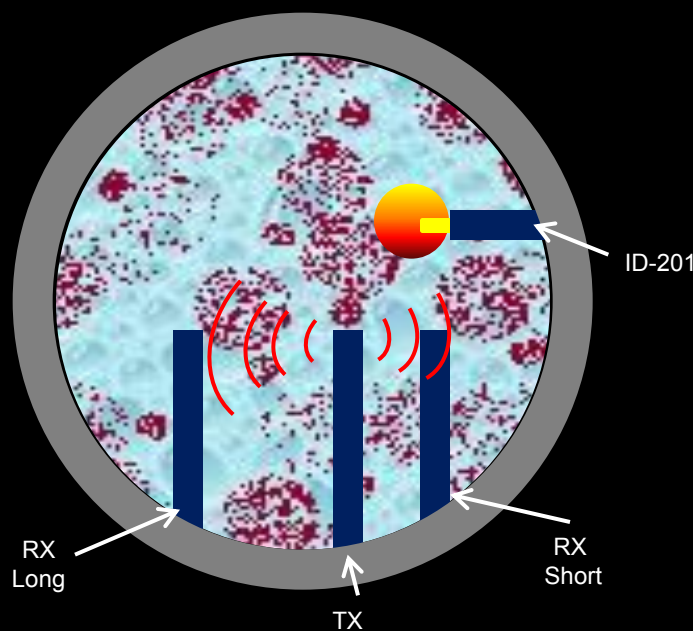
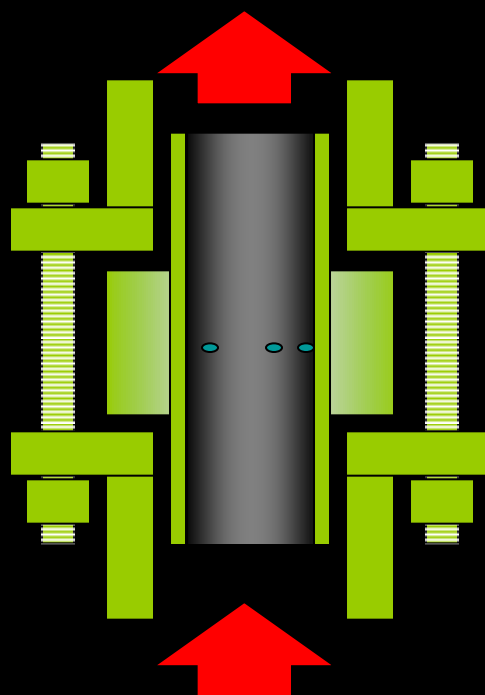
Phase (Wavelength) ———→ Propagation

Amplitude ———→ Microwave Attenuation

Microwave Phase and amplitude are affected by the Permittivity and salinity of the fluid mixture.

OWM Sensor

The OWM sensor contains three microwave antennas: two receiving antennas and one transmitting.

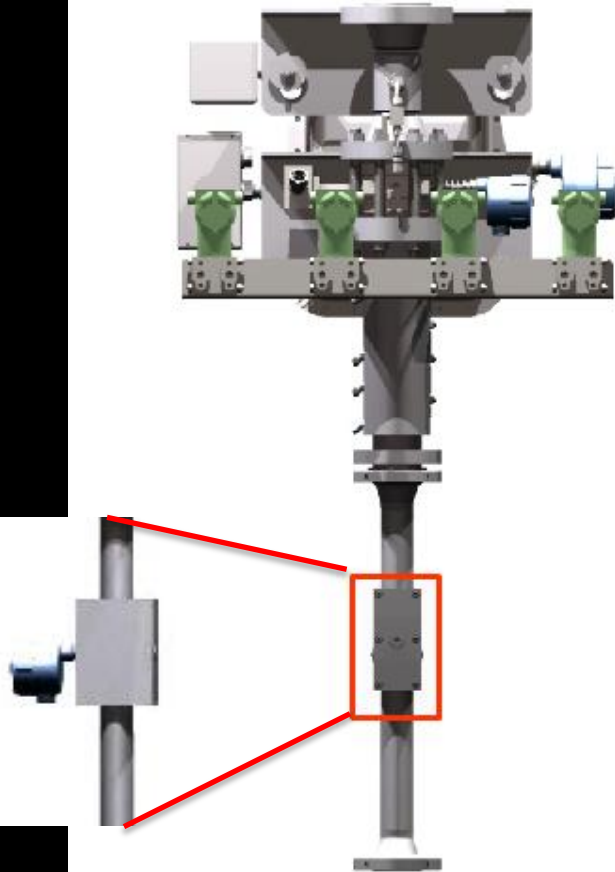


The Frequency Interface Detector (ID-201) allows to determine the status of the oil/water emulsion. Temperature is obtained from the TS transmitter located in the OWM sensor

AGAR CORIOLIS



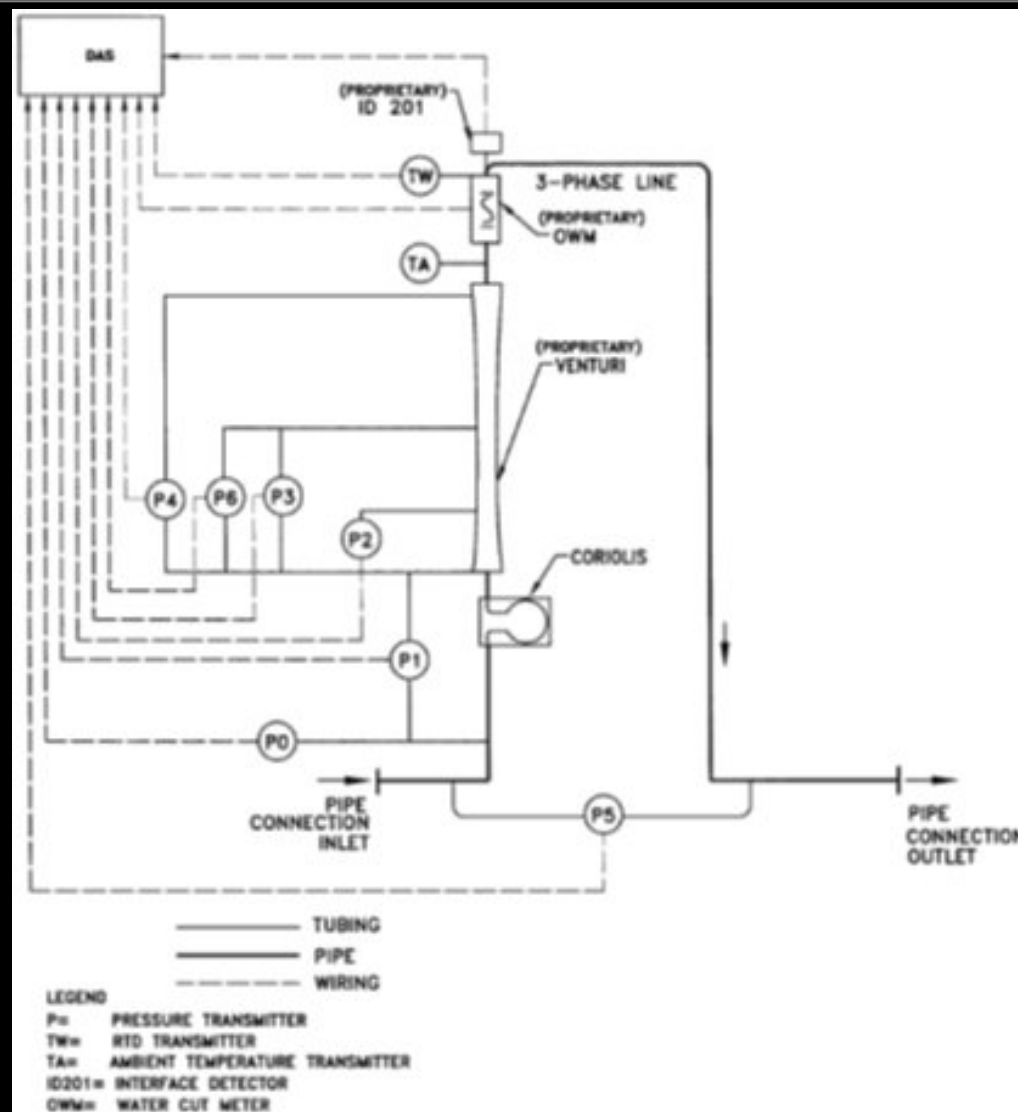
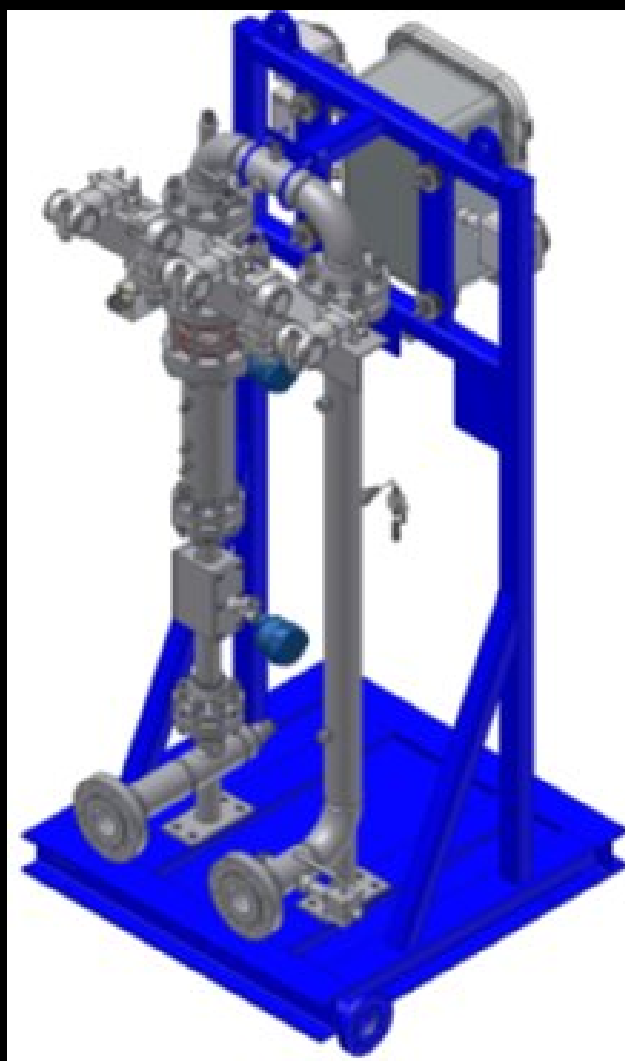
AGAR CORIOLIS



AGAR CORIOLIS METER

- Able to handle 0-100% GVF
- Low Differential Pressure due its unique design.
- Compact Design
- Designed as a straight through meter

MPFM-50 Block Diagram



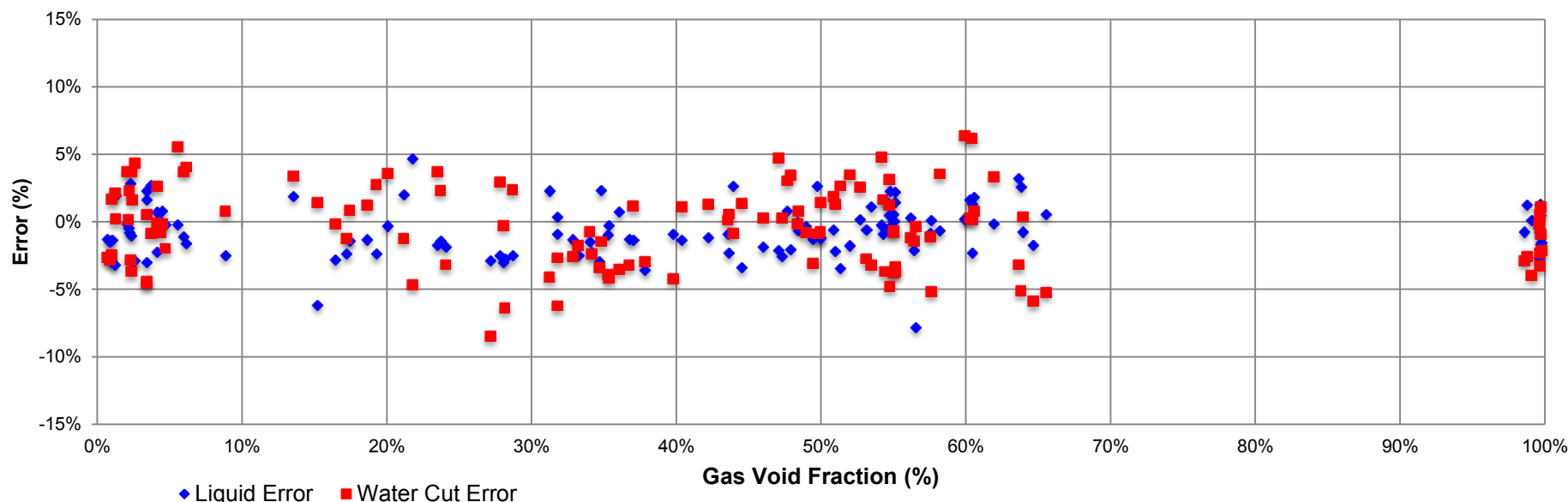
MPFM-50 Comparative Performance

Summary of Results (data provided by customer)



Producer	Liquid Flow Range		Water cut Range		GVF		Liquid Error (Relative)	Water Cut Error (Abs)
	Min	Max	Min	Max	Min	Max	Avg	Avg
	m3/d	m3/d	%	%	%	%	%	%
A	213.99	643.93	51.98	88.13	0.71%	99.77%	-0.42%	-0.07%
B	365.81	439.78	79.48	83.25	1.00%	1.00%	-2.17%	-0.40%
C	275.75	512.63	54.04	78.32	15.18%	65.53%	-0.77%	-0.96%
D	604.55	1347.23	34.27	63.06	1.22%	42.19%	-1.18%	0.10%
E	245.57	373.60	45.52	78.51	1.25%	6.15%	-0.43%	1.16%

AGAR MPFM-50 Accuracy Vs GVF



Dynamic Behavior of the Well

