



M-Flow Sure-Cut[®]

Low Water Cut Analyzer



Achieve significant operational efficiencies with Sure-Cut®

TechnipFMC and M-Flow have collaborated to deliver precision water cut measurement under changing process conditions. This partnership with M-Flow offers a fully compensated single sensor design for highly accurate measurement performance.

Delivering superior measurement accuracy

Sure-Cut® uses microwave resonant cavity sensing. Microwave resonance is recognized as the highest accuracy method for obtaining water in oil, water cut measurements. Sure-Cut® has a proven uncertainty, based on extensive laboratory validation.

The key consideration for users of water cut analyzers should be real-world field performance of the device where variations in oil type and composition, density and temperature can have a substantial impact on accuracy. Water cut analyzer users need to be aware of these factors and be confident that their device can perform in these realworld conditions. Sure-Cut® is supplied with auto-calibration software which is active when line density and temperature readings are provided in a System based around Sure-Cut®.

The Sure-Cut® analyzer's ability to compensate and maintain accuracy in a system measuring a variety of oil densities has been proven in a year long field validation trial.



The benefits

- ▶ Full range 0% to the inversion point in a single analyzer
- ▶ Full density compensation as standard
- ▶ Compatible with a wide range of oil densities and viscosities
- ▶ Unique design with no intrusions into the flow eliminates sensor fouling and damage
- ▶ Repeatable multi-year performance with no maintenance or recalibration required

Instrument performance

Water Cut range	0% to Inversion Point Inversion point varies for different oil types. Typical range is between 35-60%		
Operating ranges	Oil Density: 600 to 1000 kg / m ³ (10 to 100 API Gravity) Water Density: 990 to 1240 kg / m ³		
Measurement Accuracy*		Water cut range	Uncertainty
	Laboratory calibration	0-1%	± 0.05% absolute
	Laboratory calibration	1-20%	± 0.12% absolute
	Flow loop testing (NEL)	0-32%	± 0.22% absolute

*Uncertainty quoted is 2 x SD to 95% confidence

Instrument performance in field applications

Operating Range	Oil Density: 840 to 953 kg / m ³ (17 to 37 API Gravity)
Measurement Accuracy*	± 0.14%

Data from 64 measurement runs, each with a 6-12 hour duration.

*Uncertainty quoted is 2 x SD to 95% confidence for a 1" analyzer versus Karl Fischer analysis of API 8.2 compliant auto samples. Quoted numbers overstate analyzer uncertainty as they include the uncertainty of sampling and lab analysis.



➤ Sure-Cut® Low Water Cut Analyzer

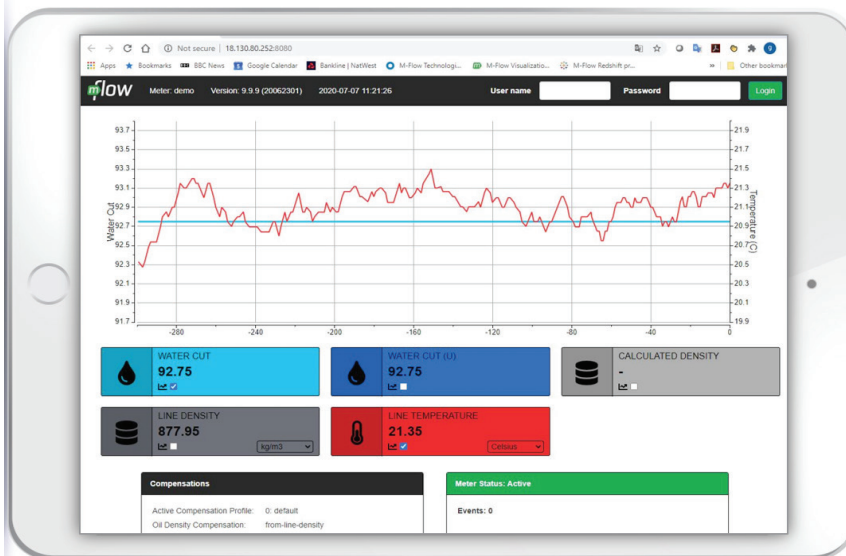
Connecting you to the digital oilfield, from anywhere in the world

Graphical interface and connectivity

- ▶ M-Flow uses a transparent system to process and present accurate production and diagnostic data
- ▶ Monitored remotely, M-Flow provides modern instrumentation for the digital oilfield
- ▶ Quality, reliable data is accessible via a secure online interface from any connected device, anywhere in the world

The benefits

- ▶ Fully digital electronics
- ▶ Continuous, rich and configurable data
- ▶ 24/7 access to real-time and historical data
- ▶ Modbus integration across SCADA, PLC
- ▶ GUI for monitoring set-up and diagnostics
- ▶ Accessible via ethernet web interface, local or remote, wired or Wi-Fi straight to laptops or handheld devices



➤ M-Flow digital interface

Design specification

Sensor type	Microwave
Water cut range	0% to inversion point
Size	2" - 4" Sensor Section / 2" - 8" Pipe Size
Pressure range	Standard 102 barg, 1480 psig Higher pressure ratings available on request
Pressure drop	0 barg / no intrusion flow
Fluid temperature range	-10 to +110° C (+14 to +230° F)
Ambient temperature range	-40 to +60° C (-40 to +140° F) Electronics certification
Hazardous area certification	ATEX, CSA, UL, II 2 (1) G Ex d [ia Ga] IIB T4 Gb
Ingress protection	IP66, NEMA 4X
Dimension / Weight	198x114x119mm / 3kg
Materials	Electronics enclosure: Painted Aluminium Core: PEEK/Carbon Fibre composite Sour Service Compatible Flange (and wetted metal parts): 316L Stainless Steel Housing: 316L Stainless Steel
Material compliance	NACE MR 0175 / ISO 15156
Flange class	ASME B16.5 Rated #150/300/600
Mounting / Orientation	Horizontal and vertical
Power	Power supply: Typical 24VDC, Min 18 VDC, Max 30 VDC Power consumption: Typical 5W

Digital interfaces

Comms	Modbus RTU, Serial Settings: 19200 bps, 8 data-bits, 1 stop-bit, even parity, no flow control. Modbus TCP:10,100 Base-T Ethernet
Transmission length	1200m (RS-485 / TIA-485-A) / 100m (Ethernet)
GUI	Access to system config, Modbus Comms Set-up, Measurement config and System diagnostics
WiFi	Full access to Graphical User Interface (GUI)
Screen	Display: 2.42" OLED, 128 x 64 pixels Dimensions: 57mm x 29mm

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