Roxar Watercut meter

FullCut (FC) model

Roxar's Flow Measurement solutions offer world-class Watercut meters (WCM) characterized by:

- Continuous real time measurement
- Unmatched sensitivity and long-term stability
- Full bore or by-pass in-line installation
- No moving or exposed parts
- Standard sizes, ratings and materials
- Automatic compensation for process temperature
- Optional AutoZero function for automatic compensation for hydrocarbon composition and entrained gas (max. 10 %)
- Optional Coriolis interface for two-phase flow measurement
- User-friendly, menu based configuration software

The Roxar WCM FC model is characterized by:

- Measurement range: 0 – 100 %
- Sensor spool piece diameter: 2" – 3"
- Maximum design pressure: 100 BAR

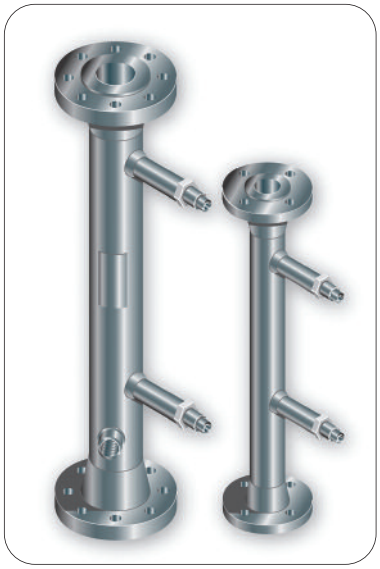
Operating principle

The Roxar WCM FC model is constructed as an open cable coaxial resonator. The pipe is used as the outer conductor of a coaxial transmission line, and a metal rod in the middle of the pipe acts as the centre conductor. An electric field propagating along the coaxial line will be reflected at both ends of the rod. Oil/water mixtures flow in the space between the centre conductor and the pipe; thus the mixture affects the frequency at which the sensor resonates.

The unique AutoZero function

All water-in-oil analyzers are sensitive to variations in the dry oil density and to the presence of free gas in the pipe. The most severe error is caused by gas entrainment in mixtures where the water is the external phase of the emulsion.
In this case, each percent of free gas in the mixture leads to a 1 % overestimation of the volumetric oil content.

Through extensive research and testing, Roxar have proven a close correlation between the density and the high frequency permittivity of a dry hydrocarbon liquid. This patended relationship is being applied by the Roxar WCM for the optional AutoZero function, which enables the meter to largely eliminate the errors caused by variations in dry oil density and entrained gas.



The AutoZero function requires a line density input to facilitate an iteration routine which will calculate both the % Water and the Dry Oil Density (or combined oil/gas hydrocarbon density in the case of free gas).

The unique AutoSalinity function

The optional AutoSalinity function enables continuous compen-sation for changing water salinities corresponding to water con-ductivities in the range from 0-43 mS/cm. This is equivalent to an AutoSalinity range for different temperatures from freshwater to:

- 3.0% NaCl at 20°C
- 1.7% NaCl at 50°C
- 1.0% NaCl at 100°C
- 0.7% NaCl at 150°C

The uncertainty of the % Water measurement with AutoSalinity is±3% absolute, within the AutoSalinity range.

Specifications

System performance and characteristics

Measurement range:	0-100% water
Accuracy:	
In-line calibration:	0-100% water: ±1% absolute
Density method:	0-60% water (oil cont): ±1.5% absolute 60-100% water (water cont): ±2.5% absolute
Repeatability:	0.25%
Sensitivity:	0.05%
Response time:	0.75s
Flow conditions:	Well mixed
Pressure drop:	Less than 0.3 bar (5 psi)
Effect of temperature variations:	Automatic temperature compensation
Effect of oil density variations:	+ 0.027% water per + 0.001 g/cm3 (Automatic compensation with AutoZero)
Effects of pressure variations:	Approximately + 0.00017% water per + 1 psi (Automatic compensation with AutoZero)

Input/output

Analogue 4-20 mA inputs

Input signals:	Up to 3 (temperature, mixture density, total flow rate)

Frequency inputs

Input signals:	Up to 2 (mixture density and total flow rate)

Analogue 4-20 mA outputs:

Output signals:	Up to 5 (temperature, % water, oil flow rates, water flow rates, etc)

Pulse outputs:

Output signals:	Up to 2 (accumulated volume of oil and water)

Digital I/O

RS232/422 serial ports, user selectable baud rates

Number:	2 (ASCII-string)
Transmission distance:	15 m (RS232) / 1000 m (RS422)

Software

The Roxar WCM comes fully equipped with all necessary software. This facilitates basic configuration, calibration and configuration of inputs and outputs, selection of measurement units, in-line calibration etc. The menu system is accessed via the serial port of any PC with MS Windows.

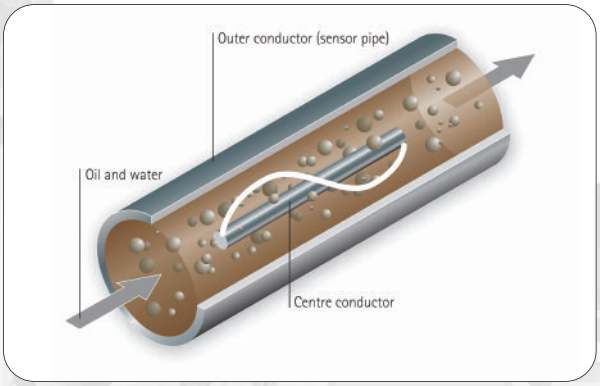
Mechanical and electrical

Meter body spool piece

Materials:	Stainless steel SS 316L or Duplex UNS S31803
Weather protection:	IP66
Connections:	2" and 3", up to 600#ANSI
Temperature:	Standard up to 120°C (250°F)
Hazardous area approval:	Simple apparatus.

Electronic housing:

Materials:	Stainless steel (ATEX) /painted aluminium (NEC)
Weather protection:	IP66 / NEMA 7
Mounting:	Field–mounted, maximum 2 m from sensor
Ambient temperature:	-20°C – 60°C (-4 – 140°F)
Weight: (NEC)	Approx. 70 kg (ATEX) / 88lb
Voltage supply:	100-240 VAC 50-60 Hz / 21-35 VDC
Power consumption:	Max. 32 W, typically 25 W
Hazardous area approval:	EEx de [ia] IIB T5 and Class 1, Div 1, Group C
Temperature transmitter:	EEx d IIC T6 (IS as option) and Class 1 Div 1, Group B C D



For further information please contact your regional office or email: info@roxar.com or visit www.roxar.com

CIS	**Email:** metering.moscow@roxar.com **Tel:** +7 095 504 34 05	Middle East	**Email:** metering.dubai@roxar.com **Tel:** +971 4 883 6606
Europe/Africa	**Email:** metering.aberdeen@roxar.com **Tel:** +44 1224 411 200	Asia Pacific	**Email:** metering.kl@roxar.com **Tel:** +603 2162 4450
Americas	**Email:** metering.houston@roxar.com **Tel:** +1 713 482 6400	Scandinavia	**Email:** metering.stavanger@roxar.com **Tel:** +47 51 81 88 00