Weatherford®

Red Eye® 2G Water-cut Meter

Unmatched accuracy across all water cuts in real-world situations.

Red Eye 2G Water-cut Meter

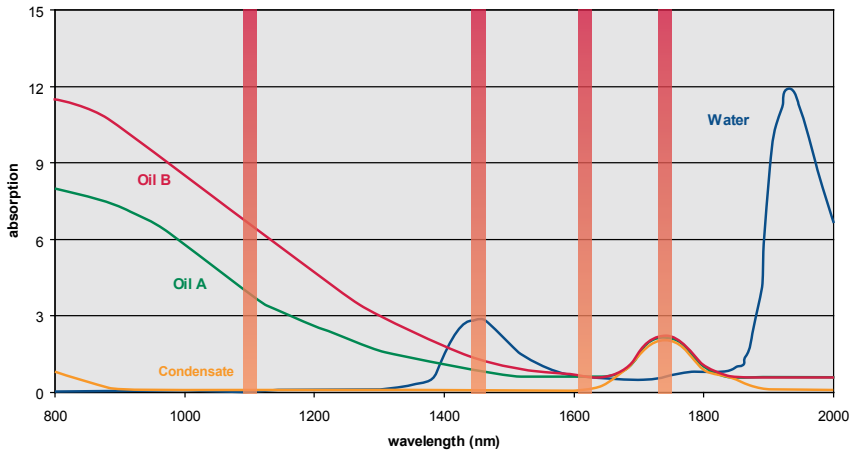
The *Red Eye* 2G water-cut meter uses patented optical sensor technology to accurately measure the full range of water cut (0 to 100%) in a commingled oil and water stream. Very high accuracy across all water-cut levels and easy installation and configuration make this unique meter suitable for numerous applications. The meter can be used in stand alone mode to measure and report instantaneous water cut and in conjunction with the *Red Eye* net oil computer (NOC) to perform timed production well tests, or as part of the *Red Eye* multiphase metering system (REMMS).

How Does It Work?

The measurement is based on near-infrared absorption spectroscopy where oil and water are easily differentiated.

The water-cut meter achieves unmatched accuracy at high water-cut levels as well as lower water-cut measurements by simultaneously measuring multiple wavelengths that include both water and oil absorption peaks.

Absorption Spectroscopy



The graph shows several bands of infrared wavelengths that are absorbed by the components of the produced fluids.

Unmatched Accuracy in Production Environments

The *Red Eye 2G* water-cut meter delivers high accuracy performance under actual production environments, not just in laboratory conditions. Water-cut measurement uncertainties are less than 2% even with situations of varying salinity and when entrained gas is present.

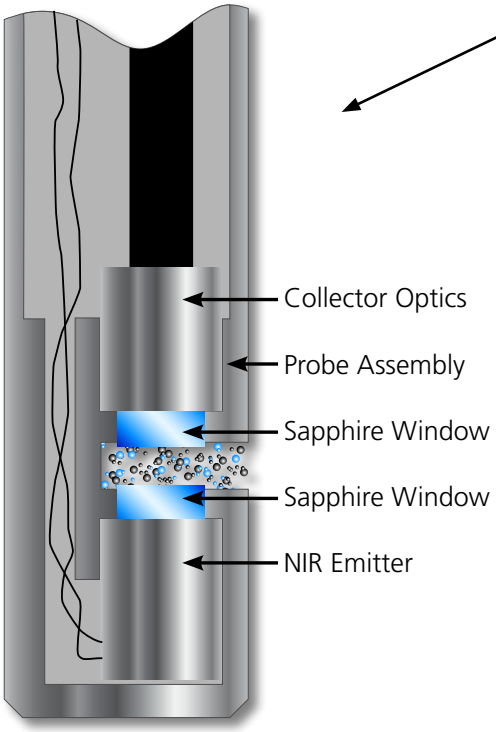
Gas Volume Fraction (GVF) Effects

This meter is designed to handle real-world issues such as entrained gas. By using the technique of multiple wavelength measurements as employed by the *Red Eye* water-cut meter, great tolerance to varying gas conditions is possible. GVFs of up to 5% have no effect on unit accuracy and up to 20% have only minimal effect.

Emulsion Handling and Salinity Effects

The Red Eye 2G water-cut meter works with emulsions as well as fluids that separate easily. Emulsions tend to cause light scattering in addition to absorption. The scattering is equal at all wavelengths whereas the absorption is strongly dependent on wavelength. The water-cut meter nulls out the scattering effect and measures the absorptions which are directly related to the water cut. Salinity has no effect on the measurement since water absorption is based on the water molecule itself, not the dissolved salts. Accuracy is, therefore, unaffected by different and changing salinities.

A local two-line display provides an instantaneous water-cut reading, active well number and instrument status information for user convenience.



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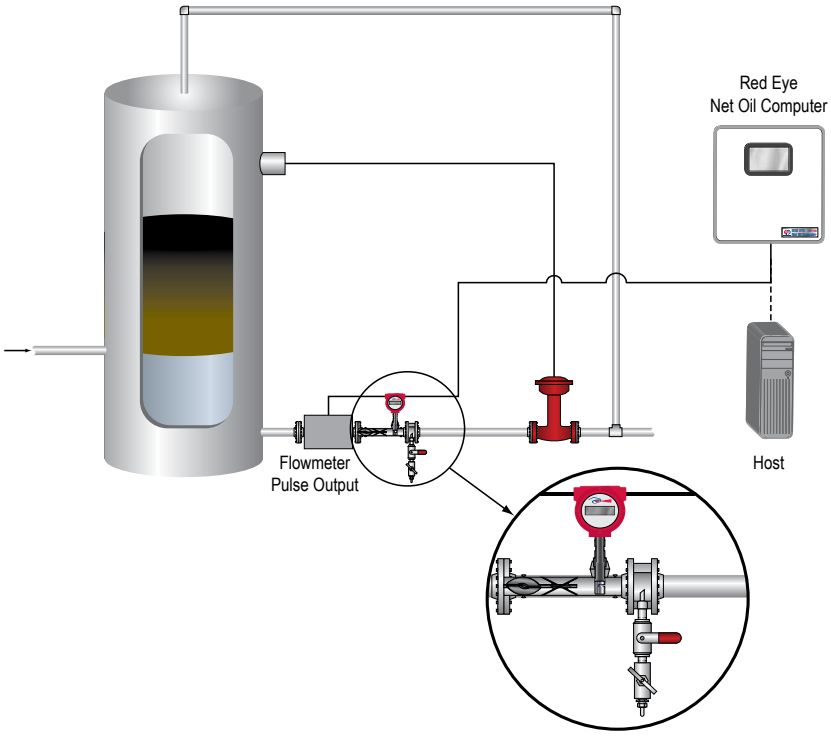
Typical Installation



Red Eye 2G Water-cut Meter Highlights

- Unmatched accuracy in real-world situations
- Insensitive to entrained gas
- Ignores salinity and dissolved gas
- Easy installation, calibration and service

Typical Applications

Well Testing

The water-cut meter is typically used downstream from a two phase test separator in the liquid leg. The meter can be combined with a total liquid flowmeter and NOC for individual oil and water flow rates.

Individual Well Monitoring

The Red Eye 2G water-cut meter can be used to monitor individual wells and provide continuous real-time, water-cut data. When streams contain free gas (up to 20% gas void fraction) the meter provides unsurpassed performance in accurate determination of oil and water rates.

Group Production at Centralized Facilities

The water-cut meter can be used to monitor group production lines as well as individual test lines. The compact insertion style design is very cost effective even for large line sizes.

Dewatering Monitoring Systems for Crude Oil Tanks

When a Red Eye 2G water-cut meter is installed on the discharge line from a tank, the operator can easily identify the rag layer (interface between the oil and water in the tank). The optical sensors of the meter sense very small amounts of oil in the rag layer as it passes through the pipe allowing the operator to shut off the flow from the tank.

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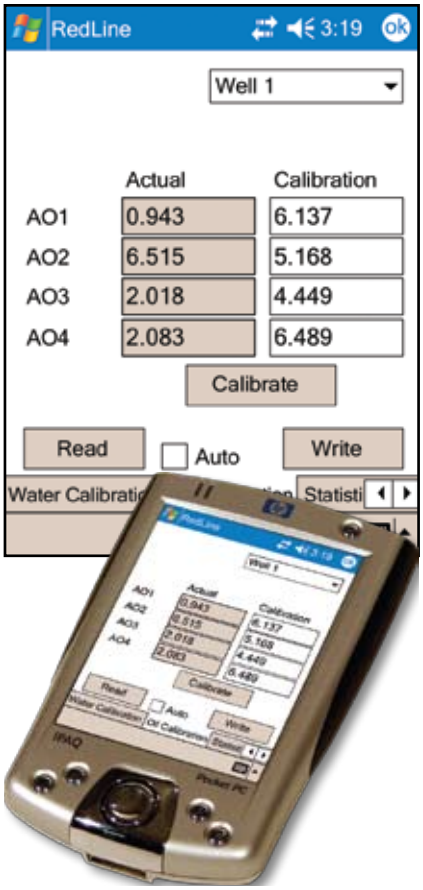

Configuration

The meter includes **RedLine**™ configuration software designed for pocket PCs. The software allows the user to configure communications, perform one-button fluid calibrations and check system diagnostics. The connection can be done through either of the meter's communication ports.

Simplified Installation and Operation

The insertion style design reduces installation costs, particularly in large line sizes. The electronics are mounted directly on the measurement probe, limiting field wiring requirements to power and output signal cables. For NOC applications, the Red Eye 2G unit can accommodate either a 4 to 20 mA or a pulse input from a flowmeter. The flow rate is available as a Modbus™ readable parameter. The NOC unit requires a two-wire RS-485 connection to the meter for both water-cut and flow-rate information.

Simplified Calibration

All that is needed is a small, 50 ml, sample of dry oil at atmospheric conditions. The operator puts dry oil from the well to be tested in the sensor slot and pushes one button to calibrate. That's it!

Specifications

Power	10 to 30 Vdc, 8 W
Wetted Parts	316 L SS or Hastelloy C 276 with sapphire windows
Operating Temperature (°F/°C)	32 to 302 *(0 to 150)* (standard) process fluid -40 to 149 *(-40 to 65)* (standard) ambient temp
Operating Pressure	Equal to carbon steel ANSI pressure rating
Process Connection (in./*cm*)	1 (*2.54*) NPT for pipe sizes 2 to 10 (*5.08 to 25.4*) 1.5 (*3.81*) RF flange ANSI 600 for pipe sizes 2 to 24 (*5.08 to 60.96*) 1.5 (*3.81*) RF flange ANSI 900/1500 for pipe sizes 2 to 24 (*5.08 to 60.96*) 2 (*5.08*) RTJ flange ANSI 900/1500 for pipe sizes 3 to 8 (*7.62 to 20.32*)
Sour Service	NACE MR0175/ISO 15156
Accuracy	±2% water cut
Communication Ports	RS232 and RS485
Flowmeter Inputs	Pulse or 4 to 20 mA
Display	2-line, 16-character vacuum fluorescent display (LCD available)
Output	4 to 20 mA water cut
Communications	Modbus RTU (standard)
Hazardous Area Classification	Factory Mutual Approvals Project I.D. 3022805 XP Class I, Division 1, Groups C & D, T3C, Ta=+85°C, CSA Sira Certification Services Certificate SIRA 05ATEX1138 EEx'd IIB T3 Ta=+85°C, IP66 Canadian Standards Association Certificate Number 1675737, Class I, Division 1, Groups C & D, T3C, Ta=+85°C, Type 4 Serial Production Gosstandart of Russia Certificate of Conformity Gosstandart of Russia Explosion-proof Certificate
Hot Tap	A hot tap version of the *Red Eye* 2G water-cut meter is available, contact the factory for details

Weatherford®

515 Post Oak Blvd., Suite 600
Houston, Texas 77027 USA
Tel: 281-348-1000
info@ep-weatherford.com
www.ep-weatherford.com

 Brochure **5313.00**