

SWC - Smart Water Cut Monitor

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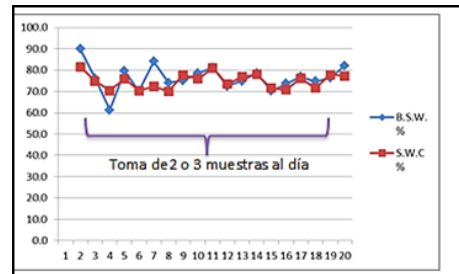
Production Optimization in Mature Fields or Water Injection: Intelligent Monitoring and Recording of In-line Water Cut

The SWC system represents a real-time measurement system for continuous water cut in hydrocarbon production lines, based on the measurement of electrical parameters (conductivity and dielectric constant) of the fluids passing through the inline sensors.

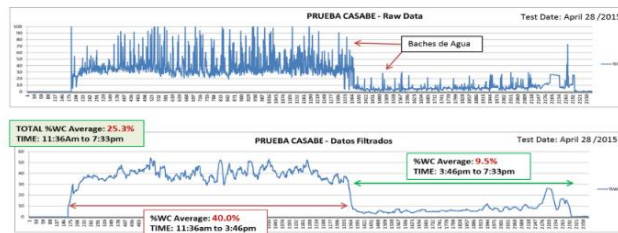
The equipment communicates in real time with a processing and communication module, allowing interaction with control and monitoring centers via RS232, 4-20mA, and/or standard ModBus, or through the safewireless platform using 900MHz or the Internet. The equipment complies with NEMA 4X standards for enclosures and is

designed and manufactured to be intrinsically safe. It is also designed and manufactured as standard for pressures up to 1000 psi and for high pressure (HP) up to 3000 psi, with a maximum working pressure of 2000 psi, depending on customer requirements. The equipment is typically tested and certified at the base before installation and operation.

The sensors are helically distributed to cover 100% of the area and are positioned horizontally. The measurement range is from 0 to 100%, with a standard resolution of less than 3% and less than 1% when calibrated in-situ.



The system consists of a sensor module that measures capacitance and resistivity, a processing system that calculates the water cut compensated for temperature and salinity, and a data transmission and connectivity module.



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Applications

- **Real-Time Water Cut Measurement:** Enables real-time measurement of water cut at the surface of hydrocarbon production wells and water injection wells, both individually and in groups or stations, to optimize the management of production and injector wells.
- **Monitoring in Mature Fields:** Provides real-time monitoring in mature fields with water injection to assess well interference and directly communicate with the injection front, which can impact production and increase water output, consequently raising costs.
- **Critical Measurement and Monitoring:** The measurement and monitoring of water cut is critical for optimizing high-performing or "pareto" wells in each field. The in-line system operates effectively with heavy oil and emulsions, which is essential in Colombian fields where other technologies may face limitations.
- **Non-Altering In-line System:** The in-line system does not alter flow conditions at the wellhead and allows for the observation of flow patterns, including mixtures and emulsions in heavy oil.

Advantages and Benefits

- Online system with complete section monitoring using multiple helically distributed sensors that measure various fluid properties for better measurement range and accuracy, determining the type of flow and fluid distribution within the pipe.
- Simple system that allows operation in different pipelines and conditions of mature fields, handling various oil densities and viscosities across a wide measurement range, with quick response to changes.
- Basic salinity measurement within certain ranges to determine the source of the water.
- Intrinsically safe system with minimal exposure, designed for mature fields.
- Compact modular design allows in-line operation for a wide range up to 3000 psi STP and 2000 psi SWP.
- Low operational costs, excellent cost-benefit ratio, and local technical support.

Response and Technical Specifications

Especificaciones Técnicas - SWC_HP	
Parameter	Specifications and Comments
Diameter	2", 3", 4" according to production line
Material	ANSI 316/ ASTM A53 Sch.80
Max. Operating Temp.	125C std / 150C - HT Assy
Max. Internal Temp.	0 to 125°C (SWCXX Node in-line)
Pressure Range	0 to 3000 psi STP / 0 to 2000 psi SOP transducer module; Standard ANSI 900 B16.5 flange
Repeatability	<1.87%
Measurement Range	0 to 100% linear – Average R ² 0.998 std
Measurement Accuracy	< ±3% standard / < 1% in-situ calibration
Power Supply	Self Solar (HUBI) o 24v DC (HUBII)
Supply Voltage	24V regulated to 12V (line) / 5V / 3.3V
Communication Port	RS 232, 4-20 analog std, ModBus (Ethernet)
Sampling Rate	Programmable, standard 90 sec
Hazardous Area	Intrinsically Safe, NEMA 4X enclosures

