

Measuring point	Installation	Measuring task
1	pipeline	monitoring the oil - salt water emulsion to check the production quantity
2	pipeline	phase separation between salt water and oil

# Water Cut Analyzer

## Introduction

One of the first steps in the crude oil production is the separation of associated gas and produced water from mined crude oil. Crude oil is a base material for numerous industries. It is used in pharmaceutical and food industry, as energy source and in the chemical industry. Typical application areas are the production of plastics, synthetic fibers, detergents, cleaning agents. Crude oil is a resource for numerous chemical applications.

The extracted wet oil is a mixture of crude oil, natural gas, salt water and contaminants. In order to reach the required quality for further processing in a refinery, the mixture needs to run through a purification phase. The purification takes place in special separation plants in several processing stages. During the first step of the purification, natural gas is extracted from the oil, followed by a separation of crude oil and salt water.

## Application

The removal of the associated gas takes place in a gas separator by swirling the mixture at increased pressure (condensation). The gas escapes and is collected separately for further processing. By the use of the LiquiSonic® analyzer in the separator the product quantity of the oil - produced (salt) water - emulsion can be determined.

The processed oil-salt water emulsion is pumped into a separate „wet oil tank“. Due to the density difference between oil and salt water, the two phases can be separated. The salt water under the oil is pumped out.

Considering the characteristic sonic velocities of the respective phases, the separation of the salt water from the oil can be easily monitored with the LiquiSonic® measuring technology. This enables a phase separation in a matter of seconds.

## Customer value

The LiquiSonic® measuring technology guarantees an exact identification of the different phases (oil / water) at all times with an extremely fast response time of less than 1s. This ensures the required quality for further processing in the refinery.

The LiquiSonic® analyzers increase the oil yield through a precise separation of salt water.

An example for an ROI calculation is shown below:

- Extracted oil per day: 500 t, which is equivalent to a crude oil revenue of about \$ 200,000 (\$ 400 per t)
- Increased crude oil content of 0.01% per day leads to an increase of the crude oil revenue of \$ 73,000.00 per year
- Investment: 20.000 € (\$ 25,000)
- Amortization: 4 month

Furthermore, the production volume per day can be determined through the monitoring of the oil - salt water emulsion concentration during gas separation.

## Installation

The LiquiSonic® immersion sensor can easily be installed into the transport pipe after gas separation. Another installation option is the phase separation tank outlet. The LiquiSonic® sensor can be integrated to a bottom outlet valve for fast phase separation without cavities.

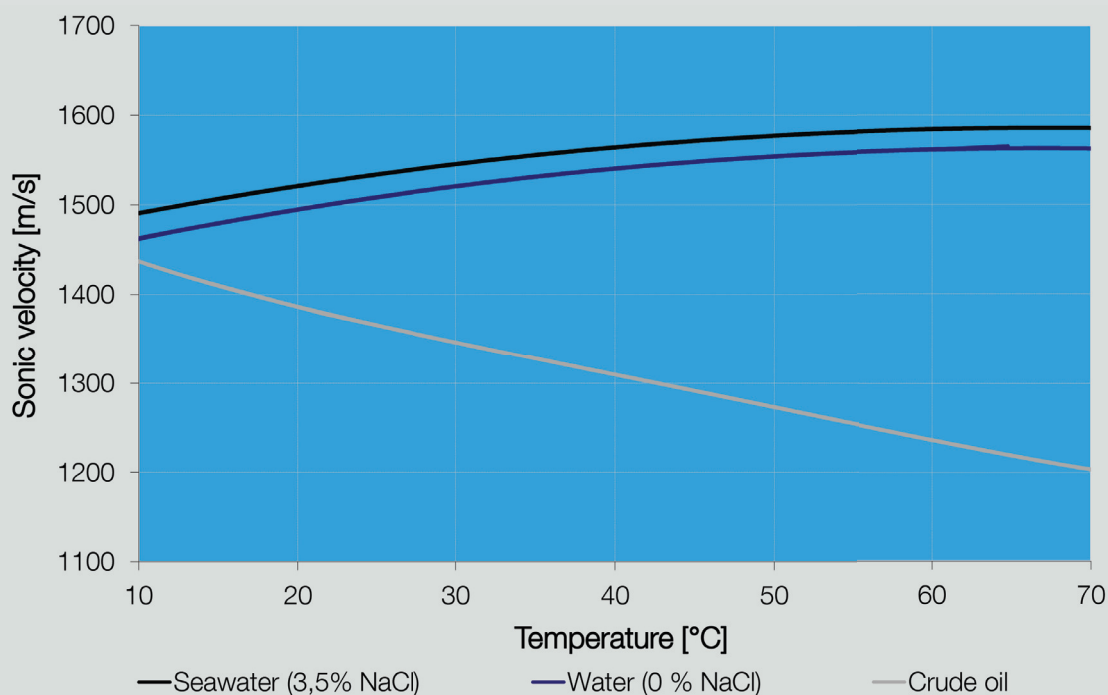
By using the LiquiSonic® controller 30, up to four sensors can be connected, allowing to monitor simultaneous at different measuring points:

- concentration monitoring of crude oil - salt water emulsion (gas separation unit)
- phase detection and phase separation

Typical measuring range:

concentration range of crude oil: 0 to 100 wt%  
temperature range: 10 bis 70 °C (50°F to 160°F)

## Phase separation with LiquiSonic® analyzer



## LiquiSonic® 30



21001311  
LiquiSonic® Controller 30 V10



21010112  
Immersion sensor V10 40-14, DIN DN50, L092



21008110  
Integration of sensor to SchuF valve

BUS

21004435  
BUS connection: Profibus DP



21004449  
Network integration



21004110  
High power sensor electronic



21004202  
Bus cable indoor (100m)



21007846  
Factory acceptance test (FAT) certificate



SensoTech GmbH  
Germany  
T +49 39203 514 100  
info@sensotech.com  
www.sensotech.com

SensoTech Inc.  
USA  
T +1 973 832 4575  
sales-usa@sensotech.com  
www.sensotech.com

SensoTech (Shanghai) Co., Ltd.  
申铄科技(上海)有限公司  
电话 +86 21 6485 5861  
sales-china@sensotech.com  
www.sensotech.com