

# Density Meter for Dredging and Mineral Slurries



## SDM - SLURRY DENSITY METER PRODUCT INFORMATION

**HART**  
COMMUNICATION PROTOCOL

## SDM – Non-nuclear Density Meter

### INTRODUCTION

For several years, Rhosonics has been successful as the only alternative supplier of density meters, replacing nuclear density meters for the measurement of abrasive slurries.

We are now proud to introduce the Rhosonics SDM Slurry Density Meter, lifting the performance to an unrivalled level.

This new density meter employs the field proven ultrasonic technology, however includes many new features, improving service life, reliability and accuracy while dramatically reducing maintenance needs.

### INDUSTRIES

SDM is used in the following industries:

- Mining and Minerals
- Dredging
- Building Materials
- Energy & Power supply
- Any other industry or application where density measurement is required.



Mining slurry



Dredging slurry

### SLURRY DENSITY METER

The Rhosonics Slurry Density Meter has its sensor, analyzer, cable and software integrated in just one system. Therefore, the new density meter weighs less than its predecessor. In addition, the 'HART' protocol is integrated to improve communication. The SDM has new sensor material and is therefore suitable for new and more challenging applications.



SDM with wafer installation

### IMPROVEMENTS

The SDM has a single probe, employing a unique measuring technology. This enables accurate density measurements in light to very dense slurries.

Unlike other sensors used in slurry measurement, the Rhosonics sensor employs a unique hybrid construction which is extremely durable and abrasion resistant.

A special alloy of selected ceramics in combination with newly developed sensor technologies are combined to provide a sensor ensuring long service life and a reliable density measurement under rough operating conditions.

In addition, maintenance needs have been further reduced and simplified, resulting in the least amount of maintenance need of density meters which are available on the market.

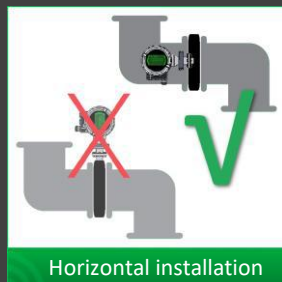
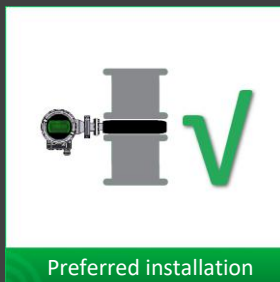
## FEATURES AND BENEFITS

- Non-Nuclear technology
- Durable probe system
- Lowest possible maintenance needs
- High accuracy and reproducibility
- Suitable for all types of slurries
- Compact integrated system
- Process connection via HART and 4-20mA
- Continuous data & system logging
- New temperature technology

## HOW TO INSTALL

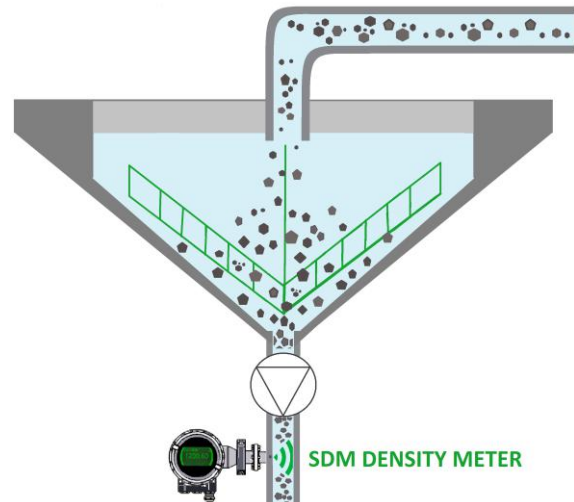
The following guidelines apply to all probe types:

- Install the probe with 5xD length of straight pipe length upstream or 3xD of straight pipe length downstream.
- Vertical pipe installation is preferred. Horizontal pipe installation: the sensors must be installed sidewise.



## A TYPICAL APPLICATION

The SDM density meter can be used in many applications to measure the density of a slurry. For the mining industry, typical applications are a thickener underflow and a cyclone feedline. Also applications like dredging, power plant ash, lime stone milk and many others are possible. The measured density value is used for process control but also in combination with flow measurement for production yield. The Rhosonics ultrasonic density meter is in general THE alternative for nuclear density technology for heavy slurries with a high abrasive impact.



*Density measurement in the slurry of a thickener underflow*

## INSTALLATION METHODS

Rhosonics offers different installation methods to fit every customer's need. The major installation methods are discussed.

- Spool (FDSC or UFTC)
- Weldolet
- UWC Wafer

## The best alternative to nuclear density meters.

### Spool (FDSC or UFTC)

A spool is a pipe piece which can be mounted between two flanges. The spool type and size are on customers' request.

### Weldolet

Rhosonics designed a special low cost Weldolet solution. The Weldolet can be installed by drilling a hole of 36 mm in a steel pipe. On the outside of the pipe, the Weldolet is welded-on so the sensor can be installed flush mounted.

### UWC Wafer (Ultrasonic Wafer Cell)

The UWC is a synthetic 60 mm thick ring made of UHPE (Ultra High Density Poly Ethylene). It can be clamped between two flanges in almost every pipe system. Rhosonics always tries to guarantee the maximum performance and therefore produces custom-made wafers. The thickness of a liner (if present) and the internal diameter of the pipe are important dimensions to guarantee flush mounted installation.

## HOW DOES IT WORK?

The density measurement is based on the measurement of the acoustic impedance using the Physical law established by Sir Rayleigh.

$$Z = C \times \rho$$

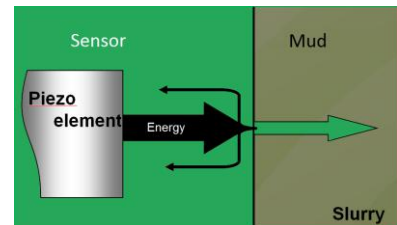
Z = acoustic impedance in MRayl

C = speed of sound in m/s

$\rho$  = density in g/l

The acoustic impedance is the reflection of the ultrasonic signal on the interface between the sensor and the slurry medium. The speed of sound is based on the sound velocity of water which is programmed in the analyser.

Ultrasonic measurement principle



## SDM MODELS

						
SDM MODEL	SDM-1		SDM-2 & SDM-3		SDM-4 & SDM-5	
Installation method	FDSC Spool	UFTC Spool	Weldolet		UWC Wafer	
Suitable for nominal pipe OD	1" ... 3"	4" ... 16"	All	All	3" ... 30" *	30" ... 60" *
Sensor depth (in mm)	16		34	52	146	200
Suitable for pipe WT (in mm)	N/A		2...17	17...40	N/A	N/A

\* Depending on the standard, determined by Rhosonics



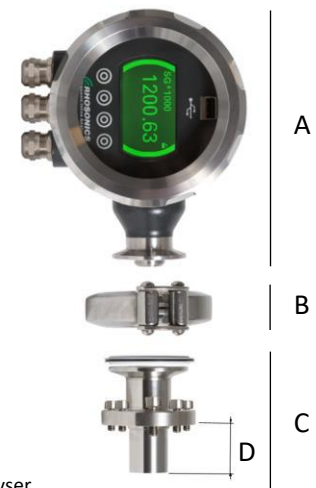
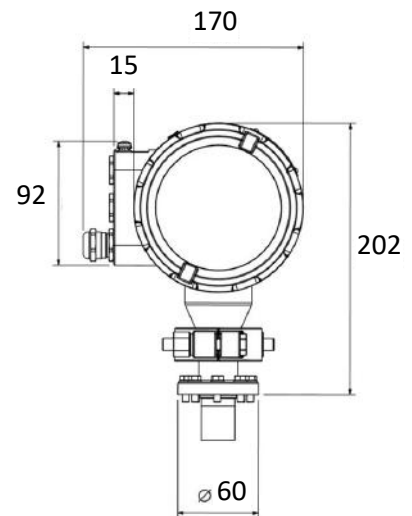
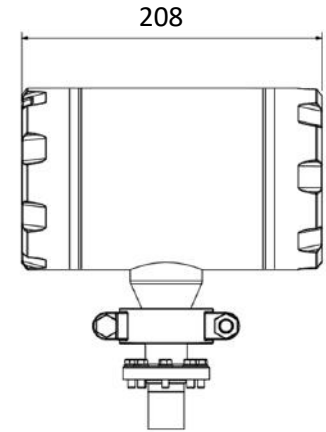
The best alternative to nuclear density meters.

## PERFORMANCE SPECIFICATIONS

Method:	Ultrasonic Spectral Power / Acoustic impedance
Density Range:	700 ... 3.000 g/l
Resolution:	0.2 g/l
Readings:	S.G., Density g/l
Accuracy:	Up to 0.005 S.G ... +/- 0.5%
Decay time:	1 to 99 s (adjustable)
Display:	Monochrome display with RGB backlight, visible through glass cover.
Operation:	Push-buttons, HART, Computer

## GENERAL SPECIFICATIONS

<b>Process conditions</b>	
Pressure:	1 ... 16 bar
Temperature:	0 °C ... 110 °C (32 °F ... 230 °F)
Wetted materials:	Ceramics and Duplex Stainless steel 1.4462
<b>Electrical specifications</b>	
Power supply:	18 ... 32 VDC, 8 Watt <i>Optional: Power supply/converter for 90 ... 240 VAC</i>
Output:	4 ... 20 mA / HART
Communication:	2-way through HART protocol
Data logging & fault reporting:	Internal memory, via USB memory stick
Cable entries:	3X M16X1.5, cable OD Ø 3-10 mm
<b>Ambient conditions</b>	
Ambient temperature:	-20 °C ... +65 °C (-4 °F ... 149 °F)
Humidity:	< 95% at 40 °C (noncondensing)
Protection:	IP68, NEMA 6P
Vibration:	Resistant to moderate / high vibration of pumps
<b>Dimensions and weights</b>	
Weight:	Approx. 6.4 – 6.8 kg
Housing materials:	Coated stainless steel
Housing dimensions:	218 – 402 mm * (L) x 208 (W) x 170 mm (H) * Various depths, depending on probe type
Process connection:	Spool (sensor depth: 16 mm) Weldolet (sensor depth: 34 or 52 mm) Wafer (sensor depth: 146 or 200 mm)
Standards:	DIN/ANSI/JIS (others on request)
Nominal pipe size:	Up to 60"



A: Analyser  
B: Tri-clamp  
C: Sensor  
D: Various depths 16/34/52/146/200 mm



## About us



### MEASURING BEYOND LIMITS

Rhosonics is based in the Netherlands near Amsterdam. We design, produce and supply state-of-the-art measuring instruments for virtually any industry. The company cooperates with partners worldwide to offer the best technology solutions. We use craftsmanship, capability and creativity to create measurements beyond limits.



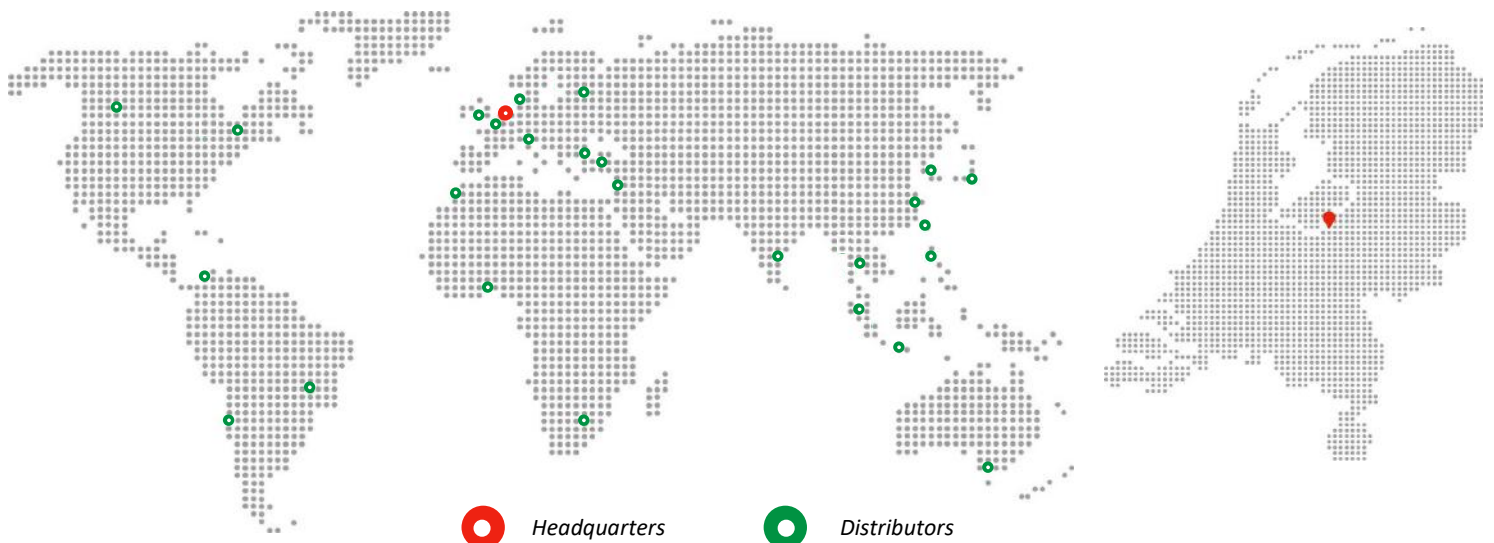
We proudly meet the requirements for the ISO9001 standard since 2010.

### CONTACT US

#### Rhosonics

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