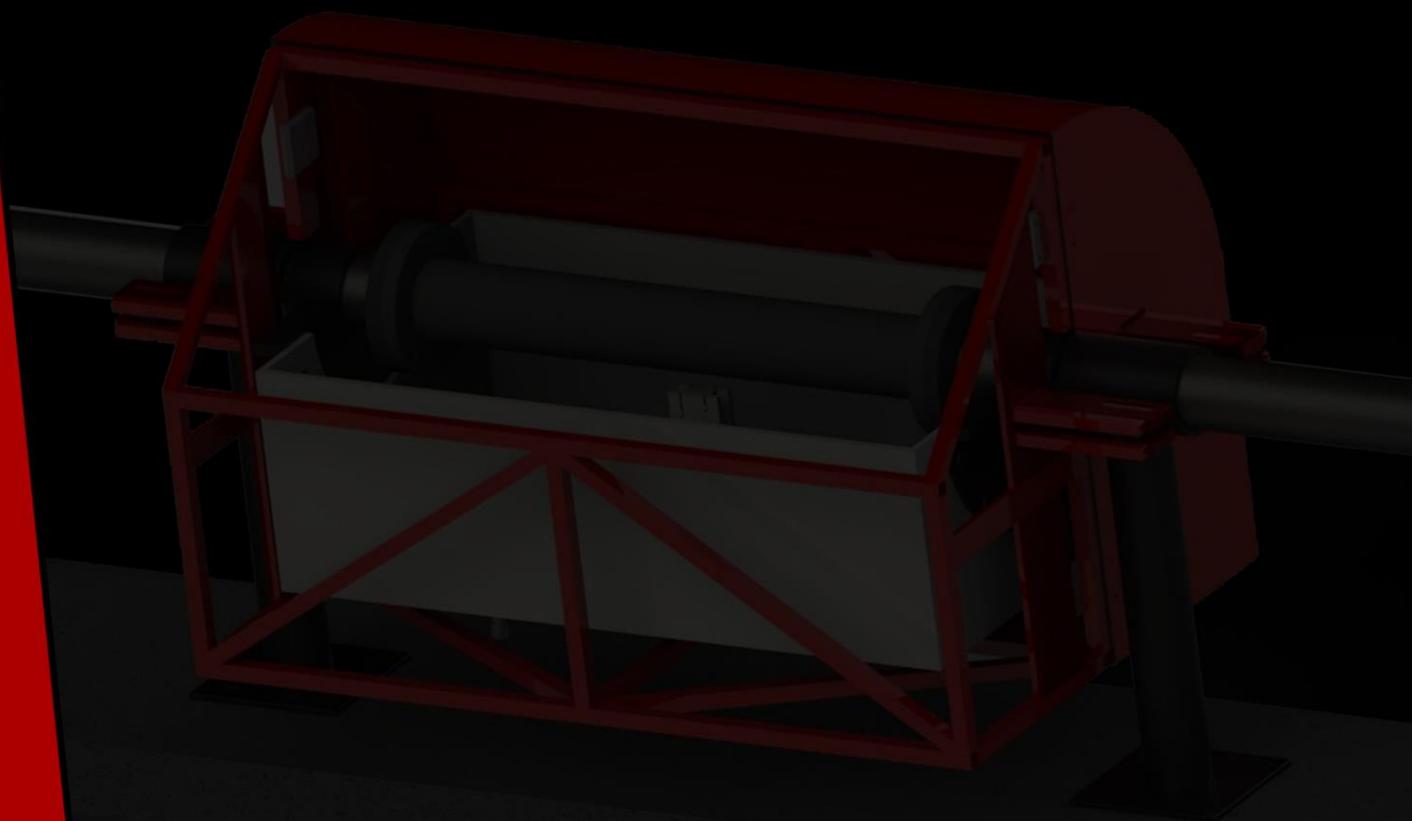


RM2

JULY 2017 WHITE PAPER

Measuring Dredged Materials On-Site:

IMPROVING PROCESS EFFICIENCY



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Introduction

Red Meters engineers and manufactures density measurement systems that deliver Real-time Exact Density measurement, providing accurate, repeatable data for slurries, liquids and powders. Built into a process pipeline, the scalable, abrasion-resistant system can accommodate nearly any material and pipe diameter with minimal maintenance, no obstructions, and no process interruptions. As material passes through the system, a Class 2 industrial laser measures microscopic flexes in the RM Series cartridge, performing 20 readings per second with repeatable +/-0.25% accuracy of reading. We are the only company producing industrial meters with this level of accuracy.

Red Meters' customer-tailored algorithms first account for temperature, pressure, and vibration, then display density, percent solids, pressure, totalized mass, and more on an integrated touchscreen Human Machine Interface (HMI). Live and archived data can be accessed anytime via ethernet, Modbus, or Wi-Fi. Designed for process control and automation, data parameters can be used to set alerts for unusual changes in temperature, pressure, etc. The RM Series is the only density meter certified by NIST, OIML, and ASTM.

Land Operations

- ◆ Determining how much material is pulled onto the dredge.
- ◆ Calculating how much material is moved from the dredge to the separation plant.
- ◆ Keeping track of waste rock removed during the various separation processes.
- ◆ Measuring what materials are moved from the separation step to de-sliming.
- ◆ Measuring density of material after de-sliming process
- ◆ Calculating amount of materials taken to tailings.
- ◆ Measuring materials after separation stage.
- ◆ Determining Final density after dewatering stage.

Sea Operations

- ◆ Measuring material picked up by the dredge.
- ◆ Calculating how much material is moved to the vessel hopper (ensuring no over-fill).
- ◆ Measuring materials unloaded from vessel hopper to its final destination.

QUICK STATS

The Red Meter boasts an accuracy of +/- 0.25% over a 6:1 density range, a significant difference from most other continuous measurement techniques. Superiority in response time should also be considered, where the RM density meter samples up to 50 times per second. In addition, the Red Meter is capable of being used on any pipe diameter and most specific gravity ranges.

HOUSING

An insulated housing is used to shield the cartridge and measurement devices from ambient temperature and weather. The casing is designed to have a sleek curved top to prevent buildup from snow, etc. This allows the effects of rain, snow and wind to be mostly negligible compared to the effects of the media temperature. This casing also eliminates damage caused by weather.



NEMA 4X

The NEMA 4x enclosure is used to prevent the detrimental effects of weather to interfere with the PLC and wiring of the measurement devices. Otherwise, water, dust, and heat can cause severe damage to the electronics.

EASE OF CALIBRATION

The Red Meter has a simple one button calibration that can calibrate any carrier liquid. The Red Meter can also handle bidirectional flow.

MONITORING

Red Meters systems can display up to six calculations on the touchscreen Human Machine Interface (HMI), with endless calculations available via ethernet, WiFi, etc. Red Meters can also provide 24-hour coverage of the system. Real time



monitoring can be accessed anywhere in the world, allowing easy maintenance for the system.

CONSTANT	VALUE
ACCURACY	
Accuracy (Overall)	± 0.25% of reading over 6:1 density range
Digital Response Time	50 ms
Measurement Time	20 per second
Internal Diameters	2" - 60" (50 - 1524 millimeters)
Repeatability	± 0.1% of reading
Linearity	± 0.018% of of reading
Pressure Coefficient	0.1% / psi of reading
Slurry Temperature Coefficient	± 0.3% / 10°C of of reading
Calibration Standards	NIST, OIML, ASTM
OPERATIONAL LIMITS	
Maximum Working Temperature	150°F (65°C)
Maximum Pressure	up to 600 psi (40 bar) [Safety Factor of 3]
INTEGRATION	
Flanged connections	ASTM, DIN, or BS
Environmental Protection	IP66/NEMA 4X
Housing	Powder-Coated Aluminum shell
Insulation	Hi-Temp Fiberglass, ASTM Compliant
Pipe Supports	Carbon Steel, 5/8" (16mm) bolts
Gaskets	ASTM Compliant
Wiring	IFC Standards
MISCELLANEOUS	
Internal Laser Source	Class 2 (FDA (CDRH) Part 1040.10)
Ambient Sensor Sampling	50 readings per second
Storage Temperature	-40° to 175° (-40° to 80°C)
Cartridge Liner	Dependent on Application
Calibration Automation	One-Touch Calibration
Integrated Display	Allen-Bradley 2711R-T7T
Integrated Logic Controller	Allen-Bradley Micro820

Conclusion

Using a density meter specifically designed for dredging operations increases measuring abilities while reducing waste cost. Determining necessary amounts of clarifiers during separation without having to guess the amounts of solids left saves money and time, therefore increasing the bottom line. With easy monitoring and plenty of data, it is easy to know exactly what is happening in every step of the dredging project.