

# NON-RADIOACTIVE SLURRY DENSITY MEASUREMENT FOR INLAND DREDGERS

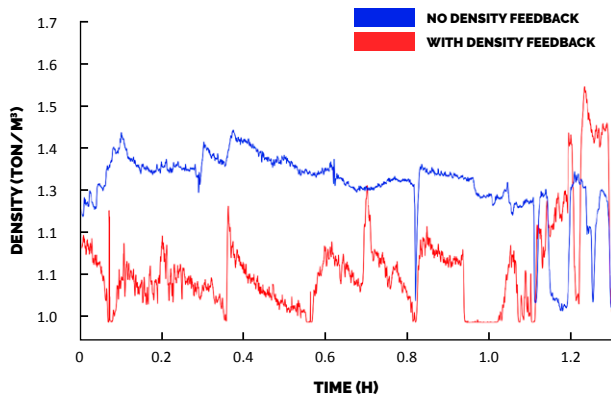
December 2017 - All rights reserved. Reproduction in any form or by any means is not allowed, without prior permission in writing from IHC Merwede Holding BV.



Installing a density meter on a dredger can improve production levels by up to 30%. It indicates to operators how much mixture is being pumped and enhances uptime by detecting suction mouth clogging (in combination with the vacuum indicator), so that it can quickly be resolved.

For decades, Royal IHC's radioactive (RA) density meter has been the instrument of choice due to its reliability and robustness, which could not be achieved by any other measurement principle. More than 1,400 units have been installed for customers worldwide.

However, as part of IHC's commitment to continuously improving its dredging equipment, it has developed and patented an innovative alternative – the radio frequency (RF) density transmitter.



*Improve production levels by installing a density meter.*



**THE TECHNOLOGY  
INNOVATOR.**

**ROYALIHC.COM**

## COST-EFFECTIVE AND SUSTAINABLE

Equally robust, reliable and accurate, the RF density transmitter has two significant advantages over the RA density meter for dredging contractors.

- firstly, it results in a lower cost of ownership, because it is not subject to strict radiation safety regulations, and does not require permits for operation, transportation and storage
- secondly, it can contribute to the vessel's sustainability, as it is a 'clean' alternative to an installed radioactive source (however safely this may be contained). This can have a positive impact on winning tenders and governmental credit facilities, for example.

These benefits make the RF density transmitter an attractive option for contractors previously unable to overcome the legislative hurdles of the RA density meter. For operations in inland (fresh) waters, the instrument therefore has strong appeal.

The patented transmitter is currently available for pipe diameters up to 650mm and pressure stage PN10, fresh water. IHC is continuing its research and development to make it available for larger diameters, as well as for application in salt water.

## MEASUREMENT PRINCIPLE

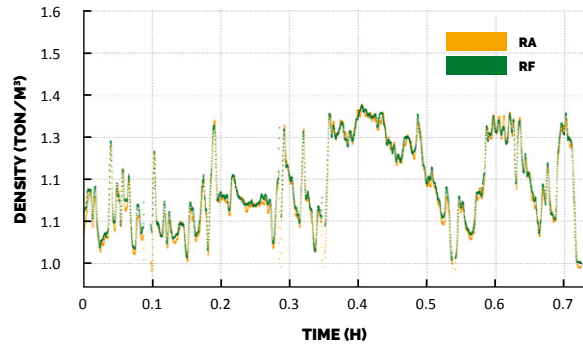
The measurement principle of the RF density meter is based on detecting and intricately processing the attenuation of radio frequent waves by the varying dielectric permittivity, caused by the varying mixture density within its pipe piece. It is equipped with two collinear antennas for transmitting and receiving 75W energy waves.

High-energy waves are strictly restricted to the inside of the pipe piece and outside energy levels are limited to microwatts. This means that no permit is required for operation, transportation and storage.

The only risk of exposure to high-energy waves is during inner pipe inspection when the power has not been switched off. This is prevented by automatically reducing the field power at an empty pipe to the level of a Wi-Fi router.

For signal processing, the reliable IHC MMU signal converter is applied, extended with a high frequency extension board. The MMU provides versatile signal connectivity to higher systems.

The accuracy of the RF density transmitter is comparable to these of the RA transmitter within  $\pm 4\%$ . However, it has not been determined which one of the two is the best in practice situations.



*The accuracy of both transmitters is comparable*

## ROBUST CONSTRUCTION

The RF density transmitter's pipe piece is a thick-walled, wear-resistant steel pipe with pipeline-compatible mounting flanges and two collinear openings inside for placement of the antenna units. These are flush-mounted in wear-resistant irathane packages and held in place by patented covers.

In case of damage, the entire antenna unit can be replaced without removing the instrument from the pipeline. The steel structure provides 100% shielding from any electromagnetic waves.

## MAIN FEATURES

- no permits required
- available for diameters up to 650mm, PN10 and for inland (fresh) water applications only
- intrinsically safe: highest voltage applied 24VDC, 100% shielding of radio waves
- mixture density range: 1,000-1,800t/m<sup>3</sup>, versatile I/O connectivity
- robust, wear-resistant, versatile and reliable
- accuracy within  $\pm 4\%$  of comparable RA density transmitter
- patented antenna assembly fitted in wear-resistant irathane cover and is easily replaceable
- pipe piece and flange dimensions fully compatible with corresponding PN10 RA transmitter
- in-line mounting utilised in any part of the pipeline where the density is supposed to be representative
- price level comparable with corresponding RA transmitter.



**THE TECHNOLOGY  
INNOVATOR.**

**ROYALIHC.COM**