APPLICATION NOTE

Chemical

Non-invasive flow measurement of sea water

- Cost-effective flow measurement of saltwater for a desalination plant
- Reliable clamp-on flow measurement on large GRP pipelines with diameters up to 2680 mm
- Permanent mounting of robust stainless-steel sensor rails in an open-air plant environment

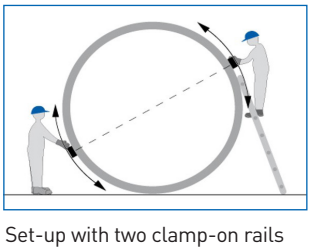
1. Background

A petrochemical company in China sources large volumes of seawater to reduce its reliance on groundwater. The seawater is transported via pipelines to an adjacent desalination plant, where it is processed into utility water.

2. Measurement requirements

To ensure transparency in the amount of seawater delivered, the company was searching for a reliable flow instrumentation. Due to the large pipeline diameters (up to 2,680 mm / ~105.5 in) and the corrosive nature of seawater, the operator decided against using an inline flowmeter. While robust electromagnetic and ultrasonic inline flowmeters with corrosion resistant wetted materials could have been used, the company did not require the high absolute accuracy these meters provide. Instead, they preferred a cost-effective, non-invasive solution with good accuracy and repeatability. However, identifying a suitable non-invasive flowmeter capable of measuring through the glass fibre reinforced plastic (GRP) pipeline proved challenging.

3. KROHNE solution



Set-up with two clamp-on rails

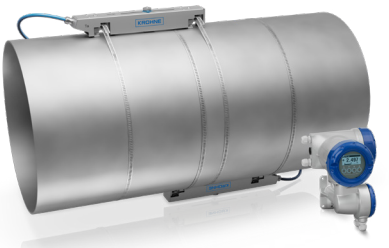
KROHNE supplied several OPTISONIC 6300 clamp-on flowmeters for seawater monitoring along the pipeline. The non-invasive ultrasonic flowmeters were mounted directly onto the GRP pipes without the need to open or cut the pipeline. Given the large pipe diameters of more than 2,600 mm (~102 inches), the version with large stainless-steel sensor rails was selected for installation. Each sensor rail set included two rails with integrated transducers. The sensors were connected to the field-mounted converter version of the clamp-on flowmeter.

KROHNE

Most of the flowmeters were installed with the recommended straight inlet and outlet runs to ensure the most favourable flow profile. In some locations, these requirements could not be fully met. However, testing demonstrated that the flowmeter's performance was robust enough to maintain reliable measurements even where the clamp-on installation had reduced straight runs. These measuring points now serve as redundant measurements.

Installation of clamp-on flowmeter on large GRP pipe with reduced inlet and outlet runs

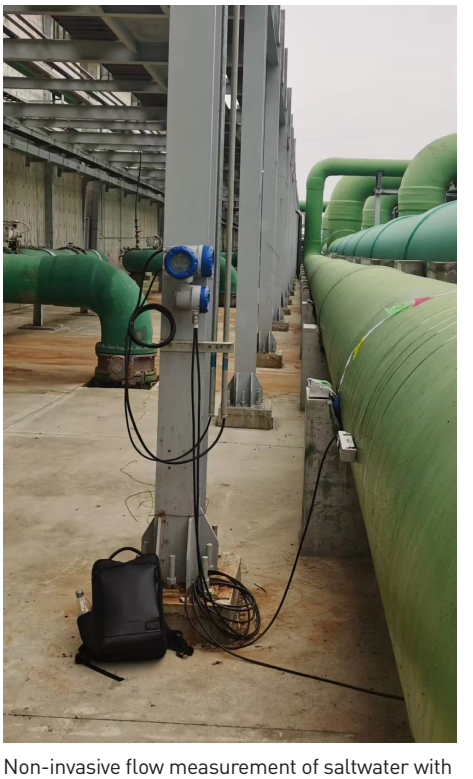
The non-invasive ultrasonic flowmeter is highly flexible and can be easily repositioned to the installation location with the most favourable conditions.



Large sensor version with two sensor rails and field-mounted signal converter

4. Customer benefits

The operator benefits from reduced flowmeter costs for monitoring flow in his large seawater pipelines. Since the plant operator required a highly reliable and repeatable flowmeter with good – but not the highest – absolute accuracy typical of inline flowmeters, the clamp-on flowmeter proved to be the ideal solution. The advanced clamp-on technology of the OPTISONIC 6300, combined with the expertise of local KROHNE service engineers, ensures reliable and cost-effective flow measurement of saltwater in a challenging environment – without the need to alter existing infrastructure. The clamp-on flowmeter features robust stainless-steel sensor rails that, thanks to their ingress protection, can remain permanently mounted on the customers' pipelines located outdoors.



Non-invasive flow measurement of saltwater with the OPTISONIC 6300

5. Product used

OPTISONIC 6300

- Ultrasonic clamp-on flowmeter for flow measurement of liquids
- Stationary device, for installation at any location without process interruption or need to cut pipes
- Robust sensor rails in stainless steel for pipes DN15...4000 / ½...160"
- Process temperatures up to +200°C / +392°F
- 4...20 mA, HART®7, Modbus, FF, Profibus-PA/DP

Contact

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