CiDRA®
Power Generation
Application Note

SONARtrac® SOLUTIONS

SONARtrac Applications in Fossil Power Generation

CiDRA's *SONARtrac* technology provides the high value applications needed in scrubber flow measurement and control, bottom ash transfer, condenser cooling water, and waste water metering.

SONARtrac Applications in Nuclear Power Generation

CiDRA's *SONARtrac* technology provides the high value applications in Safety Related Service Water, ECCS min-flow test loops, charging and chemical addition, diesel cooling water, secondary plant thermal performance monitoring, post-pump maintenance testing and in-service testing.

SONARtrac Flow Meter Technology

Sonar flow technology is a new class of industrial flow meters, utilizing measurement principles that are distinct from all conventional flow meter technologies. CiDRA's *SONARtrac* flow meters utilize patented sonar-based array processing techniques to "listen" to, and interpret pressure fields generated by turbulent pipe flows. The *SONARtrac* flow meter is non-ultrasonic, provides accurate and reliable non-contact and robust flow measurement for a wide range of single phase and multiphase flows. *SONARtrac* flow meters are available in "clamp-on" configurations that install on existing process lines, eliminating the process disruptions associated with installing other types of flow meters.

Advantages and Features - Non-Intrusive, No Maintenance, Slurry Tolerant, Highly Accurate, No Drift

CiDRA's *SONARtrac* flow monitoring system enables the Power Generation industry to realize the following measurable benefits:

- Preventive Maintenance Optimization With Increased Process Uptime
- In-Service Testing Applications Where Measurement Closest To Pump Discharge Is Most Effective
- In-Situ Pump Performance Testing To Validate Overhaul Effectiveness
- Accurate Measurement in Complex Piping Arrangements
- Slurry Flow Measurements Where Accurate Slurry Flows Are Critical

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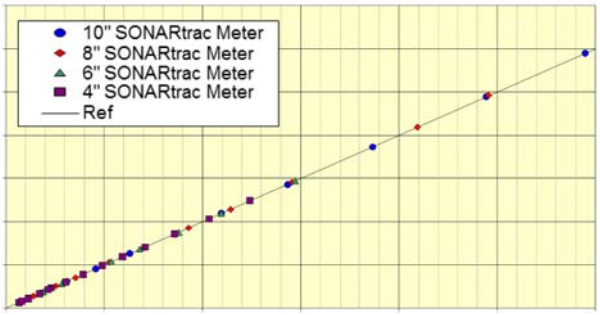
No Obstruction in the Flow, No Pressure Loss, No Clogging

Many conventional flow meter technologies such as vortex meters, orifice plates and flow nozzles inherently create pressure drops by introducing obstructions in the flow path. Parasitic pressure loss associated with these meters increases process energy consumption. Sonar measurement principles are based on the naturally occurring turbulence of the flow; therefore no internal obstruction is required, eliminating pressure loss and potential for clogging. For many applications, installation, energy and other operational savings allow a *SONARtrac* flow meter to pay for itself in a matter of months.



Accuracy

The data presented in the chart on the left shows the volumetric flow rate measured by the calibrated *SONARtrac* flow meters plotted against reference flow from an industry recognized flow meter calibration facility. Using a single Reynolds number calibration spanning the operating range of three flow meters of different pipe diameters, the sonar meter measured the volumetric flow rate to within 0.5% accuracy.

Reliability

SONARtrac flow meters are designed for reliability. The non-intrusive design means there is no risk of clogging or fouling. These flow meters have no moving parts. *SONARtrac* flow meters are robust to clean and dirty liquids, slurries, and multiphase conditions such as entrained air.

The *SONARtrac* systems have the ability to operate over a wide range of process fluids, distinguishing it from other types of flow meters. For example, unlike ultrasonic meters, *SONARtrac* flow meters do not rely on the propagation of high frequency acoustics through process fluids. As a result, *SONARtrac* meters are not affected by scattering effects which can be problematic with ultrasonic meters operating in dirty liquids and multiphase slurries. In addition, unlike magnetic flow meters, *SONARtrac* meters are not influenced by the electrical properties of process fluids, performing equally well on both conducting and non-conducting fluids.

Ease of Use

The *SONARtrac* flow meter user interface allows for remote programming using a PC or laptop, or locally from a keypad. The user enters the necessary inputs, such as pipe diameter and properties of the flow. Volumetric flow rate can be displayed locally or transmitted to a PC using RS232 or RS485 digital outputs, HART communications protocol or to a DCS system via standard 4-20 mA current output. The instrument is housed in an epoxy coated NEMA4X rated enclosure with local backlit LCD display.

Low Cost, Convenient Installation

The *SONARtrac* Clamp-on Flow Meter can be installed easily and directly onto the existing pipeline, so there is no process downtime. The sensor array is completely integrated into a lightweight, corrosion-resistant housing and clamped onto the pipe with minimal pipe preparation, requiring far less time and expense than a spool piece insertion. The clamp-on feature allows for installation of the meter without shutting down the process, saving production time and money.

For certain applications, flow meters with flush-mounted ported pressure transducers can be installed with standard NPT fittings directly into the existing pipe section. Alternatively, a spool piece with flush-mounted ported pressure sensors can be provided.

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