



PRODUCT NEWS

Alia Instruments, based in the Netherlands, introduces a new, very robust, and accurate density meter for sustainable production measurement, control, and optimisation in mining processes. The density meter was developed in partnership with the mechatronics department of a large Dutch engineering and high-technology company, Demcon, as well as the University of Twente. Finite element method (FEM) and COMSOL Multiphysics were used during simulation and hardware development.

The working principle is based on Newton's second law of motion. The instrument's excitation system exerts forces with known amplitudes and frequencies onto the full cross-section of the slurry, while a set of accelerometers measures its resulting response. Density fluctuations are easily tracked with high-speed accelerometers,

with practically immediate response times, an important aspect in quick-acting process control systems. The mass can then be calculated, and, as the volume is known, the density can be extracted as well.

The in-line, full-bore instrument is designed to measure slurry bulk density over a very large density range, and is suitable for slurry flows in small to very large diameter piping, including slurries with high abrasivity or corrosive characteristics and high volume% or weight% of solids. Through the density measurement, the technology can also detect solids settling or sediment deposition, as often occurs with insufficient slurry flow velocity. Since a full-bore bulk density measurement is made (not only at the pipe wall), it is suitable for both homogeneous and inhomogeneous slurries. It can be installed in vertical, horizontal, and sloped piping. A specially compounded and reinforced natural rubber liner is the standard wetted material, with other liners available, ensuring optimal fluid compatibility.

Long-term cost of ownership is very low, since installation, commissioning, and verification are simple and fast. Installation involves two easy steps: bolt the meter into the slurry pipeline, and connect the power and signal cable. During commissioning, separate accelerometers compensate for pipeline orientation and offset using a single point check with clean water. After installation, if desired, users can enable remote digital access to the instrument from the factory.

There are no limitations regarding solids size, abrasiveness, shape, hardness, density, conductivity (salinity), magnetism, radioactivity, or consistency. The technology is suitable for slurries carrying solids ranging from fines to large aggregates. Common challenging slurry density measurement applications in the mining industry include thickener underflow, ore concentrates, tailings, and pastes. Related applications include tunnel boring and dredging, as well as blender systems in fracking operations.

Its non-nuclear design contributes to mine safety by eliminating the need for all mine site activities related to the use of radioisotopes, such as licensing, source handling and storage, training, and administration.

The density meters are manufactured in the Netherlands under ISO 9001-2015 certification. At the factory, each instrument is wet-calibrated using liquids measured by a reference density meter, which is calibrated according to ISO 17025 and verified using ISO 17034 liquid density standards traceable to the International System of Units. **GMR**



Figure 1. New accelerometer-based slurry density meter.