Pacific Northwest NATIONAL LABORATORY

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Battelle Number(s):

10953-E

Patent(s) Issued

Available for licensing in all fields

Available Technologies

Real-Time Fluid Viscometer in Contact With Fluid

SUMMARY

The on-line measurement of the viscosity is accomplished by analyzing the multiple reflections of an ultrasonic wave within a quartz wedge, shown in the diagram. For on-line measurement, the base of the wedge forms part of the pipeline wall. Each time the ultrasound strikes the interface a small amount of ultrasound is transmitted into the liquid and the multiple echoes amplify this effect. As the liquid becomes stiffer—more viscous—more ultrasound is transmitted into the liquid. These effects are recorded by the same transducer and leads to a measurement of the product of the viscosity and density. A separate measurement of the density yields the viscosity. This method has also been developed using a quartz wedge having a 45° at the base, leading to a more compact design.

ADVANTAGES

* The viscosity sensor, like the density sensor, has a self-calibrating feature, which eliminates the problems caused by small shifts in the electronics.

* Because the sensor is self-calibrating, the value of the viscosity will not be affected by the voltage change.

RELATED LINKS

» **Macro Property Measurement Website: Acoustic Evaluation of Liquids in Containers**

http://www.technet.pnl.gov/sensors/macro/projects/es4upecw.stm

U.S. DEPARTMENT OF ENERGY

Patents & Intellectual Property

- Patent #: 6,082,180
- Patent #: 6,082,181

Technology Portfolio(s)

- Ultrasonics
- Physical Sensors

Potential Industry Applications

- Agriculture & Mining
- Chemicals
- Consumer Products
- Energy & Utilities
- Food, Beverage & Tobacco
- Healthcare, Pharma, Biotech & Medical
- Oil & Gas
- Recycling & Waste Management
- Wood, Paper & Forestry

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