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**Battelle Number(s):**

13388-E

Patent(s) Issued

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Available Technologies

# Characterizing Fluids Using Ultrasonic Diffraction Grating Spectroscopy

## SUMMARY

There are a variety of techniques for measuring particle size of a slurry in the laboratory, but few methods to measure it on-line and in real time. The research using an ultrasonic diffraction grating illustrates the emergence of a new technique to measure particle size, and its development can lead to an instrument for process control or one for the laboratory. The diffraction grating was formed by machining triangular grooves about a half-millimeter apart on the flat surface of the unit, as shown in the photograph. The slurry is in direct contact with the grating surface. This technique allows for measurement of the speed of sound of the process fluid as well. The ultrasound strikes the back of the grating surface at an angle, where it is reflected to another transducer. The resulting signal shows a peak at a certain frequency. The height of this peak is found to depend upon the particle size of the slurry. This technique can be adapted to measurements in a pipeline because the grating surface can form part of the pipeline wall.

## ADVANTAGES

\* The technology measures both the speed of sound of the process fluid as well as particle size.

## STATE OF DEVELOPMENT & AVAILABILITY

U.S. patent # 6,877,375 has been issued for this technology. Another part of the technology has a patent application pending. For more information, please contact the Commercialization Manager.

## RELATED LINKS

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

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



### Patents & Intellectual Property

- » Patent #: 6,877,375
- » Patent #: 7,395,711

### Technology Portfolio(s)

- » Ultrasonics

### 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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