Guided Wave
Process Analytical Systems

## Application Note:

# On-Line Monitoring of Turbidity or Haze with a ClearView® db Photometer

**Purpose:** To determine turbidity or Haze with the low-cost-ClearView db fiber optic photometer.

Turbidity is a measure of the clarity of a liquid. Suspended particulate or droplets of an immiscible liquid cause the turbidity to increase (i.e., the clarity to decrease). The cloudiness we see is caused by light scattering due to the presence of these particles. As you may guess, turbidity causes problems with optical transmission (or absorbance) based measurements because not all of the light lost is absorbed by the sample. Some of the light is scattered by the particles causing error in the desired measurement.

Detection of turbidity can be used to indicate solid breakthrough in a process. This can be used as an alarm and to invalidate other optical measurements until the problem can be corrected. A single channel ClearView® db configured with the turbidity option and coupled with a turbidity flow cell can provide this service. The turbidity flow cell uses a third optical fiber placed at 90° to the transmission path to detect scattered light. This system can be calibrated with NTU or haze standards.

Haze is another term for turbidity typically used in the refining sector. In refining applications turbidity is typically caused by the presence of water. Water has very low solubility in fuel. ASTM method D4176 is a visual standard for measuring turbidity by viewing cards with black lines of various thicknesses through a 100mm diameter glass jar of solution.

This is a somewhat subjective measurement that can be easily replaced with the ClearView db. Since up to 6 answers can be generated on a single channel ClearView db, with proper configuration additional parameters can be monitored at the same time. A common combination is turbidity and ASTM color in diesel fuel.

**Experimental:** Samples **Results:** The

**Conclusions:** The ClearView db photometer is an excellent choice for on-line, real-time haze measurement. The ClearView db can be configured with 4-20 mA analog outputs (6 answers max on a single channel system, and 4 per channel on a dual channel system) and corresponding contact closure outputs to alert error states. Modbus communication over ethernet is also standard.


Figure 1: ASTM D4176 Standard Visually Measuring Haze

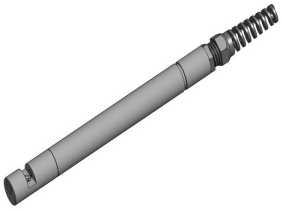
**ClearView db Enclosure Options**

Zpurge Unit

ExProof Unit

General Purpose Unit

Figure 2: ClearView db has an Optional Turbidity Port and 3 Enclosures Available



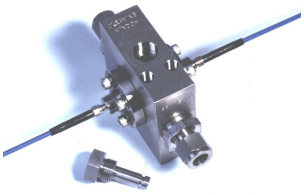


Figure 3: Turbidity Probe and Turbidity Flow Cell

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