

IN-LINE TURBIDITY & HAZE MEASUREMENT

INTRODUCTION

Turbidity is a measure of the cloudiness in fluids caused when the incident light interferes with a large number of suspended particles of different sizes that settle at different rates or not at all.

Haze is a term more properly applied to translucent solids (glass or plastic). In plastics, haze is measured as the percentage of incident light scattered by more than 2.5° through the plastic object. There are several factors responsible for light scattering such as:

- Impurities contained in the plastic material
- Surface roughness and abrasion
- Crystallization or material's level of crystallinity
- Inhomogeneities
- Porosity
- Level of Crosslinking



FIG.1 TURBIDITY

TB01-080520

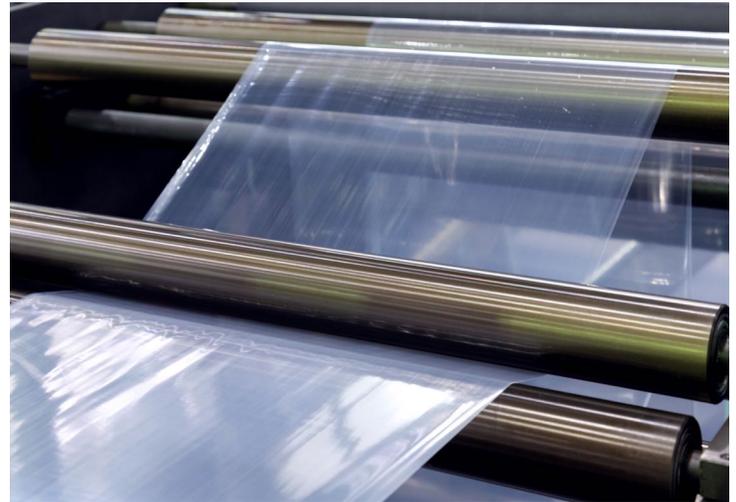


FIG 2. HAZE IN PLASTIC SHEET

CAUSES & APPLICATIONS

Particles present in a fluid cause the incident light beam to scatter and this scattered light is detected and quantified relative to a traceable calibration standard

The higher the quantity of the particulate material contained in a sample, the greater the scattering of the incident light beam and the higher the resulting turbidity.

In translucent objects some light travels through the material, but it does not pass directly through it. Light changes direction many times and is scattered as it passes through. For this reason, objects on the other side of a translucent object appear fuzzy.

Turbidity and haze have many useful applications for industrial processes, pharmaceuticals, beverages, chemicals, filter breakthroughs, plastics, and environmental monitoring.

IN-LINE PROCESS MEASUREMENT

Turbidity and haze values are good indicators of process quality. All parameters in the production process (temperature, pressure, production speed, feeders, pumps, etc.) have a direct impact on turbidity or haze values.

Equitech's In-Line Process Spectrophotometer (IPS) makes possible a relative continuous turbidity or haze measurement directly in the process.

The IPS consists of a spectrophotometer and a touch screen industrial computer integrated in a NEMA4 stainless steel box. The IPS is designed and equipped specifically for use in the production environment where the ambient conditions can include dust, vibrations, and variations in temperature or relative humidity. The IPS contains a thermoelectric cooling and heating device to keep the temperature inside the box at a constant level for maximum measurement stability.

The IPS uses fiber optics and probes to illuminate the sample and transport the signal back to the analyzer.

**FIG 3. IN-LINE PROCESS SPECTROPHOTOMETER**

The IPS and process probes are designed to be used in high-temperature, high-pressure and corrosive environments. The Retro Reflection (RR) Probe (Fig. 4) is used for fluids and its aperture can be fully customized depending on the concentration of the solution while the Integrating Sphere (IS) is used for solids. Both probes are mounted at strategic places in the process

**FIG 4. RETRO REFLECTION PROBE****USER BENEFITS**

- Comprehensive quality audit history of final product
- Feedback loop for closed loop control
- Impact of process changes on the quality of the run
- Controlled color changes: start phase, end of run
- Avoidance of off-spec batches
- Adjustment and fine tuning of recipes
- Reduce costs - higher ROI

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