

Preforms are one of the fastest growing markets in the plastics industry and color technology serves a viable role in monitoring quality and consistency in these products. Preform plastics make up a variety of products used to package beverages, detergents, condiments, and many other packaging materials. Using an injection molding system, these products are stretch blow molded<sup>1</sup> and inflated into the various shapes necessary for product development. Color technology enables manufacturers to monitor the color of raw plastic materials and predict final color outcome based on spectral data and analysis. Based on transparency and reflectance values, different color technology measurement systems are required to ensure product quality and consistency.

## Measuring Variations in Transparency

Preform plastics come in a multitude of sizes, shapes and colors, ranging from opaque to translucent or transparent. Variations in these materials require different measurement techniques to monitor color quality and consistency depending on the sample type.

*Opaque Preforms:* These materials are impenetrable to light and can be defined by the lack of transparency or visibility of light through the sample. Instrumentation that measures reflectance value is recommended for monitoring opaque samples for color quality and consistency.

*Translucent Preforms:* Light is diffused as it passes through these sample materials causing altered visibility through the sample material. Color technology that utilizes both reflective and transmittance measurement modes is recommended for translucent sample types.

*Transparent Preforms:* Light passes through these materials with little or no distortion so that objects on the other side can be clearly seen. These preforms can only be measured using transmission instrumentation to monitor haze and visual clarity.

Spectrophotometers are able to account for the many variations in plastic materials and color technology can be adapted accordingly to quantify the color and visibility of these products. Spectral technology is able to measure the path of light as it is seen by the human eye, accounting for variations in sample thickness and texture.

## Haze Measurement in Clear Plastics

Many plastic preforms utilize transparent or clear plastic materials to promote product visibility. Yellowness, whiteness, or haze can alter the visibility of transparent plastic materials and require the use of specific geometries and measurement modes to ensure clarity. Color process monitoring of preform plastics can be used to determine the amount of haze and degree of color in the preform or container sidewall.

Spectrophotometers rapidly quantify this information allowing for real-time monitor process changes to occur. This technology can alert production changes before final batch inspection, saving both time and resources while ensuring product quality and visibility.

## Color Technology Tools

Quality instrumentation is essential for monitoring preform color and "can be used to verify lot-to-lot consistency, predict final blown bottle color from the preform color and get into target range when switching over a line to a new color."<sup>2</sup>

Full article with photos available here:

<https://www.hunterlab.com/blog/color-plastics/how-color-technology-takes-the-guesswork-out-of-plastic-preform-measurement/>

