



The color of plastic bottles can have a great impact on consumer perception of a product and become an essential component of brand identity.

Image Source: Flickr user Steven Depolo

In our everyday lives we are surrounded by a wealth of objects that are truly remarkable in their form and function. When those objects become ubiquitous, however, it can be easy to forget how transformative they really are. We simply become used to having them around and their revolutionary qualities are taken for granted. The plastic bottle is one such object. First produced commercially in 1947, they entered mass use in the 1960s when the introduction of high-density polyethylene made plastic an affordable alternative to glass and quickly gained popularity owing to its improved functionality.¹ The advantages of plastic bottles include:

- **Safety and resilience:** Plastic bottles are rugged and shatter-proof, making them safe to handle, “unlikely to leak or burst”, and suitable for use in challenging conditions.
- **Energy savings:** Plastic bottles weigh significantly less than glass, reducing energy consumption and costs during transportation. As J.T. Barrett notes, “Because plastics are soft and have relatively low melting points, plastic bottles take less energy to manufacture than glass.”²
- **Recyclability:** Plastic bottles can easily be recycled into a variety of secondary products.

Along with the clear practical and economic advantages of plastic bottles, they also present unique aesthetic and marketing possibilities. Plastic is a wonderfully diverse material that can be manufactured in a wide array of colors used to compliment the product contained within and fortify brand identity. Because color is blended into the resin itself rather than being applied superficially, it “never runs, rubs, or washes off,” making color an intrinsic quality of the packaging.

Spectrophotometric color measurement allows plastic manufacturers to use the color of plastic bottles to full effect to optimize the appearance of the product.



Spectrophotometers are able to accurately measure the color of plastic bottles regardless of opacity or texture to produce reliable and relevant color data.

Image Source: Flickr user Larry Jacobsen

Measuring the Color of Plastic Bottles

Today's sophisticated spectrophotometers are ideally suited for monitoring the color of plastic bottles throughout the manufacturing process. With [a range of optical geometries](#) to choose from, these instruments are capable of providing accurate and precise color measurement of all plastic types, regardless of opacity or texture, ensuring that you can easily obtain the data you need to optimize quality. The specific spectrophotometer and measurement technique needed depend on the unique attributes of the plastic bottle itself:

- **Opaque Bottles:** Bottles that are impenetrable by light may be measured using either directional $45^{\circ}/0^{\circ}$ or $d/8^{\circ}$ instrumentation. $45^{\circ}/0^{\circ}$ spectrophotometers are designed to mimic the way the human eye sees color, giving you remarkable insight into how the bottle will be perceived by a consumer. These measurements are automatically taken in RSEX mode and include the effects of geometric attributes such as gloss and texture to capture the appearance of the product. However, if you wish to exclude the impact of geometric components, using a $d/8^{\circ}$ instrument in RSIN mode allows you to measure color alone.
- **Translucent Bottles:** The color of plastic bottles that allow light to pass through diffusely may be measured using either $45^{\circ}/0^{\circ}$ or $d/8^{\circ}$ instrumentation depending on the degree of translucence. As a general rule of thumb, transmittance measurements are preferred if you can see "slight details of your thumb or finger through the plastic" while reflectance is the best option if you cannot see any details.
- **Transparent Bottles:** Bottles that allow light to pass through without interruption or distortion should be measured in transmission mode only, using a $d/8^{\circ}$ instrument.

Spectrophotometric measurement allows you not only to obtain raw spectral data, but can be used to capture a wide variety of metrics and indexes, including [CIE L*a*b* color values](#), [haze measurements](#), and [whiteness and yellowness indexes](#), to ensure that your product has the precise qualities you are seeking. This extraordinary level of insight into the color of plastic bottles allows you to tailor your manufacturing processes to optimize the aesthetics of your product, easily identify unwanted color variations, and ensure consistent production.



Whether a bottle is designed for perfect colorlessness to showcase the product within or pigmented in a trademark shade, spectrophotometric instrumentation allows you to ensure that it looks the way consumers expect.

Image Source: Flickr user Joel Kramer

HunterLab Quality

HunterLab has been a pioneer in the field of color measurement for over 60 years. Our commitment to innovation and technological excellence has driven us to create a comprehensive line-up of spectrophotometers renowned throughout the plastics industry for their accuracy, ease of use, and versatility. Today, we offer the finest quality color measurement instruments in the world to give plastics manufacturers unprecedented quality control at every stage of the production process. [Contact us](#) to learn more about the value of spectrophotometric color measurements and let us help you select the perfect tools to advance your manufacturing practices.

1. "Plastic Bottle," https://en.wikipedia.org/wiki/Plastic_bottle

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2. "The Advantages of Plastic Bottles," <http://education.seattlepi.com/advantages-plastic-bottles-4834.html>