

In a broad range of industries, obtaining accurate color data and maintaining color consistency of liquid products is essential. This is particularly true when color has a significant impact on both the functionality and appeal of a liquid, which is why spectrophotometric color measurement is an integral part of quality control protocols for virtually endless array of products. However, the spectrophotometer is not the only factor to consider when establishing analytical methods; you must also consider the suitability of spectrophotometric accessories.

This is where a common question arises: *should I use glass or plastic sample holders?* Both glass and plastic sample cups are versatile, widely available, and can often be effectively employed for reliable color measurement of liquids. Therefore, when choosing which of two types to use, it is important to consider the pros and cons of each material.

Glass vs. Plastic Sample Holders

At the most fundamental level, the question of whether you should use a [glass or plastic sample holder](#) to measure the color of a liquid product has a simple answer: either option is likely to be sufficient. There are certain benefits to glass sample holders that render them slightly preferable to plastic sample holders, but if plastic sample holders are used properly, they can often be just as effective for color consistency measurement; as long as you are familiar with the potential pitfalls of plastic sample holders, they can achieve the same level of reliability as glass sample holders. However, there are certain circumstances in which it may be optimal to take advantage of the benefits of glass sample holders.

Benefits and Drawbacks of Glass and Plastic Sample Holders

There is a [variety of benefits](#) of glass sample holders that may make them preferable to plastic sample holders in certain situations. Here are a few of the most significant:

- **Long-term durability.** Glass sample holders are typically not impacted by the nature of the solvent, so they always maintain their transparency. Glass is also more resistant to scratching and less likely to be discolored by cleaning and sanitation processes. Plastic, on the other hand, is not suitable for all types of liquids, is more easily scratched, and is more vulnerable to discoloration or clouding from sanitation techniques. These factors may all compromise the reliability of the results.
- **Optimal construction method.** Glass sample holders are manufactured to optimize quality and reliability. One critical feature toward this end is a U-shaped abraded spacer within the sample holder, which makes it possible to minimize internal reflectance—a common cause of inaccurate color measurements. At the same time, glass sample holders are optimized for longevity: instead of being glued at the edges, they are fused together, so they are less likely to break when handled on a regular basis. While plastic sample holders are shatterproof, they are typically not built with the same long-term use in mind.
- **Suitability for hot solutions.** **Because glass can stand up to high temperatures, a glass sample holder works well for the color consistency of virtually any liquid in a typical testing environment. Additionally, specialized glass sample holders have been developed for handling extremely hot liquids.**

Due to these benefits, glass sample holders are the best choice when your goal is high performance or broad applicability. The primary drawback of glass sample holders, however, is cost; each glass sample holder is an investment, which may compromise cost-efficiency. This is especially true in situations that require multiple solutions to be prepared at the same time; in these cases, investing in the appropriate number of glass sample holders may not be financially feasible.

Indeed, cost efficiency is one of the main benefits of plastic over glass. But plastic sample holders are not necessarily a compromise; in fact, as long as a plastic sample holder is made from high-quality, optically clear plastic, it will almost always yield similar results to a glass sample holder when used within a reasonable lifespan. Additionally, although plastic sample holders do not tend to be as durable as glass sample holders—primarily because they are specifically designed to be disposable—they have the benefit of being easily replaceable. When a plastic sample cup is compromised by a stain or a scratch, it can quickly be replaced with a reliable alternative at relatively low cost. However, a key drawback to consider is that it is slightly more challenging to achieve reliable results when using a plastic sample holder for non-opaque samples; if the path length is not consistently maintained, the results can be negatively impacted.

Industry-Specific Solutions and Examples

In some cases, the answer to the question of whether to use plastic sample holders over glass sample holders depends on your industry. Consider the following situations and a recommendation for an appropriate choice of sample holder for overcoming the challenge:

- Color measurement is essential within the beverage industry, as customers tend to expect a consistent color every time, and changes might lead to concerns about whether or not the formulation has changed.¹ Depending on the temperature of a hot beverage, it may be best to choose a glass sample holder that will not be compromised by high heat.
- In the pharmaceutical industry, color change can not only have [a profound impact on patient perception and behavior](#), it may also indicate chemical breakdown and altered efficacy of medication.² As such, you want to be sure that [the color of a liquid formulation](#) remains consistent over time. In order to measure color changes over a particular time course, it may be convenient to fill multiple sample cups at the same time, and then test samples at the appropriate time points. When you want a large number of sample cups on hand, it can be more cost-efficient to choose the less expensive plastic sample holders.
- In the chemical industry, [caustic or volatile liquids](#) pose significant challenges to the color measurement process, requiring tools and methods that optimize operator safety. When working with these materials, glass may be a safer choice than plastic because it is more likely to respond well to harsh chemical exposure. This can improve accuracy of results while also minimizing safety risks.
- Some types of solid samples must be liquefied in order to undergo spectrophotometric color measurement. Because this process may require extremely high heat, glass sample holders are often the appropriate choice.

By considering your unique needs, you can determine which methods and materials will yield the best results and support an efficient color measurement process.

Full article with photos available here:

<https://www.hunterlab.com/blog/color-measurement-2/should-you-use-glass-or-plastic-sample-holders-the-pros-and-cons-of-each-method/>