

When it comes to color measurement for textiles, accuracy is essential. In today's highly competitive markets for fabric-based products, such as apparel and home decorating, companies rely on [the slightest nuances in color to distinguish their brands](#). Therefore, when measuring the color of a sample, textile manufacturers must be careful to ensure the integrity of every aspect of the process. However, in these efforts, manufacturers inevitably face the problem of determining how to prepare the textile samples for accurate color measurement. If a sample is prepared incorrectly, it can lead to an inaccurate reading, resulting in an oversight of the problem with a color or unnecessary action to resolve an error that doesn't actually exist. Either way, the disruption of an inaccurate measurement can reduce the efficiency of the manufacturing process and potentially lead to costly mistakes. As such, it is best to be sure that every textile sample is adequately prepared for [spectrophotometric analysis](#) from the start.

Choosing Among Sample Preparation Methods for a Textile Sample

The first thing to know about preparing textile samples for accurate color measurement is that there is no single sample preparation method that works perfectly for all textiles. Rather, [textile manufacturers have a number of options, each of which may be preferred under different circumstances](#):

- **Wadding random fibers.** One of the most basic ways to prepare a sample is to create a wad of random fibers for measurement. The wad needs to be large enough that light cannot penetrate through, so the method only works for fibers where a light-obscuring wad is small enough to fit in the sample container (a small container with a window at the bottom). Once the fibers are wadded, they are placed inside this container, and a weight is placed on top to keep the fibers inside. From there, the color of the fibers can be measured through the window. This method works for almost any textile, and it is ideal for situations when you want to get a quick sample measurement without putting a lot of time into the sample preparation.
- **Using a compression cell.** This method is slightly more high-tech, but the results tend to be more consistent than the method of wadding random fibers. With this method, a certain amount of the textile (measured by its weight) is placed into a sample cup and compressed within the cell by the application of air pressure rather than by placing a weight on top. The air pressure presses the textile more closely against the window at the bottom of the sample cup than a weight does, which is why the results tend to be more accurate than simply wadding the fibers and pressing them down with a weight. However, it is important to note that this method only works for textiles with a consistent density, so it may not be appropriate for textile samples that include several different fiber types. Otherwise, you can use it with almost any textile, from pure cotton to synthetics.
- **Winding the thread on a card.** With this preparation method, the goal is to wind the textile thread around a card in a parallel fashion until it is thick enough that no light shows through. Like using a compression cell, this method of color measurement typically produces results that are closely aligned with visual assessment. In order for this sample preparation method to yield accurate results, the level of tension must be consistent, and it needs to be high enough that the thread doesn't slip, but not so high that it actually stretches the textile. Therefore, for this preparation method, it is best to use a commercial cardwinder.
- **Knitting the textile thread into a sock.** It is also possible to prepare a textile for measurement by knitting it into a sock. One of the advantages of this method is that a sock is already flat, so there is no need to invest in a compression device or a cardwinder. In order to reduce the opacity of the textile, the sock may be folded into multiple layers, until the appropriate thickness has been achieved. Still, this preparation method should generally be avoided for textiles that stretch

particularly easily, since there is a much higher chance that variations in the level of tension will cause light to shine through. Therefore, it tends to be preferred for tougher textiles like cotton and denim over stretchier synthetics.

- **Using a skein.** For textile manufacturers looking to measure the color of a wrapped skein rather than individual fibers of the textile, the appropriate sample preparation method is slightly different. One end of the skein needs to be clamped or taped to the edge of a flat, rigid skein holder. Then, the skein is stretched parallel along the holder and taped to the other end. Although this method requires investment in a skein holder, it is a particularly convenient option when the textile is already loosely wrapped and it is not feasible to try to unwrap it simply because the color needs to be measured. This method is especially useful for crosshatched textiles, like denim.
- **No preparation.** When the spectrophotometric measurement is conducted on a fiber or yarn that is wound around a cone or bobble, there is no need for sample preparation. It is necessary, however, to use a positioning device to make sure that the wound fiber is consistently presented to the instrument. This simple method may be preferable in situations where the textile in question is a longer fiber that can easily be wound around a cone or bobble. It is also faster than some of the other preparation methods, so it works well to support efforts to improve manufacturing time efficiency.

The Value of the Right Spectrophotometer

When a textile sample is prepared appropriately for color measurement by a spectrophotometer, textile manufacturers can trust that the results will be accurate and consistent with expectations.

Spectrophotometric analysis of a properly-prepared sample can detect even the smallest issues and inconsistencies in color that may interfere with the quality of the final product, even if those issues are not easily detected by the human eye. This allows manufacturers to respond as necessary before advancing to the next step in the process. As such, sample preparation ultimately plays a crucial role in the workflow that takes a textile from the spool to the final fabric.

Sample preparation, however, is only one factor in the reliability of spectrophotometric color data. Choosing an advanced instrument designed with [the needs of the textile industry](#) in mind is essential to obtaining the best results and being able to use color data in a meaningful way. HunterLab offers [a complete range of spectrophotometers](#) ideally suited for textile color measurement. From portable and benchtop instruments to on-line spectrophotometers that are seamlessly [integrated within the production line](#), our instruments are renowned throughout the industry for their accuracy, precision, innovation, and usability. Coupled with our [color measurement software packages](#), HunterLab gives you unprecedented insight into your products and processes to help you enhance quality and efficiency.

Full article with photos available here:

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