



Today, cement offers extraordinary possibilities for modern, beautiful, and durable designs. Image Source: Unsplash user Todd Quackenbush

Construction contractors often choose to mix cement on-site as it allows them to gain a better end result for a lower overall cost. However, this can pose significant challenges for manufacturers of such mixes, particularly when it comes to color. A cement that measured well on the plant floor may not look the same once it's dried in a real-world environment; the color may appear faded, powdery or patchy, resulting in an overall unpleasant aesthetic even when mixed correctly. Testing the end product in a real-world environment with a robust quality assurance process is therefore necessary to ensure that you're able to guarantee an accurate long-term finish of your product.

Spectrophotometric instrumentation is [a critical part of this quality assurance process](#), allowing manufacturers to offer high-grade cement with accurate directions and predictable results for those who choose to mix on-site.



Site-mixed cement has numerous advantages of premixed and precast alternatives, but also comes with unique challenges. Image Source: Pexels user Pixabay

Challenges in On-Site Mixing

Today, premixed and [precast concrete](#) is increasingly popular within the construction industry, eliminating potentially time-consuming and laborious on-site steps. However, on-site cement mixing has unique benefits that cannot yet be replicated by premixed and precast products. These include:

- **Scalability:** With the right formula, workers can create as much, or as little, cement as they need with limited waste.
- **Strength:** Fresh concrete dries stronger than concrete that's been mixed offsite.
- **Cost:** Some construction companies pay for the convenience of pre-mixed, but those who choose to mix on-site save money as the mixes they buy are typically cheaper.

Higher quality, cost-efficient cement is something that major construction companies are always going to take advantage of. As a result, manufacturers need to ensure their product travels and settles well over time for optimum on-site mixing.

Desirability, predictability, and durability of color are some of the most important qualities construction companies, designers, and architects seek when selecting cement products. As such, cement manufacturers must implement thorough color quality control protocols not only at the point of manufacture, but in simulated real-world conditions. This includes testing for color accuracy, consistency, and longevity, allowing you to identify unwanted color behavior before a product is released into the marketplace.¹ Manufacturers can use their own in-house testing environments for this, or they can offer this testing as a final step in the cement supply process.



Spectrophotometric color measurement can help you monitor consistency of your mix, ensuring your final product looks and performs the way you want. Image Source: Pexels user Life of Pix

Spectrophotometric Color Measurement Can Eliminate Common Cement Problems

Cement is increasingly renowned for its versatile color options, opening up the door to both innovative new designs and tried and true aesthetics. However, the color of cement drastically changes as it dries, presenting unique challenges for cement manufacturers; unless manufacturers test the end color of a specific mix, they have no way of guaranteeing the final appearance of their product. This is a major concern, as incorrect cement color can create an unappealing end result at odds with a designer's vision and be both difficult and costly to fix.

Color inaccuracies in cement can result from a variety of factors, including incorrect dry mix ratios and incorrect bonding of pigment, which may only become apparent once cement is mixed.² [Spectrophotometric field testing](#) of site-mixed cement allows for identification of these issues and gives manufacturers the opportunity to take corrective action to ensure proper color behavior. By taking multiple readings of your sample, you can determine color accuracy both within and between batches, identify unwanted color variation, and obtain the data necessary to create appropriate directions for use. You may also use artificial aging environments to observe color behavior over time in order to tailor formulations for optimal color durability.

Portable spectrophotometers, such as those in HunterLab's [MiniScan EZ series](#), are ideal instruments for field testing of concrete, allowing you to easily capture color data in virtually any environment. With [dual beam technology](#) and user-friendly, one-touch designs, the MiniScan EZ is an indispensable part of the color quality control process for cement manufacturers around the world.

HunterLab Versatility

Cement is a versatile material that requires technologically advanced equipment to ensure the highest level of quality control. HunterLab's [renowned spectrophotometers](#) allow for analysis in both the lab and in the field to ensure color accuracy and consistency while giving you the information you need to perfect formulations and processes [Contact us](#) to learn more about our innovative technologies and let us help you select the perfect tools for your needs.

1. "Visual Inspection of Concrete", <https://www.nachi.org/visual-inspection-concrete.htm>
2. "Understanding Colored Concrete", https://www.concretenetwork.com/chris_sullivan/colored_concrete.htm