



Terracotta products, like gardening pots, are a popular tool for homeowners and garden designers. Image source: Pexels user rawpixel.com

A garden designer has spent months searching for the perfect teal-colored pots and planters for a new urban green space located on the rooftop of a massive apartment complex. The designer wants the rooftop garden to look beautiful and cohesive, and so she carefully selects plants and pottery that will complement each other.¹Similarly, architects use well-crafted terracotta tile as [roofing](#), flooring, and decorative elements, making buildings appear more colorful and aesthetically-pleasing. In both cases, customers rely on colorful, unique clay products to make their visions come to life.

Color is one of the most attractive features of clay and terracotta products; the right shade can completely transform the appearance of a space or building. As such, manufacturers must take color quality control into serious consideration and integrate spectrophotometric technologies in their production process. [Spectrophotometric color measurement](#) helps ensure that each product conforms to your aesthetic expectations, helping you make the most of these colorful materials.



Terracotta is naturally orange in color due to the oxidation of iron that occurs when the product is exposed to high temperatures. Image source: Shutterstock user Pi-Lens

The Benefits of Spectrophotometry for Clay and Terracotta Products

The color of terracotta and clay products can be influenced by a wide variety of factors. The traditional color of terracotta is orange, yet the material can also take on a red or brown hue if it's left in the kiln for a long period of time. In order to get this trademark look, you need to use an effective color quality control process to ensure that each product is the perfect shade of burnt orange. However, many modern industries also choose to create terracotta and clay products that deviate from their traditional colors. Today, it's not unusual to find clay and terracotta products in a range of hues, and designers, architects, gardeners, and homeowners often search for shades that match a specific color scheme. This is why quality control is essential, whether you're manufacturing a traditional product or experimenting with new, exciting colors.

Spectrophotometers are essential for achieving color quality control.² In part, this is due to the fact that these instruments are capable of detecting small variations in color that the human eye may not immediately see. Additionally, the naked eye is subjective when it comes to accurately assessing color samples, as environmental factors and biological limitations can result in variations in color perception between viewers or even when the same viewer observes an object at different times. Spectrophotometers eliminate this subjectivity; instead, they capture objective color data to ensure accuracy and consistency in your finished products.

Measuring the Color of the Product's Raw Materials and Finish

Not only do spectrophotometers help you ensure accurate color quality control of finished product, these instruments can be used to test the impact of raw materials before the general production process begins. In particular, assessment of glaze can be a critical step in your quality control process, as the color and turbidity of your glaze can dramatically impact the final color of your

product. Even the smallest variation in color could be grounds for concern, especially in large production runs of terracotta and other clay products. However, the impact of glazes can only be fully observed once applied and fired. As the authors of *Ceramic Material Systems: in Architecture and Interior Design* note, “In most processes involving glazes, test tiles or prototypical samples are made to ensure the glaze mix is consistent with expectations.”³ This prevents manufacturers from creating an entire batch of products that have serious color flaws, which in turn results in less product waste. After your samples come out of the kiln, you can also apply and test additional finishes, [such as paint](#) or an additional glossy, protective coat of glaze, which may be similarly assessed.



Spectrophotometric color measurement is valuable in assessing the color of glazes on clay products. Image Source: Shutterstock user Thirteen

Testing Proper Kiln Firing Times and Temperatures

In addition to assessing glazes and finishing, spectrophotometric color measurement can be used to establish appropriate kiln firing times. The color of your product may change depending on your kiln’s temperature and the amount of time that your product spent inside of it. This is particularly true of terracotta because its degree of color develops as it’s exposed to high heat; the iron in the clay oxidizes, deepening the color of the product. Generally, the longer your product spends in the kiln and the higher the temperature, the darker your final product will be. However, firing times can impact the color of non-terracotta products as well.

When you create a new product, you may use a spectrophotometer to find the perfect firing time—you can test a sample of clay or terracotta at different temperatures and bake times to find the time and temperature that gives you the ideal shade. Spectrophotometers can then be used to measure future products to ensure adherence to your color standard, alerting you to unwanted color

variation that could indicate potential temperature or firing time inconsistencies. This could save you from over-firing or under-firing future batches of product, minimizing waste.

HunterLab Quality Control

For more than 60 years, businesses have relied on HunterLab's state-of-the-art spectrophotometers to ensure that their products meet color standards. Our instruments are flexible, user-friendly, and come in a variety of different formats designed to meet the needs of a range of industries. With a complete line-up of [portable, benchtop, and on-line instruments](#), HunterLab spectrophotometers offer solutions for color measurement in a wide variety of applications. [Contact us](#) to find out more about how our instruments can help you improve your color quality control process.

1. "Rooftop Gardening", October 23, 2017, <https://www.thespruce.com/rooftop-gardening-1403340>
2. "Technology and Innovation", <http://bostonvalley.com/services/innovative-archlab/technology-innovation/>
3. *Ceramic Material Systems: in Architecture and Interior Design*, 2015, https://books.google.ca/books/about/Ceramic_Material_Systems.html?id=tyiCCgAAQBAJ&redir_esc=y