

There was something different about my employee, James. It was the same the next day, and the next. He asked me for a raise twice in a month and both times I said yes. I just couldn't say no to that suave, collected, California tan. It wasn't until months later, in the Spring, when he bested me three for five at my private tennis club, that I discovered his secret. I'd run out of sunscreen, and I asked to borrow his. He wouldn't let me. I pressed, but he resisted. Why the mystery, I wondered. Finally, when he left for a bathroom break, I dug into his bag and took a look. He was using tinted sunscreen! He'd been using it this whole time! He wasn't tan at all—it was all cosmetic! I slathered some on my face and caught my reflection in a pane of glass. I looked like Zeus. I felt like Apollo. "Alright," I said when he got back. "You ready for another game?"



Tinted sunscreen can protect from UV rays while adding color to a person's complexion. Image credit: Flickr user [Joe Shlabotnik](#) (CC BY 2.0)

Tinted Sunscreen Manufacturing Is a Difficult, Delicate Process

Sunscreen can be a difficult mix to master. Sunscreen recipes vary¹ by color, SPF level, brand, and intended usage. Further, as consumers become more wary of synthetic products, sunscreen manufacturers have needed to alter their recipes with more natural ingredients. Adding to the complexity of the process is the number of ingredients. Sunscreens are made of purified water, emollients, lubricants, emulsifiers, thickeners, perfumes, colorants, preservatives, [and UV filters and absorbers.](#)

In order for tinted sunscreen to come out the right color, all these ingredients must be added in a precise order, at the correct ratios, and mixed without error. In the case of tinted sunscreen, mix

color homogeneity is linked to brand consistency. As the color of a company's sunscreen is its major selling point in the high-end consumer cosmetics market, inconsistent mixes and off-color sunscreens can drive away customers. That's why tinted sunscreen manufacturers need to get it right before their product is ever bottled.

This is easier said than done. Sunscreen is either an oil-in-water or water-in-oil emulsion. Even when properly heated, this blend does not always easily mix, often requiring extended processing times. Powdered ingredients increase this difficulty, as they do not always dissolve entirely, and can stick to the sides of the mixing vat as residue. These process difficulties can result in off-color batches. Without careful attention and stringent quality control, it is entirely possible for sunscreen manufacturers to bottle and ship an inaccurately colored product.



Tinted sunscreen doubles as a foundation, and can triple as a moisturizer. Image credit: Flickr user [Evil Erin](#) (CC BY 2.0)

Spectrophotometric Quality Control Allows Manufacturers to Adjust Sunscreen Batch Color

For this reason, sunscreen manufacturers employ spectrophotometers—instruments which objectively analyze color—to determine if their mix meets standards. Manufacturers [program a tolerance standard](#) based on their desired tint into the instrument. Then, by periodically testing samples against this standard, technicians can simply and accurately determine if a batch is the right color. Implementing this process allows manufacturers to make any needed changes to off-color batches, such as prolonging the mixing cycle, before the sunscreen leaves the vat. To test batch homogeneity, the results from many samples from the same vat can be compared to one another.

These instruments are far more effective than relying on human observers for color quality control. Unlike human observers, they have no problem identifying tiny differences between similar shades. By measuring the reflections of a controlled beam of light, they are able to determine the exact shade of opaque liquids or solids with decimal precision. The processors built into these instruments

render color as a series of numerical values that can be communicated and replicated. This eliminates the need for printed standards and the fuzzy borders of subjective color standards.

With over six decades of experience developing color measurement instruments for a wide variety of industries, HunterLab has learned how to help manufacturers efficiently, affordably, and easily improve their quality control processes. To learn more about how spectrophotometers help keep sunscreen the right tint, [contact our friendly, knowledgeable sales professionals today](#).

1. "Manufacture of Sunscreen Creams and Lotions," <http://www.silverson.com/us/resource-library/application-reports/manufacture-of-sunscreen-creams-and-lotions>