DIXIE

GMK Botanical Color Matching

Reading Spectrophotometer Data

We send our samples and swatches to Nebulant, who we have partnered with to help us get actual data on color and who has helped with color matching on other sets like GMK Bingsu, to measure with a tool called a spectrophotometer. This device measures the reflectance of the samples across the visible spectrum, and can be used to calculate CIEL*a*b* color values of both the reference colors and GMK samples.

> **L*** stands for *Lightness* where 0 is black and 100 is white.
>
> **a*** is from green (-) to red (+).
>
> **b*** is from blue (-) to yellow (+).

We take these three values from one color and compare them to another color to calculate the euclidean distance between them in the CIEL*a*b* color space. The accumulation of all three (L*, a*, & b*) deltas will give us a ΔE^*_{ab} (DeltaE*ab) between the two colors. A $\Delta E^*_{ab} \leq 2.3$ considered to be a "just noticeable difference"; and our goal is to have a difference of less than 2.

Pre Color Matching

For GMK Botanical, we started out with Pantone values that Hazzy had chosen and converted them to RAL colors for faster color matching rounds. We converted by eye to what we thought matched best to the Pantone plastic chips. We then sent the Pantone chips to Nebulant to measure with a spectrophotometer, and compared 24 separate RAL samples to find the closest RAL colors. We confirmed that the color we chose by eye for the Accents and Mod Legends (Lighter Green) was the closest match and the Mod Color (Darker Green) was changed to a slightly different color because of the data. We then sent those two values to GMK for color matching. The Alpha color was already color matched for GMK Shoko and we were given permission to use it for this set by the designer.

Round 1 Samples

When we received the color match samples from GMK, we sent them to Nebulant for measurement and comparison to our chosen RAL colors. Proceed to see the data.

Below is a graph comparing the measurements of the keycap sample from GMK and the RAL swatch for the Accent / Modifier Legend color. As you can see the spectral reflectance graphs closely mirror one another with a small percent difference in reflectance
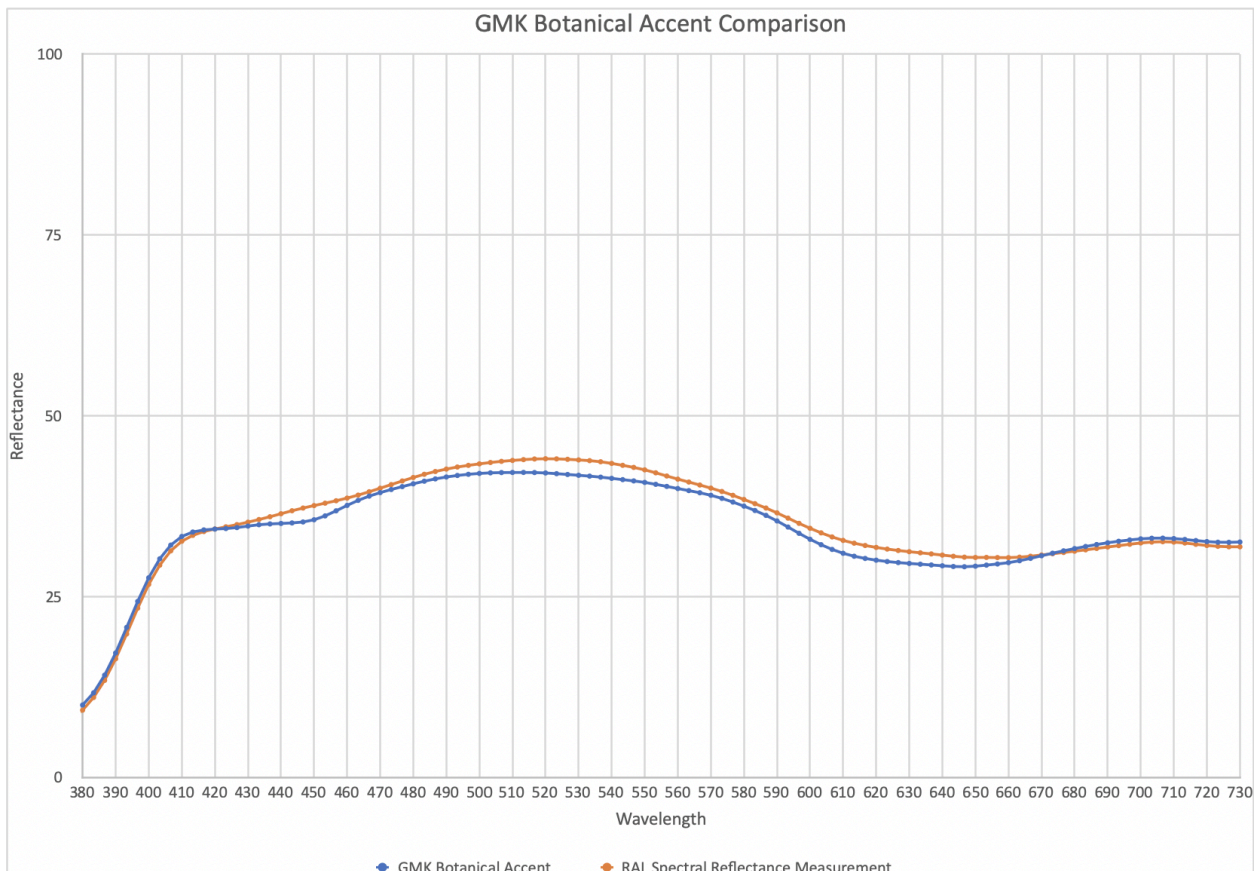
Below is the final comparison data from the sample from GMK and the RAL swatch.

ΔL*: -1.09   Very close match with only a slight decrease in lightness.

Δa*: .22   Virtually perfect.

Δb*: .51   Virtually perfect with only .5 Delta

ΔE*$_{ab}$: 1.22   This value is well under our threshold of a close match, with the majority of the difference coming from the slight decrease in lightness.

	L*	a*	b*
RAL Spectral Reflectance Measurement	69.2670683	-11.3675653	1.5735006
GMK Botanical Accent	68.1758834	-11.1469232	1.0677953
DELTA	-1.0911849	0.2206421	-0.5057053
DeltaEab	1.222744974!		

Modifier Base (Dark Green) - APPROVED

Below is a graph comparing the measurements of the keycap sample from GMK and the RAL swatch for the Modifier color. As you can see they are following nearly identical paths across the spectrum. A very close match.
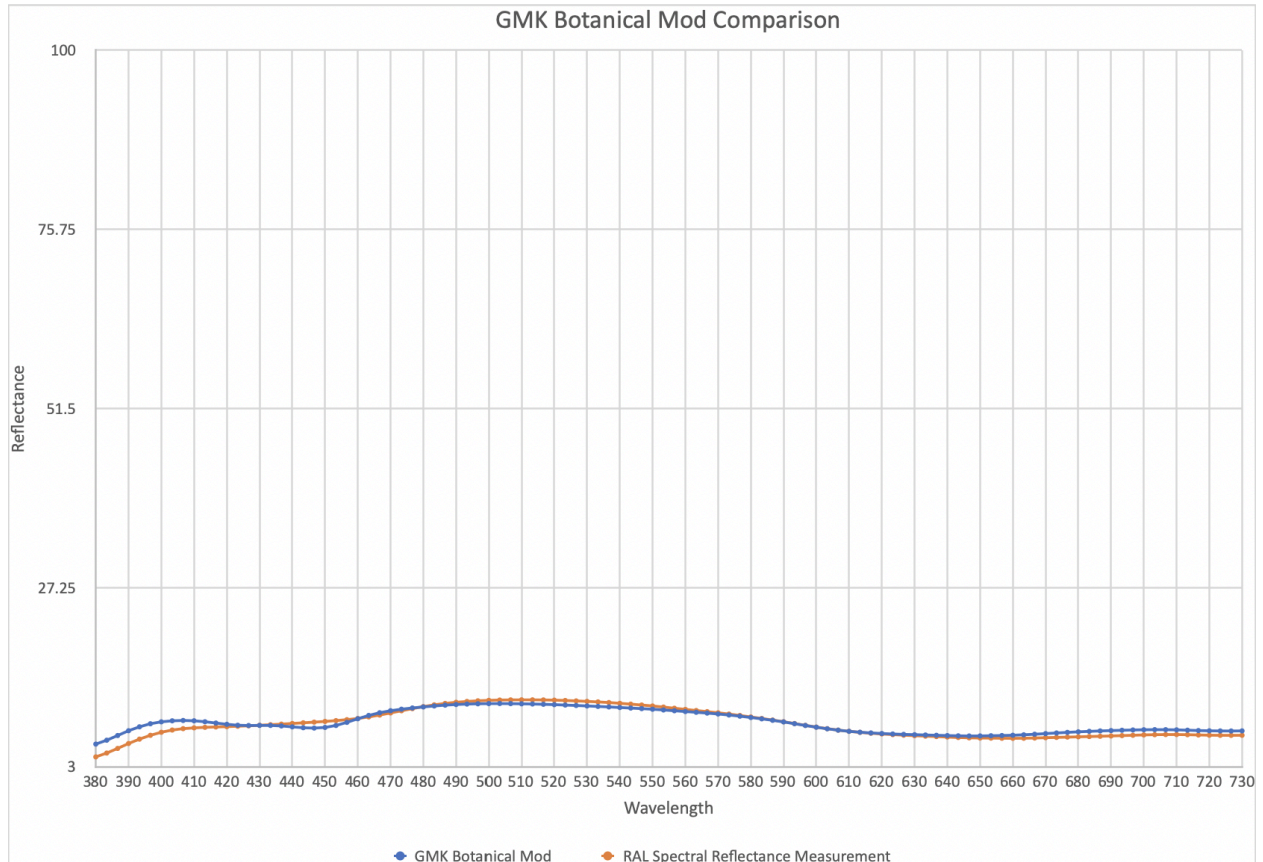
Below is the final comparison data from the sample from GMK and the RAL swatch.

ΔL*: -.04   Nearly perfect match.

Δa*: 1.44   towards red but is far under 2, so we are well within the target range.

Δb*: -.18   Basically a perfect match.

ΔE*$_{ab}$: 1.52   Difference is under 2, with the majority of change being a nearly imperceptible warming of the color.

	L*	a*	b*
RAL Spectral Reflectance Measurement	38.4674711	-10.6965282	1.7616401
GMK Botanical Mod	38.0011443	-9.2608257	1.5839881
DELTA	-0.4663268	1.4357025	-0.177652
DeltaEab	1.519954797		

Link to Photos