

What is Metamerism?

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Metamerism is a visual phenomenon that is most often seen between two colors made with different pigments. These colors appear to match under one lighting condition (i.e. daylight) but not another lighting condition (i.e. LED or fluorescent lighting).

The Science Behind Metamerism

This visual phenomenon is caused by the light source reflecting off an object. Without light, there is no color. Different light sources like sunlight or fluorescent lighting have different amounts of red, yellow, or blue shade light to reflect off an object. Differing pigments can reflect these amounts of light back to us as "color." For example, in Figure 1 an orange can be made with orange and white pigments, or it can be made with yellow and red. Any light source that has a significant amount of red reflectance like incandescent lighting, will make the red

pigment stronger, giving more of a red "color" to the red/yellow mix paint. Conversely, viewing the combination in more of a blue/yellow light will bring out the yellow in one sample, making it look less red than in another. Metamerism can be measured with a spectrophotometer and given a "DIN 6172 metamerism" reading between two samples to measure how two color samples will vary in different light sources.

How to Minimize Metamerism

The best way to eliminate or minimize metamerism is to use the same pigments within all paint coatings. Ensuring that there are no variances between pigments used in like colors is crucial for matching the coatings in multiple light sources. It is also helpful to establish the conditions of color evaluation as well as a range of tolerances within the color.

Figure 1: Metamerism and Lighting

