Applications Note

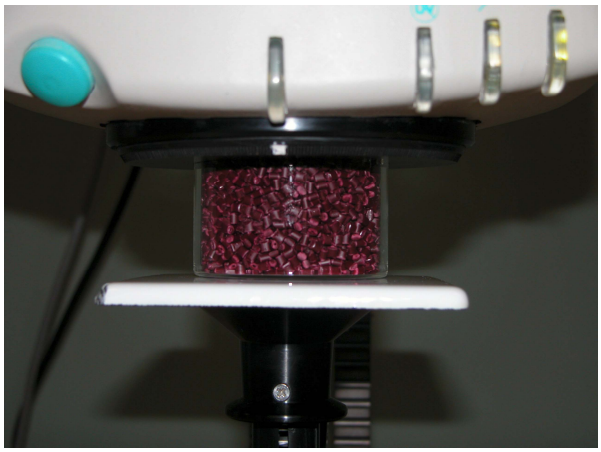
Insight on Color **Vol. 15, No. 7**

Reflectance Color Measurements Through Glass

It is sometimes necessary to measure the reflected color of a sample with glass between the sample and the instrument's measurement port. For instance, the sample may need to be contained (like a liquid, semi-solid, or batch of particulates that are too small to measure individually) or may be harmful to the instrument if placed directly at the measurement port (such as foods that may drop crumbs into the optics or fabrics that leave lint behind). In these cases, the measurement may be made in a glass sample cup (like that shown below containing plastic pellets) or using a glass cover over the opening in the port plate.

The glass does affect the sample measurement, however. Even though the glass is clear, it does absorb some of the light that should contact and be reflected back from the sample.

As an illustration, the plastic pellets shown above were measured on a LabScan XE with a 1.75-inch area of view, first with the pellets presented directly to the instrument, and then with the pellets measured through the glass bottom of the sample cup. This was achieved by mounting the LabScan XE on the port-down stand and using the sample clamp and a white backing tile to hold the cup of pellets first right-side-up at the sample port (no glass in measurement), then upside-down with the pellets held in place by the white tile (measuring through the glass). (Please note that the measurements would not normally be made in this fashion. Pellets are usually measured with the LabScan XE in the port-up orientation with the sample cup placed on top. See http://www.hunterlab.com/applicationnotes/pellets.html for illustrations.)



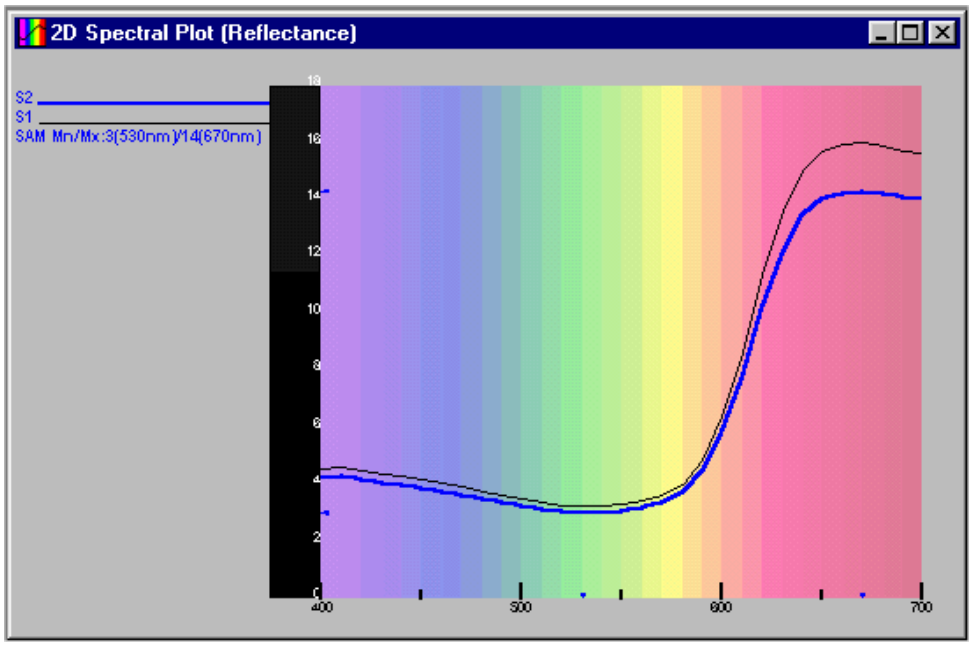
The cup of pellets held in place at the sample port

The white tile holding the pellets in place with the cup upside-down

The following color values were received (D65/10°).

Condition	L*	a*	b*
No Glass	25.97	19.29	3.15
With Glass	24.83	18.15	2.88

When measured with glass, the pellets appear slightly darker (lower L*) and less saturated (lower a* and b*) than when measured without glass. The spectral plot shown below also illustrates the differences detected instrumentally.



The spectral reflectance plot for the sample. The top curve is the sample measured without glass and the bottom curve is the sample measured through glass. The curves have approximately the same shape.

So, what does all this mean? It means that for each type of sample you measure and compare, you need to choose whether or not you will measure through glass, record that choice as part of your measurement, and stick with it. If you measure some samples through glass and others without glass, you will not be able to compare the measurements.

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