

MEASURING ORGANIC PIGMENTS WITH THE LA-960V2 HIGH-CONCENTRATION LOW-VISCOSITY (HL) CELL LY-9609

Introduction

Dyes and pigments are a common additive in nearly every product on the market today – from clothing and accessories to food and beverages to household items or cosmetics.

Understanding the particle size distribution for pigments, inks, and dyes is important for manufacturers, as the particle size will determine how well a color will cover a surface (hiding power), how the finish will look (gloss strength), or even how well the material can absorb light (tintorial strength).

The High-concentration Low-viscosity Cell (HL Cell) is an accessory for the LA-960V2 laser diffraction particle size analyzer. The HL Cell aids in measuring samples of low viscosity or high concentration. Since liquid inks, dyes, and pigments are often high concentration, the HL Cell is a useful accessory for measuring them.

Analytical Test Method

Three organic pigments dispersed in RO water were analyzed with the LA-960V2 laser diffraction particle size analyzer: Violet, Red, and Yellow.

Set the following conditions:

Basic Measurement Conditions

- Sample Information:
 - o Sample Name:
 - o Material: Organic Pigment
 - o Source: (name of vendor)
 - o Lot Number: (found on bottle)
 - o Refractive Index values can be quite high, with real values starting from about 2 and going beyond 3. Imaginary refractive index (related to absorption) values can range from 0.5 to 5i.
 - o Form of Distribution: Manual
 - o Iteration Number: 15
 - o Distribution Base: Volume



Figure 1. The HL Cell for the LA-960V2 analyzer.

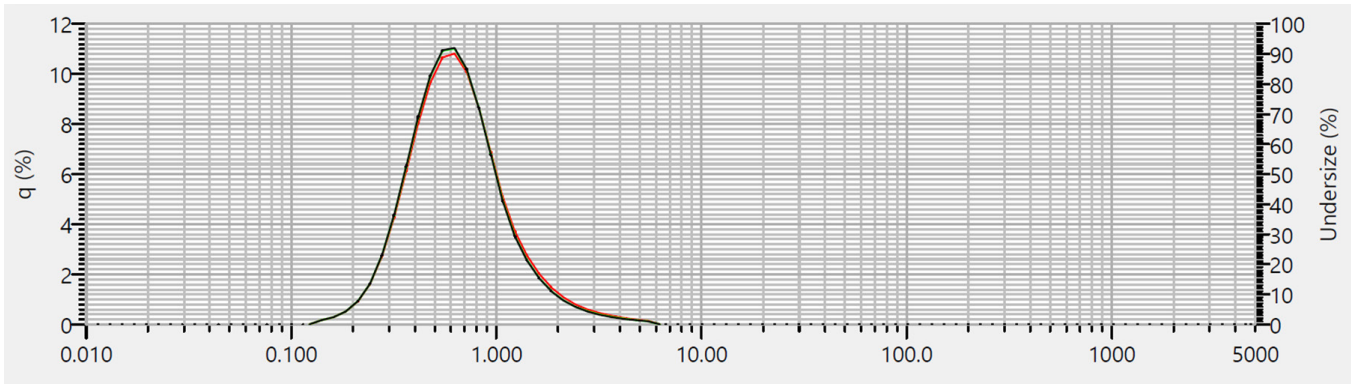
Advanced Measurement Conditions

- Measurement tab
 - o Data acquisition times (Sample): 5000
 - o Data acquisition times (Blank): 5000
 - o Alignment before measurement: Yes

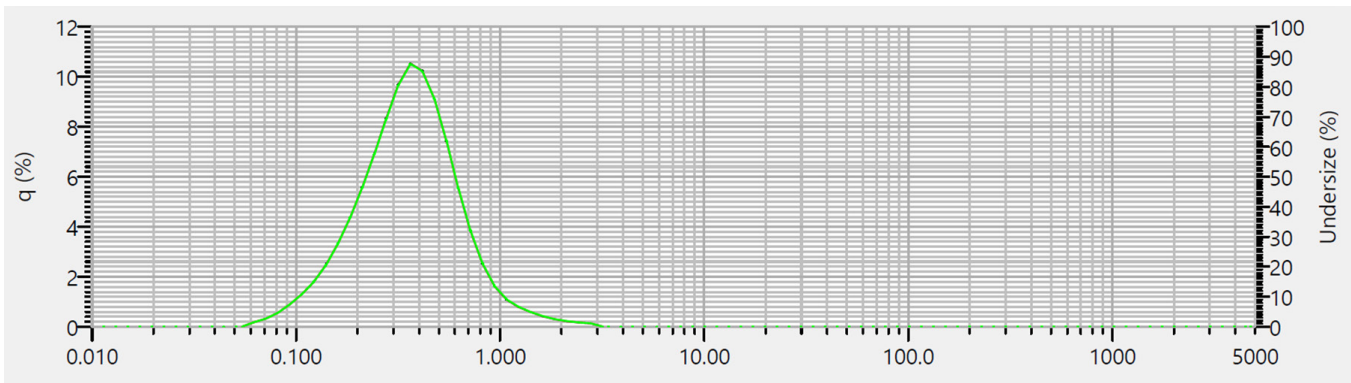
Test Procedure:

1. Clean the HL Cell glass plates.
2. Place the cell plates into the cell frame with a 5 μ m spacer between them. Screw the frame together tightly to secure.
3. Inject the HL Cell with deionized water using a syringe.
4. Insert rubber cell caps into each hole of the cell glass.
5. Place assembled cell into cell holder and slide tray into the measurement position within the LA-960V2.
6. Align the laser and verify that the cell is clean by inspecting the channel baseline for any channels reading above 500.
7. Take the system Blank.
8. Remove the HL Cell from the cell holder.
9. Clean, dry, and reassemble the HL Cell.
10. When running ink samples such as these, dilution by 10 to 100x is most often the best.
11. Inject the HL Cell with the diluted pigment.
12. Insert the cell caps and place the cell back into the holder within the LA-960V2.
13. Perform alignment of laser.
14. Take 3 measurements.
15. Remove the HL cell and clean it before the next measurement.

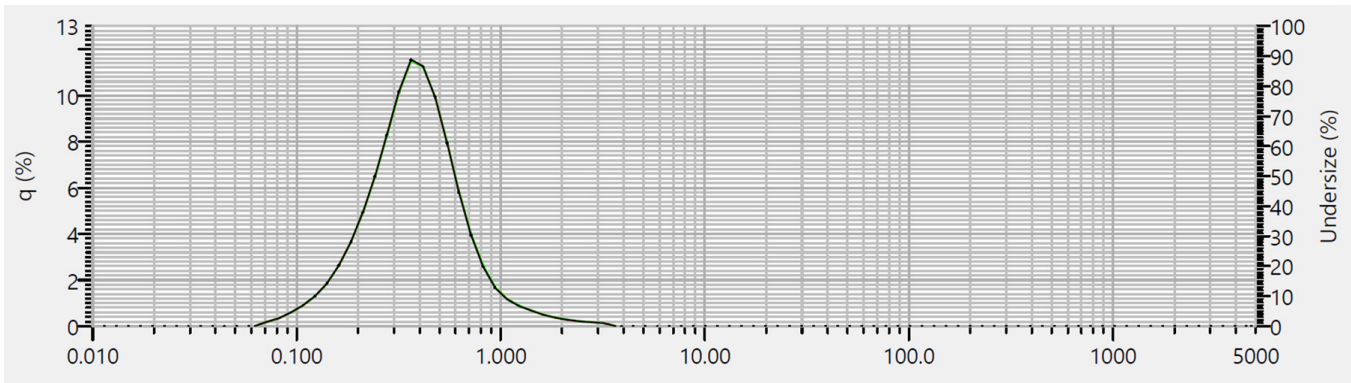
Results



Violet Pigment



Red Pigment



Yellow Pigment

Conclusion

The measurement results shown above prove the LA-960V2, with the additional functionality of the HL Cell, make laser diffraction a preferred method for measuring high-concentration, low-viscosity samples such as pigments.