

MEASURING 1 μm PSL STANDARD WITH THE LA-960V2 HIGH-CONCENTRATION LOW-VISCOSITY (HL) CELL LY-9609

Introduction

The High-concentration Low-viscosity Cell (HL Cell) is an accessory that is used with the Laser Scattering Particle Size Distribution Analyzer LA-960V2 to measure the particle size distribution of samples having low viscosity and high concentration. The HL Cell allows users to minimize the amount of material required for each measurement, while also reducing the dilution requirement. Common materials measured with the HL Cell include dyes, inks, or samples dispersed in volatile liquids.

Mono-disperse polystyrene latex (PSL) standards are commonly used to verify accuracy and proper operation of laser diffraction particle size analyzers. As these materials are somewhat different from normal materials, proper conditions and procedures are necessary to ensure correct results.

Analytical Test Method

Applicable instrument: LA-960V2 with HL Cell
Dispersant fluid: RO water

Set the following conditions:

Basic Measurement Conditions

- Sample Information:
 - o Sample Name: (nominal size of standard)
 - o Material: PSL
 - o Source: (name of vendor)
 - o Lot Number: (found on bottle)
 - o Refractive Index: Single PSL in water
 - o Form of Distribution: Manual
 - o Iteration Number: 1000
 - o Distribution Base: Volume

Advanced Measurement Conditions

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



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

Test Procedure:

1. Clean the HL Cell glass plates.
2. Place the cell plates into the cell frame with a 5 μm 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 and reassemble the HL Cell.
10. Combine 1 μm PSL with deionized water to make a 1:1 solution.
11. Inject the HL Cell with the diluted 1 μm PSL.
12. Insert the cell caps and place 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

Verify that the Mean Diameter is within the bottle tolerance for the 1 μm standard. Below is an example of a result from measuring the 1.0 μm PSL standard with the HL Cell.

Sample Name: 4010A 1.0 μm

Lot Number: 266060

Bottle tolerance: 1.025 $\mu\text{m} \pm 0.018 \mu\text{m}$

File Name	Sample	Mean Diameter
1 μm PSL Run 01.NGB	4010A 1 μm	1.02852
1 μm PSL Run 02.NGB	4010A 1 μm	1.02904
1 μm PSL Run 03.NGB	4010A 1 μm	1.02917
Average		1.02891
Std. Dev.		0.00028
CV (%)		0.02729

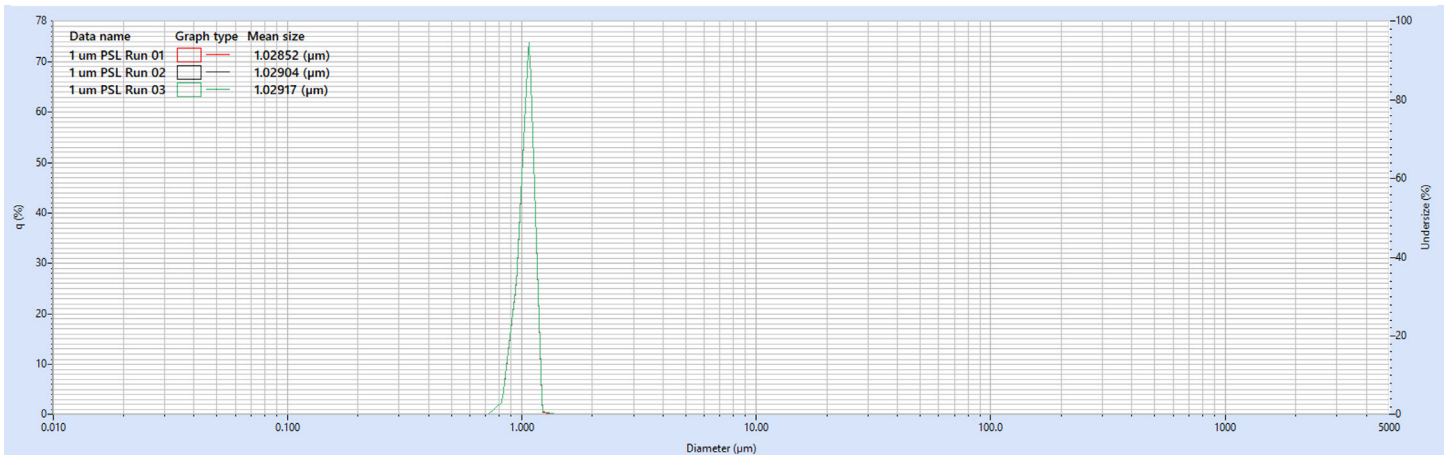


Figure 2. Results of 3 PSL Standard measurements on the LA-960V2 equipped with the HL cell.