HORIBA

Application Note

Repeatability Study: LA-960V2 Slurry AutoSampler

AN265

Repeatability Study: Measuring Alumina using the LA-960V2 Slurry AutoSampler

Introduction

The Slurry AutoSampler is an accessory for the Partica LA-960V2 laser diffraction particle size distribution analyzer. The Slurry AutoSampler automates measurements of up to 30 samples, allowing users to save time in the lab. For this example, 26 vials of Aluminum Oxide (Alumina) were measured using the Slurry AutoSampler.

Analytical Test Method

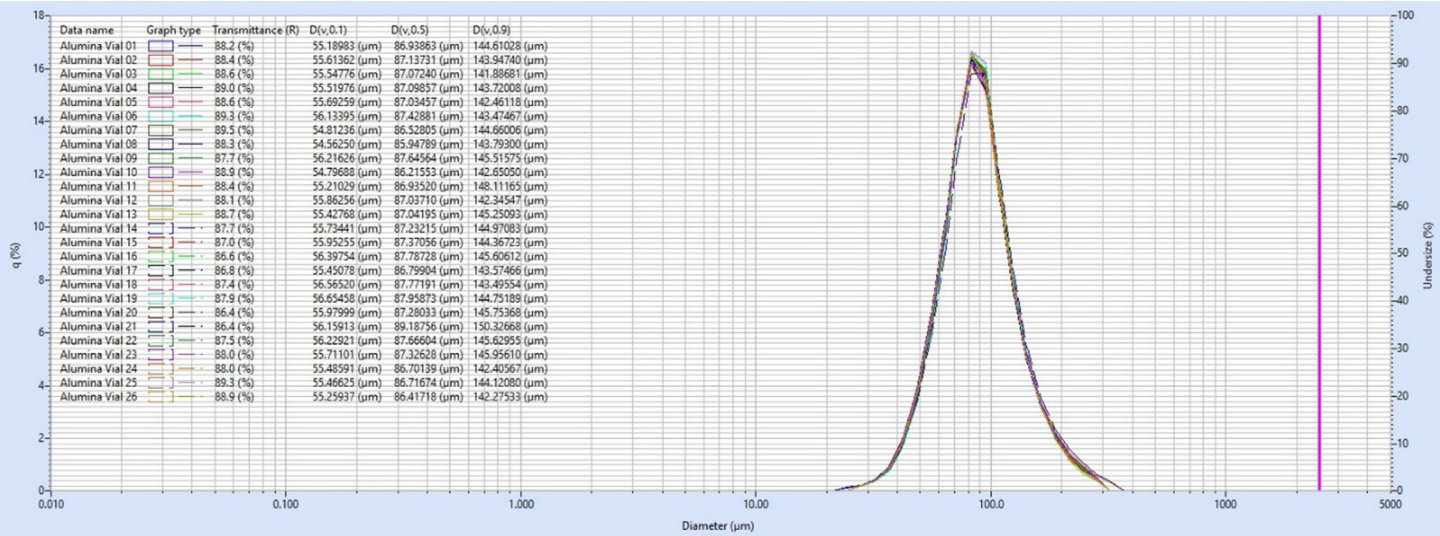
1. Attach a water source to the LA-960V2.
2. Fill each Slurry AutoSampler vial with 100 mL RO water and 4 g Alumina.
3. Fill the AutoSampler reservoir bottle with RO water.
4. Create and save a LA-960V2 condition file with the following settings:
   a. Sample Name: Alumina
   b. Material: Aluminum Oxide
   c. Source: (Name of vendor)
   d. Refractive index: 1.660-0.000i (1.333)
   e. Form of distribution: Auto
   f. Distribution Base: Volume
   g. Data acquisition times: 5000
   h. Align before measurement: Yes
   i. Liquid feed level: Low
   j. Circulation: 5
   k. Agitation: 3
5. Create and save a method in the AutoSampler Scheduling with the following settings:
   a. Dispersant: from reservoir
   b. Blanking:
      i. Delay: 20 sec.
      ii. Check box for Blank Measurement
   c. Add sample: From AutoSampler
   d. Measurement:
      i. Align before Measurement
      ii. Check concentration
      iii. Delay: 20 sec.
      iv. Num. Times: 1
      v. Repeat Delay: 0 sec

Figure 1. The LA-960V2 with the Slurry AutoSampler accessory attached.

   e. Draining Rinsing: check both boxes
   f. Rinse Fluid: From reservoir
6. Set up the concentration requirements in AutoSampler Scheduling:
   a. Check box for Auto Adjust Sample Concentration
   b. User T% From: Laser
   c. Minimum feed: 3
   d. Maximum feed: 30
   e. Required T%: 85
   f. T% Plus/Minus: 5
   g. Conc Delay: 300
   h. Add Sample: 3
7. In the AutoSampler Scheduling window, enter sample names in the corresponding row for each position.
8. Select the condition file and method created in steps 3 and 4.
9. Clear all lines for positions not in use.
10. Click Execute.

Results

Data was collected for 26 samples without user labor. Once the AutoSampler has completed each measurement, all data will be saved in the LA-960V2 software. Below is an example of results from measuring 26 vials of Aluminum Oxide with the AutoSampler and LA-960V2. Note the excellent repeatability in the measured size results. For example, the coefficient of variation (CV%) is less than 1% for D50.



File Name	Sample	D(v, 0.1)	D(v, 0.5)	D(v 0.9)
ALUMINA VIAL 01.NGB	Alumina	55.190	86.939	144.610
ALUMINA VIAL 02.NGB	Alumina	55.614	87.137	143.947
ALUMINA VIAL 03.NGB	Alumina	55.548	87.072	141.887
ALUMINA VIAL 04.NGB	Alumina	55.520	87.099	143.720
ALUMINA VIAL 05.NGB	Alumina	55.693	87.035	142.461
ALUMINA VIAL 06.NGB	Alumina	56.134	87.429	143.475
ALUMINA VIAL 07.NGB	Alumina	54.812	86.528	144.660
ALUMINA VIAL 08.NGB	Alumina	54.562	85.948	143.793
ALUMINA VIAL 09.NGB	Alumina	56.216	87.646	145.516
ALUMINA VIAL 10.NGB	Alumina	54.797	86.216	142.650
ALUMINA VIAL 11.NGB	Alumina	55.210	86.935	148.112
ALUMINA VIAL 12.NGB	Alumina	55.863	87.037	142.345
ALUMINA VIAL 13.NGB	Alumina	55.428	87.042	145.251
ALUMINA VIAL 14.NGB	Alumina	55.734	87.232	144.971
ALUMINA VIAL 15.NGB	Alumina	55.953	87.371	144.367
ALUMINA VIAL 16.NGB	Alumina	56.398	87.787	145.606
ALUMINA VIAL 17.NGB	Alumina	55.451	86.799	143.575
ALUMINA VIAL 18.NGB	Alumina	56.565	87.772	143.496
ALUMINA VIAL 19.NGB	Alumina	56.655	87.959	144.752
ALUMINA VIAL 20.NGB	Alumina	55.980	87.280	145.754
ALUMINA VIAL 21.NGB	Alumina	56.159	89.188	150.327
ALUMINA VIAL 22.NGB	Alumina	56.229	87.666	145.630
ALUMINA VIAL 23.NGB	Alumina	55.711	87.326	145.956
ALUMINA VIAL 24.NGB	Alumina	55.486	86.701	142.406
ALUMINA VIAL 25.NGB	Alumina	55.466	86.717	144.121
ALUMINA VIAL 26.NGB	Alumina	55.259	86.417	142.275
Average		55.678	87.165	144.449
Std. Dev.		0.535	0.638	1.875
CV (%)		0.960	0.732	1.298