HORIBA

Application Note

PS415 Standard Measurement
AN280

PS415 Standard Measurement on Partica LA-960V2 with PowderJet

Introduction

Poly-disperse glass bead standards were developed as a better test of complete system performance for laser diffraction analyzers, compared to monodisperse polystyrene latex dispersions that are not representative of most materials tested on these instruments. In this report PS415 was tested on the LA-960V2 with Powderjet. PS415 is a 10 µm to 100 µm, 1-gram single shot polydisperse glass bead standard produced by Whitehouse Scientific. Repeatability for all size classes was better than 2.5%, showing great repeatability.

Instrument Setup

- **Instrument Configuration**
  - Cell: Dry Cell
  - Nozzle: Medium
- **Sample Information**
  - Sample Name: PS415
  - Material: Glass beads
  - Source: Whitehouse Scientific
  - Refractive Index: 1.510 – 0.00i
  - Iteration mode: Manual
  - Convergence Factor: 15
  - Distribution base: Volume
- **Advanced Measurement Conditions**
  - Data acquisition times (Sample): 50000
  - Data acquisition times (Blank): 5000
  - Auto OFF after measurement: Check all items
  - Auto ON with auto blank: Check Vacuum and Air
  - T% for Sampling: Yes
    - Max T%: 99%
    - Min T%: 95
  - Start Trigger: No
  - Stop Trigger: Yes
    - T%: 99%
    - Behavior: Stop After Waiting
  - Feeder Speed: Auto
  - Air Pressure: 0.3 MPa

Figure 1. LA-960V2 with Dry Powder Feeder attached.

Test Procedure

1. Insert MEDIUM dispersion nozzle into dry cell.
2. Activate Vacuum and press Alignment. Inspect detector/channel baseline to determine cleanliness of dry cell glass.
3. Spread the whole bottle of standard along the chute.
4. Click Auto-Measurement.
5. Wait for measurement to complete then brush out feeder chute to prepare for next measurement.

Results

Verify that the D10, D50, and D90 are all within acceptable ranges.

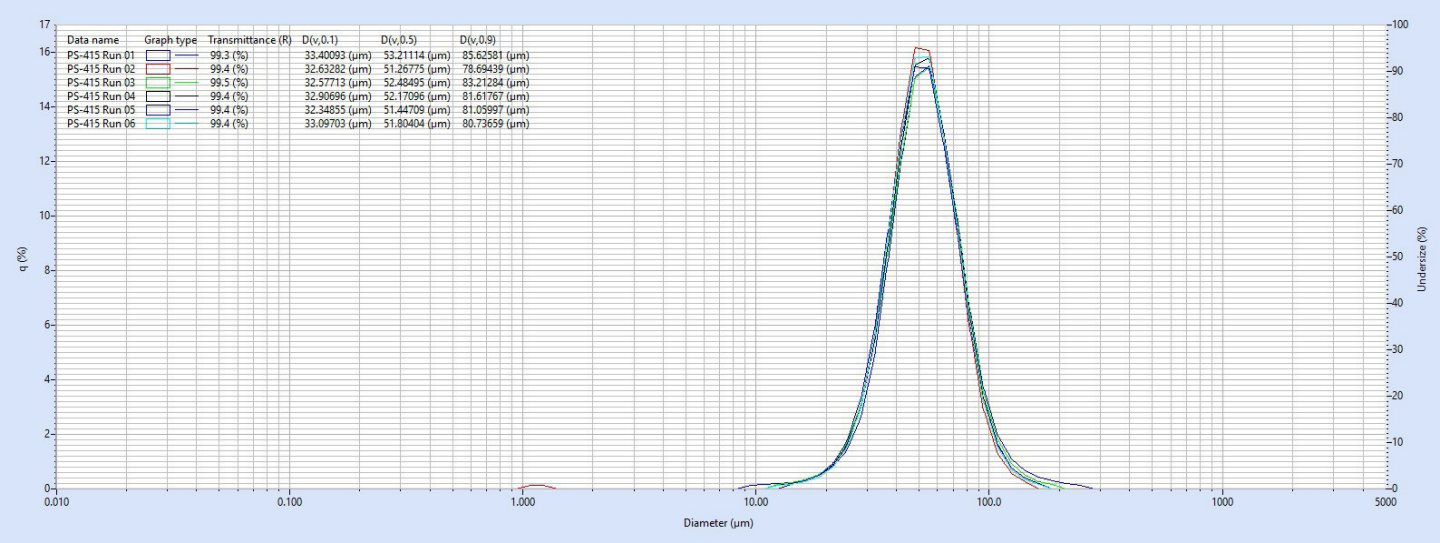

Figure 2: An overlay from the LA-960V2 showing six runs of the PS415.

Data Name	D10 (µm)	D50 (µm)	D90 (µm)
PS415 RUN 01	33.401	53.211	85.626
PS415 RUN 02	32.633	51.268	78.694
PS415 RUN 03	32.577	52.485	83.213
PS415 RUN 04	32.907	52.171	81.618
PS415 RUN 05	32.349	51.447	81.060
PS415 RUN 06	33.097	51.804	80.737
Average	32.827	52.064	81.825
Std. Dev.	0.384	0.719	2.366
CV (%)	1.170	1.382	2.891
Certified Diameter	33.2	53.9	85.8
Uncertainty	3.0	4.2	6.0
Upper Limit	29.92	49.40	78.42
Lower Limit	36.48	58.40	93.18

Table 1: Summary of six runs from the LA-960. Upper and lower limits were determined using the published PS415 uncertainty and the ISO 13320:2020 tolerance criteria, 1.5% at D50, 2.0% at D10, and 2.5% at D90.

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Setting the Standard since 1983

NIST Traceable

Polydisperse Particle Standard

10-100µm

Part Number: PS415
Nominal Weight: 1.0g x 10 bottles

Notes:
(1) Traceability –
NIST primary reference calibrated stage reference graticule, ref. 821/263573-00 and National Physical Laboratory (Teddington, UK) stage reference graticule, ref. 08A038/970127/106-66 have been used during the primary calibration of both sieving and image analysis methods.
(2) Whitehouse Scientific Ltd operates to the principles of ISO17025 with all business operations covered by a comprehensive Quality system and supporting documentation.
(3) This certificate is only valid if a complete single-shot bottle is used in the analysis.
(4) Whitehouse Scientific Ltd does not accept responsibility for losses, financial of otherwise which may occur as a result of the interpretation or use of the information contained within this certificate.

Certificate of Analysis

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NIST TRACEABLE
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SODA-LIME GLASS MICROSPHERES

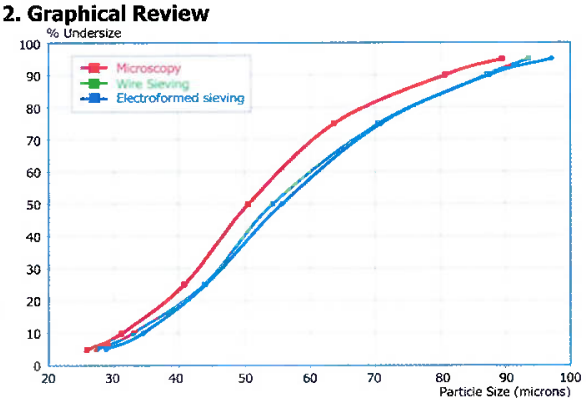
Bottles Numbers:
11571-11580

1. Detailed Review

(sieve analyses performed in dry state)
(all results by weight/volume, total of 13 individual tests)

Method		Percentile 5	10	25	50	75	90	95
Electroformed Sieve Analysis (by weight)	**Mean**	28.8	34.60	44.1	55.7	70.9	87.6	97.2
	SD	0.7	0.7	0.4	0.3	0.4	0.6	0.5
Wire Sieve (by weight)	**Mean**	**27.3**	**33.0**	**43.9**	**54.3**	**70.5**	**87.1**	**93.6**
	SD	0.6	0.6	0.3	0.4	0.6	0.6	0.2
Microscopy (x2) (by volume)	**Mean**	**25.8**	**31.10**	**40.8**	**50.5**	**63.7**	**80.7**	**89.5**
	Mean	**0.5**	**0.5**	**0.5**	**0.4**	**0.5**	**0.6**	**0.9**

2. Graphical Review



2. Tabular Summary

	10	25	50	75	90
Cumulative percent undersize					
Final Mean Size - microns	33.2	43.3	53.9	69.1	85.8
Uncertainty – microns (95% confidence)	3.0	2.9	4.2	6.3	6.0

Issued by: J A Miles, Laboratory Manager

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