

#### PS240 Standard Measurement on Partica LA-960V2

#### 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, PS240 was tested on the LA-960V2. PS240 is a 500  $\mu\text{m}$  to 2000  $\mu\text{m}$ , 7-gram single shot polydisperse glass bead standard produced by Whitehouse Scientific. Repeatability for all size classes was better than 2.5%, showing great repeatability for large size particles in wet dispersions.

#### Instrument Setup

- **Instrument Configuration**

- o Cell: Flow Cell
- o Dispersant: RO Water

- **Sample Information**

- o Sample Name: PS240
- o Material: Glass Beads
- o Source: Whitehouse Scientific
- o Refractive Index: 1.510 – 0.00i (1.33)
- o Iteration Mode: Manual
- o Convergence Factor: 15
- o Distribution Base: Volume

- **Advanced Measurement Conditions**

- o Feed Level: Low
- o Circulation Speed: 1
  - Higher circulation speeds caused transmittance instability, leading to less reproducible data.
- o Ultrasound: None
- o Agitation Speed: 1
- o Data Acquisition Time: 5000



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

#### Test Procedure

1. Fill sample bath with RO water.
2. Enable Circulation and Agitation.
3. Click De-bubble.
4. Click Align.
5. Click Blank.
6. Once blanking is finished, add one whole vial of PS240 to the sample bath. Wait for the transmittance to stabilize.
7. Run three measurements.
8. Rinse the system with RO water to prepare for the next measurement.

#### Results

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

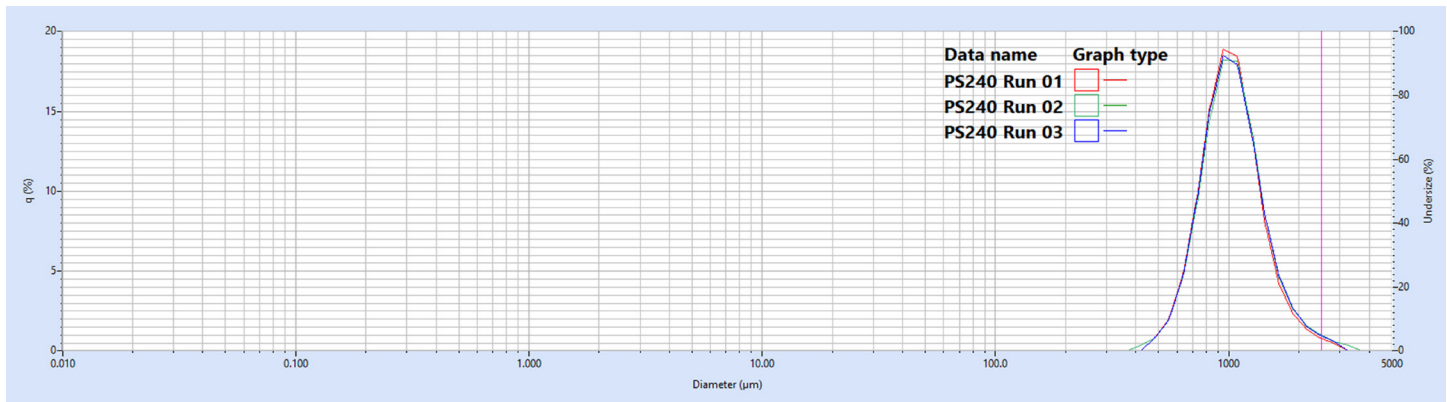


Figure 2: Graph from the LA-960 showing three runs of the PS240.

Data Name	D10	D50	D90
HS240 Run 1	700.95	1011.15	1505.64
HS240 Run 2	704.08	1025.77	1557.80
HS240 Run 3	706.48	1019.46	1545.01
<b>Average</b>	703.84	1018.80	1536.15
<b>Std.Dev.</b>	2.77	7.33	27.18
<b>CV (%)</b>	0.39	0.72	1.77
<b>Certified Diameter</b>	691	1011	1534
<b>Uncertainty</b>	6	11	42
<b>Upper Bound</b>	712.58	1043.26	1596.30
<b>Lower Bound</b>	669.42	978.74	1471.70

Table 1: Summary of three runs from the LA-960. Upper and lower limits were determined using the published PS240 uncertainty and the ISO 13320:2020 tolerance criteria, 1.5% at D50, 2.0% at D10, and 2.5% at D90.

NIST Traceable

# Polydisperse Particle Standard

# 500-2000 $\mu\text{m}$

 Part Number: PS240  
 Nominal Weight: 7.0g x 10 bottles

The 500-2000 $\mu\text{m}$  standard was not part of the original range of BCR 'Mirror' standards, but was requested later by some laser particle size manufacturers who specialized in large particle size analysis. The data in the certificate below was referenced against the NIST calibrated stage reference graticule.

## Notes:

- (1) This certificate is only applicable for repeated use of the sample provided any weight loss is restricted to 3%.
- (2) Traceability - Microscopy - NIST calibrated stage reference graticule, eg test no. 821/263573-00 or National Physical Laboratory (Teddington, UK) stage reference graticule - ref. 08A032/930082/82-153. Sieve Analysis - Electroformed sieves calibrated against NIST or NPL graticules. Weight traceable through 1g standard - eg NAMAS Laboratory 0134, Certificates T08243 and T11002, recertified weight serial number 181320295 - supplied by Analar.
- (3) For a summary of analytical methods see - Rideal G R, Dodds J A & Pons M-N, Leschonski K, Lloyd P J, and Mercus H G, The Development of New Reference Standards for Particle Size Instrument Calibration, World Congress on Particle Technology 3 (ICChemE) July 1998, Brighton, UK.
- (4) This certificate is only valid if a complete single-shot bottle is used in the analysis.
- (5) Whitehouse Scientific Ltd does not accept responsibility for losses, financial or 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

### POLYDISPERSE PARTICLE STANDARD

SODA-LIME GLASS MICROSPHERES

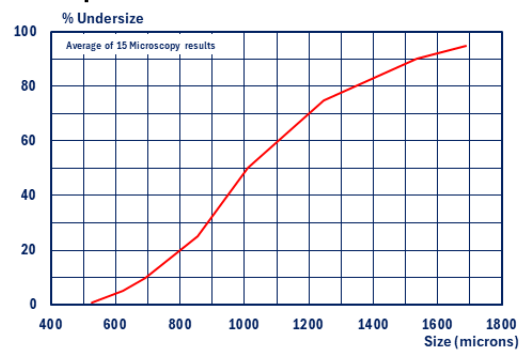
#### 1. Detailed Review

Method	Test	Percentile							
		1	5	10	25	50	75	90	95
Microscopy	1	521	621	687	853	1007	1242	1518	1665
	2	524	624	696	856	1022	1251	1527	1681
	3	524	624	690	853	1004	1226	1487	1653
	4	527	627	696	856	1013	1254	1518	1665
	5	524	624	690	850	1010	1245	1537	1687
	6	524	624	690	856	1016	1233	1515	1668
	7	527	627	693	850	1007	1236	1527	1681
	8	524	624	693	853	1007	1236	1518	1700
	9	524	624	693	853	1010	1254	1552	1690
	10	524	624	693	859	1019	1254	1537	1684
	11	526	619	692	850	1013	1259	1558	1699
	12	526	619	686	850	1007	1259	1564	1721
	13	526	623	692	856	1017	1268	1555	1699
	14	526	620	689	847	1007	1237	1542	1687
	15	526	623	692	853	1010	1259	1558	1718
Final Mean Size	x(n=15)	525	623	691	853	1011	1248	1534	1687
SD (sample)	$s_{n-1}$	1.6	2.5	2.9	3.9	5.2	12	21	19
Uncertainty	95% confidence	3.2	4.9	5.7	7.8	11	24	48	38

#### 4. Tabular Summary

15 Analyses								
Percent	5	10	25	50	75	90	95	
Mean Size - $\mu\text{m}$	623	691	853	1011	1248	1534	1687	
Uncertainty - $\mu\text{m}$ (95% confidence)	5	6	8	11	24	48	38	

#### 2. Graphical Review



Issued by:



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 Founder & Senior Analyst
