

CAN YOUR PARTICLE SIZE ANALYZER DO THIS?

The Partica LA-960V2 is a laser diffraction particle size distribution analyzer known for its wide dynamic range, speed, accuracy, and precision. This has led to a number of class-leading performance specifications that can easily be demonstrated in its particle size and shape measurement results.

Introduction

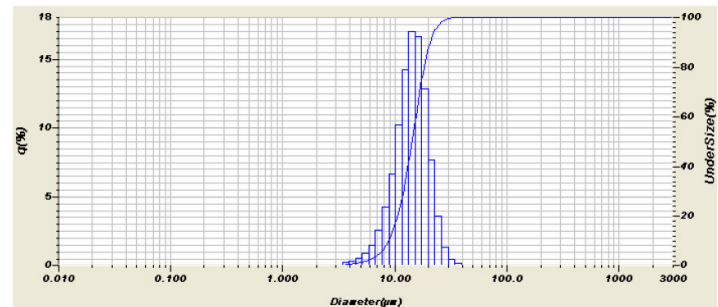
A test was conducted to quantify the LA-960V2's ability to accurately measure mixtures of samples. Polydisperse (wide distribution), NIST-traceable glass bead standards manufactured by Whitehouse Scientific were analyzed individually and in quantified mixtures.

The following results show the ability of the LA-960V2 to measure these broad distribution standards accurately for both the median size and also the width of the distribution (10% and 90% points). This is an important factor, as specified in the ISO 13320 standard on laser diffraction particle size analysis. This ability is certainly not universal with other instruments on the market today and sometimes only with certain standards. The LA-960V2 is able to accurately measure these types of standards across the full particle size range.

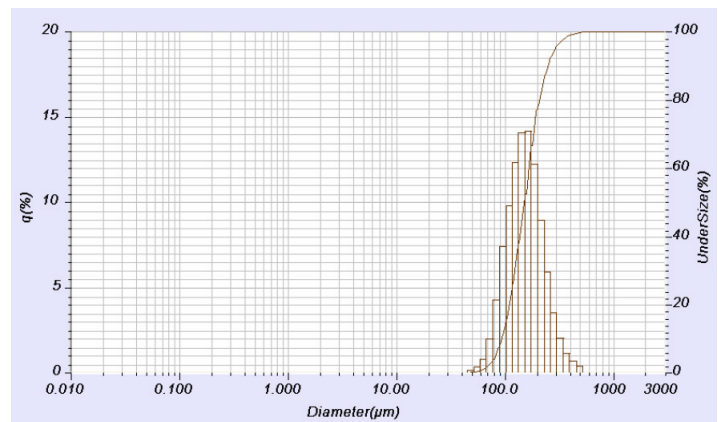
It has proven more difficult for laser diffraction instruments to accurately measure mixtures of materials. Even when the individual peak sizes are reported accurately, the relative contribution from each peak is often not representative of the true relative amounts. The LA-960V2 demonstrates its class-leading capabilities with this test, accurately representing the relative volumetric contribution from each mode.

Individual Standards

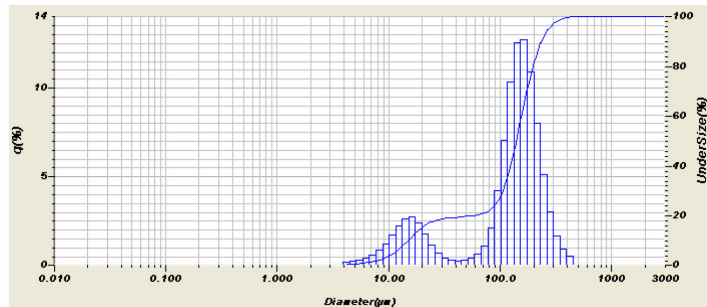
PS202 (3-30 μm)	D10	D50	D90
Standard Value (μm)	9.14	13.43	20.34
Uncertainty (μm)	0.86	0.86	1.44
ISO standard error	5%	3%	5%
Lower limit (μm)	7.866	12.193	17.955
Measured Result (μm)	9.721	13.916	18.959
Upper Limit (μm)	10.500	14.719	22.869



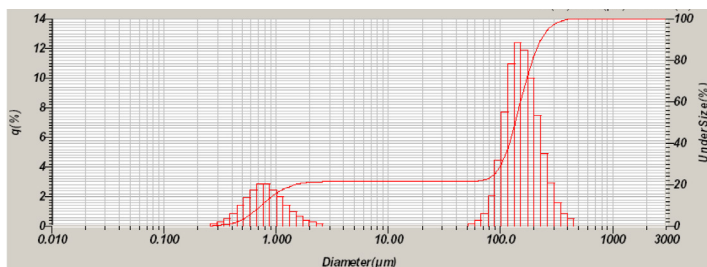
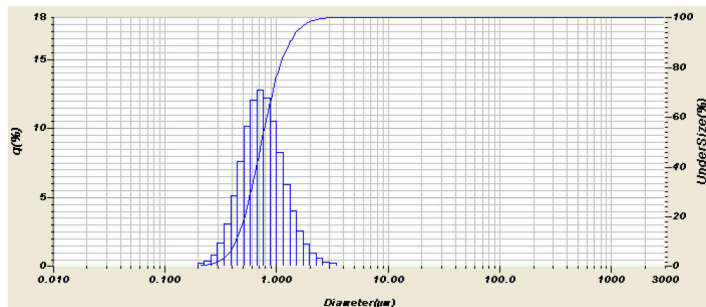
PS225 (50-350 μm)	D10	D50	D90
Standard Value (μm)	93.7	150.5	238.8
Uncertainty (μm)	3.54	2.52	6.02
ISO standard error	5%	3%	5%
Lower limit (μm)	85.652	143.541	221.141
Measured Result (μm)	94.217	153.815	252.542
Upper Limit (μm)	102.102	157.611	257.061



PS181 (0.1-1 μm)	D10	D50	D90
Standard Value (μm)	0.36	0.65	1.11
Uncertainty (μm)	0.06	0.06	0.13
ISO standard error	5%	3%	5%
Lower limit (μm)	0.285	0.5723	0.931
Measured Result (μm)	0.434	0.709	1.296
Upper Limit (μm)	0.441	0.7313	1.302



The next test was to see if more widely separated materials would be accurately measured. The PS181 standard was mixed with the PS225 standard in a 1:5 ratio. In this test, 21.2% of the total was reported in the smaller peak, against a 16.7% theoretical value.

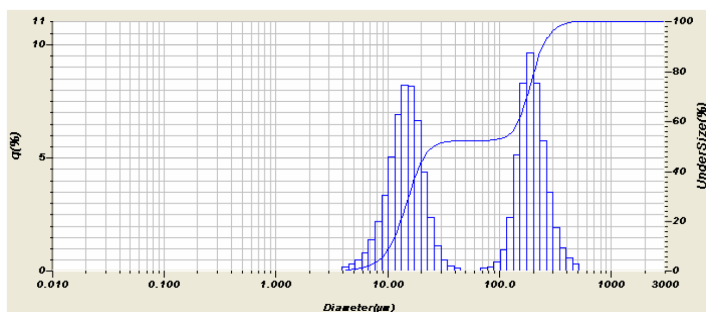


Mixed Standards Measurement

A mixture of equal weights of PS202 and PS225 was measured. There was clear peak separation and the relative amounts of material in each mode were reported as 48%/52%.

Conclusion

The LA-960V2's ability to measure broad distribution standards and accurately report mixtures of standards is unmatched by any other particle size analyzer on the market. This translates into an ability to more accurately measure the end users sample and track the manufacturing process.



With this successful test, a more challenging test was performed. Equal-size populations should be relatively easy to measure since each has a strong signal. When one of the populations is significantly smaller, the signal and data deconvolution can show some weaknesses.

A test of 5 parts PS225 to 1 part PS202 was performed with excellent results, proving that even different size peaks can be measured accurately. The portion of the distribution in the smaller peak was reported as 19.06% versus the theoretical value of 16.7% (1/6).