Technical Bulletin
AL-203

Microparticle Size Standards

revised 2/97
2 pages

PRODUCT	ALDRICH CAT. NO.
Polystyrene Uniform Latex Particles, 0.1μm diam	**46,169-5**
Polystyrene Uniform Latex Particles, 0.2μm diam	**46,170-9**
Polystyrene Uniform Latex Particles, 0.4μm diam	**46,171-7**
Polystyrene Uniform Latex Particles, 0.5μm diam	**46,172-5**
Polystyrene Uniform Latex Particles, 1μm diam	**46,173-3**
Polyvinyltoluene Uniform Latex Particles, 2μm diam	**46,494-5**

Aldrich is proud to offer a complete line of polymer products. This includes fine microparticle products and in-depth technical assistance in selecting, processing, and using these products. Our microparticle size standards are part of this line.

Aldrich's Uniform Latex Microparticles are monodisperse polystyrene and polyvinyltoluene spheres prepared by unique and proprietary emulsion polymerization methods. The uniform diameters of these microparticles makes them optimal for your applications.

The sophisticated sizing techniques used are certified and traceable to NIST standards (formerly NBS). Sizing methods employing transmission electron microscopy (TEM), scanning electron microscopy (SEM), and quasi-elastic light scattering (QELS) are used to characterize the microparticle. You can be assured of accurate and precise size analysis data.

APPLICATIONS

Aldrich's size standards are widely used in industrial, pharmaceutical, clinical, and scientific laboratories for quality control and size investigation analysis. Complete statistical and NIST-traceable calibration data are supplied with each microparticle size standard. These size standards play a vital role in:

The calibration or standardization of:

- particle size instruments
- aerosol and liquid particle counters
- light microscopes
- electrophoretic controls
- microporous filtration media
- centrifugation sedimentation calibration
- analytical optical systems

Research on:

- clean room applications
- microcontamination research
- pharmaceutical quality control
- electron microscopy
- light scattering research
- colloidal systems studies
- microbiological research
- microparticle aerosol generation

CHARACTERISTICS

Our size standards are calibrated to the nearest nanometer, have a specific gravity of 1.05g/mL, and a refractive index of 1.59 at 589nm (25°C). They are supplied as aqueous suspensions and have excellent chemical stability in a number of solutions. They can be diluted in alcohol-water mixtures, acids, and bases.

These products are supplied at 2 wt.% solids concentration, with 0.05% sodium azide added as a preservative.

SIZES AVAILABLE

Currently, Aldrich offers several microparticle sizes. These standards have been characterized by TEM, SEM and QELS. An excellent correlation exists among the size measurement obtained by these methods.

Cat. no.	TEM diam, μm	SEM diam, μm	QELS diam, μm
46,169-5	0.086	0.088	0.106
46,170-9	0.204	0.203	0.210
46,171-7	0.394	0.394	0.425
46,172-5	0.552	0.554	0.585
46,173-3	0.804	0.809	0.856
46,494-5	2.020	1.960	—

Microparticles tend to form an electrical double layer on the surface that increases the apparent diameter measured by QELS. A variety of techniques can be used to overcome the double-layer effect. However, to keep the data simple, we have made all measurements on particles diluted in filtered deionized water.

Cat. No.	46,169-5 0.086 μm		46,170-9 0.204 μm		46,171-7 0.394 μm		46,172-5 0.552 μm		46,173-3 0.804 μm		46,494-5 2.020 μm	
	TEM	SEM	TEM	SEM	TEM	SEM	TEM	SEM	TEM	SEM	TEM	SEM
Data points	262	341	106	330	282	222	245	310	140	427	54	201
Valid points	262	341	106	330	282	222	245	310	140	427	54	201
Lowest points	0.062	0.069	0.199	0.185	0.354	0.372	0.515	0.416	0.794	0.231	1.984	1.760
Highest points	0.100	0.102	0.210	0.210	0.421	0.408	0.574	0.662	0.817	1.950	2.043	2.140
Range	0.037	0.033	0.011	0.035	0.067	0.036	0.059	0.246	0.023	1.719	0.059	0.038
Mean	0.086	0.088	0.204	0.203	0.394	0.394	0.552	0.554	0.804	0.809	2.020	1.962
Std dev	0.006	0.006	0.002	0.009	0.016	0.006	0.010	0.040	0.005	0.103	0.014	0.079
Cef of var	0.075	0.064	0.010	0.040	0.041	0.014	0.019	0.079	0.006	0.127	0.007	0.040
Skewness	-0.813	-0.390	0.747	-0.122	-0.482	-0.894	-0.429	-0.521	0.587	3.423	-0.475	-0.258
Kurtosis	0.939	-0.074	1.369	-0.894	-0.626	0.193	0.574	0.607	0.318	42.056	-0.907	-0.403
Median	0.086	0.089	0.203	0.203	0.396	0.397	0.552	0.559	0.803	0.812	2.023	1.960

ALDRICH®

Organics and Inorganics for Chemical Synthesis

1001 West Saint Paul Ave., Milwaukee, WI 53233
Telephone 414-273-3850 • 800-231-8327
Fax 414-273-4979 • 800-962-9591
Internet http://www.sial.com/aldrich
E-mail aldrich@sial.com