



Filters are manufactured for disk drive, cleanroom, medical device, nuclear, semiconductor, food, pharmaceutical and other industries requiring contamination control.

The use of polystyrene latex spheres (PSL) provides a consistently controllable and repeatable means for integrity testing of cleanroom filters, their installation and method of seal. Employing PSL as a challenge allows for monodispersed upstream challenge, actual filter and system efficiencies can be verified during testing which has never before been available for field testing. The versatility of this methodology for filter leak testing permits usage for one filter during a field pre-installation bench test or in-place scan testing of hundreds of filters installed in Cleanroom.

Most Importantly, the use of PSL during the integrity testing of cleanroom filters provides a challenge medium that is non-contaminating that offers none of the negative side effects or concerns experienced when using the atomized oils such as dioctylphthalate (DOP) and mineral oil as challenge aerosols.

More and more HEPA/UPLA manufacturers, third party testing services and end users switch to test filters using this PSL method. Sphere Scientific offers PSL as a challenge medium for the cleanroom filter and cleanroom system integrity testing.

Particle Composition	Polystyrene
Mean Diameter (μm)	0.12, 0.2, 0.3
Particle Density (g/cm^3):	1.05
Refractive Index(@589)	1.59
Content	Polystyrene Microspheres Aqueous Suspension
Concentration(W/V)	2.2%, 6.6%, 11%
Expiration Date	\geq 24 months
Additives	Trace surfactant to inhibit agglomeration and promote stability
Storage & Handling	Refrigerate when not in use, do not freeze. Store upright and keep bottle tightly sealed.

Selecting PSL

PSL spheres at 0.3 μm are generally used to challenge HEPA filters and detect pin hole leaks, while PSL spheres at 0.15 μm or 0.12 μm are used to challenge ULPA filters and detect pin hole leaks.

Dispersing PSL

A common method of generating monodisperse aerosol is to atomize a hydrosol that contains monodisperse polystyrene latex (PSL). Mix a few drops of PSL with a liter of water and test the aerosol output concentration. If the concentration is too low, add a few more drops of PSL.

However, proceed slowly and thoroughly mix the PSL since each droplet of concentrated PSL has a high number of particles.

PSL Testing

Efficiency—Select particle size necessary to evaluate filter. Particle concentration should be optimized for nebulizer output. By taking the ratio of the particle counts from upstream to downstream, the filter efficiency can be calculated for the filter.

Leakage scanning—The entire face of the filter is scanned by particle counter. If a particle count is detected, the operator checks the area for continuous counts. If continuous counts in excess of the specified leakage threshold are detected, the leak is repaired.

Note: Photometer Scanning is generally reserved for HEPA filters, while Particle Counter Scanning is used for ULPA filters and/or for customers with stringent outgassing requirements.