

Sera-Mag[®] SpeedBeads[™] Magnetic Microparticles

October 2006

New

SpeedBeads[™] are the newest entry in Seradyn's Sera-Mag[®] line of magnetic beads. These beads respond twice as fast to a magnetic field as our original Sera-Mag particles, and are available in carboxylate-modified and streptavidin coated versions.

The entire line of Sera-Mag encapsulated magnetic particles exhibit high binding capacity, excellent stability, low nonspecific binding, exquisite sensitivity and very slow settling rates.

The new SpeedBeads will create improved immunoassay and molecular biology sample prep reagents. The increased speed of response to a magnetic field will allow shorter assay time in clinical diagnostic tests and faster particle movement through viscous solutions for molecular biology applications. They are especially useful in molecular biology sample preparation applications.

The SpeedBeads are nominal 1 micron diameter, super-paramagnetic particles of uniform size. They were designed to be colloidally stable in the absence of a magnetic field. When a magnetic force is applied, the particles are separated rapidly and completely from suspensions. Covalent coupling to carboxyl groups on the surface is easily accomplished using our standard coupling technology.

Features & Benefits

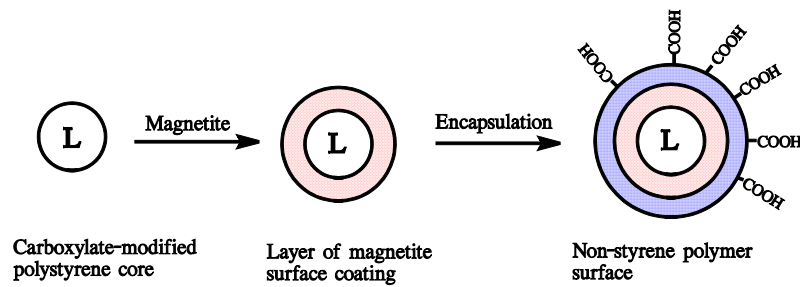
Features	Benefits
• Fast magnetic response time	Quick separations – twice as fast as our original Sera-Mag magnetic particles
• Low non-specific binding of serum proteins	Improved assay accuracy
• Nominal 1 µM diameter	High surface area per unit mass and slow settling rate, good lot to lot reproducibility
• Surfactant free	Ready to use, no washing required
• High protein binding capacity	Decreased particle quantity required per assay, high specific activity
• Encapsulated	No exposed iron
• Tight size distribution	Even particle separation, good lot to lot reproducibility results in efficient use of biological reagents
• Excellent colloidal stability	Salt tolerant, monodisperse particle suspension, slow settling rate
• Can be sonicated	Versatility in processing
• Stable in biological buffer systems, pH 4 to 11	Versatility in reagent preparation, compatible with commonly used buffers
• Stable in a variety of lysis buffer systems, pH 4 to 11	Versatility in sample preparation methods, compatible with common lysis buffers
• Stable in detergents	Versatility in reagent preparation,

- Stable in a variety of organic solvents
- No residual magnetism after removal of magnetic field

compatible with most commonly used detergents (Tween 20, Triton X100, SDS, etc.)
 Versatility in reagent preparation, compatible with DMF, DMSO, toluene, Formamide, ethanol, etc.
 No particle carry over, improved assay precision

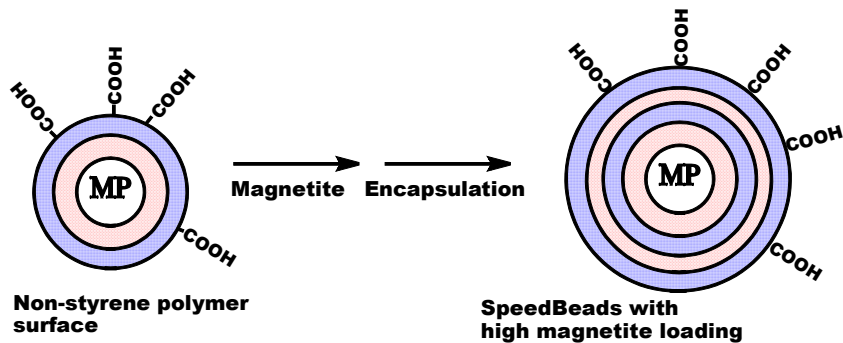
Original Sera-Mag Magnetic Microparticle Process

Magnetic Core-Shell



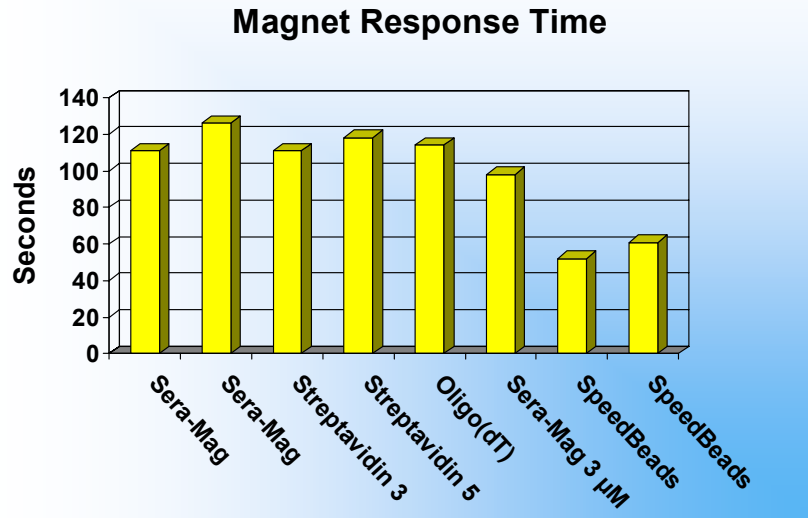
The original Sera-Mag particles are made by a core-shell process resulting in a unique cauliflower-like surface structure with exceptionally high binding capacity.

New SpeedBeads Microparticle Process



The new SpeedBeads are made by a modified Sera-Mag process wherein a larger quantity of magnetite is formed within the magnetic particles resulting in faster magnetic response times.

New SpeedBeads Microparticle Process



SpeedBeads magnetic particles demonstrating significantly improved (shorter) magnetic response time as compared to the original Sera-Mag magnetic carboxylate-modified and streptavidin particles.

Magnetic Response and Handling

In the absence of any magnetic field, no significant sedimentation takes place in one hour. In a magnetic field, total separation of a 1.5 OD_{650nm} suspension in a 1 cm x 1 cm cuvette is obtained in less than one minute. For this test, a spectrophotometer was fitted with a special cell holder which housed a rare earth magnet. A reading was taken at time zero and every 10 seconds thereafter. The following is a graph of the results for non-sensitized particles. Water was used as the reference. It should be noted that solution conditions and microparticle modifications have a large effect on speed of magnetic response. In general, conditions that increase the colloidal stability will decrease the magnetic response rate. For example, increasing pH will slow the response rate while coating the particles with protein will cause it to increase. Raising the buffer viscosity will also slow the response rate somewhat.

Particles may be repeatedly separated by a magnetic field and redispersed with no residual magnetism.

SpeedBeads Technical Data

Nominal Dia.	Size Dist.	Magnetite Content	Density (g/ml)	Mag. Sat. EMU/g	Acid Cont (mEq/g)	Park Area (Å ² /COOH)
1 µM	±10%	60%	1.4	25	0.5	2

These are nominal values. A certificate of analysis will be enclosed with each order that includes specific lot analysis.

EMU/g is a measure of induced magnetism in the presence of a strong magnetic field. In other words, it is a measure of the magnetic responsiveness of the particle. The value of 25 EMU/g for Sera-Mag is significantly greater than comparable magnetic particles which typically have values equal to or less than 20.

Coupling Procedures

Sera-Mag[®] magnetic particles have carboxylic acid groups on the surface permitting easy covalent coupling using carbodiimide chemistry. They are stable in a variety of conditions including deionized water, high salt, surfactants, pH 4 to 11, and DMF or DMSO. Some organic solvents (such as acetone, MEK, or aromatic solvents) may dissolve Sera-Mag magnetic particles.

Sera-Mag magnetic particles are designed for **covalent coupling only**. For applicable coupling procedure, please consult our “Recommended Adsorption and Covalent Coupling Procedures”.

Total bound protein may be assayed according to the procedure given in our “Microparticle-bound Protein Assay” bulletin. (Note: The covalently bound protein procedure in this bulletin is not recommended for use with Sera-Mag[™] magnetic particles.)

Ordering SpeedBeads Carboxylate and Streptavidin Magnetic Particles

SpeedBeads[™] Magnetic Microparticles

(Nominal diameters – 1% or 5% solids concentration, 0.05% sodium azide)

Diagnostic Assay Grade – Carboxylate-modified, 5% solids

1 μ M	15ml	Part No.	4515-2105-050250
1 μ M	100ml	Part No.	4515-2105-050350
1 μ M	1000ml	Part No.	4515-2105-050450

Molecular Biology Grade – Carboxylate-modified, 5% solids

1 μ M	15ml	Part No.	6515-2105-050250
1 μ M	100ml	Part No.	6515-2105-050350
1 μ M	1000ml	Part No.	6515-2105-050450

Streptavidin Coated, 1% solids

1 μ M	1ml	Part No.	6615-2104-011150
1 μ M	5ml	Part No.	6615-2104-010150
1 μ M	100ml	Part No.	6615-2104-010350

Streptavidin - Surface Blocked (reduce nonspecific binding), 1% solids

1 μ M	1ml	Part No.	5915-2104-011150
1 μ M	5ml	Part No.	5915-2104-010150
1 μ M	100ml	Part No.	5915-2104-010350

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Other Products

You are cordially invited to visit our facilities any time you are in the Indianapolis area. We are just minutes from the Indianapolis International Airport. Please inquire about our other exceptional microparticle products. We have a complete range of microparticles to suit your individual requirements.

Technical Help/Ordering Information

For technical help, call the Particle Technology Division or write, e-mail or fax to the address below. We'll be glad to help you in any way we can.

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Net 30 days to firms
of approved credit

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