SPHERO™ Coated Magnetic Particles

- Available with a variety of ligands such as Streptavidin, Avidin, Neutravidin, Protein A, Protein G, and Biotin
- Also available coated with highly specific recognition groups such as polyclonal antibodies
- Used in nucleic acid isolation, protein purification, immunology, and cell separations
- Available impregnated with fluorophores for flow cytometry or easy particle location identification in phagocytosis assays.

Magnetic particles coated with Avidin, Streptavidin, Biotin, Protein A and various antibodies are available from Spherotech. All of the proteins used are covalently coupled to the magnetic particles. The coated magnetic particles are supplied as a suspension in phosphate buffer, pH 7.4 with 0.02% sodium azide (some products also contain 0.1% BSA). Please refer to the recommended coating procedures on page 80 for more detailed technical information and coating.

Similarly to the magnetic particles offered on page 56 Spherotech coated magnetic particles are offered as the classic, encapsulated, or crosslinked magnetic microsphere. See pages 56 and 57 for benefits of each type.

SPHERO™ Biotin Coated Magnetic Particles

- Used to take advantage of the high affinities of the biotin–streptavidin and biotin–avidin interactions (Ka in the order of 10^{13}–10^{15} M^{-1})
- Represents one of the strongest biomolecules interactions to form stable complexes.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Biotin	1.0-1.4	0.5	TM-10-10	10 mL
Biotin	4.0-4.5	1.0	TM-40-10	10 mL
Biotin	6.0-7.9	1.0	TM-60-5	5 mL
Biotin, Cross-linked, granules, non-uniform	~1-2 µm	0.5	TMX-10-10	10 mL

SPHERO™ Avidin Coated Magnetic Particles

- Used for Genome isolation when coated with a biotinylated genome capture probe for E.coli and B.subtilis*

  *S. Yeung, T. Ming-Hung Lee, H. Cai, and I-Ming Hsing. "A DNA biochip for on-the-spot multiplexed pathogen identification." Nucleic Acids Res., Vol 34, No. 18, e118 (Oct 2006)

- See pages 64 to 66 for uses of streptavidin and avidin coated particles.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Avidin	1.0-1.4	0.5	VM-10-10	10 mL
Avidin	4.0-4.5	1.0	VM-40-10	10 mL
Avidin	4.0-4.5	1.0	VM-40-100	100 mL
Avidin	6.0-8.0	1.0	VM-60-10	10 mL
Avidin	6.0-8.0	1.0	VM-60-100	100 mL
Avidin	8.1-9.9	1.0	VM-80-5	5 mL
Avidin, Smooth Surface	3.0-3.9	1.0	VMS-30-10	10 mL
Avidin, Smooth Surface	4.0-5.0	1.0	VMS-40-10	10 mL
Avidin, Cross-linked, granules, non-uniform	~1-2 µm	0.5	VMX-10-10	10 mL
Avidin, Cross-linked, granules, non-uniform	~1-2 µm	0.5	VMX-10-100	100 mL

SPHERO™ Streptavidin Coated Magnetic Particles

- Streptavidin magnetic particles have found widespread use as detection reagents in immunology, biochemistry and cell biology due to their high affinity binding to biotin
- Biotin–streptavidin interaction have been exploited in many applications including the development of new reagents for diagnostics such as sandwich magnetic particle enzyme-linked immunosorbent assay (MPEIA) and molecular biology studies involving nucleic acids.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Streptavidin, High Iron	0.2-0.39	0.5	SVM-025-10H	10 mL
Streptavidin	0.4-0.69	0.5	SVM-05-10	10 mL
Streptavidin	0.7-0.9	0.5	SVM-08-10	10 mL
Streptavidin	1.0-1.4	0.5	SVM-10-10	10 mL
Streptavidin	1.5-1.9	0.5	SVM-15-10	10 mL
Streptavidin	2.0-2.9	0.5	SVM-20-10	10 mL
Streptavidin	3.0-3.9	1.0	SVM-30-10	10 mL
Streptavidin	4.0-4.5	1.0	SVM-40-10	10 mL
Streptavidin	4.6-5.9	1.0	SVM-50-5	5 mL
Streptavidin	6.0-7.9	1.0	SVM-60-5	5 mL
Streptavidin	8.0-9.9	1.0	SVM-80-5	5 mL
Streptavidin, High Iron	38.0-44.0	0.5	SVMH-400-4	4 mL
Streptavidin, High Iron	45.0-52.0	0.5	SVMH-500-4	4 mL
Streptavidin, Smooth Surface	3.0-3.9	1.0	SVMS-30-10	10 mL
Streptavidin, Smooth Surface	4.0-5.0	1.0	SVMS-40-10	10 mL
Streptavidin, Cross-linked, granules, non-uniform	~1-2 µm	0.5	SVMX-10-10	10 mL

SPHERO™ Neutravidin Coated Magnetic Particles

- Provide very low non-specific binding since they do not contain any carbohydrates and have a near-neutral isoelectric point of 6.3
- Used for diagnostic and molecular biology applications
- Have a binding capacity of ~6400 pmol/mg.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Neutravidin	2.0-2.9	1.0	NVM-20-5	5 mL

SPHERO™ Rabbit anti-HA Coated Magnetic Particles

- Coated with affinity purified anti-Hemagglutinin (HA) epitope tag [Rabbit] polycolonal antibody
- Binds to HA-tagged recombinant proteins.

Particle Type and Surface	Size, µm	Catalog No.	Unit
Rabbit anti-HA, Smooth Surface, 10^7/mL	3.0-3.9	RHAMS-30-2	2 mL

SPHERO™ Con A Coated Magnetic Particles

- Binds to saccharide functional groups on the cell surface*

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Con A	0.7-0.9	1.0	CAM-08-10	10 mL

*Gupta, S., R. G. Alargova, et al. "On-Chip Dielectrophoretic Coassembly of Live Cells and Particles into Responsive Biomaterials." Langmuir, 2010, 26 (5), pp 3441–3452.

SPHERO™ Protein G Coated Magnetic Particles

- Used to link capture species-specific anti-IgG to magnetic microspheres
- Directly binds immunoglobulins from ascites fluids or concentrated hybridoma supernatants to facilitate purification.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Protein G	4.0-4.5	1.0	PGM-40-5	5 mL
Protein G, Smooth Surface	3.0-3.9	1.0	PGMS-30-5	5 mL
Protein G, Smooth Surface	4.0-5.0	1.0	PGMS-40-5	5 mL
Protein G, Cross-linked, granules, non-uniform	~1-2	1.0	PGMX-10-5	5 mL

SPHERO™ Protein A Coated Magnetic Particles

- Used for the immunomagnetic separation (IMS) and real-time PCR to detect Escherichia coli*

  *Fu, Z., S. Rogelj, et al. (2005). "Rapid detection of Escherichia coli O157:H7 by immunomagnetic separation and real-time PCR." International Journal of Food Microbiology 99(1): 47-57.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Protein A	4.0-4.5	1.0	PAM-40-5	5 mL
Protein A, Smooth Surface	3.0-3.9	1.0	PAMS-30-5	5 mL
Protein A, Smooth Surface	4.0-5.0	1.0	PAMS-40-5	5 mL
Protein A, Cross-linked, granules, non-uniform	~1-2	1.0	PAMX-10-5	5 mL

SPHERO™ Sheep anti-Rat IgG Coated Magnetic Particles

- Consists of uniform, paramagnetic polystyrene beads coated with polyclonal Sheep anti-Rat IgG antibodies.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Sheep anti-Rat IgG (H&L)	4.0-4.5	2.0	SRM-40-5	5 mL

SPHERO™ Donkey anti-Goat IgG Coated Magnetic Particles

- Ideal for direct or indirect isolation of proteins and cells during immunomagnetic separation.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Donkey anti-Goat IgG (H&L) Cross-adsorbed	4.0-4.5	1.0	GMXA-40-10	10 mL

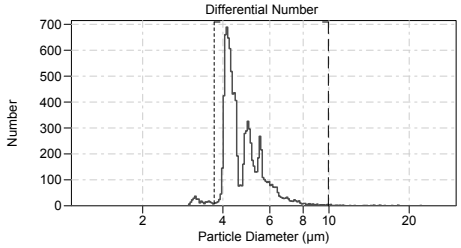
SPHERO™ Goat anti-Rabbit IgG Coated Magnetic Particles

- Used in immunomagnetic separation (IMS)*

  * Antognoli, M. C., M. D. Salman, et al. (2001). "A one-tube nested polymerase chain reaction for the detection of mycobacterium bovis in spiked milk samples: an evaluation of concentration and lytic techniques." J Vet Diagn Invest 13(2): 111-116.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Goat anti-Rabbit IgG (H&L)	4.0-4.9	1.0	RM-40-10	10 mL
Goat anti-Rabbit IgG (Fc)	4.0-4.5	1.0	RMFc-40-10	10 mL
Goat anti-Rabbit IgG (H&L), Smooth Surface	3.0-3.9	1.0	RMS-30-10	10 mL
Goat anti-Rabbit IgG (H&L), Smooth Surface	4.0-5.0	1.0	RMS-40-10	10 mL
Goat anti-Rabbit IgG (Fc), Smooth Surface	3.0-3.9	1.0	RMSFc-30-10	10 mL
Goat anti-Rabbit IgG (H&L), Cross-linked, granules, non-uniform	~1-2 µm	0.5	RMX-10-10	10 mL

Figure 100 Size distribution analysis of SPHERO™ Cat. No. RM-40-10, Gt anti-Rb IgG (H&L) Magnetic Particles from the Beckman Coulter Z3 Multisizer™.



SPHERO™ Goat anti-Mouse IgG Coated Magnetic Particles

Attributes

- Uniform particle size
- Paramagnetic in nature
- Rapid magnetic responsiveness
- Low non-specific binding
- High binding capacity
- Consistent lot-to-lot performance.

Applications

- Automated immunoassays
- Immunoprecipitation
- IP-western blots.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Goat anti-Mouse IgG (H&L)	4.0-4.5	1.0	MM-40-10	10 mL
Goat anti-Mouse IgG (Fc)	4.0-4.5	1.0	MMFc-40-10	10 mL
Goat anti-Mouse IgG (H&L) , Cross adsorbed	4.0-4.5	1.0	MMXA-40-10	10 mL
Goat anti-Mouse IgG (H&L), Smooth Surface	3.0-3.9	1.0	MMS-30-10	10 mL
Goat anti-Mouse IgG (H&L), Smooth Surface	4.0-5.0	1.0	MMS-40-10	10 mL
Goat anti-Mouse IgG (Fc), Smooth Surface	3.0-3.9	1.0	MMSFc-30-10	10 mL
Goat anti-Mouse IgG (Fc), Smooth Surface	4.0-5.0	1.0	MMSFc-40-10	10 mL
Goat anti-Mouse IgG (H&L), Smooth Surface, Cross adsorbed	3.0-3.9	1.0	MMSXA-30-10	10 mL
Goat anti-Mouse IgG (H&L), Smooth Surface, Cross adsorbed	4.0-5.0	1.0	MMSXA-40-10	10 mL
Goat anti-Mouse IgG (H&L), Cross-linked, granules, non-uniform	~1-2 µm	0.5	MMX-10-10	10 mL
Goat anti-Mouse IgG (H&L), Cross adsorbed, Cross-linked, granules, non-uniform	~1-2 µm	0.5	MMXA-10-10	10 mL

SPHERO™ Goat anti-Human IgG Coated Magnetic Particles

- Ideal for the capture and/or detection of target analytes by direct or indirect isolation during immunomagnetic separation
- Improves the performance of ELISAs by enhancing sensitivity and shortening incubation times.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Goat anti-Human IgG (H&L)	4.0-4.5	1.0	HM-40-10	10 mL
Goat anti-Human IgG (H&L) , Smooth Surface	3.0-3.9	1.0	HMS-30-10	10 mL
Goat anti-Human IgG (H&L) , Smooth Surface	4.0-5.0	1.0	HMS-40-10	10 mL
Goat anti-Human IgG (H&L), Cross-linked, granules, non-uniform	~1-2 µm	0.5	HMX-10-10	10 mL

SPHERO™ Coated Magnetic Fluorescent Particles

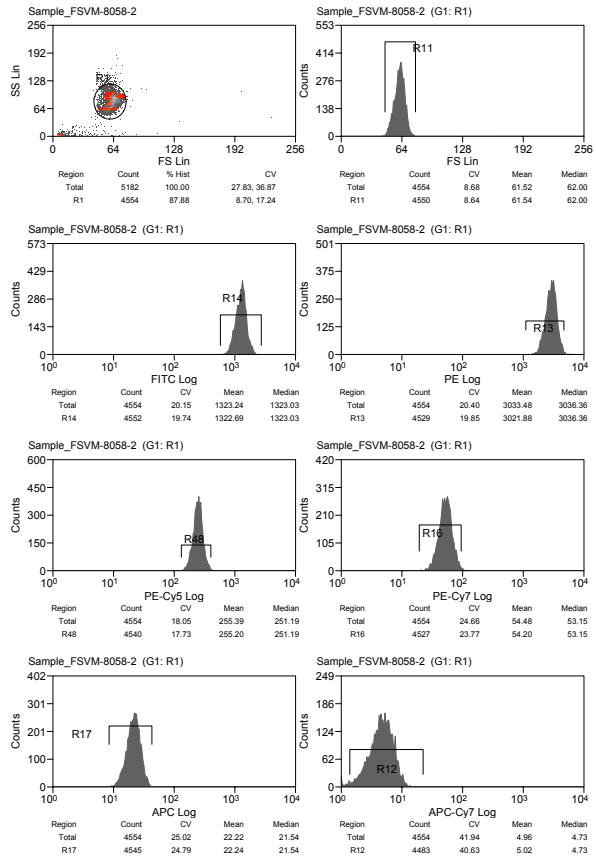
SPHERO™ Biotin Coated Magnetic Fluorescent Particles

- Offering both Biotin and Streptavidin coated paramagnetic fluorescent particles.
- Reference Page 83 for more detailed technical information and coating procedures.
- Reference Fluorescent Particle Page 14 for the excitation and emission spectra of the fluorophores used to produce the SPHERO™ Coated Magnetic Fluorescent Microparticles.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Biotin, Fluorescent Nile Red	4.0-4.9	0.1	TFM-4056-5	5 mL

SPHERO™ Streptavidin Coated Magnetic Fluorescent Particles

Figure 101 Histograms of FSVM-8058-2, No. Lot Z01 (Streptavidin Coated Fluorescent Magnetic Particles, Pink, 0.1% w/v, 8.84 µm, 2 mL).



Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Streptavidin, Fluorescent Yellow, High iron	0.2-0.39	0.1	FSVM-02552-2H	2 mL
Streptavidin, Fluorescent Nile Red	0.2-0.39	0.1	FSVM-02556-2	2 mL
Streptavidin, Fluorescent Yellow, High Iron	0.4-0.69	0.1	FSVM-0552-2H	2 mL
Streptavidin, Fluorescent Pink	1.0-1.4	0.1	FSVM-1058-2	2 mL
Streptavidin, Fluorescent UV/Light Yellow	2.0-2.9	0.1	FSVM-2042-2	2 mL
Streptavidin, Fluorescent Pink	2.0-2.9	0.1	FSVM-2058-2	2 mL
Streptavidin, Fluorescent Yellow	8.0-9.9	0.1	FSVM-8052-2	2 mL
Streptavidin, Fluorescent Pink	8.0-9.9	0.1	FSVM-8058-2	2 mL

- Reference Page 62 for an example streptavidin coated fluorescent magnetic particles used during a magnetic separation
- Reference Page 63 for a list of the magnetic separators that can be used with coated fluorescent magnetic separators.

SPHERO™ Coated Ferromagnetic Particles

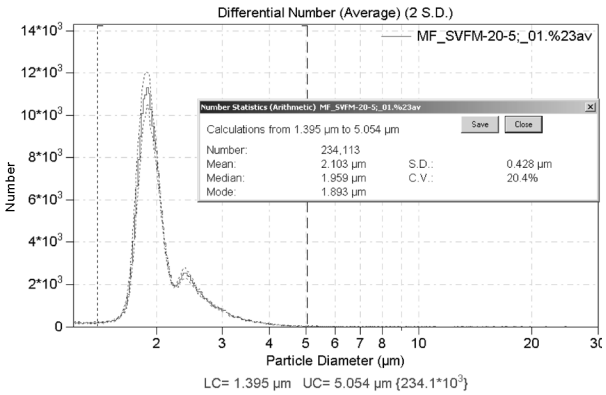
SPHERO™ Streptavidin Coated Ferromagnetic Particles

- See Page 65 for uses, benefits, and the mechanism of streptavidin coated particles
- Used for their ability to be easily manipulated in a magnetic field* .

  *Anker, J. N., C. J. Behrend, et al. (2005). "Magnetically-modulated optical nanoprobes (MagMOONs) and systems." Journal of Magnetism and Magnetic Materials 293(1): 655-662

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Streptavidin	2.0-2.9	1.0	SVFM-20-5	5 mL
Streptavidin	4.0-4.9	1.0	SVFM-40-5	5 mL

Figure 102 Size distribution analysis of SPHERO™ Cat. No. SVFM-20-5, Streptavidin Ferromagnetic Particles from the Beckman Coulter Z3 Multisizer™ 3.



SPHERO™ Goat anti-Mouse IgG Coated Ferromagnetic Particles

- Provides a means to measure forces applied to a specimen through specific receptors proteins
- Aids in the development of magnetic systems designed to apply forces or force patterns
- Coated fluorescent ferromagnetic particles allows for force measurements using fluorescent microscopy
- Contains two orders of magnitude higher magnetic moments than paramagnetic particles and can be incubated with biological cells during phagocytosis assays*.

  *Mitrelias, T., J. Palfreyman, et al. (2007). "Biological cell detection using ferromagnetic microbeads." Journal of Magnetism and Magnetic Materials 310(2, Part 3): 2862-2864.

Particle Type and Surface	Size, µm	% w/v	Catalog No.	Unit
Goat anti-Mouse IgG (Fc)	2.0-2.9	1.0	FMFc-25-5	5 mL
Goat anti-Mouse IgG (Fc)	4.0-4.5	1.0	FMFc-40-5	5 mL
Goat anti-Mouse IgG (H&L) , Cross adsorbed	2.0-2.9	1.0	FMXA-25-5	5 mL
Goat anti-Mouse IgG (H&L) , Cross adsorbed	4.0-4.9	1.0	FMXA-40-5	5 mL
Goat anti-Mouse IgG (Fc), Fluorescent, Pink	2.0-2.4	0.1	FMMFc-2058-5	5 mL

Figure 103 Size distribution analysis of SPHERO™ Cat. No. FMFc-40-5, Gt anti-Ms IgG (H&L) Ferromagnetic Particles, Lot AC01, 4.5 µm, 1.0 w/v, 5mL from the Beckman Coulter Z3 Multisizer™ 3.