

## Magnetic and Fluorescent Microspheres

## ***About Ocean NanoTech***

Ocean NanoTech is devoted to the mass production of nano/micro-sized particles, as well as their applications in healthcare and life science. It provides a variety of magnetic and fluorescent particles for:

- Immunoassay
- Nucleic acid isolation
- NGS library preparation
- PCR cleanup and size selection
- Immunoprecipitation
- Cell separation

With its core competences in preparation, surface modification, and bioconjugation of nano/micro-sized particles, Ocean NanoTech also provides custom solutions and OEM services to both academia and industry.

## Magnetic Beads

Ocean NanoTech uses excellent size control techniques to provide three series of superparamagnetic beads — **Mono Mag**, **Hi Sur Mag**, and **Super Mag** — with sizes ranging from 50 nm to 5 µm. These magnetic beads are modified with different functional groups or ligands to meet different customer needs.

Other features include:

- High density of functional groups, such as amine and carboxylic acid, are derived for high binding capacity
- Optimized iron content (30-80% depending on size) for short separation time and long settlement time
- Pre-blocked with a layer of polymer for ligand immobilization with significantly low non-specific binding

### Selection of Mono Mag, Hi Sur, and Super Mag

**Non-specific binding** — All the magnetic beads offered by Ocean NanoTech are pre-blocked, which makes them an ideal platform for ligand immobilization with significantly low non-specific binding. Among the magnetic beads Mono Mag has the lowest non-specific binding.

**Iron exposure** — Mono Mag has a layer of hydrophobic coating to seal the iron oxide from the outer environment and has the lowest iron exposure among the magnetic beads.

### Separation and Settlement

Magnetic Bead	Separation Time	Settlement Time
Super Mag 50 nm	2-8 hours	> 6 months
Super Mag 100 nm	5-10 minutes	30 days
Super Mag 150 nm	2-5 minutes	16 days
Super Mag 200 nm	1-2 minutes	7 days
Mono Mag 1 µm	<1 minute	6 hours
Hi Sur Mag 1 µm	1-2 minutes	12 hours

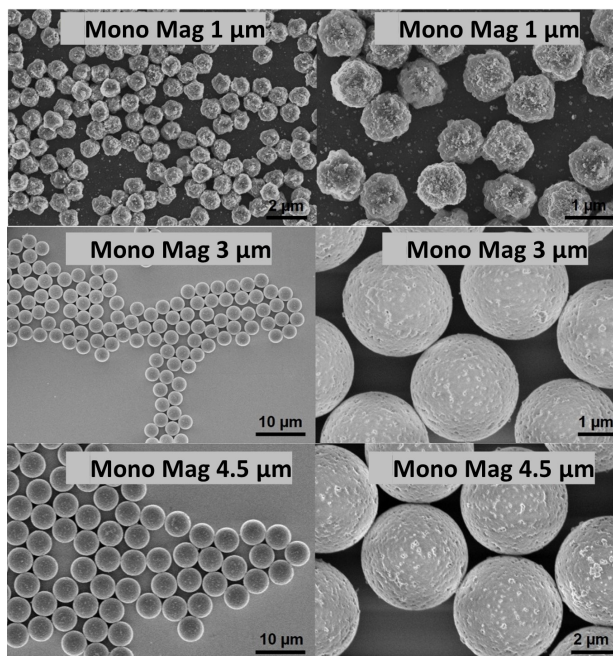
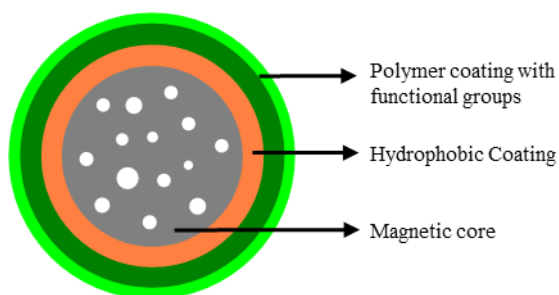
**Note:** The separation time is measured by resuspending magnetic beads in a microcentrifuge tube and placing it in a permanent magnetic separator (1.5T). The settlement time is measured after 50% of the magnetic beads settle to the bottom of a cuvette. Protein and other ligand-conjugated magnetic beads may have a different settle time.

### Mono Mag and Hi Sur Mag

Mono Mag has the lower non-specific binding and lower iron exposure. While Hi-Sur Mag has around four times larger surface area than the same weight of Mono Mag 1 µm. The feature of high surface area on Hi-Sur Mag enable its higher binding capacity than Mono Mag in the applications of protein or nucleic acid isolation.

## Mono Mag Carboxyl Beads

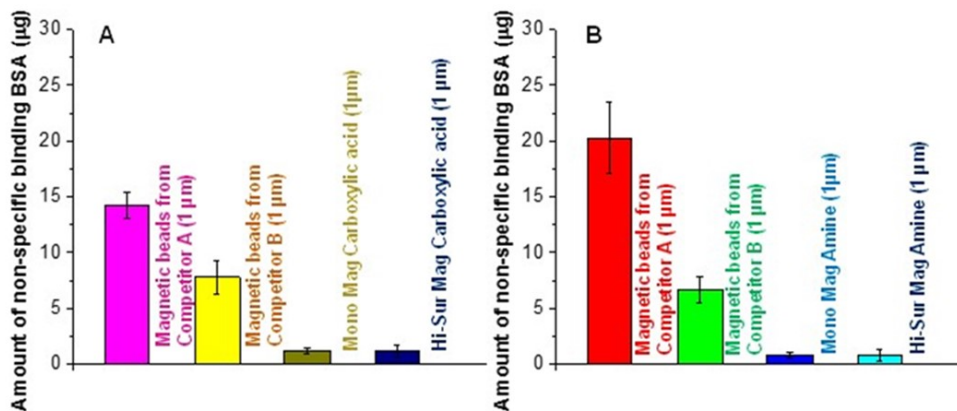
Ocean NanoTech's Mono Mag carboxyl functionalized magnetic beads are uniform, superparamagnetic beads with a layer of biocompatible polymer coating. The outer layer of its biocompatible coating makes them an ideal platform for ligands immobilization with significantly low non-specific binding.



### Applications

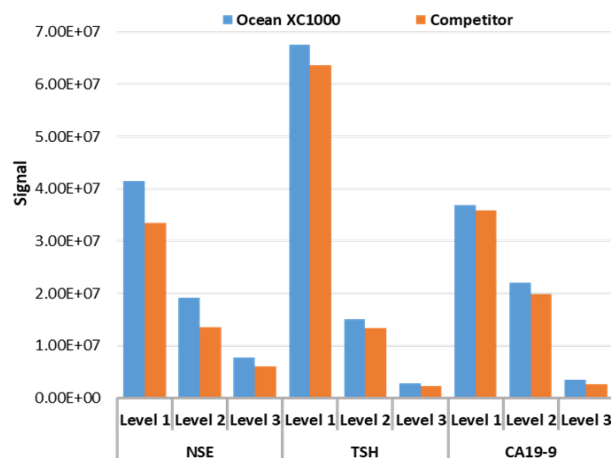
- Immunoassay
- Immunoprecipitation
- Nucleic acid hybridization
- Western blot
- Cell separation

Feature 1. Significantly low non-specific binding



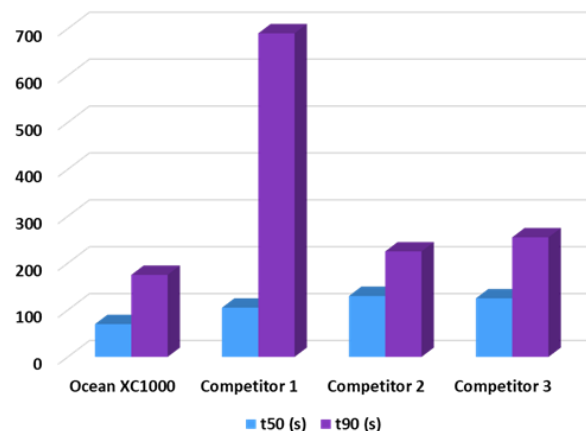
**Note:** Mono Mag carboxyl beads from Ocean NanoTech (MC1000) shows significantly lower non-specific binding. All beads were incubated for 1 hour with BSA at a ratio of 1 mg beads to 150 µg BSA.

**Feature 2. High binding capacity**



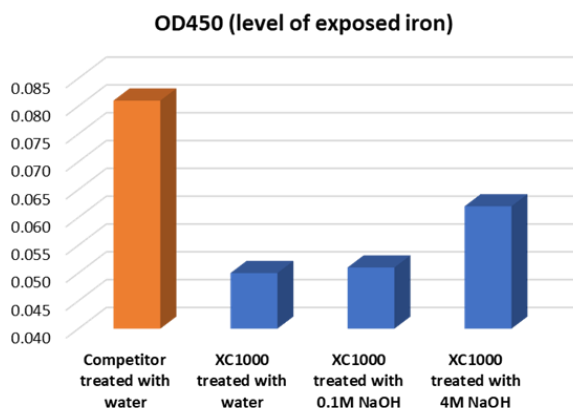
**Note:** Mono Mag Carboxyl Beads XC1000 shows higher binding capacity in multiple chemiluminescent assays.

**Feature 3. High iron content and fast separation**

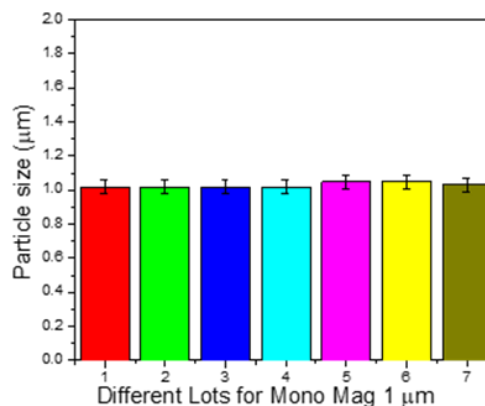


**Note:** Mono Mag Carboxyl Beads XC1000 have faster separation. At t50 (s) is when 50% of beads have been magnetically separated. At t90 (s) is when 90% of beads have been magnetically separated.

**Feature 2. High binding capacity**



**Feature 3. High iron content and fast separation**



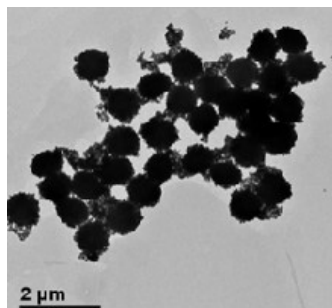
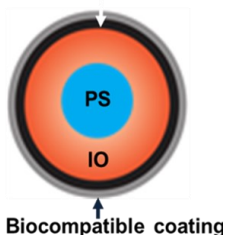
**Figure 1. Significantly low non-specific binding**

**Available Products**

Catalog #	Product name	Size	Surface	Unit Size
XC1000	Mono Mag Carboxyl Beads	1 µm	Hydrophobic	2 ml , 10 ml , 50 ml
MC1000	Mono Mag Carboxyl Beads	1 µm	Hydrophobic	2 ml , 10 ml , 50 ml
MC3000	Mono Mag Carboxyl Beads	1 µm	Hydrophobic	2 ml , 10 ml , 50 ml
MC4500	Mono Mag Carboxyl Beads	1 µm	Hydrophobic	2 ml , 10 ml , 50 ml

## Hi-Sur Mag Carboxyl Beads

Hydrophobic coating  
against acid and H<sub>2</sub>O<sub>2</sub>



Ocean NanoTech's Hi-Sur Mag Carboxyl Beads are hydrophilic magnetic beads with carboxylic acid groups. These surface groups allow covalent amide bond formation to proteins/peptides via primary amine (NH<sub>2</sub>) groups. Oligonucleotides, antibodies, or other ligands with amine groups can be easily coupled to the beads for use in many downstream applications including protein purification, DNA sample preparation and clean up, proteomics and immunoassays. Activation through carbodiimide is required. Attribute to their very large surface area (about three times larger than that of the Mono Mag Carboxyl Beads, 1 μm, MC1000) and unique surface coating, Hi-Sur Mag Carboxyl Beads exhibit superior binding capacity and low non-specific binding of protein or nucleic acids.

### Features

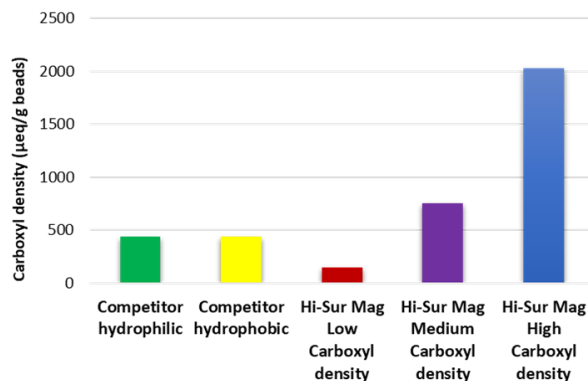
- Superior binding capacity
- High surface area (4 times larger than that of Mono Mag Streptavidin Beads)
- Low non-specific binding
- Fast magnetic separation
- Convenient one-step or two-step coupling.
- Available in three different carboxyl densities to meeting different needs

### Applications

- Immunoprecipitation
- Nucleic acid isolation
- Assay development

### Specifications

- Concentration: 50 mg/ml
- Size: 1 μm (optional)



**Note:** Hi-Sur Mag Carboxyl in three different carboxyl densities.

### Storage and Usage

- Store at 2-8°C. Freezing of particles may result in irreversible aggregation and loss of binding activity.
- Ensure the suspension is well dispersed prior to use, bath sonication is strongly recommended, as particles are expected to settle during storage.

### Available Products

Catalog #	Product Name	Size	Surface	Unit Size
HC1000-L	Hi-Sur Mag Carboxyl Beads	1 μm	Hydrophilic	2 ml , 15 ml , 100 ml
HC1000-M	Hi-Sur Mag Carboxyl Beads	1 μm	Hydrophilic	2 ml , 15 ml , 100 ml
HC1000-H	Hi-Sur Mag Carboxyl Beads	1 μm	Hydrophilic	2 ml , 15 ml , 100 ml



## Super Mag Carboxyl Beads



Ocean NanoTech's Super Mag carboxylic acid modified magnetic beads are superparamagnetic beads with a layer of biocompatible coating which makes our magnetic beads an ideal platform for ligand immobilization with significantly low non-specific binding. High density of carboxylic acid groups is derived to maximize the binding capacity of the magnetic beads.

### Applications

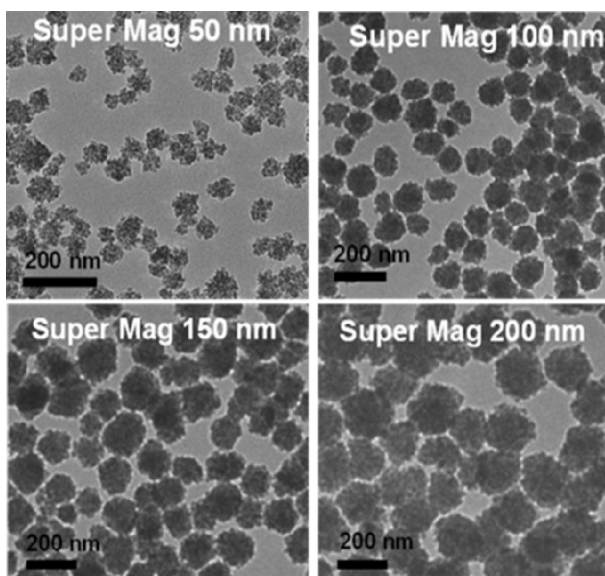
- CTC separation
- Cell separation
- Protein separation
- Bacteria separation
- Immunoassays

### Features

- High binding capacity
- Extremely slow sedimentation rate
- Shorter magnetic separation time than beads with the same size from other suppliers
- Low non-specific binding
- Convenient one-step or two-step coupling
- Iron oxide content: ~ 80%

### Specifications

- Concentration: 10 mg/ml
- Size: 50 nm, 100 nm, 150 nm, 200 nm



### Storage and Usage

- Store at 2-8°C. Freezing of particles may result in irreversible aggregation and loss of binding activity.
- Ensure the suspension is well dispersed prior to use, bath sonication

### Available Products

Catalog #	Product Name	Size	Surface	Unit Size
SC0050	Super Mag Carboxyl Beads	50 nm	Hydrophilic	2 ml , 10 ml
SC0100	Super Mag Carboxyl Beads	100 nm	Hydrophilic	2 ml , 10 ml
SC0150	Super Mag Carboxyl Beads	150 nm	Hydrophilic	2 ml , 10 ml
SC0200	Super Mag Carboxyl Beads	200 nm	Hydrophilic	2 ml , 10 ml

## Mono Mag Streptavidin Beads

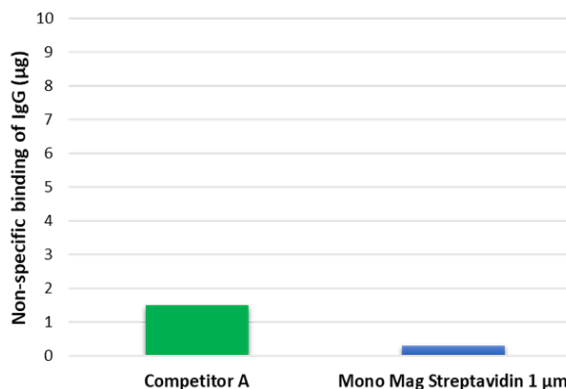
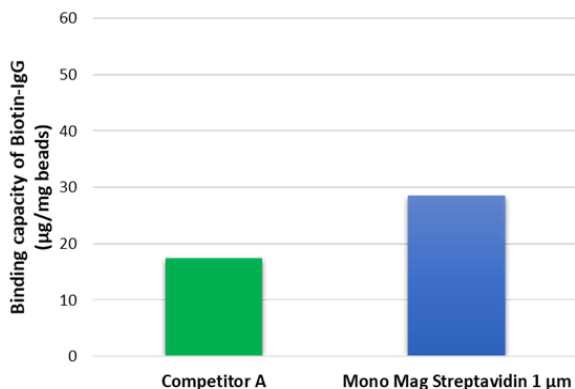
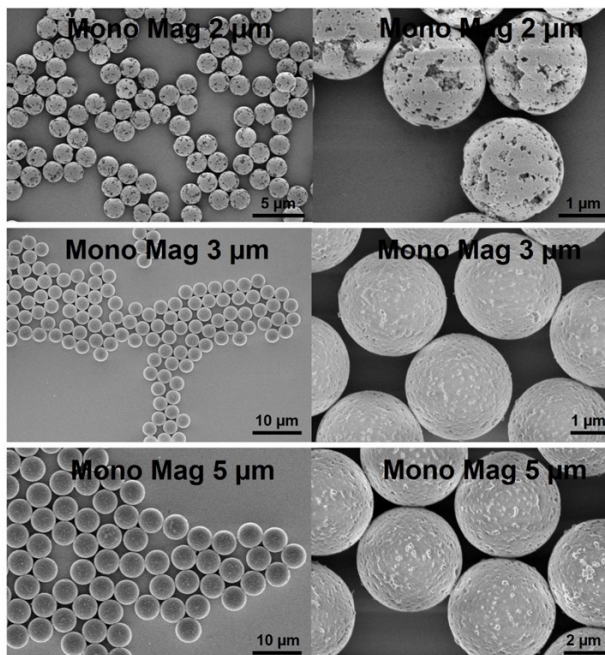
Ocean NanoTech provides both hydrophilic and hydrophobic Mono Mag Streptavidin Beads. A monolayer of streptavidin is covalently coupled to their surface and makes most of the biotin binding sites sterically available for binding of biotinylated antibodies, nucleic acids, or other biotinylated ligands and targets.

### Applications

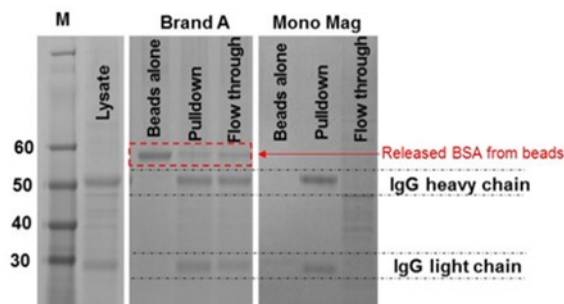
- Chemiluminescent assay
- ELISA
- Immunoprecipitation
- Nucleic acid isolation
- Cell separation

### Features

- High binding capacity: > 30  $\mu\text{g}$  biotinylated BSA or IgG per mg beads
- Low non-specific binding
- Narrow size distribution: CV  $\leq$  5%



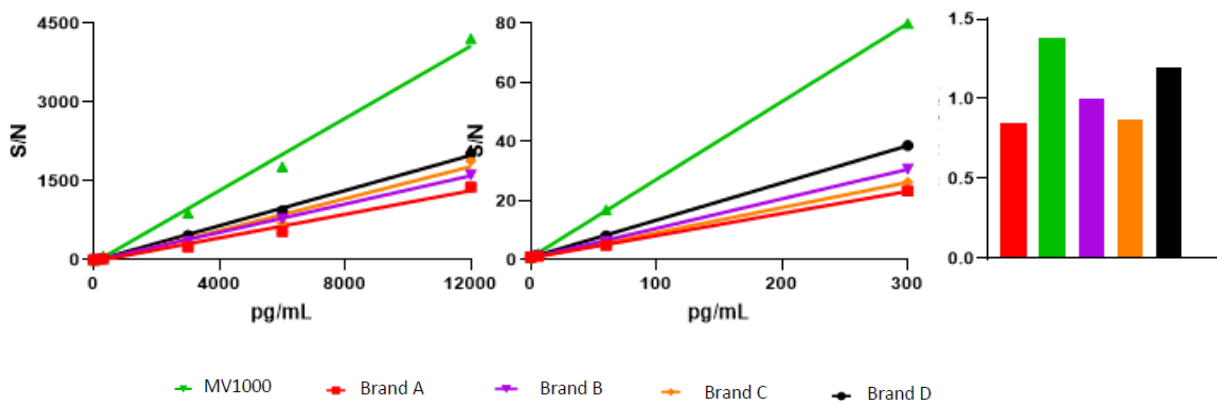
**Note:** Higher binding capacity and low non-specific binding of Mono Mag Streptavidin beads (MV1000)



Pull-down of biotinylated IgG spiked in cell lysate with Mono Mag Streptavidin Beads (MV1000). Pull-down efficiency was evaluated by SDS-PAGE. Almost all the spiked biotin-IgG was captured by MV1000.

Meanwhile, most of the impurities remained in the flow through, which indicated the high binding capacity and low nonspecific binding of the Mono Mag. However, majority of the biotin-IgG remained in the supernatant and cannot be captured by the beads from leading brand A. The BSA absorbed on the beads from leading brand A are not stable and can be eluted by SDS.





Note: Signal to noise and sensitivity of MV1000 in cardiac troponin cTnT assay.

### Available Products

Catalog #	Product name	Size	Surface	Unit Size
XV1000	Mono Mag Streptavidin Beads	1 $\mu\text{m}$	Hydrophobic	2 ml , 10 ml , 100 ml
MV1000	Mono Mag Streptavidin Beads	1 $\mu\text{m}$	Hydrophilic	2 ml , 10 ml , 100 ml
MV3000	Mono Mag Streptavidin Beads	3 $\mu\text{m}$	Hydrophilic	2 ml , 10 ml , 100 ml
MV4500	Mono Mag Streptavidin Beads	4.5 $\mu\text{m}$	Hydrophilic	2 ml , 10 ml , 100 ml

### Hi-Sur Streptavidin Beads

Ocean NanoTech’s Hi-Sur Streptavidin Beads (1  $\mu\text{m}$ , HV1000) are hydrophilic magnetic beads with a monolayer of streptavidin. It is covalently coupled to their surface and makes most of the biotin binding sites sterically available for binding of biotinylated nucleic acids, antibodies, or other biotinylated ligands and targets. Attributes to their very large surface area and unique surface coating, Hi-Sur Mag Streptavidin Beads exhibit superior binding capacity and significantly low non-specific binding.

#### Applications

- Immunoprecipitation
- Nucleic acid isolation
- Assay development

#### Features

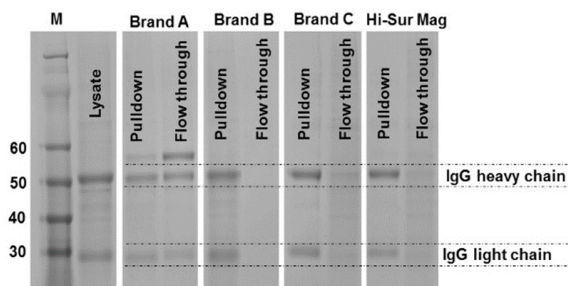
- High capacity: > 50  $\mu\text{g}$  biotinylated IgG per mg beads
- Large surface area: 3 or 4 times larger than that of Mono Mag Streptavidin Beads
- Low non-specific beads

#### Specification

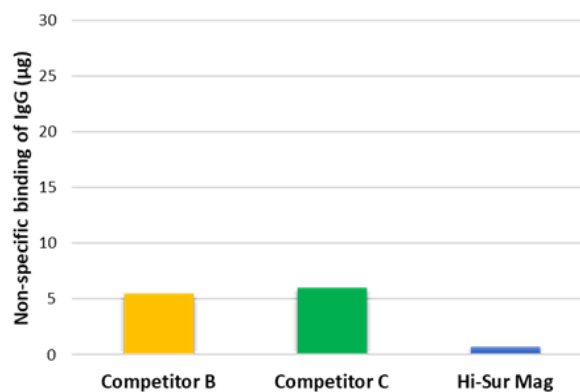
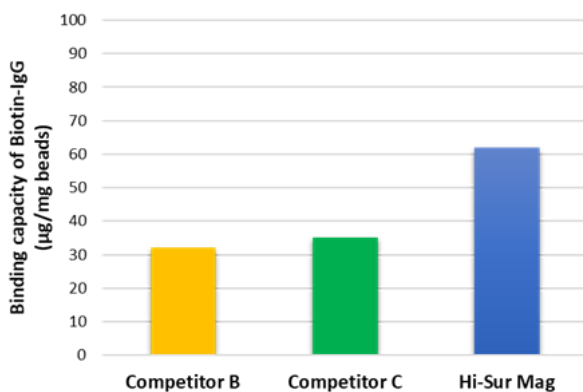
- Concentration: 10 mg/ml
- Size: 1  $\mu\text{m}$  (nominal)

#### Storage and Usage

- Store at 2-8°C. Freezing of particles may result in irreversible aggregation and loss of binding activity.
- Ensure the suspension is well dispersed prior to use, bath sonication is strongly recommended, as particles are expected to settle during storage.



Pull-down of biotinylated IgG spiked in cell lysate with Hi-Sur streptavidin beads (HV1000). Pull-down efficiency was evaluated by SDS-PAGE. Almost all the spiked biotin-IgG was captured by the beads from HV1000 and most of the impurities remained in the flow through, which indicated the high binding capacity and low non-specific binding of the Hi-Sur Mag.



Note: Signal to noise and sensitivity of MV1000 in cardiac troponin cTnT assay.

### Available Products

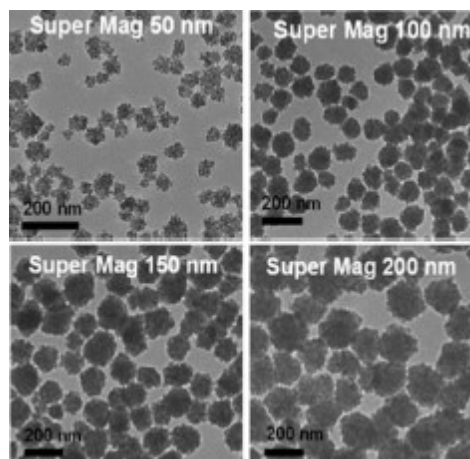
Catalog #	Product name	Size	Surface	Unit Size
HV1000	Hi-Sur Mag Streptavidin Beads	1 µm	Hydrophilic	2 ml , 10 ml , 100 ml

### Super Mag Streptavidin Beads

Ocean NanoTech’s Super Mag Streptavidin Beads are hydrophilic magnetic beads with a monolayer of streptavidin. It is covalently coupled to their surface and makes most of the biotin binding sites sterically available for binding of biotinylated antibodies, nucleic acids, or other biotinylated ligands and targets. The high-affinity interaction between streptavidin and biotin is used in a vast number of applications.

#### Applications

- Cell separation
- Immunoprecipitation
- Immunoassay



**Features**

- High Binding Capacity: > 40 µg biotinylated BSA or IgG per mg beads (SV0050)
- Extremely slow sedimentation rate
- Shorter magnetic separation time than the beads with the same size from other suppliers.
- Low non-specific binding

**Specifications**

- Concentration: 10 mg/ml
- Size: 1 µm (nominal)

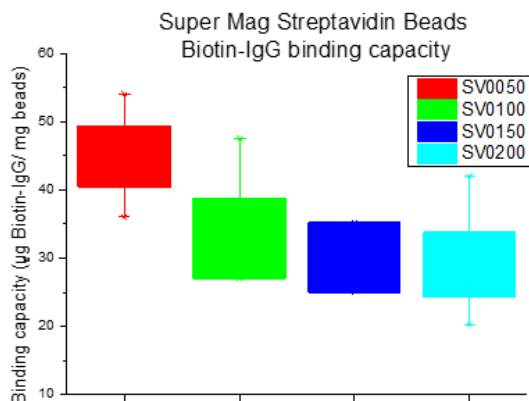
**Storage and Usage**

- Store at 2-8°C. Freezing of particles may results in irreversible aggregation and loss of binding activity.
- Ensure the suspension is well dispersed prior to use, bath sonication is strongly recommended, as particles are expected to settle during storage.

**Note:** Signal to noise and sensitivity of MV1000 in cardiac troponin cTnT assay.

**Available Products**

Catalog #	Product name	Size	Surface	Unit Size
SV0050	Super Mag Streptavidin Beads	50 nm	Hydrophilic	1 ml , 5 ml
SV0100	Super Mag Streptavidin Beads	100 nm	Hydrophilic	1 ml , 5 ml
SV0150	Super Mag Streptavidin Beads	150 nm	Hydrophilic	1 ml , 5 ml
SV0200	Super Mag Streptavidin Beads	200 nm	Hydrophilic	1 ml , 5 ml



***How to order***

Online: [www.oceannanotech.com](http://www.oceannanotech.com)

Phone: (858) 689-8808

Email: [orders@oceannanotech.com](mailto:orders@oceannanotech.com)



***Technical Support***

Online: [www.oceannanotech.com](http://www.oceannanotech.com)

Phone: (858) 689-8808

Email: [orders@oceannanotech.com](mailto:orders@oceannanotech.com)

***Contact Us***

Ocean NanoTech, LLC

7964 Arjons Drive, Suite G

San Diego, CA 92126

Phone: (858) 689-8808

Email: [info@oceannanotech.com](mailto:info@oceannanotech.com)