Agilent LodeStars
Superparamagnetic Particles
LodeStars Biomagnetic Separation Technology:

Quality particles for confidence in your results.

Biomagnetic separation is a mainstream technology in bioscience and life science research. With so many new and demanding applications, it is vital that research scientists, product developers, manufacturers and healthcare professionals have access to top quality paramagnetic particle products which they can rely on for performance and consistency.

Agilent’s LodeStars beads are high performance, superparamagnetic particles with excellent physical and chemical characteristics designed for biomagnetic separations. Based on patented technology and experience, the beads are a powerful magnetic platform for bioscience and life science applications.

The beads are polymer microparticles with a microcrystalline ferric oxide component uniformly dispersed throughout the bead. This provides the beads with their superparamagnetic properties, causing them to move rapidly in an applied magnetic field. Also, as no permanent magnetism is induced, the beads fully disperse once the field is removed.

The beads are coated in a polymer shell which provides two key properties, firstly the iron is protected inside the bead ensuring that the iron cannot interfere with biological reagents. Secondly, the polymer coating provides chemical groups for covalent attachment of biological molecules, eg, antibodies for immunocapture and minimizes non-specific interactions.

LodeStars beads are used as a solid phase in manual and automated bioassay, and to isolate and manipulate targets in biological samples, eg, cells, proteins and other molecules.

Key Benefits

- Highly selective ligand capture due to controlled surface functionality
- Excellent assay performance due to low backgrounds
- Improved productivity due to speed of response
- Reduced costs due to ease of use and efficiency
- Peace of mind due to controlled batch-to-batch reproducibility

Principle of Operation

LodeStars beads, coupled with the chosen biomolecule, are allowed to bind and form a complex with the target. For example, LodeStars 2.7 Streptavidin beads will bind a biotinylated ligand. After a short reaction time, a magnetic field should be applied and the LodeStars beads recovered from the sample solution. The separation is fast, efficient and gentle. It requires no columns or centrifugation. Washing and handling using magnetic particles lends itself to automated processing that is quick and highly reproducible.

The beads’ polymer surface is highly controlled to provide ultralow non-specific binding of unwanted sample components and to reduce non-covalent biomolecule attachment that might cause loss of biomolecules from the surface in storage or during a procedure. LodeStars beads are highly resistant to mechanical stress and reducing conditions, and stable over a wide pH range.

Based on Agilent’s patented technology, LodeStars products have applications across numerous areas of bioscience and life science research, diagnostics and therapeutics, as well as the development of new products in molecular medicine.
Agilent manufactures LodeStars particles in 2.7 µm Carboxyl and 2.7 µm Streptavidin formats for application-focused biomagnetic separations.

**LodeStars 2.7 µm Carboxyl**
- Superparamagnetic 2.7 µm polystyrene microparticles coated with carboxylic acid groups
- Suitable for covalent coupling of affinity ligands to isolate targets in biological samples, including proteins, cells and other biomolecules
- Microcrystalline ferric oxide is uniformly dispersed throughout the particle for optimal performance in a magnetic field
- Highly controlled surface maximizes coupling efficiency and minimizes non-specific binding

**LodeStars 2.7 µm Streptavidin**
- Superparamagnetic 2.7 µm polystyrene microparticles coated with Streptavidin
- Suitable for binding Biotin labeled biomolecules with very high affinity
- Microcrystalline ferric oxide is uniformly dispersed throughout the particle for optimal performance in a magnetic field
- Highly controlled surface maximizes coupling efficiency and minimizes non-specific binding

**Binding Capacity Comparison**

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<tr>
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<th>LodeStars 2.7 Streptavidin</th>
<th>Alternative 2.7 µm Streptavidin particle</th>
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</thead>
<tbody>
<tr>
<td>Biotinylated antibody binding capacity (Biotinylated IgG goat anti-fluorescein)</td>
<td>6.3 µg/mg</td>
<td>3.0 µg/mg</td>
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*Table 1. LodeStars 2.7 Streptavidin beads compared with an alternative 2.7 µm Streptavidin product.*

LodeStars 2.7 Streptavidin beads illustrate improved performance metrics.

<table>
<thead>
<tr>
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<th>LodeStars 2.7 Carboxyl</th>
<th>Alternative 2.7 µm Carboxyl particle</th>
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</thead>
<tbody>
<tr>
<td>Affinity-purified polyclonal goat anti-mouse IgG (Fc)</td>
<td>9 µg/mg</td>
<td>11 µg/mg</td>
</tr>
<tr>
<td>Immuno-capture of mouse IgG</td>
<td>4.0 µg/mg</td>
<td>2.8 µg/mg</td>
</tr>
<tr>
<td>Performance efficiency µg mouse IgG/µg goat anti-mouse IgG</td>
<td>0.44</td>
<td>0.25</td>
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*Table 2. LodeStars 2.7 Carboxyl beads compared with an alternative 2.7 µm Carboxyl product.*

In these experiments, LodeStars 2.7 Carboxyl beads consumed less goat-anti-mouse first antibody and captured significantly more mouse IgG than another vendor’s 2.7 µm Carboxyl particle. The LodeStars beads’ surface allows high functional availability of bound ligand leading to better all round performance metrics.
Manufacturing Capabilities

Agilent is one of the world’s largest producers of particles for bioseparations. Agilent is ISO 9001:2000 accredited, with over 35 years’ experience in bead manufacture and applications development. Agilent’s technologies are widely used in chromatography, life science and pharmaceutical chemistries. We manufacture superior quality, reliable particles for bead-based assays, chromatography media, supports for peptide and oligonucleotide synthesis, and resins for high throughput chemistry. All Agilent’s beads are manufactured under stringent quality controls to ensure batch-to-batch reproducibility of physical and chemical properties.

Agilent manufactures polymer microparticles with engineered structure and highly controlled surfaces with consistency between production runs. In response to client partners’ needs, Agilent applies its abilities and technologies to make bead products directed towards specific applications. As a result, Agilent is a key OEM development partner and supplier of beads to major diagnostic and bioscience companies worldwide.

- Microparticles for Life Science & Bioscience
- Synthesis & Purification of Oligonucleotides & Peptides
- Analytical and Preparative Chromatography