

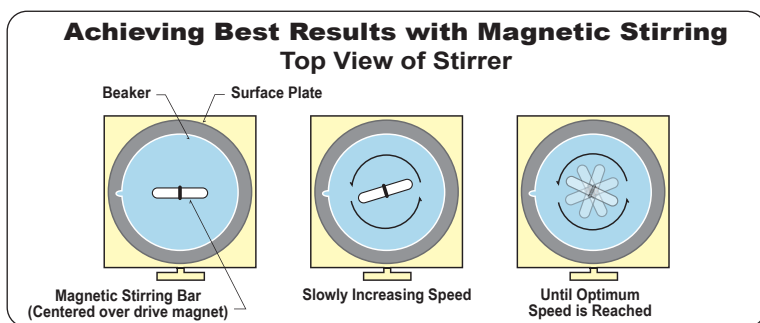
## MAGNETIC STIRRING BAR SELECTION & USE



Magnetic stirring is used in a number of common laboratory procedures, yet the importance of selecting the best stirring bar for each particular application is often overlooked. The drive magnet, vessel shape, viscosity and abrasiveness of the materials should all be considered when choosing the size, shape and materials (coating and magnet) of the magnetic stirring bar in order to achieve effective, efficient stirring results.

First, let's discuss magnetism. On the most basic level, we know that opposite poles attract. A magnetic stirrer has a drive magnet, generally a bar or U-shape made of a metallic alloy or a ceramic which rotates powered by a drive motor. The magnetic poles of the drive magnet are typically about two inches apart in bench top models, and can be up to six inches apart in larger units used to mix 50 gallons of liquid solution. For optimum magnetic coupling, the distance between the magnetic poles of the drive magnet and the length of the stirring bar should be equal. Bars too long or too short in proportion to the drive magnet will not have optimum coupling which is important to reduce spinout.

Once a magnetic stirring bar has been placed in a container with solution, it should be positioned directly over the center of the drive magnet. The stirring speed should be increased slowly, until the desired vortex pattern is achieved. Should the magnetic stirring bar lose its coupling with the drive magnet because of the speed of the drive magnet, viscosity of the fluid, or an improperly selected stirring bar length, it is said to have "spin-out."



Vertical distance between the drive magnet and the stirring bar should be kept to a minimum for the best coupling and stirring efficiency. Therefore, the containing vessel should be as thin as practical.

The selection of the shape of the magnetic stirring bar also influences the resulting vortex in that multi-sided shapes may be more efficient in moving solutions and certain shapes have been designed to provide a tailored fit in specialty vessels such as test tubes, cuvettes and spectrophotometer cells.

Magnetic stirring bars are generally made of ALNICO (an alloy of aluminum, nickel, iron and cobalt) magnets encapsulated in an FDA approved PTFE coating. In addition, magnetic stirring bars also use high energy magnetic materials, such as Samarium Cobalt (page 377) which increases strength of coupling with a drive magnet and helps to reduce spinout when mixing viscous solutions or mixing at high speeds.

Newer to the market, are Bel-Art Products Spinfinity® magnetic stirring bars, page 374. Spinfinity® magnetic stirring bars use ALNICO magnets encapsulated in plastic for increased durability in granular slurries.

Contact Us for Your Special Magnetic Stirring Bar Needs

## A Magnetic Stirring Bar for Every Application

Applications	General Stirring Applications	High Temperature Stirring	Viscous Solutions High Speed Stirring	Abrasive Slurries Extended Stirring Applications
Brand/Type	Spinbar® Teflon PTFE	Spinbar® Pyrex Glass	Spinbar® Rare Earth Samarium Cobalt	Spinfinity®
Magnetic Type	Alnico	Alnico	Samarium Cobalt	Alnico
Covering	Teflon® PTFE	Clear Pyrex® Glass	Teflon® PTFE	Plastic
Features/ Benefits	Wide selection of shapes and sizes to fit vessels of all types; Individual shapes create different vortices for efficient and effective stirring	Heated stirring applications up to 274°C (525°F)	Reliable Magnetic Coupling - Superior magnetic energy reduces frequency of spinout in the most vigorous applications	Durable - Last 2.5 to 3 times longer under conditions known to traditionally cause material breakdown
	FDA grade Teflon® PTFE low friction coating is durable and inert	Glass casing has zero absorption and porosity	FDA Grade Teflon® PTFE low friction coating is durable and inert	Outer shell made from FDA approved materials
	Color selection for color-coding work processes		Distinct Color - Green color lets you quickly identify Spinbar® Rare Earth Samarium Cobalt	Distinct Color - Quickly identify the Spinfinity® difference by its purple color

*All Spinbar® and other Teflon® PTFE Coated Magnetic Stirring Bars are Manufactured in a Registered ISO 9001:2008, as Verified by SGS Certification.*

### Spinbar® Magnetic Stirring Bar Shapes and Performance

Whether mixing is needed in a 10mm cuvette, a 1.5ml vial, a beaker, or a 50 gallon drum, there is a Spinbar® magnetic stirring bar that can do the job. Bel-Art Products offers the most comprehensive selection of magnetic stirring bars on the planet.



**Capsule** magnetic stirring bar has a polygon magnetic stir bar that spins freely inside a protective capsule. The capsule assures the bar does not spin off center and reduces turbulence and obstructions to ensure consistent smooth stirring. Page 385.



**Cell** magnetic stirring bars are designed specifically for use with spectrophotometer cells, cuvettes or test tubes. The cell stirrer fits into standard 10mm spectral cells and provides rapid vertical and horizontal mixing with a minimum of vortexing when placed on a magnetic stirring machine. Centrifugal pumping action, generated by the cross channels in the upper face, mixes without aeration. Page 388.



**Circulus™** magnetic stirring bars provide strong turbulence at relatively low speeds, offer reduced surface contact and have excellent centering characteristics, particularly in vessels with convex bottoms. Page 383.



**Cylindrical** magnetic stirring bars offer excellent centering and smooth running characteristics. A small removable pivot ring in the center adds to their versatility. The pivot ring minimizes the contact area of the bar to the vessel, reduces friction and lessens marring of plastic containers. Page 378.



**Elliptical (Egg Shaped)** magnetic stirring bars are particularly well suited for round bottom flasks. Their shape mimics that of a flask and ensures complete mixing. They also offer minimal contact when used in plastic containers. Page 381.



**Fluted Octagonal–Rare Earth magnet:** The flutes of this eight-sided bar along with a definitive tapering to conical ends provides excellent surface area and recessed breaks in the profile to generate strong turbulence and efficiently move fluids. Available only in Rare Earth (Samarium Cobalt), the shape and magnet strength make these bars especially well-suited for viscous solutions. Page 377.



**Micro (Flea)** magnetic stirring bars are designed for stirring small volumes in vessels such as vials, tubes and gradient makers. Available in a variety of colors and sizes, micro (flea) stirring bars are particularly useful for environmental testing and life science applications in which small sample volumes need to be prepared and evaluated. Page 384-385.



**Octagon** magnetic stirring bars with integral pivot ring are the most commonly used shape. Their interrupted profile provides greater surface area and added turbulence when compared to the smooth surface of cylindrical bars. Pivot ring aids in reducing friction and chattering. Page 375-376.



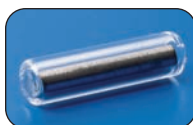
**Octagon – Spinfinity®:** The octagonal shape was also selected for the Spinfinity® line. Spinfinity® magnetic stirring bars have a hard plastic casing that gives them superior durability in granular slurries. Quickly identify Spinfinity® magnetic stirring bars by their bright purple coating. See page 374.



**Octagon – Rare Earth magnet:** The superior magnetic energy of Rare Earth (Samarium Cobalt) magnets provides strong coupling with drive magnets reducing frequency of spinout in viscous solutions or high speed stirring. The bright green Teflon® PTFE coating makes them easy to identify in the laboratory. See page 377.



**Polygon/Giant Polygon** multifaceted surfaces add turbulence relative to similar smooth size cylindrical bars. Giant Polygon bars can be used for stirring substantial volumes in large vessels such as drums and tanks. Available with or without a molded pivot ring, this ring minimizes the contact area between the bar and the vessel, thus reducing friction and chattering. Page 378-380.



**Pyrex® Spinbar® Glass Stirring Bars** are completely encapsulated in Pyrex® glass. Glass stirring bars are useful for high temperature applications in excess of 225°C (437°F) where Teflon® PTFE is not stable. Glass bars also offer “zero absorption” of the stirred solution. Page 377.



**Round** magnetic stirring bars with tapered ends have a naturally centered pivot point, eliminating the need for a separate pivot ring. Smooth surface and the slightly raised ends on these bars facilitate efficient movement through solutions. Page 376.



**Saturn Spinbar® Magnetic Stirring Bars** easily stir powders into solutions without getting stalled. A prominent sphere in the middle of the bar elevates the stirring bar arms during rotation and consequently diminishes the surface contact area, permitting the magnet to spin freely without stalling. For use in round or flat bottom vessels. Page 383.



**Spinfin®** magnetic stirring bars can be used in round bottom flasks as well as rounded vessels such as test tubes or cylinders. Page 386.



**Spinplus®** magnetic stirring bars add speed and efficiency to mixing operations. The “+” shape creates a deep vortex and provides stable, quiet operation. Page 382.



**Spinring®** stirring bars provide maximum stabilization of the magnetic stirring bar with the addition of a “hoop” around a standard octagonal bar. The friction fit of the “hoop” and bar allows them to spin as a unit. By presenting a greater surface area and wider profile, “spin out” is virtually eliminated. This particular arrangement is best suited for larger open-neck vessels, such as buckets and beakers. Page 382.



**Spinstar®** magnetic stirring bars create a deep mixing vortex at relatively slow speeds. Designed to fit the inside diameter of most commonly-used beakers, the Spinstar® stirring bar is perfect for applications requiring slow, thorough mixing. Page 382.



**Spinvane®** magnetic stirring bars are designed for test tubes, micro vials and conical bottom centrifuge tubes. Each style is manufactured for a specific size tube, but can be modified if needed without affecting the magnet. Page 387.



**Spinwedge®** magnetic stirring bars provide strong turbulence at fairly low speeds and are well suited for churning sediment or dissolving salts. Page 381.

## NEW PRODUCT!



### Spinfinity® Octagon Magnetic Stirring Bar

#### *The Next Revolution in Magnetic Stirring Durability*

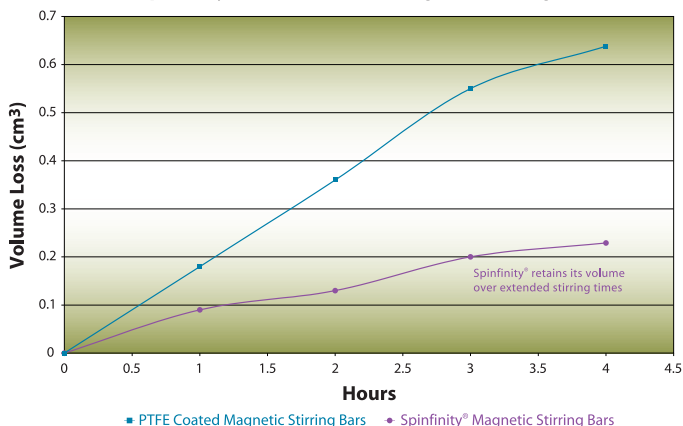
Those mixing granular slurries know that magnetic stirring bars can and do often wear down quicker than preferred. Manufactured with different processes and materials, new Spinfinity® magnetic stirring bars have a hard plastic covering that delivers 2.5 to 3 times the wear resistance of PTFE coated magnetic stirring bars under conditions known to cause material breakdown.

The Spinfinity® magnetic stirring bar is an octagon shape with a molded-in pivot ring. This shape provides greater surface area than a rounded bar of similar size and an interrupted profile which provides added turbulence for efficient stirring. The pivot ring reduces friction and chattering. In the lab, they can quickly be identified from other magnetic stirring bars by their distinctive purple coating.

CATALOG NO.	SIZE	PRICE/EACH
F37190-0001	3 x 1/2" (76.2 x 12.7mm)	\$34.55

### Durability Testing

#### Spinfinity® vs. PTFE Coated Magnetic Stirring Bars



Spinfinity® and PTFE coated magnetic stirring bars were used under conditions known to cause material breakdown and measured for volume loss each hour for a period of four hours.

PTFE coated magnetic stirring bars lost on average, 2.85 times more volume than Spinfinity® magnetic stirring bars.