

## Magnetic Mixers: How Are They Different?

Mixing product with a magnetically-coupled mixer provides many processing advantages as compared to other types of mixers. However, many don't realize that there are even significant differences between the various designs of magnetic-coupled mixers. The most critical component in the mechanical success of a magnetic mixer is the magnetic coupling used to drive the impeller. Making the correct choice can provide trouble-free operation instead of costly and catastrophic failures.

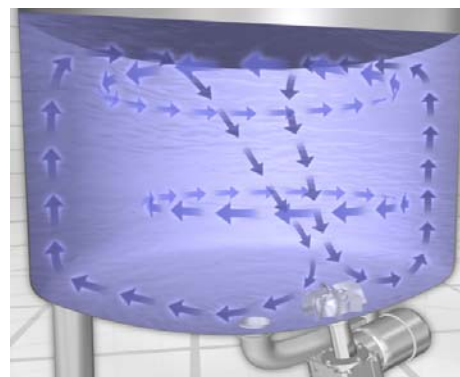
### *What is a Magnetic Coupled Mixer?*

Magnetically coupled mixers are designed with permanent magnets embedded into the impeller and the outer driving head. The impeller (inside the tank) is coupled to the outer driving head (outside the tank) through the bottom of the mixing vessel. When the mixer is assembled, these magnets form a strong interlocked field which, when rotated cause the mixing action. The magnetic field created in magnetically coupled mixers is technologically superior for driving the impeller because it eliminates the need for shaft seals (which can form a leak or contamination path into or out of the vessel).

Magnetically coupled mixers typically use bearings as a way of allowing the rotating impeller to be turned at high speed under the load of the process liquid. Bearings provide the most efficient way of dealing with the torque and stresses encountered while under load.

Magnetically coupled mixers are typically installed offset into the bottom of a vessel. Placement like this virtually eliminates the need for a baffle, and also allows for mixing to the last drop. This is a tremendous advantage as compared to top-mounted mixers which can leave as much as 15% to 20% of the vessels product un-mixed.

Magnetically coupled mixers are also much more efficient than top mounted mixers because they use smaller motors and because of the inherent physics of the design. Furthermore, this type of mixer is much more cleanable than other types and results in huge lifetime savings in turn-around time.



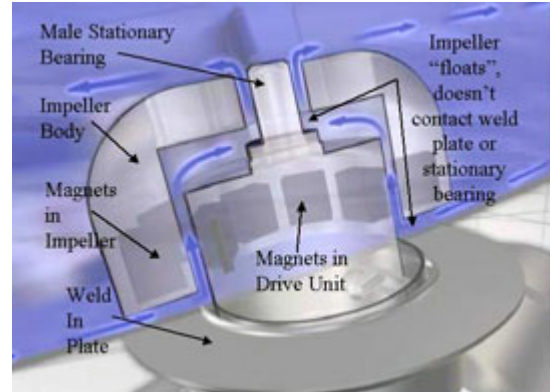
### *The Evolution of Magnetically Coupled Mixers*

Magnetically coupled mixers have been in use for many years and have been extremely successful in Europe and the US. In the Pharmaceutical and Biotech industries, sales of bottom mounted magnetically coupled mixers have now taken over as the mixer of choice for sterile processes. Over time, magnetically coupled bottom mounted mixers have evolved and improved to the point that they are now an integral part of the manufacturing process. Improvements to the unique aspects of magnetically coupled mixers, such as time, energy, shear stresses, cleanability, and particle generation are constantly being sought in order to minimize processing and downtime while maximizing efficiency.

Some of the most critical factors for magnetically coupled mixers are cleaning and the potential for catastrophic failure of the bearings. Several different bearing designs have been produced by magnetically coupled mixer manufacturers and are now in use throughout the market. However, the ability to run dry as a failsafe has eluded all current manufacturers using bearings. Although some manufacturers do claim the ability to run dry, damage to the bearing happens to varying degrees.

**PremierTec's® Ultra Clean Mixer - A Levitated Impeller (Pat. No. 7,396,153)**

PremierTec® offers a patented Ultra Clean Mixer design that makes significant innovative advances in the magnetic coupling used to drive the impeller. The engineering design of this mixer causes the impeller to levitate above the guide bearing. With this levitation, the impeller is actually floating within a strong magnetic field; there is no direct contact between the rotating bearing and the stationary guide bearing. Where most other magnetic mixers have the edge of the impeller's rotating bearing resting on the stationary guide bearing, the Ultra Clean Mixer has no direct contact at all.



**A Mixer that CAN Run Dry**

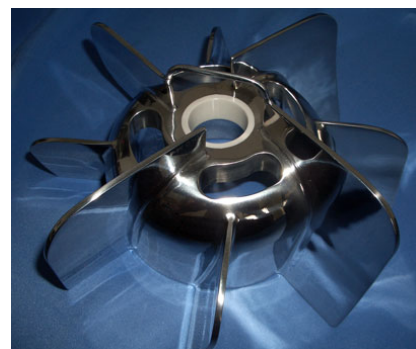
The processing advantages of this levitated impeller are numerous. First of all, the Ultra Clean Mixer is the first mixer that can really run dry, with no liquid in the tank. It is levitated by its design, not by the hydraulic lift of the liquid underneath the impeller wings. Since the impeller stays levitated at all times, even with no liquid or electric energy, it does not need to be stopped to begin the CIP (clean-in-place) process. It can run during the transition from product processing in the tank and throughout the entire CIP process, from beginning to end. It can run while product is being drained from the tank, until every last drop drains from the tank; no product stagnation, no batch contamination. The impeller always stays levitated.

**Friction-less Mixing**

With the levitated impeller and no bearing contact, friction between the bearing surfaces is basically eliminated. With no friction, there is virtually no speed limitation on the mixer. There is virtually no bearing wear, damage or particle generation.

**Power Mixing**

Additionally, the PremierTec® mixer has 8 curved impeller wings as compared to other 3 or 4 wing designs. The increased number and improved shape of the impeller wings allow the Ultra Clean mixer to handle a larger mixing volume for each size of the drive unit and impeller. It has a greater pumping effect which allows it to move more product at a lower speed. It can gently agitate product and keep product in suspension. It can



achieve turbulent mixing. It is more powerful with less effort and requires less energy consumption.

### ***Versatile Mixing***

The Ultra Clean Mixer has been designed to meet the critical standards of the Pharmaceutical and Biotech industries. All product contact surfaces conform to USP Class VI, and are designed to withstand CIP and SIP conditions. The robust design and the quality of construction also make it highly compatible with the harsh requirements of the Chemical Industry and with the turbulent mixing requirements of the Food and Beverage Industry.



The PremierTec<sup>®</sup> Ultra Clean Mixer offers the best technological solution in the magnetic mixing field today. PremierTec<sup>®</sup> has taken their customers' feedback over the years to create a design that truly overcomes the most common issues with magnetic mixing today.

### ***The Company - PremierTec<sup>®</sup>***

PremierTec<sup>®</sup> is a US company that was established in 2001 by Per-Olof Andersson, a Mechanical Engineer who has over 20 years experience in aseptic processing and mixing. PremierTec<sup>®</sup>'s mission is to provide cutting-edge designs and to deliver those designs with the highest level of customer service. Its current customer base consists of companies such as Cardinal Health, Schering Plough and Tropicana. PremierTec<sup>®</sup> has representatives across the United States, as well as in Europe and South America.

### ***Please Visit us on the Web – [www.PremierTec.net](http://www.PremierTec.net)***

The PremierTec<sup>®</sup> website offers a 3D animation download, pictures and videos of the Ultra Clean Mixer, as well as information on the mixer and tank loan program. PremierTec<sup>®</sup> also offers a full line of radial diaphragm valves and septum sampler products, which can be viewed on their website.

### ***Contact PremierTec***

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