



ZETA **MAGNETIC AGITATORS**

For sterile liquid processing



ZETA AGITATORS – A VERSATILE PRODUCT FAMILY

Proven agitator technology that meets the highest standards of sterile design and reliability.

ZETA system with top-mounted magnetic agitator AMRe



- **Bioreactors for bacteria and cell culture**
- **Process tanks upstream and downstream of fermentation vessels**
- **Processes with carrier suspensions**
- **Vaccine production**
- **Solutions for injection and infusion**
- **Fractionation of blood plasma**
- **Manufacturing of active ingredients**
- **Fine chemicals**
- **Food and beverage, including**
 - dairy
 - brewing
 - fruit juice
 - fruit preparations
- **Special applications, for example**
 - high-pressure reactors
 - cooling media



Fermenter agitator BMRF

An overview of our product range:

PRODUCT GROUP	PRODUCT TYPE	SERIES	APPLICATIONS	TORQUE RANGE
Bottom-mounted magnetic agitators	Magnetic impeller with improved run-dry capability	BMRT	Hygienic and sterile process tanks in pharmaceutical and food/beverage production, up to approx. 60.000 litres	50 - 30.000 Ncm
	Bioreactor agitators	BMRF	In bioreactors for bacteria and cell cultures; application-specific multiple-impeller design	50 - 30.000 Ncm
Top-mounted magnetic agitators	Externally mounted magnetic coupling	AMRe	In bioreactors for cell cultures; application-specific multiple-impeller design	300 - 2.500 Ncm
	Internally mounted magnetic coupling	AMRi	Smaller bioreactors and process tanks; application-specific multiple-impeller design	30 - 550 Ncm
Container magnetic agitators	Magnetic coupling on inside of vessel	CMRT	Top-mounted magnetic agitator for the food industry	30 - 2.500 Ncm



ZETA MAGNETIC AGITATORS – FULLY SEALED, RELIABLE AND PERFECTLY CLEANABLE

ZETA magnetic agitators are the product of many years of experience with sterile design and process engineering.

Magnetic agitator types



Bottom-mounted magnetic agitator



The big advantage of ZETA magnetic agitators is the complete separation of the interior of the tank from the outside. In contrast to conventional agitators, there is no shaft penetrating the tank and therefore no mechanical seal. This eliminates the risks of leaks and microbial contamination and the need for special maintenance that are associated with conventional agitators. We have developed our magnetic agitators with special emphasis on optimising their cleanability, which is essential for sterile processes. Independent tests, e.g. EHEDG, confirm that these agitators can be qualified for such applications.

Wide product range:

We offer a variety of types of bottom-mounted and top-mounted magnetic agitators. Bottom-mounted magnetic agitators are state of the art for low-viscosity liquids in pharmaceutical and biotechnology production. The compact design, low maintenance and high reliability guarantee trouble-free production. Using a bottom-mounted agitator also frees up space on the tank lid for sensors, valves and sight glasses.

Agitators for special applications:

As well as our standard range of agitators, we also make customized versions to order. Features including the dimensions of the impeller, rotational speed or the type of impeller can be modified to perform customer-specific mixing tasks. With monitoring of the liquid level and rotational speed, and using a type-approved motor, the agitators can be used for vessels in ATEX zones 0 or 1 according to the directive 2014/34/EU.

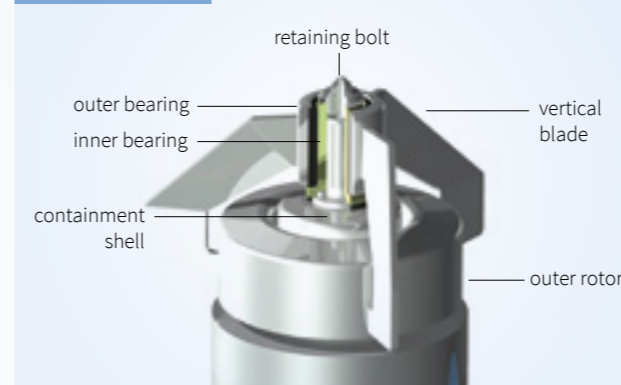


Option: drive unit in stainless steel

ZETA MAGNETIC IMPELLERS

The standard impeller type, suitable for many applications.

BMRT rotor design



BMRT: open design & optimal flow through rotor

Open design with excellent cleaning: hub and magnetic rotor are connected only by the impeller blades.

The ceramic bearings are oversized (in diameter and height), product-lubricated and consist of outer (silicon carbide) and inner (zirconium oxide) bearing. This results in exceptional stability, good emergency running properties and particle generation below detectable levels.

Ease of maintenance – ceramic bearing parts can be replaced by users on site; no spare rotor needed.

A very large gap between the rotor and the containment shell maximizes flow through the gap and minimizes shear stress (see picture Open design – flow through the bearing gap)

CFD-engineered mixing: fluid is drawn from above and pumped radially. Perfect for mixing solid powders into liquids; rapid breakdown of temperature and concentration gradients, ensures good heating and cooling.

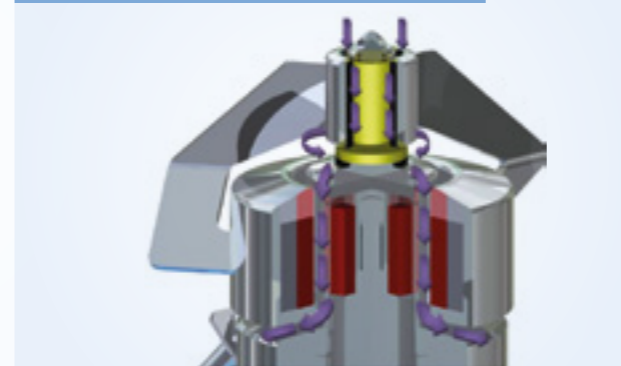
BMRT magnetic impellers:

New and stronger magnetic materials enable us to reach a higher transferable torque for the same geometry of the drive and rotor. ZETA offers a wide range of drive sizes with operating torques from 30 Ncm to 300 Nm to suit every specific application.

BMRT magnetic impellers ensure that the optimal formulation of the product is achieved throughout the whole volume. When the product is being transferred out of the vessel, the homogeneity of the mixed product is maintained reliably down to the last drop.

The open design enables easy cleaning (CIP) and sterilization (SIP). ZETA experts will help you select the best impeller variant for your process, the best drive unit and the most suitable installation option (welded or Plug In containment shell).

Open design – flow through the bearing gap



Impeller and installation options



DESIGN FEATURES & FUNCTIONS OF BOTTOM-MOUNTED MAGNETIC AGITATORS

Reliable and easy to maintain

One example of a rotating SiC bearing

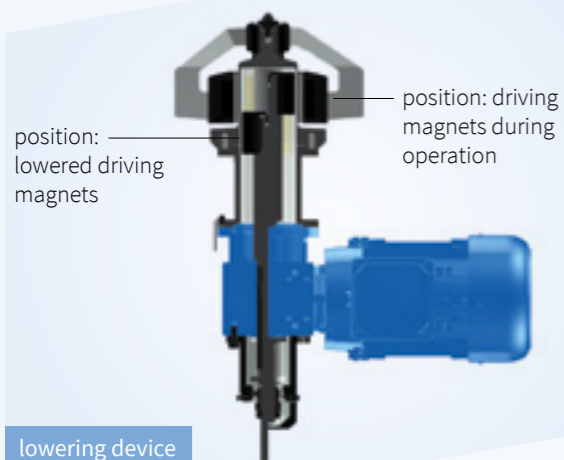


Bearings

- Zirconium oxide inner bearing: less risk of breakage, resistant to damage by sudden settling of the rotor
- Silicon carbide outer bearing: with channels in the face side (see picture) for better lubrication of the bottom contact surface and enhanced cleaning (CIP)
- Run-dry capability with the rotor type BMRT: Magnetic lifting of the impeller reduces the load on the bearing surface so that the agitator can be kept running while the vessel is emptied (mixing down to the last drop).

Lowering Device:

Agitators of the size 2.500 (25 Nm) and upwards are supplied with a special lowering mechanism that withdraws the drive magnet out of the containment shell.



lowering device

Benefits of the retractable drive magnet:

Controlled removal and safe insertion of the impeller due to withdrawal of the drive magnet. The drive unit remains in position while the magnetic drive rotor is lowered out of the containment shell. Avoids damage to the ceramic bearings. Improved safety: The device protects against the crushing hazard involved in placing the agitator head on the bearing, and thus meets the demand of the EC Machinery Directive for designed protection against injury.

Removable containment shell (Plug In):

As an alternative to a version with a flange for welding into the vessel, the agitator can be supplied with a removable containment shell. This can facilitate maintenance. This practical Plug In solution is becoming more popular and makes it easier to switch from shaft-driven agitators with mechanical seals to magnetic agitators.

Electropolishing of stainless steel surfaces

ZETA has an electropolishing unit in-house so that we can meet the growing demand for the highest possible surface quality.



Plug In and weld-in containment shells

Large catalogue of agitator models and alternative technical solutions

Extra large Plug In flange

The Plug In flange is also available with a large-diameter flange which allows the whole agitator head to be extracted from the vessel through the bottom opening.

Impeller speed monitoring:

Sometimes a problem inside the tank or an operating error can lead to forces on the agitator head that exceed the maximum transmissible torque, so that the magnetic coupling decouples. In this situation the agitator head stops turning although the drive is still running. To control this issue, we offer an optional contact-free rpm sensor for the agitator head.

For safety reasons, the speed sensor is included as standard in agitators for use in ATEX Zone 0 (directive 2014/34/EU).

Attachment of the drive shell by TriClamp:

Attaching the drive with a TriClamp fitting enables it to be removed quickly without tools, for example when using the agitator with an autoclavable tank. As another alternative, bayonet fittings are also possible.

Extractor tool:

An optional tool for the removable containment shell (Plug In). The tool enables the containment shell to be removed from the tank easily and gently.



BMR with large Plug In flange



Impeller rpm monitoring



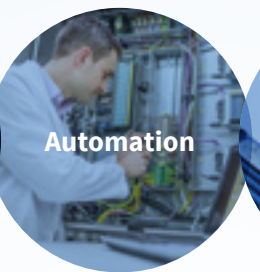
TriClamp Attachment



Extractor Tool

INNOVATIVE SOLUTIONS FOR OUR CUSTOMERS

EVOLUTION OF TECHNOLOGY



ZETA Business Activities

Bioreactors & Fermentation Systems
Downstream Systems
Preparation Systems
CIP/SIP Systems
Magnetic Agitators
Freeze & Thaw Systems
Engineering
Automation

Customer Benefits

Deep process understanding
GMP FDA Compliance
Super-Skid Design
Focus on Sterility
High Process Reliability
Scale-up capabilities
Experience in complex biologics
Customized Process Systems

ZETA Biopharma

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