

# Autoclave Engineers MagneDrives®



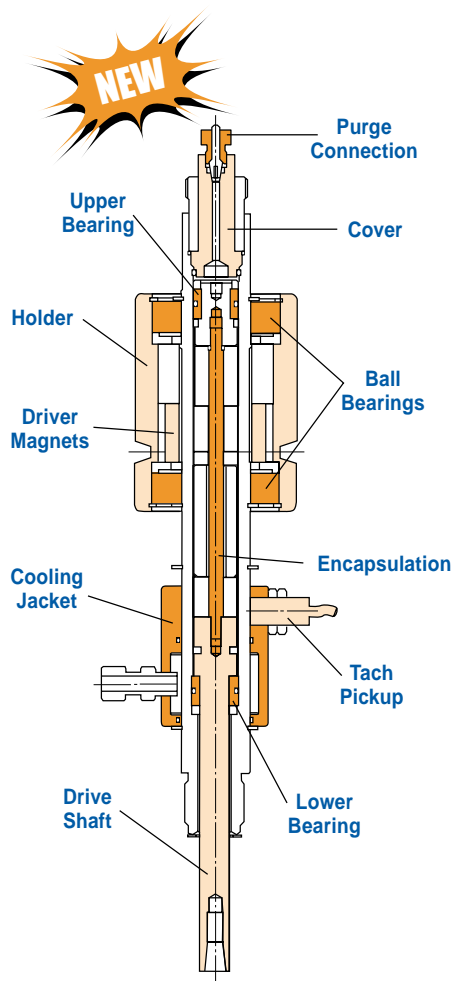
**Autoclave  
Engineers**  
Division of Snap-tite, Inc.



Agitation



## MagneDrives® for containment-free packless agitation



### MAG075 SERIES

◆ Autoclave Engineers MagneDrive® is a magnetically coupled, packless rotary impeller system designed to provide continuous high speed mixing without leakage or contamination. Utilizing the rare earth magnetic technology which Autoclave Engineers developed and was the first to market in 1958, the packless MagneDrive® eliminates the process contamination, lubrication, packing friction, shaft cooling and maintenance problems common with other forms of mixing.

◆ MagneDrive® is a completely sealed, closed system with metal-to-metal or O-ring seals. The incorporation of a leak-free mixing system enables researchers to process hazardous/toxic fluids without fear of fugitive emissions. Autoclave Engineers has continually improved the magnetics of the MagneDrive® to provide increased horsepower and torque in a smaller package. These improvements have extended the capacities, speeds and viscosity handling capabilities for the MagneDrive®, allowing more applications to utilize this

environmentally safe mixing system.

◆ MagneDrives® are available with the Dispersimax Gas Dispersion Impeller System (and others) which utilizes a hollow shaft to draw gases into the impeller and propel them into the liquid for maximum gas dispersion. MagneDrives® are available in three (3) magnet diameters and several models which can be retrofitted for existing vessels or customer supplied vessels. For high temperature applications, air and water cooling are available. Autoclave Engineers will custom design a MagneDrive® for individual mixing requirements.

#### Applications

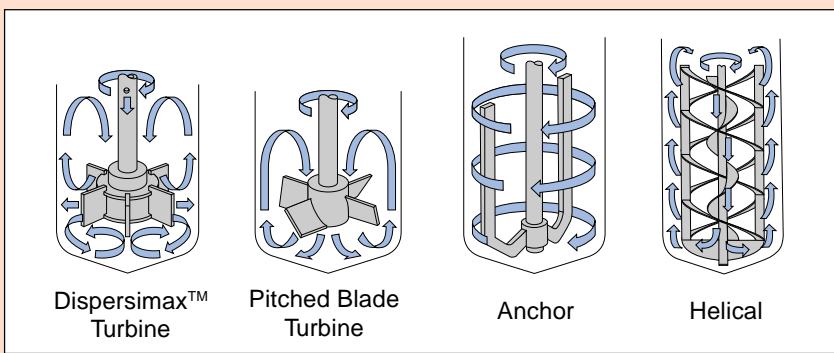
- ◆ High speed mixing
- ◆ Low to moderate torque
- ◆ High pressure service
- ◆ Lethal service
- ◆ Contaminant sensitive process
- ◆ Gas Dispersion
- ◆ Hydrogenation
- ◆ Blending
- ◆ Suspension of particles

\* Consult factory for other applications

Autoclave Engineers NEW MAG075 Series MagneDrive® with enhanced design provides improved bearing life and the ability to increase the MagneDrive® torque capacity with the substitution of a high torque stator module. This module allows the user to easily convert between 7 in-lbs (.8Nm) and 16 in-lbs (1.8Nm) static mixing torque. The MAG075 utilizes a solid state magnetically sensitive pickup for general purpose or explosion proof (requires Intrinsic Safety Barriers) applications. For more information, refer to bulletin "MAG075 Series MagneDrive®" or consult factory.

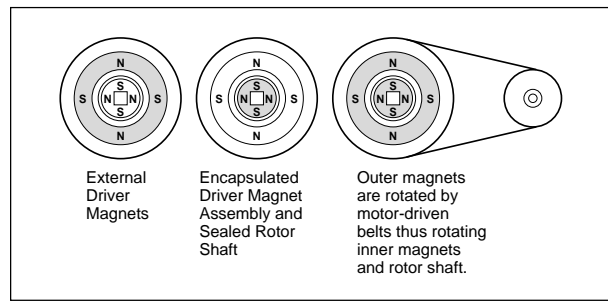
### Agitators

Autoclave Engineers offers a broad variety of agitator impeller systems which can be used in processes involving gas dispersion, liquid blending and motion, and solids suspension from low to very high viscosities with variable mixing intensity requirements. Illustrated are only four of the many standard agitators offered. For additional types, write or call for our Autoclave Agitator/Mixer Bulletin.



# The MagneDrive® Principle

◆ MagneDrive® agitators use rare earth magnets, permitting packless mixing at higher speeds in larger vessels and with higher viscosity fluids. Outer drive magnets, rotated by a motor-driven belt, exert powerful attraction on the encapsulated inner magnet assembly. As the outer drive magnets are rotated, the inner magnets are actuated, resulting in rotation of the agitator shaft.



## MagneDrive® Specifications

SERIES	Shaft Coupling	Shaft Diameter inches (mm)	Pressure PSI (Bar)	Max Speed RPM <sup>1</sup>	Avg. Static Torque inch-lbs (N-m)	HP@Max Speed RPM <sup>2,3</sup>
MAG07501	Tapered Thread	1/2 (12.7)	6000 (414)	3300	7 (0.8)	0.36 @ 3300
MAG07502	Tapered Thread	1/2 (12.7)	6000 (414)	3300	16 (1.8)	0.86 @ 3300
1.5001AS*_A&C	Pinned	3/8 (9.53)	6000 (414)	2500	27 (3.0)	1.07 @ 2500
1.5001AS*_CBD	Pinned	5/8 (15.88)	6000 (414)	2500	27 (3.0)	1.07 @ 2500
1.5001SS*	Pinned	5/8 (15.88)	4400 (304)	2500	27 (3.0)	1.07 @ 2500
1.5002AS*	Threaded	3/4 (19.05)	6600 (455)	2000	60 (6.6)	1.90 @ 2000
1.5002SR*	Threaded	3/4 (19.05)	3300 (229)	2000	60 (6.6)	1.90 @ 2000
1.5004	In-Tank Coupling	7/8 (22.22)	3000 (207)	3250	120 (14)	6.19 @ 3250
1.5006	In-Tank Coupling	7/8 (22.22)	3000 (207)	3000	180 (20)	8.57 @ 3000
1.5008	In-Tank Coupling	7/8 (22.22)	3000 (207)	3000	240 (27)	11.42 @ 3000
1.5010	In-Tank Coupling	7/8 (22.22)	3000 (207)	2750	300 (34)	13.09 @ 2750
2.7504	In-Tank Coupling	1-1/2 (38.1)	3000 (207)	1700	284 (32)	7.66 @ 1700
2.7506	In-Tank Coupling	1-1/2 (38.1)	3000 (207)	1500	426 (47)	10.14 @ 1500
2.7508	In-Tank Coupling	1-1/2 (38.1)	3000 (207)	1400	568 (63)	12.62 @ 1400
2.7510	In-Tank Coupling	1-1/2 (38.1)	3000 (207)	1300	710 (80)	14.64 @ 1300

\* NOTE: SS = 316SS, AS = A286, and SR = 304SS

◆ **Material of Construction:** 316, 304, or A-286 Stainless Steel. Optional materials include Hastelloy C-276, Hastelloy B-2, and Titanium. Please consult factory for additional materials.

◆ **Bearing Material:** Standard bearing material is Purebon® 658RCH<sup>4</sup>. Please consult factory for other bearing requirements.

◆ **Minimum Metal Design Temperature:** 40°F (4°C)

◆ **Maximum Temperature @ Connection:** 650°F (343°C)

◆ **Maximum Temperature @ Magnet Zone:** 300°F (149°C)<sup>5</sup>

◆ **Cover Connection:** Threaded, collar and gland, or flanged. Refer to individual bulletins for specific MagneDrives®.

◆ **Purge Connection:** MagneDrives® are provided with gas purge connection.

◆ **Shaft and Impeller:** MagneDrives® are supplied without shafts or impellers, allowing for the customization of the shaft length and impeller style. Autoclave Engineers offers a wide selection of impellers in a variety of materials, including the Dispersimax™ Gas Dispersion System. Please consult factory for more information.

<sup>1</sup> Maximum speeds may be limited by mixing requirements and shaft vibration, including critical speed.

<sup>2</sup> Motor horsepower should be sized at least 25% higher than the intended application requirement.

<sup>3</sup> To determine horsepower at a certain speed, use the formula:

$$hp = \frac{T \times n}{63,025} \quad \text{where: } T = \text{torque in inch-lbs} \\ n = \text{speed in rpm}$$

<sup>4</sup> Purebon® is a registered Trademark of Pure Carbon Company, Inc.

<sup>5</sup> The magnets are stabilized at 300°F (149°C). When the temperature of the magnets exceeds the stabilizing temperature for an extended period, loss of magnetic torque will occur. Some of this loss is reversible and torque will regenerate; however, the problem is avoided by using adequate cooling to limit the magnet temperature to 300°F (149°C). A cooling jacket with two NPT connections is provided for water cooling, if necessary. Additional information on cooling requirements can be obtained in the Operation and Maintenance Manual.

**MagneDrive®**  
**Application Data Sheet**

**Agitation**



To allow us to select a MagneDrive® that best fits your application, please provide as much of the following information as possible. The information that must be supplied is marked with an asterisk(\*). This information can also be submitted electronically through our website. *PLEASE INCLUDE UNITS WHERE APPLICABLE.*

Name\*: \_\_\_\_\_ Phone\*: \_\_\_\_\_  
 Company Name\*: \_\_\_\_\_ Fax\*: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Country or Province: \_\_\_\_\_

Please check the items you require a quote on\*:  MagneDrive®  Shaft  Impeller  Motor

APPLICATION: \_\_\_\_\_  
 \_\_\_\_\_

MODEL (if known): \_\_\_\_\_

DESIGN PRESSURE: \_\_\_\_\_ DESIGN TEMPERATURE: \_\_\_\_\_ MAX \_\_\_\_\_ MIN\* \_\_\_\_\_

MAX. WORKING PRESSURE\*: \_\_\_\_\_ MAX. WORKING TEMPERATURE\*: \_\_\_\_\_

MATERIAL OF CONSTRUCTION\*: \_\_\_\_\_

**(Note - On some non-Stainless Steel MagneDrives®, material of construction of some components such as retaining rings and screws may not be available in the requested material. See bulletins for list of standard materials.)**

BEARING MATERIAL:  Standard  Other: \_\_\_\_\_

O-RING SEAL MATERIAL:  Standard  Other: \_\_\_\_\_

IN-TANK COUPLING:  Yes  No  SHAFT DIAMETER \_\_\_\_\_

MOTOR TO DRIVE CONNECTION\*:  In-line  Belt-driven (In-line is not available on all MagneDrives®)

**MIXING REQUIREMENTS**

MAXIMUM SPECIFIC GRAVITY\*: \_\_\_\_\_ MAXIMUM VISCOSITY\*: \_\_\_\_\_

ARE SOLIDS PRESENT?  No  Yes SIZE: \_\_\_\_\_ % SOLIDS: \_\_\_\_\_

REACTOR INSIDE DIAMETER\*: \_\_\_\_\_ REACTOR INSIDE LENGTH: \_\_\_\_\_

SHAFT LENGTH FROM TOP OF COVER\*: \_\_\_\_\_ LIQUID HEIGHT ABOVE IMPELLER: \_\_\_\_\_  
 (required for dispersion)\*

**IMPELLER\*:**

<input type="checkbox"/> Dispersimax™ (gas dispersion)	Diameter: _____	Qty: _____	<input type="checkbox"/> Adjustable	<input type="checkbox"/> Fixed
<input type="checkbox"/> Straight 4-blade turbine	Diameter: _____	Qty: _____	<input type="checkbox"/> Adjustable	<input type="checkbox"/> Fixed
<input type="checkbox"/> 45 deg pitched 4-blade (up)	Diameter: _____	Qty: _____	<input type="checkbox"/> Adjustable	<input type="checkbox"/> Fixed
<input type="checkbox"/> 45 deg pitched 4-blade (down)	Diameter: _____	Qty: _____	<input type="checkbox"/> Adjustable	<input type="checkbox"/> Fixed
<input type="checkbox"/> Marine Impeller (Propeller)	Diameter: _____	Qty: _____	<input type="checkbox"/> Adjustable	<input type="checkbox"/> Fixed
<input type="checkbox"/> Helix	Diameter: _____ Number of outer flights: _____		Number of inner flights: _____	
<input type="checkbox"/> Anchor	Diameter: _____			
<input type="checkbox"/> Other:	_____			

SPACING OF IMPELLERS ON SHAFT\*: \_\_\_\_\_  
 MAXIMUM REQUIRED SPEED (RPM)\*: \_\_\_\_\_ MINIMUM REQUIRED SPEED (RPM): \_\_\_\_\_  
 NORMAL OPERATING SPEED (RPM): \_\_\_\_\_ LIQUID LEVEL ABOVE BOTTOM IMPELLER: \_\_\_\_\_  
 IS DISPERSION REQUIRED?  Yes  No ARE MIXING BAFFLES PRESENT:  Yes  No  
 IS A FOOT BEARING AVAILABLE OR ACCEPTABLE:  Yes  No

**DRIVE MOTOR REQUIREMENTS**

DC motor  AC motor

ELECTRIC MOTOR VOLTAGE REQUIREMENTS: \_\_\_\_\_

General Purpose

Explosion-Proof

ELECTRICAL CLASSIFICATION: CLASS \_\_\_\_\_ DIV \_\_\_\_\_ GROUP(S) \_\_\_\_\_

OTHER \_\_\_\_\_

Air motor

AIR SUPPLY PRESSURE AND FLOW RATE AVAILABLE: \_\_\_\_\_

MOTOR MOUNTING REQUIRED (Foot mount, Face mount, etc.): \_\_\_\_\_

MOTOR / MAGNEDRIVE® CENTER TO CENTER DISTANCE: \_\_\_\_\_

MISCELLANEOUS REQUIREMENTS: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Please provide any additional information on a separate sheet.

**! WARNING !**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE.

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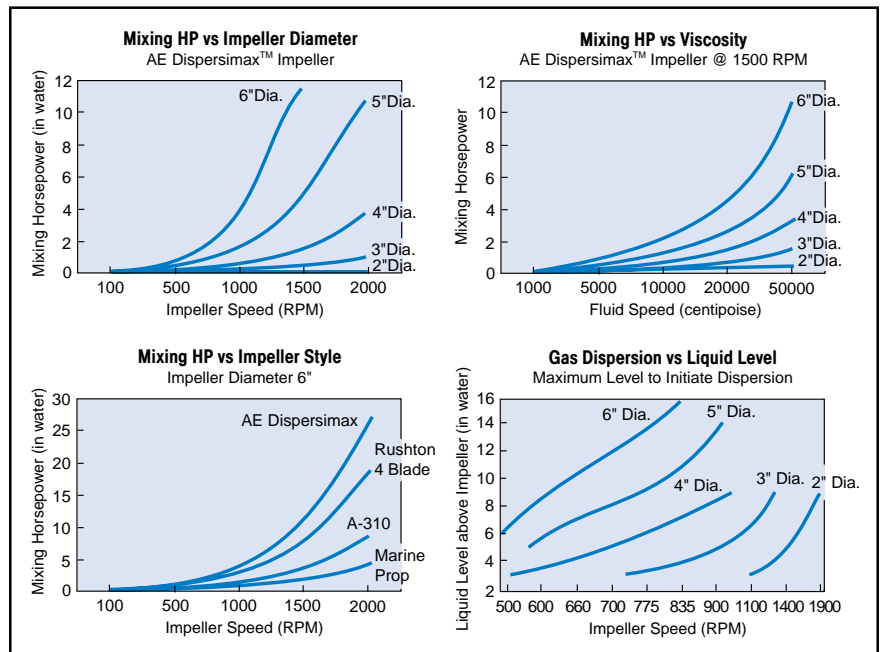
2930 West 22nd Street  
 Erie, Pennsylvania 16506-2302 USA  
 PH: 814-838-5700 Fax: 814-838-5855  
 email: [aeclave\\_sales@snap-tite.com](mailto:aeclave_sales@snap-tite.com)  
 www.autoclaveengineers.com

**ISO-9001**  
**Certified**

# Test Reports

Autoclave Engineers will provide computer analysis of many of the variables which impact your mixing system. These computer projections enable us to properly size and engineer an agitation system to meet your specific requirements.

Shown at right are typical graphs illustrating the relationship between several critical parameters. These graphs are approximate and represent a sample of our capabilities. For a detailed evaluation of your mixing application, call your Autoclave Engineers representative.



# Supporting Information

MAG075 Series .....	Bulletin AGT-MAG075
1.5001 Series.....	Bulletin AGT-1.5001MD
1.5002 Series.....	Bulletin AGT-1.5002MD
1.5004 - 1.5010 Series .....	Bulletin AGT-1.50MD
2.7504-2.7510 Series .....	Bulletin AGT-2.75MD
Autoclave Agitator/Mixer .....	Bulletin 1201
MagneDrive® Application Data Sheet .....	Bulletin AGT-ADSMD



Division of Snap-tite, Inc.

2930 West 22nd Street  
 Erie, Pennsylvania 16506-2302 USA  
 PH: 814-838-5700 Fax: 814-838-5855  
 email: aeclave\_sales@snap-tite.com  
 www.autoclaveengineers.com



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