www.INNOMAG.com

TB-mag Pump Series Sales Guide

Thrust Balanced, Sealless, Mag-drive pumps

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

TB-mag Specifications

Thrust Balanced
- ✓ Thrust-balanced, Sealless, non-metallic magnetic drive pump
- ✓ A revolutionary, patented, thrust balancing system eliminates the axial thrust created by the internal pump pressures.
- ✓ The balancing system is responsive, automatic and stable with any change in the fluid conditions such as flow, pressure or viscosity.
- ✓ Operate with less power by eliminating axial thrust loads. Less friction, less power….
- ✓ Expanded operating range, engineered to perform continuously over the entire flow range.
- ✓ Increased pump life and reliability with no forward thrust.

Double Welded Impeller
- ✓ The inner magnets are protected by a patented hermetically sealed cover.
- ✓ For an extreme corrosion and permeation resistant barrier the magnet assembly is again hermetically sealed with a corrosion resistant fluoropolymer ETFE or PFA creating a double weld design.

Wear Rings
- ✓ The Patented wear ring system prevents impeller from rubbing containment shell in the event of a primary bearing upset.
- ✓ Wear rings control leakage rates maintaining higher efficiencies.
- ✓ Wear Rings restrict solids > 0.005” from entering the containment shell area, keeping all bearings and critical flow paths clear.
- ✓ Concentrations to 30%, particulate sizes to ¼”

Open Suction
- ✓ A cantilever shaft supported in the containment shell eliminates the need for a shaft support in the pump’s suction.
- ✓ No suction blockage, Lower NPSHr.

Pressurized Radial Bearing
- ✓ Isolated from the suction pressure by a patented thrust balanced system, the radial bearings operate in a pressurized fluid environment.
- ✓ Pressure in the bearing area is approximately 1/3 of TDH which virtually eliminates the possibility of flashing.

Water Hammer Resistant
- ✓ Burst pressures at 3000 psi give the TB-mag pump a 10 x safety factor and resistance to sudden system surges.

Modified Concentric Volute
- ✓ All Innomag casings are designed to minimize radial loads and distribute pressure evenly across the entire flow range.
- ✓ Lowers stress on bearings and wear rings maximum pump life.

“True-Seal” Secondary Containment
- ✓ A patented design combines a simple, yet proven, “off-the-shelf” dry run cartridge seal with our long couple bearing frame. Together, these products provide your service with true metallic secondary containment.

Expanded Operating Range
- ✓ Engineered to perform continuously over the entire flow range.
- ✓ Operate at speeds 500 to 3500 rpm.

Universal Mounting
- ✓ Connect a NEMA or IEC Frame Motor, Close or Long Coupled.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Sealless

- ✓ Non-slip, synchronous mag-drive pump.
- ✓ Leak free operation for a clean environment.
- ✓ Process lubricated, no external flush system needed.

Trouble-free Maintenance

- ✓ A back pull out design for quick in the field inspections or maintenance without disturbing the piping connections.
- ✓ Liquid end and drive end independently serviceable.
- ✓ Complete kits are available for impellers, containment shells and casings. No assembly.
- ✓ 100% replaceable wear parts including all rotating and stationary wear rings.

Chemically Inert

- ✓ All pump internals are molded with thick layer of mechanically tough, chemically inert ETFE or optional PFA fluoropolymer.
- ✓ Thickness from 0.125” to .375” (2.5 to 12.7mm)

Armored Design

- ✓ Ductile iron, the suit of armor protecting the pump from pipe strain, vibration, exterior shocks and handling.

External Protection

- ✓ All external parts are 100% coated for maximum protection.
- ✓ All mating and exposed metal surfaces are coated in a premium Epoxy/Epoxy Polyamide Primer and topped with a aliphatic acrylic polyurethane.

Standard Dimension Process Pumps

- ✓ Conforms to the requirements of ANSI B73.1
- ✓ Class 150 or 300 lb flanges, ISO PN 16 or JIS 10kg/cm^2 drilled flanges are optional
- ✓ Also available, International conformance to ISO 2858 pumps

Performance

- ✓ Temperature range of -20^{o}F (-29^{o}C) to 250^{o}F (121^{o}C)
- ✓ Capacities up to 1500 gpm (340 m^3/hr)
- ✓ Heads up to 500 ft (152 m)
- ✓ Pressures up to 300 psi (2068 kPa)
- ✓ Power ranges are 1 to 100 hp (0.75 to 45 kW)

Quality Assurance

- ✓ All parts are manufactured to the highest possible standard of quality and workmanship.
- ✓ All completed pumps and wet ends must pass a 25 point quality inspection including, a running performance/endurance and pressure test prior to shipping.
- ✓ All critical components manufactured in house in our US Factory.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

TB-mag Part Features

Casing
- ✓ One piece cast ductile iron.
- ✓ Bonded ETFE or PFA lining, minimum of 1/8” (3mm) thickness.
- ✓ Self venting, top centerline discharge design.
- ✓ Casing houses front stationary silicon carbide (SiC) wear ring and thrust bumper.
- ✓ ASME/ANSI B73.1 dimensions for flange position and foot print.
- ✓ Flanges: ASME/ANSI B16.5 class 150 hole pattern standard, class 300, ISO or JIS optional.
- ✓ Two bolt flanged drain with pure PTFE gasket and 316SS blind flange, standard.

Impeller Assembly
- ✓ Molded one-piece enclosed impeller made of carbon fiber-reinforced ETFE or PFA.
- ✓ High strength neodymium iron boron magnet assembly. Maximum size magnets in every impeller.
- ✓ One impeller per pump size.
- ✓ Double weld magnet assembly hermetically sealed from environment.
- ✓ High efficiency, low NPSHr impeller geometry.
- ✓ Fully open impeller eye; no shaft socket or support struts.
- ✓ Replaceable front and back rotating SiC wear rings.
- ✓ Impeller houses radial bearings and thrust control valve.

Radial Bearings
- ✓ Tandem bearing system made of pure sintered silicon carbide (SiC)
- ✓ Separately mounted for optimum alignment with shaft.
- ✓ Bearings separated by pure PTFE spacer.

Pump Shaft
- ✓ Replaceable, straight SiC shaft.
- ✓ Cantilevered design leaves impeller eye open for optimum NPSHr.
- ✓ Shaft oversized to handle any combinations of radial loads.

Gasket
- ✓ FEP/FKM (Fluorocarbon) o-ring standard. Provides universal chemical resistance.
- ✓ Other o-ring materials available on request.

Containment Shell
- ✓ One-piece molding of carbon fiber-reinforced ETFE or PFA.
- ✓ Outer pressure housing molded from a Aramid/Vinyl ester composite.
- ✓ Provides optimum combination of pressure and shock resistance.
- ✓ Reinforced shaft socket to handle any combination of radial loads.
- ✓ Zero eddy current losses for no heat operation and maximum possible efficiency.
- ✓ Front face houses stationary SiC wear ring.
- ✓ Internal ribs limit swirl to promote fast ejection of fine particles from containment shell.

Containment Ring
- ✓ One-piece ductile iron casting.
- ✓ Aligns and supports the containment shell.
- ✓ Jackscrew holes provided for easy disassembly.

Outer Magnet Assembly
- ✓ Ductile iron shell with high strength neodymium iron boron magnets.
- ✓ One drive size per motor frame. Minimum possible inventory.
- ✓ Keyless hub for fast assembly.
- ✓ Jackscrew holes provided for easy removal from motor shaft.

Adapter
- ✓ One-piece ductile iron casting.
- ✓ Mounts to a wide range of standard NEMA and IEC C-face motors.
- ✓ Zero alignment required, just bolt it up.
- ✓ Back foot positioned for mounting directly to existing ANSI pump bases.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Thrust Balancing

The TB-mag pumps create three distinct pressure regions around the impeller. These regions are the **suction pressure** in the impeller eye, the **discharge pressure** in the volute and the **balance pressure** behind the impeller (Figure 1). In operation, the balance pressure is approximately one quarter to one third of the discharge pressure. The discharge pressure is created by the routine pumping action of the impeller while the balance pressure is controlled by the combined action of a fixed orifice and a variable orifice. The fixed orifice is created by a set of clearance rings behind the impeller. These rings limit the leakage flow behind the impeller to a relatively constant rate. The leakage then flows around the magnets, past the bushing to the thrust control valve. This thrust control valve combined with the front of the shaft defines the variable orifice. Because the impeller is free to slide axially the variable orifice changes size. As conditions of service change for the pump the impeller will automatically compensate for the pressure change and remain thrust balanced. If the impeller moves forward, the valve is opened to a greater degree and the balance chamber pressure is reduced. This causes the impeller to react with a net force towards the motor. If the impeller moves backward, the valve is now closing and the balance chamber pressure increasing. This moves the impeller towards the suction. The balancing system is responsive, automatic and stable with any change in the fluid conditions such as flow, pressure or viscosity. Compare axial thrust loads in **(Figure 2).**

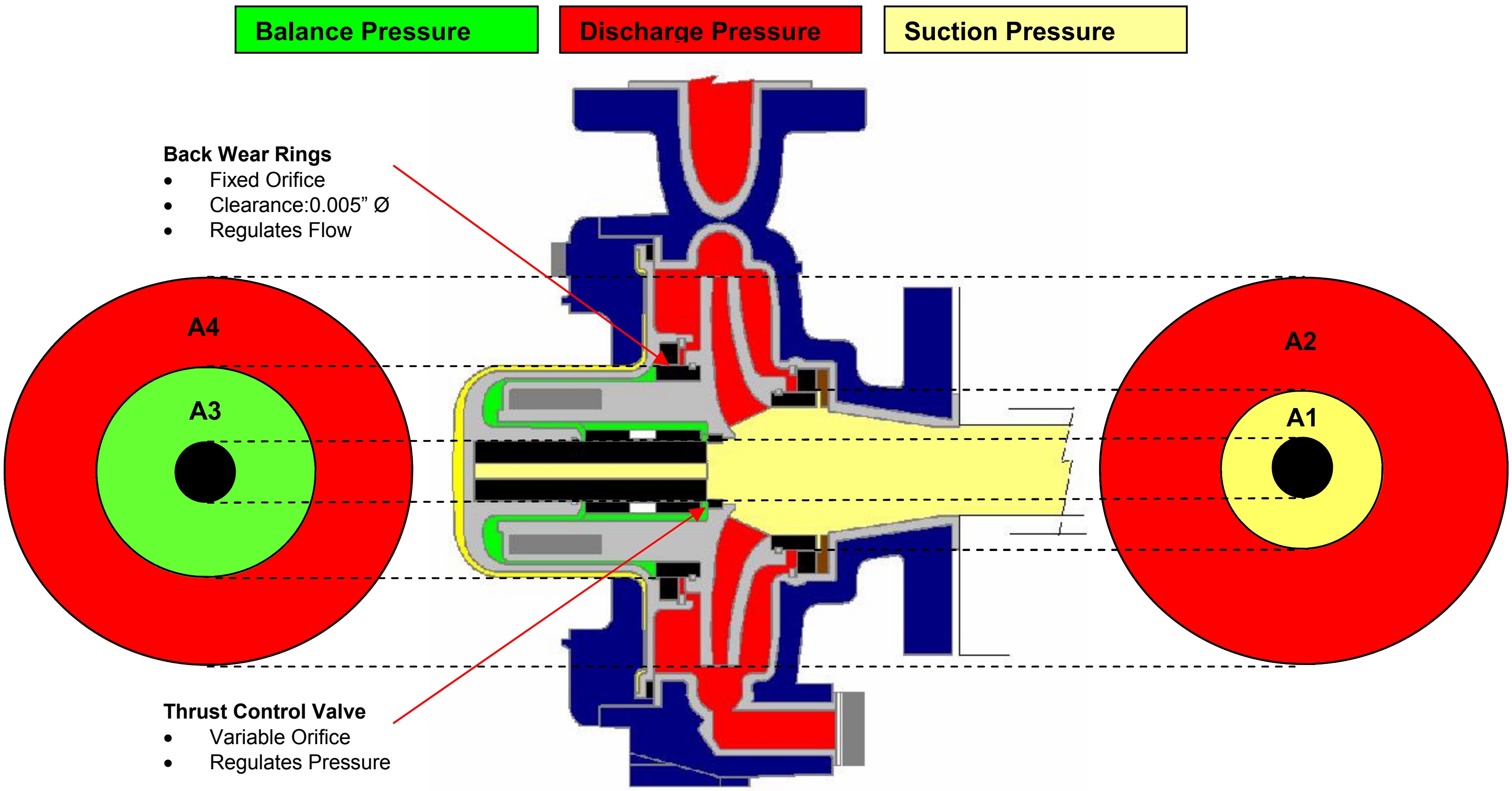


Figure 1 – Thrust Balancing Pressures & Projected Areas.

Thrust Balancing Benefits

- The balancing system is responsive, automatic and stable with any change in the fluid conditions such as flow, pressure or viscosity.
- Operate with less power by eliminating axial thrust loads. Less friction, less power….
- Expanded operating range, engineered to perform continuously over the entire flow range.
- Increased pump life and reliability with no forward thrust.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Thrust Balancing Engineering

To help clarify how our thrust balancing system works lets calculate the projected axial areas shown in Figure 1. The four areas, **A1, A2, A3** and **A4** represent the four main pressure areas affecting the forces on both the front and back of the impeller. The four areas are:

- **A1** - suction pressure area on front shroud of impeller (zero pressure)
- **A2** - discharge pressure area on front shroud of impeller (discharge pressure)
- **A3** - balance chamber pressure area on back shroud/magnet of impeller (between suction and discharge controlled by thrust balance system, approximately 1/3 to 1/4 of discharge pressure)
- **A4** - discharge pressure on back shroud of impeller. (discharge pressure) The unmarked areas at the very center represent the pump shaft which is not attached to the impeller and therefore doesn't affect the thrust forces.

The forces acting on each of these areas is the product of the area times the pressure and the sum of the forces on the front must equal the sum of forces on the back. This can be written as:

P1*A1+P2*A2 = P3*A3+P4*A4

Where **P1** is the suction pressure, **P2** is discharge, **P3** is the balance chamber pressure and **P4** is also discharge pressure.

Now, **P2 = P4** and **P1=0** then,

P3*A3=P4*(A2-A4) or

P3=P4*(A2-A4)/A3

In the TB-mag design, **A2>A4** so **P3** is a positive value and solely a function of the discharge pressure and the areas of the impeller wear rings.

The second important concept in the TB-mag system is how the pressure, **P3** acting on area **A3** is kept at exactly the value required to balance the system. This is accomplished by allowing the impeller to float freely in the axial direction. If the forces on the back of the impeller are greater than those on the front then the impeller is displaced forward (towards the suction). This causes the clearance between the valve and the end of the shaft to increase. This allows more fluid to exit from area **A3** and drops pressure **P3** until **P3** again balances the forces. Displacement of the impeller towards the back causes the valve-to-shaft clearance to decrease, increasing the **P3** until it balances the system. Pressures in areas **A1, A2** and **A4** are not affected by the impeller movement. In practice this is a very stable control system that requires pressure to operate. This system works effectively from the minimum thermal flow limit (typically a few gpm) to run-out provided the pump is generating pressure.

This simplified explanation of the axial forces doesn't include all secondary effects that can vary the pressures over the areas but does a reasonable job of describing the system. The TB-mag system is fully thrust balanced when operating to the left and right of BEP provided the pump is generating pressure and not operating in a cavitated state or very close to shut-off.

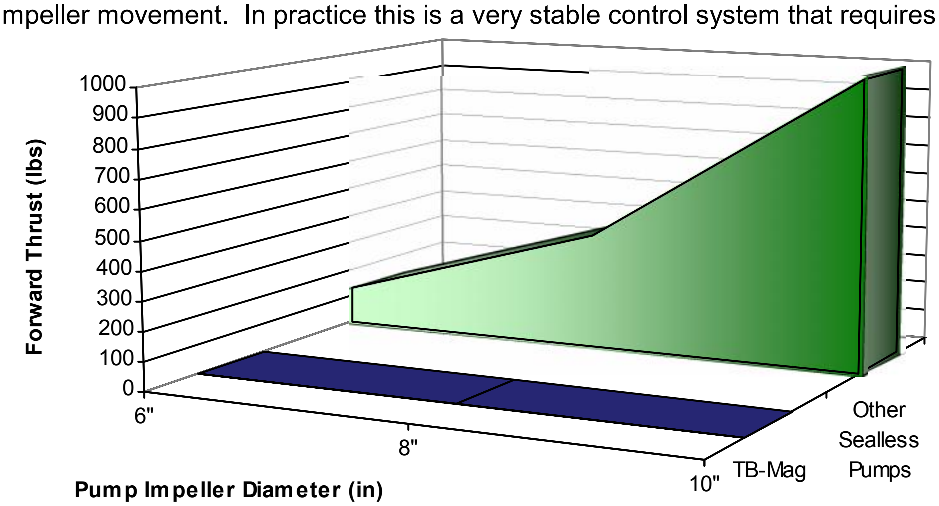


Figure 2 – Forward Thrust Comparison

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

TB-mag Solids Handling

Solids enter the pump through the suction and pass out through the discharge nozzle. Some of the solids will try to leak around the impeller past the wear rings. The leakage past the front wear rings simply returns the particles directly to the suction flow. However, leakage past the back wear rings could bring particles in contact with the inner magnets, the containment shell and the radial bearings. Fortunately, wear rings restrict solids > 0.005” from entering the containment shell area, keeping all bearings and critical flow paths clear. Figure 1, illustrates the main solids laden stream around the impeller and the clean stream behind the impeller. No other non metallic mag-drive keeps the solids from entering these critical areas behind the impeller.

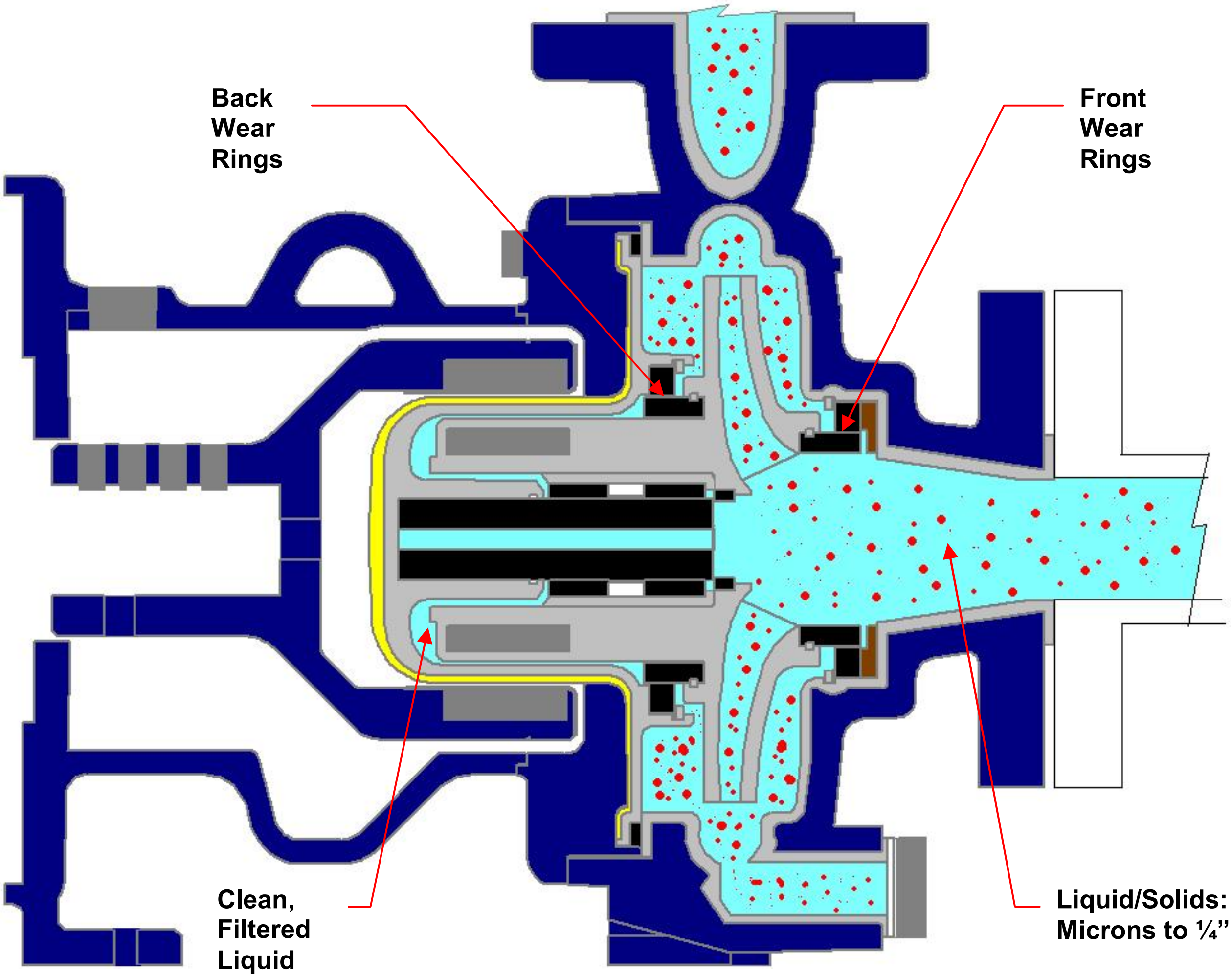


Figure 1 - Solids passing through the pump

Solids Handling Considerations

Maximum Pump Life	Minimum Pump Life
Low percentage of solids	High percentage of solids
Fine, smooth, spherical shaped particles	Sharp, irregular shaped, large particles
Softer particles or flakes	Hard particles, silica sand (Silicon Dioxide), etc.
Suspended, uniform solids	Fibrous, sticky or scale forming solids
Low or variable speed operation	High speed operation
Operate at or near BEP	Operation near shut off or end of curve
Continuous Duty	Intermittent duty, solids settle

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

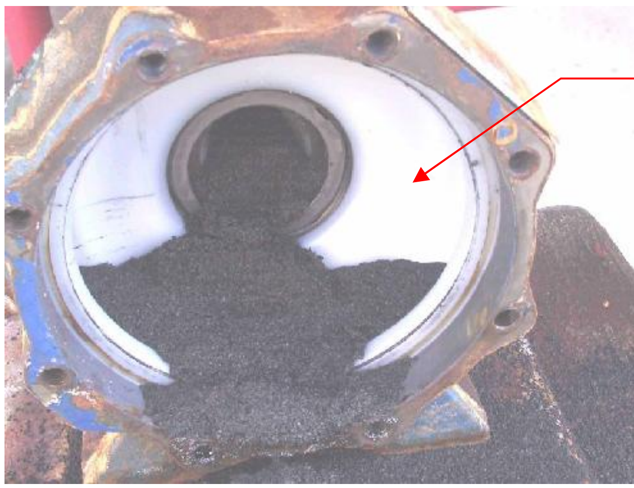
Case Study - Extreme Solids Handling

Application: Approx. 65% Carbon Slurry

Trial Pump: TB-mag A, 3x2x6, 10 hp motor, 3600 rpm

Current problem: Existing mechanical seal pump would have weekly seal failures.

Results: The TB-mag pump ran 9 months. The internal filtering system kept the bearings and inner magnet assembly clean and free from the carbon slurry. The slurry eroded the impeller vanes away separating the front shroud from the back shroud.



No wear on the casing lining.

Figure 2 – Carbon Slurry

Vanes eroded away separating the back and front shrouds.

No wear on the inner magnet assembly.

Figure 3 – Front of impeller, no vanes

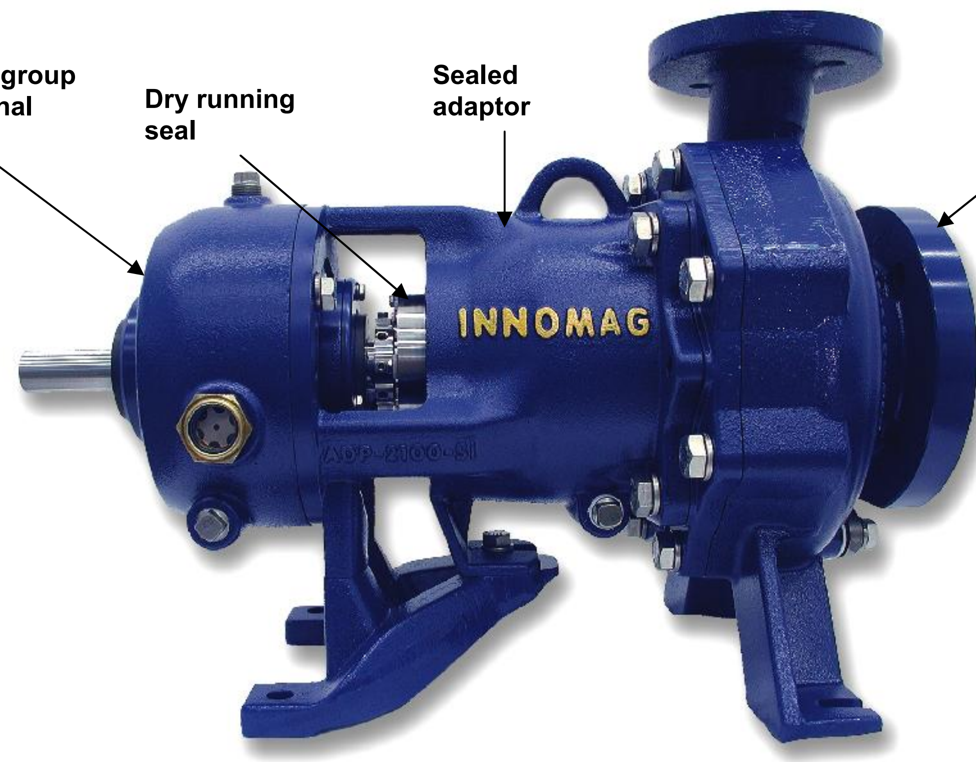
Figure 4 – No wear on magnet assembly

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Case Study – Lethal Service/Canned Motor Pump replacement

Application: Titanium Tetrachloride, TiCl4, S.G: 1.6-1.7, ambient temperature

Trial Pump: C1(3x2x8) with 300# flanges, no casing drain, 3500 rpm, 8.125" impeller



Current problem: The chemical being pumped ($TiCl_4$) is classified as a "lethal" service; therefore the customer required a pump with secondary containment in the event that the primary seal of the pump leaks. A canned motor pump was being used for this application but the service life of the pump ranged from one to four months at a cost of $10,000 – $25,000 to repair or replace. The particular canned motor pump being used was not field-serviceable so in addition to the cost, the customer also had to contend with lead time for the repairs. Over the history of each of the process lines, the customer was spending $100,000 per pump per year in repair costs.

Due to the hazardous nature of the product, the customers' procedure is to run the pump until it completely cavitates to deliver as much product as possible before the next process cycle. This is a very difficult application for any pump to handle, but a necessary procedure for the customer. The customer wanted a pump that would last for at least one year between rebuilds, and that could be repaired in their facility. The Innomag pump filled both these requirements and at a much lower initial cost than the canned motor pump; the complete Innomag pump, motor and base cost about $18,000 vs. $25,000 for the canned motor pump. Due to the longevity of the Innomag pumps, any repairs necessary are expected to cost a fraction of the canned motor repair costs.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

The Innomag units installed consist of a standard pump, and the long-couple bearing frame outfitted with a dry running mechanical seal. The seal is a John Crane ECS seal specifically designed to be a dry running, secondary containment seal; the unit does not require gas or liquid seal flush lines. Additionally the Innomag pump is much more tolerant of cavitation than a canned motor pump.

Pump testing prior to shipment:
All Innomag pumps are tested though their complete hydraulic range on our in-house test tank followed by an internal inspection and a hydrostatic pressure test at 450 psi. Due to the reactive nature of $TiCl_4$ with water, all wetted parts of the pump are dried overnight to ensure the pump is completely dry before leaving the Innomag plant. The flange connections are then sealed for shipment. A final leak down test of the secondary containment unit is performed per API standard 682, section 6.3.4 to ensure the chamber is sealed.

Results:
There are now four pumps in the $TiCl_4$ service at the first facility. As of August of 2004, the oldest two units had 5,000 and 6,000 running hours on them without incident. The customer has declared the project a great success and is saving more than $100,000 per year per pump in repair costs by simply switching to the Innomag pumps.

As of August 2006, two other end users pumping $TiCl_4$ have installed Innomag pumps with the secondary containment units. Both of these companies have found great success and savings in the Innomag product.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Patented Permeation Protection

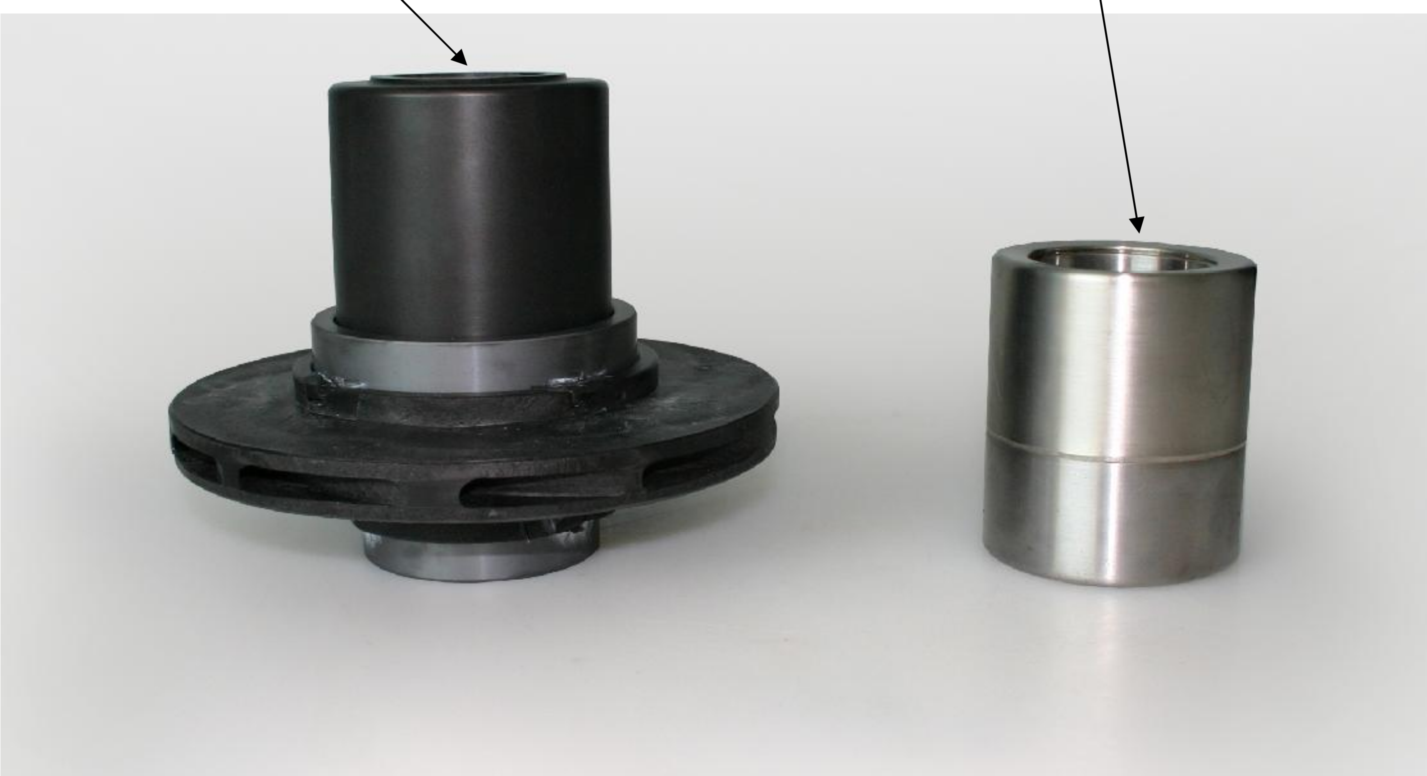
Effectively, all plastics are semi-permeable. This means that they allow small atoms, ions or molecules present in the pumped fluid to pass between their molecules like a very fine sieve. Many of these materials are very corrosive. This normally doesn't affect the plastic but can allow the corrosive products to attack the underlying materials. By far the most vulnerable parts of any pumps are the magnets. Our pumps are made using neodymium-iron-boron magnets which are the strongest available but not very corrosion resistant.

To combat permeation and give the longest life possible all Innomag pumps utilize a patented double welded magnet assembly. On the outside, the magnet assembly is hermetically sealed under the fluoropolymer plastic covering. Underneath the plastic, the magnets are hermetically sealed to the magnet carrier by welding on a 316L stainless cover. This second barrier stops permeate from reaching the magnets.

From the Umag on up, all Innomag models are manufactured using this technology.

TBmag-A, 1.5x1x6 impeller magnet showing sealed magnet assembly under fluoropolymer cover.

Same impeller looking at the stainless cover over the magnets.



Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

TB-mag Flowpath

All Innomag pumps are product lubricated; meaning the liquid being pumped is the same liquid that lubricates and cools the internal bearings and wear rings. It's critical for the pump to have and maintain adequate suction pressure

To help visualize the flow path/internal recirculation of the TB-mag pump view Figure 1. As liquid enters the pumps suction it quickly accelerates into the impeller eye then discharged radially into the volute. The pressurized liquid splits three ways.

1) The mainstream of the liquid will efficiently discharge out of the casing.
2) A small percentage of the liquid (approximately 2-3 gpm) flows around the impeller through the rear wear rings, around the magnet assembly then splitting over and under the journal bearings before releasing past the control valve to the impeller suction.
3) The rest of the liquid returns to the impeller suction through the front wear rings and thrust collar.

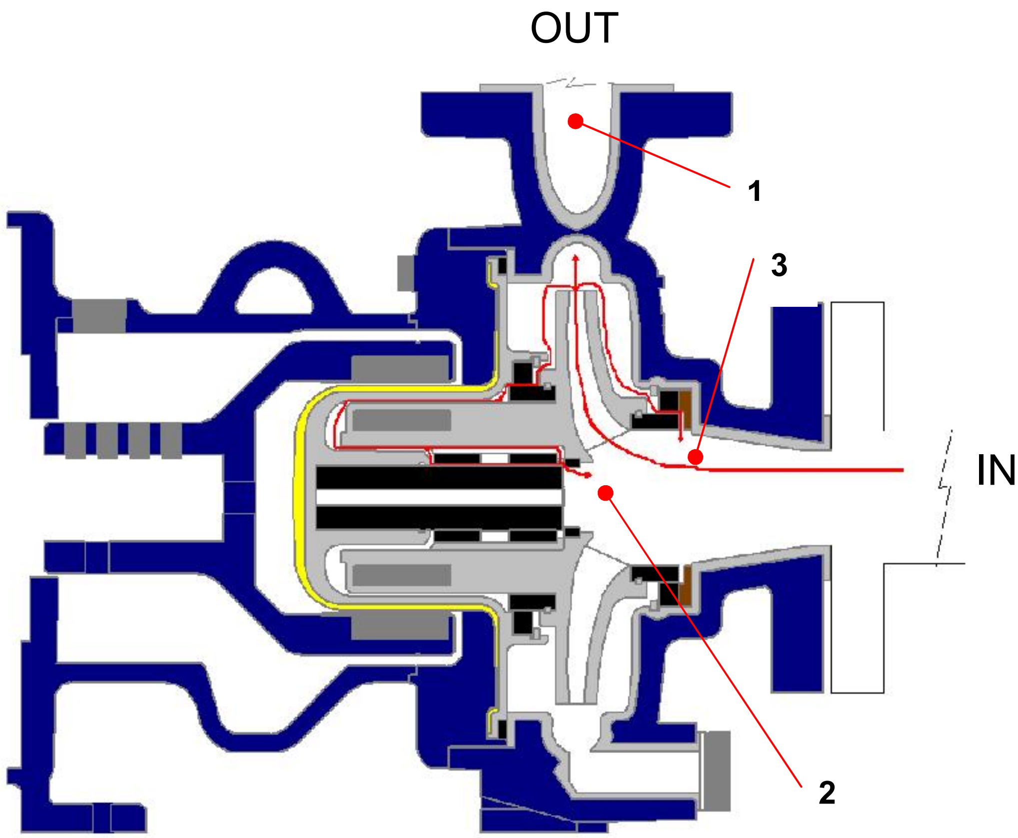


Figure 1 – TB-mag Flow Path

For maximun pump life consider the following:

1) Flooded Suction, liquid must flow to the pump naturally.
2) Net Positive Suction Head available is greater than required, NPSHa > NPSHr
3) Minimize suction pipe length, bends and restrictions.
4) Always run the pump above the minimum flow required.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Pump Identification Code-ANSI

Wet End A1 665 1 1 1 0 0 - A D 0 **Drive End**

TB-mag Models

Code	Pump Size	STD.	Drive Torque	Max.	Min.
A1 -	(1.5 x 1 x 6)	AA	0,1	6.65"	4.00"
AL -	(1.5 x 1 x 6) Low Flow	AA	0,1	6.65"	4.00"
A3 -	(3 x 1.5 x 6)	AB	0,1	6.65"	4.00"
A4 -	(3 x 2 x 6)	--	0,1	6.65"	4.00"
B1 -	(1.5 x 1 x 8)	AA	0,1	8.25"	5.50"
BL -	(1.5 x 1 x 8) Low Flow	AA	0,1	8.25"	5.50"
B3 -	(3 x 2 x 6)	--	0,1	7.00"	5.50"
B4 -	(3 x 1.5 x 8)	A50	0,1	8.25"	5.50"
B5 -	(3 x 2 x 6)	A10	0,1	7.00"	5.50"
B6 -	(4 x 3 x 6)	--	0,1	7.00"	5.50"
C1 -	(3 x 2 x 8)	A60	0,1	8.25"	5.50"
C2 -	(4 x 3 x 8)	A70	0,1	8.25	5.50"
C3 -	(2 x 1 x 10)	A05	0,1	10.5"	5.50"
CL --	(2 x 1 x 10) Low Flow	A05	0,1	10.5"	5.50"
C4 -	(3 x 1.5 x 10)	A50	0,1	10.5"	5.50"
C5 -	(3 x 2 x 10)	A60	0,1	10.5"	5.50"
C6 -	(4 x 3 x 10)	A70	0,1,2	10.5"	5.50"
C7 -	(4 x 3 x 10H)	A70	0,1,2	10.5"	8.00"
C8 -	(6 x 4 x 10H)	A80	0,1,2	10.5"	8.00"
C9 -	(6 x 4 x 8)	A80	0,1,2	8.25"	5.50"
V1 -	(2 x 1.5 x 6) Vertical	2015/15	0,1	6.65"	4.00"
W1 -	(2 x 1.5 x 8) Vertical	2015/17	0,1	8.25"	5.50"
W3 -	(3x2x6)Vertical	3020/17	0,1	7.00"	5.50"

Note: Drive Torque - availible drives per pump size.

Impeller Diameter

*	**6.65**	inches, (example: 665 = 6.65")

* Impeller trim for ANSI models must be specified in inches.

Bearing System

		Bushing	Shaft, Pump
s	**1** -	SiC	SiC

Wear Rings/Thrust Collar System

		Impeller Wear Rings	Cont. Shell Wear Ring	Casing Wear Ring	Thrust Collar
s	**1** -	SiC	SiC	SiC	CF PTFE
	2 -	SiC	SiC	CF PTFE	SiC
	3 -	SiC	SiC	SiC	SiC
C9	**5** -	CF PTFE	SiC		SiC
C9	**6**	SiC	SiC		SiC

Gasket (All Gaskets are 0.210" square cross section)

s	**1** -	FEP/FKM (Fluorocarbon)
	2 -	FKM (Fluorocarbon)
	3 -	EPDM (Ethylene Propylene)

Option 1

s	**0** -	ANSI Dimension Pump Drilled w/ANSI (Class 150) Flanges
	1 -	ANSI Dimension Pump Drilled w/ANSI (Class 300) Flanges
	2 -	ANSI Dimension Pump Drilled w/ISO/DIN (PN16) Flanges
	3 -	ANSI Dimension Pump Drilled w/JIS (10 kg/cm^2) Flanges

Option 2

		Impeller Body	Casing Casting/Lining	Casing Drain	Containment Shell Lining/Composite	Impeller Torque
s	**0** -	CF-ETFE	D.I./ETFE	Yes	CF-ETFE/Aramid Composite	Standard
	1 -	CF-ETFE	D.I./ETFE	No	CF-ETFE/Aramid Composite	Standard
c	**2** -	CF-ETFE	D.I./Unfilled PFA	Yes	CF-ETFE/Aramid Composite	Standard
c	**3** -	CF-ETFE	D.I./Unfilled PFA	No	CF-ETFE/Aramid Composite	Standard
c	**4** -	CF-ETFE	D.I./ETFE	Yes	CF-ETFE/Aramid Composite	Ultra
c	**5** -	CF-ETFE	D.I./ETFE	No	CF-ETFE/Aramid Composite	Ultra

C - Consult Factory for Availability   C9 - C9 MODEL ONLY
S - Standard Material/Options

Option 1

0 -	Standard Torque
1 -	High Torque
2 -	Ultra High Torque

Ultra High Torque is for "K,W" Motor Frame!
Refer to Table 1 for Torque Values

Motor Frame

NEMA C-Face

	A -	56C	(A Series Only)
	B -	143/5TC	
	C -	182/4TC	
ta	**D** -	213/5TC	
ta	**E** -	254/6TC	(Max. A-Series)
	F -	254/6 (4 Pole) 284/6TSC	(Max. B-Series)
	G -	324/6TSC	
	H -	364/365TSC	
tc	**J** -	284/6TC	
uc	**K** -	324/6TC & 405TSC	

IEC B5

	M -	80	(A Series Only)
	N -	90S/L	
	P -	100L	
	Q -	112M	
ta	**R** -	132S/M	(Max. A-Series)
	S -	160M	
	T -	160M/L	(Max. B-Series)
tc	**U** -	180M/L	
tc/uc	**V** -	200L(55mm dia.)	
uc	**W** -	225 S/M(55&60mm dia)	
uc	**Y** -	250M(60mm dia)	
uc	**Z** -	280S(65mm dia.)	

ta-A-Series High Torque Drives
tc-B/C-Series High Torque Drives
uc- Optional Ultra High Torque Drive

Product Group

	A -	TB-mag A
	B	TB-mag B
	C -	TB-mag C
LC	**L** -	Long Coupled B/C
SS	**S** -	Secondary Seal Unit B/C

SS-L TB-mag Models B1-C9, $$ Adder

Patented Secondary Sealing System for
TB-mag Models B1-C9, $$$ Adder

Material Guide
CF - Carbon Fiber
D.I. - Ductile Iron
ETFE - Ethylene-tetrafluoroethylene
PFA - Perfluoroalkoxy
SiC - Silicon Carbide (Ceramic)

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Motor Frame Guide				
60 Hz Motors				
HP	RPM	NEMA frame size	Code	Shaft size Ø
1	3600	143TC	B	0.875
	1800	143TC		
1.5	3600	143TC		
	1800	145TC		
2	3600	145TC		
	1800	145TC		
3	3600	182TC	C	1.125
	1800	182TC		
5	3600	184TC		
	1800	184TC		
7.5	3600	213TC	D	1.375
	1800	213TC		
10	3600	215TC		
	1800	215TC		
15	3600	254TC	E	1.625
	1800	254TC	F	
20	3600	256TC	E	
	1800	256TC	F	
25	3600	284TSC		
	1800	284TC	J	1.875
30	3600	286TSC	F	1.625
	1800	286TC	J1	1.875
40	3600	324TSC	G	
	1800	324TC	K1	2.125
50	3600	326TSC	G	1.875
	1800	326TC	K2	2.125
60	3600	364TSC	H1	1.875
75	3600	365TSC		
100	3600	405TSC	K2	2.125

Motor Frame Guide				
50Hz Motors				
Kw	RPM	IEC frame size	Code	Shaft size Ø
0.75	2900	80	M	19
	1450	80		
1.1	2900	80		
	1450	90S	N	24
1.5	2900	90S		
	1450	90L		
2.2	2900	90L		
	1450	100L	P	28
3	2900	100L		
	1450	100L		
4	2900	112M	Q	
	1450	112M		
5.5	2900	132S	R	38
	1450	132S		
7.5	2900	132S		
	1450	132M	R1	
11	2900	160M	S	42
	1450	160M	T	
15	2900	160M	S	
	1450	160L	T	
18.5	2900	160L		
	1450	180M	U1	48
22	2900	180M	U	
	1450	180L	U1	
30	2900	200L	V	55
	1450	200L	V2	
37	2900	200L	V1	
	1450	225S	W2	60
45	2900	225M	W1	55
55	2900	250M	Y2	60
75	2900	280S	Z2	65

Table 1 - Torque Ratings					
Pump Series	Drive Code	Max HP (Kw) at rated rpm:			
		3500	2900	1750	1450
TB-Mag A	A,B,C,D,M,N,P,Q,R	10 (7.5)	8.3 (6.2)	5 (3.8)	4.1 (3.1)
	D1,E1,R1	14 (10.4)	11.6 (8.7)	7 (5.2)	5.8 (4.4)
TB-Mag B	B,C,D,E,N,P,Q,R,S	20 (14.9)	16.6 (12.4)	10 (7.5)	8.3 (6.2)
	F,R1,T	30 (22.4)	24.9 (18.7)	15 (11.2)	12.4 (9.3)
TB-Mag C	B,C,D,E,N,P,Q,R,S	25 (18.7)	20.7 (15.5)	12.5 (9.3)	10.4 (7.7)
	F,G,J,R1,T,U,V	50 (37.3)	41.4 (31.1)	25 (18.7)	20.7 (15.5)
	J1,K1,H1,U1,V1,	75 (56.0)	62.1 (46.6)	37.5 (28.0)	31.1 (23.3)
	K2,V2,W2,Y2, Z2	100 (75.0)	82.9 (63.0)	50 (38.0)	41.4 (31.0)

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Pump Identification Code - ISO

Wet End E 1 1 6 5 1 1 1 0 0 - E B 0 **Drive End**

TB-mag Models

Code	Pump Size	Drive Torque	Impeller Dia. (mm) Max.	Min.
E1 -	(50 x 32 x 160mm)	0,1	169	102
E3 -	(65 x 50 x 160mm)	0,1	169	102
F1 -	(50 x 32 x 200mm)	0,1	210	140
F4 -	(65 x 40 x 200mm)	0,1	210	140
G2 -	(100 x 65 x 200mm)	0,1	210	140

Impeller Diameter

*	**165**	mm, (i.e. - 165, 140)

* Impeller trim for ISO models must be specified in mm.

Bearing System

	Code	Bushing	Shaft, Pump
S	**1** -	SiC	SiC

Wear Rings/Thrust Collar System

	Code	Impeller Wear Rings	Cont. Shell Wear Ring	Casing Wear Ring	Casing Thrust Collar
S	**1** -	SiC	SiC	SiC	CF PTFE
	2 -	SiC	SiC	CF PTFE	SiC
	3 -	SiC	SiC	SiC	SiC

Gasket (All Gaskets are 0.210" square cross section)

S	**1** -	FEP/FKM (Fluorocarbon)
	2 -	FKM (Fluorocarbon)
	3 -	EPDM (Ethylene Propylene)

Option 1

	0 -	ISO Dimension Pump Drilled w/ANSI (Class 150) Flanges
	1 -	ISO Dimension Pump Drilled w/ANSI (Class 300) Flanges
S	**2** -	ISO Dimension Pump Drilled w/ISO/DIN (PN16) Flanges
	3 -	ISO Dimension Pump Drilled w/JIS (10 kg/cm^2) Flanges

Option 2

	Code	Impeller Body	Casing Casting/Lining	Casing Drain	Containment Shell Lining/Composite	Impeller Torque
S	**0** -	CF-ETFE	D.I./ETFE	Yes	CF-ETFE/Aramid Composite	Standard
	1 -	CF-ETFE	D.I./ETFE	No	CF-ETFE/Aramid Composite	Standard
C	**2** -	CF-ETFE	D.I./Unfilled PFA	Yes	CF-ETFE/Aramid Composite	Standard
C	**3** -	CF-ETFE	D.I./Unfilled PFA	No	CF-ETFE/Aramid Composite	Standard
C	**4** -	CF-ETFE	D.I./ETFE	Yes	CF-ETFE/Aramid Composite	Ultra
C	**5** -	CF-ETFE	D.I./ETFE	No	CF-ETFE/Aramid Composite	Ultra

C - Consult Factory for Availability
S - Standard Material/Options

Drive Torque

0 -	Standard Torque
1 -	High Torque
2 -	Ultra High Torque

Ultra High Torque is for "K,W" Motor Frame Only!
Refer to Table 1 for Torque Values

Motor Frame

NEMA C-Face

	A -	56C (A Series Only)
	B -	143/5TC
	C -	182/4TC
ta	**D** -	213/5TC
ta	**E** -	254/6TC (Max. A-Series)
	F -	254/6 (4 Pole) 284/6TS((Max. B-Series)
	G -	324/6TSC
	H -	364/365TSC
tc	**J** -	284/6TC
uc	**K** -	324/6TC & 405TSC

IEC B5

	M -	80 (A Series Only)
	N -	90S/L
	P -	100L
	Q -	112M
ta	**R** -	132S/M (Max. A-Series)
	S -	160M
	T -	160M/L (Max. B-Series)
tc	**U** -	180M/L
tc	**V** -	200L
uc	**W** -	225S/M

ta-A-Series High Torque Drives
tc-B/C-Series High Torque Drives
uc-Optional Ultra High Torque Drive

Product Group

	E -	TB-mag A
	F -	TB-mag B
	G -	TB-mag C
LC	**L** -	Long Coupled B/C
SS	**S** -	Secondary Seal Unit B/C

LC-Standard Long Coupled Bearing Frame for TB-mag Models B1-C9, $$ Adder
SS-Long Coupled Bearing Frame equipped with Patented Secondary Sealing System for TB-mag Models B1-C9, $$$ Adder

(ANSI DIMENSIONAL BEARING FRAME ONLY)

Material Guide
CF - Carbon Fiber
D.I. - Ductile Iron
DLC - Diamond Like Carbon Coating
ETFE - Ethylene-tetrafluoroethylene
PFA - Perfluoroalkoxy
SiC - Silicon Carbide (Ceramic)

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

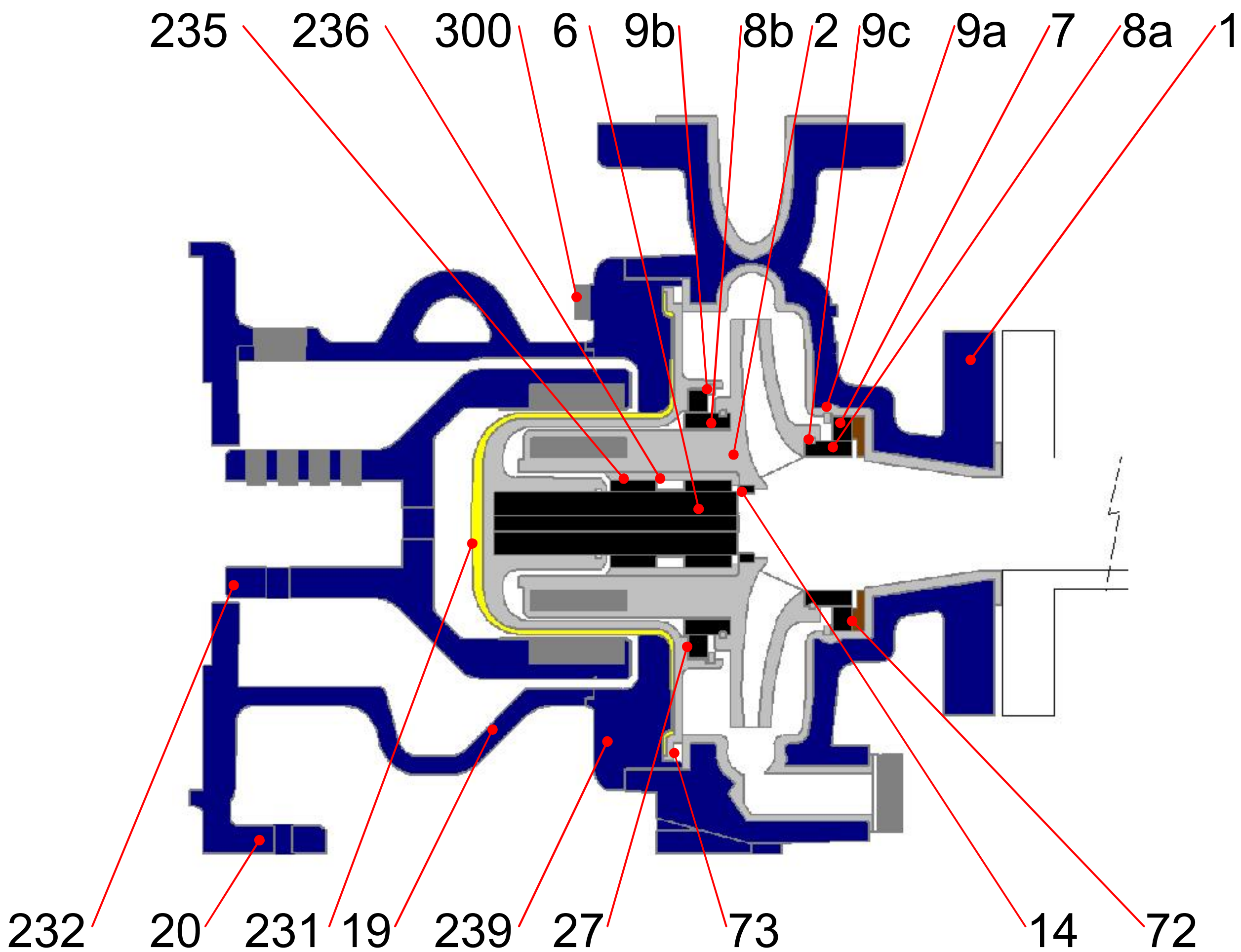
Motor Frame Guide 60 Hz Motors				
HP	RPM	NEMA frame size	Code	Shaft size Ø
1	3600	143TC	B	0.875
	1800	143TC		
1.5	3600	143TC		
	1800	145TC		
2	3600	145TC		
	1800	145TC		
3	3600	182TC	C	1.125
	1800	182TC		
5	3600	184TC		
	1800	184TC		
7.5	3600	213TC	D	1.375
	1800	213TC		
10	3600	215TC		
	1800	215TC		
15	3600	254TC	E	1.625
	1800	254TC	F	
20	3600	256TC	E	
	1800	256TC	F	
25	3600	284TSC		
	1800	284TC	J	1.875
30	3600	286TSC	F	1.625
	1800	286TC	J1	1.875
40	3600	324TSC	G	
	1800	324TC	K1	2.125
50	3600	326TSC	G	1.875
	1800	326TC	K2	2.125
60	3600	364TSC	H1	1.875
75	3600	365TSC		
100	3600	405TSC	K2	2.125

Motor Frame Guide 50Hz Motors				
Kw	RPM	IEC frame size	Code	Shaft size Ø
0.75	2900	80	M	19
	1450	80		
1.1	2900	80		
	1450	90S	N	24
1.5	2900	90S		
	1450	90L		
2.2	2900	90L		
	1450	100L	P	28
3	2900	100L		
	1450	100L		
4	2900	112M	Q	
	1450	112M		
5.5	2900	132S	R	38
	1450	132S		
7.5	2900	132S		
	1450	132M	R1	
11	2900	160M	S	42
	1450	160M	T	
15	2900	160M	S	
	1450	160L	T	
18.5	2900	160L		
	1450	180M	U1	48
22	2900	180M	U	
	1450	180L	U1	
30	2900	200L	V	55
	1450	200L	V2	
37	2900	200L	V1	
	1450	225S	W2	60
45	2900	225M	W1	55
55	2900	250M	Y2	60
75	2900	280S	Z2	65

Table 1 - Torque Ratings									
Pump Series	Drive Code	Max HP (Kw) at rated rpm:							
		3500		2900		1750		1450	
TB-Mag A	A,B,C,D,M,N,P,Q,R	10	(7.5)	8.3	(6.2)	5	(3.8)	4.1	(3.1)
	D1,E1,R1	14	(10.4)	11.6	(8.7)	7	(5.2)	5.8	(4.4)
TB-Mag B	B,C,D,E,N,P,Q,R,S	20	(14.9)	16.6	(12.4)	10	(7.5)	8.3	(6.2)
	F,R1,T	30	(22.4)	24.9	(18.7)	15	(11.2)	12.4	(9.3)
TB-Mag C	B,C,D,E,N,P,Q,R,S	25	(18.7)	20.7	(15.5)	12.5	(9.3)	10.4	(7.7)
	F,G,J,R1,T,U,V	50	(37.3)	41.4	(31.1)	25	(18.7)	20.7	(15.5)
	J1,K1,H1,U1,V1,	75	(56.0)	62.1	(46.6)	37.5	(28.0)	31.1	(23.3)
	K2,V2,W2,Y2, Z2	100	(75.0)	82.9	(63.0)	50	(38.0)	41.4	(31.0)

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

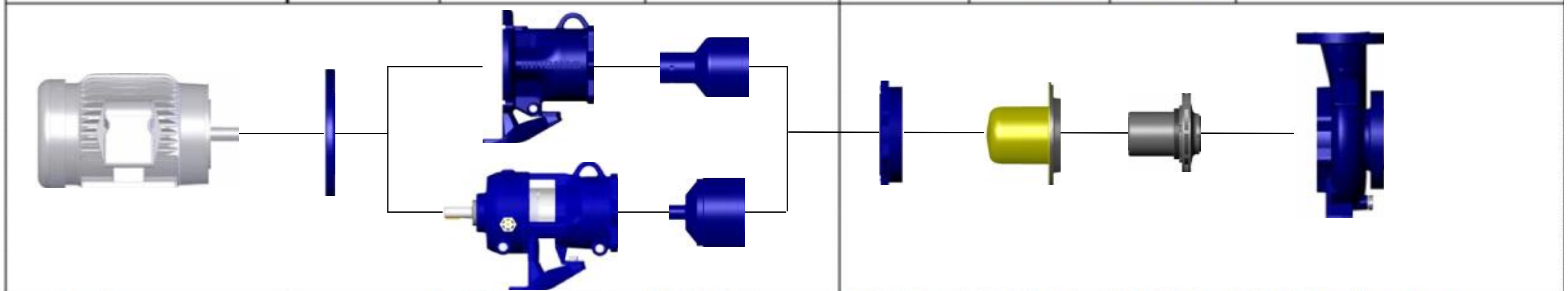
Item List



Item	Qty	Part Name	Material
1	1	Casing	Ductile Iron/ETFE lining
2	1	Impeller Magnet Assembly	ETFE
6	1	Shaft, Pump	Silicon Carbide
7	1	Wear Ring, Front Stationary	Silicon Carbide
8a	1	Wear Ring, Front Rotating	Silicon Carbide
8b	1	Wear Ring, Back Rotating	Silicon Carbide
9a	1	Retaining Ring, Front Stationary	ETFE
9b	1	Retaining Ring, Back Stationary	ETFE
9c	2	Retaining Ring, Pin (sets)	ETFE
14	1	Valve, Thrust Control	Silicon Carbide
19	1	Adapter	Ductile Iron
20	1	Only for Group 2, TB-mag B/C 8.25” centerline	Ductile Iron
27	1	Wear Ring, Back Stationary	Silicon Carbide
72	1	Collar, Thrust	CFR/PTFE
73	1	Gasket, O-ring	FEP/FKM (Fluorocarbon) Core
231	1	Shell, Containment	ETFE/Fiber Reinforced Vinyl Ester
232	1	Magnet Assembly, Outer	Ductile Iron/Neodymium Iron
235	2	Bushing, Bearing	Silicon Carbide
236	1	Bushing, Spacer	PTFE
239	1	Ring, Containment	Ductile Iron
300	14	Hex Cap Screw/Lock Washer	304SS

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

DRIVE END				WET END			
Motor Frame (NEMA/IEC)	Mounting Plate (Close Coupled NEMA/IEC)	Adapter (NEMA/IEC Close Coupled with Riser)	Outer Magnet Assembly (NEMA & IEC)	Containment Ring	Containment Shell Assembly (Includes:Pump Shaft, Wear Ring & Gasket)	Complete Impeller Assembly (Includes: Wear Ring & Bushing)	Casing Assembly (Includes: Wear Ring, Thrust Collar)



TB-mag A

Motor Frame (NEMA/IEC)	Mounting Plate	Adapter	Outer Magnet Assembly
A. - 56C		ADP-1000-SI	MAO-1000-SI
B. - 143/5 TC			MAO-1010-SI
C. - 182/4 TC			MAO-1020-SI
D. - 213/5 TC			MAO-1030-SI
D1. - 213/5 TC, High Torque			MAO-1031-SI
E. - 254/6 TC, High Torque			MAO-1032-SI
M. - 80		ADP-1005-SI	MAO-1005-SI
N. - 90			MAO-1015-SI
P. - 100/112			MAO-1025-SI
R. - 132			MAO-1035-SI
R1. - 132			MAO-1036-SI

Containment Ring	Containment Shell Assembly	Complete Impeller Assembly	Casing Assembly		
RGC-1000-SI	SLC-1000-AA	IMA-1010-AA	CSG-1010-AA	A1	(1.5 x 1 x 6)
RGC-1005-SI		IMA-1010-AA	CSG-1010-LB	AL	(1.5 x 1 x 6) Low Flow
		IMA-1010-AA	CSG-1015-AA	E1	(50mm x 32mm)
		IMA-1010-AA	CSG-1015-LB	EL	(50mm x 32mm)
		IMA-1070-AA	CSG-1070-AA	A3	(3 x 1.5 x 6)
		IMA-1070-AA	CSG-107A-AA	E3	(65mm x 40mm)
		IMA-1070-AA	CSG-1075-AA	A4	(3 x 2 x 6)
		IMA-1010-AA	CSG-1210-AA	V1	(2 x 1.5 x 6) Vertical

TB-mag B/C

Motor Frame (NEMA/IEC)	Mounting Plate	Adapter	Outer Magnet Assembly
B. - 143/5TC		ADP-1010-SI	MAO-1040-SI
C. - 182/4TC			MAO-1050-SI
D. - 213/5TC			MAO-1060-SI
E. - 254/6TC (2 Pole)			MAO-1070-SI
F. - 284/6T SC & 254/6TC			MAO-1080-SI
G. - 324/6TSC	ADP-1100-SI		MAO-1090-SI
H. - 364/365T SC, High Torque	ADP-1100-SI		MAO-1100-SI
J. - 284/6TC			MAO-1110-SI
J1. - 284/6TC, High Torque			MAO-1111-SI
K. - 324TC, High Torque	ADP-1100-SI		MAO-1120-SI
N. - 90S/L		ADP-1015-SI	MAO-1055-SI
P. - 100L			MAO-1065-SI
Q. - 112M			MAO-1066-SI
R. - 132S/M			MAO-1075-SI
R1. - 132S/M, High Torque			MAO-1076-SI
S. - 160M	ADP-1125-SI		MAO-1085-SI
T. - 160M/L	ADP-1125-SI		MAO-1095-SI
U. - 180M/L			MAO-1105-SI
V. - 200L	ADP-1135-SI		MAO-1115-SI
U. - 180M/L, High Torque			MAO-1106-SI
V. - 200L High Torque	ADP-1135-SI		MAO-1116-SI
V. - 200L Ultra High Torque	ADP-1135-SI		MAO-1117-SI
W. - 225M, High Torque	ADP-1145-SI		MAO-1116-SI
W. - 225S, Ultra High Torque	ADP-1145-SI		MAO-1117-SI
Y. - 250M Ultra High Torque	ADP-1155-SI		MAO-1125-SI
Z. - 280S Ultra high Torque	ADP-1155-Si		MAO-1126-SI

ANSI Bearing Frame	Outer Magnet Assembly
BFR-2000-AA	MAO-2100-SI
BFR-2010-AA	MAO-2110-SI
BFR-2020-AA	MAO-2120-SI

Containment Ring	Containment Shell Assembly	Complete Impeller Assembly	Casing Assembly		
RGC-1010-SI	SLC-1010-AA	IMA-1030-AA	CSG-1030-AA	B1	(1.5 x 1 x 8)
RGC-1015-SI		IMA-1030-AA	CSG-1030-LB	BL	(1.5 x 1 x 8) Low Flow
		IMA-1030-AA	CSG-1035-AA	F1	(50mm x 32mm)
		IMA-1030-AA	CSG-1035-LB	FL	(50mm x 32mm)
		IMA-1020-AA	CSG-1020-AA	B3	(3 x 2 x 6)
		IMA-1040-AA	CSG-1080-AA	B4	(3 x 1.5 x 8)
		IMA-1040-AA	CSG-1085-AA	F4	65mm x 40mm
		IMA-1020-AA	CSG-1090-AA	B5	(3 x 2 x 6) 7" (178mm)
		IMA-1065-AA	CSG-1160-AA	B6	(4 x 3 x 6) 7" (178mm)
		IMA-1050-AA	CSG-1050-AA	C1	(3 x 2 x 8)
		IMA-1060-AA	CSG-1060-AA	C2	(4 x 3 x 8)
		IMA-1060-AA	CSG-1065-AA	G2	(100mm x 65mm)
		IMA-1030-AA	CSG-1230-AA	W1	(2 x 1.5 x 8) Vertical
RGC-1020-SI	SLC-1020-AA	IMA-1100-AA	CSG-1100-AA	C3	(2 x 1 x 10)
RGC-1025-SI		IMA-1100-AA	CSG-1100-LB	CL	(2 x 1 x 10) Low Flow
		IMA-1100-AA	CSG-1110-AA	C4	(3 x 1.5 x 10)
		IMA-1120-AA	CSG-1120-AA	C5	(3 x 2 x 10)
		IMA-1130-AA	CSG-1130-AA	C6	(4 x 3 x 10)
		IMA-1155-AA	CSG-1155-AA	C9	(6 x 4 x 8)
	SLC-1030-AA	IMA-1140-AA	CSG-1140-AA	C7	(4 x 3 x 10H)
		IMA-1150-AA	CSG-1150-AA	C8	(6 x 4 x 10H)

NOTES:
1. - Metric pump/parts (highlighted)
2. - Not all configurations are listed, consult factory for details.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Pump Dimensions – ANSI & ISO

ANSI Pump – NEMA Motor Mounting

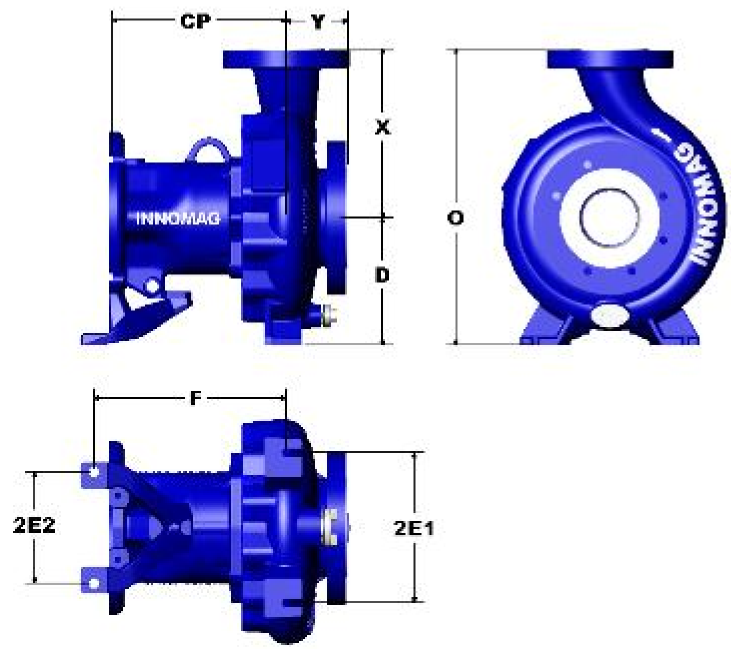


Figure 1 – ANSI Pump Dimensions

<table>
<tr><th rowspan="2">Серия</th><th rowspan="2">Типоразмер</th><th colspan="10">In (mm)</th><th>lb. (kg)</th></tr>
<tr><th>D</th><th>$2E_1$</th><th>$2E_2$</th><th>F</th><th>O</th><th>X</th><th>Y</th><th>CP</th><th>SF</th><th>DF</th><th>Масса</th></tr>
<tr><td rowspan="4">TB-mag A</td><td>A1 - (1.5x1x6)
ANSI Designation - AA</td><td rowspan="7">5.25
(133)</td><td rowspan="7">6.00
(152)</td><td rowspan="7">0.00
0</td><td rowspan="7">7.25
(184)</td><td rowspan="7">11.75
(298)</td><td rowspan="7">6.50
(165)</td><td rowspan="10">4.00
(102)</td><td rowspan="3">8.70
(221)</td><td rowspan="2">1.50
(38)</td><td rowspan="2">1.00
(25)</td><td rowspan="2">80.00
(36)</td></tr>
<tr><td>AL - (1.5x1x6 LF)
ANSI Designation - AA</td></tr>
<tr><td>A3 - (3x1.5x6)
ANSI Designation - AB</td><td rowspan="2">3.00
(76)</td><td>1.50
(38)</td><td rowspan="2">90.00
(41)</td></tr>
<tr><td>A4 - (3x2x6)
ANSI Designation - --</td><td rowspan="7">11.30
(287)</td><td>2.00
(51)</td></tr>
<tr><td rowspan="6">TB-mag B</td><td>B1 - (1.5x1x8)
ANSI Designation - AA</td><td rowspan="2">1.50
(38)</td><td rowspan="2">1.00
(25)</td><td rowspan="2">125.00
(57)</td></tr>
<tr><td>BL - (1.5x1x8 LF)
ANSI Designation - AA</td></tr>
<tr><td>B3 - (3x2x6 Short)
ANSI Designation - --</td><td rowspan="3">3.00
(76)</td><td rowspan="3">2.00
(51)</td><td>135.00
(61)</td></tr>
<tr><td>B4 - (3x1.5x8)
ANSI Designation - A50</td><td rowspan="3">8.25
(210)</td><td rowspan="3">9.75
(248)</td><td rowspan="3">7.25
(184)</td><td rowspan="3">12.50
(318)</td><td>16.75
(425)</td><td>8.50
(216)</td><td>153.00
(70)</td></tr>
<tr><td>B5 - (3x2x6 Tall)
ANSI Designation - A10</td><td rowspan="2">16.50
(419)</td><td rowspan="2">8.25
(210)</td><td>135.00
(61)</td></tr>
<tr><td>B6 - (4x3x6)
ANSI Designation - --</td><td>4.00
(102)</td><td>3.00
(76)</td><td>185.00
(84)</td></tr>
</table>

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Pump Dimensions - Continued

<table>
<tr><th rowspan="2">Series</th><th rowspan="2">Model (Size)</th><th colspan="10">In (mm)</th><th>lb. (kg)</th></tr>
<tr><th>D</th><th>$2E_1$</th><th>$2E_2$</th><th>F</th><th>O</th><th>X</th><th>Y</th><th>CP</th><th>SF</th><th>DF</th><th>Weight</th></tr>
<tr><td rowspan="10">TB-mag C</td><td>C1 - (3x2x8)
ANSI Designation - A60</td><td rowspan="8">8.25
(210)</td><td rowspan="10">9.75
(248)</td><td rowspan="10">7.25
(184)</td><td rowspan="10">12.50
(318)</td><td>17.75
(451)</td><td>9.50
(241)</td><td rowspan="10">4.00
(102)</td><td rowspan="10">11.30
(287)</td><td>3.00
(76)</td><td>2.00
(51)</td><td>159.00
(72)</td></tr>
<tr><td>C2 - (4x3x8)
ANSI Designation - A70</td><td>19.25
(489)</td><td>11.00
(279)</td><td>4.00
(102)</td><td>3.00
(76)</td><td>195.00
(88)</td></tr>
<tr><td>C3 - (2x1x10)
ANSI Designation - A05</td><td rowspan="3">16.75
(425)</td><td rowspan="3">8.50
(216)</td><td rowspan="2">2.00
(51)</td><td rowspan="2">1.00
(25)</td><td rowspan="2">174.00
(79)</td></tr>
<tr><td>CL - (2x1x10 LF)
ANSI Designation - A05</td></tr>
<tr><td>C4 - (3x1.5x10)
ANSI Designation - A50</td><td rowspan="2">3.00
(76)</td><td>1.50
(38)</td><td>188.00
(85)</td></tr>
<tr><td>C5 - (3x2x10)
ANSI Designation - A60</td><td>17.75
(451)</td><td>9.50
(241)</td><td>2.00
(51)</td><td>189.00
(86)</td></tr>
<tr><td>C6 - (4x3x10)
ANSI Designation - A70</td><td rowspan="2">19.25
(489)</td><td rowspan="2">11.00
(279)</td><td rowspan="2">4.00
(102)</td><td>3.00
(76)</td><td>205.00
(93)</td></tr>
<tr><td>C7 - (4x3x10H)
ANSI Designation - A70</td><td>3.00
(76)</td><td>219.00
(99)</td></tr>
<tr><td>C8 - (6x4x10H)
ANSI Designation - A80</td><td rowspan="2">10.00
(254)</td><td rowspan="2">23.50
(597)</td><td rowspan="2">13.50
(343)</td><td rowspan="2">6.00
(152)</td><td rowspan="2">4.00
(102)</td><td rowspan="2">269.00
(122)</td></tr>
<tr><td>C9 - (6x4x8)
ANSI Designation - A80</td></tr>
</table>

Table 1 – ANSI Pumps

NOTE: Dimensions are for reference only, use certified drawings for construction.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

ISO Pump – IEC Motor Mounting

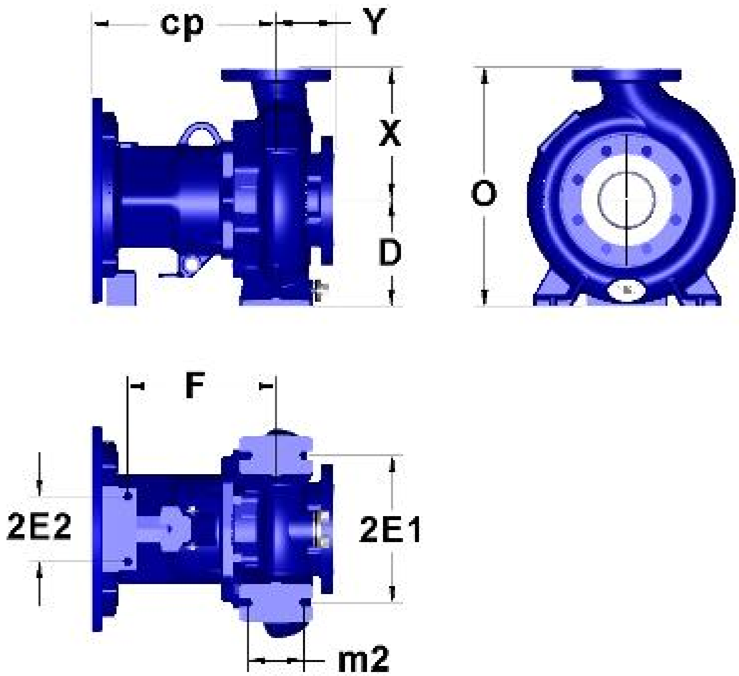


Figure 2 – ISO Pump Dimensions

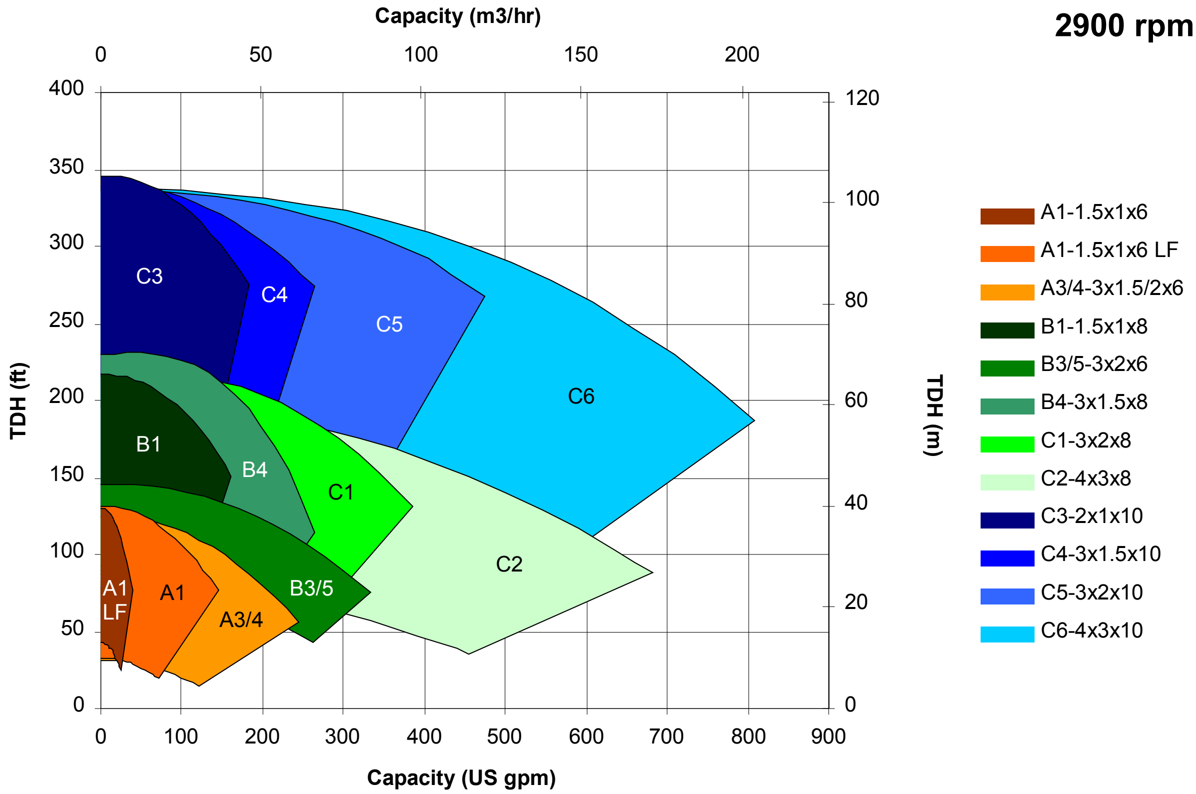
<table>
<tr><th rowspan="2">Pump Series</th><th rowspan="2">Model (Size)</th><th colspan="10">in (mm)</th><th>lb.</th></tr>
<tr><th>D</th><th>2E1</th><th>2E2</th><th>M2</th><th>F</th><th>O</th><th>X</th><th>Y</th><th>CP</th><th>SF</th><th>DF</th><th>(kg)</th></tr>
<tr><td rowspan="3">TB-mag A</td><td>E1 - (50x32x160)</td><td rowspan="3">5.20 (132)</td><td rowspan="5">7.48 (190)</td><td rowspan="7">4.33 (110)</td><td rowspan="6">2.76 (70)</td><td rowspan="3">7.25 (184)</td><td rowspan="3">11.50 (292)</td><td rowspan="3">6.299 (160)</td><td rowspan="5">3.15 (80)</td><td rowspan="3">8.39 (213)</td><td rowspan="2">1.97 (50)</td><td rowspan="2">1.26 (32)</td><td rowspan="2">80 (36)</td></tr>
<tr><td>EL - (50x32x160LF)</td></tr>
<tr><td>E3 - (65x50x160)</td><td>2.56 (65)</td><td>1.97 (50)</td><td>86 (39)</td></tr>
<tr><td rowspan="3">TB-mag B</td><td>F1 - (50x32x200)</td><td rowspan="3">6.299 (160)</td><td rowspan="4">9.91 (252)</td><td rowspan="3">13.39 (340)</td><td rowspan="3">7.09 (180)</td><td rowspan="4">11.16 (284)</td><td rowspan="2">1.97 (50)</td><td rowspan="2">1.26 (32)</td><td rowspan="2">133 (60)</td></tr>
<tr><td>FL - (50x32x200LF)</td></tr>
<tr><td>F4 - (65x40x200)</td><td>8.35 (212)</td><td rowspan="2">3.97 (100)</td><td>2.56 (65)</td><td>1.57 (40)</td><td>144 (65)</td></tr>
<tr><td>TB-mag C</td><td>G2 - (100x65x200)</td><td>7.09 (180)</td><td>9.84 (250)</td><td>3.74 (95)</td><td>15.94 (405)</td><td>8.86 (225)</td><td>3.93 (100)</td><td>2.56 (65)</td><td>168 (76)</td></tr>
</table>

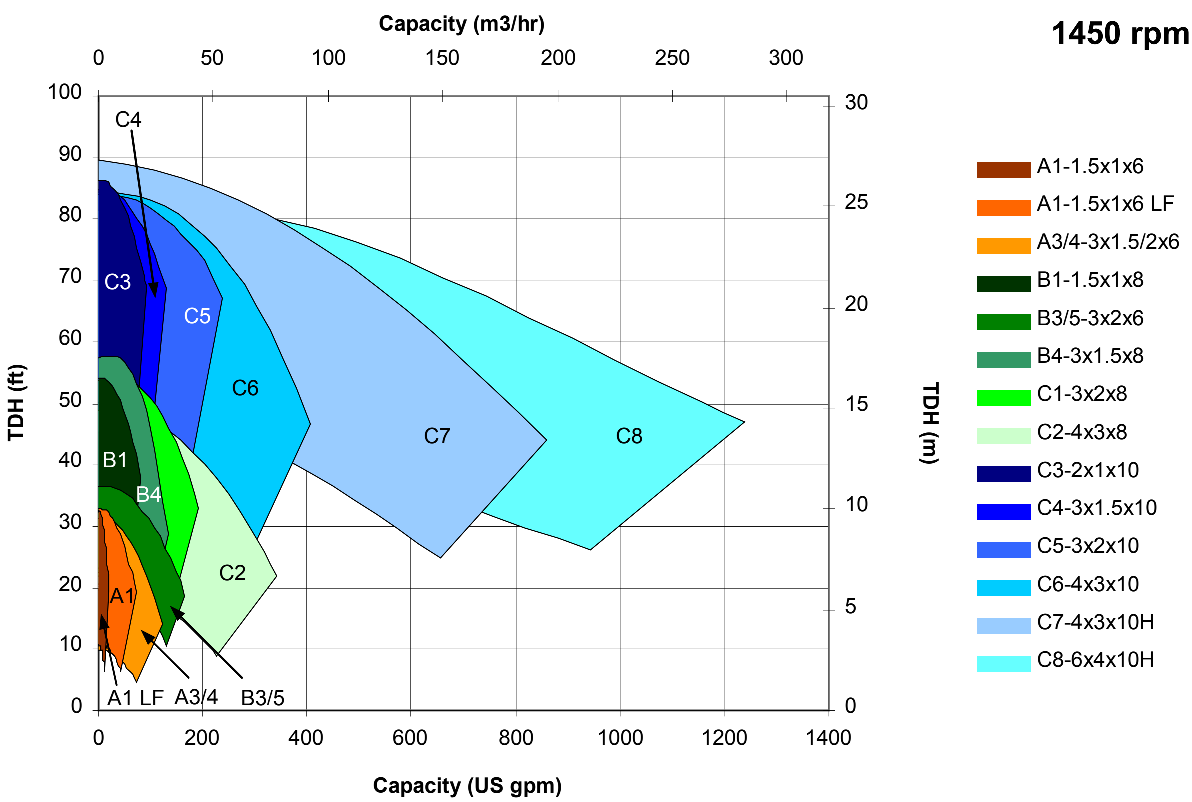
Table 2 – ISO Pumps

NOTE: Dimensions are for reference only, use certified drawings for construction.

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Hydraulic Coverage – 50Hz

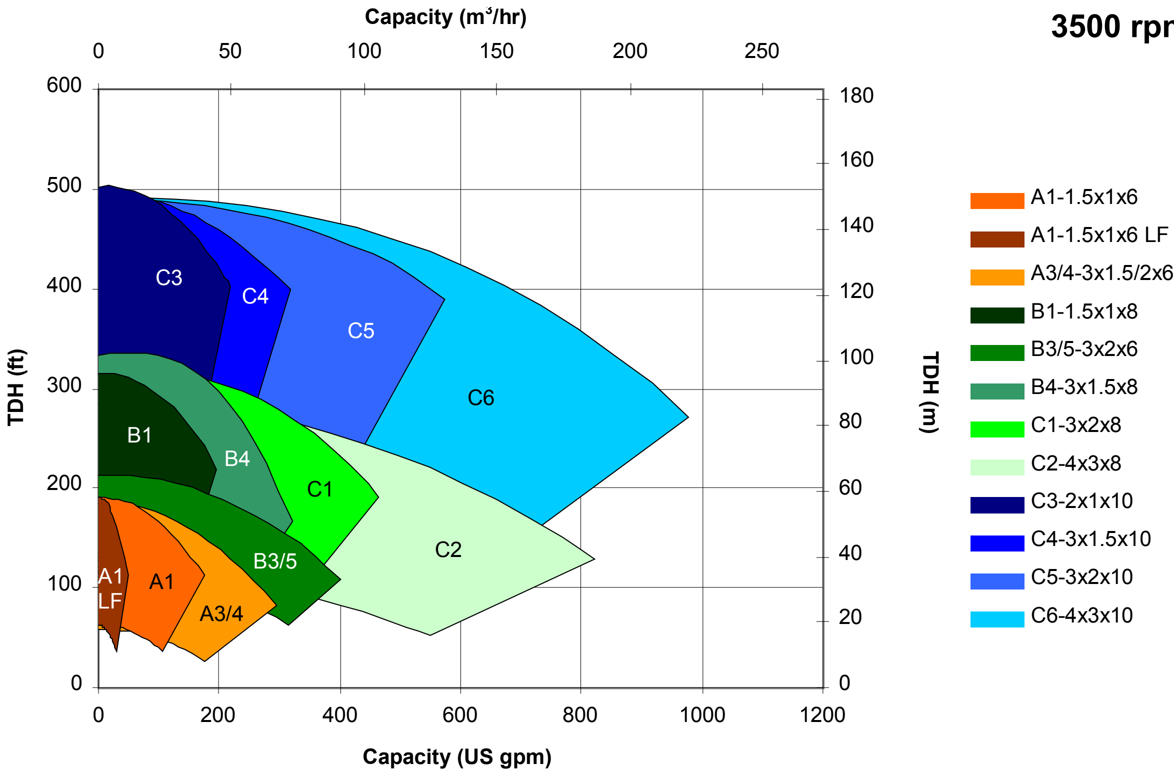




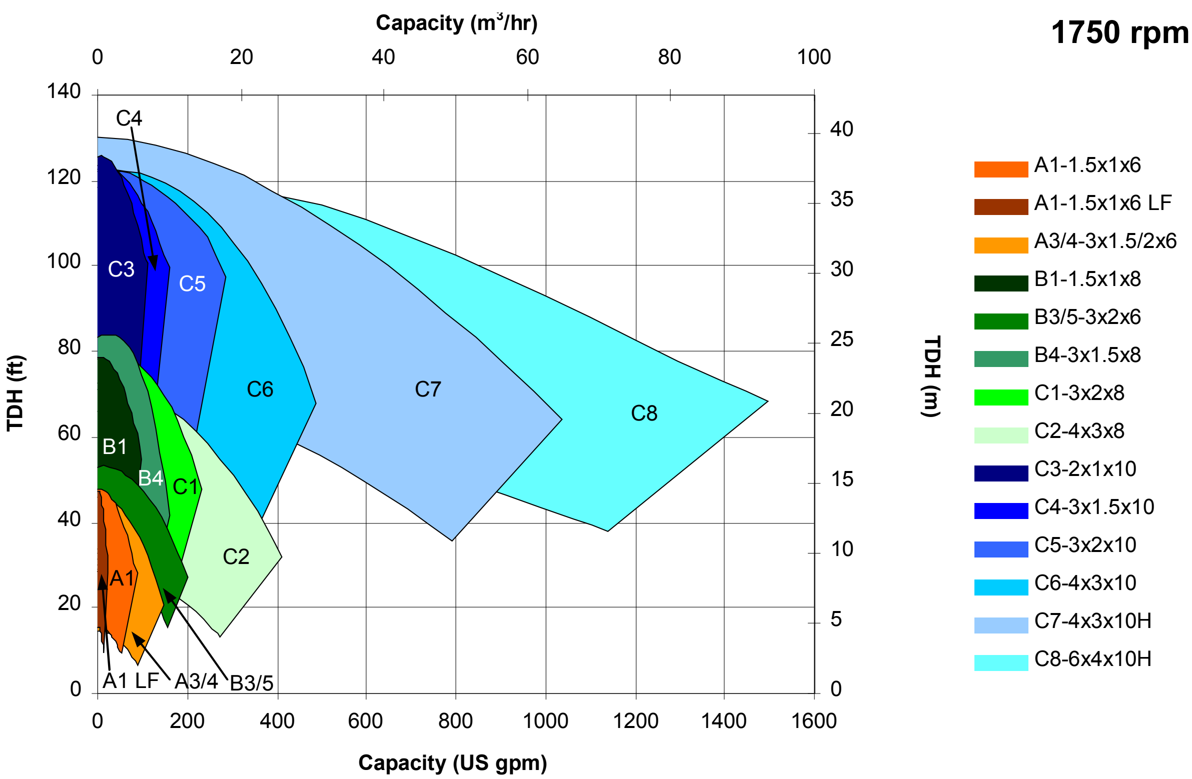
Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Hydraulic Coverage – 60Hz

3500 rpm



1750 rpm



Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250

Design Features & Benefits:

	INNOMAG TB-mag	Goulds 3298	ANSIMAG K-Series	Finnish Th. UC Series	Iwaki MDM,MDFL
Thrust Balanced ✓ Thrust-balanced, Sealless, non-metallic magnetic drive pump. ✓ A revolutionary, patented, thrust balancing system eliminates the axial thrust created by the internal pump pressures. ✓ The balancing system is responsive, automatic and stable with any change in the fluid conditions such as flow, pressure or viscosity. ✓ Operate with less power by eliminating axial thrust loads. Less friction, less power…. ✓ Expanded operating range, engineered to perform continuously at any flow. ✓ Increased pump life and reliability with no forward thrust.	YES	NO	NO	NO	NO
Double Welded Impeller ✓ The inner magnets are protected by a patented hermetically sealed cover. ✓ For an extreme corrosion and permeation resistant barrier the magnet assembly is again hermetically sealed with a corrosion resistant fluoropolymer ETFE or PFA creating a double weld design.	YES	NO	NO	NO	NO
Wear Rings ✓ The Patented wear ring system prevents impeller from rubbing containment shell in the event of a primary bearing upset. ✓ Wear rings control leakage rates maintaining higher efficiencies. ✓ Wear Rings restrict solids > 0.005" from entering the containment shell area, keeping all bearings and critical flow paths clear. ✓ Concentrations to 30%, particulate sizes to ¼"	YES	NO	NO	NO	NO
Open Suction ✓ A cantilever shaft supported in the containment shell eliminates the need for a shaft support in the pump's suction. No suction blockage**,** Lower NPSHr.	YES	NO	NO	NO	NO
Pressurized Radial Bearing ✓ Isolated from the suction pressure by a patented thrust balanced system, the radial bearings operate in a pressurized fluid environment. ✓ Pressure in the bearing area is approximately 1/3 of TDH which virtually eliminates the possibility of flashing.	YES	NO	NO	NO	NO
Water Hammer Resistant ✓ Burst pressures at 3000 psi give the TB-mag pump a 10 x safety factor and resistance to sudden system surges.	YES	NO	NO	NO	NO
Modified Concentric Volute ✓ All Innomag casings are designed to minimize radial loads and distribute pressure evenly across the entire flow range. ✓ Lowers stress on bearings and wear rings maximum pump life.	YES	NO	YES	YES	NO
"True-Seal" Secondary Containment ✓ A patented design combines a simple, yet proven, "off-the-shelf" dry run cartridge seal with our long couple bearing frame. Together, these products provide your service with true metallic secondary containment.	YES	NO	NO	NO	NO
Expanded Operating Range ✓ Engineered to perform continuously over the entire flow range. ✓ Operate at speeds 500 to 3500 rpm.	YES	NO	NO	NO	NO
Standard Dimension Process Pumps ✓ Conforms to the requirements of ANSI B73.1 ✓ Class 150 or 300 lb flanges, ISO PN 16 or JIS 10kg/cm^2 drilled flanges are optional. ✓ International conformance to ISO 2858 pumps.	YES	YES	YES	YES	NO
Quality Assurance ✓ All parts are manufactured to the highest possible standard of quality and workmanship. ✓ All completed pumps and wet ends must pass a 25 point quality inspection including, a running performance/endurance and pressure test prior to shipping. ✓ All critical components manufactured in house in our US Factory.	YES	NO	NO	NO	NO

Innovative Mag-Drive, LLC.
409 S. Vista Ave., Addison, IL. 60101
Tel: 630.543.4240 Fax: 630.543.4250