# INDUSTRY

M PUMPS

SETTING
INNOVATIVE
STANDARDS

# CONTENTS

# MAGNETIC DRIVE PUMPS

A magnetic drive pump uses a magnetic field to create the rotation of the impeller (or any other device utilized to displace fluid). The external magnet is mounted on the motor shaft. The liquid end consists of pump impeller (or any other device used to displace fluids) and an internal magnet mounted onto the driven shaft which is supported by bushing assembly and HERMETICALLY sealed by containment shell. Without the need of a mechanical seal.

The external magnet begins to rotate when the motor is started. The rotating magnetic field effects the inner magnet which begins to rotate the impeller as the same speed of the external magnet to displace the fluid.

## MAGNETIC DRIVE PUMPS OFFER A SERIES OF SUPERIOR ADVANTAGES OVER MECHANICAL SEAL PUMPS:

- Pump is sealless guaranteeing operational safety for operators and environment, most of all in case of critical, hazardous, corrosive or expensive chemicals pumping.
- Without mechanical seal, both initial costs of the same and cumbersome auxiliary API flushed plans are avoided.
- For the same reason, pump selection, operation and maintenance are much simpler and less expensive than mechanical seal.
- Ability to handle high gas content fluids in which most mechanical seals would fail due to poor lubrication and cooling.

Are you concerned about energy costs, maintenance costs (Spare parts and downtime), leakages of dangerous/expansive chemicals, frequent seal failure and complex sealing system? M Pumps has the solution to address your concerns with its advanced sealless pump technology.

With its superior technology applied on the HYBRID containment shell which generates negligible Eddy current loss, M Pumps is now able to directly replace double mechanical seal pumps and canned motor pumps using standard motors. It is now possible to upgrade your conventional pumps into M Pumps most advanced and environmental friendly sealless pumps.

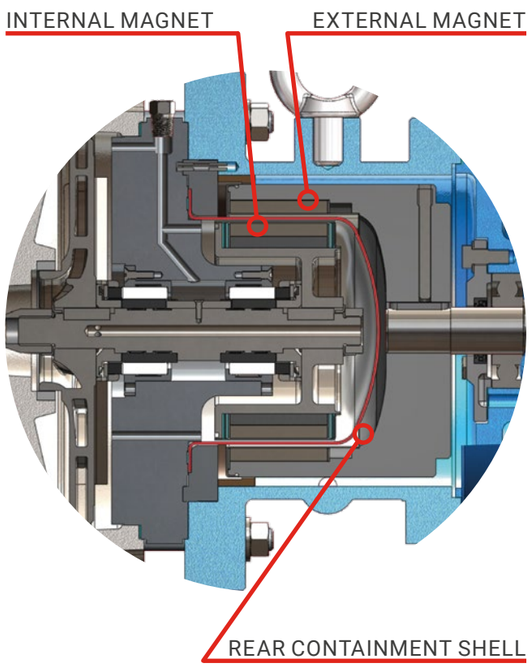
**There are NO MORE technical reasons to choose a mechanical seal pumps Vs a M PUMPS magnetic sealless pump.**

## M PUMPS HAS SOLVED ALL THESE ISSUES WITH THE HYBRID CONTAINMENT SHELL

*(SEE PAGE 9)*

The Hybrid Rear Shell offers several advantages:

- Vs other magnetic drive manufacturers, much lower power absorption.
- Consequently the power consumption is much lower, offering very competitive Total Cost of Ownership.
- Almost negligible heat generation, with easy handling of: low boiling chemicals/cooling agents.
- 50 bar g design pressure and -90°C/+200°C design temperature.
- On demand: Reliable, immediate temperature reading (temperature sensor is located at the source of the magnetic field, providing accurate reading and timely response, avoiding pump failure).



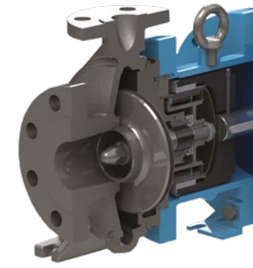



# M PUMPS RANGE

## Centrifugal Pumps

State of the art centrifugal pumps from the simplest to the most demanding industrial process application. Suitable for transfer, unloading, circulation and many other applications. High efficiency, long life and low cost maintenance. Meeting several international standards (ISO/DIN/ANSI/API) and available in both magnetic drive (sealless) and traditional mechanical seal.

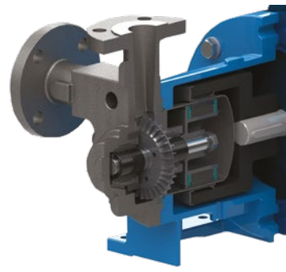
- Flow up to 4000 m³/h
- Head up to 2200 m
- System pressure from vacuum up to 1500 bar
- Temperature from -150°C up to +400°C
- No heat exchanger required up to +350°C



## Regenerative Turbine Pumps

Low to medium flows, pulsation free, suitable where high pressure is required. Perfect solution where traditional centrifugal pumps are not suitable (used instead of a multistage pumps).

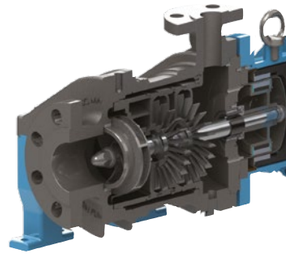
- Flow up to 24 m³/h
- Head up to 800 m
- System pressure from vacuum up to 1500 bar
- Temperature from -150°C up to +400°C
- No heat exchanger required up to +350°C



## Side Channel Pumps

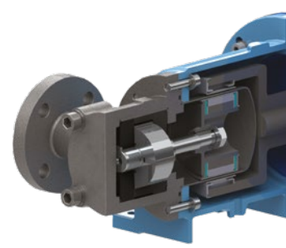
316 stainless steel (or better) multi-stage barrel construction. Ideal to pump liquefied gasses and liquids under vapor pressure like condensate, refrigerant, boiler feed water or LPG (up to 50% gas content).

- From low to medium flows ,best choice for truck unloading and natural gas handling.
- Low NPSHr 0,5 m
- Self priming up to 5 m.
- Flow up to 40 m³/h
- Delivery Head up to 450 m
- System pressure up 50 bar
- Temperature from -90°C up to +250°C



## Volumetric Pumps

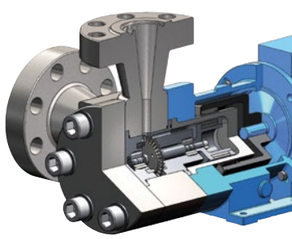
| | |
|---|---|
| SLIDING VANE PUMPS | • Flow rates up to 3000 l/h, discharge pressure up to 48 bar g.<br>• Suitable for viscosities from 1 to 1000 cP<br>• Pulsation free dosing/sampling/transfer pumps |
| EXTERNAL GEAR PUMPS | • Flow rates up to 80 m³/h, discharge pressure up to 30 bar g.<br>• Suitable for lubricating media up to 25000 cP<br>• Temperature up to +200°C |
| HOLLOW DISC | • Flow rates up to 38 m³/h, discharge pressure up to 5 bar g<br>• Viscosities up to 10000 cP |



## Special Pumps

M PUMPS is able to design and manufacture bespoke pumps for the most demanding applications:

- High system pressure (up to 1500 bar g)
- High design temperature (400°C)
- Low design temperature (liquid CO2 cryogenic application)
- Solid content
- Jacketing
- Exotic materials such as: Hastelloy C® 276, Titanium, Monel®



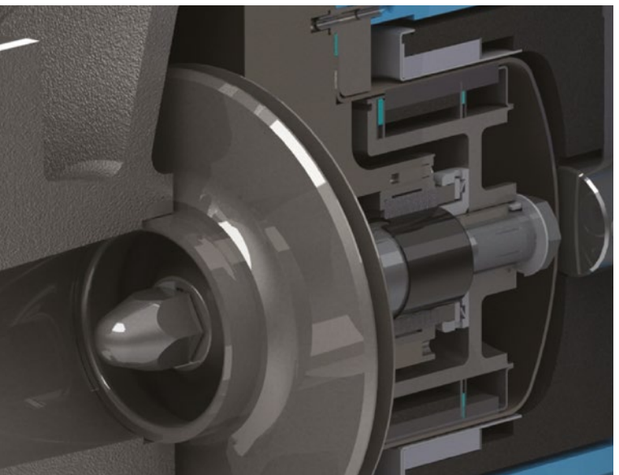
# CENTRIFUGAL PUMPS

Extremely wide centrifugal pump range, meeting and exceeding international standards (DIN EN 22858 – ISO 2858, ANSI B73.3, API 685 2nd Ed & API 610 11th Ed) and available in both magnetic drive and traditional mechanical seal design.

These pumps can be supplied both with close coupled and long coupled version (with or without baseplate). Metallic wetted parts from AISI 316 (STD), Duplex, Hastelloy C, Titanium etc.

Several non-metallic models for corrosive and ultra pure application (PFA lined cast iron pump heads, vertical pumps with solid plastic, injection molding both in PP and PVDF.

- Closed impeller
- High efficiency
- SiC bearings
- Modular construction 4000 m³/h – 700 m
- -28°C to +350°C



(Petroleum, Petrochemical & Gas process services)

### CNV MAG-M
Centrifugal Vertical Sealless Pump

Mag-Drive
Flow up to 4000 m³/h
Head up to 350 m
Length up to 7 m

## DIN EN 22858

### CL MAG-M SERIES
Horizontal Lined Centrifugal Magnetic Sealless Pump

Acc. to DIN EN 22858 - ISO 5199
Flow up to 90 m³/h
Head up to 63 m

### CN SEAL-M SERIES
Centrifugal Pump-Mech. Seal

Acc. to DIN EN 22858 - ISO 5199
Flow up to 1000 m³/h
Head up to 225 m

### CL SEAL-M SERIES
Lined Centrifugal Pump-Mech. Seal

Acc. to DIN EN 22858 - ISO 5199
Flow up to 340 m³/h
Head up to 86 m

### CN MAG-M SERIES
Centrifugal Sealless Pump

Acc. to DIN EN 22858 - ISO 5199
Flow up to 4000 m³/h
Head up to 220 m

## M PUMPS STD ( Mag Drive )

### CM MAG-M SERIES
Centrifugal Sealless Pump

Metallic Head
Flow up to 35 m³/h
Head up to 36 m

### CM MAG-P SERIES
Reinforced Plastic Centrifugal Sealless Pump

Plastic Head Injection Molding
Flow up to 35 m³/h
Head up to 23 m

### C MAG-PL SERIES
Lined Centrifugal Sealless Pump

Flow up to 140 m³/h
Head up to 44 m

## ANSI B73.3

### CN MAG-M SERIES
Centrifugal Sealless Pump

ANSI B73.3
Flow up to 4000 m³/h
Head up to 155 m

### CL MAG-M SERIES
Centrifugal Sealless Pump

ANSI B73.3
Flow up to 102 m³/h
Head up to 77 m

### CL MAG-M SERIES
Centrifugal Magnetic Sealless Pump

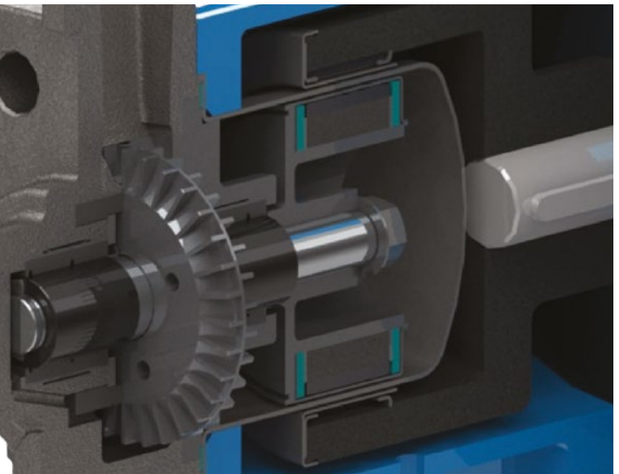
ANSI B73.3
Flow up to 102 m³/h
Head up to 77 m

# REGENERATIVE TURBINE PUMPS

Superior performances (high head, very high overall efficiency, pulsation free and very low NPSH r) thanks to both M PUMPS design and choice of materials (AISI 316, PEEK etc.)

These pumps, thanks to the small footprints, and custom design, can be used in any industrial application, from demanding 24/7 Oil&Gas application to service duties for OEMs

- Low to medium flow (up to 22 m³/h)
- High head (up to 800 meters; very often used instead of multistage pumps)
- Pressure systems from vacuum to 1500 bar
- Temperatures from -150°C to +400°C (no external cooling required up to 350°C)
- Pulsation free



## TURBINE

Hydraulically-balanced floating impeller design that builds pressure equally on both sides.

The four available models cover several type of applications and budget where low to medium flows and high head are required.

The CT MAG-M sealless regenerative turbine pumps are designed with first centrifugal stage and one or two turbine stages. Ideal for low flow-high head (up to 800 meters) applications and low NPSH (as low as 0,5 meters).

### T MAG-M SERIES
Peripherical Pump

Flow up to 9 m³/h
Head up to 90 m

### T ECO MAG-M SERIES
Peripherical Pump

Flow up to 1,5 m³/h
Head up to 85 m

### T MAG-P SERIES
Solid Plastic Peripheral Pump

Flow up to 13 m³/h
Head up to 53 m

# VOLUMETRIC PUMPS

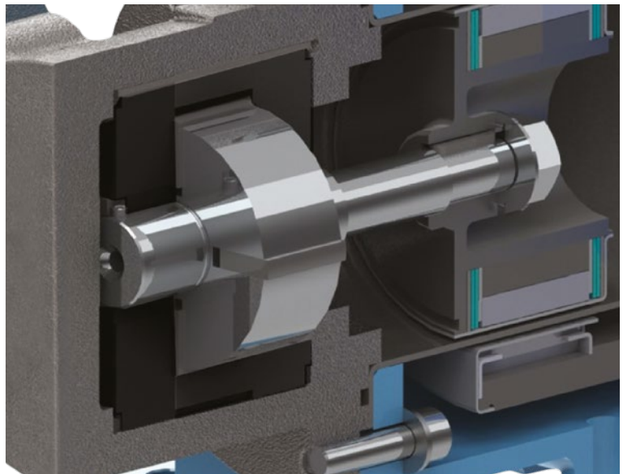
M PUMPS, over the years, was required to develop several volumetric pumps to meet its customers' demands.

These volumetric pumps, benefit from M PUMPS hydraulic knowledge and most of state-of-the-art magnetic drive design experience.

These type of pumps are commonly available in the market with traditional mechanical seal technology; M PUMPS care for centrifugal pumps was transferred to volumetric technology and coupled with the most advanced magnetic drive solution currently available.

**MPUMPS VOLUMETRIC PUMPS ARE**

- Robust, industrial process pumps
- Pulseless
- Leak-free
- Flow rate virtually unaffected by pressure, temperature and viscosity variation



## SLIDING VANE

- Pulsation free, dosing/sampling/small transfer pump.
- Viscosities 1 to 10000 cP.
- Flow rates to 3000 l/h Disch. press up to 48 bar.

### V IN LINE SERIES
Sliding Vane Pump

Flow up to 3 m³/h
Head up to 12 bar

### V MODULAR SERIES
Multistage Sliding Vane Pump

Flow up to 2 m³/h
Head up to 48 bar

### VP SERIES
Solid Plastic Sliding Vane Pump

Flow up to 3 m³/h
Head up to 5 bar

## EXTERNAL GEAR

- Suitable for lubricating media with viscosities up to 25000 cSt
- Temp up to +200°C

### GS MAG-M SERIES
External Gear Pump

Flow up to 80 m³/h
Head up to 30 bar

## HOLLOW DISC

- Self priming, reversible flow heavy duty mag drive pumps.
- Suitable for oily media, paints, glues, resins, molasses, coal, tar.
- Viscosities up to 25000 cSt.

### MHV MAG-M SERIES
Hollow Disc Pump

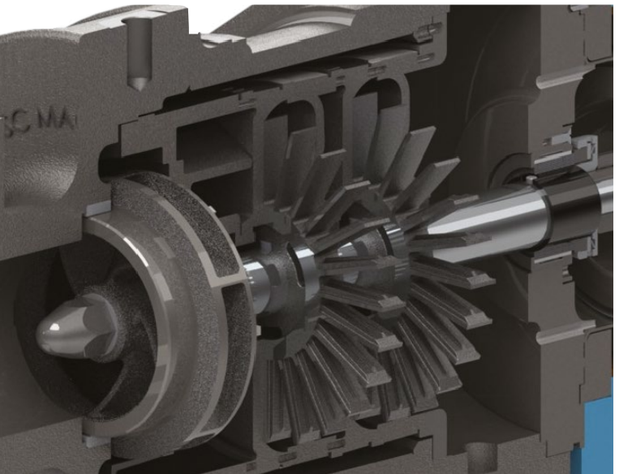
Flow up to 38 m³/h
Head up to 8 bar

# SIDE CHANNEL PUMPS

316 stainless steel Multi-Stage Barrel construction. Ideal to pump liquefied gasses and liquids under vapor pressure like condensate, refrigerant, boiler feed water or LPG (up to 50% gas content).

Applications: Chemical and Petrochemical Industries, Refineries, Liquid gas plants, Power plants truck loading and unloading.

- **Aggressive, explosive and toxic liquids**
- **Isobutylene, butadiene, propylene**
- **Hydrocarbons**
- **Liquid gases**
- **Boiler water**
- **LPG**
- **Ammonia**
- **Methyl chloride, vinyl chloride**



## SIDE CHANNEL

- Low NPSHr (as low as 0,5 metres)
- Able to deliver up to 50% gas content
- Self priming
- Flows up to 40 m³/h
- Head up to 450 m (multi stage)
- System pressure 40 bar g
- Operating temperature -28 to +120°C
- Heavy Duty Centerline
- Barrel construction
  (No intermediate gaskets)

### SC MAG-M SERIES

Centrifugal Side Channel Combination Pump

Flow up to 40 m³/h
Head up to 450 m
NPSH up to 0,5 m

### SCE MAG-M SERIES

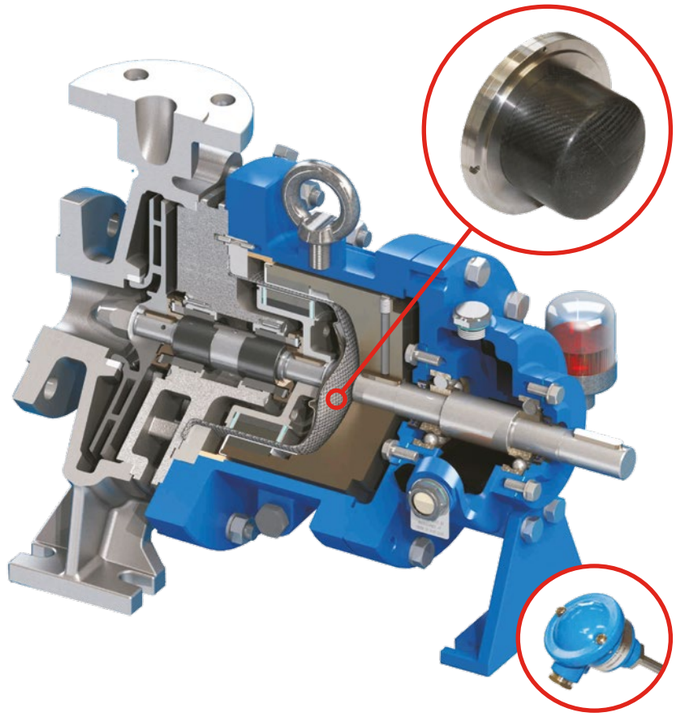
Centrifugal Side Channel Pump
in according to EN 734

Flow up to 40 m³/h
Head up to 53 m
NPSHr up to 2 m

# HYBRYD REAR CONTAINMENT SHELL

Thanks to our 40 years of experience in magnetic drive technology, M Pumps is able to supply innovative and unique rear containment shell on magnetic drive pumps to enhance the competiveness and operational efficiency in today's process industry. As technology advances, the need for high pressure, high temperature and energy efficient become the top priorities among pump users.

Staying ahead of these priorities required M Pumps to adopt a forward thinking and proactive approach to pump design.



## AVAILABLE ON ALL M PUMPS PROCESS PUMPS

Based on this Philosophy, M Pumps has created an advanced High pressure, High Temperature and Energy efficient Rear Containment Shell to eliminate the various concerns on the use of magnetic driven pumps in the process industry.

M PUMPS Hybrid Technology is the most advanced and attractive ENERGY SAVING solution available now in the market. Innovative and unique M Pumps solution offering:

## MAIN ADVANTAGES

- Impressive reduction in Magnetic losses
- High Pressure design: vacuum to 50 bar g
- High Temperature design: -90°C to 200°C
- Motor power installation up to 1000 kW

INTELLECTUAL PATENTED PROPERTY

The PATENT US 9841025 B2 hybrid echnology containment shell combines the reliability of a standard inner metallic shell (High Pressure and High Temperature) with the strength of Carbon Fibre outer shell to achieve an energy efficient (Reduction in magnetic loss and cost of ownership) and environmental friendly Hermetically sealed) solution.

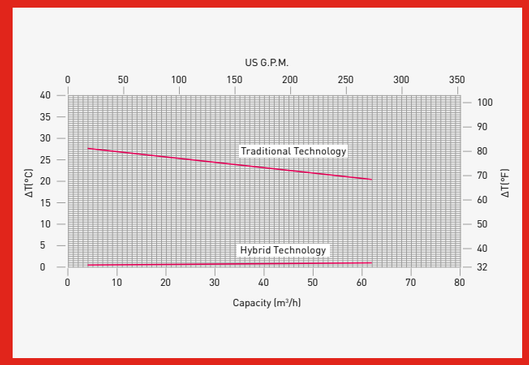
## MAG LOSSES AND HEAT REDUCTION

| | Hybrid shell containment comparison (*) | | | | |
|---|---|---|---|---|---|
| | MATERIAL | DES PRESS (bar) | DESIGN TEMP °C | MAG-LOSSES (KW) | NOTES |
| HYBRID M PUMPS | HASTELLOY C / CARBON FIBER | 50 | -90/+200°C | 0,78 | EXTREMELY RELIABLE/SUITABLE FOR TEMP. PROBE/GREAT PRICE ADVANTAGE |
| COMPETITORS | ZIRCONIUM OXYDE | 16 | -190/+350°C | / | HIGH COST AND MUCH LOWER PRESSURE |
| | METAL ZIRCONIUM OXYDE | 16 | -190/+350°C | 1,5 | HIGH COST, MUCH LOWER PRESSURE AND HIGHER MAG LOSS COMPARED TO M PUMPS |
| | COMPOSITE PEEK | 16(≤ 20°C) | -40/+120°C | / | HIGH COST AND PRESSURE AND TEMPERATURE LIMITATION |
| | PTFE - CARBON FIBER | 16 | -20/+200°C | / | PRESSURE LIMITS AND OVERSIZING OF MAGNET (DE-COUPLING RISK) |
| | BOROSILICATE GLASS | 10 | -40/+180°C | / | PRESSURE LIMITS, VERY FRAGILE AND HIGH COST (OVERSIZED MAGNET) |

(*) Comparison with installed motor 18,5 kW, 2 poles, 50 Hz.

Comparison between M PUMPS and other rear shell solutions available now on the market.

## MINIMIZED TEMPERATURE RISING ON REAR CASING REGION




Hybrid technology reduces greatly heat generation in the rear casing region. This benefit is particularly important when pumping low boiling liquids.

# BOA PUMPS

Air operated double diaphgram pumps have long been recognized as the most flexible pumps of the industry for handling difficult liquids at relatively low pressure and flows.

The range of applications in virtually limitless. MPUMPS AODD pumps come in many size and choices of material construction. Almost every type of liquid from highly corrosive acids through high viscosity paints and adhesives, to food and drink produts can be pumped.

## BOA

Air operated double diaphragm pumps
Realized in: PP, PVDF, ALUMINIUM, SS AISI316, POMc

Flow-rate from 8 lt/min to 1.000 lt/min
Connection from ¼" to 3"

## BOA DRUM

Air operated double diaphragm pumps special Features to empty drums and tanks. Realized in: PP, PVDF, ALUMINUM, SS AISI 316, POMc

Flow-rate from 8 lt/min to 160 lt/min
Connection from ¼" to 1"

## BOA TWIN

Air operated double diaphgragms pumps with special Features with double inlet/outlet. Realized in: PP, PVDF, ALUMINIUM, SS AISI 316, POMc

Flow-rate from 8 lt/min to 700 lt/min
Connection from ¼" to 2"

## BOA FOOD

Air operated double diaphragm pumps
Realized in: SS AISI 316 electro-polished and PP food grade (P7)

Flow-rate from 8 lt/min to 1.000 lt/min
Tri-Clamp Connection

## DAMPER

Pneumatic, automatic pulsation dampeners. Realized in: PP, PVDF, ALUMINIUM, SS AISI 316, POMc

Applicable to all size of pumps.
Available also in ATEX or FOOD version

## BOA ATEX

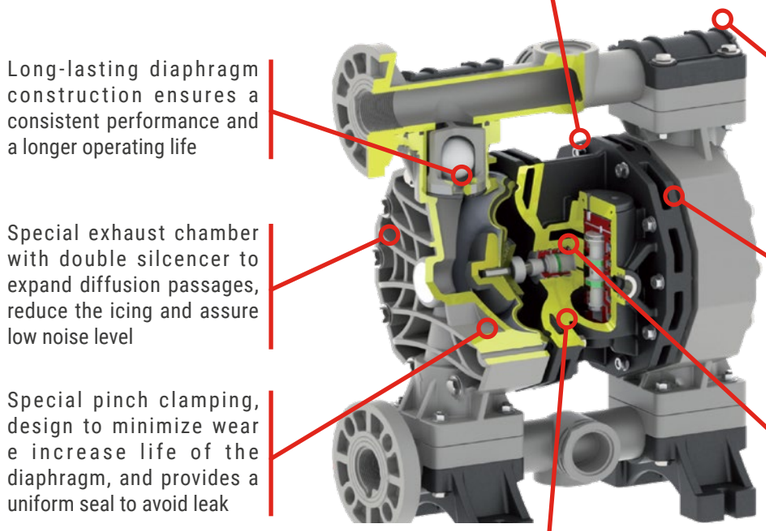
Air operated double diaphragms pumps, ATEX certified for zone 1. Realized in: PP+CF, PVDF+CF, ALUMINIUM, SS AISI 316, POMc+CF

Flow-rate from 8 lt/min to 1.000 lt/min
Connection from ¼" to 3"

## BOA ACCURATE

Double diaphragm pumps with remote control. Realized in: PP, PVDF, ALUMINUM, SS AISI 316, POMc

Flow-rate from 8 lt/min to 700 lt/min
Connection from ¼" to 2"



# REFERENCE LIST

| YEAR | END USER/EPC CONTRACTOR | PLANT TYPE PROJECT NAME | PLANT TYPE | COUNTRY |
|---|---|---|---|---|
| **2015** | Sanofi | Pharmaceutical BRINDISI PLANT | Solvent | **Italy** |
| **2016** | Johan Svendrum | Statoin, offshore | Cooling/Sea Water application | **Offshore** |
| **2017** | Lundin Petroleum | Edvar Greig Field | Various pumps for particular services | **Norway** |
| **2017** | UK governative agency | CO2 capture and storage project | Supercritical CO2 | **UK** |
| **2018** | ENI - Gela | Raffineria ENI | Hydrocarbons | **Italy** |
| **2018** | PETRONAS CHEMICALS ISONONANOL SDN. BHD. | Unloading pump | Raffinate III Unloading Pump | **Asia** |
| **2019** | OMV | Produced Water | Produced Water plant | **Libya** |
| **2019** | LANXESS SOLUTIONS ITALY S.R.L. | Chemical Process | Water, Sulfuric Acid, Hydrochloric Acid | **Italy** |
| **2020** | Lundin Petroleum | Hot sea water - Crude Oil - Water Injection - Heatings Medium | Nr.12 Units, OH3, installed power from 30 to 320 kW | **Norway** |
| **2020** | Formosan Union Chemical Corp. | Ammonia Water | Hydrocarbon | **Taiwan** |
| **2020** | Himsen Corporation | 25% Ammonia Hydroxide (NH4OH) | Loading, Unloading Pump | **South Korea** |
| **2021** | Vfuels (U.S.A) | Cabinda Refinery | Hot Oil | **Angola** |
| **2021** | Alcantara | Production | Solvent Circulation | **Italy** |

# CERTIFICATIONS

ISO 9001 : 2015

0273

ISO 14001 : 2015

0273




## THE DRIVING FORCE IN MAGNETIC SEALLESS PUMPS TECHNOLOGY

Since its foundation in 1978, M Pumps has been the driving force in the design and development in magnetic driven sealless pumps technology. Our unparalleled expertise and unrelenting passion have created a new paradigm in the application of magnetic sealless pumps in the process industry.

Energy Saving, Environmental Friendly, Safety, Performance, Operation reliability, Total Cost of Ownership and pumps system simplification are now available with one supplier only:

M Pumps advanced magnetic sealless pumps and pump systems.

M Pumps with its wide portfolio of products incorporates over 26 designs and 350 basic models allow our engineering department to select the right pump for your exact process requirement. Pre-engineered pumps, highly engineered and special purpose pumps and systems can be tailor-made to meet any demanding operating parameters as required by today's complex processes.

**ALL PUMPS MANUFACTURED BY M PUMPS ARE DESIGNED, DEVELOPED AND VALIDATED IN COMPILANCE WITH EXISTING INTERNATIONAL STANDARDS.**

- ISO 9001:2015, ISO 5199:2005, ISO 3069:2005 that denotes conformity to highest Quality Standard.
- ISO 14001:2015 that denotes conformity to highest Environmental Standard.

**M Pumps S.r.l.**

Head Office, Plant and Mechanical Workshop
Via Dell'Artigianato, 120 - 45015 Corbola (Ro)

Phone: +39 0426 346304
Fax: +39 0426 349126

info@mpumps.it
www.mpumps.it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