



Customer : ETATRON UKRAINA  
 LLC  
 Reference :

Pump Performance Datasheet  
 MPumps Selection System 24.1.1

|              |                            |                       |                       |
|--------------|----------------------------|-----------------------|-----------------------|
| Item number  | : 001                      | Size                  | : CL MAG-M 80-50-160  |
| Service      | : 10% nitric / acetic acid | Stages                | : 1                   |
| Quantity     | : 1                        | Based on curve number | : 12257               |
| Quote number | : 31268                    | Date last saved       | : 08 Aug 2024 9:24 AM |

**Operating Conditions**

|   |                     |
|---|---------------------|
| Flow, rated                                     | : 20.00 m3/h        |
| Differential head / pressure, rated (requested) | : 5.75 m            |
| Differential head / pressure, rated (actual)    | : 5.84 m            |
| Suction pressure, rated / max                   | : 0.00 / 0.00 bar.g |
| NPSH available, rated                           | : Ample             |
| Site Supply Frequency                           | : 50 Hz             |

**Liquid**

|                                 |                              |
|---------------------------------|------------------------------|
| Liquid type                     | : Nitric Acid [10.00 %]      |
| Additional liquid description   | : Lead Nitrate + Nitric Acid |
| Solids diameter, max            | : 0.00 mm                    |
| Solids concentration, by volume | : 0.00 %                     |
| Temperature, max                | : 110.0 deg C                |
| Fluid density, rated / max      | : 1.300 / 1.550 g/cm3        |
| Viscosity, rated                | : 20.00 cP                   |
| Vapor pressure, rated           | : 0.00 bar.a                 |

**Performance**

|  |                             |
|--|-----------------------------|
| Speed criteria                           | : Synchronous               |
| Speed, rated                             | : 1450 rpm                  |
| Impeller diameter, rated                 | : 141 mm                    |
| Impeller diameter, maximum               | : 169 mm                    |
| Impeller diameter, minimum               | : 140 mm                    |
| Efficiency (total / pump)                | : 45.65 / 45.65 %           |
| NPSH required / margin required          | : 0.55 / 0.00 m             |
| Ns (imp. eye flow) / Nss (imp. eye flow) | : 1,481 / 8,343 US Units    |
| MCSF                                     | : 6.25 m3/h                 |
| Head, maximum, rated diameter            | : 6.41 m                    |
| Head rise to shutoff                     | : 11.49 %                   |
| Flow, best eff. point                    | : 24.76 m3/h                |
| Flow ratio, rated / BEP                  | : 80.78 %                   |
| Diameter ratio (rated / max)             | : 83.43 %                   |
| Head ratio (rated dia / max dia)         | : 65.27 %                   |
| Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]         | : 0.98 / 0.98 / 0.85 / 1.00 |
| Selection status                         | : Acceptable                |

**Material**

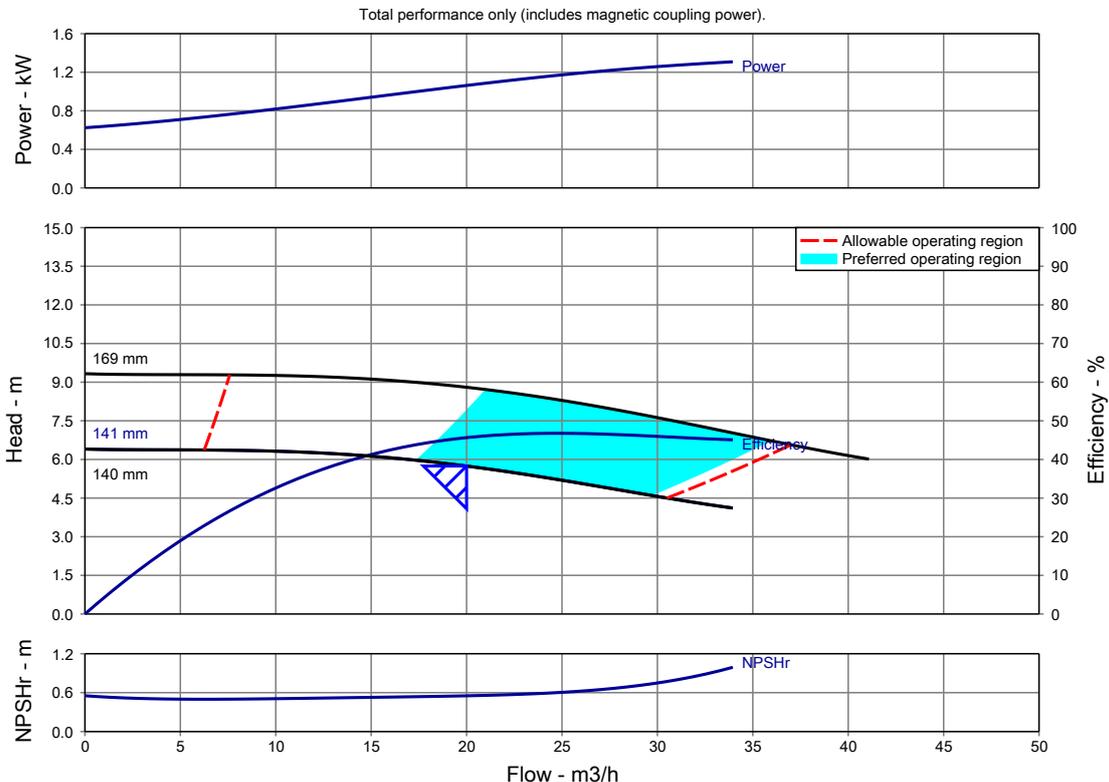
|                   |                                     |
|-------------------|-------------------------------------|
| Material selected | : GGG 40.3 with PFA internal lining |
|-------------------|-------------------------------------|

**Pressure Data**

|                                    |               |
|------------------------------------|---------------|
| Maximum working pressure           | : 0.97 bar.g  |
| Maximum allowable working pressure | : 16.00 bar.g |
| Maximum allowable suction pressure | : N/A         |
| Hydrostatic test pressure          | : N/A         |

**Driver & Power Data (@Max density)**

|                                  |                     |
|----------------------------------|---------------------|
| Driver sizing specification      | : Rated power       |
| Margin over specification        | : 0.00 %            |
| Service factor                   | : 1.00              |
| Magnetic losses                  | : 0.00 kW           |
| Power (total / pump)             | : 1.06 / 1.06 kW    |
| Power, maximum, rated diameter   | : 1.31 kW           |
| Minimum recommended motor rating | : 2.20 kW / 2.95 hp |



## Datasheet

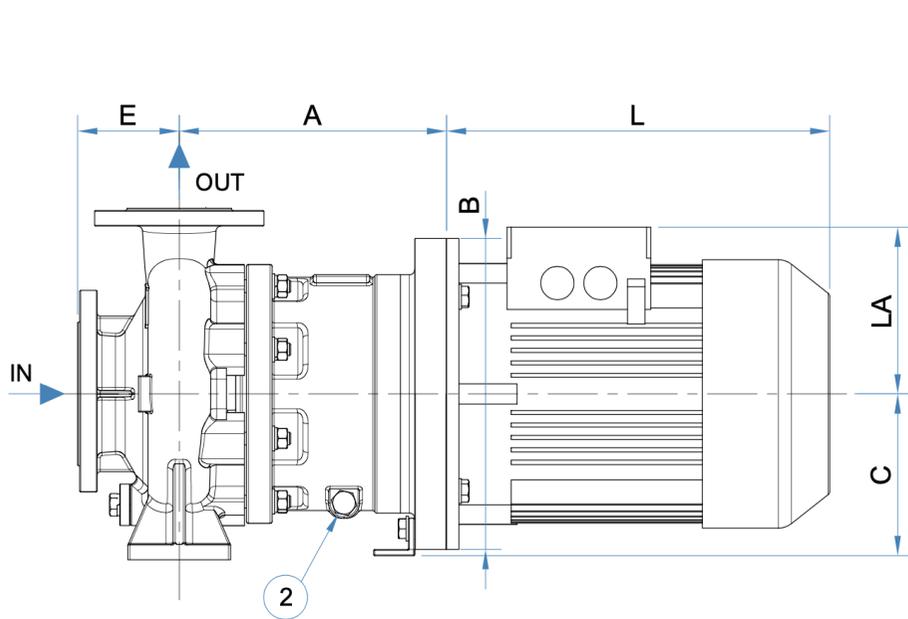
| Customer : ETATRON UKRAINA LLC       | Quote Number : 31268                |       |        |        |          |  |
|--------------------------------------|-------------------------------------|-------|--------|--------|----------|--|
| Customer Reference :                 | Project : Nitric acid + Acetic acid |       |        |        |          |  |
| Item Number : 001                    | Comply To : -                       |       |        |        |          |  |
| Service : 10% nitric / acetic acid   | Comply To : -                       |       |        |        |          |  |
| Quantity of Pumps : 1                | ATEX : No Atex                      |       |        |        |          |  |
| Pump Design                          | Application Data                    |       |        |        |          |  |
| Model : CL MAG-M                     | Liquid Type: : Nitric Acid          |       |        |        |          |  |
| Type : CL MAG-M 80-50-160            | Operating Temp : 110.0 deg C        |       |        |        |          |  |
| Standard : -                         | Viscosity : 20.00 cP                |       |        |        |          |  |
| Rotation : Counterclockwise          | Vapour Pressure : 0.00 bar.a        |       |        |        |          |  |
| Max. Operating Pressure : 0.97 bar.a | Flow, rated : 20.00 m3/h            |       |        |        |          |  |
| MAWP : 16                            | Head : 5.75 m                       |       |        |        |          |  |
| Min. Continuous Flow : 6.25 m3/h     | NPSHA : -                           |       |        |        |          |  |
| NPSHR : 0.55 m                       | Flow, Rated : 20.00 m3/h            |       |        |        |          |  |
| Hydraulic Efficiency : 45.65 %       | Suction Pressure : 0.97 bar.g       |       |        |        |          |  |
| Rated Power : 1.06 kW                | Solid Diameter : 0.00 mm            |       |        |        |          |  |
| Magnetic Coupling Type : N-N         | Density Rated : 1.300 g/cm3         |       |        |        |          |  |
| Impeller Rated* : 140 mm             | Design Pressure : 16.00 bar.g       |       |        |        |          |  |
| Pump Speed : 1450 rpm                | Design Temperature : -              |       |        |        |          |  |
| Connections : DIN PN16               | Driver Information                  |       |        |        |          |  |
| Nozzle                               | Standard                            | Size  | Rating | Face   | Position | Brand : EUROMOTORI   |
| Suction                              | EN 1092-1                           | DN 80 | PN 16  | Tipo B | IN       | Power : 2.20 kW  |
| Discharge                            | EN 1092-1                           | DN 50 | PN 16  | Tipo B | OUT      | Power Supply : 400 V                                       |
| Materials                            |                                     |       |        |        |          | Frequency : 50 Hz  |
| xxx : Pump Casing                    | : GGG 40.3 with PFA internal lining |       |        |        |          | RPM : 1450 rpm   |
| xxx : Impeller                       | : PFA (Standard)                    |       |        |        |          | Enclosure : TEFC   |
| xxx : Pump Bracket                   | : ASTM WCB A216 (Standard)          |       |        |        |          | Frame Size : 100   |
| xxx : Bushing/Sleeve/Thrust Bearings | : Silicon Carbide (Standard)        |       |        |        |          | Construction : B5  |
| xxx : Gaskets                        | : PTFE (Standard)                   |       |        |        |          | Weight   |
|                                      |                                     |       |        |        |          | Pump : 56.00 kg  |
|                                      |                                     |       |        |        |          | Motor : 33.00 kg   |
| Painting Specification               |                                     |       |        |        |          |  |
|                                      |                                     |       |        |        |          | Color : -  |
|                                      |                                     |       |        |        |          | Specifications : C4 HIGH RAL 5015 on no-inox surface (Std) |
| Testing                              |                                     |       |        |        |          |  |
|                                      |                                     |       |        |        |          | Performance test : Not Requested                           |
|                                      |                                     |       |        |        |          | Hydrostatic test : Not Requested                           |
|                                      |                                     |       |        |        |          | NPSH test : Not Requested                                  |
|                                      |                                     |       |        |        |          | Material Certificate : Not Requested                       |

\*M PUMPS S.R.L. reserves the right to modify the impeller diameter, for centrifugal pumps, to reach the guaranteed duty point, when communicated by the customer, according to ISO 9906-2012 and considering the applicable grade, unless otherwise agreed.

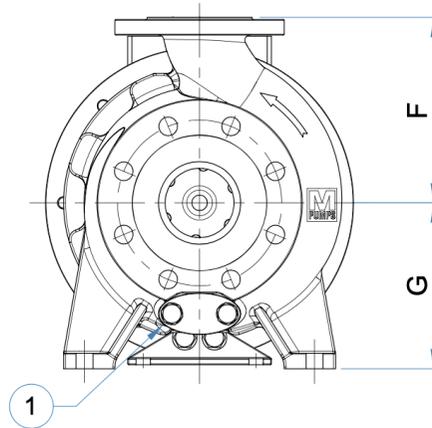
M PUMPS S.R.L. si riserva la facoltà di modificare il diametro della girante, per le pompa centrifughe, per raggiungere il punto di funzionamento garantito, quando comunicato dal cliente, secondo quanto stabilito dalla ISO 9906-2012 e considerato il grado applicabile, salvo diversamente concordato.

Pump size and type : CL MAG-M 80-50-160  
 Item number : 001  
 Customer : ETATRON UKRAINA LLC  
 ATEX : No Atex

Weight (kg) : 56.00 kg  
 Pump

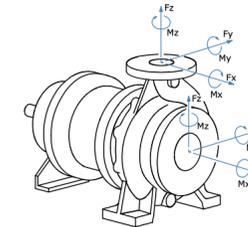


ROTATION



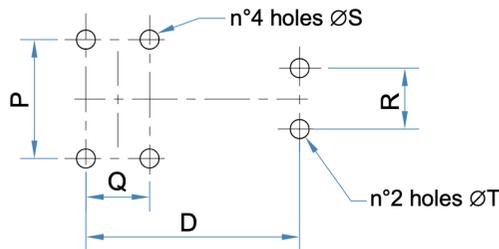
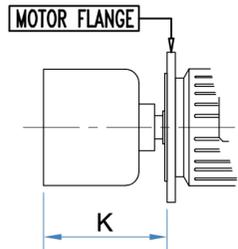
| Dimension (mm) |     |    |       |
|----------------|-----|----|-------|
| A              | 240 | D  | 180   |
| E              | 100 | R  | 110   |
| C              | 155 | K  | 160.5 |
| B              | 250 | S  | 14    |
| T              | 14  | P  | 212   |
| Q              | 70  | L  | 325   |
| G              | 160 | LA | 165   |
| F              | 180 |    |       |

| Strenght (N-m) |     |       |     |     |     |
|----------------|-----|-------|-----|-----|-----|
| SF             |     |       |     |     |     |
| Fx             | Fy  | Fz    | Mx  | My  | Mz  |
| 833            | 500 | 750   | 533 | 467 | 383 |
| DF             |     |       |     |     |     |
| Fx             | Fy  | Fz    | Mx  | My  | Mz  |
| 683            | 550 | 1,317 | 433 | 383 | 783 |



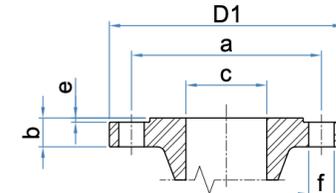
EXTERNAL MAGNET

FOOT PRINT SKETCH



Plug and Port  
 N.1 Pump Casing Drain Plug: Plug Drain 3/8" BSPP  
 N.2 Bracket Plug:

| Flanges      |       |                |       |
|--------------|-------|----------------|-------|
| Suction (mm) |       | Discharge (mm) |       |
| DN           | DN 80 | DN             | DN 50 |
| N. Holes     | 8     | N. Holes       | 4     |
| D1           | 200   | D1             | 165   |
| a            | 160   | a              | 125   |
| c            | 138   | c              | 102   |
| f            | 18    | f              | 18    |
| e            | 3     | e              | 3     |
| b            | 20    | b              | 18    |



Quote number :  
 Item number : 001  
 Service : 10% nitric / acetic acid  
 Quantity of pumps : 1

Pump speed : 1450 rpm  
 Flow : 20.00 m3/h  
 Head : 5.75 m  
 Driver Power : 2.20 kW

Frequency : 50 Hz  
 Coupling Size : N-N  
 Magnet Material :  
 Motor Frame size : 100



### Operating Range:

- Max viscosity 200cSt
- Max system pressure 20 BAR
- Flow up to 90 m<sup>3</sup>/h
- Head up to 63 m
- Temperature Range from -30 to +150°C (-22°F to +300°F)
- Electric motors from 1,5 to 30 KW
- ATEX II - /2G cbk II C T5
- Above parameters are for guidance only and are not to associated



A unit of  
**Mischiatti**  
GROUP

#### M PUMPS s.r.l

Via dell'Artigianato, 120  
45015 Corbola (RO) Italy  
Tel: +39 0426 346304  
Fax +39 0426 349126

info@mpumps.it  
www.mpumps.it

M PUMPS ASIA PACIFIC PTE. LTD.  
51 Bukit Batok Crescent,  
#08-12, Unity Centre, Singapore 658077  
www.mpumps.cn  
Tel: (65) 6316 1339  
Fax: (65) 6287 1406

M PUMPS CORP. LTD  
1019 Campbell Ave. SE  
Roanoke VA - 24013 - www.mpumpscorp.com  
USA Toll Free Number 877-829-2122  
Canada and Mexico Only +1 540-537-3343  
Fax +1 253-484-4155

For more information please contact:



26/02/2016

## CL MAG-M

HORIZONTAL SEALLESS PFA LINED  
CENTRIFUGAL MAGNETIC DRIVE PUMPS ACC. TO ISO 2858 - ISO 5199

Ideal for pump highly corrosive, difficult to seal and high purity chemicals



A unit of  
**Mischiatti**  
GROUP

Setting *Innovative Standards*

# Pump Details

## Pump casings

Robust cast iron (ASTM A395) casings absorbs pipework forces and eliminates need for expansion joint. High thickness transfer moulded unfilled, pure PFA lining for best chemical compatibility. Minimum casing lining thickness is 5 mm.

## Connections

Flanged connections to either UNI 1092-2/ISO 7005-2 PN 16.

## Lining

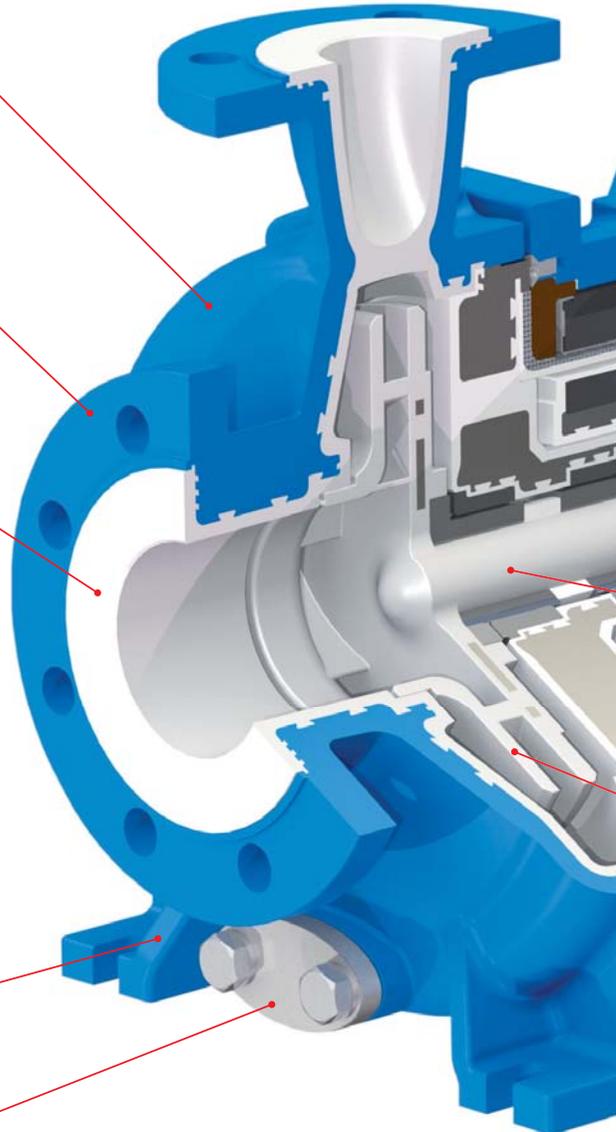
The PFA coating, FDA compliant, for all wetted parts, ensures excellent resistance to aggressive and corrosive fluids. This coating is made using the transfer moulding technique (not for rotational moulding or by injection). This allows obtaining the maximum quality of the coating, both in terms of the thickness distribution and for the compactness of the coating and for the minimization of residual stresses. The coating is precise and determined by the geometry of the mould used that other techniques cannot ensure.

## Surfaces protection

The metal surfaces are protected by a layer of high-resistance paint, according to ISO 12944-5 C5-I, realized in three layer, with epoxy zinc primer, intermediate bicomponent, bottom epossipoliammidica-based, two-component aliphatic acriluretana finish, with a total thickness of 240 microns. Optional: the C5-I cycle

## Flanged Drain plug

1/2" plug drain comes as standard.



# FEATURES & BENEFITS

- Wetted parts materials FDA certificate
- Inert to most of fluids
- High permeation resistance
- Casing and impeller magnet are lined with pure PFA, and achieved by compression transfer moulding
- Containment shell made in PTFE with external reinforce of carbon fiber composite
- Solid handling capability
- Axially thrust-optimized rotating unit by back vanes
- Strong SSiC bushings fully spaced
- Non-cantilevered design, thus no shaft deflection
- High strenght metallic lined rotating shaft with silicon carbide sleeves

Protect your investment with Shaft Power Monitor



## Technical data

- Supply voltage 100-240 VAC / 380-500 VAC / 525-690 VAC
- Frequency 50 Hz / 60 Hz
- Rated current Up to 999 A via current transformer
- Protection class IP20
- Certifications CE, UL, cUL

## Smart protection for fixed speed application:

- Dry Running
- Cavitation
- Closed Valve
- Locked Pump Wheel
- Detect under load and overload
- Flow variation
- Change of fluid density
- Activate alarm or shut down the pump before damage occurs.

# Pump Details

**M PUMPS** has long and proven experience in the chemical process and is daily challenged with new heavy duty and critical applications.

**CL MAG-M** series (PFA lined centrifugal pumps meeting ISO 2858 and ANSI B73.3) benefits from the long and successful experience gained on the field by the metallic series (CN MAG-M series).

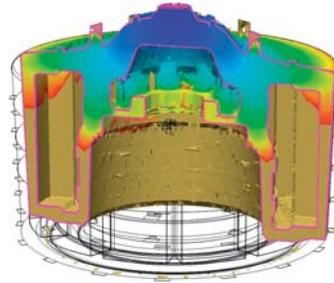
**M PUMPS CL MAG-M** are designed to improve operators and plant safety, specially when toxic, explosive or other dangerous liquids which react on contact with the atmosphere. For all these services rear containment shell replaces double mechanical seals with external fluid reservoirs and all the required control devices. CL MAG-M pumps offer therefore unique advantages to the chemical, pharmaceutical and other process applications.

All pumps manufactured by M PUMPS are in full accordance to existing international standards

- ISO 9001-2013 certification ensures compliance to highest quality standards.
- ISO 14001-2004 certification proves M PUMPS absolute care for the environment.



## Designed and built in M PUMPS



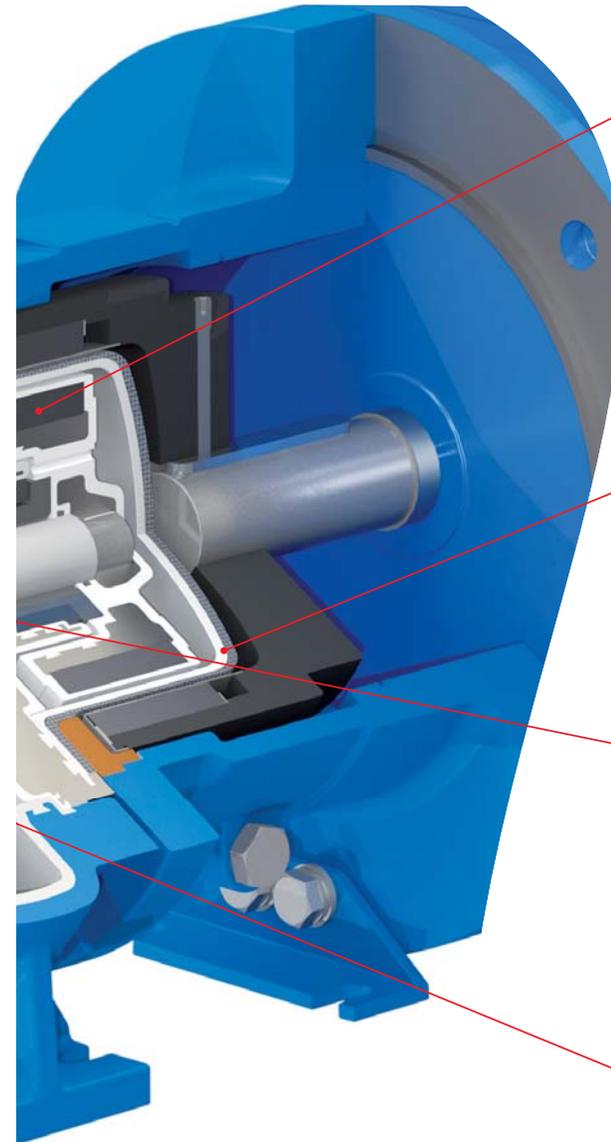
The extensive research conducted by M PUMPS engineers has lead to the best configuration possible, according with the strict transfer molding rules.

This is possible thanks to sophisticated computational software that reduced significantly developing time, maximizing product quality.

M PUMPS engineers have simulated how melted PFA flows during transfer moulding process to predict manufacturing-related defects on parts. Fauld identified, they can be immediately eliminated by making changes to the part design, mold design or processing parameters, in order to save energy, natural resources, time, and money.



Rear Wetted Part assembly (RWP)



### Magnetic Coupling

The powerful synchronous magnetic coupling, assembled without the use of adhesives or resins, are designed and dimensioned by our Technical Department, adapting to the specific needs of these pumps. The mechanical locking of the magnetic sector provides the best balance and the total absence of vibration, helping to increase the longevity of these pumps. The outer magnets are completely encapsulated, and the magnetic fields are not exposed, this is another factor that helps to keep in perfect conditions the pump, and simplifies maintenance (cleaning of simplified magnet).

### Containment shell

The rear containment shell is made in pure PTFE, and it is provided with a solid carbon fibre outer shell. This construction ensures mechanical strength and chemical compatibility at the same time. These containment shells have been studied to achieve a burst pressure of 80 bar, far beyond the design limits expressed by the ISO 5199.

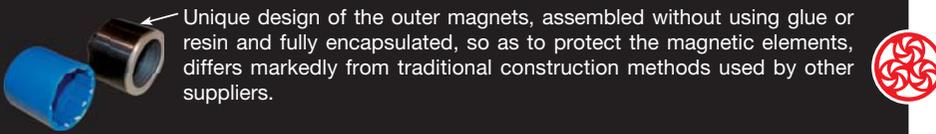
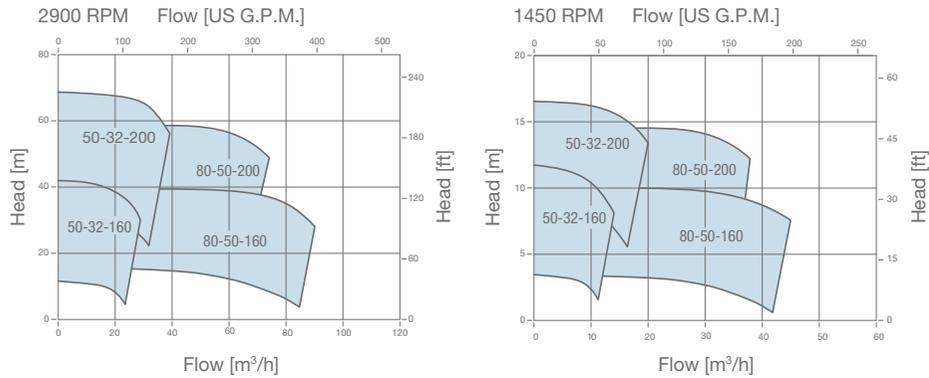
### Shaft and Bushings

The large bushings of sintered silicon carbide ensure a safe and reliable operation even in the more severe transient. As an option is proposed DSiC version, which thanks to the diamond coating of tribological surfaces, allows dry run for short periods.

### Impeller

There are different impeller to meet specific hydraulic requirements. Made by transfer moulding in one piece welding free, with metallic core, and balanced to meet stringent requirements of ISO 1940 grade 2.5.

# Pump Performances



# Guideline for CL MAG-M Pumps series

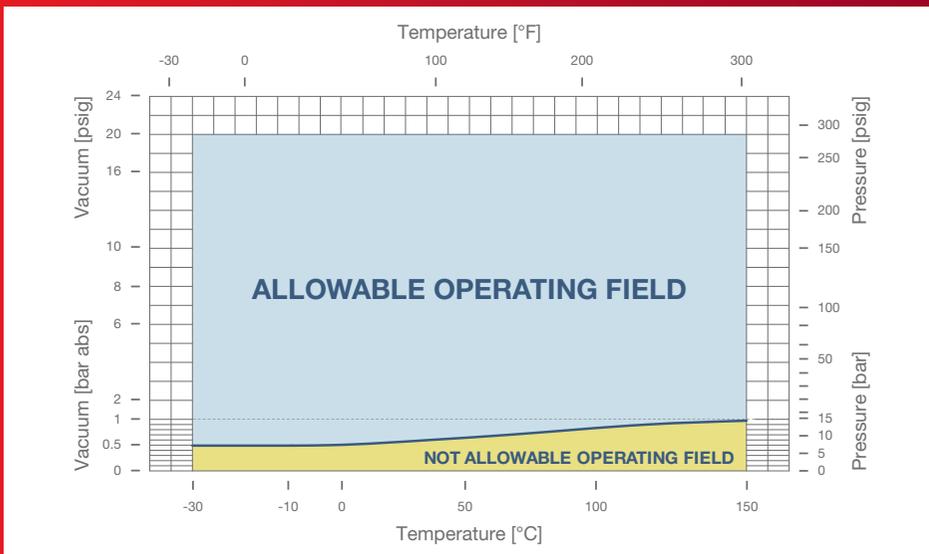
## Main Features

- Pure PFA coating, with thicknesses from 3 to 6 mm.
- PFA, better chemical resistance than ETFE
- Temperature range from -30°C to +150°C (-22°F to +300°F)
- Dry-run possibility over 15 minutes with DSIC silicon carbide bushings.



Close couple or long couple version available

## Temperature Limits



## Dry Running Capability Chart

