

**Magnetic drive pumps**



**Mechanical seal pumps**

Design and realization: Comcorde Grafimedia, Bladel, The Netherlands

## Quality pumps deserve quality piping!

Many pump problems are caused by poor suction conditions. The bigger the pump and the higher the temperature, the more important that pump and pipe work match.

### Select the right pipe size

Always try to respect the basic rules for liquid velocity  $v$  (metre/second)

We recommend for: Suction side  $v = 1 - 2$  m/s Discharge side  $v = 1,5 - 3$  m/s

Flow l/h	Inner pipe diameter (mm)								
	15	20	25	32	40	50	65	80	100
	Velocity (m/s) at given flow (l/h)								
1000	1,57	0,88	0,57						
2000	3,15	1,77	1,13	0,69					
4000	6,29	3,54	2,26	1,38	0,88				
6000		5,31	3,40	2,07	1,33				
8000			4,53	2,76	1,77	1,13			
10000			5,66	3,46	2,21	1,42	0,84		
15000				5,18	3,32	2,12	1,26	0,83	
20000				6,91	4,42	2,83	1,68	1,11	
30000				10,37	6,63	4,25	2,51	1,66	1,1
40000					8,85	5,66	3,35	2,21	1,4

EG For flow of 10000 l/h choose suction pipe with 50 mm inner diameter

### 10 Golden rules for suction piping

- 1 Keep suction pipe as short as possible.
- 2 Increase suction pipe size by at least one diameter for longer suction pipe and/or high temperature.
- 3 Prevent or limit fittings on suction side.
- 4 If unavoidable, keep fittings a distance of 10 pipe diameters away from pump inlet.
- 5 Allow sufficient liquid level to prevent intake of air into suction pipe.
- 6 Support piping near pump to prevent stress.
- 7 Ensure piping is completely leak free.
- 8 Use generously oversized strainer in case of risk of foreign particles.
- 9 Use siphon breaker if pump is primed over top of tank.
- 10 Never throttle pump on suction side.

## To calculate system resistance, the following data are required

### Liquid

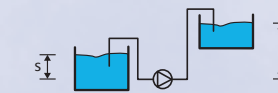
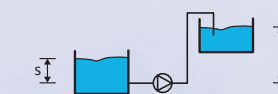
Concentration   
 pH   
 Temperature (°C/°F)   
 Specific gravity (kg/dm<sup>3</sup>)   
 Viscosity (cSt)

Is liquid contaminated?  yes / no  
 Abrasive liquid?  yes / no  
 Contains ferrous particles?  yes / no  
 Risk of crystallization  yes / no  
**Required pump capacity (l/h)**

### How is pump installed?

S = Suction D = Discharge side

S  D   
 mm mm



Diameter pipework (mm)

Total length pipework (m)

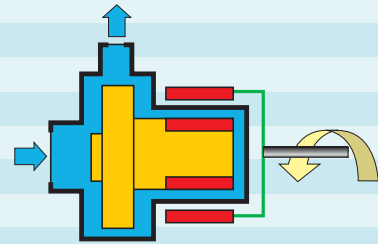
### Flow restrictions

	S	D
	qty	qty
Elbow 90°		
Elbow 45°		
Tee 90°		
Tee 45°		
Ball valve		
Diaphragm valve		
Butterfly valve		
Ball check valve		
Y-strainer		
Eductor		
Spray nozzle		
Filter		
Heat exchanger		

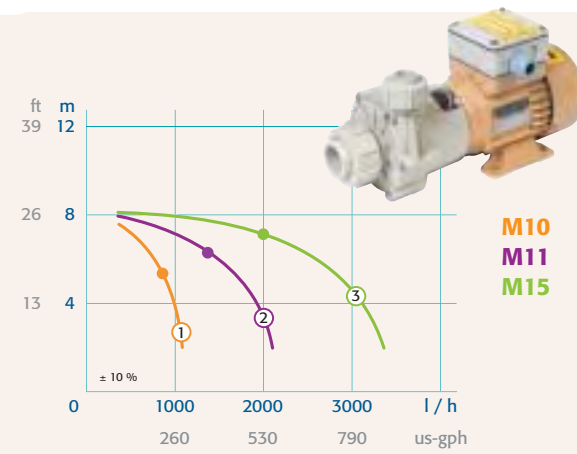
# Horizontal centrifugal pumps in PP and PVDF



## Magnetic drive pumps

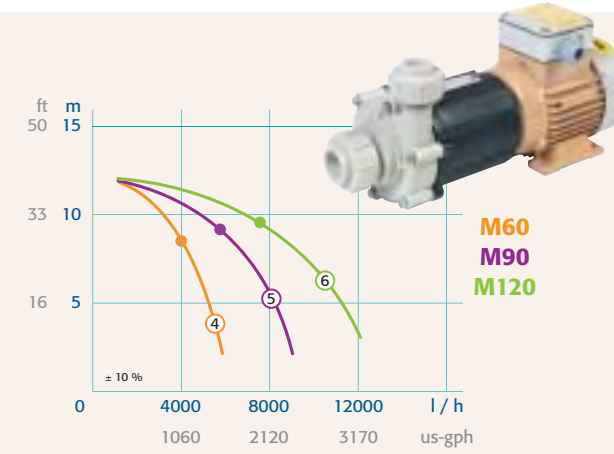


- Well accepted pumps for plating applications
- Sealless, therefore leakfree
- Ideal for clean or slightly contaminated acids and alkalines
- Not suitable for electroless nickel and highly abrasive solutions or solutions which contain ferrous particles
- Provide extra safety factor for aggressive and expensive liquids

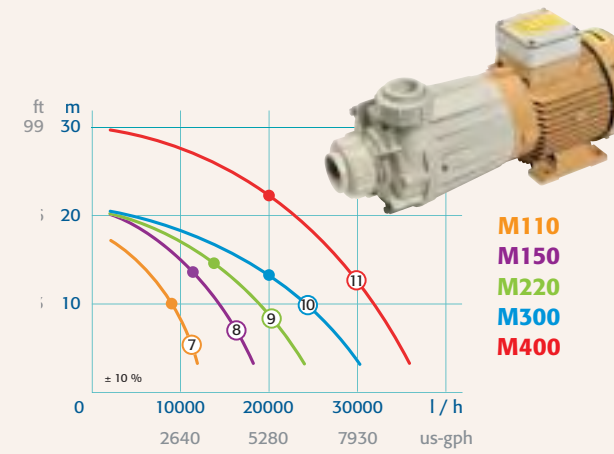


M10  
M11  
M15

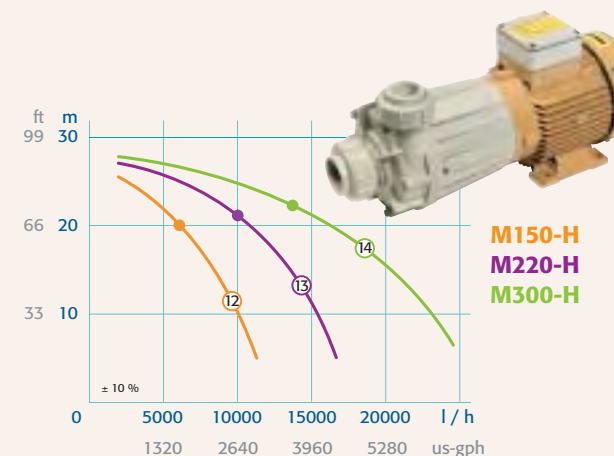
Best Efficiency Point ( $\eta$ )  
All curves based on water 20°C / 68°F for 50 and 60 Hz (trimmed impeller)



M60  
M90  
M120

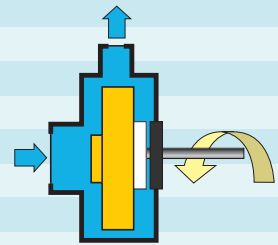


M110  
M150  
M220  
M300  
M400

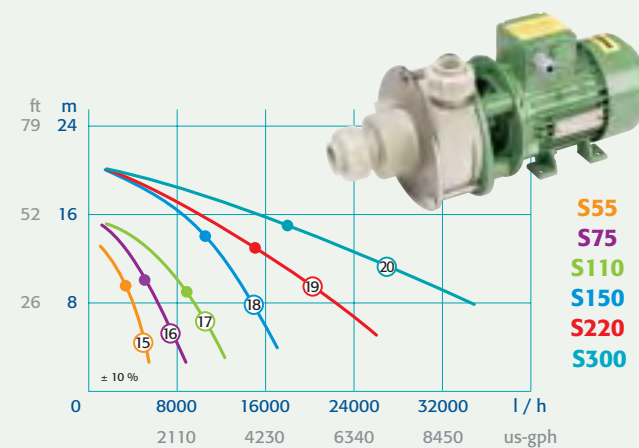


M150-H  
M220-H  
M300-H

## Mechanical seal pumps



- Suitable for most plating solutions
- Traditionally cost effective to purchase and maintain
- Ideal for abrasive solutions or solutions which contain ferrous particles (not suitable for electroless nickel)
- Mechanical seal material depends on application



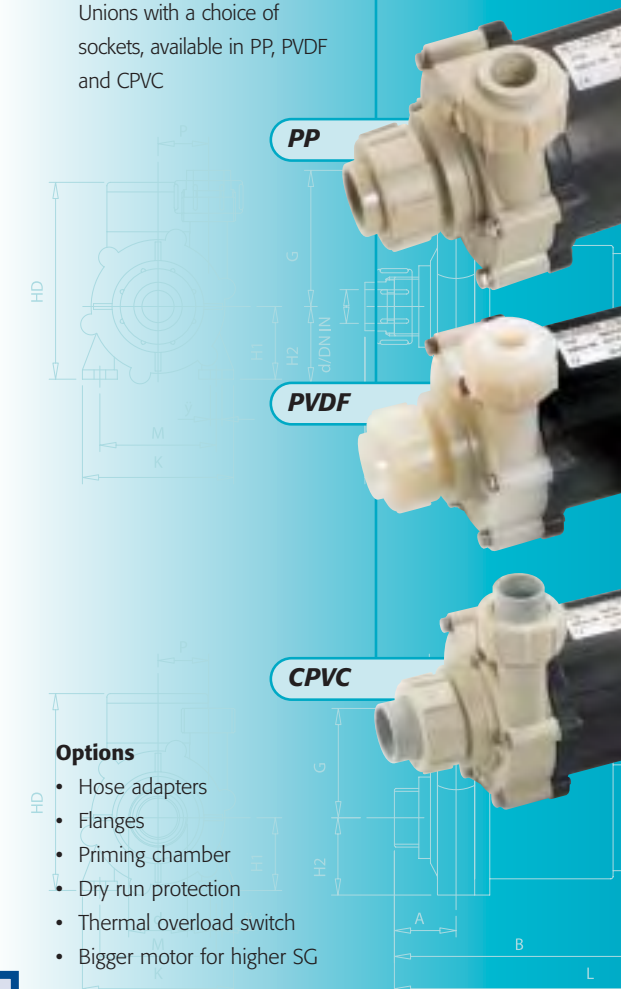
S55  
S75  
S110  
S150  
S220  
S300

### Features

- Max temp PP 80°C / 176°F, PVDF 100°C / 212°F
- Motor with two component Polyurethane for excellent chemical resistance
- Some motor parts are constructed from PP, depending on brand and size

### Hendor standard connections

Unions with a choice of sockets, available in PP, PVDF and CPVC

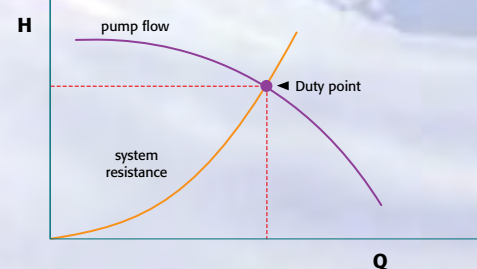


### Options

- Hose adapters
- Flanges
- Priming chamber
- Dry run protection
- Thermal overload switch
- Bigger motor for higher SG



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### Select the right pump

- 1 Select pump design (magnetic drive or direct drive) depending on liquid
- 2 Determine required flow
- 3 Find required head by calculating system resistance in metres or feet
- 4 Find duty point by matching required flow and head with pump curve
- 5 Select pump closest to Best Efficiency Point ( $\eta$ )
- 6 For high SG a bigger motor may be required
- 7 Specify material for Pump, O-rings/Seals based on liquid and temperature
- 8 Select inlet/outlet type
- 9 Check available options
- 10 Specify supply power (Volt /Phase /Cycles)

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑳	
Pump Type (-PP/-PVDF)	M10	M11	M15	M60	M90	M120	M110	M150	M220	M300	M400	M150H	M220H	M300H	S55	S75	S110	S150	S220	S300
Motor (kW)	0,12	0,18	0,18	0,25	0,37	0,55	1,1	1,5	2,2	3	4	1,5	2,2	3	0,55	0,75	1,1	1,5	2,2	3
(hp)	1/6	1/4	1/4	1/3	1/2	3/4	1-1/2	2	3	4	5-1/2	2	3	4	3/4	1	1-1/2	2	3	4
Max SG at BEP	1,25	1,22	1,19	1	1,2	1,3	1,5	1,4	1,6	1,4	1,3	1,2	1,5	1,2	1,1	1,3	1,5	1,3	1,3	1,3
Bigger motor available	+			+	+			+		+		+	+		+					
Inlet d/DN (mm) *	32/25	32/25	32/25	32/25	32/25	40/32	40/32	50/40	65/50	65/50	65/50	65/50	65/50	65/50	32/25	32/25	40/32	50/40	63/50	63/50
Outlet d/DN (mm) *	20/15	20/15	20/15	25/20	25/20	32/25	32/25	40/32	50/40	50/40	50/40	50/40	50/40	50/40	25/20	25/20	32/25	40/32	50/40	50/40
Net weight (kg)	5,5	5,5	6	8	10	11	14,5	17,5	23	27	33	17,5	23	27	13	15	18	22	25	29

\* d/DN = OD/ID metric pipe size. For dimensional drawing in metric and inches refer to www.hendor.com