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CHEMSTEEL - Pump Selection Guide

The selection of the appropriate Chemsteel pump to fit a given application depends upon full knowledge of the application including both system parameters and fluid properties. Follow the guidelines given below when selecting a Chemsteel gear pump.

Chemical Compatibility: Select the basic materials of construction for the pump based upon chemical compatibility. Refer to Chemical Resistance Charts to decide on acceptable materials of construction. Then, consider the fluid's lubricity.

Lubricity: As a general rule, use only metal/plastic, plastic/plastic, or W88/W88 gear combinations for nonlubricating fl uids, typically viscosities less than 25 centipoise. Drive/idle gear combinations of 316/316 and Alloy-C/Alloy-C must only be used with lubricating fluids to avoid galling.

Pressure: Refer to the following table for limitations on pressure for various constructions. (Not applicable to tandem pumps, consult factory.)

A. Gears and Bearings

Gear Combination	Maximum Differential Pressure					
	Carbon bearings		Teflon Bearings		Rulon Bearings	
Plastic / Plastic	50 psi	3.4 bar	50 psi	3.4 bar	50 psi	3.4 bar
Metal / Plastic	100 psi	6.9 bar	50 psi	3.4 bar	75 psi	5.2 bar
Metal / Metal*	150 psi**	10.3 bar	Not Available		100 psi	6.9 bar

* Not available for pumps with Ryton housings.
** Mag Drive limited to 110 psi.

B. Housing

Housing	Maximum Differential Pressure		Maximum System Pressure	
Metal	150 psi	10.3 bar	300 psig, R1 & R2 Series	20.7 bar, R1 & R2 Series
Metal	150 psi	10.3 bar	225 psig, S4 & S9 Series	15.5 bar S4 & S9 Series

Temperature: Refer to the following table for selection of the appropriate Trim Code when using plastic gears. Teflon or PEEK gears must be trimmed for applications exceeding 110°F (43°C). Ryton gears (to a maximum temperature of 200°F (93°C)) in either a Ryton or metal housing are thermally stable and do not require trimming.

Trim Code	Teflon/Rulon		PEEK	
T1	115 - 134°F	46 – 57°C	200 - 239°F	93 – 115°C
T2	135 - 154°F	57 – 68°C	240 - 279°F	116 – 137°C
T3	155 - 174°F	68 – 79°C	280 - 319°F	138 – 159°C
T4	175 - 194°F	79 – 90°C	320 - 359°F	160 – 182°C
T5	195 - 215°F	90 – 102°C	360 - 400°F	182 – 204°C
T6	216 - 236°F	102 – 113°C		
T7	237 - 257°F	114 – 125°C		
T8	258 - 278°F	126 – 137°C		
T9	279 - 299°F	137 – 148°C		
T10	300 - 320°F	149 – 160°C		
T11	321 - 341°F	161 – 172°C		
T12	344 - 362°F	173 – 183°C		
T13	363 - 383°F	184 – 195°C		

Code	Magnet Material	Temp. Limit
W	Somarium Cobalt	400°F / 204°C

Chemsteel pumps can be applied for temperatures as low as –40°F (-40°C) for pumps of plastic construction, or –50°F (-45.6°C) for pumps of metal construction.

Speed: All Chemsteel pumps are rated for operation at a speed of 1750 RPM.

Life and Noise: Pump life will always be extended and noise reduced by selection of either a plastic/plastic or metal/plastic gear combination. Also, the Chemsteel product line provides the user with the quietest operation possible by off ering both plastic combinations of gears and a helical gear profile.

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Rheology: The power requirement for a given pump will increase with fl uid viscosity. For Newtonian fluids (where viscosity is not a function of shear) the table in the following section can be used directly. For non-Newtonian fluids, some adjustment must be made.

For shear thinning fl uids (Thixotropic or Pseudo Plastic), the dynamic viscosity may be considered to be approximately 25% of the viscosity tabulated in the literature. For those fl uids that are shear thickening (Dilatent, Bingham Plastic), extra care should be taken when selecting the appropriate pump and motor requirements. Usually, a trial would be well advised.

Viscosity: When pumping viscous fl uids, the horsepower required of the drive motor will increase. Refer to the following table for the appropriate multiplier to be used against the horsepower required when pumping water. "Water horsepowers" are available by reference to the individual fl ow curves that are available for all Chemsteel pumps.

Also, the pump speed must be reduced for viscous fl uids. Follow the guideline below for maximum shaft speed.

Users should be advised to increase the pipe size by one size over the pump's standard connection size on the inlet of the pump. On the discharge of the pump, the line size may similarly be increased if the user encounters excessive back pressure.

Chemsteel Pumps - High Viscosity Fluids, Power Requirement

I. Viscosity				II. Maximum Shaft Speed	III. Multipliers for Horsepower (Multiply X Water Horsepower)					
Liquid @ 70°F / 21°C	Centipoise CP @ 0.8 S.G.	Centistokes CS	Viscosity SSU	RPM	2 psi / 0.13 bar	20 psi / 1.37 bar	40 psi / 2.75 bar	60 psi / 4.13 bar	80 psi / 5.51 bar	100 psi / 6.89 bar
Water	1	1	5	1750	1.00	1.00	1.00	1.00	1.00	1.00
	9	11	50	1750	1.00	1.05	1.00	1.00	1.00	1.00
No. 2 Fuel Oil @ 57°F / 14°C	17	22	100	1700	1.10	1.10	1.05	1.05	1.00	1.00
	43	54	250	1600	1.20	1.15	1.10	1.10	1.05	1.05
SAE 10 Oil @ 62°F / 17°C	86	108	500	1500	1.30	1.25	1.20	1.15	1.10	1.10
	130	162	750	1400	1.45	1.35	1.25	1.20	1.15	1.15
SAE 30 Oil @ 72°F / 22°C	173	216	1000	1300	1.60	1.50	1.40	1.30	1.25	1.20
	432	540	2500	1200	1.90	1.75	1.60	1.45	1.35	1.30
SAE 60 OIL @ 70°F / 21°C	864	1080	5000	1000	2.20	2.00	1.80	1.60	1.50	1.40
	1296	1620	7500	850	2.60	2.30	2.00	1.80	1.70	1.60
SAE 70 OIL @ 60°F / 16°C	1728	2160	10000	600	3.00	2.60	2.20	2.00	1.90	1.80
	4320	5400	25000	500	3.50	3.00	2.70	2.40	2.20	2.00
No. 6 Fuel Oil @ 70°F / 21°C	8640	10800	50000	400	4.00	3.60	3.20	2.80	2.50	2.20
	12960	16200	75000	300	4.50	4.10	3.60	3.15	2.75	2.35
No. 6 Fuel Oil @ 60 °F / 16°C	17280	21600	100000	200	5.00	4.50	4.00	3.50	3.00	2.50

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