

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 fluids, 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 | 50 psi | 50 psi |
| Metal/Plastic | 100 psi | 50 psi | 75 psi |
| Metal/Metal* | 150 psi** | Not Available | 100 psi |

* 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 | 300 psig, R1 & R2 Series |
| Metal | 150 psi | 225 psig, S4 & S9 Series |
| Ryton | 100 psi | 200 psig |

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. Ryton gears (to a maximum temperature of 200°F) in either a Ryton or metal housing are thermally stable and do not require trimming.

| Trim Code | Teflon/Rulon | Peek |
|-----------|--------------|------------|
| T1 | 115-134° F | 200-239° F |
| T2 | 135-154° F | 240-279° F |
| T3 | 155-174° F | 280-319° F |
| T4 | 175-194° F | 320-359° F |
| T5 | 195-215° F | 360-400° F |
| T6 | 216-236° F | |
| T7 | 237-257° F | |
| T8 | 258-278° F | |
| T9 | 279-299° F | |
| T10 | 300-320° F | |
| T11 | 321-341° F | |
| T12 | 344-362° F | |
| T13 | 363-383° F | |

| Code | Magnet Material | Temp. Limit |
|------|-----------------|-------------|
| W | Samarium Cobalt | 450° F |

Chemsteel pumps can be applied for temperatures as low as -40°F for pumps of plastic construction, or -50°F 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 offering both plastic combinations of gears and a helical gear profile.

Rheology: The power requirement for a given pump will increase with fluid 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 fluids (Thixotropic or Pseudo Plastic), the dynamic viscosity may be considered to be approximately 25% of the viscosity tabulated in the literature. For those fluids 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 fluids, 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 flow curves that are available for all Chemsteel pumps.

Also, the pump speed must be reduced for viscous fluids. 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 | Centipoise CP @ 0.8 S.G. | Centistokes CS | Viscosity SSU | RPM | 2 psi | 20 psi | 40 psi | 60 psi | 80 psi | 100 psi |
| 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 | 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 | 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 | 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 | 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 | 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 | 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 | 17280 | 21600 | 100000 | 200 | 5.00 | 4.50 | 4.00 | 3.50 | 3.00 | 2.50 |



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Due to ongoing product improvements, data shown here is subject to change without notice. Contact Oberdorfer Pumps for latest specifications.