Application Note to the Field	Heat Transfer Fluids
Application Note Number: 1601-4	**Date:** Jan. 21, 2016; Revised Sept. 2022

Heat transfer fluids comprise a wide range of chemicals, but they are most often fluorocarbon based liquids with a low to moderate viscosity (~ 1 to 100 cP) at room temperature.

Gear pumps can be a great way to circulate these fluids around the system. Over the years, Liquiflo has picked up a few tips and tricks for dealing with these fluids.

First, it is very important to note the operating temperature, or range of temperatures, at which the fluid will be used and also the viscosity at those temperatures, to properly size the pump. The viscosity at elevated or reduced temperatures can vary significantly from that at room temperature. These values are usually published by the company selling the heat transfer fluid.

Some of the heat transfer fluids are quite expensive. In that case, a mag-drive pump will provide the most reliable protection against leaks and failures.

Stainless steel and PEEK are compatible with most of these fluids, and are the first choice for the housing and gear components.

Next, these fluids are most often circulated through a system many times. This is one of the rare instances where carbon is not preferred, as it can cause blackening of the fluid after several circulations around the system. This can be remedied by selecting silicon carbide (SiC) wear plates and bearings.

Teflon is the default O-ring material and it often works well for these applications. However, it can sometimes swell from the fluorocarbon fluid. This is usually not an issue, since the O-rings are captive and static; trapped between the housings. If swelling is a concern, EPDM, Viton or Kalrez can be considered. One instance where standard Teflon O-rings are not well suited is fluctuating temperatures. At colder temperatures, PTFE can set (i.e., shrink and remain shrunk) and elastomers can become brittle and lose their elasticity. This can cause leakage. In this situation, Silicone/FEP-encapsulated O-rings can remain elastic throughout a wide temperature range.

Putting all of the above together, a model code for a common configuration would be:

Pump Model Code	Description
H5FSPP4B002**X**00US	Model H5F mag-drive pump, 316 SS housing and shafts, double PEEK gears, SiC wear plates and bearings, Tungsten Carbide coating on shafts; **X** denotes the material of the O-rings which depends on the specific fluid and conditions: **X** = 0 (Teflon), E (EPDM), V (Viton), K (Kalrez) or 6 (Silicone/FEP)

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