Handling Viscous Fluids
With Thermo Scientific FH Series Pumps

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Thermo Scientific peristaltic pumps are ideal for pumping viscous products due, in part, to their ability to sustain volumetric accuracy regardless of viscosity to ensure consistent fluid handling.

To best pump viscous fluids, it’s important to understand viscous fluid behavior at different shear rates. There are a number of types of viscous fluid behavior.

**Newtonian fluids**
Viscosity is constant with change in shear rate or agitation. Forces to cause motion increase proportionately as speed increases. Fluids showing Newtonian behavior include water, mineral oils, syrup, hydrocarbons, and resins.

**Thixotropic fluids**
Viscosity decreases as shear rate or agitation increases. The forces to cause motion are relatively lower as speed increases. Examples are soaps, tars, vegetable oils, shortening, glue, inks, peanut butter, and some slurries.

**Dilatant fluids**
Viscosity increases as shear rate increases. Forces to cause motion may greatly increase as speed increases. Some liquids showing dilatant behavior are slurries, clay, and candy compounds.

**Plastic and pseudoplastic fluids**
Viscosity decreases as shear rate increases, but initial viscosity may not be great enough to prevent start of flow in a typical pumping system. Typical plastic fluids are gels, latex paints, lotions, shortening and ketchup.

To maximize the pumping efficiency of viscous fluid, follow these steps:

**Slow down the speed of your pump.**
Increasing the speed beyond a certain point will not have any effect on flow rate. The maximum efficient speed of the pump decreases as viscosity increases and tubing size decreases.

**Choose a larger size tubing.**
Choose a larger size tubing than required to pump water. The table on the back of this Application Note will help you choose the best size.

**Decrease the viscosity of your fluid.**
Heat your fluid if possible; viscosity usually decreases with temperature.

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Key Words
- Peristaltic Pumps
- Tubing Pumps
- Viscous Fluids
- Shear Rate
- Norprene
- PharMed
- Tygon
- Viton
- Gore