



fluidguide-under250gal



FLUID SELECTION: SMALL SYSTEMS

Guide to Fluid Selection for Systems Under 250 Gallon and/or Electrically Heated

The intent of this paper is to provide basic industry information so that an educated decision can be made when selecting a heat transfer fluid. While each application is different, this guide will provide enough background to make fluid selection for your specific application easier.

There are numerous, high-temperature heat transfer fluids on the market today. Some are recommended for open-to-atmosphere systems, while others are not. Some are rated for use at operating temperatures as high as 398°C (750°F) and some as low as only 232°C (450°F). All transfer heat efficiently but what other criteria should be considered?

For systems with a capacity under a few hundred gallons, it is typical to find they are open-to-atmosphere and that there is no inert buffer (nitrogen blanket) between the fluid and the atmosphere [usually at the reservoir or expansion tank]. These types of systems have unique considerations for fluid selection.

To Begin With There are Basically 4 General Types Of High Temperature Heat Transfer Fluids:

Mineral Oils

Generally available from major refineries, mineral oils tend to be low in cost and multi-purpose with no or very little additives blended in for 'extra' protection. These products are usually lightly refined and as a result, often retain petroleum distillates or aromatic hydrocarbons like naphthalene, xylene, toluene, and benzene. These fluids can also retain sulfur, waxes and other components, all of which contribute to an overall shorter fluid life - particularly at higher temperatures.

White/Paraffinic Oils

In the past 20 years, the crude oil refining process has advanced significantly to offer highly refined white and virtually pure paraffinic base oils free of aromatic hydrocarbons. While there are numerous grades or 'cuts', some of these base stocks have shown to be well suited for heat transfer applications. Furthermore, a few companies have specifically engineered blends of these base stocks with additives to provide enhanced protection and an extended service life in today's demanding heat transfer applications.

Synthetics (PAO's and Silicones)

Generally the highest costing fluids, PAO's (similar to those used in synthetic motor oils) have been shown to inherently provide oxidative and thermal stability (up to about 287°C, 550°F) in heat transfer applications.

Silicones are relatively new to the heat transfer market; although costly, they do exhibit extreme resistance to thermal and oxidative degradation. The use of silicones in some manufacturing environments however may cause issue with product finishing - such as painting or coating - if silicone or its vapors are introduced to the surface prior to or during finishing.

Chemical Aromatics

Typically comprised of benzene-based chemical structures, they have wide ranging temperature characteristics and can often be used up to 398°C (750°F). While they offer good thermal characteristics, they tend to be costly and less friendly to both the environment and worker health and safety. They are often also not recommended for use in open systems.

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Caption:

Description:

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