



# FLASH AND FIRE IN HOT OIL SYSTEMS

# FLASH AND FIRE POINTS IN HOT OIL SYSTEMS

## FLASHPOINT DEFINED

A “flashpoint” is the temperature at which a fluid generates enough vapor to be ignited (“flash”). There are 2 common test methods — Open Cup (ASTM D92) and Closed Cup (ASTM D93). Both methods involve heating the sample in a small cup and inserting an ignitor into the vapor. The temperature at which the vapor “flashes” is recorded. The difference between the 2 methods is that the cup is covered in the Closed Cup test which prevents any vapor from dissipating to the air. The concentrated vapor vents directly into the ignition source. Because the Open Cup has no cover it registers higher results because the sample has to be hotter to generate sufficient vapor to overcome what dissipates into the air. Typically the Open Cup Flashpoint is 20-30°F higher than the Closed Cup.

## FLASH POINT VS. FIRE POINT IN RUNNING SYSTEMS

Vapor flashes should not be confused with fire since only the accumulated vapor will ignite — once it is used up the flash is over. For a thermal fluid to burn, it must

1. Stay hot enough to continuously generate vapor. This is known as the Fire Point which is typically 30-40°F higher than the Open Cup Flashpoint for new fluid.
2. Have an ignition source within the vapor cloud.

3. Be exposed to enough air to support combustion but not enough to convert the vapor to smoke.

## WHAT PREVENTS THE MAJORITY OF LEAKS FROM BECOMING FIRES?

1. Hot vapors will react with air to produce smoke which is not ignitable. This limits the area where ignition can occur.
2. Organic heat transfer fluids have relatively low density and specific heat and so cool rapidly when exposed to air. This limits the amount of vapor produced around a leak.
3. Leaks almost always occur in the open where there is sufficient air both to cool the fluid and to react with any vapor. So one of the requirements for a fire — “air” actually can significantly reduce the potential.

*Final note: There have been very few fires in thermal fluid systems caused by a low flashpoint. This is reinforced by the fact that Factory Mutual only mentions flash point once in its FM 7-99 Property Loss Prevention Sheets on Heat Transfer by Organic and Synthetic Fluid (and that section deals with heater location.)*

Founded in 1988, Paratherm—Heat Transfer Fluids has become a leading U.S. manufacturer of specialized heat transfer fluids and system cleaners. The firm offers a wide range of heat transfer fluids (currently 8 fluids and 3 cleaners) covering temperatures from -137°F to +650°F. The company has a network of distributors and warehousing locations throughout North America and globally to offer regional service and quick delivery.

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