DURATHERM
Heat Transfer Fluids

understanding-flash-fire-and-auto-ignition

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UNDERSTANDING FLASH, FIRE AND AUTO IGNITION

Heat transfer fluids are exceptionally safe if specified correctly for the application and some basic guidelines are followed with respect to their use and handling.

First off, it's important to understand your fluid's fire safety ratings. These are characterized by a fluid's flash, fire and auto ignition points.

Flash Point

The temperature at which the vapors produced from a fluid will ignite (flash off) with the presence of an ignition source (the fluid will not burn at this point). While some applications and revised fire safety standards may require a high flash point fluid to be used, it is still quite common to operate systems at temperatures above the flash point of the fluid.

Fire Point

The temperature at which the fluid will sustain a fire if ignited by an outside ignition source. Heat transfer systems are commonly run at temperatures above a fluid's fire point as the fluid is contained within the system, far removed from ignition sources.

Auto Ignition

The minimum temperature at which a fluid will spontaneously ignite without an external ignition source, such as a flame or spark. Never operate a system above a fluid's auto ignition temperature.

In summary, thermal fluids are intended to be used above their flash and fire points but never above their auto ignition temperatures. Within a properly designed system, a fluid can be used right up to its maximum bulk fluid temperature rating which is usually much higher than either its flash point or fire point. To better understand how you can safely heat past these limits, you need to consider how each relates to a heat transfer system

In the case of the flash point, vapors would need to collect or become trapped in a relatively confined space AND have an ignition source to cause a 'flash'. This combination is very unlikely to happen within a properly engineered/ constructed system and a workplace operating with even only a moderate degree of safety.

In the case of the fire point, again through proper system design there should be no air/oxygen contact (needed for a fire) at the heat source (boiler, electric immersion heater). Also, during normal operation, the fluid is contained within the system and well away from external ignition sources.

Extenuating Circumstances - Leaks

In the 'real world' however, there are circumstances that can pose potential fire hazards that you should be aware of, namely from leaks. When a system leaks, it could result in a few potentially hazardous scenarios:

1. The fluid drips onto a hot surface or open ignition source (e.g. electric pumps) where it could potentially ignite.
2. If a fluid leaks and collects within the system's pipe or reactor jacket insulation, it is of particular safety concern. This is especially true when open cell insulation is used and it is for this reason closed cell insulation is highly recommended. If the fluid becomes trapped within the open cell insulation it can oxidize. The fluid produces heat as it oxidizes, which remains trapped between the process piping or reactor jacket and the insulation. As the fluid continues to degrade, its fire safety points are reduced and, compounded with the heat created from its degradation, the fluid can start to smolder. This could result in an auto ignition-type fire should air be introduced to the mix.*

* It is extremely important to remember that should any part of your heat transfer system start to leak or smoke that you approach it with caution and have proper fire extinguishing media close at hand – particularly if you see smoldering insulation. Instinctively, workers will often want to cut away the smoldering insulation to investigate the cause of the smoke. This immediately introduces the source of air needed to potentially cause an auto ignition fire.

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Caption:

Description:

Dimensions: x