# SUNOCO Heat Transfer Fluids

Our SUNOCO HEAT TRANSFER OIL provides an excellent heat transfer media for manufacturing processes where temperatures will not exceed 600°F*. These premium oils are highly refined paraffinic oils to provide excellent oxidation stability and low temperature properties.

## Applications

SUNOCO HEAT TRANSFER OILS are designed for use in closed system boilers and other transfer systems equipped with expansion tanks where temperatures do not exceed 600°F.

## Features & Benefits

SUNOCO HEAT TRANSFER OILS employ highly refined base stocks for efficient heat conduction and excellent thermal and oxidation stability. Non-corrosive to equipment. Designed to minimize coking and varnish build up

## Product and Typical Properties

| Product Code | 12813 | 1613 | 12443 | 1603 | 1653 |
|---|---|---|---|---|---|
| Product | HTO-22 | HTO-32 | HTO-21 | HTO-46 | HTO-68 |
| Viscosity, cSt @ 40°C | 22.0 | 32.0 | 41.0 | 46.0 | 68.0 |
| Viscosity, cSt @ 100°C | 3.8 | 4.65 | 6.2 | 6.2 | 8.6 |
| Viscosity Index | 100 | 104 | 106 | 105 | 95 |
| Flash Point, °C | 190 | 215 | 225 | 221 | 230 |
| Pour Point, °C | -17 | -15 | -13 | -15 | -12 |
| Color | 1.0 | 1.0 | 0.5 | 1.0 | 1.0 |
| Conradson Carbon, % | Nil | Nil | Nil | Nil | Nil |
| API Gravity, °API | 32 | 32 | 32.5 | 32 | 30.1 |

* Do not exceed 600°F (316°C) in your system, as this will cause rapid degradation of your HTO and ultimately result in the need to recharge the HTO almost immediately

Lubricants
United States

# Sunoco HTO Fluids

## HTO Typical Thermal Properties

| ISO grade | HTO 21 (32/46) | ISO 32 | HTO 46 |
|---|---|---|---|
| *Vapor Pressure, psia (kpa)* | | | |
| @ 15.6 °C (60°F) | 0.0036 (.025) | 0.004 (.028) | 0.0036 (.025) |
| @ 38 °C (100°F) | 0.0043 (.03) | 0.005 (.03) | 0.0043 (.03) |
| @ 160 °C (320°F) | 0.032 (.022) | 0.036 (.025) | 0.032 (.022) |
| @288 °C (550°) | 0.730 (5.03) | 0.860 (5.93) | 0.730 (5.03) |
| *Coefficient of Thermal Expansion, vol %/°C (%/°F)* | | | |
| @ 15.6 °C (60°F) | 0.102 (.056) | 0.102 (.056) | 0.102 (.056) |
| @ 38 °C (100°F) | 0.102 (.056) | 0.102 (.056) | 0.102 (.056) |
| @ 160 °C (320°F) | 0.102 (.056) | 0.102 (.056) | 0.102 (.056) |
| @288 °C (550°) | 0.102 (.056) | 0.102 (.056) | 0.102 (.056) |
| *Thermal Conductivity, Btu/hr-ft-°F* | | | |
| @ 15.6 °C (60°F) | 0.081 | 0.081 | 0.081 |
| @ 38 °C (100°F) | 0.079 | 0.079 | 0.079 |
| @ 160 °C (320°F) | 0.074 | 0.074 | 0.074 |
| @288 °C (550°) | 0.067 | 0.067 | 0.067 |
| *Specific Heat Capacity, Cp, Btu/hr-lbs-°F* | | | |
| @ 15.6 °C (60°F) | 0.450 | 0.573 | 0.450 |
| @ 38 °C (100°F) | 0.468 | 0.583 | 0.468 |
| @ 160 °C (320°F) | 0.581 | 0.664 | 0.581 |
| @288 °C (550°) | 0.683 | 0.747 | 0.683 |

### Health and Safety Information

For recommendations on safe handling and use of this product, please refer to the Material Safety Data Sheet via *HTTP://WWW.SUNOCOLUBES.COM/PRODUCT/SUNOCO-HEAT-TRANSFER-OILS*

# SUNOCO Heat Transfer Fluids

## SUNOCO HTO Charging Procedure

Heat transfer systems will accumulate varnish, carbon, sludge and other process contaminants over time. If your system needs to be cleaned and/or you are planning to change the type of HTO you are using in your system, consider using SUNOCO HTO-C Cleaning Fluid or SUNOCO HTO-F Flushing Fluid before charging fresh HTO into your system.

If you simply need to recharge SUNOCO HTO into your system, the following procedure can be used.

1. Operate the system at 230°F (110°C) to 255°F (124°C) or just below the flash point of the HTO. This will ensure that particulates are adequately suspended in the HTO so they can be removed when the fluid is drained.
2. Turn off the heater and continue to run the circulating pump to keep the particles suspended as you allow the system temperature to cool to an acceptable temperature to allow the HTO to be safely drained from the system.
3. Stop the circulating pump and drain the HTO quickly from all low points.
4. Recharge the system with SUNOCO HTO from all the low point drains in the system to prevent the formation of air pockets. Open the high point vents in the system to purge the air from the system and close them once the air is removed.
5. Start the circulating pump without heat to help remove any air pockets (you will hear them working their way into the expansion tank). When all air pockets are removed, you can apply heat.

# SUNOCO Heat Transfer Maintenance Fluids

Maintaining the cleanliness of your heat transfer equipment is essential for efficient operation. Periodically the heat transfer system should be cleaned to remove varnish, carbon, sludge and other process contaminants that accumulate over time. Cleaning the system is also recommended before charging the system with a new type of heat transfer fluid. SUNOCO offers two products designed to maintain the operation of your heat transfer equipment.

- **SUNOCO HTO-C** is our cleaning fluid designed for systems that contain a heavy buildup of deposit, flow rates are reduced, and in cases where the replacement heat transfer oil is a different type than what is currently being used.

- **SUNOCO HTO-F** is our flushing fluid designed for systems that do not contain a high level of deposits and contaminants and where the replacement heat transfer oil is compatible with the existing fluid. The use of a flushing fluid is best when the system is easy to completely drain. SUNOCO HTO-F is designed to work in conjunction with our HTO-C cleaner to achieve optimum results in heavily coked systems.

## SUNOCO HTO-C Cleaning Fluid Procedure

1. If the HTO can be filtered, then filter the existing fluid to 40 micron or less to remove particulates. This will ensure that the larger particulates do not remain in the system when the HTO is drained.
2. Depending on how severely degraded the fluid has become; add 4% to 20% of SUNOCO HTO-C to the existing HTO. If necessary remove some of the existing HTO to allow the cleaning fluid to be added to the suction side of the system. A secondary pump may be required to accomplish this. **Do not add the HTO-C to the expansion tank.**
3. Circulate the cleaning fluid for a maximum of 48 hours at 230°F (110°C) or at the system operating temperature. **Do not exceed 600°F (316°C).**
4. Toward the end of the cleaning period, reduce heater outlet temperature to 220°F (106°C) to facilitate the removal of any remaining HTO as well as any particulates collected with the cleaning fluid.

## SUNOCO HTO-C Cleaning Fluid Procedure *(continued)*

5. Turn off the heater and continue to run the circulating pump to keep the particles suspended as you allow the system to cool to a temperature that allows the HTO-C to be safely drained from the system.
6. Stop the circulating pump and drain the HTO quickly from all low points.
7. If the system is severely degraded, you can recharge the system with SUNOCO HTO-F and follow Steps 5 thru 10 from the *SUNOCO HTO-F Flushing Fluid Procedure*. If not proceed to Step 8 below.
8. Recharge the system with your SUNOCO HTO product from all the low point drains in the system to prevent the formation of air pockets. Open the high point vents in the system to purge the air from the system and close them once the air is removed.
9. Start the circulating pump without heat to help remove any air pockets (you will hear them working their way into the expansion tank). When all air pockets are removed, you can apply heat.

## SUNOCO HTO-F Flushing Fluid Procedure

1. If the heat transfer oil (HTO) can be filtered, then filter the existing fluid to 40 micron or less to remove particulates from the HTO. This will ensure that the larger particulates do not remain in the system when the HTO is drained.
2. Operate the system at 230°F (110°C) to 255°F (124°C) or just below the flash point of the HTO. This will ensure that the remaining particulates are adequately suspended in the HTO so they can be removed when the fluid is drained.
3. Turn off the heater and continue to run the circulating pump to keep the particles suspended as you allow the system temperature to cool to an acceptable temperature to allow the HTO to be safely drained from the system.
4. Stop the circulating pump and drain the HTO quickly from all low points.
5. Recharge the system to normal capacity with SUNOCO HTO-F from all the low point drains in the system to prevent the formation of air pockets. Open the high point vents in the system to purge the air from the system and close them once the air is removed.

## SUNOCO HTO-F Flushing Fluid Procedure *(continued)*

6. Start the circulating pump without heat to help remove any air pockets (you will hear them working their way into the expansion tank). When all air pockets are removed, you can apply heat.
7. Circulate flushing fluid for a maximum of 72 hours above 200°F (94°C) or at the system operating temperature. We recommend a target temperature of 400°F (205°C). **Do not exceed 600°F (316°C).**
8. Toward the end of the flushing period, reduce heater outlet temperature to 220°F (106°C) to facilitate the removal of any remaining HTO and particulates collected with the flushing fluid.
9. Turn off the heater and continue to run the circulating pump to keep the particles suspended as you allow the system to cool to a temperature that allows the HTO-F to be safely drained from the system.
10. Stop the circulating pump and drain the HTO-F quickly from all low points
11. Recharge the system with your SUNOCO HTO product from all the low point drains in the system to prevent the formation of air pockets. Open the high point vents in the system to purge the air from the system and close them once the air is removed.
12. Start the circulating pump without heat to help remove any air pockets (you will hear them working their way into the expansion tank). When all air pockets are removed, you can apply heat.