

PRODUCT INFORMATION

A PRODUCT OF AMERICAN CHEMICAL TECHNOLOGIES, INC.



HTO 45+

Heat Transfer Fluid for Moderate Operating Temperatures (0° to 600° °F)

DESCRIPTION:

HTO 45+ is a low cost, petroleum-based heat transfer fluid and one of the most popular heat transfer products available for use at moderate operating temperatures. **HTO 45+** is completely non-toxic and is certified by the FDA and USDA for use with food and pharmaceuticals. The product also carries the USDA's incidental food contact rating.

PERFORMANCE:

HTO 45+ has an operating range of 0-600°F and a pour point of -40 °F. It offers good viscosity characteristics (pumpable to -10°F), high specific heat and thermal conductivity.

HTO 45+ heat transfer fluid is designed for use in non-pressurized indirect heating systems and delivers efficient, dependable and uniform process heat with no need for high-pressure equipment.

HTO 45+ is not classified as a fire resistant heat transfer fluid. Consequently, the use of protective devices may be required to minimize fire risk. However, these fluids have been proven safe in operations with good equipment design and maintenance. **HTO 45+** is being used safely in a number of die casting plants and steel mills. The insurer of your property should be consulted relative to this matter.

To minimize fluid oxidation, systems utilizing **HTO 45+** should be blanketed with an inert atmosphere. A system pressure relief device should also be provided.

HTO 45+ is non-corrosive to metals commonly used in design of heat transfer systems. **HTO 45+** is blended from natural oil base stocks and offers similar metal coating and lubricating properties as petroleum oils.

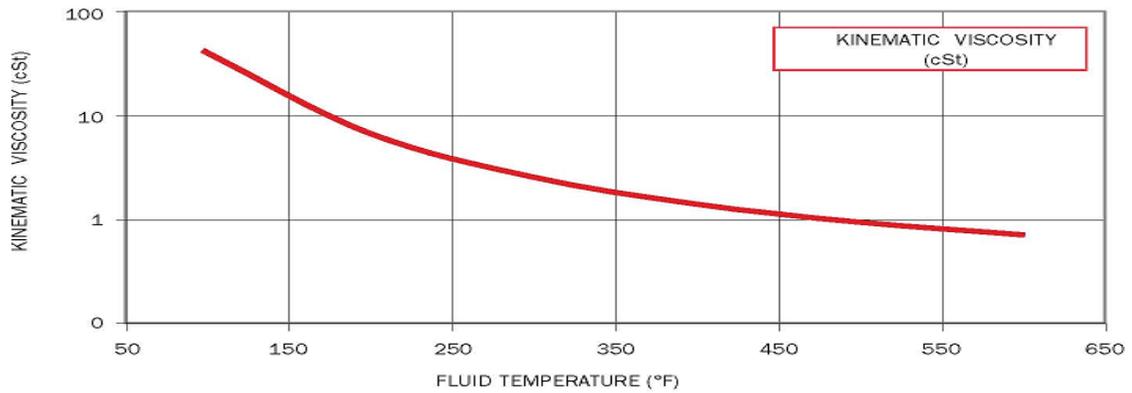
The maximum bulk temperature (600°F) and film temperature (635°F) are based on thermal studies. These temperature maximums provide long service life under most operating conditions. Actual fluid life is quite dependent on system design and operation. As decomposition occurs, it results in the formation of volatile (low boiling) products and high boiling compounds. Volatile products should be vented from the system to a non-hazardous area away from personnel and sources of ignition. The high boiling compounds are generally soluble in the fluid. Over-heating or fluid contamination will accelerate this decomposition and may result in separation of the high boiling compounds as solids (tar, coke, etc.). These solids could be detrimental to the operation of the system and when detected, can be easily removed via filtration.

CAUTION:

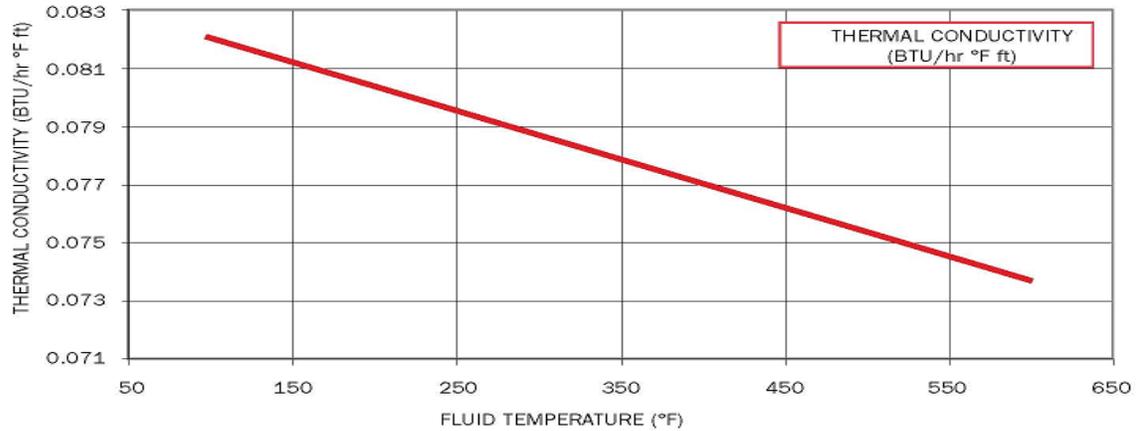
Because **HTO 45+** is blended from natural, petroleum oil base stocks, it is easy to dispose of and exceptionally safe to use. In the event of a spill, **HTO 45+** can be treated using the same clean-up procedures that would be used for light lubricating oils. Precautions against ignitions and fires should be taken with this product.

HTO 45+

Kinematic Viscosity vs Temperature for HTO 45+

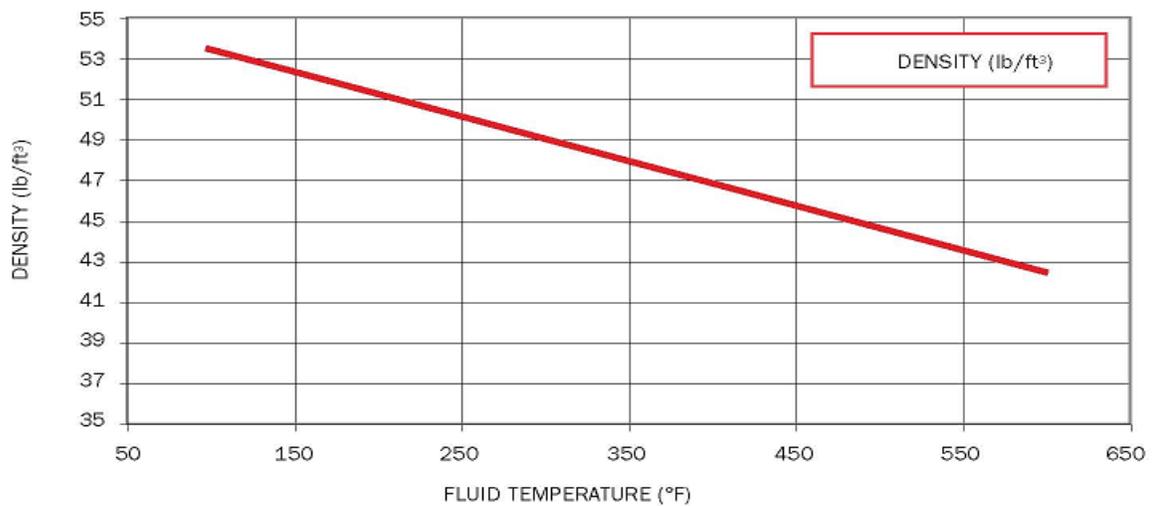


Thermal Conductivity vs Temperature for HTO 45+



Thermal Conductivity, W/mK (Btu/hr°F ft)	<u>15°C(59°F)</u>	<u>38°C(100°F)</u>	<u>260°C(500°F)</u>	<u>316°C(600°F)</u>
	0.14(0.083)	0.14(0.082)	0.13(0.075)	0.13(0.074)

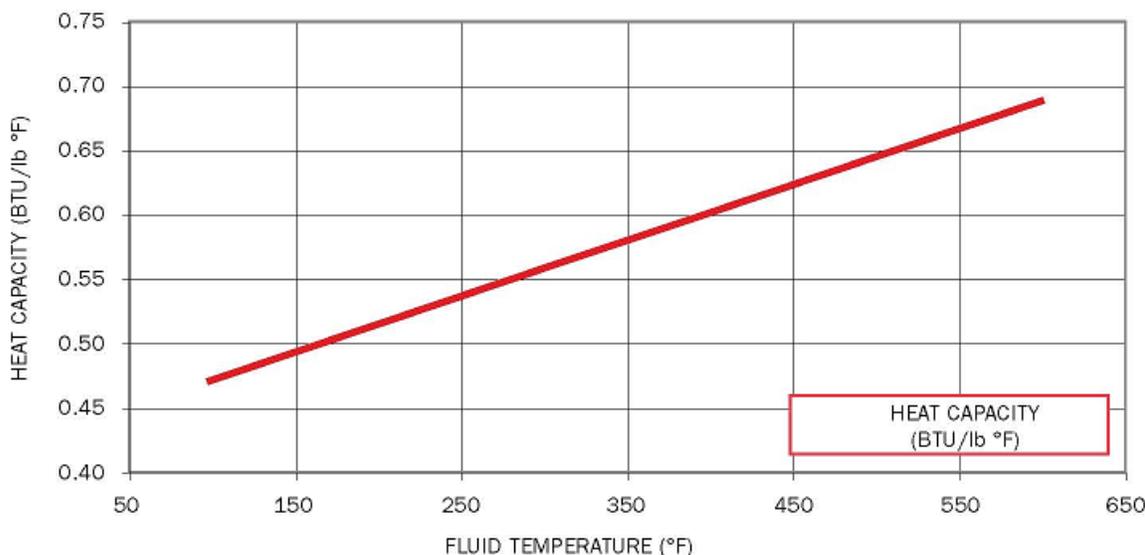
Change in Density vs Temperature for HTO 45+



Denisty, kg/L (lb/ft³)	<u>15°C(59°F)</u>	<u>38°C(100°F)</u>	<u>260°C(500°F)</u>	<u>316°C(600°F)</u>
	0.869(54.3)	0.855(53.4)	0.714(44.6)	0.679(42.4)

HTO 45+

Heat Capacity vs Temperature for HTO 45+



	<u>15°C(59°F)</u>	<u>38°C(100°F)</u>	<u>260°C(500°F)</u>	<u>316°C(600°F)</u>
Heat Capacity, kJ/kg K (Btu/lb°F)	1.89(0.45)	1.97(0.47)	2.69(0.64)	2.88(0.69)
Vapor Pressure kPa (psi a)	0.00(0.00)	0.00(0.00)	2.65(0.39)	11.44(1.64)

PROPERTIES:

	Test Method	HTO 45+
Composition		NF/USP Grade white mineral oil
Appearance		Clear, transparent liquid
Kinematic Viscosity @ 40 °C	ASTM D445	43.0 cSt
Kinematic Viscosity @ 100 °C	ASTM D445	6.4 cSt
Kinematic Viscosity @ 316 °C	ASTM D445	0.7 cSt
Viscosity @ 100 °F	ASTM D2983	42.3 cps
Pour Point	ASTM D97	-40°C (-40°F)
Specific Gravity @ 16 °C	ASTM D1298	0.8805g/cm ³
Coefficient of thermal expansion	ASTM D1903	0.000304%/°F
Flash Point	ASTM D92	222°C (432°F)
Fire Point	ASTM D92	240°C (464°F)
Heat of Vaporization (calculated)		90 BTU/LB
Turbine Oil Stability Test	ASTM D943	
95 °C H ₂ O, Fe and Cu catalysts		4,300 hours
Time to TAN = 2.0 mgKOH/g		
Oxidation Resistance Rotating Bomb	ASTM D2272	
Minutes to 25 psi drop @ 150 °C		1,026 minutes
1000 hours TOST Sludge	ASTM D4310	<20 mg
AIT	ASTM D2155	363°C (685°F)

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this bulletin are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laboratory prior to use. Our responsibility for claims arising from breach of warranty, negligence, or otherwise is limited to the purchase price of the material. Freedom to use any patent owned by American Chemical Technologies' or others is not to be inferred from any statement contained herein.

