



LUBRICANTS

Diamond Class® Heat Transfer Fluids

Phillips 66® Diamond Class Heat Transfer Fluids are premium quality fluids specifically developed for use in liquid-phase heat transfer systems. They are available in two different formulations, designated “O/S” for use in open systems and “C/S” for use in closed systems.

Diamond Class Heat Transfer Fluids O/S and C/S are formulated with premium hydrocracked paraffinic base oils and advanced additive chemistry to provide outstanding thermal stability and low sludge-forming tendency for long service life and outstanding overall performance.

Applications

Diamond Class Heat Transfer Fluid O/S is optimized for use in pressure-relieved, liquid-phase heat transfer systems with expansion tanks, where there is the possibility of contact between the heat transfer fluid and air in the expansion tank. It is fortified with oxidation and corrosion inhibitors to prevent fluid degradation and deposit buildup in the system. The O/S fluid is recommended for use in systems operating with continuous maximum bulk oil temperatures up to 550°F (290°C), intermittent maximum temperatures as high as 650°F (343°C), and a maximum skin film temperature of 600°F (316°C).

Diamond Class Heat Transfer Fluid C/S is optimized for use in pressure-relieved, expansion tank-equipped liquid-phase heat transfer systems that are closed to the atmosphere and potential air contamination. The system must be equipped with a cold-oil seal pot on the expansion tank vent, or operated with low-pressure nitrogen blanketing of the oil so there is no possibility of air contacting the oil during operation. The C/S fluid is fortified with special additives to prevent thermal degradation. It is recommended for use in systems operating with continuous maximum bulk oil temperatures up to 620°F (327°C) and maximum skin film temperatures up to 650°F (343°C).

Some common applications include:

- Liquid-phase heat transfer systems ⁽¹⁾
- Heat transfer medium for industrial manufacturing processes
- Heat transfer equipment used in the manufacture of resins and coatings
- Asphalt heating
- Die casting
- Plastic injection molding and extrusion
- Wax coating equipment

⁽¹⁾ **Caution:** These fluids are **not** to be used in “vapor-phase” heat transfer units, nor should they come into contact with water, which can cause steam and pressure to build up in the system and create the potential for an explosion. Also, under no circumstances should the bulk oil be exposed to continuous high temperatures without the presence of an expansion tank, as the fluid will degrade quickly.

Premium Heat Transfer Fluids for Open And Closed Systems

KEEPING THE WORLD RUNNING SMOOTHLY.





Features/Benefits

- Outstanding performance in closed or open systems
- Outstanding thermal stability to minimize deposits
- Long service life
- Less waste oil disposal
- Reduced operating costs

Diamond Class® Heat Transfer Fluids

Typical Properties			
Grade	O/S 32	O/S 46	C/S 32
ISO Grade	32	46	32
Specific Gravity			
@ 15.6°C (60°F)	0.865	0.866	0.862
@ 38°C (100°F)	0.744	0.746	0.742
@ 160°C (320°F)	0.709	0.710	0.706
@ 288°C (550°F)	0.673	0.674	0.670
Density, lbs/gal			
@ 15.6°C (60°F)	7.20	7.21	7.18
@ 38°C (100°F)	6.20	6.21	6.18
@ 160°C (320°F)	5.90	5.91	5.88
@ 288°C (550°F)	5.60	5.61	5.58
Color, ASTM D1500	0.5	0.5	0.5
Flash Point (COC), °C (°F)	225 (437)	240 (464)	225 (437)
Autoignition Temperature, ASTM E659, °C (°F)	357 (675)	362 (684)	364 (687)
Pour Point, °C (°F)	-42 (-44)	-42 (-44)	-42 (-44)
Viscosity			
cSt @ 40°C (104°F)	32.0	46.0	32.0
cSt @ 100°C (212°F)	5.4	6.8	5.4
cSt @ 204°C (400°F)	1.35	1.56	1.35
cSt @ 260°C (500°F)	0.91	1.02	0.91
cSt @ 316°C (600°F)	0.69	0.75	0.69
Viscosity Index	102	102	102
Acid Number, ASTM D974, mg KOH/g	0.00	0.00	0.01
Carbon Residue, ASTM D524, wt %	<0.1	<0.1	<0.1
Copper Corrosion, ASTM D130	1a	1a	1a
Oxidation Stability, RPVOT, ASTM D2272, minutes	875	875	448

Typical properties are average values only and do not constitute a specification. Minor variations that do not affect product performance are to be expected during normal manufacture, and at different blending locations. Product formulations are subject to change without notification.



Diamond Class® Heat Transfer Fluids

Typical Thermal Properties			
Grade	O/S 32	O/S 46	C/S 32
Coefficient of Thermal Expansion, vol %/°C (vol%/°F)			
@ 15.6°C (60°F)	0.102 (0.056)	0.102 (0.056)	0.102 (0.056)
@ 38°C (100°F)	0.102 (0.056)	0.102 (0.056)	0.102 (0.056)
@ 160°C (320°F)	0.102 (0.056)	0.102 (0.056)	0.102 (0.056)
@ 288°C (550°F)	0.102 (0.056)	0.102 (0.056)	0.102 (0.056)
Specific Heat Capacity, Cp, Btu/lb-°F			
@ 15.6°C (60°F)	0.450	0.450	0.450
@ 38°C (100°F)	0.621	0.619	0.621
@ 160°C (320°F)	0.665	0.663	0.665
@ 288°C (550°F)	0.700	0.700	0.700
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°F)	0.067	0.067	0.067
Vapor Pressure, psia (kpa)			
@ 15.6°C (60°F)	0.004 (0.029)	0.003 (0.025)	0.004 (0.029)
@ 38°C (100°F)	0.102 (0.700)	0.087 (0.597)	0.102 (0.700)
@ 160°C (320°F)	0.415 (2.86)	0.349 (2.41)	0.415 (2.86)
@ 288°C (550°F)	1.882 (12.98)	1.561 (10.76)	1.882 (12.98)

Health & Safety Information

For recommendations on safe handling and use of this product, please refer to the Safety Data Sheet via <http://www.phillips66.com/EN/products/Pages/MSDS.aspx>.