PHILLIPS 66 LUBRICANTS

Diamond Class® Heat Transfer Fluids

Premium Heat Transfer Fluids for Open And Closed Systems

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 grades are optimized for use in pressure-relieved, forced circulation, liquid-phase heat transfer systems where there is the possibility of contact between the heat transfer fluid and air in the system. The O/S fluids are recommended for use in systems operating with continuous bulk oil temperatures up to 550°F (290°C).

Diamond Class Heat Transfer Fluid C/S 32 is optimized for use in closed, liquid-phase, forced circulation heat transfer systems equipped with expansion tanks and pressure relief valves. Preventive measures should be taken to minimize oil oxidation by eliminating air from the system prior to bringing the oil up to operating temperature. The use of an inert gas, such as nitrogen, under positive pressure in the expansion tank is recommended at all times during operation. Under no circumstances should the hot oil come into contact with air. C/S 32 is recommended for use in systems operating with continuous bulk oil temperatures up to 620°F (327°C).

Skin film temperature can be estimated at 50°F to 75°F above bulk oil temperature in properly designed and operating systems. If skin film temperatures rise higher than this, the service life of the oil may be shortened. Additionally sludge and coke may be deposited resulting in reduced efficiency of the system.

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.*

KEEPING THE WORLD RUNNING SMOOTHLY

Phillips66Lubricants.com | **U.S. Customer Service:** 1-800-368-7128 | **Technical Hotline:** 1-877-445-9198 | **International Customer Service:** 1-832-765-2500 | **E-mail address:** phillips66lubricants@p66.com

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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)		0.853	0.858	0.851
@ 38°C (100°F)		0.839	0.844	0.837
@ 160°C (320°F)		0.761	0.766	0.759
@ 288°C (550°F)		0.680	0.685	0.678
@ 316°C (600°F)		0.661	0.665	0.659
Density, lbs/gal				
@ 15.6°C (60°F)		7.10	7.15	7.09
@ 38°C (100°F)		6.99	7.03	6.97
@ 160°C (320°F)		6.34	6.38	6.32
@ 288°C (550°F)		5.65	5.70	5.64
@ 316°C (600°F)		5.51	5.55	5.49
Color	ASTM D1500	0.5	0.5	0.5
Flash Point (COC), °C (°F)	ASTM D92	225 (437)	228 (442)	225 (437)
Autoignition Temperature, °C (°F)	ASTM E659	363 (685)	357 (675)	365 (689)
Pour Point, °C (°F)	ASTM D97	-42 (-44)	-42 (-44)	-42 (-44)
Viscosity				
cSt @ 40°C (104°F)	ASTM D445	32.0	46.0	32.0
cSt @ 100°C (212°F)		5.6	6.8	5.7
cSt @ 204°C (400°F)	ASTM D341	1.40	1.56	1.45
cSt @ 260°C (500°F)		0.95	1.02	0.97
cSt @ 316°C (600°F)		0.72	0.75	0.73
Viscosity Index	ASTM D2270	114	102	119
Acid Number, mg KOH/g	ASTM D974	0.02	0.02	0.02
Carbon Residue, wt %	ASTM D524	<0.1	<0.1	<0.1
Copper Corrosion	ASTM D130	1a	1a	1a
Oxidation Stability, RPVOT, minutes	ASTM D2272	1600	750	350

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.

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Typical Thermal Properties			
Grade	**O/S 32**	**O/S 46**	**C/S 32**
Coefficient of Thermal Expansion, 1/°C (1/°F)			
@ 15.6°C (60°F)	0.00075 (0.00042)	0.00074 (0.00041)	0.00075 (0.00042)
@ 38°C (100°F)	0.00076 (0.00042)	0.00076 (0.00042)	0.00076 (0.00042)
@ 160°C (320°F)	0.00084 (0.00047)	0.00083 (0.00046)	0.00084 (0.00047)
@ 288°C (550°F)	0.00094 (0.00052)	0.00093 (0.00052)	0.00094 (0.00052)
@ 316°C (600°F)	0.00097 (0.00054)	0.00096 (0.00053)	0.00097 (0.00054)
Specific Heat Capacity, C_p, Btu/lb-°F			
@ 15.6°C (60°F)	0.449	0.448	0.450
@ 38°C (100°F)	0.469	0.468	0.470
@ 160°C (320°F)	0.576	0.574	0.577
@ 288°C (550°F)	0.689	0.687	0.592
@ 316°C (600°F)	0.713	0.711	0.714
Thermal Conductivity, Btu/hr-ft-°F			
@ 15.6°C (60°F)	0.079	0.078	0.079
@ 38°C (100°F)	0.078	0.077	0.078
@ 160°C (320°F)	0.073	0.072	0.073
@ 288°C (550°F)	0.067	0.066	0.067
@ 316°C (600°F)	0.066	0.066	0.066
Vapor Pressure, psia (kpa)			
@ 15.6°C (60°F)	0.021 (0.145)	0.008 (0.055)	0.008 (0.055)
@ 38°C (100°F)	0.031 (0.214)	0.012 (0.083)	0.012 (0.083)
@ 160°C (320°F)	0.070 (0.483)	0.035 (0.241)	0.054 (0.372)
@ 288°C (550°F)	0.830 (5.72)	0.619 (4.27)	0.850 (5.86)
@ 316°C (600°F)	1.21 (8.34)	0.830 (5.72)	1.32 (9.10)

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/SDS.

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