

# DAPHNE

## Thermic Oil Series

### Description

Daphne Thermic Oil Series is a range of heat transfer oil formulated with highly refined hydrocracked paraffinic base oil with specially selected additives to provide exceptional oxidation and thermal stability, thus, minimizing viscosity changes and deposits forming at the heating surfaces.

### Features & Characteristics

Recommended as a heat transfer oil for both open type and closed type heating systems. It is most suitable for long-term application. Recommended operating temperature range is up to 200°C in the open systems and 300°C in the closed systems.

Note: Heat transfer oil requirements are different in open and closed systems.

There is a greater risk of oil oxidation in the open systems.

- (1) Excellent Oxidation Stability - A highly refined paraffinic base oil and anti-oxidation additives assure excellent oxidation stability and reduce problems caused by formation of sludge.
- (2) Excellent Thermal Stability - Addition of special additives assure excellent thermal stability minimizes viscosity changes
- (3) High Viscosity Index
- (4) High Flash Point

### Chemical and Physical Properties

Test Item	Test Method	Unit	8 Result	32 Result	68 Result
Density at 15°C	ASTM D4052	g/cm <sup>3</sup>	0.873	0.867	0.877
Color(ASTM)	ASTM D1500	-	L3.5	L2.5	4.0
Flash Point (C.O.C)	ASTM D93	°C	166	220	240
Viscosity at 40°C	ASTM D445	mm <sup>2</sup> /s	8.8	30.6	62.9
Viscosity at 100°C	ASTM D445	mm <sup>2</sup> /s	2.4	5.3	8.4
Viscosity Index	ASTM D2270	-	83	105	103
Acid Number	ASTM D974	mgKOH/g	0.10	0.10	0.10
Pour Point	ASTM D97	°C	-10.0	-15.0	-15.0

### Thermic indices

(1) Density g/cm<sup>3</sup>

Grade \ Temp. °C		Temp. °C		
		0	50	100
Daphne Thermic Oil	8	0.883	0.851	0.817
	32	0.882	0.850	0.816
	68	0.886	0.854	0.820

Grade \ Temp. °C		Temp. °C		
		150	200	250
Daphne Thermic Oil	8	0.781	0.739	0.689
	32	0.780	0.738	0.688
	68	0.784	0.743	0.692

(2) Specific heat kJ/kg · °C

Grade \ Temp. °C		0	50	100
Daphne Thermic Oil	8	1.76	1.84	1.93
	32	1.76	1.84	1.93
	68	0.72	1.84	1.93

Grade \ Temp. °C		150	200	250
Daphne Thermic Oil	8	2.05	2.18	2.26
	32	2.05	2.18	2.26
	68	2.01	2.14	2.22

(3) Viscosity mPa · s

Grade \ Temp. °C		0	50	100
Daphne Thermic Oil	8	41.3	5.62	1.95
	32	294	18.2	4.40
	68	791	34.2	6.89

Grade \ Temp. °C		150	200	250
Daphne Thermic Oil	8	1.01	0.63	0.45
	32	1.87	1.04	0.79
	68	2.64	1.38	0.85

(4) Thermal conductivity kJ/m · hr · °C

Grade \ Temp. °C		0	50	100
Daphne Thermic Oil	8	0.481	0.469	0.456
	32	0.481	0.469	0.456
	68	0.481	0.469	0.456

Grade \ Temp. °C		150	200	250
Daphne Thermic Oil	8	0.444	0.431	0.419
	32	0.444	0.431	0.419
	68	0.444	0.431	0.419

## (5) Vapor pressure Pa

Grade		Temp. °C		
		0	50	100
Daphne Thermic Oil	8	$4.4 \times 10^{-4}$	$6.0 \times 10^{-1}$	$4.5 \times 10$
	32	$1.3 \times 10^{-8}$	$1.3 \times 10^{-3}$	$7.6 \times 10^{-1}$
	68	$1.2 \times 10^{-9}$	$3.7 \times 10^{-4}$	$3.3 \times 10^{-1}$

Grade		Temp. °C		
		150	200	250
Daphne Thermic Oil	8	$8.0 \times 10^2$	$6.3 \times 10^3$	$2.9 \times 10^4$
	32	$4.0 \times 10$	$6.1 \times 10^2$	$4.5 \times 10^3$
	68	$2.3 \times 10$	$4.0 \times 10^2$	$3.2 \times 10^3$

**Oxidation Stability (Indiana oxidation stability test)**

Test Condition Oil Temperature ; 170°C

Air gas ; 10L/hr

Catalysis ; Cu, Fe

Oxidation time	Items	DAPHNE THERMIC OIL		
		8	32	68
New oil	Viscosity @100 mm <sup>2</sup> /s	2.388	5.398	8.398
	Carbon Residue wt%	0.56	0.56	0.57
24 hr	Viscosity @100 mm <sup>2</sup> /s	2.460	—	—
	Carbon Residue wt%	0.64	—	—
	n-pentane insolubles wt%	0.03	—	—
48 hr	Viscosity @100 mm <sup>2</sup> /s	2.508	5.722	8.818
	Carbon Residue wt%	0.78	0.79	0.72
	n-pentane insolubles wt%	0.05	0.03	0.01
96 hr	Viscosity @100 mm <sup>2</sup> /s	2.627	6.314	9.657
	Carbon Residue wt%	1.39	1.28	1.10
	n-pentane insolubles wt%	0.34	0.14	0.20
144 hr	Viscosity @100 mm <sup>2</sup> /s	—	7.503	11.34
	Carbon Residue wt%	—	1.86	1.47
	n-pentane insolubles wt%	—	0.70	0.49
192 hr	Viscosity @100 mm <sup>2</sup> /s	—	8.205	12.26
	Carbon Residue wt%	—	2.72	2.18
	n-pentane insolubles wt%	—	1.59	1.04

- Based on available information, this product is not expected to produce adverse effects on health when used for the intended application and the recommendations provided in the Safety Data Sheet (SDS) are followed.
- SDS is available upon request through your sales contract office, or via the internet.  
<https://www.idemitsu.com/jp/business/lube/>
- Due to continual product research and development, the information contained herein is subject to change without notification.

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