THERMINOL® 66

heat transfer fluid

Proven performance
for high-temperature,
low-pressure applications

–3° to 345°C

(27° to 650°F)

THERMINOL®
Heat Transfer Fluids by Eastman

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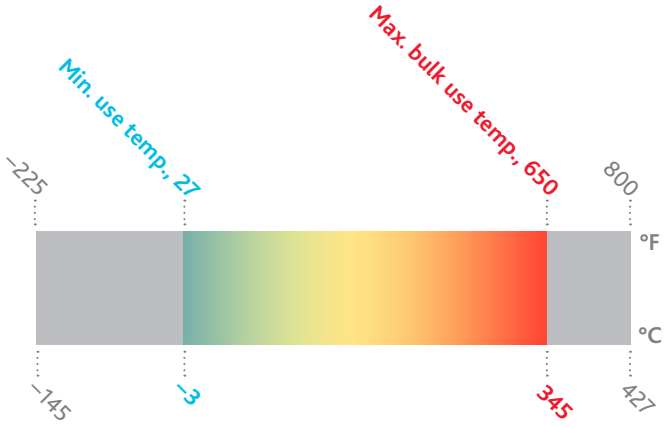
heat transfer fluid



Eastman Therminol® 66 heat transfer fluid offers outstanding high-temperature performance to 345°C (650°F), including excellent thermal stability and low vapor pressure. These properties result in reliable, consistent performance of heat transfer systems over long periods of time. Therminol 66 performance is proven through many years of industrial experience under a wide range of operating conditions. No heat transfer fluid material in the world has had more success than Therminol 66.

Therminol 66 is available globally. Contact your local Eastman Therminol sales representative for more information.

Physical and chemical characteristics

Therminol 66 fluid is designed for use in nonpressurized/low-pressure, indirect heating systems. It delivers efficient, dependable, uniform process heat with no need for high pressures. The high boiling point of Therminol 66 helps reduce the volatility and fluid leakage problems associated with other fluids.

The recommended maximum bulk (345°C/650°F) and film (375°C/705°F) temperatures are based on industry-standard thermal studies. Operation at or below these temperature maximums can provide long service life under most operating conditions.

Actual fluid life is dependent on the total system design and operation and can vary by heat transfer fluid chemistry. As fluid ages, the formation of low- and high-boiling compounds may result. Low-boiling compounds should be vented from the system as necessary to a safe location away from personnel and sources of ignition and in compliance with applicable regulations and laws. The high-boiling compounds can be very soluble in the fluid. Significant overheating or fluid contamination will accelerate decomposition and may result in increased high-boiler and solids concentrations. Excess solids can typically be filtered for removal.

Eastman recommends that systems utilizing Therminol 66 fluid should be blanketed with an atmosphere of inert gas to protect against the effects of fluid oxidation on its performance and life expectancy. Pressure relief device(s) should be installed where required.

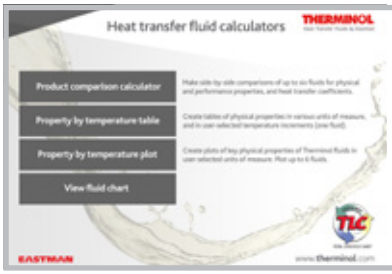
Therminol 66 is noncorrosive to metals commonly used in the construction of heat transfer systems.

While Therminol 66 has a relatively high flash point, it is not classified as a fire-resistant heat transfer fluid. Consequently, the use of protective devices may be required to minimize fire risk, and users of Therminol 66 should check with their safety and risk management experts for specific instructions.

Typical properties[a]

Appearance	Clear, pale yellow liquid
Composition	Modified terphenyl
Maximum bulk temperature	345°C (650°F)
Maximum film temperature	375°C (705°F)
Normal boiling point	359°C (678°F)
Pumpability, at 300 mm^2/s (cSt)	11°C (52°F)
Pumpability, at 2000 mm^2/s (cSt)	–3°C (27°F)
Flash point, COC (ASTM D-92)	184°C (363°F)
Flash point, PMCC (ASTM D-93)	170°C (338°F)
Autoignition temperature (ASTM E-659)	374°C (705°F)
Autoignition temperature (DIN 51794)	399°C (750°F)
Pour point (ASTM D-97)	–32°C (–25°F)
Minimum liquid temperatures for fully developed turbulent flow (N_{Re} > 10,000)	
10 ft/sec, 1-in. tube (3.048 m/s, 2.54-cm tube)	72°C (162°F)
20 ft/sec, 1-in. tube (6.096 m/s, 2.54-cm tube)	53°C (128°F)
Minimum liquid temperatures for transitional region flow (N_{Re} > 2000)	
10 ft/sec, 1-in. tube (3.048 m/s, 2.54-cm tube)	35°C (96°F)
20 ft/sec, 1-in. tube (6.096 m/s, 2.54-cm tube)	26°C (78°F)
Coefficient of thermal expansion at 200°C	0.000819/°C (0.000455/°F)
Total acidity (ASTM D-664)	<0.2 mg KOH/g
Average molecular weight	252
Pseudocritical temperature	569°C (1056°F)
Pseudocritical pressure	24.3 bar (353 psia)
Pseudocritical density	317 kg/m^3 (19.8 lb/ft^3)
Chlorine content, ppm (DIN 51577)	<10 ppm
Copper corrosion (ASTM D-130)	<< 1a
Moisture content, maximum (ASTM E-203)	150 ppm
Dielectric constant @ 23°C (ASTM D-924)	2.61

[a]*These data are based on samples tested in the laboratory and are not guaranteed for all samples. Contact us for complete sales specifications for Therminol 66 fluid. Does not constitute an express warranty. See disclaimer on the back page of this bulletin.*



To create your own customized table
with preferred properties, units of measure,
and temperature intervals, visit
www.therminol.com/resources
and download the Therminol heat transfer fluid calculator.

For the technical service contact in your region, visit the CONTACT US page on our website, www.therminol.com.

Liquid properties of Therminol® 66 heat transfer fluid by temperature[a] (SI units)

Temperature		Liquid density	Liquid heat capacity	Heat of vaporization	Liquid enthalpy[b]	Liquid thermal conductivity	Liquid viscosity[c]		Vapor pressure[d]
°C	°F	kg/m³	kJ/(kg·K)	kJ/kg	kJ/kg	W/(m·K)	cP (mPa·s)	cSt (mm²/s)	kPa
–3	27	1023	1.49	415.6	22.0	0.1180	2050	2000	—
0	32	1021	1.49	414.3	26.0	0.1183	1320	1300	—
10	50	1015	1.53	409.6	41.2	0.1179	344	339	—
20	68	1008	1.56	405.0	56.6	0.1176	123	122	—
30	86	1002	1.60	400.5	72.4	0.1172	55.6	55.5	—
40	104	995	1.63	396.1	88.5	0.1167	29.5	29.6	—
50	122	989	1.66	391.8	105.0	0.1163	17.6	17.8	—
60	140	982	1.70	387.5	121.8	0.1158	11.5	11.7	—
70	158	975	1.73	383.3	139.0	0.1152	8.06	8.26	0.011
80	176	969	1.77	379.2	156.5	0.1147	5.93	6.12	0.018
90	194	962	1.80	375.1	174.4	0.1141	4.55	4.73	0.030
100	212	955	1.84	371.1	192.6	0.1135	3.60	3.77	0.048
110	230	948	1.87	367.1	211.1	0.1128	2.92	3.08	0.077
120	248	941	1.91	363.2	230.0	0.1121	2.42	2.57	0.119
130	266	934	1.94	359.4	249.3	0.1114	2.05	2.19	0.181
140	284	928	1.98	355.5	268.9	0.1107	1.75	1.89	0.271
150	302	921	2.01	351.7	288.8	0.1099	1.52	1.65	0.400
160	320	914	2.05	347.9	309.1	0.1091	1.33	1.46	0.579
170	338	907	2.09	344.2	329.8	0.1083	1.18	1.30	0.827
180	356	899	2.12	340.4	350.9	0.1074	1.06	1.17	1.17
190	374	892	2.16	336.7	372.3	0.1065	0.950	1.06	1.62
200	392	885	2.19	332.9	394.0	0.1056	0.860	0.972	2.23
210	410	878	2.23	329.1	416.1	0.1046	0.784	0.893	3.02
220	428	870	2.27	325.3	438.6	0.1036	0.718	0.825	4.06
230	446	863	2.30	321.5	461.5	0.1026	0.661	0.766	5.39
240	464	856	2.34	317.7	484.7	0.1015	0.611	0.714	7.10
250	482	848	2.38	313.7	508.3	0.1004	0.567	0.669	9.25
260	500	840	2.42	309.8	532.3	0.0993	0.529	0.629	12.0
270	518	832	2.45	305.8	556.7	0.0982	0.495	0.594	15.3
280	536	825	2.49	301.7	581.4	0.0970	0.464	0.563	19.5
290	554	817	2.53	297.5	606.5	0.0958	0.437	0.535	24.5
300	572	809	2.57	293.2	632.0	0.0946	0.413	0.510	30.7
310	590	800	2.61	288.8	657.9	0.0933	0.391	0.488	38.2
320	608	792	2.65	284.3	684.2	0.0920	0.371	0.468	47.2
330	626	783	2.69	279.7	710.8	0.0906	0.353	0.450	57.9
340	644	775	2.73	274.9	737.9	0.0893	0.336	0.434	70.7
350	662	766	2.77	270.0	765.4	0.0879	0.321	0.420	85.7
360	680	757	2.81	264.9	793.2	0.0865	0.308	0.406	103
370	698	748	2.85	259.6	821.5	0.0850	0.295	0.395	124

[a]Maximum recommended bulk temperature 345°C (650°F). These data are based on samples tested in the laboratory and are not guaranteed for all samples. Contact us for complete sales specifications for Therminol 66 fluid. [b]Liquid enthalpy basis is –17.8°C (0°F). [c]1 cSt = 1 mm²/s and 1 mPa•s = 1 cP. [d]100 kPa = 1 bar

Liquid properties of Therminol® 66 heat transfer fluid by temperature[a] (English units)

Temperature		Liquid density		Liquid heat capacity	Heat of vaporization	Liquid enthalpy[b]	Liquid thermal conductivity	Liquid viscosity[c]		Vapor pressure[d]
°F	°C	lb/gal	lb/ft³	Btu/(lb·°F)	Btu/lb	Btu/lb	Btu/(ft·h·°F)	lb/(ft·h)	cSt (mm²/s)	psia
27	–3	8.54	63.9	0.355	178.8	9.4	0.0684	5020	2000	—
40	4	8.50	63.6	0.361	177.3	14.1	0.0683	1680	681	—
60	16	8.44	63.1	0.370	175.1	21.4	0.0681	456	186	—
80	27	8.38	62.7	0.379	173.0	28.9	0.0678	172	70.8	—
100	38	8.32	62.2	0.388	170.8	36.5	0.0675	81.2	33.7	—
120	49	8.26	61.8	0.397	168.7	44.4	0.0672	44.9	18.8	—
140	60	8.19	61.3	0.406	166.7	52.4	0.0669	27.9	11.7	—
160	71	8.13	60.8	0.415	164.7	60.6	0.0666	18.8	7.97	0.0016
180	82	8.07	60.4	0.424	162.7	69.0	0.0662	13.5	5.76	0.0029
200	93	8.01	59.9	0.434	160.8	77.6	0.0658	10.1	4.37	0.0051
220	104	7.94	59.4	0.443	158.9	86.4	0.0654	7.91	3.44	0.0086
240	116	7.88	59.0	0.452	157.0	95.3	0.0650	6.36	2.78	0.0142
260	127	7.82	58.5	0.462	155.2	104.5	0.0646	5.23	2.31	0.0229
280	138	7.75	58.0	0.471	153.3	113.8	0.0641	4.39	1.95	0.0360
300	149	7.69	57.5	0.480	151.5	123.3	0.0636	3.74	1.68	0.0556
320	160	7.62	57.0	0.490	149.7	133.0	0.0631	3.23	1.46	0.0840
340	171	7.56	56.5	0.499	147.9	142.9	0.0625	2.82	1.29	0.125
360	182	7.49	56.1	0.509	146.1	153.0	0.0620	2.49	1.15	0.182
380	193	7.43	55.6	0.519	144.3	163.3	0.0614	2.22	1.03	0.262
400	204	7.36	55.1	0.528	142.5	173.7	0.0608	2.00	0.935	0.370
420	216	7.29	54.5	0.538	140.7	184.4	0.0602	1.80	0.854	0.517
440	227	7.22	54.0	0.548	138.9	195.2	0.0595	1.64	0.784	0.712
460	238	7.15	53.5	0.558	137.0	206.3	0.0588	1.50	0.725	0.969
480	249	7.08	53.0	0.568	135.2	217.6	0.0581	1.38	0.674	1.30
500	260	7.01	52.5	0.578	133.3	229.0	0.0574	1.28	0.629	1.73
520	271	6.94	51.9	0.588	131.3	240.7	0.0567	1.19	0.591	2.28
540	282	6.87	51.4	0.598	129.4	252.5	0.0559	1.11	0.557	2.97
560	293	6.79	50.8	0.608	127.4	264.6	0.0551	1.04	0.527	3.84
580	304	6.72	50.2	0.618	125.3	276.8	0.0543	0.974	0.500	4.92
600	316	6.64	49.7	0.628	123.2	289.3	0.0535	0.918	0.477	6.24
620	327	6.56	49.1	0.639	121.0	302.0	0.0527	0.867	0.456	7.85
640	338	6.48	48.5	0.649	118.7	314.9	0.0518	0.822	0.438	9.81
660	349	6.40	47.9	0.660	116.4	327.9	0.0509	0.781	0.421	12.2
680	360	6.32	47.3	0.671	113.9	341.3	0.0500	0.744	0.406	15.0
700	371	6.23	46.6	0.682	111.4	354.8	0.0491	0.711	0.393	18.4

TLC Total Lifecycle Care®

In-service heat transfer fluid sample analysis

When Therminol heat transfer fluids are used within suggested temperature limits, they may provide years of trouble-free service. To help users get maximum life, Eastman offers testing of in-service heat transfer fluids to detect contamination, moisture, thermal degradation, and other conditions that may impact system performance. This comprehensive analysis includes acid number, kinematic viscosity, insoluble solids, low boilers, high boilers, and moisture content. Additional special analyses are available on request. Sample analysis includes sample collection kits that are easy to use. Most systems should be sampled annually. Users should also sample anytime a fluid-related problem is suspected.

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Results of the test are presented in a detailed report that provides suggestions for corrective action. Test results are stored in a database for future reference. Customers can access their specific test information via ***my.therminol.com***.

Technical service hotline

Experienced technical service specialists can help answer your questions regarding heat transfer fluid selection, system start-ups, system design, and operational issues.

System design support

Eastman regularly assists some of the world's largest engineering, chemical, and equipment manufacturing companies on the design and operation of heat transfer systems. Our liquid phase and vapor phase design guide information and system design data have been field tested in numerous installations. Eastman also conducts engineering seminars for customers, engineering firms, and equipment manufacturers to cover a wide range of heat transfer fluid system design and operation issues. Customers can request a technical service visit to audit heat transfer systems for fluid loss and leak prevention opportunities.

Operational training

Eastman believes that by sharing our experience with customers, we can help improve system design, promote safety, and reduce overall cost. Customers can take advantage of Eastman's heat transfer system operation and product training programs. These programs are customized to suit the varied needs of frontline technicians, operations supervisors, and maintenance technicians to design engineers. Customers can also receive training assistance for dealing with important topics like fluid safety and handling.

Safety awareness training

At Eastman, we're "All in for Safety." We provide our customers safety awareness training that focuses on the design, start-up, operation, and maintenance of heat transfer fluid systems.

Start-up assistance

Eastman provides start-up assistance by reviewing procedures and offering suggestions to reduce typical problems. Customers can also receive help by calling their local Eastman technical specialist or through on-site assistance.

Flush fluid and fluid refill

Liquid phase heat transfer systems can be cleaned with Therminol® FF flushing fluid. After the system is flushed, the appropriate liquid phase Therminol heat transfer fluid can be added.

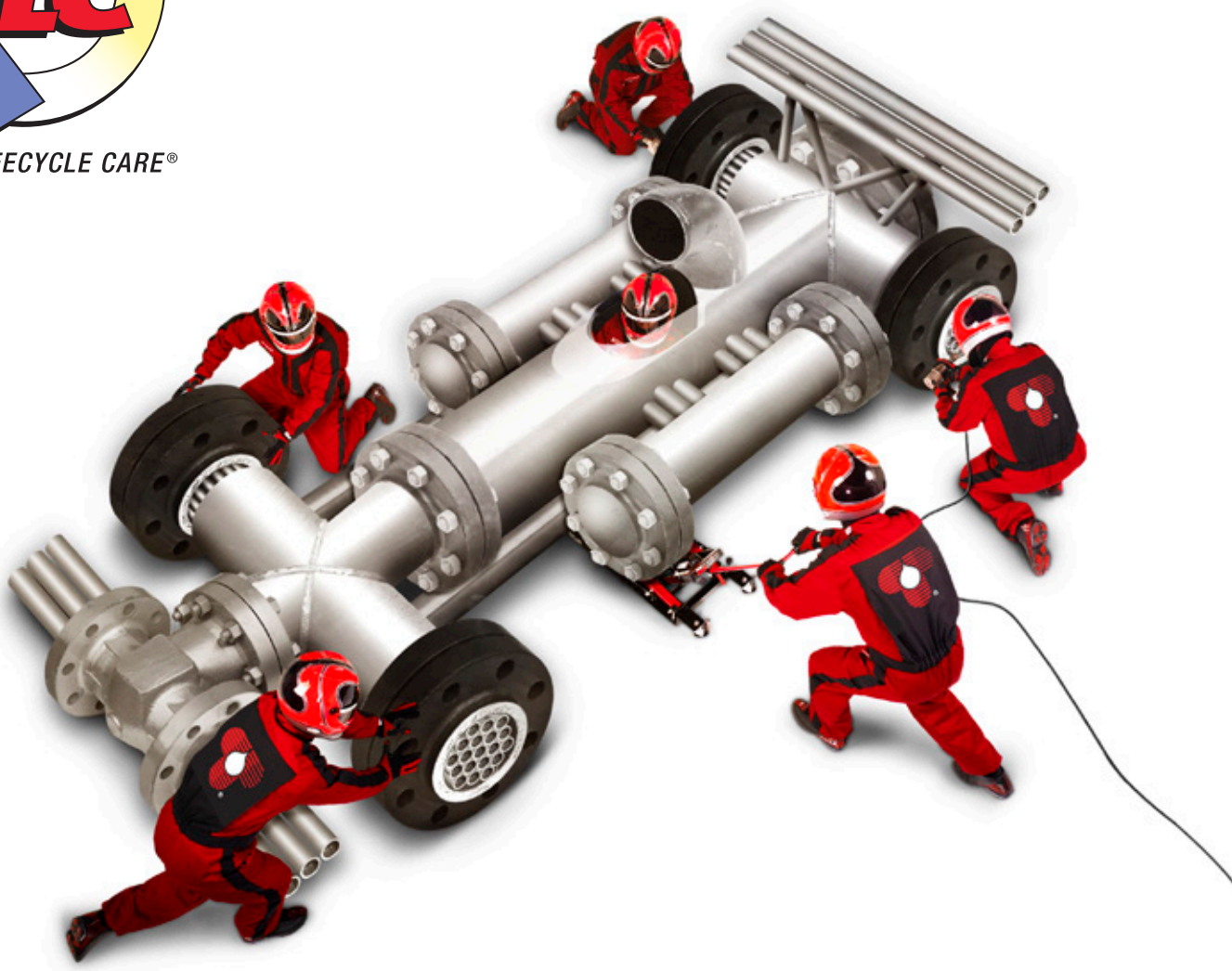
Fluid trade-in program*

As part of our commitment to sustainability and the environment, Eastman offers a trade-in program for used Therminol and competitive heat transfer fluids. Depending on the fluid and its condition, it may be turned in for potential credit towards the purchase of new Therminol heat transfer fluid.

**Available in North America. Contact your local sales representative for more information.*

THERMINOL® TLC

TOTAL LIFECYCLE CARE®



Eastman's TLC Total Lifecycle Care® program is designed to support Therminol customers throughout their systems' life cycle. This comprehensive program includes system design support, start-up assistance, training, sample analysis, flush and refill fluids, and our fluid trade-in program. In North America, call our hotline at 1-800-433-6997 or contact your local sales or technical representative.

For more information or to find the sales or technical contact nearest you, visit the "Contact us" page on our website: www.therminol.com.

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