THERMINOL®
from Eastman

THERMINOL® 66

heat transfer fluid

Proven performance for high-temperature, low-pressure applications

–3° to 345°C
(27° to 650°F)

THERMINOL® 66
heat transfer fluid

Physical and chemical characteristics

Therminol 66 heat transfer 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.

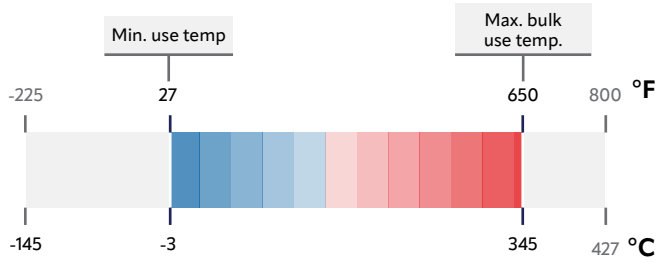
The recommended maximum bulk (345°C/650°F) and film (375°C/705°F) temperatures are based on industry-standard thermal studies. Operation at or below these temperature maximums can provide long service life under most operating conditions.

Actual fluid life is dependent on the total system design and operation and can vary by heat transfer fluid chemistry. As fluid ages, low- and high-boiling compounds may form. 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 using Therminol 66 fluid be blanketed with an atmosphere of inert gas to protect against the effects of fluid oxidation on 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.

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. The performance of Therminol 66 has been proven through many years of industrial experience under a wide range of operating conditions. No other heat transfer fluid in the world has had more success than Therminol 66.

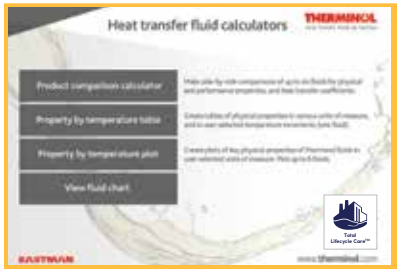


Therminol 66 is available globally. Contact your local Eastman Therminol sales representative for more information.

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 2,000 mm^2/s (cSt)	–3°C (27°F)
Flash point, COC (ASTM D92)	184°C (363°F)
Flash point, PMCC (ASTM D93)	170°C (338°F)
Autoignition temperature (ASTM E659)	374°C (705°F)
Autoignition temperature (DIN 51794)	399°C (750°F)
Pour point (ASTM D97)	–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} > 2,000)	
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 D664)	<0.2 mg KOH/g
Average molecular weight	252
Pseudocritical temperature	569°C (1,056°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 D130)	<< 1a
Moisture content, maximum (ASTM E203)	150 ppm
Dielectric constant @ 23°C (ASTM D924)	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 brochure.



To create your own customized table

with preferred properties, units of measure and temperature intervals, visit

therminol.com/resources

and download the Therminol heat transfer fluid calculator.

For technical service, visit the contact page **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	1,023	1.49	415.6	22.0	0.1180	2,050	2,000	—
0	32	1,021	1.49	414.3	26.0	0.1183	1,320	1,300	—
10	50	1,015	1.53	409.6	41.2	0.1179	344	339	—
20	68	1,008	1.56	405.0	56.6	0.1176	123	122	—
30	86	1,002	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	5,020	2,000	—
40	4	8.50	63.6	0.361	177.3	14.1	0.0683	1,680	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

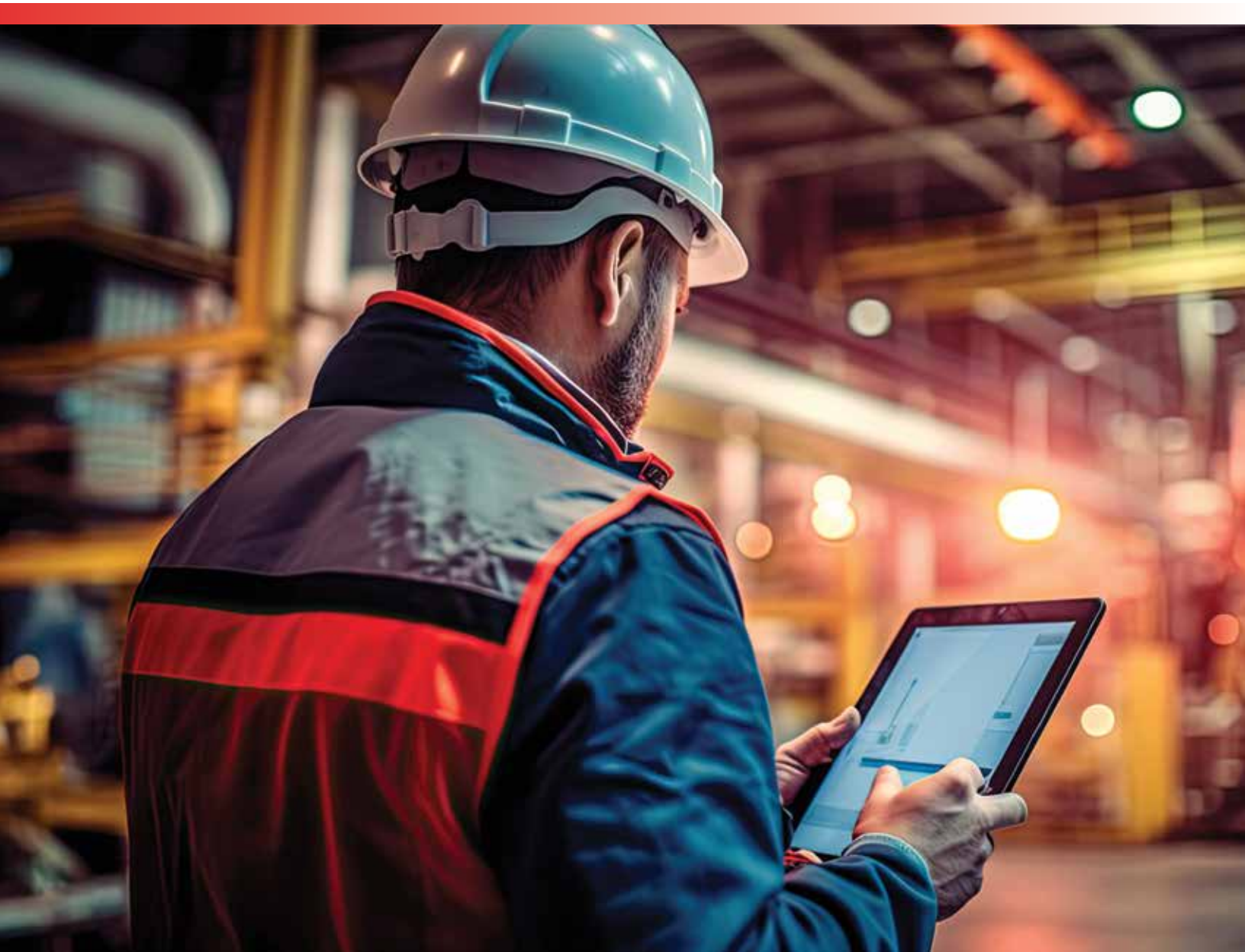
[a]Maximum recommended bulk temperature 345°C (650°F). These data are based on samples tested in the laboratory and are not guaranteed for all samples. Contact us for complete sales specifications for Therminol 66 fluid.

[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

Total Lifecycle Care™

Total Lifecycle Care is a comprehensive service that uses analytics, sampling and training to prevent heat transfer system failures, ensuring safe, efficient and uninterrupted operations.

- Offers industry-leading technical support
- Provides data through Fluid Genius™ for informed decision-making
- Helps minimize unexpected downtime and maintenance costs
- Assists in maximizing fluid life
- Enables safe working environments through tailored safety training
- Helps keep systems running smoothly



Comprehensive support services

- **In-service heat transfer fluid sample analysis**
  Eastman provides comprehensive testing services to extend heat transfer fluid life and ensure system performance by detecting contamination, moisture and degradation through key tests like acid number, viscosity, insoluble solids and moisture content.

- **Fluid Genius™**
  Fluid Genius is a web-based portal and sampling service that simplifies fluid sample management by providing expert analysis, fluid condition monitoring, lifespan prediction, early maintenance alerts, technical support and access to a comprehensive knowledge base. Learn more at fluidgenius.net.

Operational efficiency

- **System design support**
  Eastman collaborates with leading manufacturers to provide expert support in heat transfer system design, performance, fluid selection, and compliance, offering seminars, technical visits, and on-site audits to improve system reliability and efficiency.

- **Start-up assistance**
  Eastman offers start-up assistance by reviewing procedures and recommending improvements to streamline systems and reduce common issues, with support available from local technical specialists or on-site visits.

- **Flush and refill guidance**
  Therminol FF is specially formulated to clean liquid-phase heat transfer systems. After flushing with Therminol FF, refill the system with the appropriate Eastman heat transfer fluid to ensure optimal performance. Contact your local Eastman technical specialist to learn more and get expert guidance.

- **Compliance support**
  Our team provides guidance to help you achieve and maintain regulatory compliance related to safety, health and environmental standards, ensuring your operations meet the necessary requirements.

- **Environmental impact**
  Eastman supports your sustainability goals by advising on waste heat recovery and water-lean utility deployments using Therminol products to reduce CO_2 emissions and water consumption.

Operational and safety awareness training

- **Operational training**
  Eastman's customized training programs improve expertise in fluid selection and heat transfer system operation for technicians, supervisors, maintenance staff and engineers through core and specialized sessions to enhance design, improve safety and reduce costs.

- **Safety awareness training**
  At Eastman, we approach safety with a zero-incident mindset. We offer our customers safety awareness training that focuses on the design start-up, operation and maintenance of heat transfer fluid systems to help ensure safe, efficient operations.

- **Expert global assistance**
  Get direct access to experienced technical service specialists who can help answer questions regarding heat transfer fluid selection, system start-ups, system design and operational issues.

For more information, visit **therminol.com**.

EASTMAN

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