THERMINOL®
from Eastman

THERMINOL® SP

heat transfer fluid

Trusted, medium-temperature-range fluid

–28° to 300°C
(–18° to 570°F)

THERMINOL® SP
heat transfer fluid

Physical and chemical characteristics

Therminol SP 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 SP helps reduce the volatility and fluid leakage problems associated with other fluids.

The recommended bulk and maximum film temperatures for Therminol SP 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.

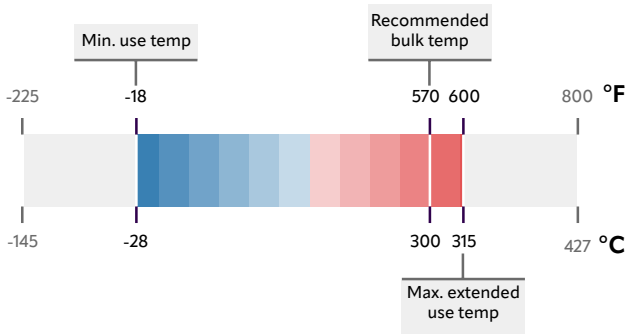
Therminol SP has been shown to be significantly less sensitive than mineral oils to the negative consequences (sludging, fouling) of thermal oxidation. Eastman recommends that systems using Therminol SP fluid be blanketed with an atmosphere of inert gas to protect against the effects of fluid oxidation on its performance and life expectancy. Pressure relief device(s) should be installed where required.

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

While Therminol SP 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 SP should check with their safety and risk management experts for specific instructions.

Eastman Therminol SP heat transfer fluid is a unique, synthetic fluid designed to provide reliable, consistent heat transfer performance over a long life at recommended bulk temperatures up to 300°C (570°F).

- Delivers excellent cost performance over the fluid life when compared to common mineral oil-based heat transfer fluids, even when operating temperatures reach a maximum extended use temperature of 315°C (600°F)
- More readily pumpable at low temperatures than the majority of other mineral oil-based heat transfer fluids
- Savings in capital, operations, and maintenance costs are often achieved when used in applications that traditionally

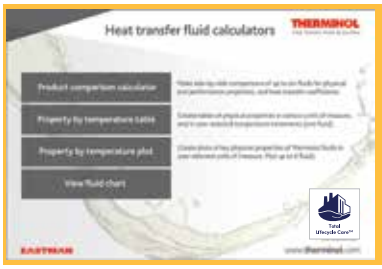


Therminol SP is available in Europe, the Middle East and Africa. Contact your local Eastman Therminol sales representative for more information.

Typical properties[a]

Appearance	Clear, yellow liquid
Composition	Synthetic hydrocarbon mixture
Recommended bulk temperature	300°C (570°F)
Maximum extended use temperature	315°C (600°F)
Maximum film temperature	335°C (635°F)
Normal boiling point	351°C (664°F)
Pumpability, at 300 mm^2/s (cSt)	–8°C (17°F)
Pumpability, at 2,000 mm^2/s (cSt)	–28°C (–18°F)
Flash point, COC (ASTM D92)	193°C (379°F)
Autoignition temperature (ASTM E659)	343°C (650°F)
Autoignition temperature (DIN 51794)	382°C (719°F)
Pour point (ISO 3016)	–54°C (–65°F)
Minimum liquid temperatures for fully developed turbulent flow (N_{Re} > 10,000)	
10 ft/s, 1-in. tube (3.048 m/s, 2.54-cm tube)	67°C (152°F)
20 ft/s, 1-in. tube (6.096 m/s, 2.54-cm tube)	45°C (114°F)
Minimum liquid temperatures for transitional region flow (N_{Re} > 2,000)	
10 ft/s, 1-in. tube (3.048 m/s, 2.54-cm tube)	24°C (75°F)
20 ft/s, 1-in. tube (6.096 m/s, 2.54-cm tube)	11°C (52°F)
Coefficient of thermal expansion @ 200°C	0.000961/°C (0.000534/°F)
Heat of vaporization at maximum use temperature	228 kJ/kg (98.1 Btu/lb)
Average molecular weight	320
Pseudocritical temperature	512°C (953°F)
Pseudocritical pressure	13.2 bar (191 psia)
Pseudocritical density	258 kg/m^3 (16.1 lb/ft^3)
Moisture content, maximum (ASTM E203)	<150 ppm
Dielectric constant @ 23°C (ASTM D924)	2.23

[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 SP 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 on **therminol.com.**

Liquid properties of Therminol SP 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
–28	–18	904	1.73	418.0	–18.8	0.1340	1,820	2,010	—
–20	–4	899	1.76	412.0	–3.9	0.1331	756	841	—
–10	14	892	1.80	405.0	13.9	0.1319	309	346	—
0	32	885	1.83	398.1	32.0	0.1307	143	162	—
10	50	878	1.87	391.3	50.6	0.1296	73.8	84.0	—
20	68	872	1.91	384.6	69.4	0.1284	41.6	47.7	—
30	86	865	1.94	377.9	88.7	0.1273	25.2	29.2	—
40	104	858	1.98	371.4	108.3	0.1261	16.3	19.0	—
50	122	852	2.01	364.9	128.2	0.1249	11.1	13.1	—
60	140	845	2.05	358.5	148.5	0.1238	7.93	9.39	—
70	158	838	2.08	352.2	169.2	0.1226	5.89	7.02	—
80	176	831	2.12	345.9	190.2	0.1214	4.52	5.43	0.011
90	194	825	2.16	339.8	211.6	0.1203	3.56	4.32	0.019
100	212	818	2.19	333.7	233.3	0.1191	2.88	3.52	0.032
110	230	811	2.23	327.8	255.4	0.1179	2.38	2.93	0.054
120	248	804	2.26	321.8	277.9	0.1168	2.00	2.49	0.088
130	266	797	2.30	316.0	300.7	0.1156	1.71	2.14	0.140
140	284	790	2.33	310.2	323.8	0.1144	1.48	1.87	0.219
150	302	784	2.37	304.5	347.3	0.1133	1.29	1.65	0.334
160	320	777	2.40	298.8	371.2	0.1121	1.14	1.47	0.501
170	338	770	2.44	293.2	395.4	0.1109	1.02	1.32	0.738
180	356	763	2.47	287.7	420.0	0.1098	0.913	1.20	1.07
190	374	755	2.51	282.2	444.9	0.1086	0.825	1.09	1.53
200	392	748	2.54	276.7	470.1	0.1074	0.749	1.00	2.15
210	410	741	2.58	271.3	495.7	0.1062	0.683	0.921	2.98
220	428	734	2.61	265.9	521.7	0.1051	0.625	0.852	4.07
230	446	726	2.65	260.5	548.0	0.1039	0.574	0.790	5.51
240	464	719	2.68	255.1	574.7	0.1027	0.528	0.735	7.37
250	482	711	2.72	249.7	601.7	0.1015	0.488	0.686	9.76
260	500	704	2.75	244.3	629.1	0.1004	0.451	0.641	12.8
270	518	696	2.79	239.0	656.8	0.0992	0.418	0.600	16.6
280	536	688	2.83	233.5	684.9	0.0980	0.387	0.563	21.3
290	554	680	2.86	228.1	713.3	0.0968	0.360	0.529	27.2
300	572	672	2.90	222.6	742.1	0.0957	0.334	0.497	34.4
310	590	663	2.93	217.1	771.2	0.0945	0.311	0.468	43.1
320[e]	608	655	2.97	211.5	800.7	0.0933	0.289	0.441	53.7

[a]Recommended bulk temperature 300°C (570°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 SP 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. [e]Maximum extended use temperature is 315°C (600°F).

Liquid properties of Therminol SP 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
–18	–28	7.55	56.5	0.414	179.8	–8.1	0.0775	4,400	2,010	—
0	–18	7.49	56.0	0.423	176.6	0.0	0.0768	1,480	683	—
20	–7	7.42	55.5	0.433	173.3	8.6	0.0760	571	265	—
40	4	7.36	55.1	0.442	170.0	17.3	0.0753	255	120	—
60	16	7.30	54.6	0.452	166.7	26.2	0.0745	128	60.7	—
80	27	7.24	54.1	0.461	163.5	35.4	0.0738	71.5	34.1	—
100	38	7.18	53.7	0.471	160.4	44.7	0.0731	43.2	20.8	—
120	49	7.11	53.2	0.480	157.3	54.2	0.0723	28.0	13.6	—
140	60	7.05	52.7	0.490	154.2	63.9	0.0716	19.2	9.39	—
160	71	6.99	52.3	0.499	151.2	73.8	0.0708	13.8	6.82	—
180	82	6.93	51.8	0.509	148.2	83.9	0.0701	10.3	5.15	0.0018
200	93	6.86	51.3	0.518	145.3	94.1	0.0693	8.01	4.03	0.0033
220	104	6.80	50.9	0.527	142.4	104.6	0.0686	6.39	3.24	0.0059
240	116	6.74	50.4	0.537	139.6	115.2	0.0678	5.22	2.67	0.010
260	127	6.67	49.9	0.546	136.8	126.1	0.0671	4.35	2.25	0.017
280	138	6.61	49.4	0.556	134.0	137.1	0.0663	3.69	1.92	0.029
300	149	6.55	49.0	0.565	131.3	148.3	0.0656	3.17	1.67	0.046
320	160	6.48	48.5	0.574	128.6	159.7	0.0648	2.76	1.47	0.073
340	171	6.42	48.0	0.584	125.9	171.3	0.0641	2.43	1.31	0.112
360	182	6.35	47.5	0.593	123.2	183.0	0.0633	2.16	1.17	0.168
380	193	6.28	47.0	0.602	120.6	195.0	0.0626	1.93	1.06	0.248
400	204	6.22	46.5	0.612	118.0	207.1	0.0618	1.74	0.964	0.360
420	216	6.15	46.0	0.621	115.4	219.5	0.0610	1.57	0.881	0.515
440	227	6.08	45.5	0.630	112.8	232.0	0.0603	1.43	0.810	0.724
460	238	6.01	45.0	0.640	110.3	244.7	0.0595	1.30	0.747	1.00
480	249	5.94	44.5	0.649	107.7	257.6	0.0588	1.19	0.691	1.37
500	260	5.87	43.9	0.658	105.1	270.6	0.0580	1.09	0.641	1.85
520	271	5.80	43.4	0.668	102.5	283.9	0.0573	1.00	0.596	2.47
540	282	5.73	42.8	0.677	100.0	297.3	0.0565	0.922	0.555	3.27
560	293	5.65	42.3	0.686	97.3	311.0	0.0558	0.849	0.518	4.27
580	304	5.58	41.7	0.696	94.7	324.8	0.0550	0.783	0.484	5.52
600[e]	316	5.50	41.1	0.705	92.1	338.8	0.0542	0.722	0.453	7.07

[a]Recommended bulk temperature 300°C (570°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 SP 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. [e]Maximum extended use temperature is 315°C (600°F).

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

Eastman Corporate Headquarters
P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other locations, +(1) 423-229-2000

eastman.com/locations

SFE-HTF-20240 4/26