

THERMINOL® VLT

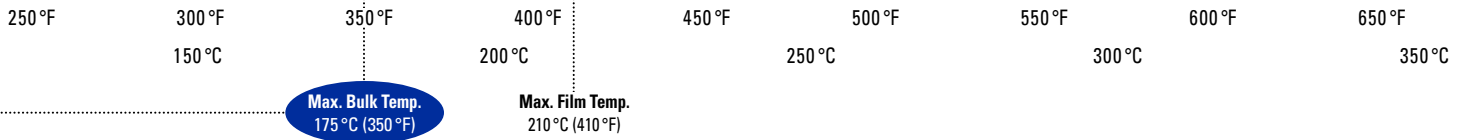
Heat Transfer Fluid by Solutia

Very Low
Temperature Coolant,
for Single
Fluid Heating and
Cooling Systems

-175 °F to
350 °F



+450 °F
+400 °F
+200 °C
+350 °F
+150 °C +300 °F
+250 °F
+100 °C +200 °F
+150 °F
+50 °C +100 °F
+50 °F
0 °C
0 °F
-50 °F
-50 °C
-100 °F
-150 °F
-100 °C
-200 °F



T Y P I C A L P R O P E R T I E S*†

Appearance	Water-white liquid
Composition	Methylcyclohexane/trimethylpentane mixture
Moisture Content, Maximum (ASTM E203-75)	80 ppm
Total Acidity (ASTM D664-81)	< 0.2 mg KOH/g
Chlorine Content	< 10 ppm
Copper Corrosion (ASTM D-130)	<< 1 a
Flash Point, Tag Closed Cup (ASTM D-56)	-7°C (20°F)
Fire Point (ASTM D-1310)	-7°C (20°F)
Autoignition Temperature (ASTM E-659)	264°C (507°F)
Kinematic Viscosity at -100 °C	19.0 mm ² /s (cSt)
at 0 °C	1.14 mm ² /s (cSt)
at 100 °C	0.41 mm ² /s (cSt)
Liquid Density at 25 °C	743.3 kg/m ³ (6.20 lb/gal)
Vapor Density at 25 °C	0.2845 kg/m ³ (0.01776 lb/ft ³)
Coefficient of Thermal Expansion at 100 °C	0.00142/°C (0.000786/°F)
Average Molecular Weight	102
Cloud Point	-135°C (-211°F)
Pumpability, at 300 mm²/s	-126°C (-195°F)
Minimum Temperatures for Fully Developed Turbulent Flow, (Re = 10000)	
10 ft/sec, 1-in tube (3.048 m/s, 2.54-cm tube)	-76°C (-106°F)
20 ft/sec, 1-in tube (6.096 m/s, 2.54-cm tube)	-93°C (-135°F)
Minimum Temperatures for Transition Region Flow (Re = 2000)	
10 ft/sec, 1-in tube (3.048 m/s, 2.54-cm tube)	-108°C (-163°F)
20 ft/sec, 1-in tube (6.096 m/s, 2.54-cm tube)	-118°C (-180°F)
Normal Boiling Point	99.2°C (210.6°F)
Heat of Vaporization at Maximum Use Temperature of 175 °C (350 °F)	252.3 kJ/kg (108.6 Btu/lb)
Optimum Use Range	-115° to 175°C (-175° to 350°F)
Maximum Bulk Temperature	175°C (350°F)
Maximum Film Temperature	210°C (410°F)
Pseudocritical Temperature	299°C (570.2°F)
Pseudocritical Pressure	35.0 bar (521.7 psia)
Pseudocritical Density	267.8 kg/m ³ (16.72 lb/ft ³)

* These data are based upon samples tested in the laboratory and are not guaranteed for all samples.

† Does not constitute an express warranty. See NOTICE on the back page of this bulletin.



Min. Use Temp.
-115°C (-175°F)

OPERATING RANGE*

-115°C (-175°F) TO 175°C (350°F)

THERMINOL® VLT**

Heat Transfer Fluid by **Solutia**

PHYSICAL AND CHEMICAL CHARACTERISTICS

Operating Range

Therminol® VLT is a uniquely formulated liquid phase heat transfer fluid with excellent heat transfer and fluid properties for use in extremely low temperature applications. This fluid offers exceptional low temperature pumpability and thermal stability and is ideally suited for single fluid heating and cooling systems between -115°C (-175°F) and 175°C (350°F).

Combustibility

With a closed cup flash point of -7°C (20°F), Therminol VLT is a Class I flammable liquid under the definitions of the NFPA (National Fire Protection Association). The use of protective devices may be required to minimize fire risk. The insurer of your property should be consulted relative to this matter.

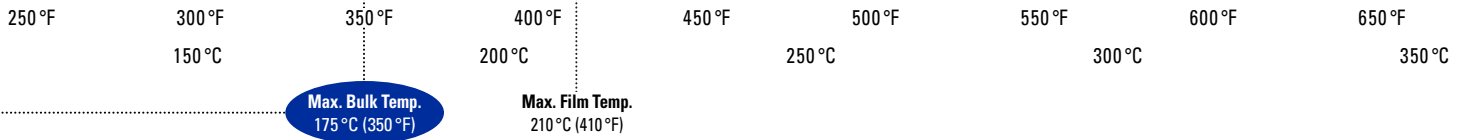
Fluid Operation

Therminol VLT generally is neither corrosive to nor affected by metals and alloys commonly used in low temperature heat transfer systems.

Therminol VLT is not listed as reportable under SARA Title III, Section 313. The fluid is water-white and has a characteristic hydrocarbon odor.

The maximum bulk and film operating temperatures are based on thermal studies, vapor pressure and the autoignition temperature of the fluid. Operating within these temperature maxima promotes long service life under most operating conditions. Operation below ambient temperatures would provide an almost limitless fluid life, based on thermal stability.

** Patent Pending



P R O P E R T I E S O F T H E R M I N O L [®] V L T

H E A T T R A N S F E R F L U I D ^{* †}

Temperature		Liquid Density			Liquid Heat Capacity		Liquid Enthalpy**		Liquid Thermal Conductivity		
°F	°C	lb/gal	lb/ft ³	kg/m ³	Btu/(lb·°F) [cal/(g·°C)]	kJ/(kg·K)	Btu/lb	kJ/kg	Btu/ (h·ft·°F)	kcal/ (h·m·°C)	W/(m·K)
-180	-118	7.21	53.9	864	0.326	1.36	0.0	0.0	0.0757	0.1126	0.1309
-160	-107	7.13	53.4	855	0.337	1.41	6.6	15.4	0.0745	0.1108	0.1288
-140	-96	7.06	52.8	845	0.349	1.46	13.5	31.4	0.0733	0.1090	0.1267
-120	-84	6.98	52.2	836	0.361	1.51	20.6	47.9	0.0720	0.1072	0.1246
-100	-73	6.90	51.6	827	0.372	1.56	27.9	64.9	0.0708	0.1054	0.1225
-80	-62	6.83	51.1	818	0.384	1.61	35.5	82.5	0.0696	0.1035	0.1203
-60	-51	6.75	50.5	809	0.395	1.65	43.3	100.6	0.0683	0.1016	0.1181
-40	-40	6.67	49.9	799	0.407	1.70	51.3	119.2	0.0670	0.0998	0.1159
-20	-29	6.59	49.3	790	0.418	1.75	59.5	138.4	0.0657	0.0978	0.1137
0	-18	6.52	48.7	781	0.429	1.80	68.0	158.1	0.0644	0.0959	0.1114
20	-7	6.44	48.1	771	0.441	1.84	76.7	178.3	0.0631	0.0939	0.1092
40	4	6.36	47.6	762	0.452	1.89	85.6	199.1	0.0618	0.0919	0.1069
60	16	6.28	47.0	752	0.463	1.94	94.8	220.3	0.0604	0.0899	0.1045
80	27	6.20	46.4	743	0.474	1.98	104.2	242.1	0.0591	0.0879	0.1021
100	38	6.12	45.8	733	0.485	2.03	113.8	264.4	0.0577	0.0858	0.0998
120	49	6.03	45.1	723	0.496	2.08	123.6	287.2	0.0563	0.0837	0.0973
140	60	5.95	44.5	713	0.507	2.12	133.6	310.5	0.0548	0.0816	0.0949
160	71	5.87	43.9	703	0.518	2.17	143.8	334.4	0.0534	0.0795	0.0924
180	82	5.78	43.2	693	0.529	2.21	154.3	358.7	0.0519	0.0773	0.0898
200	93	5.69	42.6	682	0.540	2.26	165.0	383.5	0.0504	0.0751	0.0872
220	104	5.61	41.9	672	0.551	2.31	175.9	408.9	0.0489	0.0728	0.0846
240	116	5.52	41.3	661	0.562	2.35	187.0	434.8	0.0474	0.0705	0.0819
260	127	5.42	40.6	650	0.573	2.40	198.4	461.2	0.0458	0.0681	0.0792
280	138	5.33	39.9	638	0.584	2.44	210.0	488.4	0.0442	0.0657	0.0764
300	149	5.23	39.1	627	0.596	2.49	221.8	515.5	0.0425	0.0633	0.0735
320	160	5.13	38.4	615	0.607	2.54	233.8	543.5	0.0408	0.0607	0.0706
340	171	5.03	37.6	602	0.619	2.59	246.1	572.0	0.0391	0.0581	0.0676
360	182	4.92	36.8	589	0.632	2.64	258.6	601.1	0.0373	0.0555	0.0645

* Maximum recommended bulk temperature 175 °C (350 °F).

† These data are based upon samples tested in the laboratory and are not guaranteed for all samples. Write us for complete sales specifications for Therminol VLT fluid.

** The liquid enthalpy basis is zero at -118 °C (-180 °F).

TECHNICAL ASSISTANCE WHEN YOU NEED IT: 1-800-433-6997

With Solutia, technical guidance is only a phone call away. Any time during the normal business day, we'll answer questions about heat transfer fluids, system start-ups, proper fluid selection, general trouble-shooting and similar matters. Solutia specialists also are available to assist you on-site at your plant and will even conduct operation and safety seminars.

FREE SAMPLE KIT SERVICE

Our free fluid sampling kit is the easiest way ever to take a fluid sample and get it analyzed by Solutia. Each kit contains an aluminum sample bottle, instructions, a system description form, a handy pre-addressed mailer and an order form for more free kits.

A FLUID TESTING PROGRAM THAT TELLS A LOT MORE AT NO EXTRA COST

At Solutia, we routinely do testing that tells you far more than whether your fluid is "good" or "bad." Instead, we give you detailed analyses so you can quickly trouble-shoot system problems, extend your fluid life and improve your overall system performance. We even track the ongoing performance of your system over time with data stored in our technical service data base. Our routine fluid analysis includes:

Total Acid Number

To measure the degree of oxidation or possible contamination of a fluid.

Moisture Content

To identify system component failures and to specify corrective action.

Acetone Insoluble Solids

To identify contamination, solids build-up or severe oxidation.

Viscosity Measurement

To pinpoint viscosity changes that can impact heat transfer efficiency.

Low Boilers and High Boilers

To measure the degree of thermal degradation, to determine fitness for use and remaining fluid life, and to identify potential corrective action.

Special Tests

Solids analysis, fluid compatibility, material compatibility and others as required. Free fluid analysis is routinely completed within three weeks of sample receipt. In an emergency, analysis can be provided within 48 hours.

Liquid Viscosity			Vapor Pressure			
lb/ (ft-h)	cSt [mm ² /s]	cP [mPa·s]	psia	mmHg	kgf/cm ²	kPa
138	66.2	57.2	—	—	—	—
59.4	28.7	24.6	—	—	—	—
30.5	14.9	12.6	—	—	—	—
17.8	8.79	7.35	—	—	—	—
11.4	5.71	4.73	0.0006	0.0305	0.00004	0.0041
7.91	4.00	3.27	0.0021	0.109	0.0001	0.0145
5.78	2.96	2.39	0.0064	0.333	0.0005	0.0444
4.42	2.28	1.83	0.0173	0.894	0.0012	0.119
3.49	1.83	1.44	0.0416	2.2	0.0029	0.287
2.83	1.50	1.17	0.0915	4.7	0.0064	0.631
2.35	1.26	0.972	0.186	9.6	0.0131	1.28
1.98	1.08	0.819	0.354	18.3	0.0249	2.44
1.70	0.932	0.701	0.635	32.8	0.0446	4.38
1.47	0.816	0.606	1.08	56.1	0.076	7.47
1.28	0.722	0.529	1.77	91.6	0.124	12.2
1.13	0.644	0.466	2.78	144	0.196	19.2
0.998	0.578	0.412	4.22	218	0.297	29.1
0.888	0.522	0.367	6.22	321	0.437	42.9
0.794	0.474	0.328	8.90	460	0.626	61.4
0.713	0.432	0.295	12.4	643	0.875	85.8
0.642	0.395	0.265	17.0	879	1.20	117
0.580	0.363	0.240	22.8	1180	1.60	157
0.525	0.334	0.217	30.0	1550	2.11	207
0.476	0.308	0.197	38.8	2010	2.73	268
0.433	0.286	0.179	49.5	2560	3.48	341
0.394	0.265	0.163	62.2	3220	4.37	429
0.360	0.247	0.149	77.2	3990	5.43	533
0.329	0.231	0.136	94.8	4900	6.66	654

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