THERMINOL® SP

Heat Transfer Fluids By SOLUTIA™

Applied Chemistry, Creative Solutions

SP

Synthetic Fluid Optimum Cost Performance Heat Transfer Fluid

-10°C to 315°C

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

TM

Therminol SP is a synthetic heat transfer medium intended for use in the liquid phase for indirect process heating.

Therminol SP exhibits thermal stability markedly superior to that of mineral oils used for the same purpose, resulting in a favourable cost/performance ratio.

With a viscosity of about 300 mm2/s at -10°C this fluid is more readily pumpable at low temperatures than the majority of other mineral oil based heat transfer fluids. Liquid phase systems using Therminol SP are finding use in applications which traditionally used steam as heating medium. Savings in capital, running and maintenance costs are often achieved.

Therminol SP applications in process heating include thermal control units for extruders, barge heating, heating of calender rolls, tracing of lines at storage terminals and waste heat recovery systems.

Thermal Stability

The thermal stability of a heat transfer fluid is one of the most important considerations in the selection of a fluid for operation under specific heat transfer conditions.

Fluid decomposition, for both mineral oil and synthetic hydrocarbon based heat transfer fluids, generally results in the formation of volatile products (low boilers) and polymeric high viscosity fractions (high boilers). The relative proportion of low and high boiler formation, and the solubility of the high boiling fraction, may vary widely and are critical factors when evaluating fluid performance, predicting top-up costs, and the overall risk of deposits or coking.

The chemical composition of Therminol SP has been carefully selected to minimise the formation of low boilers and eliminate the risk of insoluble high boiler formation and fouling, provided proper attention is given to system design and operation within the maximum bulk and film temperatures specified below.

Typical Physical, Chemical and Thermal Properties of Therminol SP

Composition		Mixture of synthetic hydrocarbons
Appearance		Clear yellow liquid
Max. bulk temperature		315°C
Max. film temperature		335°C
Kinematic viscosity @ 40°C	DIN 51562 - 1	19.0 mm^2/s (cSt)
Density @ 15°C	DIN 51757	875 kg/m^3
Flash point	DIN EN 22719	166°C
	DIN 51376	177°C
Fire point	ISO 2592	218°C
Autoignition temperature	DIN 51794	366°C
Pour point	ISO 3016	-40°C
Boiling point @ 1013 mbar		351°C
Coefficient of thermal expansion		0.00096/°C
Moisture content	DIN 51777 - 1	< 150 ppm
Total acidity	DIN 51558 - 1	< 0.2 mg KOH/g
Chlorine content	DIN 51577 - 3	< 10 ppm
Copper corrosion	EN ISO 2160	<< 1a
Average molecular weight		320

Note: Values quoted are typical values obtained in the laboratory from production samples. Other samples might exhibit slightly different data. Specifications are subject to change. Write to Solutia for current sales specifications.

Properties of Therminol® SP vs Temperatures

Temperature °C	Density kg/m³	Thermal Conductivity W/m.K	Heat Capacity kJ/kg.K	Viscosity		Vapour pressure (absolute) kPa*
				Dynamic mPa.s	Kinematic mm²/s**	
-10	892	0.132	1.798	308.6	346	-
0	885	0.131	1.834	143.3	162	-
10	878	0.130	1.870	73.8	84	-
20	872	0.128	1.906	41.6	47.70	-
30	865	0.127	1.942	25.2	29.10	-
40	858	0.126	1.978	16.3	18.99	-
50	852	0.125	2.013	11.1	13.05	-
60	845	0.124	2.049	7.90	9.39	-
70	838	0.123	2.085	5.90	7.02	-
80	831	0.122	2.120	4.50	5.43	-
90	825	0.120	2.156	3.56	4.32	-
100	818	0.119	2.191	2.88	3.52	-
110	811	0.118	2.227	2.38	2.93	-
120	804	0.117	2.262	2.00	2.49	-
130	797	0.116	2.297	1.71	2.14	0.1
140	790	0.115	2.333	1.48	1.87	0.2
150	783	0.113	2.368	1.29	1.65	0.3
160	777	0.112	2.403	1.14	1.47	0.5
170	770	0.111	2.438	1.02	1.32	0.7
180	762	0.110	2.474	0.91	1.20	1.1
190	755	0.109	2.509	0.82	1.09	1.5
200	748	0.107	2.544	0.75	1.00	2.2
210	741	0.106	2.579	0.68	0.92	3.0
220	734	0.105	2.614	0.63	0.85	4.1
230	726	0.104	2.649	0.57	0.79	5.5
240	719	0.103	2.684	0.53	0.74	7.4
250	711	0.102	2.719	0.49	0.69	9.8
260	704	0.100	2.755	0.45	0.64	12.8
270	696	0.099	2.790	0.42	0.60	16.6
280	688	0.098	2.825	0.39	0.56	21.3
290	680	0.097	2.860	0.36	0.53	27.2
300	672	0.096	2.896	0.33	0.50	34.4
310	663	0.094	2.932	0.31	0.47	43.1
320	655	0.093	2.967	0.29	0.44	53.7
330	646	0.092	3.003	0.27	0.42	66.3
335	642	0.091	3.022	0.26	0.40	73.6

* 1 bar = 100 kPa - ** 1 mm²/s = 1 cSt

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Physical Property Formulae

Density (kg/m³) = 885.597 - 0.689367 * T(°C) + 1.9228 * 10^{-4} * T²(°C) - 8.87642 * 10^{-7} * T³(°C)

Heat Capacity (kJ/kg.K) = 1.83369 + 0.0036172 * T(°C) - 4.94238 * 10^{-7} * T²(°C) + 7.98115 * 10^{-10} * T³(°C)

Thermal Conductivity (W/m.K) = 0.131281 - 0.000114034 * T(°C) - 1.49876 * 10^{-8} * T²(°C) + 1.76622 * 10^{-11} * T³(°C)

Kinematic Viscosity (mm²/s) = $e^{\left(\frac{798.89}{T(°C)+97.7} - 2.65773\right)}$

Vapour Pressure (kPa) = $e^{\left(\frac{-5322370}{(T(°C)+480) + (T(°C)+480)^2} + 12.2641\right)}$

The Therminol® Range

Therminol SP is one of the Solutia synthetic heat transfer fluids covering an operating range from -85°C to +400°C, suitable for most process heating or waste heat recovery applications, and capable of operation at or near atmospheric pressure within their recommended operating temperature range.

As a user's process temperature demands change there is always a Therminol fluid capable of meeting the new requirements. In addition, Therminol fluids are often interchangeable allowing conversion by a simple top-up procedure where this is preferred.

Solutia also has a standard DP-DPO eutectic, Therminol VP-1.

Quality Management

All our manufacturing units have obtained ISO 9002 quality control certification. This registration means that plant procedures, quality control systems, material sampling, product storage, handling, packaging, shipping, product literature and characteristic data, record keeping and other company procedures are in line with the quality requirements of the ISO 9002 standards and its other national equivalents.

This is your quality assurance.

Health, Safety and Environmental Information

Please contact the Solutia Europe/Africa HQ for the Material Safety Data Sheet, or if any other information concerning health, safety and environmental issues is required during filling or operation of your heat transfer system with this product.

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Therminol is a trademark of Solutia. *Therminol* has now been adopted as a world-wide brand for the Solutia Heat Transfer Fluid range. Fluids known previously under the Santotherm and Gilotherm brands are identical in composition and performance to the corresponding *Therminol* brand fluids.

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