THERMINOL® ALD

Heat Transfer Fluids By SOLUTIA™

Applied Chemistry, Creative Solutions

ALD

Optimum Cost Performance Highly Stable Heat Transfer Fluid

7°C to 310°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 ALD is a synthetic heat transfer medium intended for use in the liquid phase for indirect process heating.

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

Its high purity and low water content result in corrosion-free operations and smooth start-up.

Liquid phase systems using Therminol ALD are finding use in applications which traditionally used steam as heating medium. Savings in capital, running and maintenance costs are often achieved.

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

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, both for 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 ALD 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 ALD

Composition		Mixture of synthetic hydrocarbons
Appearance		Clear pale yellow liquid
Max. bulk temperature		310°C
Max. film temperature		340°C
Kinematic viscosity @ 40°C	DIN 51562 - 1	29.36 mm^2/s (cSt)
Density @ 15°C	DIN 51757	874 kg/m^3
Flash point	DIN 51376	168°C
Fire point	ISO 2592	180°C
Autoignition temperature	DIN 51794	390°C
Pour point	ISO 3016	-30°C
Boiling point @ 1013 mbar		342°C
Coefficient of thermal expansion		0.00123/°C
Moisture content	DIN 51777 - 1	< 200 ppm
Total acidity	DIN 51558 - 1	< 0.01 mg KOH/g
Chlorine content	DIN 51577 - 3	<< 0.005 %
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® ALD 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	0.116	1.85	2711.66	3039.98	-
0	884	0.115	1.88	630.76	713.53	-
10	877	0.114	1.91	209.89	239.33	-
20	870	0.113	1.94	88.74	102.00	-
30	863	0.113	1.97	44.41	51.46	-
40	856	0.112	2.01	25.13	29.36	-
50	849	0.111	2.04	15.60	18.37	-
60	842	0.110	2.07	10.40	12.35	-
70	835	0.109	2.10	7.33	8.78	-
80	828	0.109	2.13	5.41	6.53	-
90	821	0.108	2.17	4.14	5.04	-
100	814	0.107	2.20	3.26	4.01	-
110	807	0.106	2.23	2.64	3.27	-
120	800	0.105	2.26	2.18	2.73	-
130	793	0.104	2.30	1.83	2.31	-
140	786	0.104	2.34	1.56	1.99	-
150	779	0.103	2.36	1.36	1.74	-
160	773	0.102	2.39	1.19	1.54	-
170	766	0.101	2.43	1.05	1.37	-
180	759	0.100	2.46	0.94	1.24	1
190	752	0.100	2.49	0.85	1.13	1
200	746	0.099	2.53	0.77	1.03	2
210	739	0.098	2.56	0.70	0.95	2
220	733	0.097	2.59	0.64	0.88	3
230	726	0.096	2.63	0.60	0.82	5
240	719	0.096	2.66	0.55	0.76	7
250	713	0.095	2.69	0.51	0.72	9
260	706	0.094	2.73	0.47	0.67	13
270	700	0.093	2.76	0.45	0.64	17
280	693	0.092	2.80	0.42	0.61	23
290	687	0.092	2.83	0.39	0.58	29
300	681	0.091	2.86	0.37	0.55	38
310	674	0.090	2.90	0.36	0.53	49

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

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Physical Property Formulae

Density (kg/m³) = -0.72 * T (°C) + 0.000134 * T² (°C) + 884.4

Heat Capacity (kJ/kg.K) = 0.00313 * T(°C) + 5.0 * 10^{-7} * T²(°C) + 1.8795

Thermal Conductivity (W/m.K) = -8.1 * 10^{-5} * T (°C) + 0.115

Kinematic Viscosity (mm²/s) = $e^{\left(\frac{631.56}{T(°C)+71.2} - 2.3\right)}$

Vapour Pressure (kPa) = $0.001 * e^{\left(\frac{-6154.95}{T(°C)+193.56} + 23.02\right)}$

The Therminol® Range

Therminol ALD 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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