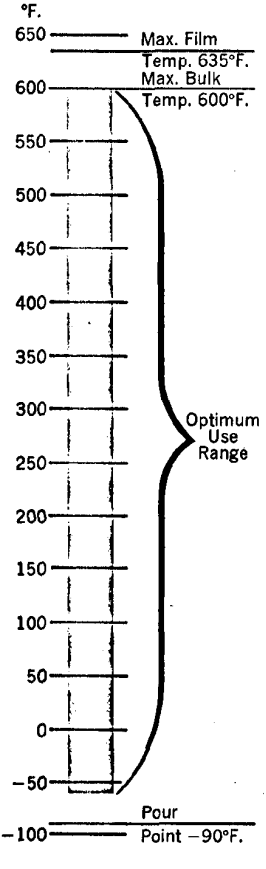
Therminol® 60* IC/FF-34



. . . a wide range liquid phase heat transfer fluid for non-pressurized indirect heating and cooling applications from −60° to 600°F.

Heat transfer fluids are intended only for *indirect* heating purposes. Under no circumstances should this product contact or in any way contaminate food, animal feed, food products, food packaging materials, pharmaceuticals or *any items which may directly or indirectly be ultimately ingested by humans.* Any contact may contaminate these items to the extent that their destruction may be required. Precautions against ignitions and fires should be taken with this product.

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NOTICE: Nothing contained herein is to be construed as a recommendation to use any product in conflict with any patent. MONSANTO MAKES NO WARRANTIES AS TO THE FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY OF ANY PRODUCT REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations, and disclaims all liability for any resulting loss or damage.

Box

~~FUNCTIONAL PRODUCTS~~ Monsanto Industrial Chemicals Co.
800 North Lindbergh Blvd., St. Louis, Missouri 63166

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*In certain countries of Western Europe and the Far East, Monsanto sells Therminol Heat Transfer Fluids under the brand name "Santotherm® Heat Transfer Fluids". Corresponding Therminol and Santotherm fluids are identical in composition.

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WATER_PCB-00023859

Therminol® 60 . . .

is a synthetic, liquid phase heat transfer fluid with excellent low temperature pumping characteristics (pumpable @ −60°F), yet thermally stable to allow 600°F bulk temperature use. Therminol 60 is ideally suited for both heating and cooling applications between −60°F and 600°F.

Therminol 60 is designed for use in indirect heating systems; to deliver efficient, dependable process heat with no need for system pressurization beyond the normal static head requirements of the pump.

Therminol 60 may oxidize on air contact when hot. Inert gas blanketing is suggested for system expansion tanks.

Therminol 60 is not corrosive to nor affected by metals and alloys commonly used in heat transfer systems.

Therminol 60 is not classified as a fire resistant heat transfer fluid. The use of protective devices may be required to minimize fire risk. Consult your insuring underwriter.

Typical Properties*

Composition	Polyaromatic Compounds
Appearance	Light yellow liquid
Odor	Faint, aromatic
Pour Point	−90°F. (−67.8°C.)
Density @ 75°F.	8.33 lbs./gal.
Flash Point, coc.	310°F. (154°C.)
Fire Point, coc.	320°F. (160°C.)
AIT	835°F. (445.8°C.)
Coefficient of Expansion	0.00082 cc/cc/°C.
Boiling Range:	
10%	550°F. (288°C.)
90%	741°F. (394°C.)
Average Molecular Weight	250

Use same size type as footnote on front cover

*This data is based upon samples tested in the laboratory and is not guaranteed for all samples. Write us for complete sales specifications for Therminol 60 heat transfer fluid.

Variations of Properties With Temperature

Temperature		Density			Specific Heat		Thermal Conductivity		Viscosity		Vapor Pressure	
°F	°C	lb./gal.	lb./ft.³	Kg./m.³	Btu./lb. °F	Kcal./Kg. °C.	Btu./Hr. ft. °F.	Kcal./Hr. m. °C.	lb./hr. ft.	cs.	mm Hg. abs.	Kg./cm.²
−65	−59.4	8.72	65.2	1046	0.315	0.315	0.0797	0.1186	9746	3850	—	—
−50	−45.6	8.66	64.8	1038	0.321	0.321	0.0793	0.1180	2763	1100	—	—
0	−18	8.50	63.6	1019	0.346	0.346	0.0780	0.1161	160	65.0	—	—
50	10	8.35	62.5	1001	0.371	0.371	0.0768	0.1143	32	13.2	—	—
100	38	8.20	61.3	983	0.395	0.395	0.0755	0.1123	11.7	4.90	—	—
150	66	8.05	60.2	965	0.420	0.420	0.0743	0.1106	6.3	2.70	—	—
200	93	7.90	59.1	947	0.445	0.445	0.0731	0.1088	4.0	1.75	<2.0	—
250	121	7.75	57.9	929	0.470	0.470	0.0718	0.1068	2.8	1.25	5	0.007
300	149	7.60	56.9	911	0.495	0.495	0.0705	0.1049	2.1	0.97	12	0.016
350	177	7.43	55.6	891	0.518	0.518	0.0693	0.1031	1.6	0.75	30	0.041
400	204	7.30	54.6	875	0.543	0.543	0.0681	0.1013	1.3	0.62	65	0.088
450	232	7.12	53.3	854	0.568	0.568	0.0668	0.0994	1.1	0.52	130	0.176
500	260	6.95	52.0	833	0.593	0.593	0.0656	0.0976	0.93	0.46	240	0.324
550	288	6.80	50.9	815	0.618	0.618	0.0643	0.0957	0.81	0.41	450	0.608
600*	316	6.65	49.7	797	0.643	0.643	0.0630	0.0937	0.69	0.36	760	1.026
650	343	6.50	48.6	779	0.668	0.668	0.0618	0.0920	0.60	0.32	1200	1.620

*Maximum Recommended Bulk Temperature: 600°F.

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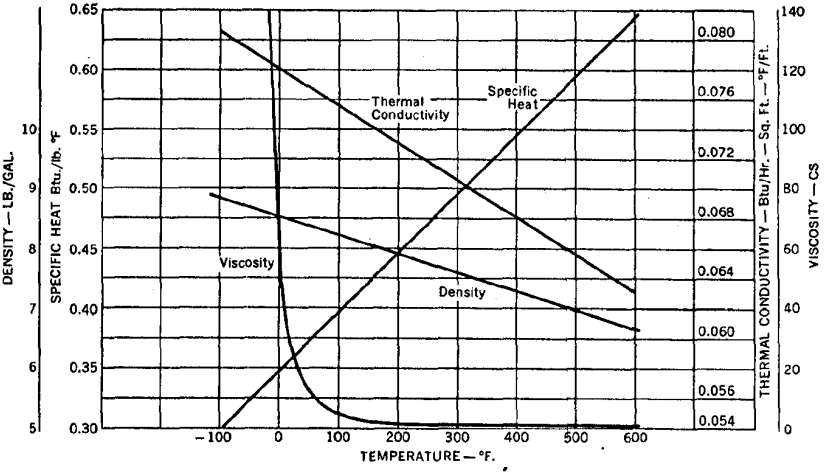
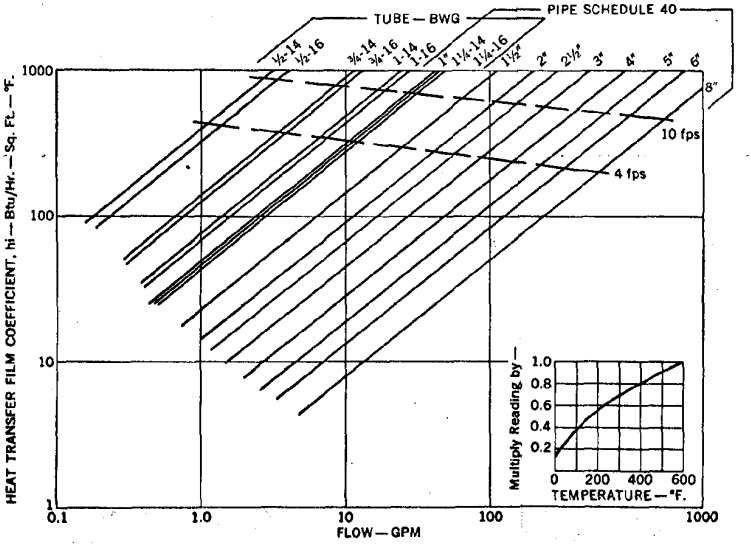
Therminol® 60 — Physical Properties



Therminol® 60 — Heat Transfer Coefficients



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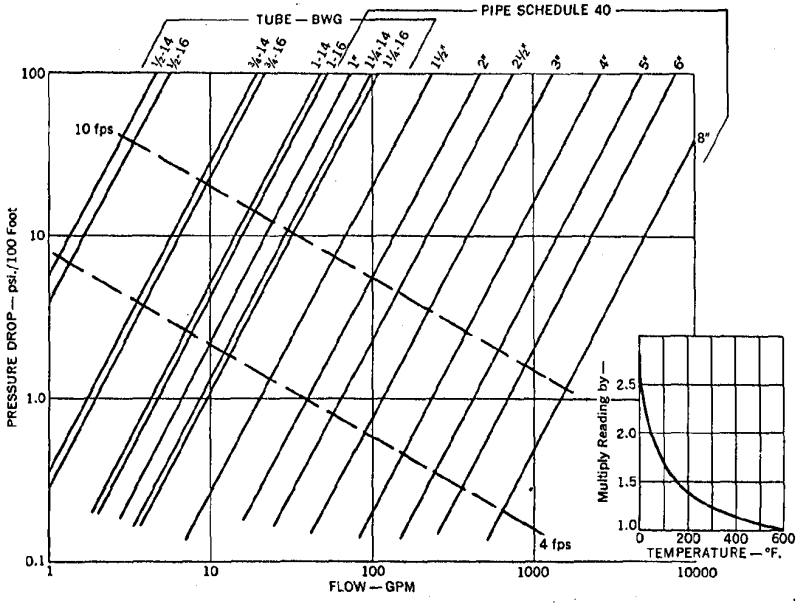
Therminol® 60—Pressure Drop



Therminol 60—Safety of Handling

Therminol 60 is virtually non-toxic based on acute oral and skin absorption studies, and pose no special handling problems. Therminol 60 is not absorbed through unbroken skin in any significant quantity, but can be mildly irritating to the skin on prolonged contact. Therminol 60 should be washed off the skin with soap and water as soon as possible after contact, and fluid soiled clothing should be laundered before reuse.

Therminol 60 may be mildly irritating if eye contact occurs. Immediate flushing of the eye with copious amounts of water will minimize eye irritation or aftereffects.

Handled like any other industrial chemical, Therminol 60 is quite safe to store and use.

Therminol 60 vapors are not toxic, but may cause discomfort if coming off of heated fluid. There is no vapor exposure problem when transferring the fluid from its shipping container to the heat transfer system. On the other hand, vapors emitted by Therminol 60 heated to elevated temperatures may be mildly irritating upon prolonged exposure. In heat transfer installations, the fluid is used in a closed, non-pressurized system free from leaks and with the expansion tank vent trapped so as to condense any vapors. Consequently, there should be little or no opportunity for workers to come in contact with vapors.

While Therminol 60 poses no serious problems with respect to the environment, as a concerned supplier to industry, Monsanto urges the user to maintain a tight system, to correct leakage promptly, and to exercise care in the handling and disposal of this and all other such products. A tight maintenance program not only protects the environment, but keeps employes comfortable, the working area clean, and the system running smoothly.

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