TECHNICAL BULLETIN FR-O (T)

THERMINOL® FR-O FIRE-RESISTANT HEAT TRANSFER FLUID

Therminol FR-O liquid phase heat transfer fluid with low temperature pumpability.

Nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use. The information contained herein is, to our best knowledge, accurate; but all recommendations or suggestions are made without guarantee, since the conditions of use are beyond our control. Monsanto disclaims any liability for loss or damage incurred in connection with the use of the above.

Organic Division / 800 N. Lindbergh Blvd. / St. Louis, Missouri 63166

FUNCTIONAL FLUIDS Monsanto

0592768

TOWOLDMON0037368

Introducing Therminol FR-O...

Newest member of the growing line of Monsanto heat transfer fluids. Therminol FR-O was formulated specifically to eliminate freeze-up during cold weather shut down for in-transit heating of sulfur, pitch, asphalt, naphthalene, bunker "C" fuel oil, and high melting resin materials. Therminol FR-O eliminates the need for high temperature reheating in order to pump out the material at its destination. Low temperature pumpability makes it ideally suited for space heating applications, outdoor plants in Northern climates, or in any application where good fluidity at low temperatures is a prerequisite.

Fire-Resistance...

Therminol FR-O permits installation of a non-pressurized system operating with a liquid that has no fire point, and will not support combustion ... so fire-resistant, Therminol fluids have achieved recognition by Underwriters' Laboratory, Factory Mutual, and Factory Insurance Association. Because of this extreme fire-resistance and its listing by insurance companies, important savings can be made in designing a process heating system around Therminol FR-O fluid.

Chemically Speaking...

Therminol FR-O fluid is a chlorinated biphenyl, manufactured under exacting process control to rigid specifications for long term thermal stability, specific heat, thermal conductivity, vapor pressure and viscosity. The liquid is an oily, clear, nearly colorless, fluid with a pour point of −15°F and a minimum pumpable temperature of −5°F.

Therminol FR-O fluid is recommended for use up to 500°F and will not show measurable change after years of exposure to such temperatures. The fluid is non-corrosive with all common metals used in heat transfer system designs.

TYPICAL PROPERTIES OF THERMINOL FR-O

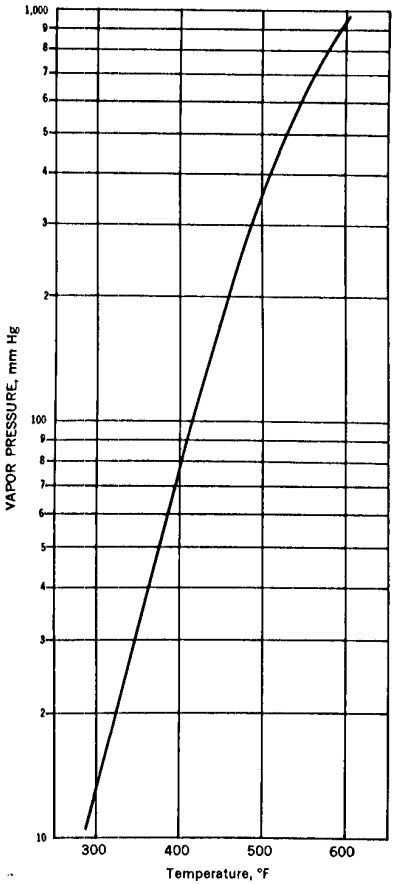
	Temperature, °F								
Property	**−5**	**+10**	**40**	**100**	**200**	**300**	**400**	**600**	**600**
Kinematic Viscosity, cs.	4545	1007	92.55	8.10	1.70*	0.95	—	—	—
Saybolt Viscosity, SSU	20850	4640	429	52.43	7.99*	4.54	—	—	—
Vapor Pressure, mm Hg	—	—	—	—	1.35	13.00	76.0	315	915
Specific Heat, BTU/lb.[b]	—	—	—	0.27	0.29	0.31	0.33	0.35	0.36
Thermal Conductivity, BTU/°F-Ft.-Hr.[b]	—	—	—	0.061	0.060	0.059	0.058	0.057	0.056
Density, g/cc	—	1.45	1.43	1.40	1.34	1.28	1.23	1.17	1.11
Density, lbs./gal.	—	12.10	11.92	11.70	11.19	10.69	10.27	9.76	9.27

*Viscosity at 210°F
[b]Calculated values

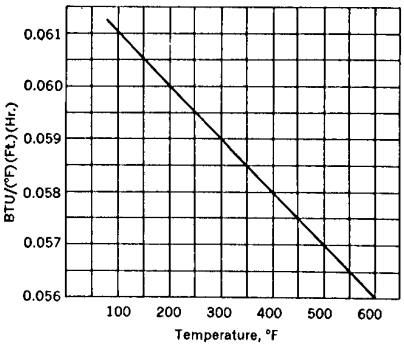
0592769

TOWOLDMON0037369

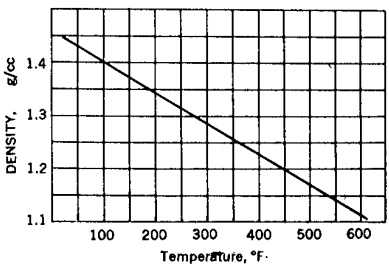
VAPOR PRESSURE



THERMAL CONDUCTIVITY
(calculated)



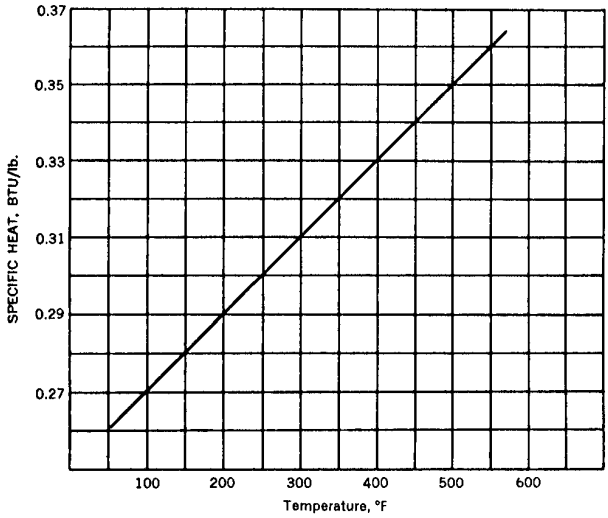
DENSITY



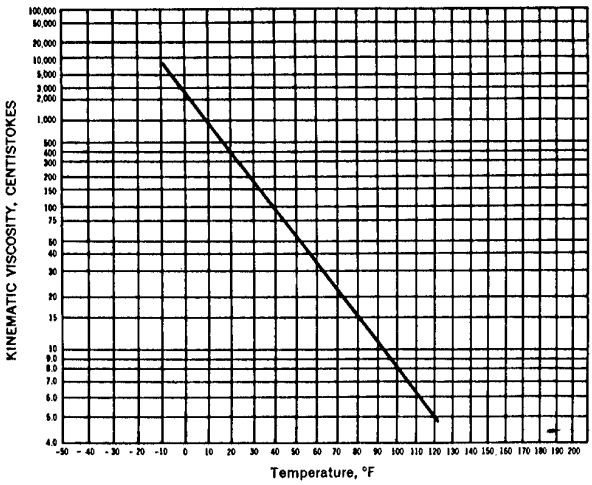
0592770

TOWOLDMON0037370

SPECIFIC HEAT



KINEMATIC VISCOSITIES



0592771

TOWOLDMON0037371