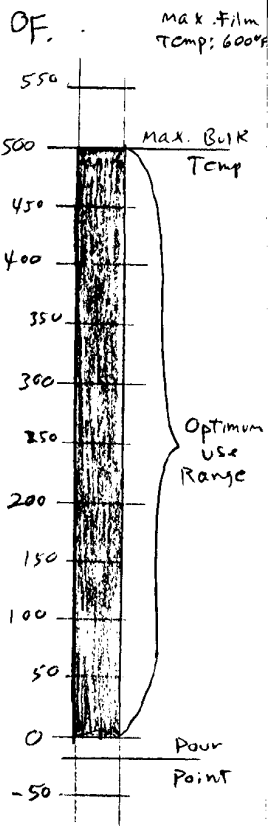


SP/O-X

THERMINOL FR-O



... Fire-resistant, Low-temperature Liquid phase heat transfer Fluid For cold weather applications.

Monsanto®

(Disclaimers)

0592916

(Copy "C")

(Copy "C")

(Typical
Properties
FR-O)

VARIATION OF PROPERTIES WITH TEMPERATURE

(Insert Column "N")

Temperature		Density		Specific Heat		Thermal Conductivity		Viscosity			Vapour Pressure	
°F	°C	lb/ft ³	Kg/m ³	BTU/lb. °F	Kcal/Kg. °C	BTU/ft. hr. °F	Kcal/m. hr. °C	lb/hr. ft	cP	cS	mmHg absolute	Kg/cm ²
-5	-21	-	-	-	-	-	-	-	-	4545	-	-
+10	-12	90.5	1449.6	-	-	-	-	3533	1460	1007	-	-
40	4	89.2	1428.0	-	-	-	-	320	132	92.55	-	-
100	38	87.5	1401.7	0.27	0.27	0.061	0.091	27.6	11.4	8.10	-	-
200	93	83.7	1340.6	0.29	0.29	0.060	0.089	5.6	3	1.70	1.35	0.0018
300	149	80.0	1280.7	0.31	0.31	0.059	0.088	2.9	2	0.95	13.00	0.0177
400	204	76.8	1230.4	0.33	0.33	0.058	0.086	-	-	-	76.00	0.1034
500	260	73.0	1169.3	0.35	0.35	0.057	0.085	-	-	-	315	0.4284
600	316	69.3	1110.6	0.36	0.36	0.056	0.083	-	-	-	915	1.2444

0592917

TOWOLDMON0037449

WATER_PCB-00021918

(COPY "C" -- FR-0)

THERMINOL FR-0...

is a low-temperature fire-resistant heat transfer fluid formulated for good pumpability at temperatures as low as 0°F.

Therminol FR-0, while not offering the extreme low-temperature performance of Therminol FR Lo-Temp (-40°F.), does provide a higher operating temperature capability -- up to 500°F. This fluid is excellently suited for outdoor applications in moderate-to-cold climates, or for any application where good pumpability at low temperatures is required.

Therminol FR-0 is designed for use in non-pressurized indirect heating systems. It delivers efficient, dependable process heat with no need for high pressures, costly "extra" equipment, or continuous supervision.

Therminol FR-0 is a chlorinated biphenyl compound, manufactured to exacting specifications for long-term thermal stability, specific heat, thermal conductivity, vapor pressure and viscosity. Because this fluid contains PCB (polychlorinated biphenyl), care should be taken by users of this or any other PCB-containing products, to prevent entry into the environment through spills, leaks, disposal, vaporization or everyday use and handling. A tight maintenance program not only helps protect the environment, but keeps the plant clean and the system running efficiently.

0592918

(COPY "C" -- FR-O, Cont.)

Therminol FR-O is recommended for use up to 500°F., and should not show measurable change after years of service at such temperatures. This fluid is chemically inert, and non-corrosive to all metals commonly encountered in heat transfer systems design.

0592919

(FR-O - Column "N")

(°F)

Lb./Gal.

- 5

+10

40

100

200

300

400

500

600

12.10

11.92

11.70

11.17

10.69

10.27

9.76

9.27

0592920

TOWOLDMON0037452

WATER_PCB-00021921

THERMINOL FR-0

Typical Properties

Composition	Chlorinated hydrocarbons
Appearance	Pale yellowish liquid
Odor	Characteristics
Pour Point	-15°F.
Density @ 75°F.	11.80 lbs./gal.
Flash Point	305°F.
Fire Point	None to boiling
AIT	Over 1200°F.
Coefficient of Expansion	0.000415 cc/cc/°C.
Boiling Range:	
10%	520 °F.
90%	615 °F.
Average Molecular Weight	245

0592921

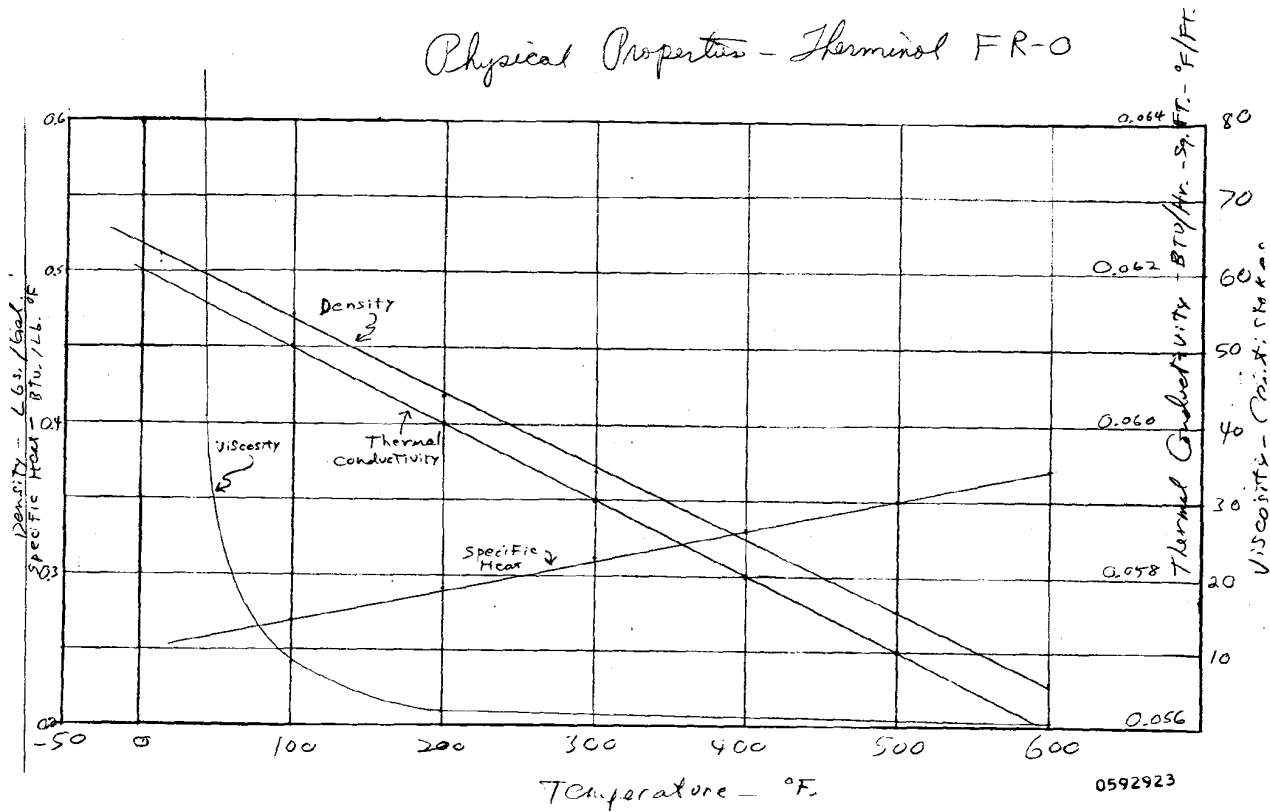
TOWOLDMON0037453

WATER_PCB-00021922

Physical
Properties -
Thermal FR - 0

0592922

Physical Properties - Therminol FR-O



0592923

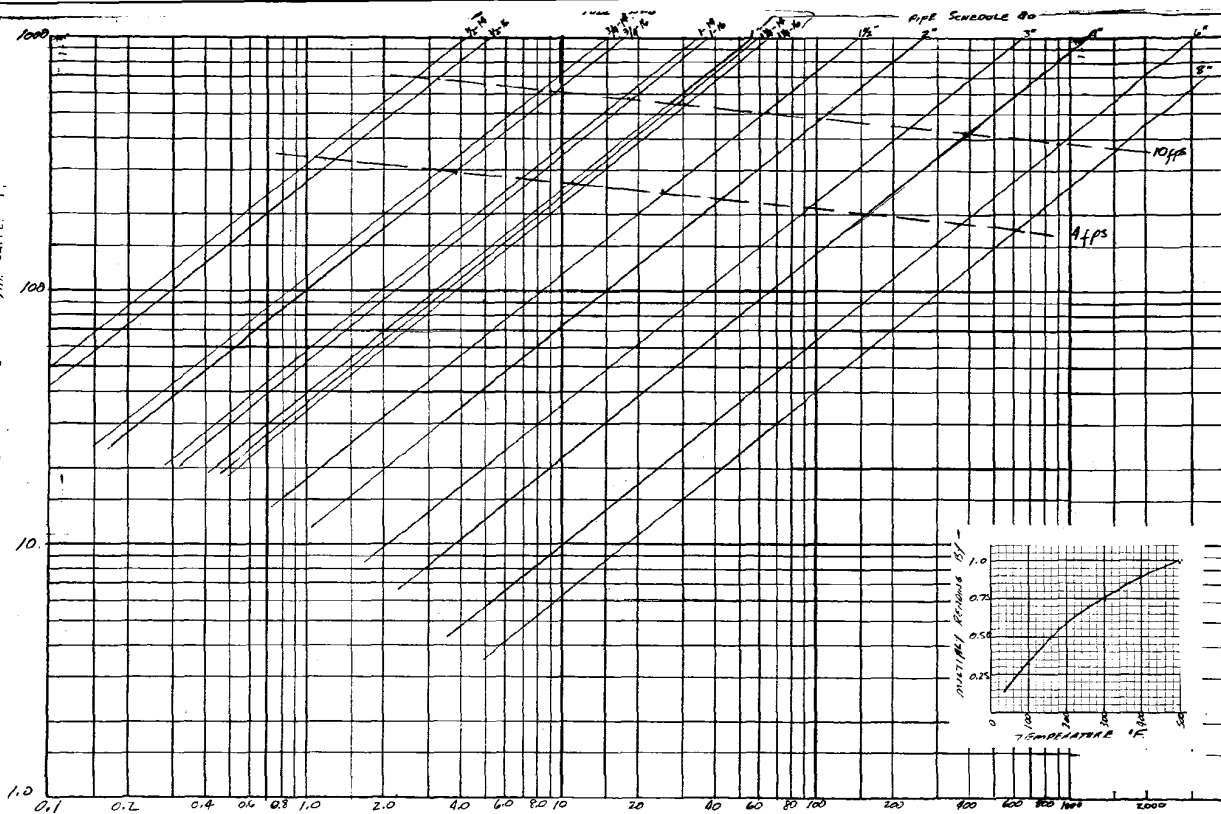
TOWOLDMON0037455

WATER_PCB-00021924

Def Transfer Coefficient
FR-0

0592924

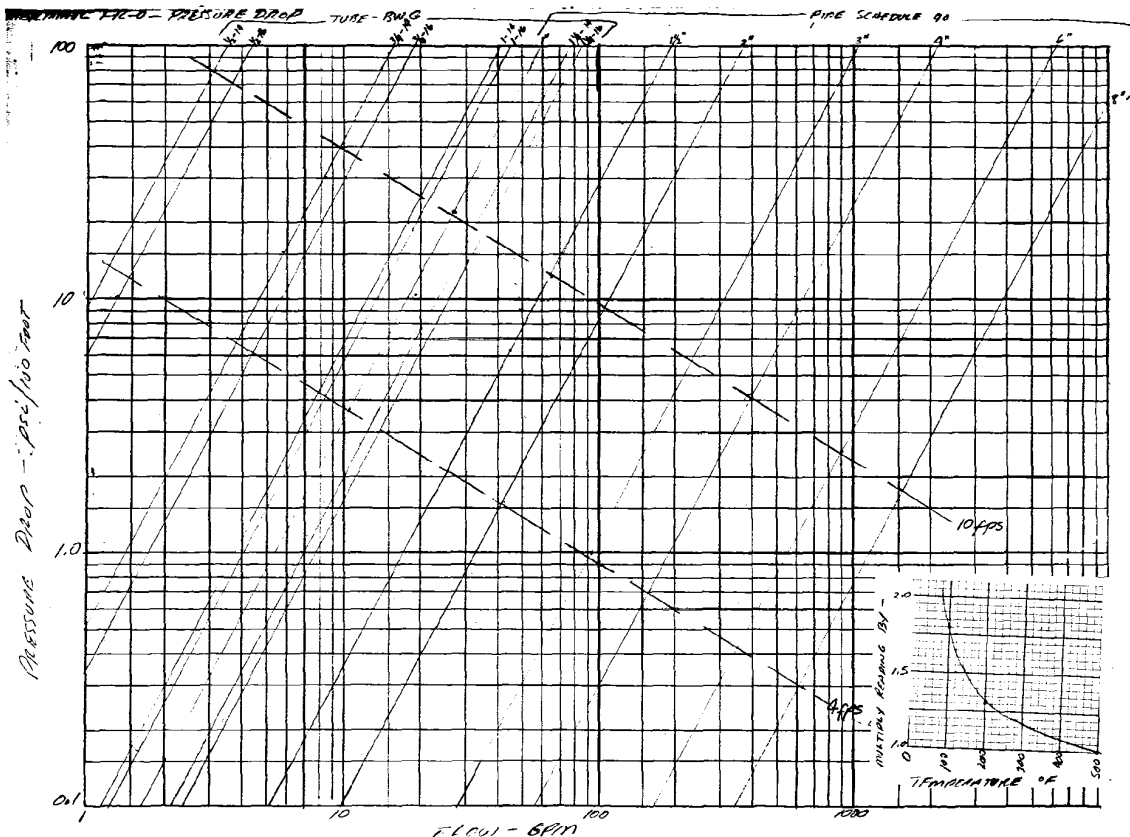
HEAT TRANSFER COEFFICIENT $h_c = Btu/hr \cdot sq \cdot ft \cdot ^\circ F$



0592925

Pressure Drop
F/R-O

0592926



0592927

(Physical
Properties -
F R - 0)

(H - T
Film
Coefficient)

0592928

(Pressure Drop)

(Handling &
Environmental
Considerations -
See FR - 1
layover)

0592929