Monsanto

THERMINOL® 88

HIGH TEMPERATURE
HEAT TRANSFER FLUID

...for use in liquid phase between 300° and 800°F

## TYPICAL PROPERTIES OF THERMINOL® 88

| | |
|---|---|
| Composition | Mixed terphenyls |
| Appearance | Crumbly wax-like flakes at room temperature. Light amber liquid above Melt Point. |
| Color | Yellow to light amber |
| Odor | Faint, pleasant |
| Melt Point<br>begins to soften<br>completely liquid | <br>140°F (60°C)<br>293°F (145°C) |
| Flash Point | 375°F (191°C) |
| Flame Point | 460°F (238°C) |
| Autoignition Temperature | >1000°F |
| Coefficient of Expansion | 0.00047 cc/cc/°F |
| Latent Heat of Fusion | 5.0-5.1 K Cal/mole |
| Molecular Weight | 230 |
| Boiling Range | 687°-784°F (364°-418°C) |

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## PHYSICAL PROPERTIES - THERMINOL 88

| Temp. °F | Density gm/cc | Kinematic Viscosity cs | Specific Heat BTU/# °F | Thermal Conductivity BTU/hr-ft-°F | Vapor Pressure mm Hg |
|---|---|---|---|---|---|
| 77 | 1.133 | - | - | - | - |
| 200 | - | - | - | - | - |
| 300 | 1.01 | 1.57 | 0.467 | 0.0738 | 1.2 |
| 400 | 0.96 | 0.87 | 0.497 | 0.0712 | 11 |
| 500 | 0.92 | 0.55 | 0.525 | 0.0686 | 65 |
| 600 | 0.88 | 0.38 | 0.554 | 0.0660 | 260 |
| 700 | 0.83 | 0.29 | 0.584 | 0.0634 | 800 |
| 800 | 0.79 | 0.23 | 0.613 | 0.0608 | 1500 |
| 900 | 0.74 | 0.19 | 0.642 | 0.0581 | 3000 |

THERMAL DECOMPOSITION

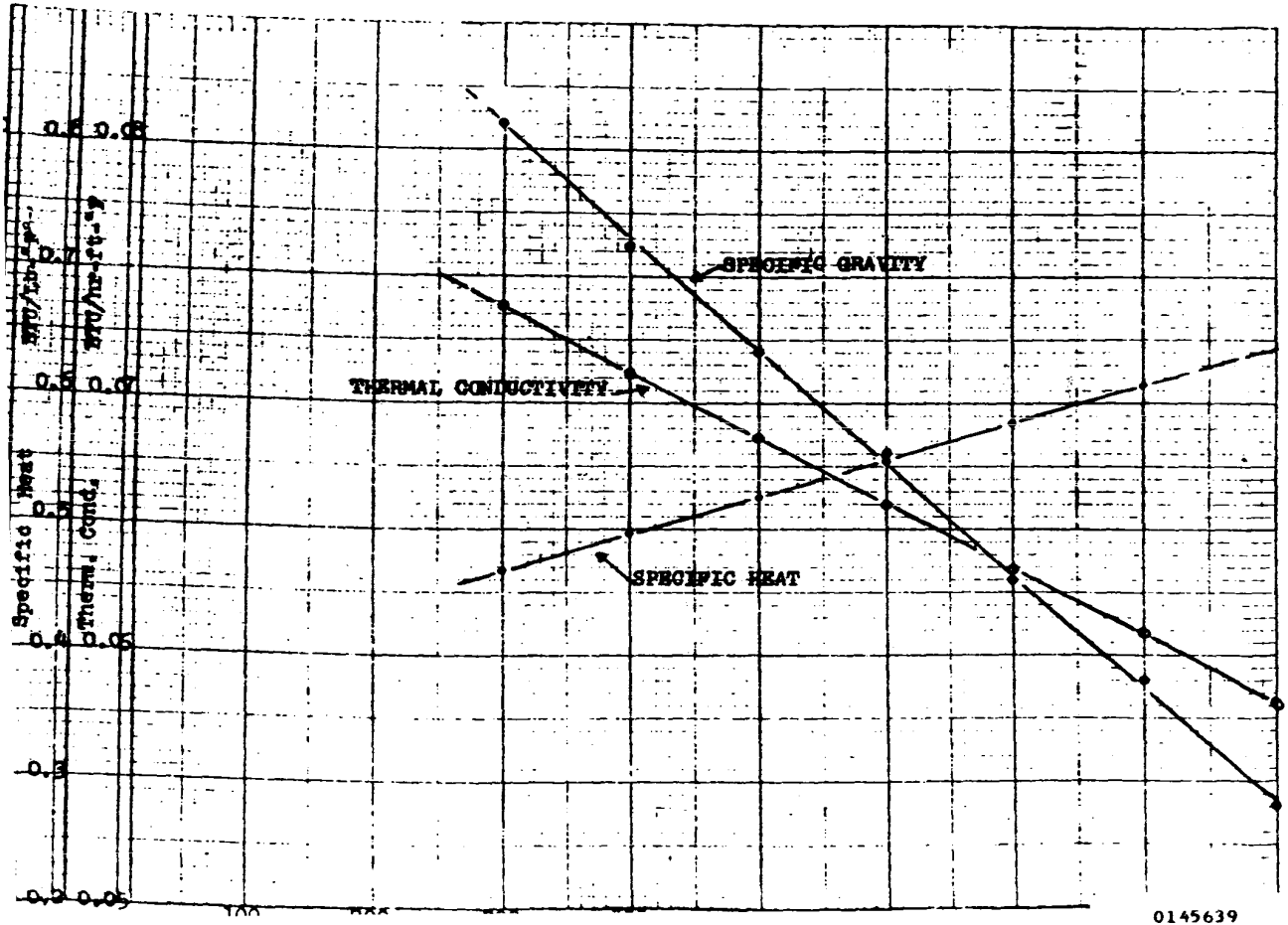
| Temperature, °F | % Polymerized/Hr. |
|---|---|
| 700 | 0.000065 |
| 800 | 0.0048 |
| 900 | 0.32 |

Therminol 88 is usable with as much as 30% polymer content which affect properties as follows:

| | |
|---|---|
| Melt Point | 293° to 276°F |
| Flash & Flame Point, AIT | No appreciable change |
| Specific Gravity | + 7% at 800°F |
| Viscosity | +35% at 800°F |
| Specific Heat | - 1% at 800°F |
| Thermal Conductivity | -13% at 800°F |

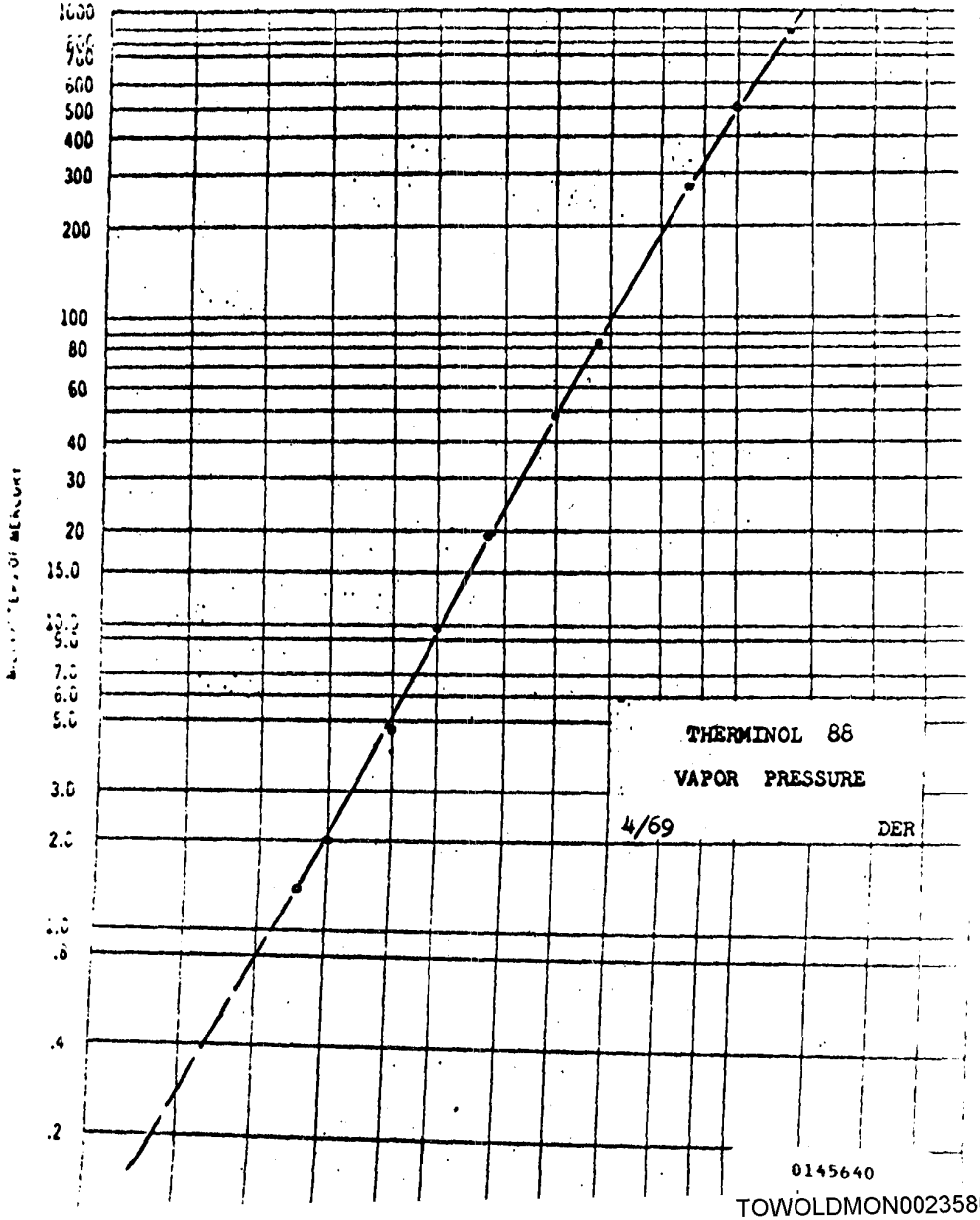


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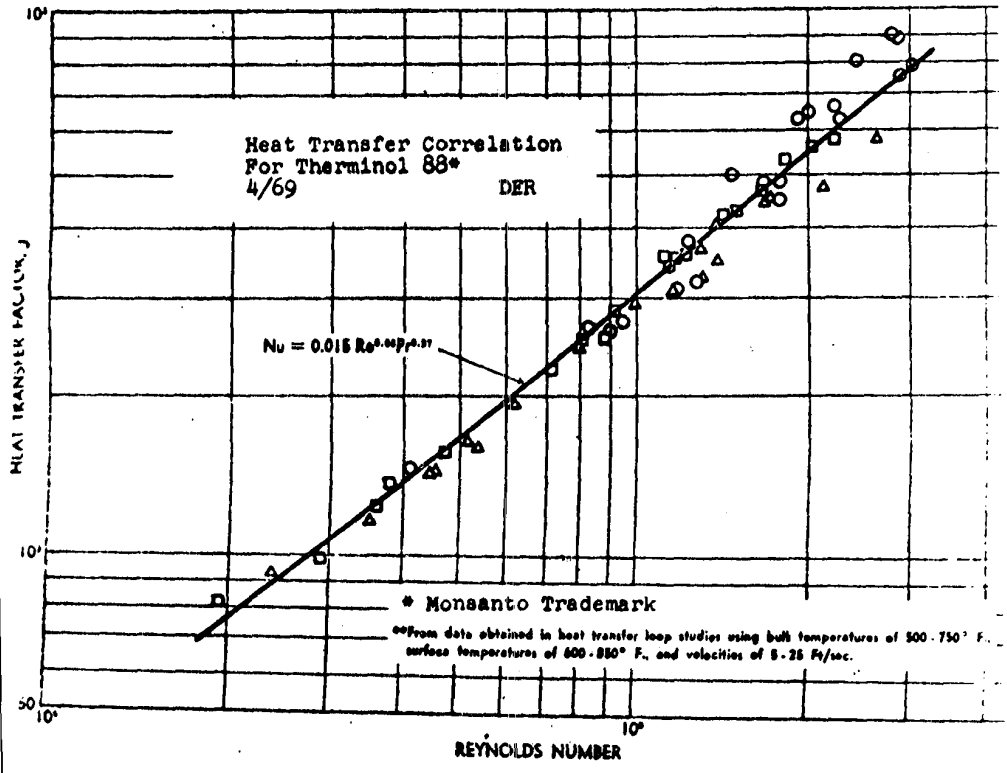



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THERMINOL 88
Heat Transfer Correlation

This equation and j-factor plot is adequate to approximately plus/minus 7% and was developed for polyphenyls by A.I.

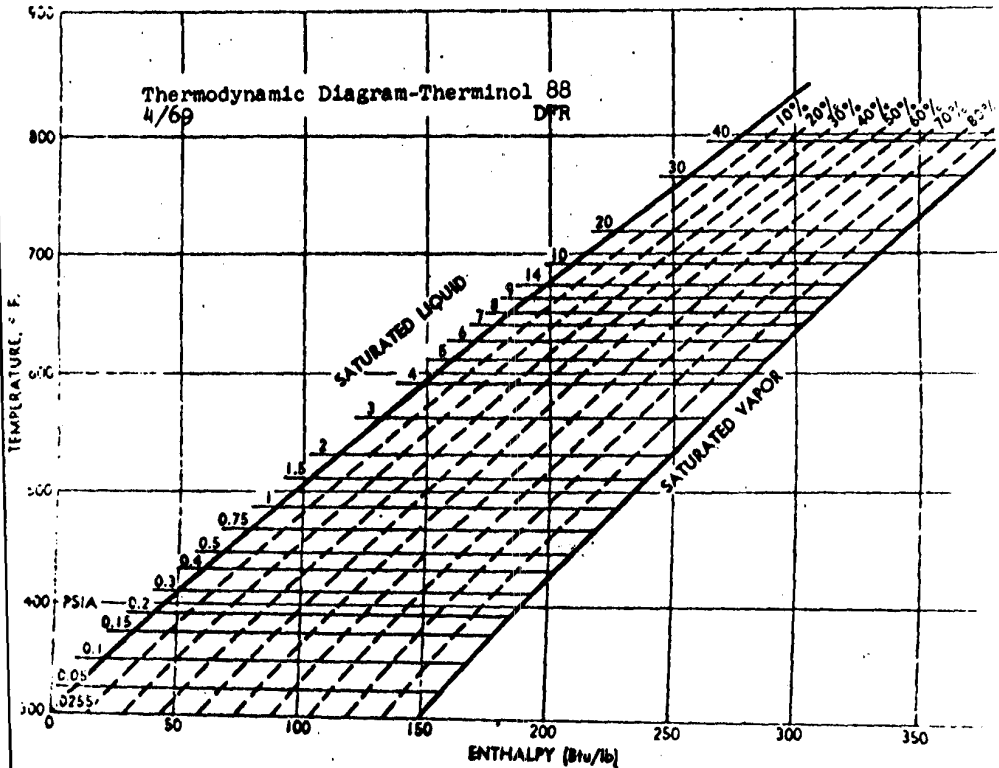



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THERMINOL 88
Thermodynamic Diagram

While we do not propose that Therminol 88 be used as a vapor phase heat transfer medium, we often are requested to provide a thermodynamic network--which appears below.




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## TYPICAL ELECTRICAL PROPERTIES THERMINOL 88

| | |
|---|---|
| **Dielectric Constant at 77°F** | 2.58 at 60 cps |
| **Volume Resistivity** | |
| **at 212°F** | 140,000 x $10^9$ ohm-cm |
| **at 275°F** | 35,000 x $10^9$ ohm-cm |
| **at 311°F** | 550 x $10^9$ ohm-cm |

## SOLUBILITY OF THERMINOL 88 IN MISCELLANEOUS SOLVENTS

| Solvent | Grms. Therminol 88 per 100 ml. of solvent | |
|---|---|---|
| | 25° C. | 75° C. |
| 3A Alcohol | 0.008 | 0.6 |
| Turpentine | 1.2 | 9.0 |
| Fuel Oil, API 36°, 38 S.U.S. at 100° F | 1.66 | 8.4 |
| Benzene | 6.0 | 42.0 |
| Trichlorobenzene | 9.0 | 45.0 |
| Stoddard's Solvent | 0.7 | 6.0 |
| Nitromethane | 0.2 | 7.5 |
| Nitroethane | 2.0 | 15.0 |
| 1-Nitropropane | 2.0 | 20.0 |
| 2-Nitropropane | 2.0 | 20.0 |
| (See also Figs. 1 and 2.) | | |

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## SOLUBILITY OF THERMINOL 88 IN COMMON SOLVENTS

Fig. 1 - Solubility of Therminol 88 in Four Common Solvents

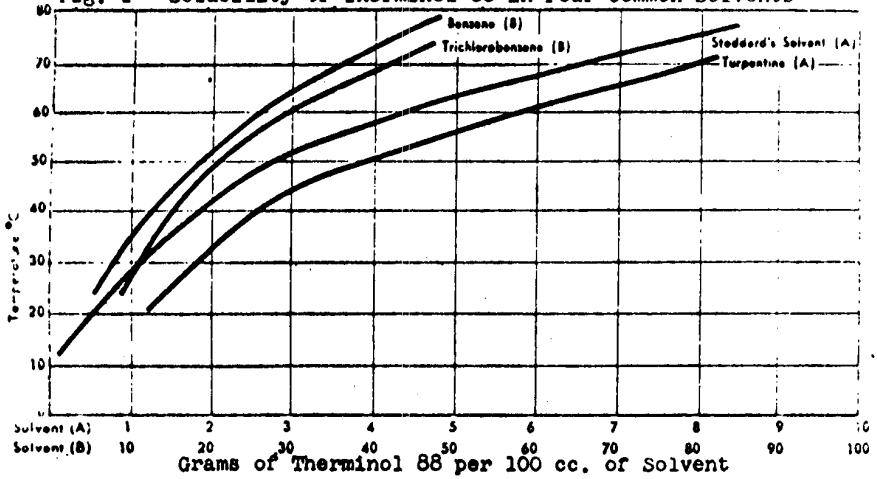
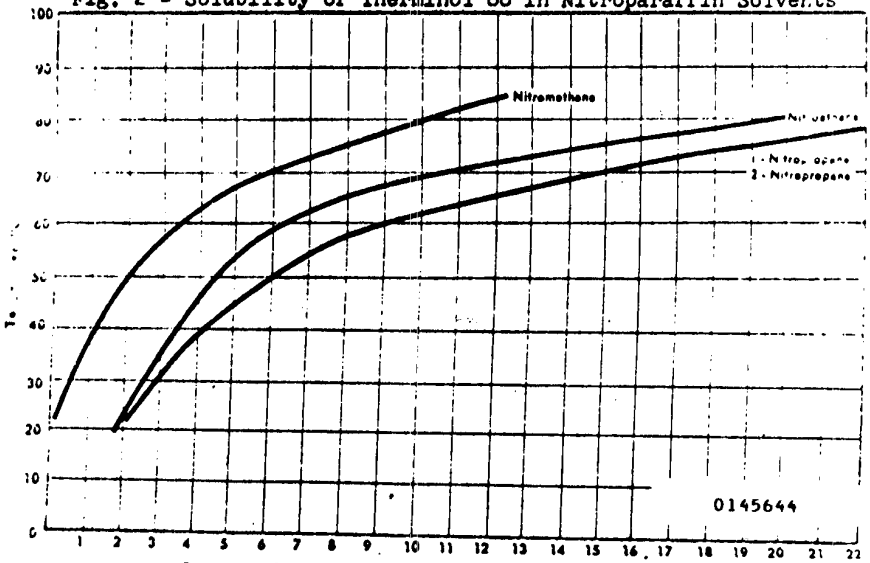



Fig. 2 - Solubility of Therminol 88 in Nitroparaffin Solvents




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