



PLASTICIZER APPLICATION GROUP

MONSANTO TERPHENYLS

Monsanto Technical Bulletin No. P-106
November 6, 1950

Monsanto Chemical Company Phosphate Division
St. Louis, Missouri

MONSANTO TRADE LITERATURE PERMANENT FILE

#202

INTRODUCTION

The Monsanto TERPHENYLS are a series of hydrocarbon solids ranging in melting point from a little above room temperature to as high as 210°C. (410°F.).

Monsanto TERPHENYLS have found use as plasticizers, softening agents, wax additives and extenders, and in paper coatings. Various properties of the TERPHENYLS are presented in this bulletin to facilitate the selection of the proper one for specific applications.

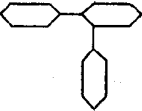
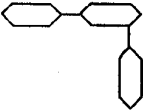
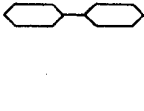
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PHYSICAL PROPERTIES

	<u>Ortho</u>	<u>Meta</u>	<u>Para</u>
<u>Formula:</u>			
<u>Color - NPA:</u>	<1.5	<3.5	<2.0
<u>Density - g./cc.:</u>	1.14	1.164	1.236
<u>Melting Point:</u>			
Completely liquid	55°C. (131°F.)	90°C. (194°F.)	213°C. (415°F.)
<u>Solidification Temp.:</u>			
First crystals	--	<90°C. (<194°F.)	209-213°C. (408-415°F.)
Hold point	53-55°C. (127-131°F.)	83-85°C. (181-185°F.)	--
<u>Distillation Range:</u> D-20 corrected	330-350°C. (626-662°F.)	368-378°C. (694-712°F.)	381-388°C. (718-730°F.)
<u>Flash Point:</u>	171°C. (340°F.)	207°C. (405°F.)	207°C. (405°F.)
<u>Flame Point:</u>	193°C. (390°F.)	229°C. (445°F.)	238°C. (460°F.)
<u>Viscosity S.U.S.</u> at 210°F.:	40.6 (See Graph No. I)	39.3	28.8 (at 225°C.)
<u>Solubility:</u>	See Graphs Nos. II, III and IV		

Vapor Pressure (mm. of Mercury):

<u>T°C.</u>	<u>Ortho</u>	<u>Meta</u>	<u>Para</u>
90	0.17	-	-
100	0.3	-	-
110	0.5	0.15	-
120	0.9	0.3	-
130	1.5	0.5	-
140	2.4	0.8	0.15
150	3.7	1.3	0.3
160	5.7	2.0	0.6
170	8.2	3.0	1.0
180	12.0	4.6	1.9
190	18.0	6.8	3.2
200	25.0	9.8	5.5
210	35.0	14.0	9.1
220	46.0	19.0	14.0
230	62.0	26.0	19.0
240	82.0	36.0	26.0
250	110.0	48.0	35.0
260	140.0	63.0	46.0
270	180.0	83.0	61.0
280	230.0	110.0	80.0
290	290.0	140.0	101.0
300	360.0	180.0	130.0
310	450.0	220.0	165.0
320	550.0	270.0	210.0
330	670.0	340.0	260.0
340	810.0	410.0	320.0
350	990.0	500.0	390.0
360	1160.0	610.0	470.0
370	1390.0	730.0	570.0
380	1600.0	870.0	680.0

Solid

ELECTRICAL PROPERTIES

<u>Terphenyl</u>	<u>Dielectric Constant</u>	<u>Resistivity - ohm-cm.</u>
		<u>100°C.</u> <u>250°C.</u>
Ortho	2.54	8200 X 10 ⁹
Meta	2.62	2600 X 10 ⁹
Para	-	-
		30 X 10 ⁹

STABILITY

No detectible effect on boiling Terphenyls in 10% Sulfuric Acid or Caustic Soda.

COMPATIBILITY

Ortho Terphenyl Other Component	% Ortho Terphenyl in Mixture				
	10	25	50	75	90
Paraffin (120°/125°F.)	C		C		C
Barnsdall (160°/165°F.)	C		C		C
Beeswax	C	C	C		I
Opal Wax	C		I		I
Stearic Acid	I	I	I		I
"N" Wood Rosin	C	C	I	I	

Meta Terphenyl Other Component	% Meta Terphenyl in Mixture				
	10	25	50	75	90
Paraffin (120°/125°F.)	Incompatible with 2% or more Meta Terphenyl				
Barnsdall Wax (160°/165°F.)		C	B	I	I
Ceresin	I		I		I
Carnauba Wax	C		C	C	I
Candelilla Wax	C	C	I		I
Montan Wax	I		I		I
Beeswax	I		I		I
Japan Wax	C	I	I		
Opal Wax	C	C	I		I
I. G. Wax O	I		I		I
Stroba Wax	I		I		I
Acra Wax	C		C		B
Stearic Acid	I		I		
Shellac	C		I		I
Manila Resin (Loba B)	C		I		I
Ester Gum	C		I		I
"N" Wood Rosin (Hercules)	C	C	I		I
Piccolite Resin (85°)	C		I		I
Staybellite Resin	B		I		I

Para Terphenyl Other Component	% Para Terphenyl in Mixture				
	0.5	1-2	3	5	10-75
Paraffin (120°/125°F.)	I				
Paradene No. 1				C	I
Paradene No. 2		C	I		
"N" Wood Rosin					I

Note: C = Compatible
I = Incompatible
B = Almost Compatible

COMPARATIVE HARDNESS

(Smaller values denote greater hardness)

Average Penetration in cm. x 10^{-2}
in 60 seconds at 25°C. under load
indicated (ASTM D-5-25)

<u>Material</u>	<u>50 Grams</u>	<u>150 Grams</u>	<u>250 Grams</u>
Meta Terphenyl	0	0	2.3
Para Terphenyl	0	0	3.3
Carnauba Wax	0	2.3	4.7
Candelilla Wax	0	3.3	4.7
Ortho Terphenyl	1.3	4.0	10.7
50% Paraffin & 50% Meta Terphenyl	3.7	12.3	18.0
75% Paraffin & 25% Meta Terphenyl	7.3	18.0	25.3
Ceresin Wax	9.3	15.7	26.0
95% Paraffin & 5% Meta Terphenyl	10.7	21.0	29.7
98% Paraffin & 2% Meta Terphenyl	11.7	26.0	32.7
Paraffin Wax	14.3	23.3	31.3
Montan Wax	15.0	28.7	37.3
Mixed Isomeric Terphenyl			
No aging	60.0	-	-
Aged 24 hours	28.7	-	-

AVAILABILITY

The Terphenyls are available in limited quantities.

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TEMPERATURE, DEGREES FAHRENHEIT

CHART B: SAYBOLT UNIVERSAL VISCOSITY, ABRIDGED
OF THE
A.S.T.M. TENTATIVE VISCOSITY-TEMPERATURE CHARTS
FOR LIQUID PETROLEUM PRODUCTS (D 341-37 T)

Graph I

VISCOSITY OF ORTHO TERPHENYL

(Lot 0-12)

VISCOSITY, SAYBOLT UNIVERSAL SECONDS

VISCOSITY, SAYBOLT UNIVERSAL SECONDS

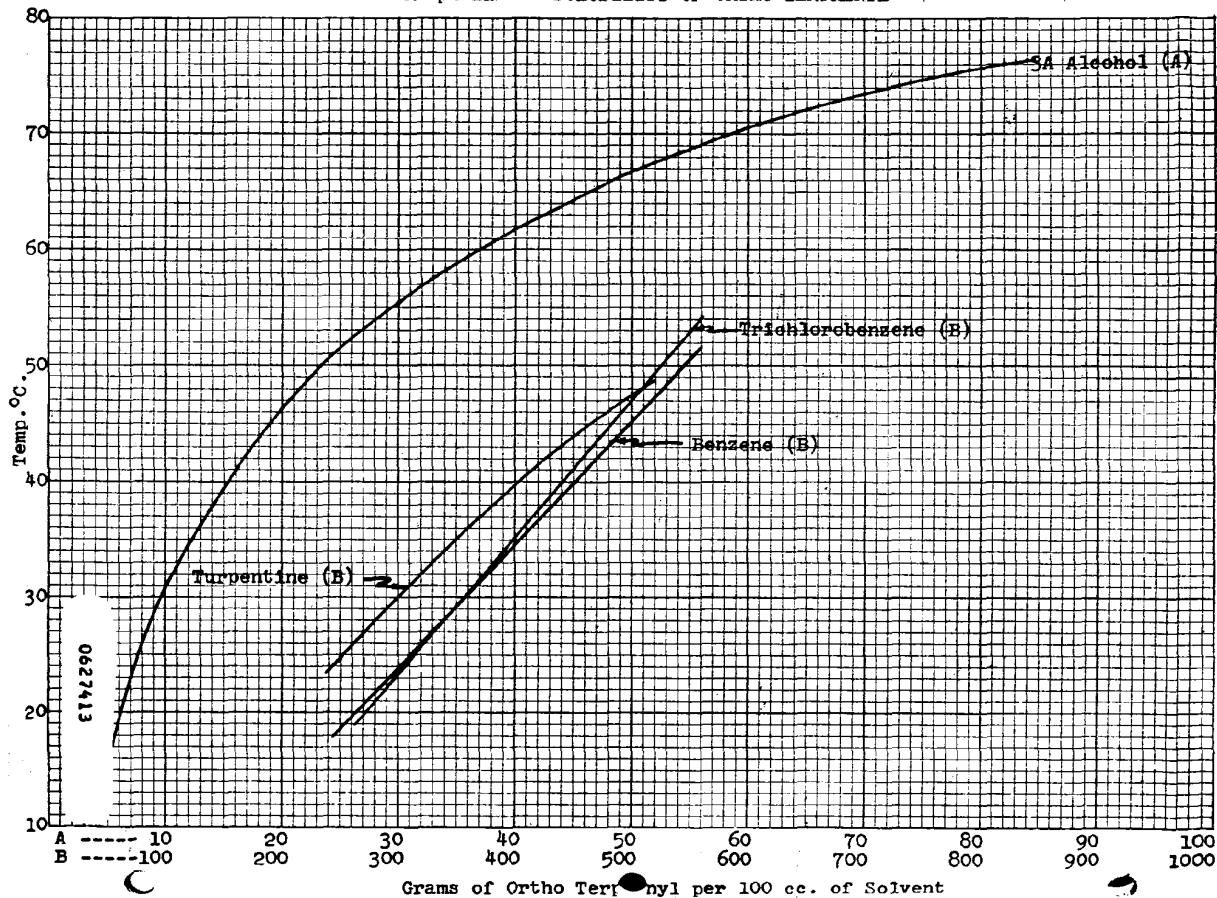
TEMPERATURE, DEGREES FAHRENHEIT

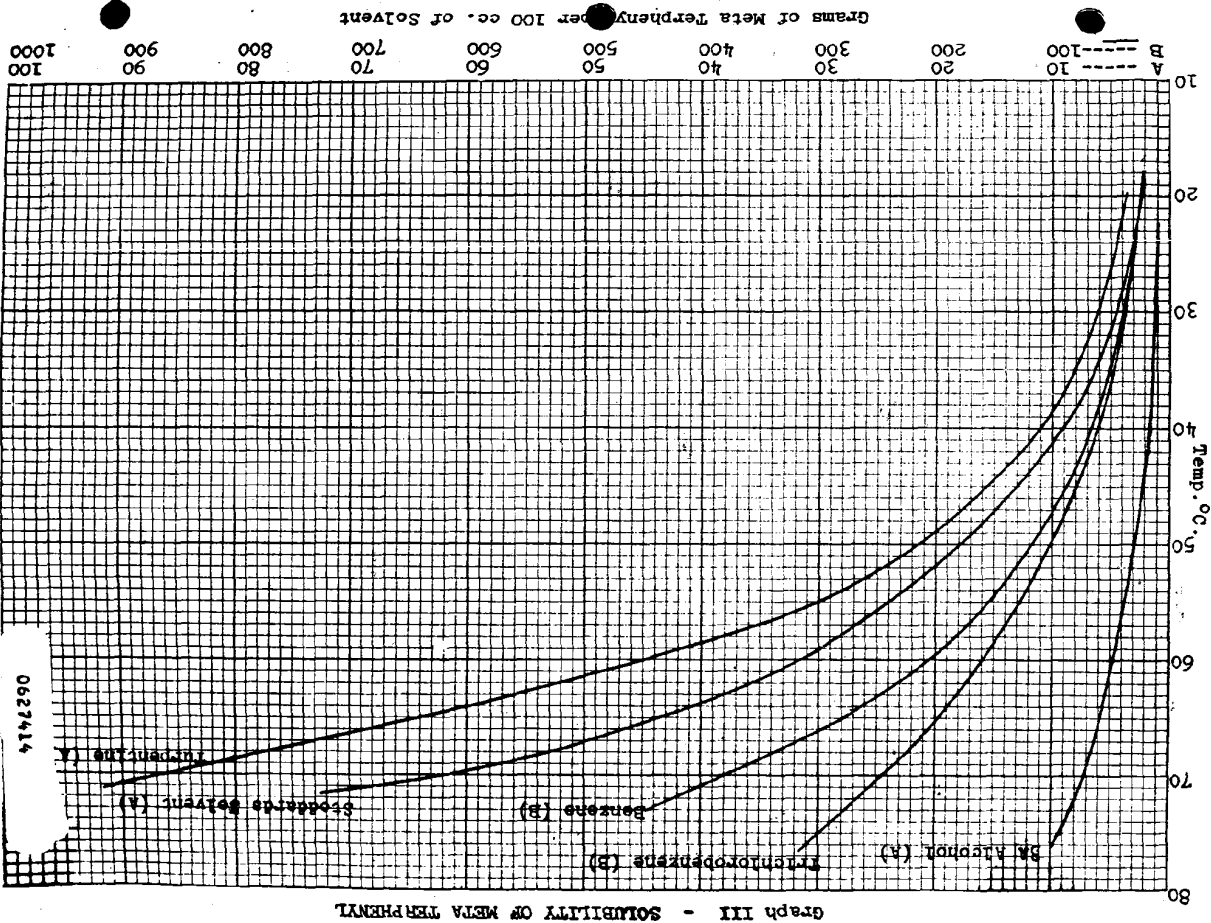
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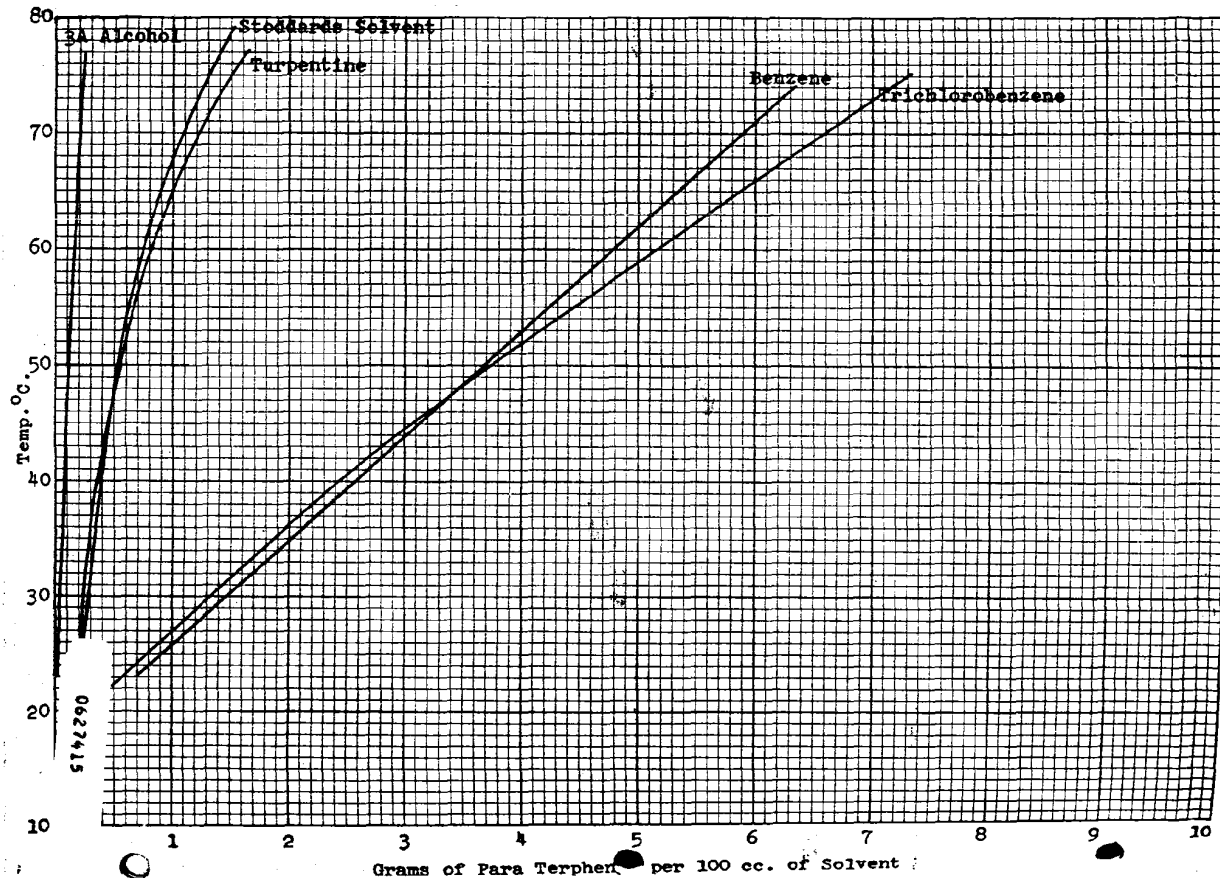
Graph II - SOLUBILITY OF ORTHO TERPHENYL

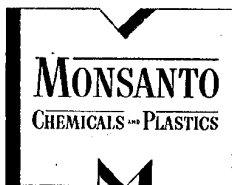




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Graph IV - SOLUBILITY OF PARA TERPHENYL





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