MONSANTO TERPHENYLS

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

Monsanto Chemical Company Phosphate Division
St. Louis, Missouri

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.

The information contained in this bulletin is, to our best knowledge, true and accurate, but all recommendations or suggestions are made without guarantee, since the conditions of use are beyond our control. The Monsanto Chemical Company disclaims any liability incurred in connection with the use of these data or suggestions.

Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use.

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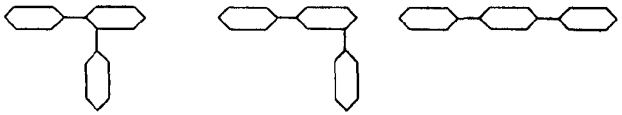
WATER_PCB-00021115

PHYSICAL PROPERTIES

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

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Vapor Pressure (mm. of Mercury):

T°C.	Ortho	Meta	Para	
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	Solid
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	

ELECTRICAL PROPERTIES

Terphenyl	Dielectric Constant	Resistivity - ohm-cm. 100°C.	250°C.
Ortho	2.54	8200×10^9	-
Meta	2.62	2600×10^9	-
Para	-	-	30×10^9

STABILITY

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

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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		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

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COMPARATIVE HARDNESS

(Smaller values denote greater hardness)

Material	Average Penetration in cm. x 10^{-2} in 60 seconds at 25°C. under load indicated (ASTM D-5-25)		
	50 Grams	150 Grams	250 Grams
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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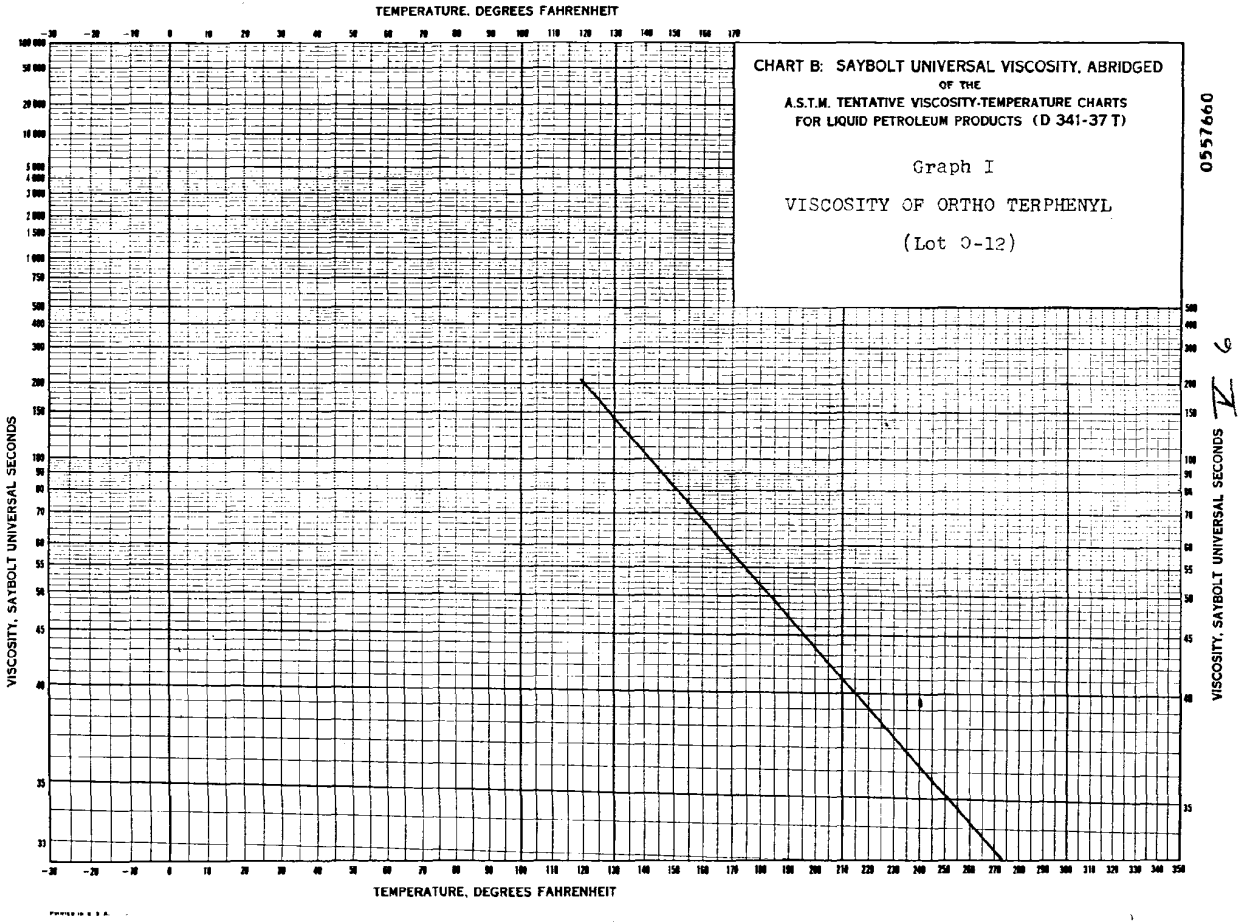

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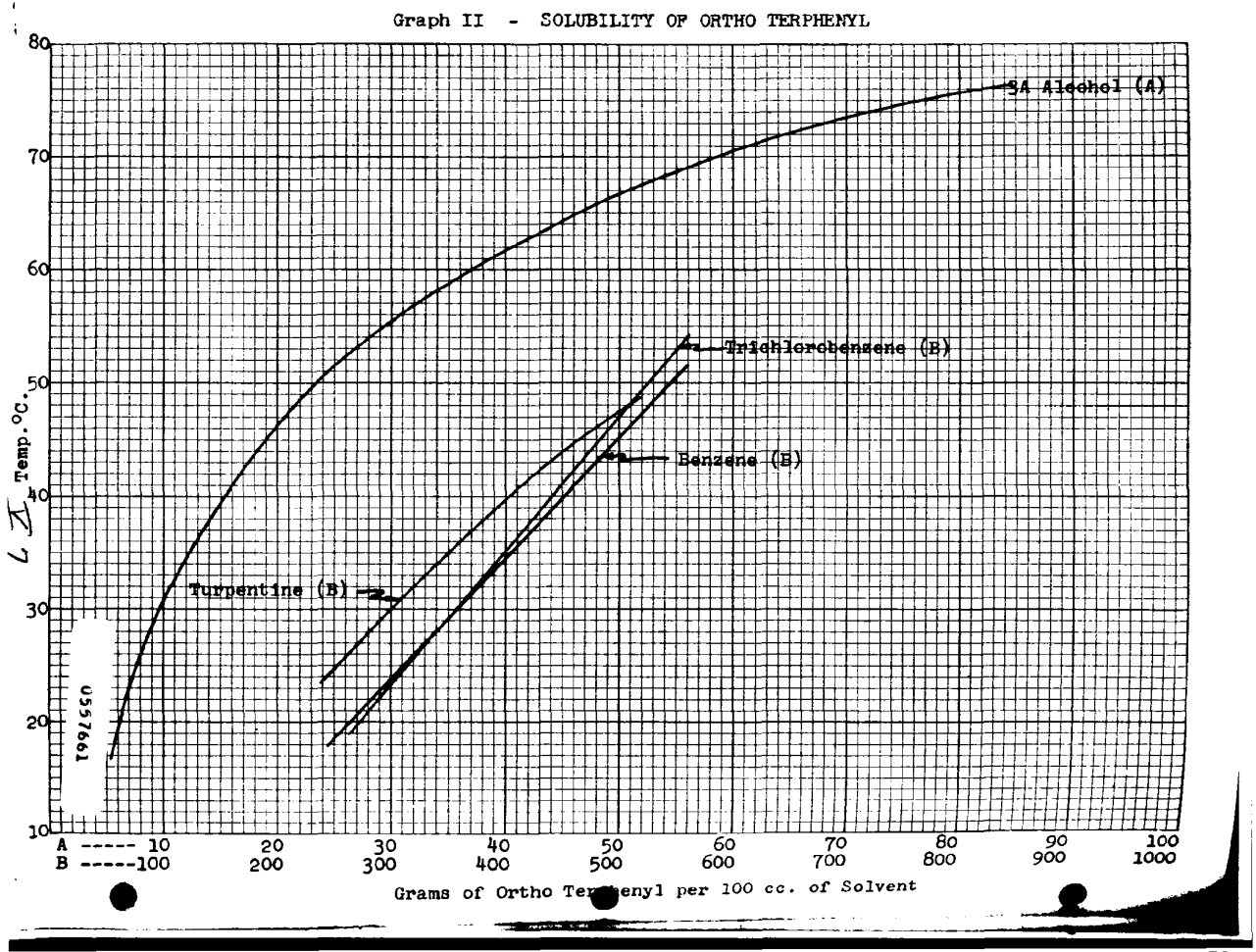

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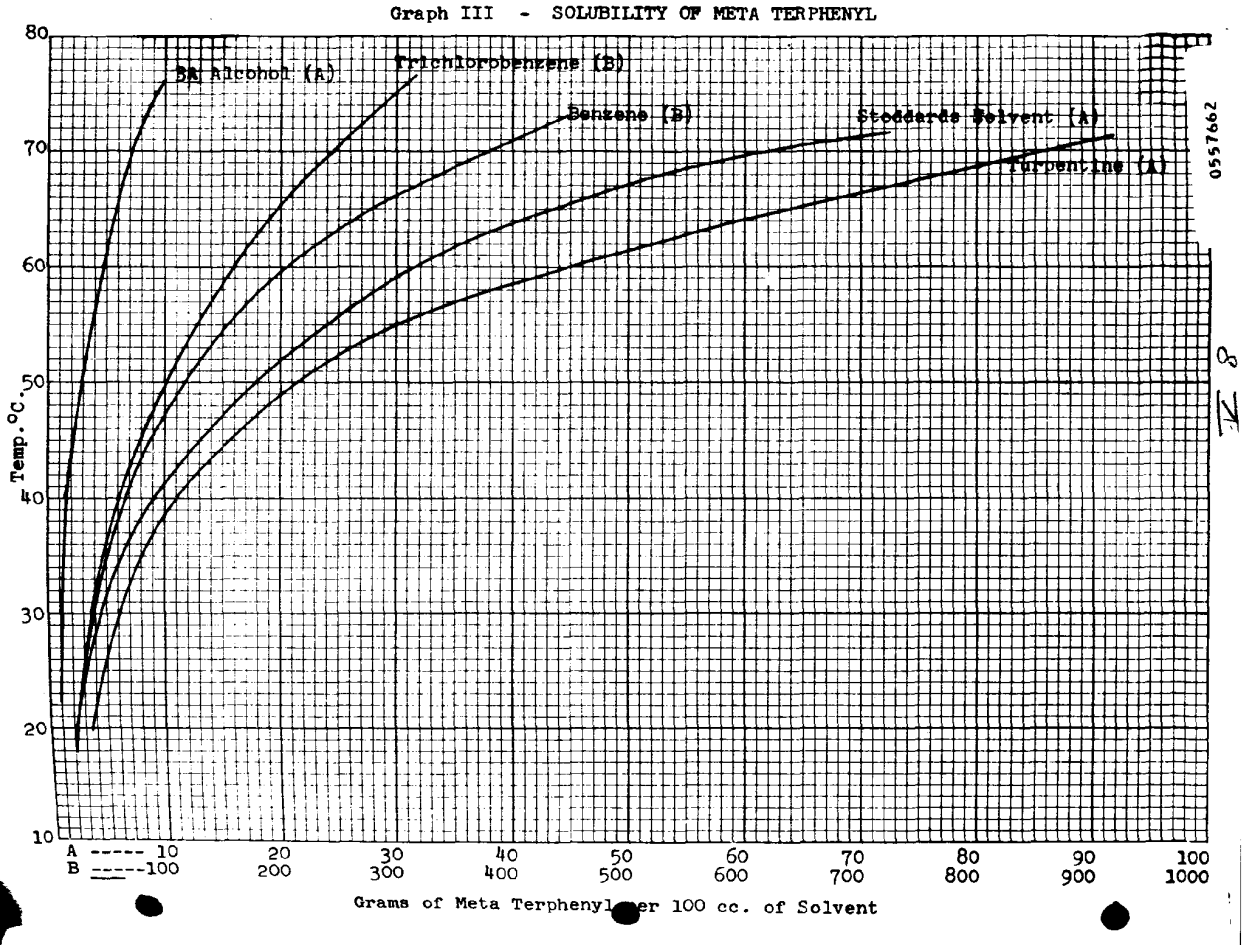

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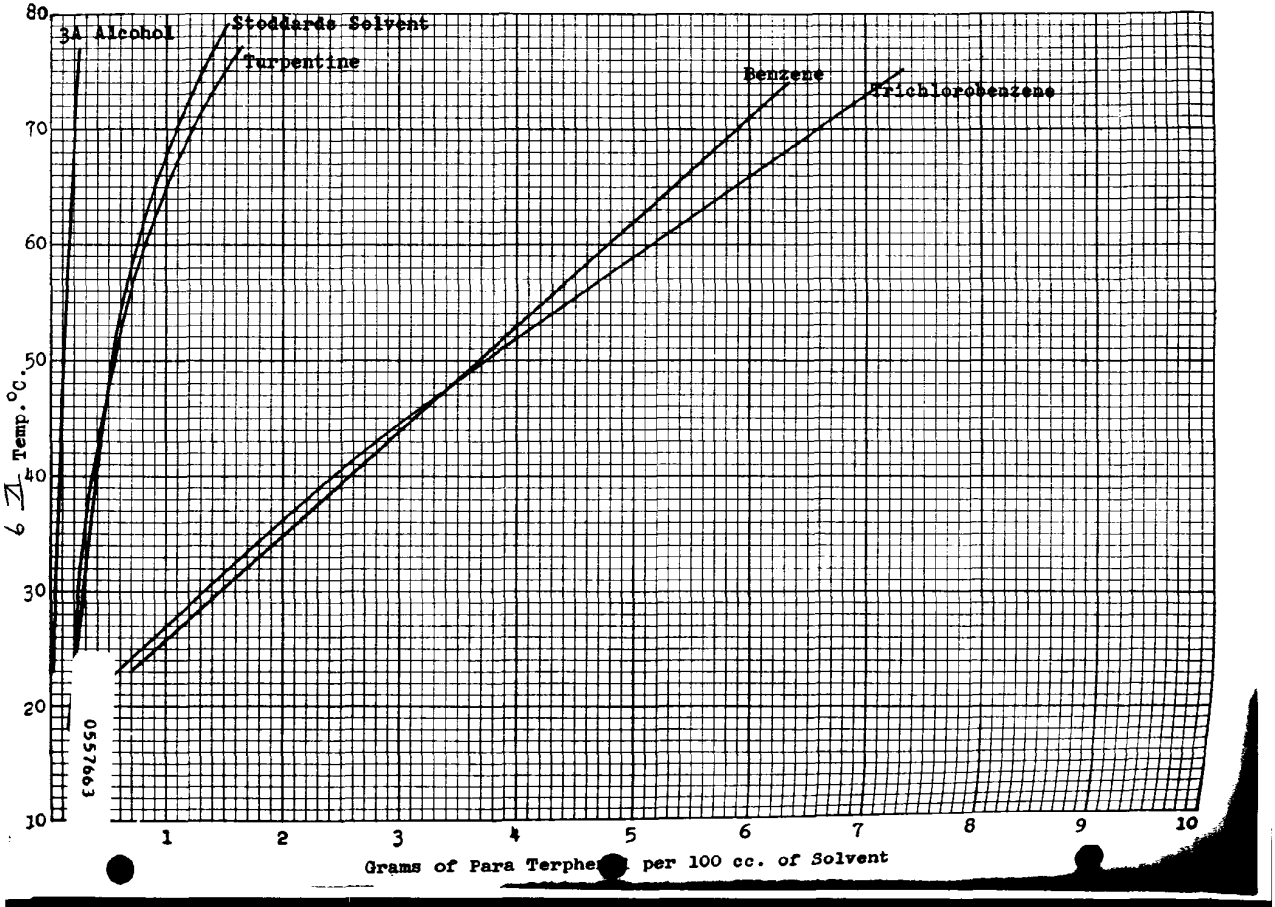
Graph IV - SOLUBILITY OF PARA TERPHENYL



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