The low vaporization loss of Aroclor plasticizers is indicated in Table 15.

TABLE 15

VAPORIZATION RATES OF AROCLOR® PLASTICIZERS

Plasticizer (Surface area: 12.28 sq. cm.)	*Wt. Loss (g)*	*Exposure at 100°C (hr.)*	*Vaporization Rate (g/sq. cm./hr.)*
Aroclor 1221	0.5125	24	0.00174
Aroclor 1232	0.2572	24	0.000874
Aroclor 1242	0.0995	24	0.000338
Aroclor 1248	0.0448	24	0.000152
Clorafin®-42-S	0.0745	48	0.000126
Dioctyl phthalate	0.0688	48	0.000117
Dutrex®® 25	0.0256	24	0.000087
Aroclor 1254	0.0156	24	0.000053
Shell Dutrex 20	0.0047	24	0.000016
Aroclor 1262	0.0039	24	0.000013
Aroclor 1260	0.0026	24	0.000009
Aroclor 4465	0.0064	72	0.000007
Aroclor 5442	0.0039	72	0.000004
Aroclor 5460	0.0032	72	0.000004
Tricresyl phosphate	0.0010	24	0.000003

It is concluded that the vaporization rates of Aroclor plasticizers — especially the most widely used 1254 and 1260 — compare most favorably with the similar constants of other plasticizers selected specifically for these tests because of their low vaporization rates.

*Trademark of Hercules, Inc.

**Trademark of Shell Oil Co.

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TABLE 16

ELECTRICAL PROPERTIES OF AROCLOR®

Aroclor	Dielectric Constant (ASTM D-150-47T) 1000 cycles 25°C	Dielectric Constant (ASTM D-150-47T) 1000 cycles 100°C	Volume Resistivity (ASTM D-257-46) 500 Volts D.C., 100°C (ohm-cm.)	Dielectric Strength (ASTM D-149-44) (KV)	Power Factor (ASTM D-150-47T) 1000 cycles, 100°C (%)
1232	5.7	4.6			
1242	5.8	4.9	Above 500 x 10^9	Above 35	Below 0.1
1248	5.6	4.6	Above 500 x 10^9	Above 35	Below 0.1
1254	5.0	4.3	Above 500 x 10^9	Above 35	Below 0.1
1260	4.3	3.7	Above 500 x 10^9	Above 35	Below 0.1
1268	2.5				
5442	3.0	4.9	Above 500 x 10^9		
5454	2.7	4.2			
5460	2.5	3.7			
4465	2.7	3.3			

How To Emulsify Aroclor

Emulsions of Aroclor plasticizers can be made simply in several ways; the method can be selected to suit the particular Aroclor and the type of formulation in which it will be used.

Emulsifiable Concentrated Stock Solutions of Aroclor

Stock solutions made according to the following formulation are readily emulsified with water. The amount of toluene may be increased as needed to dissolve the more resinous Aroclor plasticizers.

Ingredient	*Parts by Weight*
Aroclor	79
Toluene	16.70
Isopropanol	3.55
Sterox® CD (nonionic emulsifier)	1.00
Santomerse® No. 3 (anionic wetting agent)	0.75

Emulsifying Liquid Aroclor

Ingredient	*Parts by Weight*
Portion 1	
Aroclor 1254	100
Oleic Acid	4
Portion 2	
Water	100
Ammonium Hydroxide (28%)	2

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TABLE 13

SOLUBILITIES OF AROCLOR® PLASTICIZERS IN VARIOUS SOLVENTS

Solvent	Aroclor 1242 25°C	Aroclor 1242 Hot	Aroclor 1248 25°C	Aroclor 1248 Hot	Aroclor 1254 25°C	Aroclor 1254 Hot	Aroclor 1268 Cold	Aroclor 1268 Hot	Aroclor 4465 Cold	Aroclor 4465 Hot	Aroclor 5460 25°C
Acid											
Acetic Acid	S	S	—	—	S	S	—	—	SS	S	—
Oleic Acid	S	S	—	—	S	S	—	—	S	VS	—
Benzoic Acid	10.0 31°C	—	10.0 32°C	—	—	—	—	—	—	—	—
Aldehyde											
40% Formaldehyde	I	I	I	I	I	I	I	I	I	I	—
Furfural	VS	VS	VS	VS	VS	VS	SS	SS	VS	VS	—
Amine											
Aniline	S	S	—	—	S	S	—	—	VS	VS	—
Pyridine	132.5 16°C	440 99°C	—	—	114 31°C	425 100°C	—	—	VS	VS	—
Chloro derivatives											
Amyl chlorides — mixed	S	S	S	S	S	S	—	—	VS	VS	—
Carbon Tetrachloride	S	S	S	S	S	S	—	—	VS	VS	156
Chloroform	S	S	S	S	S	S	S	S	VS	VS	—
Dichloroethylene	—	—	—	—	—	—	—	—	VS	VS	—
Ethylene Dichloride	S	S	S	S	S	S	S	S	VS	VS	—
Monochlorobenzene	S	S	S	S	S	S	—	—	VS	VS	—
Orthodichlorobenzene	—	—	—	—	—	—	—	—	VS	VS	—
Tetrachlorethane	S	S	S	S	S	S	—	—	VS	VS	—
Trichlorethane	S	S	S	S	S	S	—	—	VS	VS	—
Trichlorethylene	S	S	S	S	S	S	—	—	VS	VS	—
Drying Oil											
Tung Oil	S	S	S	S	S	S	—	—	VS	VS	—
Linseed Oil	S	S	S	S	S	S	I	S	VS	VS	—
Ester											
Amyl Acetate	S	S	S	S	S	S	S	S	VS	VS	—
Butyl Acetate	S	S	S	S	S	S	S	S	VS	VS	—
"Cellosolve"® Acetate	S	S	S	S	S	S	—	—	VS	VS	—
Cottonseed Oil	S	S	S	S	S	S	—	—	S	VS	—
Dibutyl Phthalate	S	S	S	S	S	S	S	S	S	VS	—
Diethyl Phthalate	S	S	S	S	S	S	—	—	S	VS	—
Ethyl Acetate	S	S	S	S	S	S	SS	SS	S	VS	—
Ethyl Lactate	S	S	S	S	S	S	I	S	VS	VS	—
Ethylene Glycol Diacetate	S	S	S	S	S	S	—	—	VS	VS	—
Methyl Acetate	S	S	S	S	S	S	SS	SS	S	S	—
Tricresyl Phosphate	S	S	S	S	S	S	—	—	SS	S	—
Ether: Ethyl Ether	S	S	S	S	S	S	S	S	S	—	—
Ether Alcohol											
Carbitol®	224 35°C	307 99°C	VS	VS	173 39°C	259 84°C	I	S	SS	—	—
Cellosolve	S	S	S	S	S	S	I	S	S	—	—
Diethylene Glycol	—	—	—	—	—	—	—	—	S	—	—
p,p'-Dihydroxy Ethyl Ether	16.0 23°C	190 99°C	SS	SS	8 24°C	10 100°C	—	—	SS	—	—
Hydrocarbon											
Benzene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	143
Gasoline	VS	VS	VS	VS	VS	VS	—	—	VS	VS	—
Kerosene	VS	VS	VS	VS	VS	VS	SS	S	VS	VS	—
Mineral Spirits	VS	VS	VS	VS	VS	VS	S	S	VS	VS	—
Paraffin	2.0 73°C	S	2.0 35°C	S	—	S	—	—	5.0	S	—
Pine Oil	S	S	VS	VS	S	S	S	S	S	S	—
Toluene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	142
Turpentine	VS	VS	VS	VS	VS	VS	S	S	VS	VS	-
Xylene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	178
Hydroxy derivatives											
Amyl Alcohol	S	S	—	—	S	S	SS	S	S	S	—
n-Butyl Alcohol	S	S	—	—	S	S	I	SS	SS	S	—
Ethyl Alcohol (3-A)	23.3 25°C	80.0 78°C	—	—	10 27°C	28 78°C	I	I	SS	—	—
Glycerine	I	I	I	I	I	I	I	I	I	I	—
Methyl Alcohol	42.5 25°C	88.5 56°C	—	—	15 24°C	22.2 45°C	—	—	SS	—	—
Phenol — 90%	194 38°C	S	—	—	SS	S	SS	S	S	S	—
Ketone: Acetone	S	S	—	—	S	S	I	I	S	S	260
Miscellaneous											
Carbon Disulfide	S	S	—	—	S	S	S	S	VS	VS	—
Nitrobenzene	S	S	—	—	S	S	—	—	VS	—	—
Water	I	I	I	I	I	I	I	I	I	I	—

I — Insoluble SS — Slightly Soluble S — Soluble VS — Very Soluble.
Figures show grams of Aroclor per 100 milliliters of solvent at 25°C unless otherwise indicated.

*Trademark of Union Carbide Corp.

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TABLE 14

CHEMICAL AND PHYSICAL PROPERTIES OF REPRESENTATIVE AROCLOR® PLASTICIZERS AND RESINS

Property	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254
Appearance	Clear, mobile oil	Clear, mobile oil	Clear, mobile oil	Clear, mobile oil	Light-yellow viscous liquid
Color, maximum	*100 APHA	*100 APHA	*100 APHA	*100 APHA	*100 APHA
Chlorine, percent	20.5-21.5	31.5-32.5	42	48	54
Acidity, mg KOH/g, maximum	*0.014	*0.014	*0.015	*0.010	*0.010
Moisture, ppm, maximum	—	—	*50	*50	*50
Ave. Coefficient of Expansion, cc/cc/°C	0.00071 (15°-60°C)	0.00073 (25°-100°C)	0.00065 (25°-60°C)	0.00070 (25°-60°C)	0.00068 (25°-65°C)
Specific Gravity	*1.197-1.192 (25°/15.5°C)	*1.270-1.280 (25°/15.5°C)	*1.381-1.393 (25°/15.5°C)	*1.486-1.495 (65°/15.5°C)	*1.496-1.505 (65°/15.5°C)
Density, pounds per gallon, 25°C	9.86	10.55	11.58	12.84	12.92
Distillation Range, °C, corrected (ASTM D-20, modified)	275-320	290-325	325-366	340-375	365-388
Evaporation Loss, %, 105°C, 6 hours (ASTM D-6, mod.) 163°C, 6 hours	1.0-1.5	1.0-1.5	0-0.6 2.0-3.6	0-0.3 2.0-4.0	0-0.3 1.7-1.3
Flash Point (Cleveland Open Cup), °C °F	343-160 386-302	152-184 306-310	176-180 348-356	193-196 378-384	None to boiling point
Fire Point (Cleveland Open Cup), °C °F	176 348	230 488	None to boiling point	None to boiling point	None to boiling point
Pour Point (ASTM E-97), °C °F	1 (cryostatic) 34 (cryostatic)	−35.5 −32	−19 2	−7 19.4	10 50
Softening Point (ASTM E-28), °C °F	—	—	—	—	—
Refractive Index, n D 25 20°C	1.617-1.618	1.630-1.632	1.637-1.639	1.630-1.631	1.630-1.641
Viscosity, Seconds Saybolt Universal (ASTM D 88) 100°F (37.8°C) 130°F (54.4°C) 210°F (98.9°C)	*38-41 35 37 30 31	*44 51 39-41 31 32	*82 92 45 56 34 35	185-240 *73 88 36 37	1900-2500 260 340 *44-48

Aroclor 1260	Aroclor 1262	Aroclor 5442	Aroclor 5445	Aroclor 2565	Aroclor 5460	Aroclor 1268
Light-yellow, soft, sticky resin	Light-yellow sticky, viscous resin	Clear yellow sticky resin	Clear, light-yellow, resin	Black, opaque brittle resin	Clear, yellow-to amber, brittle resin or flakes	White to off-white powder
*150 APHA	*150 APHA	*2 NPA (molten)	*2 NPA (molten)	—	*2 NPA (molten)	*1 5 NPA (molten)
60	61.5-62.5	42	66	66	66 5-68.5	68
*0.014	*0.014	0.05	0.05	1.4	0.05	0 05
*50	—	—	—	—	—	—
0.00067 (20°-100°C)	0.00064 (25°-80°C)	0.00122 (25°-80°C)	0.00083 (25°-60°C)	0.00066 (25°-60°C)	0.00179 (25°-124°C)	0 00067 (20° 100°C)
*1.566-1.586 (60°/15.5°C)	*1.572-1.583 (60°/15.5°C)	1.470 (25°/25°C)	1.670 (25°/25°C)	1.734 (25°/25°C)	1 670 (25°/25°C)	1 604 1 611 (25°/25°C)
13.50	13.72	12.24	13.91	14.44	13.91	13 09
366-430	366-425	210-300 (4 mm. Hg)	230-320 (4 mm. Hg)	—	280 326 (5 mm. Hg)	425-450
0-0.1 0.3-0.6	0-0.1 0.5-0.6	0.01 0.2	0-0.02 0.1 0.3	0.2-0.3	0.03	0 0 06 0 1 0 2
None to boiling point	None to boiling point	247 477	None to boiling point	—	None to boiling point	None to boiling point
None to boiling point	None to boiling point	> 260 > 502	None to boiling point	—	None to boiling point	None to boiling point
39 86	36-38 99	46 115	—	—	—	—
—	—	*46-52 115-125	*66-66 140-151	*66 72 140-162	*88 -106 280 222	*150 170 (Ball and Ring) 302 338 (Ball and Ring)
1.647-1.648	1.6601-1.6617	—	1.664-1.667	—	1 668 1 665	—
3200-4500 *72-78	600-850 (160°F, 71°C) *66-100	386-400	80-150 (266°F, 130°C)	—	—	—

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