

CLASS 3600

Rosin maleic type adducts, esterified or not, including fumaric or other acids capable of forming a diene adduct with rosin, and spirit and oil varnishes made therefrom.

3600 - 3629 Rosin maleic type adducts and spirit solutions thereof.

**3630 - 3699 Rosin maleic type oil varnishes where the last two figures indicate % oil content in non-volatile portion.
Includes adducts formed in situ in presence of oil.**

The oil varnishes are listed on pages 36-2 and 36-3. Hard resins and their solutions are listed on pages 36-4 and 36-5.

Maleic and fumaric oil varnishes in general are superior to oleoresinous varnishes of comparable cost. They are lower in cost and inferior to phthalic alkyds.

Number	Type Resin	% Oil	Alc.	% NVM	Solvents	Visc. GHT	Max. Color Gard.
<u>Oil Varnishes</u>							
(3643)	Fum. Int.	46 (662)	P.E.	50	(145)	V-X	14
(3646)	Mal. Int.	48 Soya	Gly.	50	30 (145) : 70 (125)	Q-S	12
(3648)	Fum. Int.	48 Soya	Gly.	50	(145)	R-U	11
(3650)	Fum. Int.	49 Soya	Gly.	50	30 (145) : 70 (125)	L-N	12
(3652)	Mal. Int.	47 Castor	Gly.	60	38 (317) : 62 (323)	T-V	12
(3654)	3602	54 D.C.O.	-	50	(145)	H-I	11
(3655)	Fum. Int.	59 (662) Soya	P.E.	50	(145)	Q-S	12
(3666)	Mal. Int.	68 Lins.	P.E.	60	(145)	U-W	12
(3677)	Mal. Int.	77 Lins.	P.E.	60	(145)	H-J	13
(36A1)	36A13	35 Lins.	-	54	21 (329) : 79 (145)	T-V	12
(36A12)	36A13	62 Lins.	-	60	(145)	R-T	11
(36A14)	36A13	28 Lins.	-	68	50 (151) : 50 (145)	Z ₆	11
(36A15)	36A13	62 Lins.	-	60	(145)	R-T	11
(36A16)	3602	54 D.C.O.	-	50	(145)	H-L	11
(36C12)	Mal. Int.	26 (6C8)	P.E.	55	(145)	Z ₂ -Z ₄	Dark
(36C13)	Fum. Int.	48 Soya	Gly.	55	30 (145) : 70 (125)	Q-S	12
(36C16)	Mal. Int.	79 Lins.	Gly.	100	None	29"-38"	11
(36C19)	Mal. Int.	45 Soya	Gly.	50	(145)	S-U	12
(36C25)	Mal. Int.	56 Soya	Gly.	70	(145)	Z ₁ -Z ₂	12
(36C32)	Mal. Int.	61 (6C18)	DiPE	50	(145)	O-Q	12
(36C34)	Fum. Int.	41 (662)	Gly.	70	(323)	Z ₁ -Z ₃	14
(36C38)	Mal. Int.	90 Lins.	P.E.	100	None	6'-9'	10
(36C44)	Fum. Int.	59 (28 Lin.					
		(72 (6C22)	DiPE	50	(145)	S-U	9
(36C46)	Fum. Int.	48 Soya	Gly.	50	(1C12)	U-W	9
(36C48)	Fum. Int.	90 Lins.	P.E.	100	None	6'-9'	10
(36C54)	Gloss Varn.	-	-	-	-	-	-
(36C55)	Mal. Int.	81 Lins.	Gly.	100	None	12"-16"	10
(36C57)	Mal. Int.	79 Lins.	Gly.	100	None	105"-130"	12
(36D31)	Fum. Int.	44 (662)	P.E.	45	(145)	H-J	14
(36F6)	Fum. Int.	62 Soya	P.E.	55	(1F6)	N-P	11
(36M1)	Mal. Int.	45 Lins.	-	45	(145)	K-M	11-12
(36M4)	Mal. Int.	40 Lins.	-	40	(145)	A-B	9-10
(36M8)	Mal. Int.	55 (38 D.C.O.					
		(62 Soya	P.E.	55	(151)	K-N	9
(36M9)	Mal. Int.	69 (38 Tung					
		(62 Lins.	P.E.	60	(145)	M-O	12
(36N4)	Mal. Int.	65 (66 Lins.					
		(34 D.C.O.	Gly.	60	(145)	M-O	12
(36Y11)	Mal. Int.	72 (6Y5)	Gly.	75	98 (317) 2 (323)	G-J	10

Cure	AV/NVM	Remarks	F. P. °F T.O.C.	Lbs./Gal. @ 75°F	Number
20" min.	20-25	Chicago only	105 min.	7.48	(3643)
22"-27"	20-25	-	55 min.	7.40	(3646)
22"-27"	20-25	-	105 min.	7.50	(3648)
22"-27"	20-25	Same as (3648)-other than solvent	55 min.	7.34	(3650)
32" std.	20-30	Lacquer Plasticizer	40 min.	8.16	(3652)
-	12-20	-	105 min.	7.42	(3654)
20"-30"	15-25	-	105 min.	7.45	(3655)
-	6-10	Interior Brushing Enamels	105 min.	7.61	(3666)
20" Std.	2-6	Brushing Enamel	105 min.	7.50	(3677)
7"-9"	-	Driers Added	105 min.	7.73	(36A1)
-	7 Std.	Sanitary	105 min.	7.60	(36A12)
-	-	-	105 min.	7.95	(36A14)
-	7	Sanitary (36A12)	105 min.	7.60	(36A15)
-	12-16	Sanitary version of (3654)	105 min.	7.42	(36A16)
20"-30"	15-25	Freight Car Paint Liquid	105 min.	7.75	(36C12)
22"-27"	20-25	-	55 min.	7.50	(36C13)
-	6-10	PC&C Litho	above 200	8.25	(36C16)
25"-30"	8 max.	-	105 min.	7.47	(36C19)
-	17-22	Black Drum Enamels	105 min.	7.91	(36C25)
9"-13"	5-9	-	105 min.	7.40	(36C32)
-	20-30	-	80 min.	8.40	(36C34)
82"-100"	7 max.	SKT Vehicle	above 200	8.12	(36C38)
27"-37"	10-25	-	105 min.	7.40	(36C44)
20"-26"	15-20	-	105 min.	7.33	(36C46)
62"-80"	5-7	SKT Vehicle	-	8.18	(36C48)
-	-	C. Weigel supplier-#76 slow drying	-	-	(36C48)
-	6-10	-	-	8.19	(36C55)
-	6-10	Heat Set Vehicle	-	8.26	(36C57)
20-30	15-20.	-	105 min.	7.40	(36D31)
-	-	Marine Line	105 min.	7.35	(36F6)
-	30 max.	Enamel Mixing Vehicle	105 min.	7.2	(36M1)
-	10-14	Driers Added. Wood Sealer.	105 min.	7.12	(36M4)
-	15 max.	-	135	7.6	(36M8)
-	8-12	-	105 min.	7.65	(36M9)
27-30	8-12	-	105 min.	7.60	(36N4)
-	20-30	-	80 min.	8.45	(36Y11)

Number	Name	Resin	% NVM	Solvents	Melting Point °F	Viscosity GHT
<u>Hard Resins & Their Solutions</u>						
3600	Pentalyn X	Mal. Est.	100	None	295 Std. BR	50% (145)R
3602	Amberol 801 - Ext. Lt.	Mal. Est.	100	None	288-300 BR	44% (317)K-P
3604	HG-11	Mal. Est.	100	None	264-268 BR	-
3606	HG-28 EL	Mal. Est.	100	None	287-291 BR	-
3608	Pentalyn G	Mal. Est.	100	None	257-261 BR	-
(3610)	HG-28 EL Sol'n.	3606	55	(323)	287-291 BR	H-L
3612	Cellolyn 102	Mal. Est.	100	None	252-270 BR	40% (317)J-L
3614	Arochem 520	Mal. Est.	100	None	244-255 BR	-
36A9	Amberol 800	Mal. Est.	100	None	252-259 BR	36% (317)K-P
(36A11)	Pentalyn X Sol'n.	3600	56	(145)	295 Std. BR	Z ₃ -Z ₄
36A13	HG-77	Fum. Est.	100	None	298-302 BR	-
(36A23)	HG-28 EL Sol'n.	3606	50	(145) (329)	287-291 BR	V-X
36C1	Arochem 542	Mal. Est.	100	None	206-224 BR	-
(36C10)	Pentalyn G Sol'n.	3608	50	(145)	257-261 BR	D-E
36C11	Maleic Resin	Ros. Add.	100	None	190-205 B	-
(36C14)	Fum. Ros. Add.	Fum. Add.	50	(4C7)	280-290 B	42"-50"
36C23	Maleic Ros. Ester	Mal. Est.	60	(1C5)	205-215 B	Z ₄ -Z ₆
(36C29)	Maleic Ros. Ester	Mal. Est.	60	(1C8)	205-215 BR	Z ₃ -Z ₄
(36C31)	HG-28 EL Sol'n.	3606	60	(317)	287-291 BR	-
36C35	Cellolyn 104	Mal. Est.	100	None	194 BR	-
36C37	Amberol 750	Mal. Est.	100	None	311-347 BR	-
36C40	Mal. Ros. Ester	Mal. Est.	100	None	255-260 B	50% (323)G-I
(36C41)	Fum. Ros. Add.	Fum. Add.	60	(4C7)	280-290 B	10'-14'
(36C45)	McWhorters S-2266	Mal. Est.	50	-	-	S-U
36C47	Mal. Ros. Est.	Mal. Est.	100	None	221-229 B	50% (323)A-C
36C50	Pentalyn K	Mal. Est.	100	None	170-180 BR	-
(36C53)	Mal. Ros. Est. Sol'n.	Mal. Int.	60	(1C17)	-	11'-13'
36C60	P-39 Resin	Mal. Est.	100	None	228-252 BR	-
(36C61)	Mal. Ros. Ester	Mal. Est.	80	(1C10)	-	Z ₄ -Z ₆
36D1	HG-110	-	100	-	-	-
(36D4)	HG-15 Sol'n.	36D5	50	(323)	-	A std.
36D5	HG-15	Mal. Est.	100	-	-	-
(36D33)	Cellolyn 102 Sol'n.	3612	60	(12D40)	-	G-H
(36D34)	HG-110 Sol'n.	36D1	60	(12D40)	-	R-S
36F1	Lewisol 33	Mal. Est.	100	None	320 Drop	40% (317)N
(36F5)	Neolyn 2375T	-	75	-	-	U Std.
36F7	Arochen 460	Mal. Est.	100	None	-	-
36M5	Pentalyn B-56	-	100	None	130 BR	-
36N10	M-36 Resin	Ros. Est.	100	None	248-257 BR	50% (406)C-F
36N14	S-W 360 Resin	Ros. Est.	100	None	248-257 BR	50% (406)C-F
(36Y1)	HG-28 EL Sol'n.	3606	60	(334)	-	-
36Y9	Pentalyn N	PE Ros. Est	100	None	212-229 BR	60% (145)F-J
(36Y10)	HG-28 EL Sol'n.	3606	50	(319)	-	D Std.

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AV/NVM	Color	Remarks	Minimum		Number
			F.P. °F	Lbs./Gal.	
			T.O.C.	@ 75°F	
14 Std.	N Std. Ros. Std.	Varnish Resin	295	9.18	3600
25-40	WG-M Ros. Std.	Varnish Resin	295	9.42	3602
25-30	50%(317) 11G	Lacquer Resin	270	9.26	3604
20-25	50%(317) 11G	-	285	9.35	3606
15 Std.	11 max. G	-	260	9.03	3608
20-25	11 max. G	-	80	8.35	(3610)
30-40	M max. Ros. Std.	Lacquer Resin	270	9.33	3612
25-35	50%(317) 7-10G	-	250	9.43	3614
15-30	50%(317) 9G	-	250	9.4	36A9
14 Std.	10 Max. G	-	105	7.86	(36A11)
15 Std.	50%(317) 10 Std.	Varnish Resin	300	9.26	36A13
24-28	10 max.	-	105	7.32	(36A23)
25-30	-	Furn. Lacq. Sealer & Lacq.	200	9.35	36C1
60 Std.	11 max. G	-	105	7.70	(36C10)
220-235	-	Used in Water Dispersions	-	-	36C11
70 max.	11 max. G	Moisture Set Inks	230	9.55	(36C14)
15-20	10	-	260	8.0	(36C23)
20 max.	10 max.	Heat Set Ink Vehicle	230	8.0	(36C29)
20-25	-	Lacquer Resin	35	8.25	(36C31)
27-35	10 Std.	Furn. Lacq. Sealer & Lacq.	200	9.46	36C35
105-115	-	-	-	-	36C37
22-28	50%(323) 11G	Match for 3606	285	9.35	36C40
178 max.	12 max. G	Moisture Set Inks	230	9.68	(36C41)
-	5-7	Hammer Vehicle	-	7.75	(36C45)
33-37	50%(323) 10G	-	-	-	36C47
18 Std.	G Ros. Std.	Heat Set Ink Vehicle	-	9.03	36C50
20 Max.	11 max.	-	335	8.13	(36C53)
12-18	WG-N Ros. Std.	Printing Ink	-	9.14	36C60
20 Max.	10	Heat Set Vehicle	285	8.0	(36C61)
-	-	-	-	-	36D1
-	10 Std.	Brushing Lacquer	80	8.11	(36D4)
-	-	Brushing Lacquer	-	-	36D5
-	11 Std.	-	32	8.27	(36D33)
-	10	-	32	8.42	(36D34)
36 Std.	M Ros. Std.	Lacquer	-	-	36F1
5 Std.	-	Lacquer	-	9.0	(36F5)
-	-	-	-	9.66	36F7
135 Std.	-	-	-	9.37	36M5
110-120	6-8 @ 50ZNVM(406)	Alcohol Soluble Resin	-	9.50	36N10
110-120	6-8 @ 50ZNVM(406)	Label Varnish	-	9.50	36N14
-	-	-	130	8.35	(36Y1)
8	M Rosin Std.	-	-	-	36Y9
20-25	10 Std.	-	20	8.10	(36Y10)

Remarks

Maleic anhydride and fumaric acid may be used more or less interchangeably in rosin oil varnishes. In general, rosin fumaric varnishes have a faster drying time, harder films and lighter color. Also, fumaric acid is cheaper than maleic anhydride. Therefore, it is requested that all new rosin varnishes which may be made with fumaric acid or maleic anhydride, be formulated to utilize fumaric acid.

Varnishes made in situ are generally more economical than varnishes made by cooking already manufactured hard resins with oils. Therefore, varnish formulators are urged to try to make in situ varnishes whenever possible.

Conditions are now such that the manufacture of maleic hard resins in the Chicago Varnish-Resin Department are economical. Resins equivalent to some of the more popular and useful competitive resins are now being developed.

- (3643) is a low cost vehicle for industrial application where cost is especially important. It has fair flexibility and good gloss retention but is rather dark in color.
- (36C45) should be replaced with (3648).
- (36C46) should be replaced with (3650) where possible.
- (3648) a fumaric version of (3645), has been found to dry faster to a harder film than (3645). It is especially adapted for use in low cost finishes. Initial gloss and gloss retention on baking are good. Color retention is fair. This varnish may be used to advantage in shelf goods, drum enamels, and low cost industrial finishes requiring air dry or low temperature baking schedules.
- (3654) is used primarily in roller coating finishes for tin decorating enamels. It dries rapidly, leaving a hard and tough film with good gloss and adhesion. It tends to be a bit brittle and is usually used with longer oil varnishes. The dried film must withstand various deformation processes involved in making metal products. It is suggested that an in situ varnish be used.
- (3666) is primarily used in interior brushing enamels. It has good flow and rapid air drying speed.
- (3677) has good scuff resistance and is especially adapted for porch and deck enamels.
- (36N4) has good flow and is well suited for brushing application. It is suggested for use in industrial primers and enamels, but is not recommended for shelf goods due to its tendency toward instability.