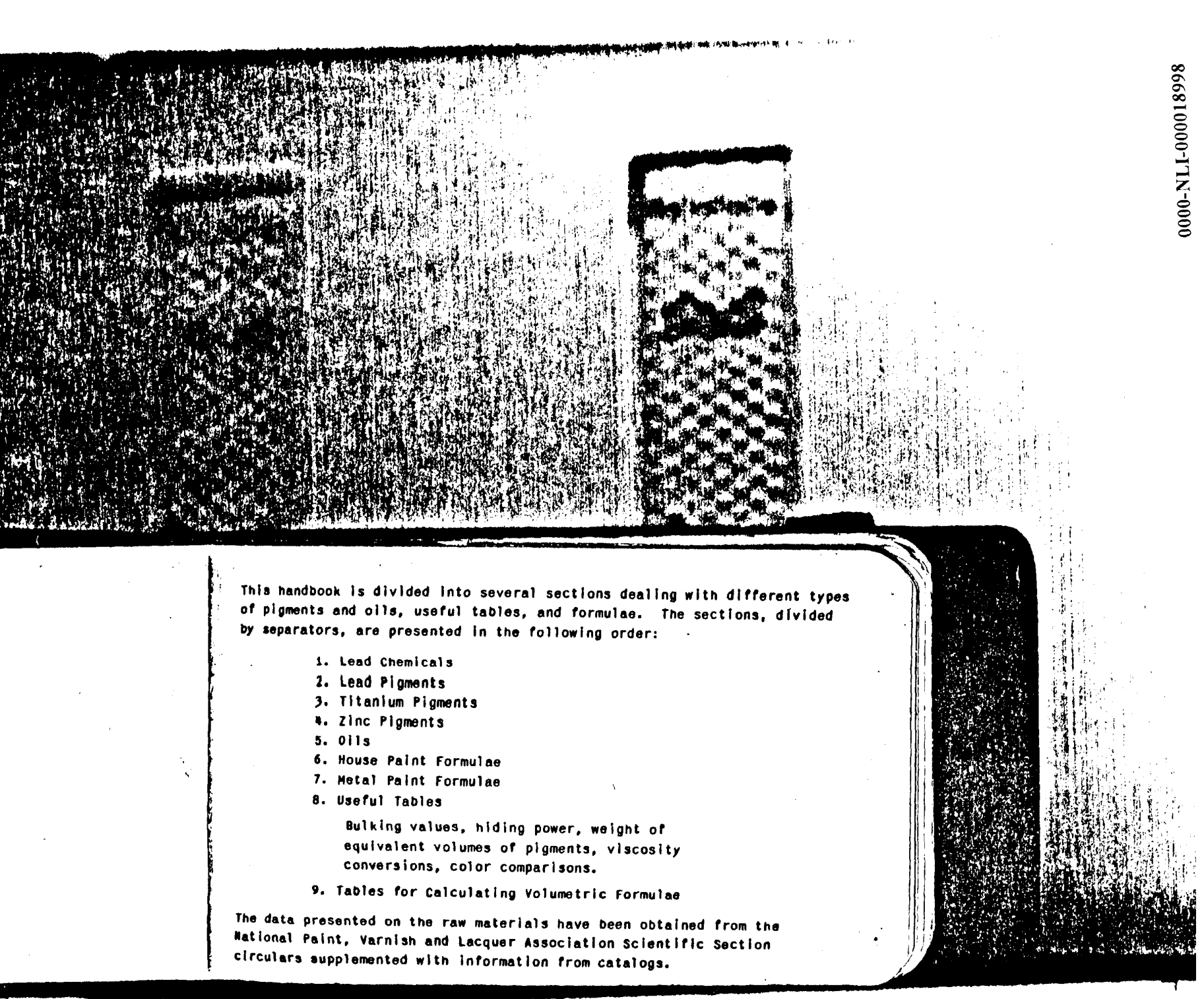


This handbook is divided into several sections dealing with different types of pigments and oils, useful tables, and formulae. The sections, divided by separators, are presented in the following order:

1. Lead Chemicals
2. Lead Pigments
3. Titanium Pigments
4. Zinc Pigments
5. Oils
6. House Paint Formulae
7. Metal Paint Formulae
8. Useful Tables

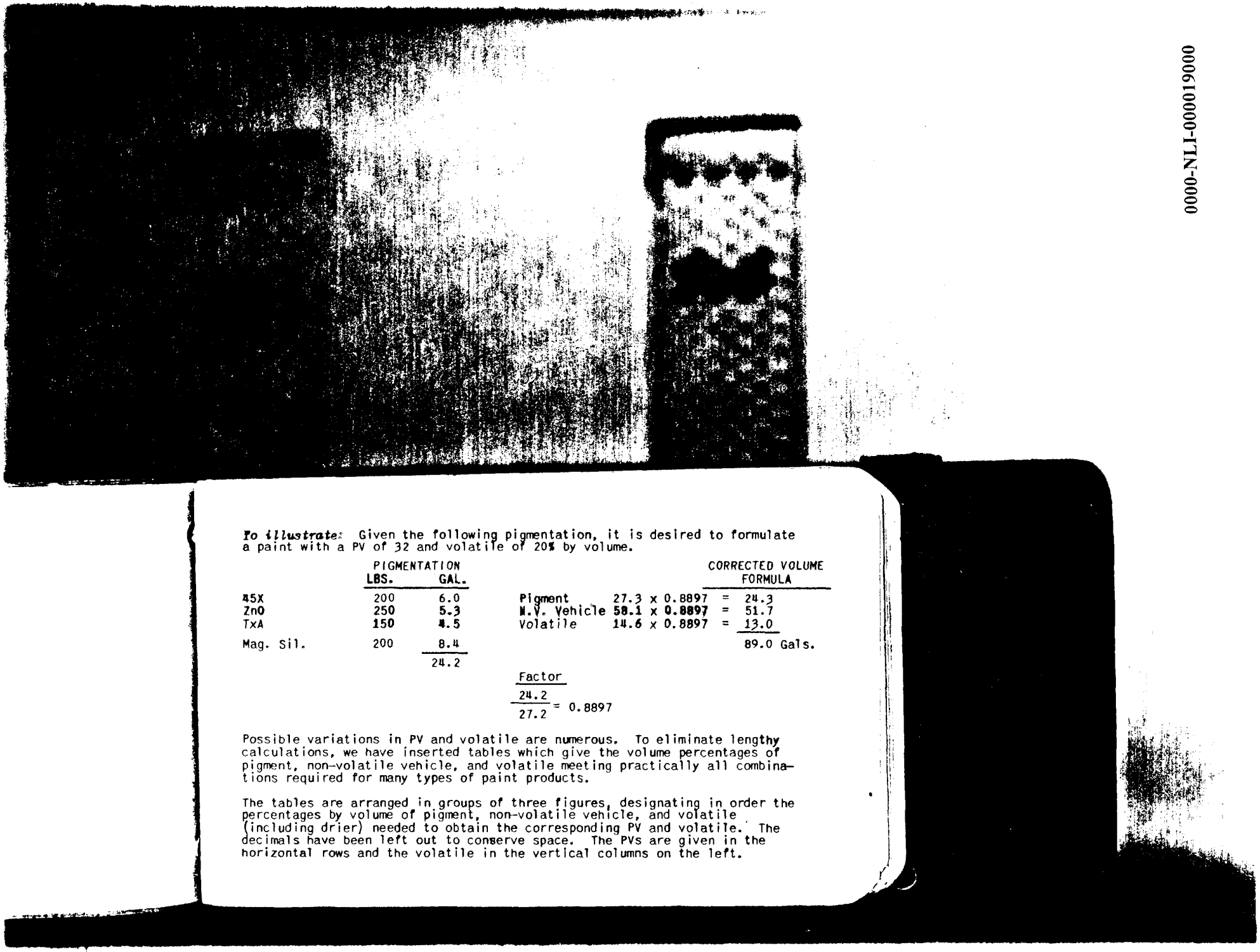
   Bulking values, hiding power, weight of equivalent volumes of pigments, viscosity conversions, color comparisons.

9. Tables for Calculating Volumetric Formulae

The data presented on the raw materials have been obtained from the National Paint, Varnish and Lacquer Association Scientific Section circulars supplemented with information from catalogs.

To aid in calculating a formula by volume where the prime interest is PV and volatile content, the following tables have been prepared. Since the formulator knows what pigment volume he wishes to work with, and the approximate volatile content of the finished paint, he need only to go into the tables, read across the top of the pages until he finds his PV, read down the column for the desired paint volatile, and copy off the percentages by volume of pigment, non-volatile vehicle, and volatile. Since these are percentages, the figures may also represent gallons for a 100 gallon batch, which for simple single pigment formulae, may be converted to pounds by multiplying the weight per gallon of the different raw materials.

Very often the coating involves the use of several pigments. In this case, it is suggested that the pounds of pigment intended to be used be converted to gallons and totaled. Then when the percentage of pigment (considered as gallons) for the desired PV has been read from the tables, this should be divided into the total gallons of pigment to obtain a factor. The percentages of non-volatile vehicle and volatile (converted to gallons) should then be multiplied by the factor to obtain the proper number of gallons of vehicle components for use with the original gallons of pigment.



To illustrate: Given the following pigmentation, it is desired to formulate a paint with a PV of 32 and volatile of 20% by volume.

	PIGMENTATION LBS.	GAL.
45X	200	6.0
ZnO	250	5.3
TxA	150	4.5
Mag. Sil.	200	8.4
		24.2

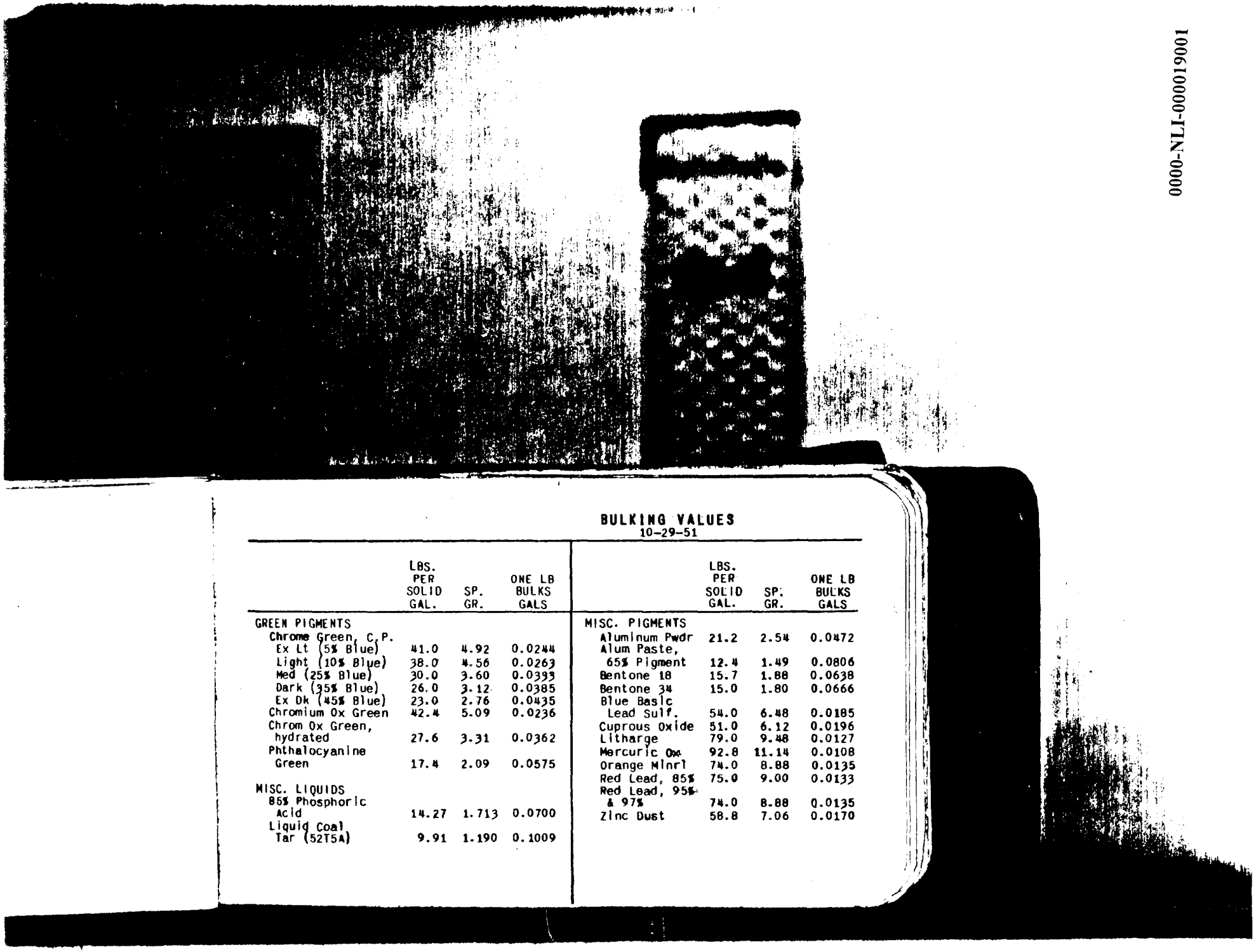
		CORRECTED VOLUME FORMULA
Pigment	27.3 x 0.8897 =	24.3
N.V. Vehicle	58.1 x 0.8897 =	51.7
Volatile	14.6 x 0.8897 =	13.0
		89.0 Gals.

Factor

$$\frac{24.2}{27.2} = 0.8897$$

Possible variations in PV and volatile are numerous. To eliminate lengthy calculations, we have inserted tables which give the volume percentages of pigment, non-volatile vehicle, and volatile meeting practically all combinations required for many types of paint products.

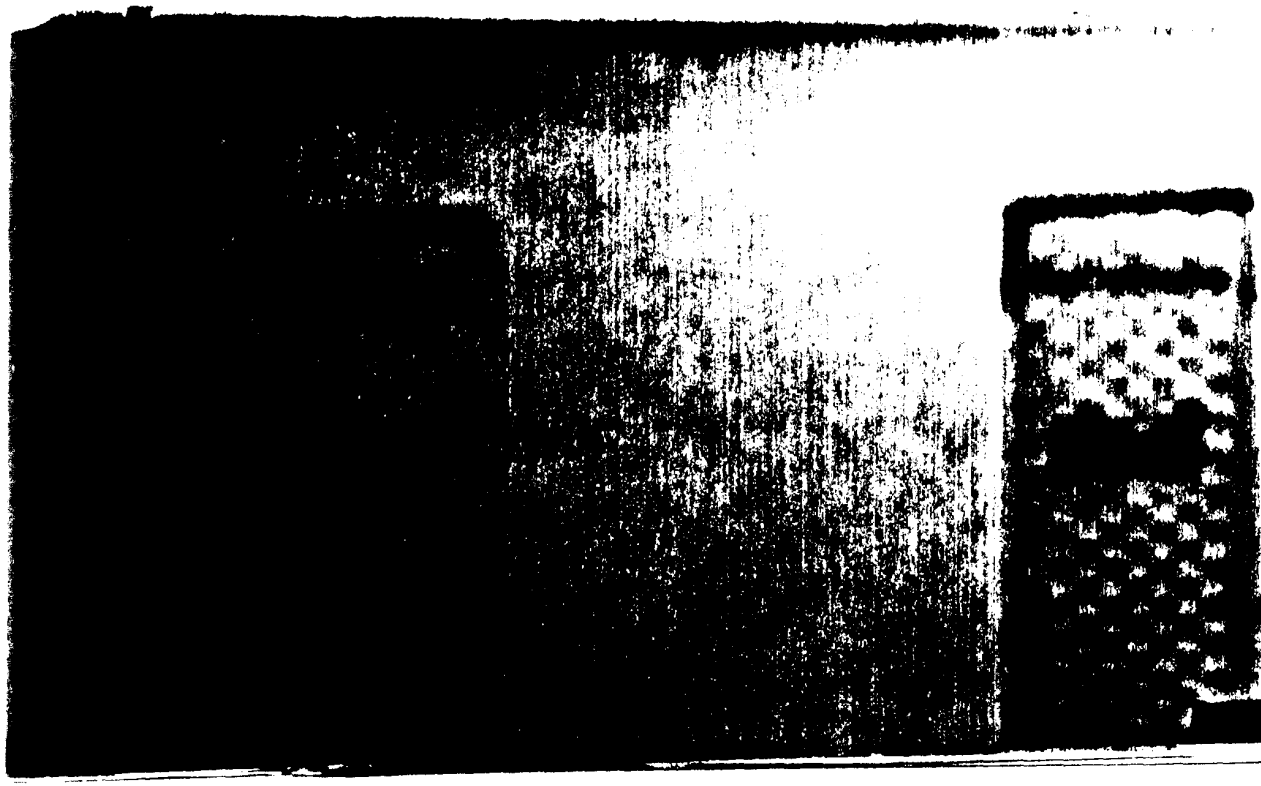
The tables are arranged in groups of three figures, designating in order the percentages by volume of pigment, non-volatile vehicle, and volatile (including drier) needed to obtain the corresponding PV and volatile. The decimals have been left out to conserve space. The PVs are given in the horizontal rows and the volatile in the vertical columns on the left.



BULKING VALUES
10-29-51

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
GREEN PIGMENTS			
Chrome Green, C.P. Ex Lt (5% Blue)	41.0	4.92	0.0244
Light (10% Blue)	38.0	4.56	0.0263
Med (25% Blue)	30.0	3.60	0.0333
Dark (35% Blue)	26.0	3.12	0.0385
Ex Dk (45% Blue)	23.0	2.76	0.0435
Chromium Ox Green	42.4	5.09	0.0236
Chrom Ox Green, hydrated	27.6	3.31	0.0362
Phthalocyanine Green	17.4	2.09	0.0575
MISC. LIQUIDS			
85% Phosphoric Acid	14.27	1.713	0.0700
Liquid Coal Tar (52T5A)	9.91	1.190	0.1009

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
MISC. PIGMENTS			
Aluminum Pwdr	21.2	2.54	0.0472
Alum Paste, 65% Pigment	12.4	1.49	0.0806
Bentone 18	15.7	1.88	0.0638
Bentone 34	15.0	1.80	0.0666
Blue Basic Lead Sulf.	54.0	6.48	0.0185
Cuprous Oxide	51.0	6.12	0.0196
Litharge	79.0	9.48	0.0127
Mercuric Oxe	92.8	11.14	0.0108
Orange Mlnrl	74.0	8.88	0.0135
Red Lead, 85%	75.0	9.00	0.0133
Red Lead, 95% & 97%	74.0	8.88	0.0135
Zinc Dust	58.8	7.06	0.0170

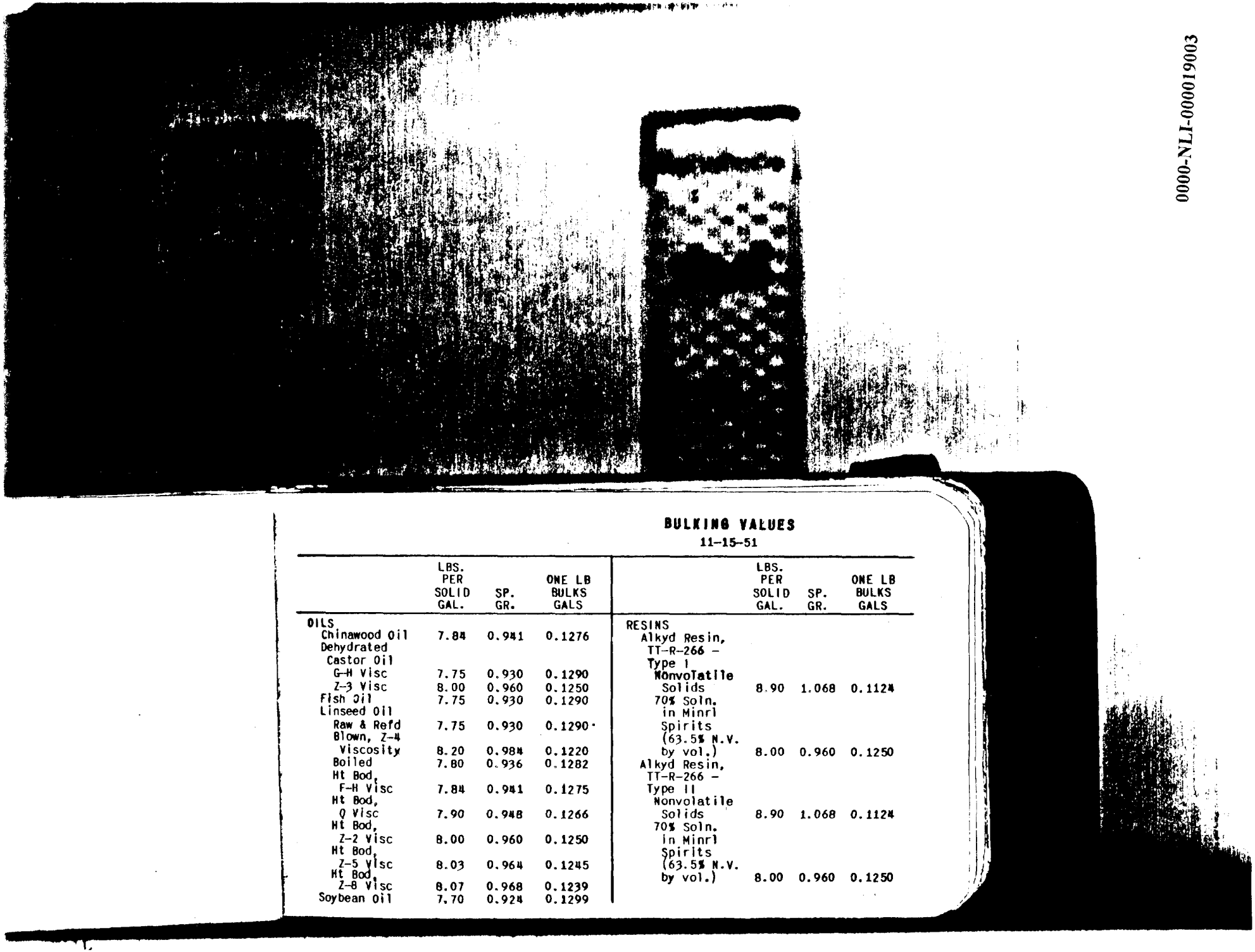


BULKING VALUES

11-8-51

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
YELLOW & ORANGE PIGMENTS			
Cadmium Yellow	35.4	4.25	0.0282
Chrome Yellow, C.P.			
Lemon	46.0	5.52	0.0217
Light	48.0	5.76	0.0208
Medium	50.0	6.00	0.0200
Chrome Orange, C.P.	57.0	6.84	0.0175
Hansa Yellow	12.0	1.44	0.0833
Irox Ox Yel, Syn	33.8	4.06	0.0296
Ochre	24.0	2.88	0.0417
Pigment E	30.4	3.65	0.0329
Zinc Yellow	29.9	3.59	0.0334
Zinc Yellow, Basic	30.6	3.67	0.0327

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
DRIERS & SOAPS			
Alum. Stearate	8.40	1.008	0.1190
Calc. Naphthenate, 5%	8.30	0.996	0.1205
Cobalt Naphthenate, 6%	8.00	0.960	0.1250
Copper Naphthenate, 8%	8.50	1.020	0.1176
Lead Naphthenate, 24%	9.60	1.152	0.1042
Manganese Naph., 6%	8.10	0.972	0.1234
Zinc Naphthenate, 8%	8.10	0.972	0.1234
Cobalt Tallate, 6%	8.15	0.978	0.1226
Lead Tallate, 24%	9.70	1.164	0.1030
Manganese Tallate, 6%	8.10	0.972	0.1234
Zinc Stearate	9.10	1.092	0.1099

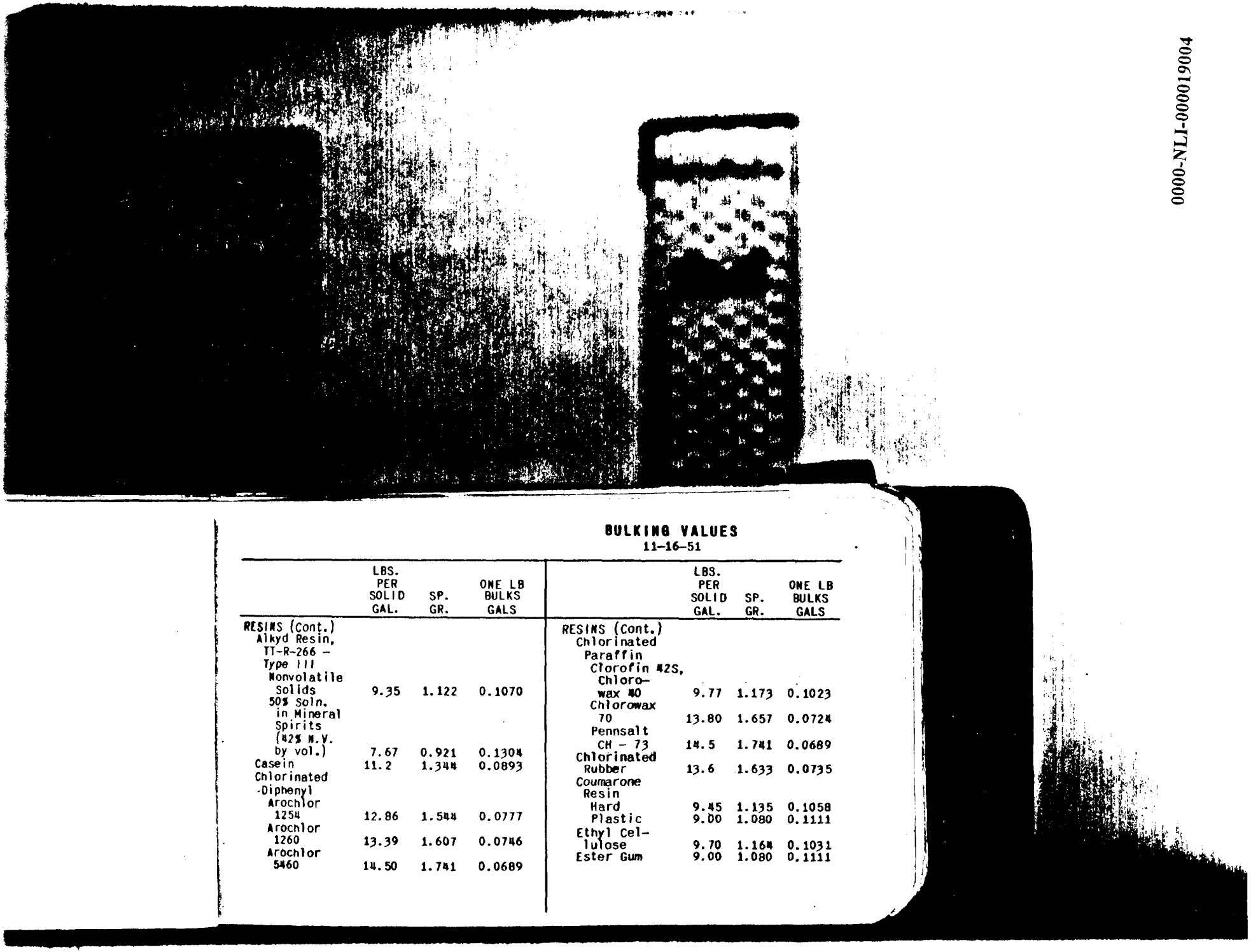


BULKING VALUES

11-15-51

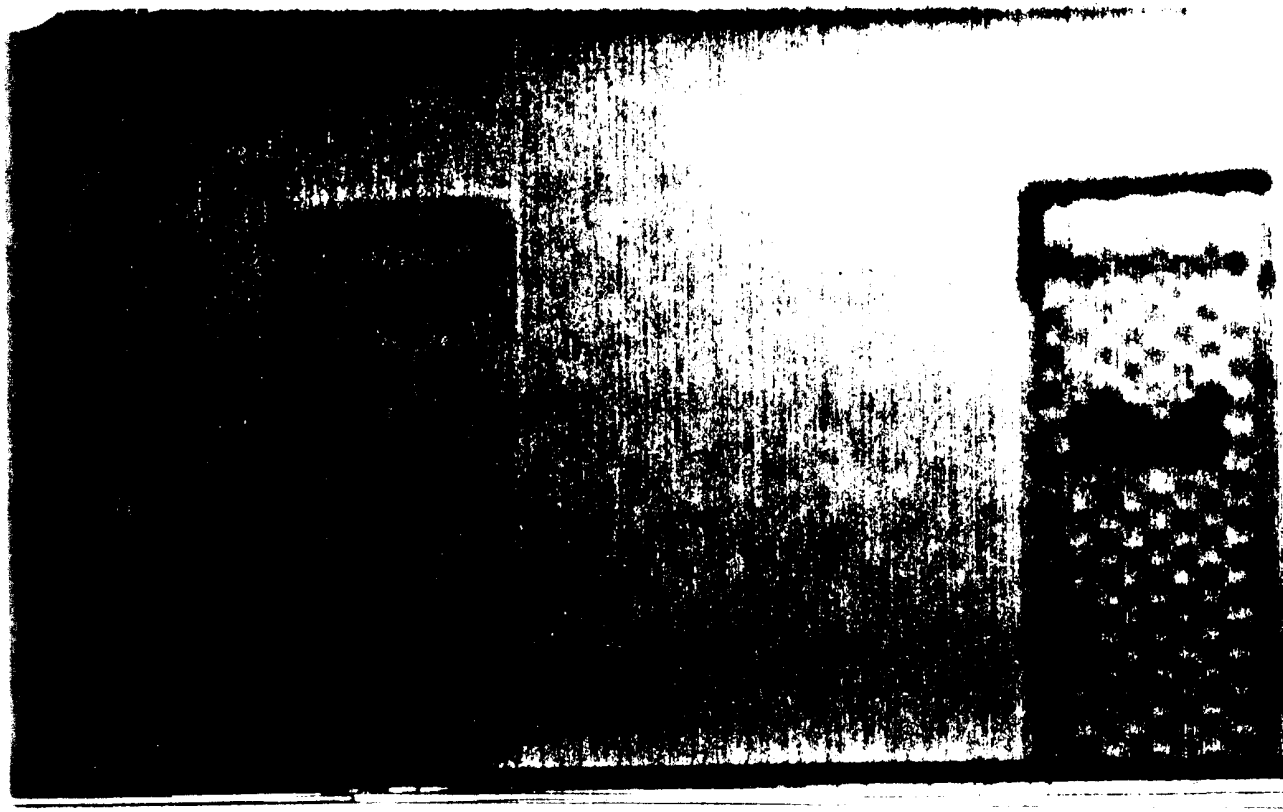
	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
OILS			
Chinawood Oil	7.84	0.941	0.1276
Dehydrated Castor Oil			
G-H Visc	7.75	0.930	0.1290
Z-3 Visc	8.00	0.960	0.1250
Fish Oil	7.75	0.930	0.1290
Linseed Oil			
Raw & Refd	7.75	0.930	0.1290
Blown, Z-4 Viscosity	8.20	0.984	0.1220
Boiled	7.80	0.936	0.1282
Ht Bod, F-H Visc	7.84	0.941	0.1275
Ht Bod, Q Visc	7.90	0.948	0.1266
Ht Bod, Z-2 Visc	8.00	0.960	0.1250
Ht Bod, Z-5 Visc	8.03	0.964	0.1245
Ht Bod, Z-8 Visc	8.07	0.968	0.1239
Soybean Oil	7.70	0.924	0.1299

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
RESINS			
Alkyd Resin, TT-R-266 - Type I Nonvolatile Solids 70% Soln. in Minrl Spirits (63.5% N.V. by vol.)	8.90	1.068	0.1124
	8.00	0.960	0.1250
Alkyd Resin, TT-R-266 - Type II Nonvolatile Solids 70% Soln. in Minrl Spirits (63.5% N.V. by vol.)	8.90	1.068	0.1124
	8.00	0.960	0.1250



BULKING VALUES
11-16-51

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
RESINS (Cont.)			
Alkyd Resin, TT-R-266 – Type III			
Nonvolatile Solids	9.35	1.122	0.1070
50% Soln. in Mineral Spirits (42% N.V. by vol.)	7.67	0.921	0.1304
Casein	11.2	1.344	0.0893
Chlorinated -Diphenyl			
Arochlor 1254	12.86	1.544	0.0777
Arochlor 1260	13.39	1.607	0.0746
Arochlor 5460	14.50	1.741	0.0689
RESINS (Cont.)			
Chlorinated Paraffin			
Clorofin 42S, Chloro-wax 40	9.77	1.173	0.1023
Chlorowax 70	13.80	1.657	0.0724
Pennsalt CH – 73	14.5	1.741	0.0689
Chlorinated Rubber	13.6	1.633	0.0735
Coumarone Resin			
Hard	9.45	1.135	0.1058
Plastic	9.00	1.080	0.1111
Ethyl Cellulose	9.70	1.164	0.1031
Ester Gum	9.00	1.080	0.1111



BULKING VALUES

12-14-51

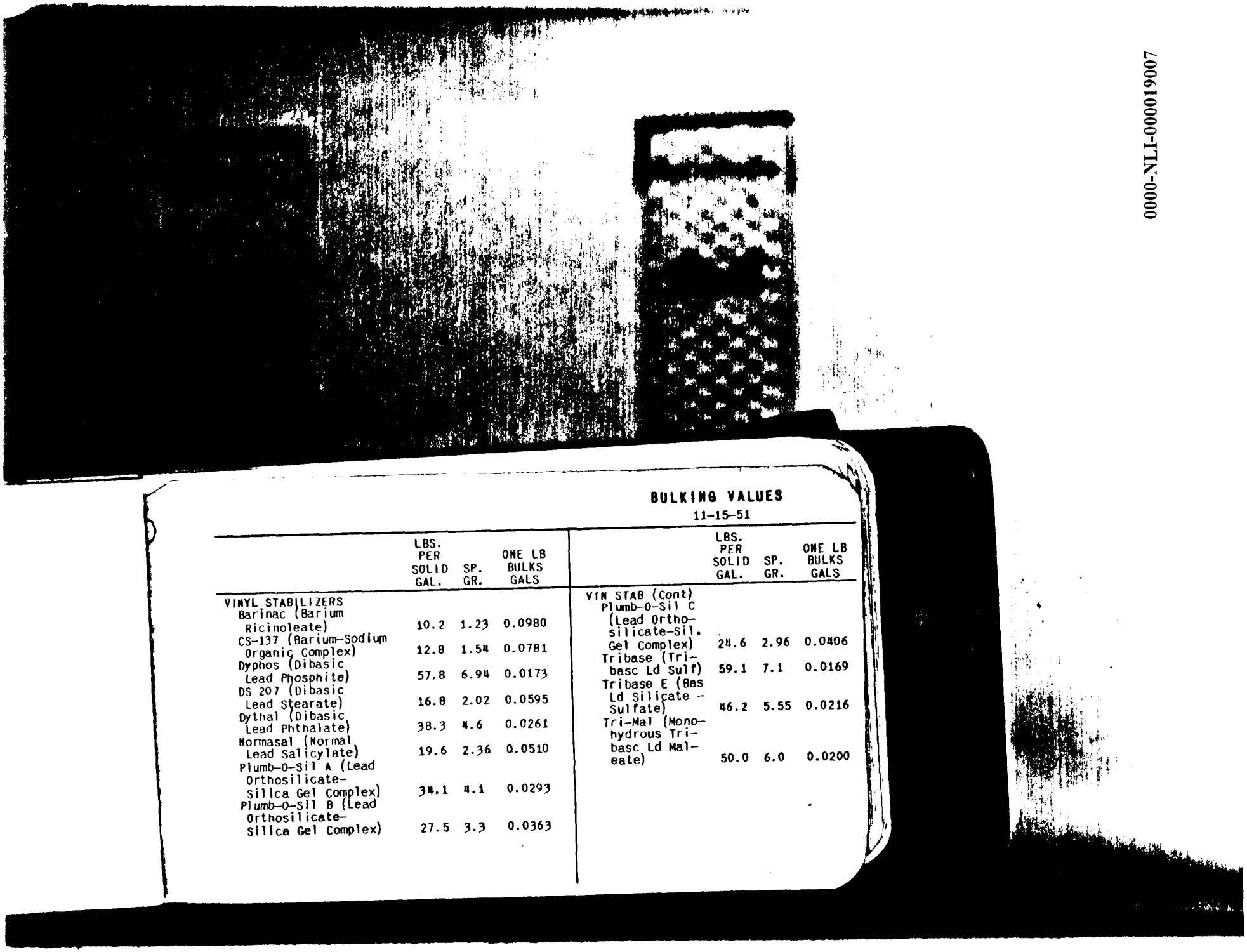
	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
RESINS (Cont.)			
Pure Phenolic Resin Mil - R - 15184	10.0	1.200	0.1000
Mil - R - 15189	8.60	1.032	0.1163
Rosin	9.00	1.080	0.1111
Vinyl Resin Hydralized Vinyl Chloride Acetate	11.60	1.392	0.0862
Vinyl Chloride Acetate	11.30	1.356	0.0885
Vinyl Butyral	8.60	1.032	0.1163
THINNERS, SOLVENTS & PLASTICIZERS			
Acetone	6.64	0.797	0.1506
Benzene	7.28	0.874	0.1374
Butyl Alcohol, N	6.76	0.811	0.1479

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
THINNERS, SOLVENTS & PLASTICIZERS			
Butyl Cellosolve	7.50	0.900	0.1333
Cellosolve Acetate	7.75	0.930	0.1290
Dibutyl Phthalate	8.75	1.050	0.1143
Dioctyl Phthalate	8.20	0.984	0.1220
Dipentine	7.10	0.852	0.1408
Ethyl Alcohol	6.64	0.797	0.1506
High Flash Naphtha (Petroleum)	7.26	0.871	0.1377
Isopropanol, 99%	6.55	0.786	0.1526
Low Gravity Carbitol	8.23	0.988	0.1215
Methyl Ethyl Ketone	6.70	0.804	0.1493
Methyl Isobutyl Ketone	6.68	0.802	0.1497
Petroleum Thinners			
VM & P Naphtha	6.35	0.762	0.1575
Mineral Spirits	6.55	0.786	0.1526

BULKING VALUES

12-14-51

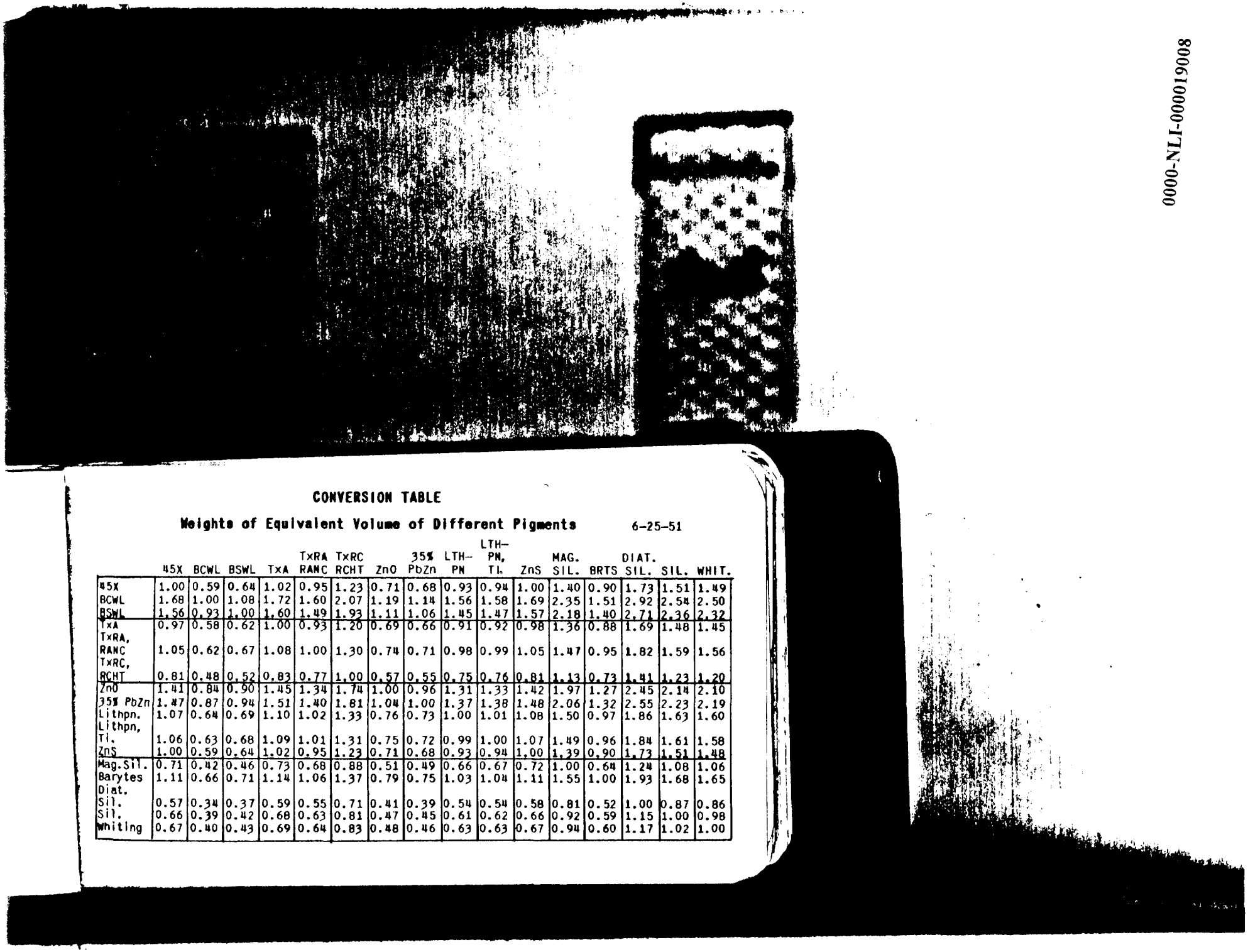
	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
THINNERS, SOLVENTS & PLASTICIZERS			
Petroleum Thinners			
Heavy Mineral Spirits	6.70	0.804	0.1493
Kerosene	6.70	0.804	0.1493
Pine Oil	7.50	0.900	0.1333
Turpentine	7.20	0.864	0.1389
Tricresyl Phosphate	9.83	1.180	0.1017
Toluol	7.25	0.870	0.1379
Xylol	7.23	0.868	0.1383



BULKING VALUES

11-15-51

	LBS. PER SOLID GAL.	SP. GR.	ONE LB BULKS GALS
VINYL STABILIZERS			
Barinac (Barium Ricinoleate)	10.2	1.23	0.0980
CS-137 (Barium-Sodium Organic Complex)	12.8	1.54	0.0781
Dyphos (Dibasic Lead Phosphite)	57.8	6.94	0.0173
DS 207 (Dibasic Lead Stearate)	16.8	2.02	0.0595
Dythal (Dibasic Lead Phthalate)	38.3	4.6	0.0261
Normasal (Normal Lead Salicylate)	19.6	2.36	0.0510
Plumb-O-Sil A (Lead Orthosilicate-Silica Gel Complex)	34.1	4.1	0.0293
Plumb-O-Sil B (Lead Orthosilicate-Silica Gel Complex)	27.5	3.3	0.0363
VIN STAB (Cont)			
Plumb-O-Sil C (Lead Orthosilicate-Sil. Gel Complex)	24.6	2.96	0.0406
Tribase (Tribasc Ld Sulf)	59.1	7.1	0.0169
Tribase E (Bas Ld Silicate - Sulfate)	46.2	5.55	0.0216
Tri-Mal (Monohydrous Tribasc Ld Maleate)	50.0	6.0	0.0200

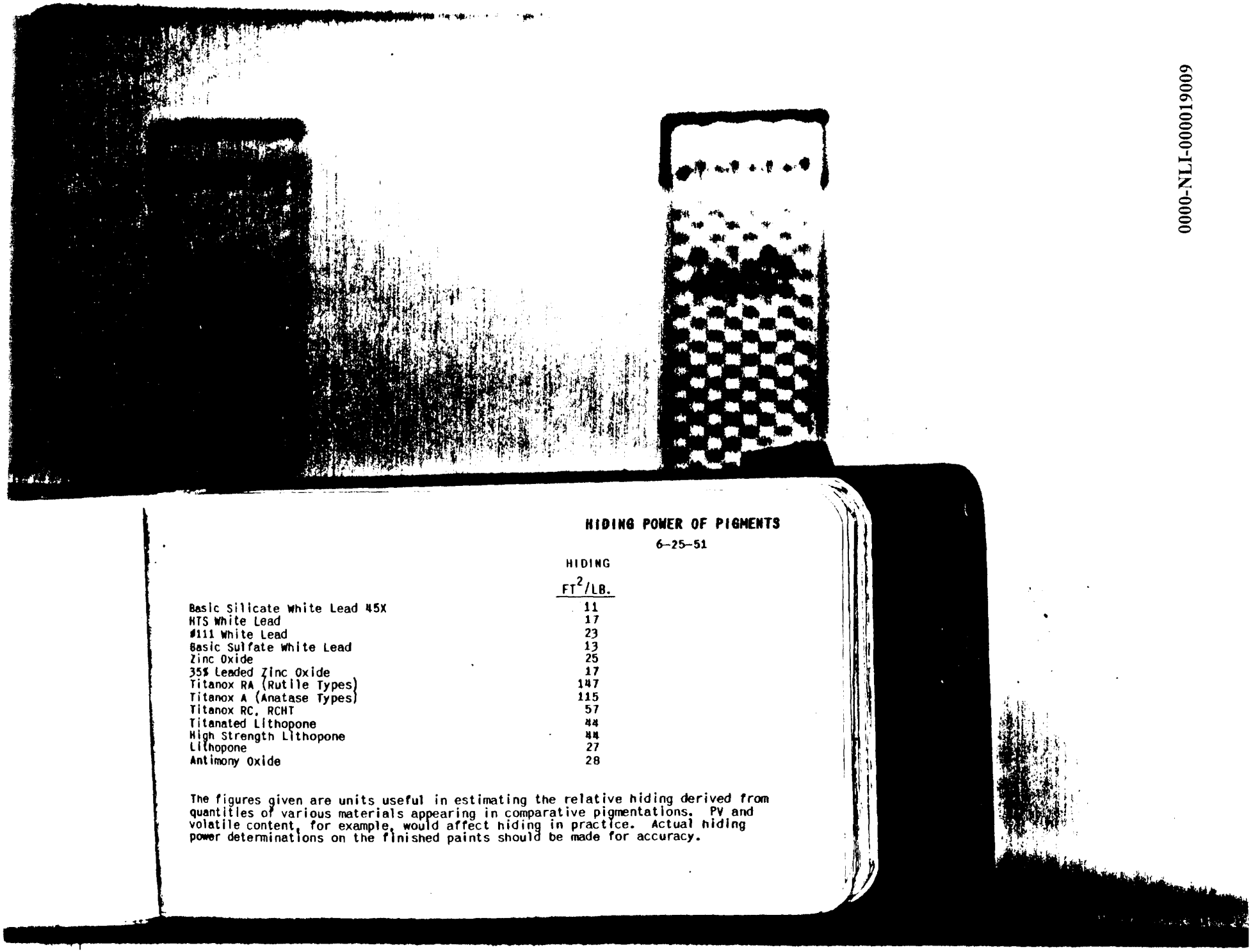


CONVERSION TABLE

Weights of Equivalent Volume of Different Pigments

6-25-51

	45X	BCWL	BSWL	TxA	TxRA RANC	TxRC RCHT	ZnO	35% PbZn	LTH-PN	LTH-PN, Ti.	ZnS	MAG. SIL.	DIAT. BRTS	DIAT. SIL.	SIL.	WHIT.
45X	1.00	0.59	0.64	1.02	0.95	1.23	0.71	0.68	0.93	0.94	1.00	1.40	0.90	1.73	1.51	1.49
BCWL	1.68	1.00	1.08	1.72	1.60	2.07	1.19	1.14	1.56	1.58	1.69	2.35	1.51	2.92	2.54	2.50
BSWL	1.56	0.93	1.00	1.60	1.49	1.93	1.11	1.06	1.45	1.47	1.57	2.18	1.40	2.71	2.36	2.32
TxA	0.97	0.58	0.62	1.00	0.93	1.20	0.69	0.66	0.91	0.92	0.98	1.36	0.88	1.69	1.48	1.45
TxRA, RANC	1.05	0.62	0.67	1.08	1.00	1.30	0.74	0.71	0.98	0.99	1.05	1.47	0.95	1.82	1.59	1.56
TxRC, RCHT	0.81	0.48	0.52	0.83	0.77	1.00	0.57	0.55	0.75	0.76	0.81	1.13	0.73	1.41	1.23	1.20
ZnO	1.41	0.84	0.90	1.45	1.34	1.74	1.00	0.96	1.31	1.33	1.42	1.97	1.27	2.45	2.14	2.10
35% PbZn	1.47	0.87	0.94	1.51	1.40	1.81	1.04	1.00	1.37	1.38	1.48	2.06	1.32	2.55	2.23	2.19
Lithpn.	1.07	0.64	0.69	1.10	1.02	1.33	0.76	0.73	1.00	1.01	1.08	1.50	0.97	1.86	1.63	1.60
Lithpn, Ti.	1.06	0.63	0.68	1.09	1.01	1.31	0.75	0.72	0.99	1.00	1.07	1.49	0.96	1.84	1.61	1.58
ZnS	1.00	0.59	0.64	1.02	0.95	1.23	0.71	0.68	0.93	0.94	1.00	1.39	0.90	1.73	1.51	1.48
Mag.Sil.	0.71	0.42	0.46	0.73	0.68	0.88	0.51	0.49	0.66	0.67	0.72	1.00	0.64	1.24	1.08	1.06
Barytes	1.11	0.66	0.71	1.14	1.06	1.37	0.79	0.75	1.03	1.04	1.11	1.55	1.00	1.93	1.68	1.65
Diat. Sil.	0.57	0.34	0.37	0.59	0.55	0.71	0.41	0.39	0.54	0.54	0.58	0.81	0.52	1.00	0.87	0.86
Sil.	0.66	0.39	0.42	0.68	0.63	0.81	0.47	0.45	0.61	0.62	0.66	0.92	0.59	1.15	1.00	0.98
Whiting	0.67	0.40	0.43	0.69	0.64	0.83	0.48	0.46	0.63	0.63	0.67	0.94	0.60	1.17	1.02	1.00

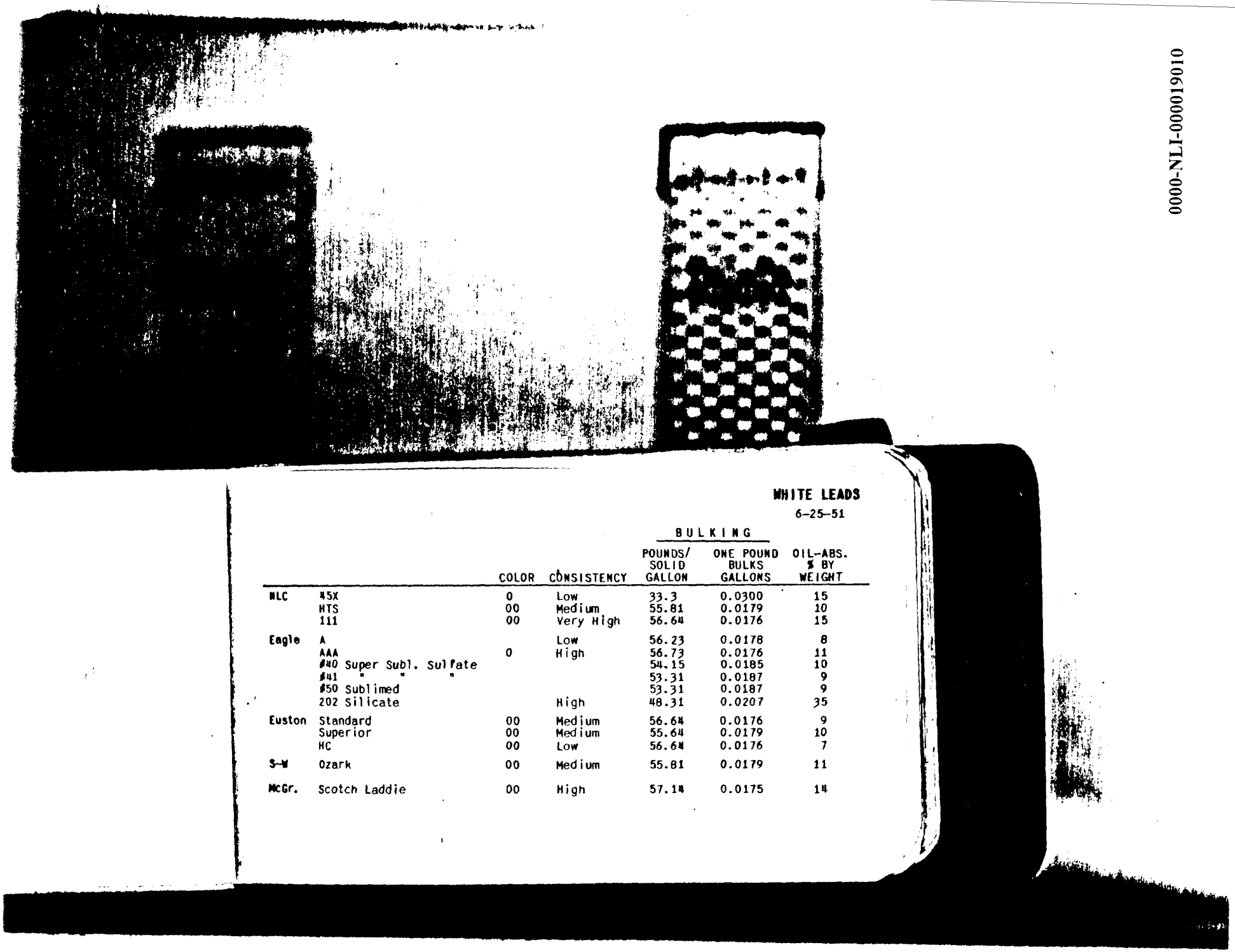


HIDING POWER OF PIGMENTS

6-25-51

	HIDING $FT^2/LB.$
Basic Silicate White Lead 45X	11
NTS White Lead	17
#111 White Lead	23
Basic Sulfate White Lead	13
Zinc Oxide	25
35% Leaded Zinc Oxide	17
Titanox RA (Rutile Types)	147
Titanox A (Anatase Types)	115
Titanox RC, RCHT	57
Titanated Lithopone	44
High Strength Lithopone	44
Lithopone	27
Antimony Oxide	28

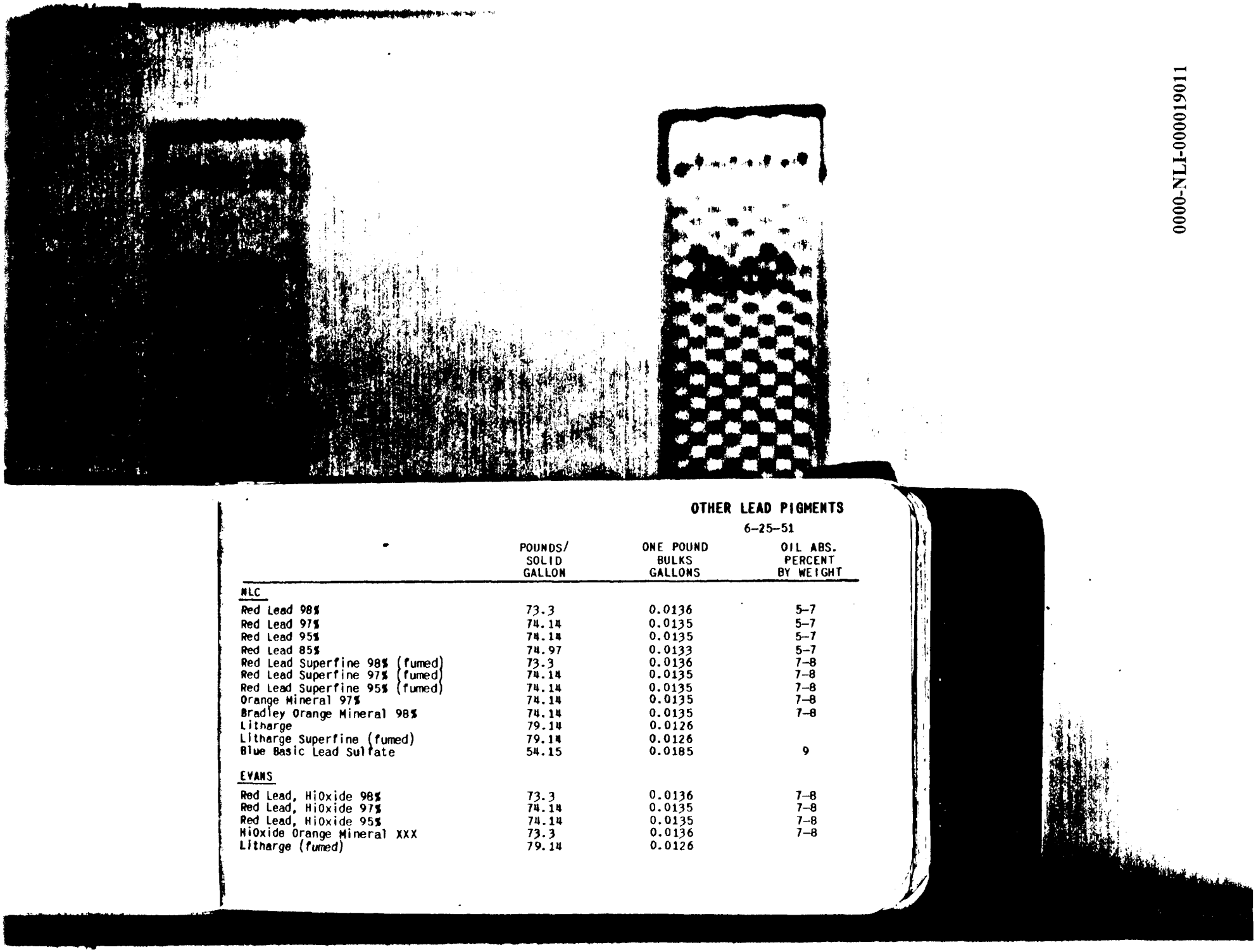
The figures given are units useful in estimating the relative hiding derived from quantities of various materials appearing in comparative pigmentations. PV and volatile content, for example, would affect hiding in practice. Actual hiding power determinations on the finished paints should be made for accuracy.



WHITE LEADS

6-25-51

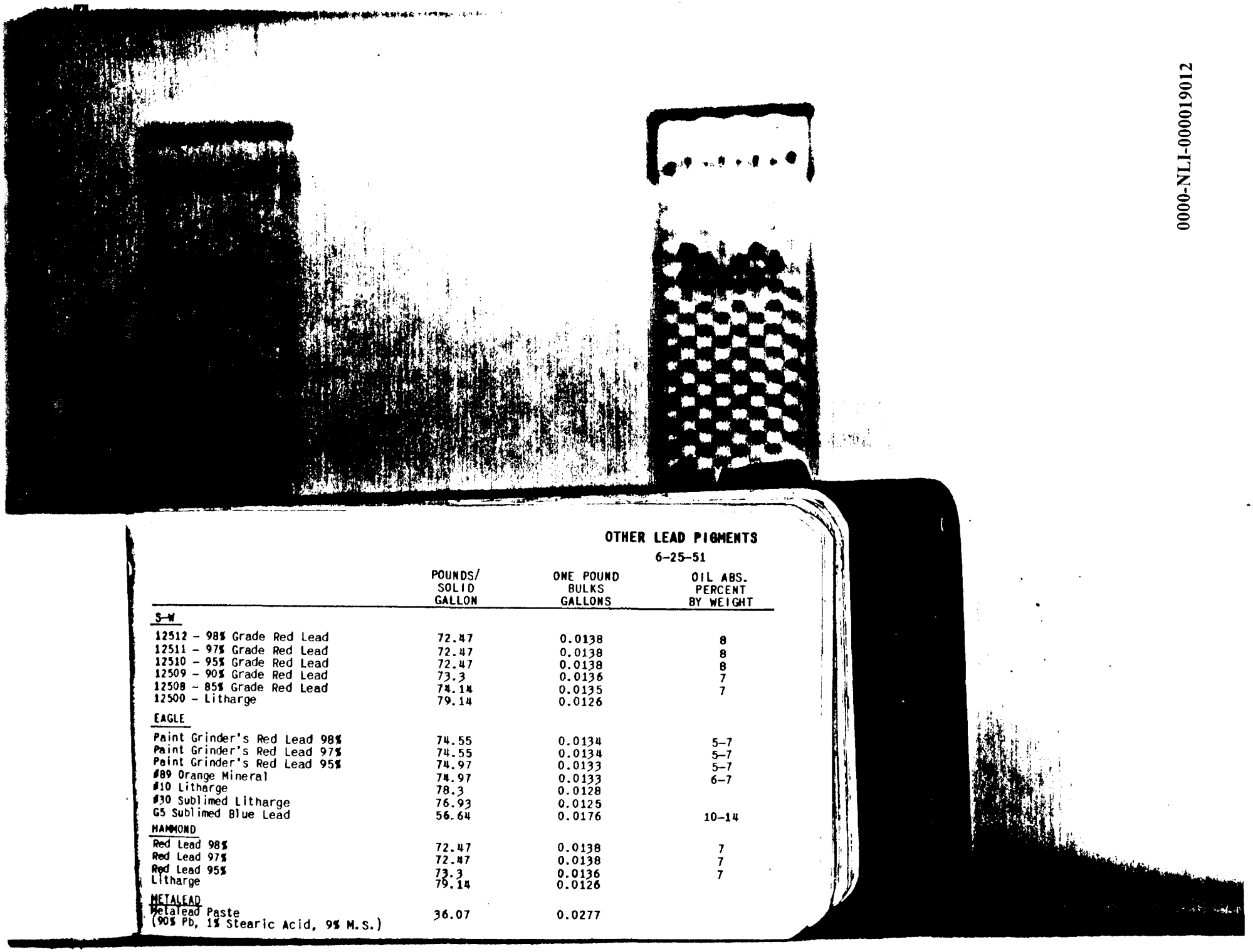
		COLOR	CONSISTENCY	BULKING: POUNDS/ SOLID GALLON	BULKING: ONE POUND BULKS GALLONS	OIL-ABS. % BY WEIGHT
NLC	45X	0	Low	33.3	0.0300	15
	HTS	00	Medium	55.81	0.0179	10
	111	00	Very High	56.64	0.0176	15
Eagle	A		Low	56.23	0.0178	8
	AAA	0	High	56.73	0.0176	11
	#40 Super Subl. Sulfate			54.15	0.0185	10
	#41 " " "			53.31	0.0187	9
	#50 Sublimed			53.31	0.0187	9
	202 Silicate		High	48.31	0.0207	35
Euston	Standard	00	Medium	56.64	0.0176	9
	Superior	00	Medium	55.64	0.0179	10
	HC	00	Low	56.64	0.0176	7
S-W	Ozark	00	Medium	55.81	0.0179	11
McGr.	Scotch Laddie	00	High	57.14	0.0175	14



OTHER LEAD PIGMENTS

6-25-51

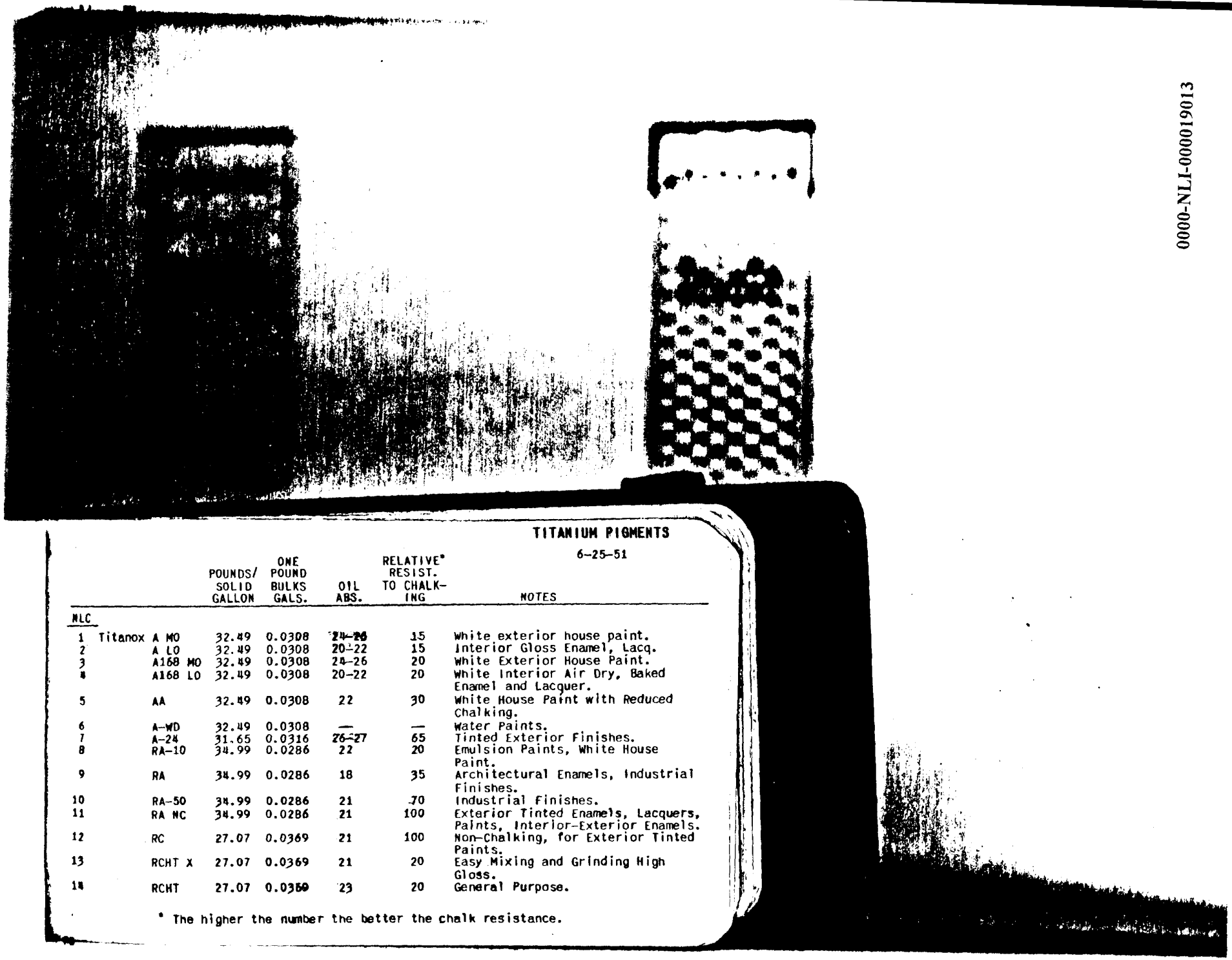
	POUNDS/ SOLID GALLON	ONE POUND BULKS GALLONS	OIL ABS. PERCENT BY WEIGHT
NLC			
Red Lead 98%	73.3	0.0136	5-7
Red Lead 97%	74.14	0.0135	5-7
Red Lead 95%	74.14	0.0135	5-7
Red Lead 85%	74.97	0.0133	5-7
Red Lead Superfine 98% (fumed)	73.3	0.0136	7-8
Red Lead Superfine 97% (fumed)	74.14	0.0135	7-8
Red Lead Superfine 95% (fumed)	74.14	0.0135	7-8
Orange Mineral 97%	74.14	0.0135	7-8
Bradley Orange Mineral 98%	74.14	0.0135	7-8
Litharge	79.14	0.0126	
Litharge Superfine (fumed)	79.14	0.0126	
Blue Basic Lead Sulfate	54.15	0.0185	9
EVANS			
Red Lead, HiOxide 98%	73.3	0.0136	7-8
Red Lead, HiOxide 97%	74.14	0.0135	7-8
Red Lead, HiOxide 95%	74.14	0.0135	7-8
HiOxide Orange Mineral XXX	73.3	0.0136	7-8
Litharge (fumed)	79.14	0.0126	



OTHER LEAD PIGMENTS

6-25-51

	POUNDS/ SOLID GALLON	ONE POUND BULKS GALLONS	OIL ABS. PERCENT BY WEIGHT
S-W			
12512 - 98% Grade Red Lead	72.47	0.0138	8
12511 - 97% Grade Red Lead	72.47	0.0138	8
12510 - 95% Grade Red Lead	72.47	0.0138	8
12509 - 90% Grade Red Lead	73.3	0.0136	7
12508 - 85% Grade Red Lead	74.14	0.0135	7
12500 - Litharge	79.14	0.0126	
EAGLE			
Paint Grinder's Red Lead 98%	74.55	0.0134	5-7
Paint Grinder's Red Lead 97%	74.55	0.0134	5-7
Paint Grinder's Red Lead 95%	74.97	0.0133	5-7
#89 Orange Mineral	74.97	0.0133	6-7
#10 Litharge	78.3	0.0128	
#30 Sublimed Litharge	76.93	0.0125	
G5 Sublimed Blue Lead	56.64	0.0176	10-14
HAMMOND			
Red Lead 98%	72.47	0.0138	7
Red Lead 97%	72.47	0.0138	7
Red Lead 95%	73.3	0.0136	7
Litharge	79.14	0.0126	
METALEAD			
Metalead Paste (90% Pb, 1% Stearic Acid, 9% M.S.)	36.07	0.0277	



TITANIUM PIGMENTS

6-25-51

NLC		POUNDS/ SOLID GALLON	ONE POUND BULKS GALS.	OIL ABS.	RELATIVE* RESIST. TO CHALK-ING	NOTES
1	Titanox A MO	32.49	0.0308	24-26	15	White exterior house paint.
2	A LO	32.49	0.0308	20-22	15	Interior Gloss Enamel, Lacq.
3	A168 MO	32.49	0.0308	24-26	20	White Exterior House Paint.
4	A168 LO	32.49	0.0308	20-22	20	White Interior Air Dry, Baked Enamel and Lacquer.
5	AA	32.49	0.0308	22	30	White House Paint with Reduced Chalking.
6	A-WD	32.49	0.0308	—	—	Water Paints.
7	A-24	31.65	0.0316	26-27	65	Tinted Exterior Finishes.
8	RA-10	34.99	0.0286	22	20	Emulsion Paints, White House Paint.
9	RA	34.99	0.0286	18	35	Architectural Enamels, Industrial Finishes.
10	RA-50	34.99	0.0286	21	70	Industrial Finishes.
11	RA NC	34.99	0.0286	21	100	Exterior Tinted Enamels, Lacquers, Paints, Interior-Exterior Enamels.
12	RC	27.07	0.0369	21	100	Non-Chalking, for Exterior Tinted Paints.
13	RCHT X	27.07	0.0369	21	20	Easy Mixing and Grinding High Gloss.
14	RCHT	27.07	0.0369	23	20	General Purpose.

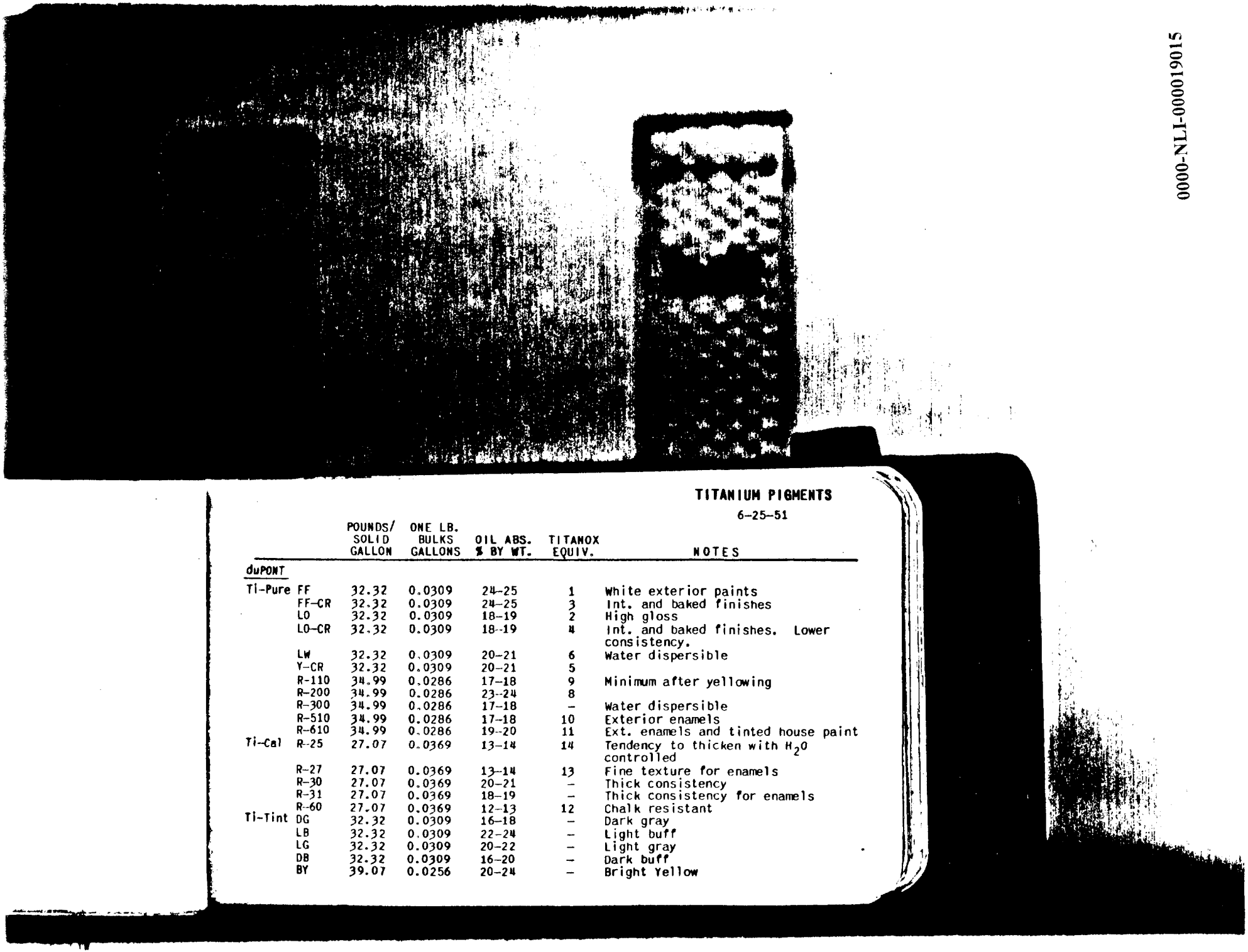
* The higher the number the better the chalk resistance.

TITANIUM PIGMENTS

6-25-51

USES:	A-MO	A-LO	A168 MO	A168 LO	AA	A-WD	A-24	RA-10	RA	RA-50	RA-NC	RC	RCHT X	RCHT
House Paint														
White	1		1	1	3			4	5					2
White and Tint														2
Tint							4			3	2	1		
Primers											4	2		
Concrete & Stucco White	3													1
	1													2
Tint									3					
Household Enamels			4	4					1	1	2	1		2
Painters Enamels and											3	3	2	
Gloss Paints										3	2	1		1
Flat Wall Paint								2			4	2		1
Appliance Enamels			2											1
Exterior Enamels							4		1	1				
Industrial Enamels			2						1	3	1	2		
Porch & Floor Enamels				2					1	1				
Lacquers		3									2	1		
Lacquer, Exterior Tint							3			3	1	2	4	4
Lacquer, Undercoaters											1	2	3	
Marine Paints					5				3		1	2		1
Water Base and Emulsion														4
Paints						1			2	3				

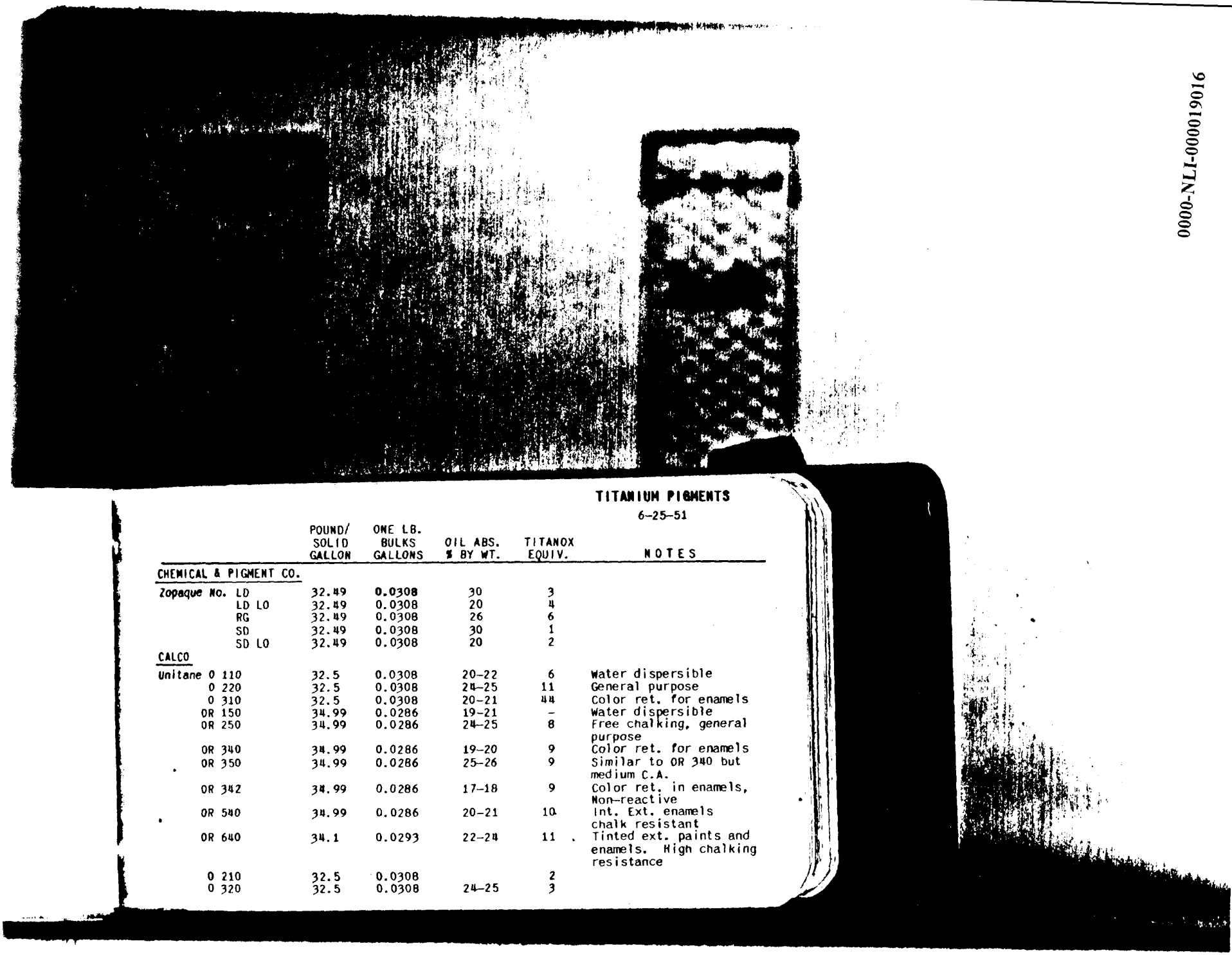
Numbers represent order of preference.



TITANIUM PIGMENTS

6-25-51

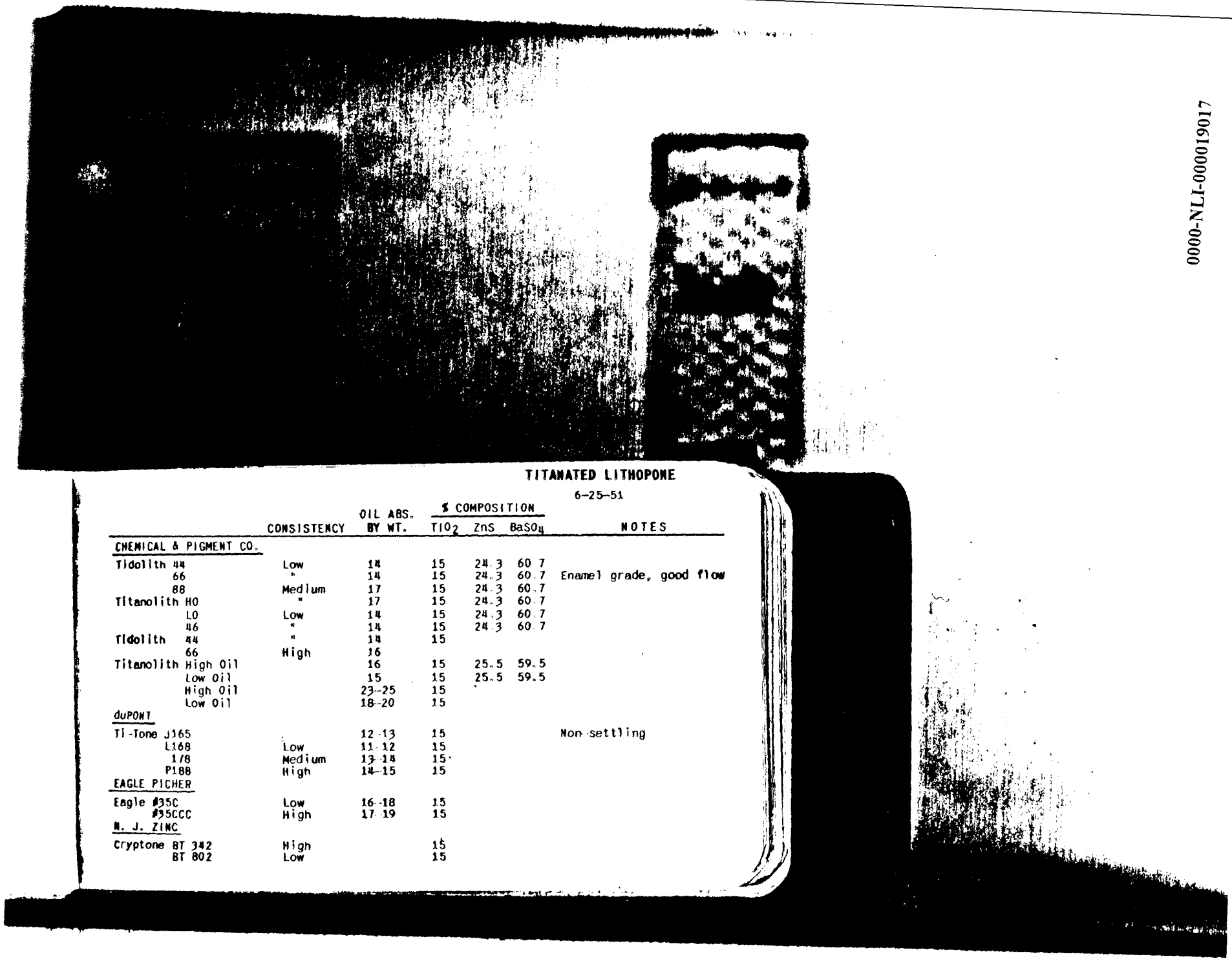
		POUNDS/ SOLID GALLON	ONE LB. BULKS GALLONS	OIL ABS. % BY WT.	TITANOX EQUIV.	NOTES
duPONT						
Ti-Pure	FF	32.32	0.0309	24–25	1	White exterior paints
	FF-CR	32.32	0.0309	24–25	3	Int. and baked finishes
	LO	32.32	0.0309	18–19	2	High gloss
	LO-CR	32.32	0.0309	18–19	4	Int. and baked finishes. Lower consistency.
	LW	32.32	0.0309	20–21	6	Water dispersible
	Y-CR	32.32	0.0309	20–21	5	
	R-110	34.99	0.0286	17–18	9	Minimum after yellowing
	R-200	34.99	0.0286	23–24	8	
	R-300	34.99	0.0286	17–18	–	Water dispersible
	R-510	34.99	0.0286	17–18	10	Exterior enamels
	R-610	34.99	0.0286	19–20	11	Ext. enamels and tinted house paint
Ti-Cal	R-25	27.07	0.0369	13–14	14	Tendency to thicken with H_2O controlled
	R-27	27.07	0.0369	13–14	13	Fine texture for enamels
	R-30	27.07	0.0369	20–21	–	Thick consistency
	R-31	27.07	0.0369	18–19	–	Thick consistency for enamels
	R-60	27.07	0.0369	12–13	12	Chalk resistant
Ti-Tint	DG	32.32	0.0309	16–18	–	Dark gray
	LB	32.32	0.0309	22–24	–	Light buff
	LG	32.32	0.0309	20–22	–	Light gray
	DB	32.32	0.0309	16–20	–	Dark buff
	BY	39.07	0.0256	20–24	–	Bright Yellow



TITANIUM PIGMENTS

6-25-51

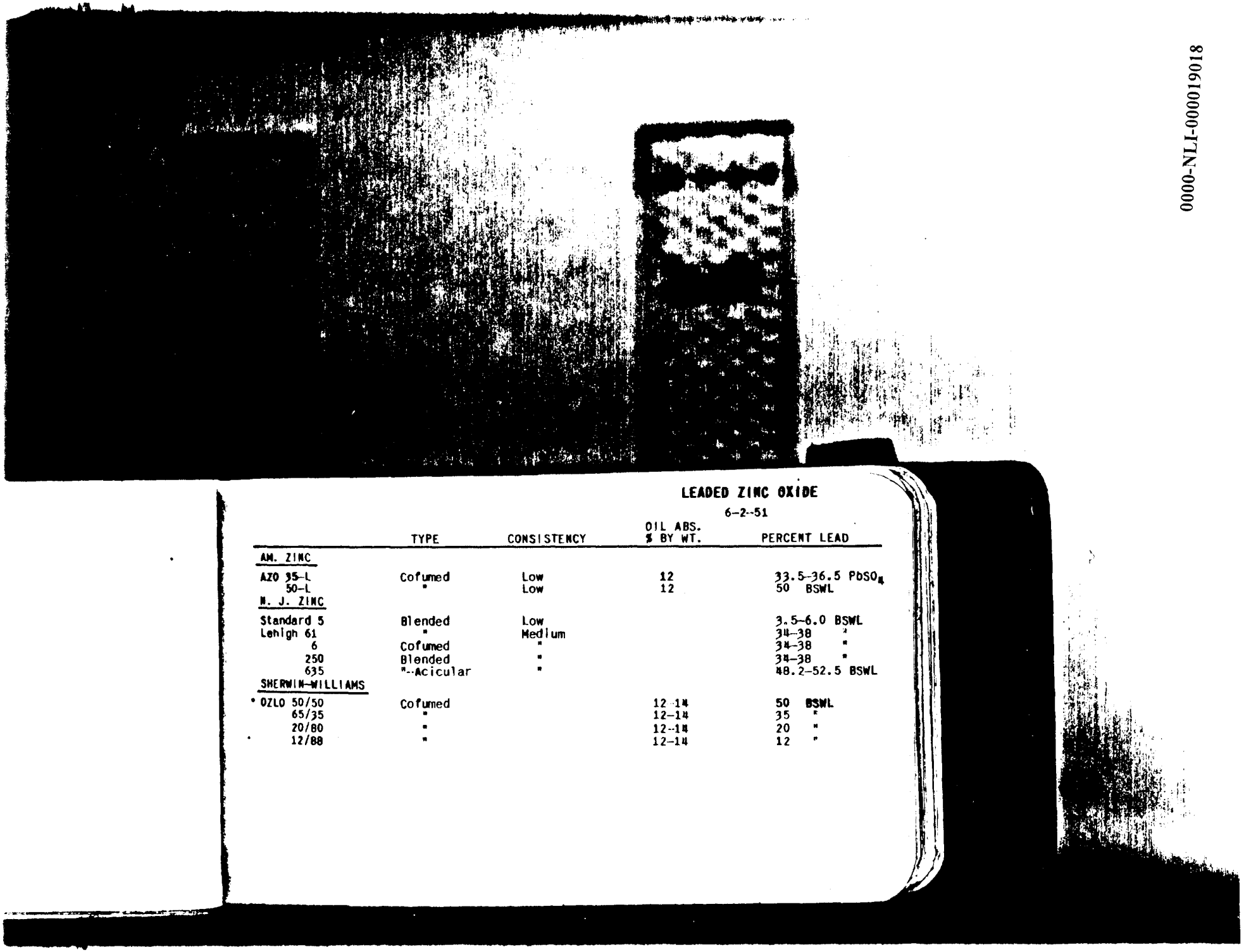
	POUND/ SOLID GALLON	ONE LB. BULKS GALLONS	OIL ABS. % BY WT.	TITANOX EQUIV.	NOTES
CHEMICAL & PIGMENT CO.					
Zopaque No. LD	32.49	0.0308	30	3	
LD LO	32.49	0.0308	20	4	
RG	32.49	0.0308	26	6	
SD	32.49	0.0308	30	1	
SD LO	32.49	0.0308	20	2	
CALCO					
Unitane 0 110	32.5	0.0308	20-22	6	Water dispersible
0 220	32.5	0.0308	24-25	11	General purpose
0 310	32.5	0.0308	20-21	44	Color ret. for enamels
OR 150	34.99	0.0286	19-21	-	Water dispersible
OR 250	34.99	0.0286	24-25	8	Free chalking, general purpose
OR 340	34.99	0.0286	19-20	9	Color ret. for enamels
OR 350	34.99	0.0286	25-26	9	Similar to OR 340 but medium C.A.
OR 342	34.99	0.0286	17-18	9	Color ret. in enamels, Non-reactive
OR 540	34.99	0.0286	20-21	10	Int. Ext. enamels chalk resistant
OR 640	34.1	0.0293	22-24	11	Tinted ext. paints and enamels. High chalking resistance
0 210	32.5	0.0308		2	
0 320	32.5	0.0308	24-25	3	



TITANATED LITHOPONE

6-25-51

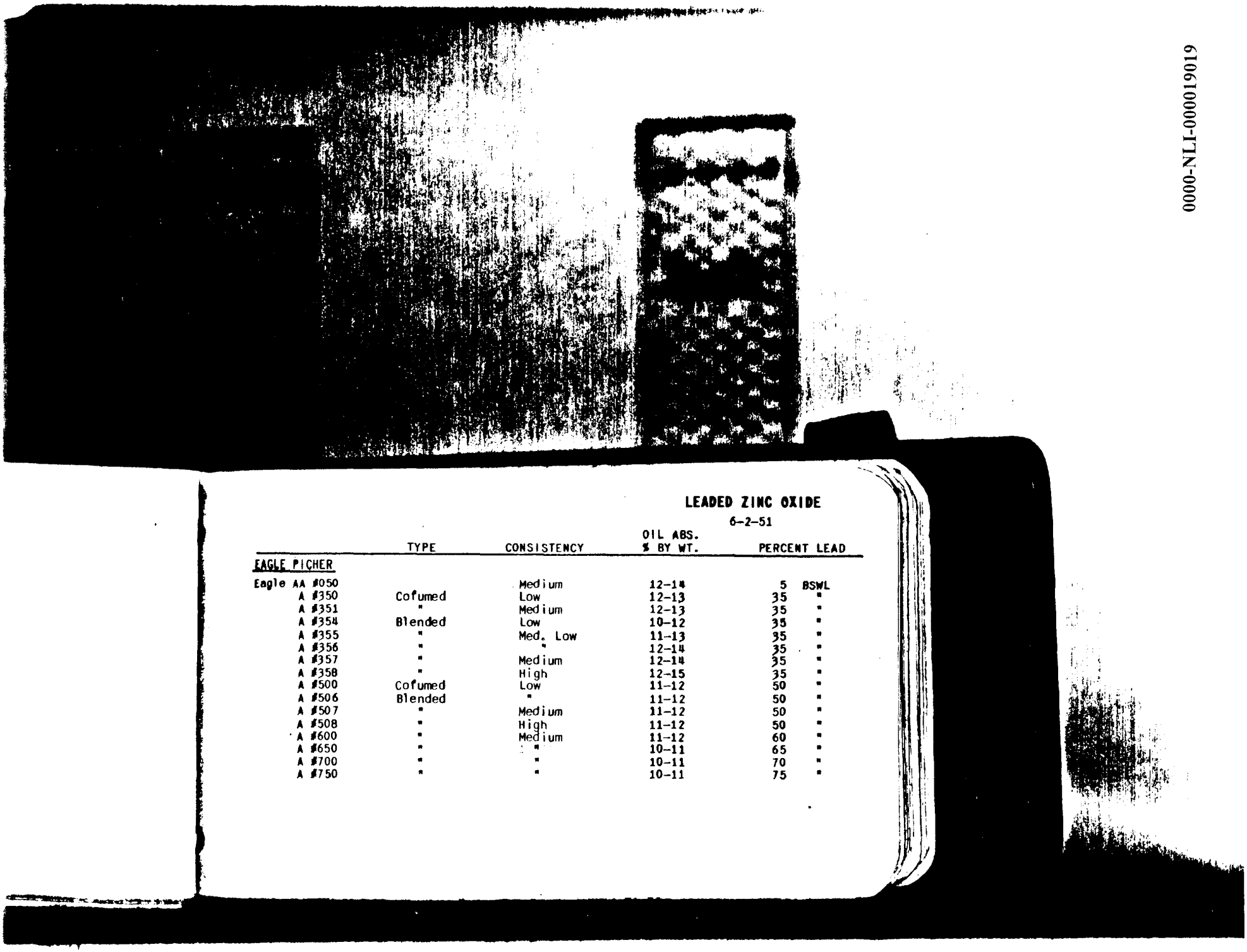
	CONSISTENCY	OIL ABS. BY WT.	% COMPOSITION TiO_2	ZnS	$BaSO_4$	NOTES
CHEMICAL & PIGMENT CO.						
Tidolith 44	Low	14	15	24.3	60.7	
66	"	14	15	24.3	60.7	Enamel grade, good flow
88	Medium	17	15	24.3	60.7	
Titanolith HO	"	17	15	24.3	60.7	
LO	Low	14	15	24.3	60.7	
46	"	14	15	24.3	60.7	
Tidolith 44	"	14	15			
66	High	16				
Titanolith High Oil		16	15	25.5	59.5	
Low Oil		15	15	25.5	59.5	
High Oil		23-25	15			
Low Oil		18-20	15			
duPONT						
Ti-Tone J165		12-13	15			Non-settling
L168	Low	11-12	15			
178	Medium	13-14	15			
P188	High	14-15	15			
EAGLE PICHER						
Eagle #35C	Low	16-18	15			
#35CCC	High	17-19	15			
N. J. ZINC						
Cryptone BT 342	High		15			
BT 802	Low		15			



LEADED ZINC OXIDE

6-2-51

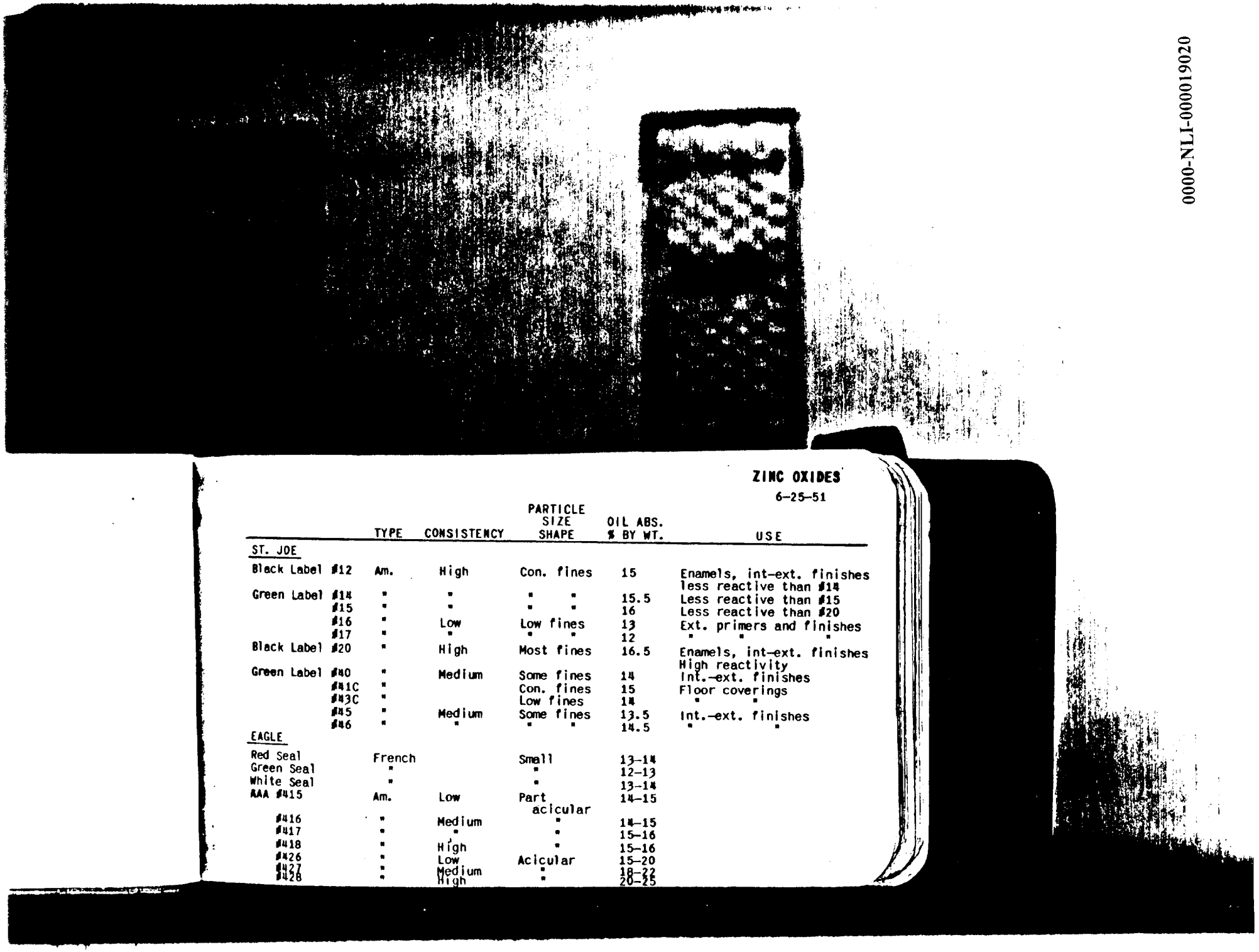
	TYPE	CONSISTENCY	OIL ABS. % BY WT.	PERCENT LEAD
AM. ZINC				
AZO 35-L	Cofumed	Low	12	33.5-36.5 $PbSO_4$
50-L	"	Low	12	50 BSWL
N. J. ZINC				
Standard 5	Blended	Low		3.5-6.0 BSWL
Lehigh 61	"	Medium		34-38 "
6	Cofumed	"		34-38 "
250	Blended	"		34-38 "
635	"--Acicular	"		48.2-52.5 BSWL
SHERWIN-WILLIAMS				
* OZLO 50/50	Cofumed		12-14	50 BSWL
65/35	"		12-14	35 "
20/80	"		12-14	20 "
12/88	"		12-14	12 "



LEADED ZINC OXIDE

6-2-51

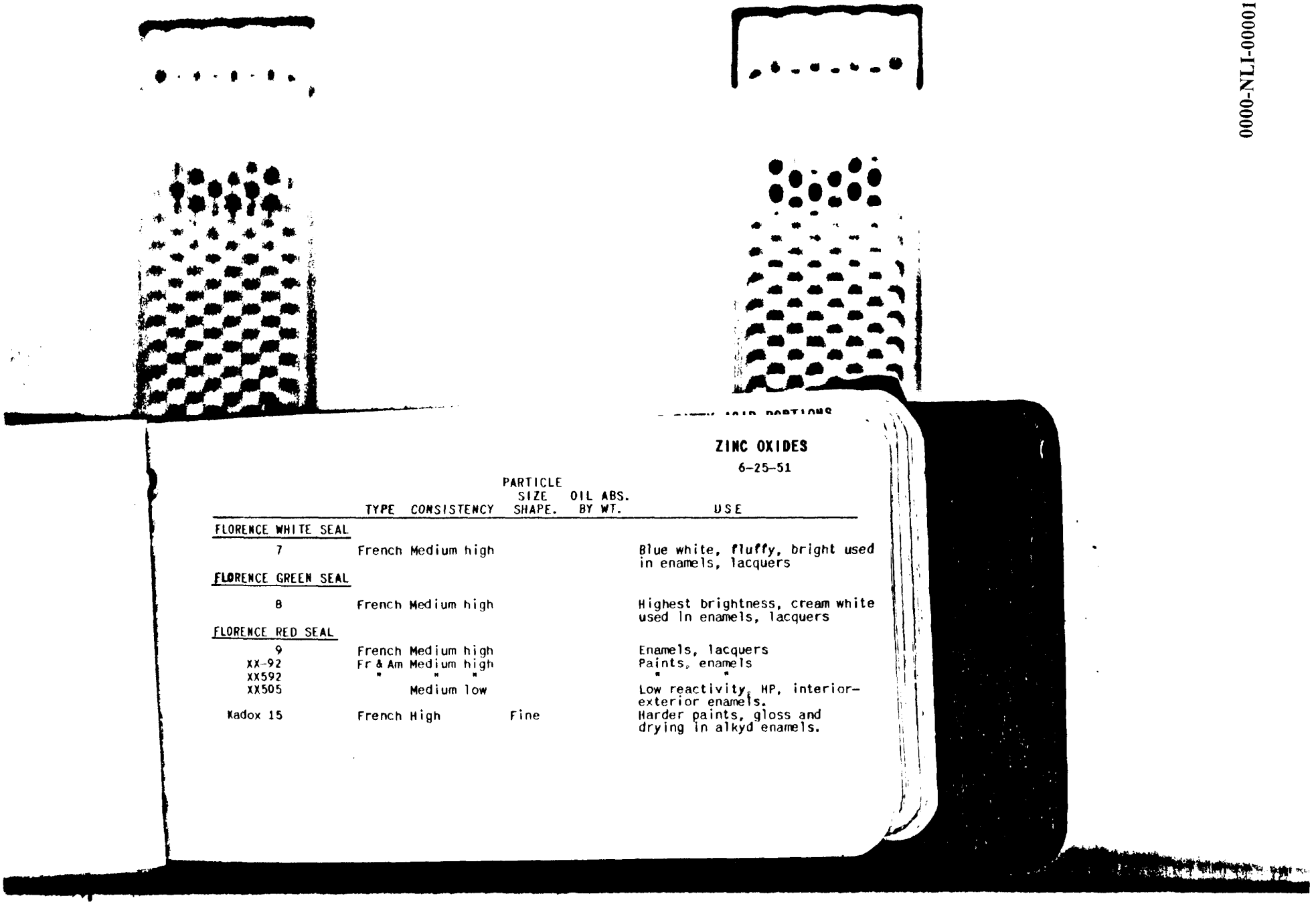
	TYPE	CONSISTENCY	OIL ABS. % BY WT.	PERCENT LEAD	
EAGLE PICHER					
Eagle AA #050		Medium	12-14	5	BSWL
A #350	Cofumed	Low	12-13	35	"
A #351	"	Medium	12-13	35	"
A #354	Blended	Low	10-12	35	"
A #355	"	Med. Low	11-13	35	"
A #356	"	"	12-14	35	"
A #357	"	Medium	12-14	35	"
A #358	"	High	12-15	35	"
A #500	Cofumed	Low	11-12	50	"
A #506	Blended	"	11-12	50	"
A #507	"	Medium	11-12	50	"
A #508	"	High	11-12	50	"
A #600	"	Medium	11-12	60	"
A #650	"	"	10-11	65	"
A #700	"	"	10-11	70	"
A #750	"	"	10-11	75	"



ZINC OXIDES

6-25-51

		TYPE	CONSISTENCY	PARTICLE SIZE SHAPE	OIL ABS. % BY WT.	USE
ST. JOE						
Black Label	#12	Am.	High	Con. fines	15	Enamels, int-ext. finishes less reactive than #14
Green Label	#14	"	"	" "	15.5	Less reactive than #15
	#15	"	"	" "	16	Less reactive than #20
	#16	"	Low	Low fines	13	Ext. primers and finishes
	#17	"	"	" "	12	" " "
Black Label	#20	"	High	Most fines	16.5	Enamels, int-ext. finishes High reactivity
Green Label	#40	"	Medium	Some fines	14	Int.-ext. finishes
	#41C	"		Con. fines	15	Floor coverings
	#43C	"		Low fines	14	" "
	#45	"	Medium	Some fines	13.5	Int.-ext. finishes
	#46	"	"	" "	14.5	" "
EAGLE						
Red Seal		French		Small	13-14	
Green Seal		"		"	12-13	
White Seal		"		"	13-14	
AAA	#415	Am.	Low	Part acicular	14-15	
	#416	"	Medium	"	14-15	
	#417	"	"	"	15-16	
	#418	"	High	"	15-16	
	#426	"	Low	Acicular	15-20	
	#427	"	Medium	"	18-22	
	#428	"	High	"	20-25	



ZINC OXIDES

6-25-51

	TYPE	CONSISTENCY	PARTICLE SIZE SHAPE.	OIL ABS. BY WT.	USE
FLORENCE WHITE SEAL					
7	French	Medium high			Blue white, fluffy, bright used in enamels, lacquers
FLORENCE GREEN SEAL					
8	French	Medium high			Highest brightness, cream white used In enamels, lacquers
FLORENCE RED SEAL					
9	French	Medium high			Enamels, lacquers
XX-92	Fr & Am	Medium high			Paints, enamels
XX592	"	" "			" "
XX505		Medium low			Low reactivity, HP, interior-exterior enamels.
Kadox 15	French	High	Fine		Harder paints, gloss and drying in alkyd enamels.

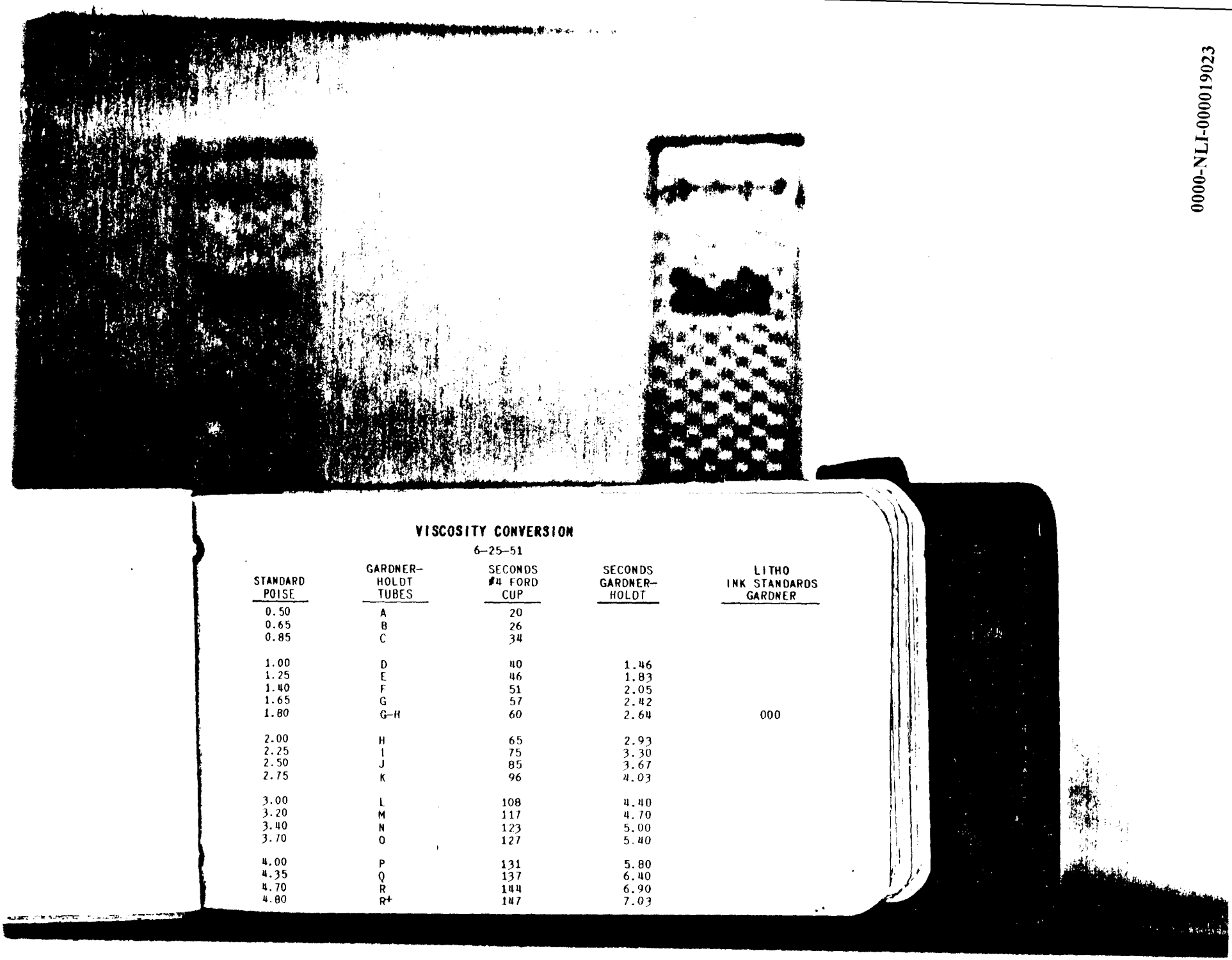
CONSTANTS OF DRYING OILS AND TYPICAL COMPOSITIONS OF THE FATTY ACID PORTIONS

OILS	IO. NO.	AC. NO.	SAP. NO.	REF. INDEX. 25°C	S.G. 15.5°C/15.5°C	LBS. PER GAL.	PERCENTAGE FATTY ACIDS				
							SAT. (O)	OLEIC (89.9)	LINOLEIC (181.0)	LINOLENIC (273.5)**	MISCELLANEOUS
Castor,	137	2	189	1.4819	0.938	7.82	3	7	87***	-	Hydroxylated 3%
Dehydrated	200	1	192	1.4885	0.934	7.79	8	1	49	42	
Chia	139	4	189	1.4730	0.925	7.66	10	33	55	2	- -
Cottonseed	154	4	191	1.4800	0.927	7.73	8	12	60	20	- -
Linseed	180	2	191	1.4800	0.932	7.78	10	12	38	40	- -
Menhaden*	162	4	187	1.4850	0.932	7.77	24		30		Other unsat. 46%
Oiticica	152	4	189	1.5141	0.969	8.08	11	5	11	-	Licanic 73%
Perilla	204	2	188	1.4814	0.934	7.78	7	7	14	42	- -
Tung	191	5	192	1.4820	0.931	7.76	22		8		Other unsat. 60%
Apricot	138	2	192	1.4731	0.926	7.72	8	30	62	-	- -
Apricot	102	3	175	1.4724	0.915	7.63	4	30	15	1	Erucic 50%
Safflower	143	6	190	1.4744	0.928	7.74	6	26	68	-	- -
Sardine*	139	10	187	1.4800	0.920	7.50	18		24		other unsat. 58%
Soybean	133	2	189	1.4750	0.924	7.70	11	26	59	4	- -
Stillingia	176	2	206	1.4818	0.939	7.83	9	11	53	27	- -
Sunflower	129	8	189	1.4796	0.924	7.70	6	34	60	-	- -
Tung	165	5	192	1.5170	0.944	7.87	4	8	10	-	eleostearic 78%
Walnut	147	2	193	1.4770	0.926	7.72	6	28	57	9	- -

*The paint industry uses these fish oils after they have been refined, and the iodine numbers are then 200 or more.

**A mixture of conjugated and non-conjugated.

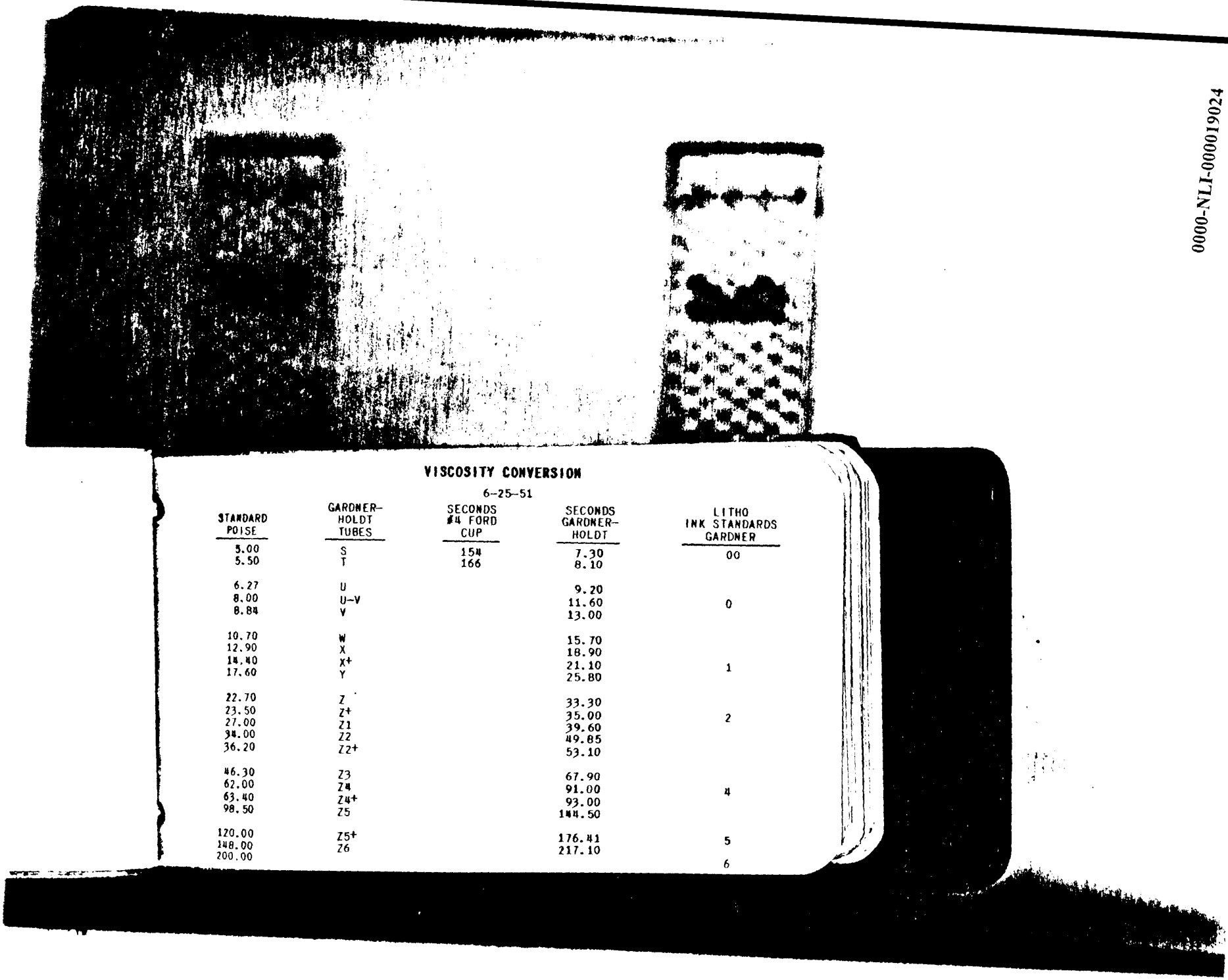
***Figures in parentheses represent Iodine Numbers of the acids (not to be confused with those of the glycerides)



VISCOSITY CONVERSION

6–25–51

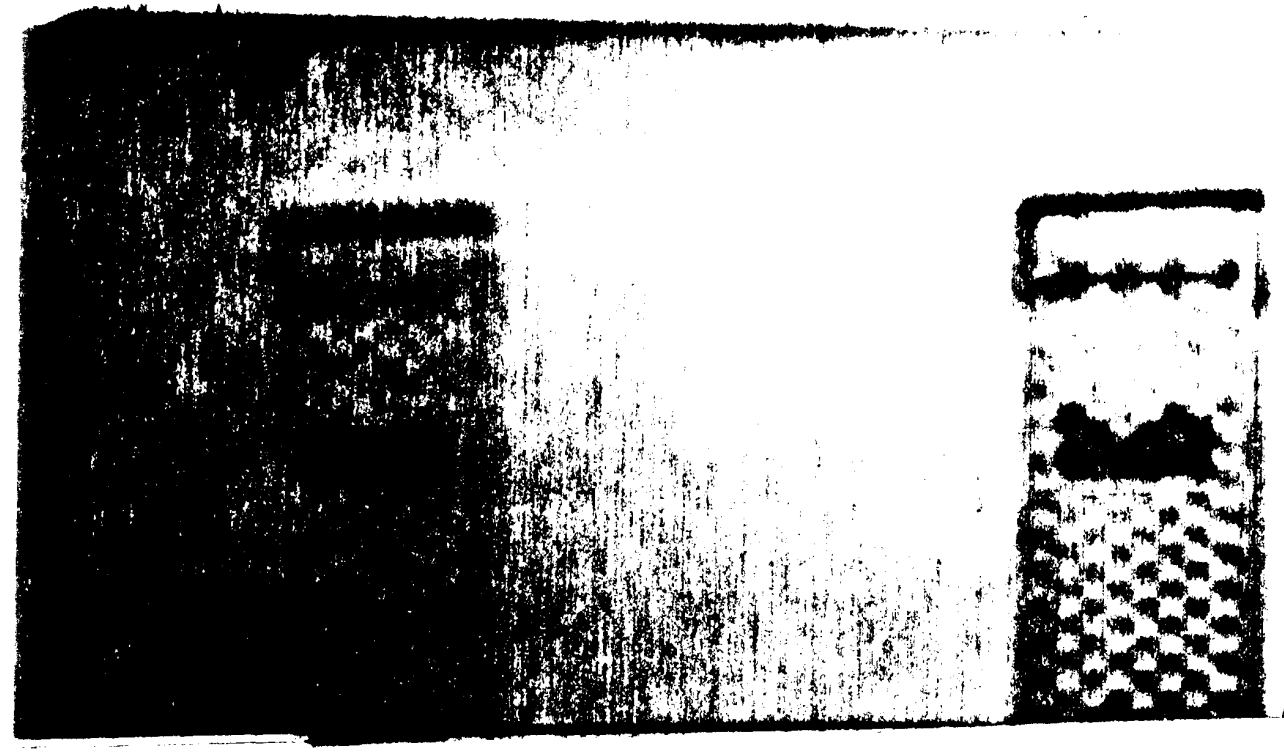
STANDARD POISE	GARDNER–HOLDT TUBES	SECONDS #4 FORD CUP	SECONDS GARDNER–HOLDT	LITHO INK STANDARDS GARDNER
0.50	A	20		
0.65	B	26		
0.85	C	34		
1.00	D	40	1.46	
1.25	E	46	1.83	
1.40	F	51	2.05	
1.65	G	57	2.42	
1.80	G–H	60	2.64	000
2.00	H	65	2.93	
2.25	I	75	3.30	
2.50	J	85	3.67	
2.75	K	96	4.03	
3.00	L	108	4.40	
3.20	M	117	4.70	
3.40	N	123	5.00	
3.70	O	127	5.40	
4.00	P	131	5.80	
4.35	Q	137	6.40	
4.70	R	144	6.90	
4.80	R+	147	7.03	



VISCOSITY CONVERSION

6-25-51

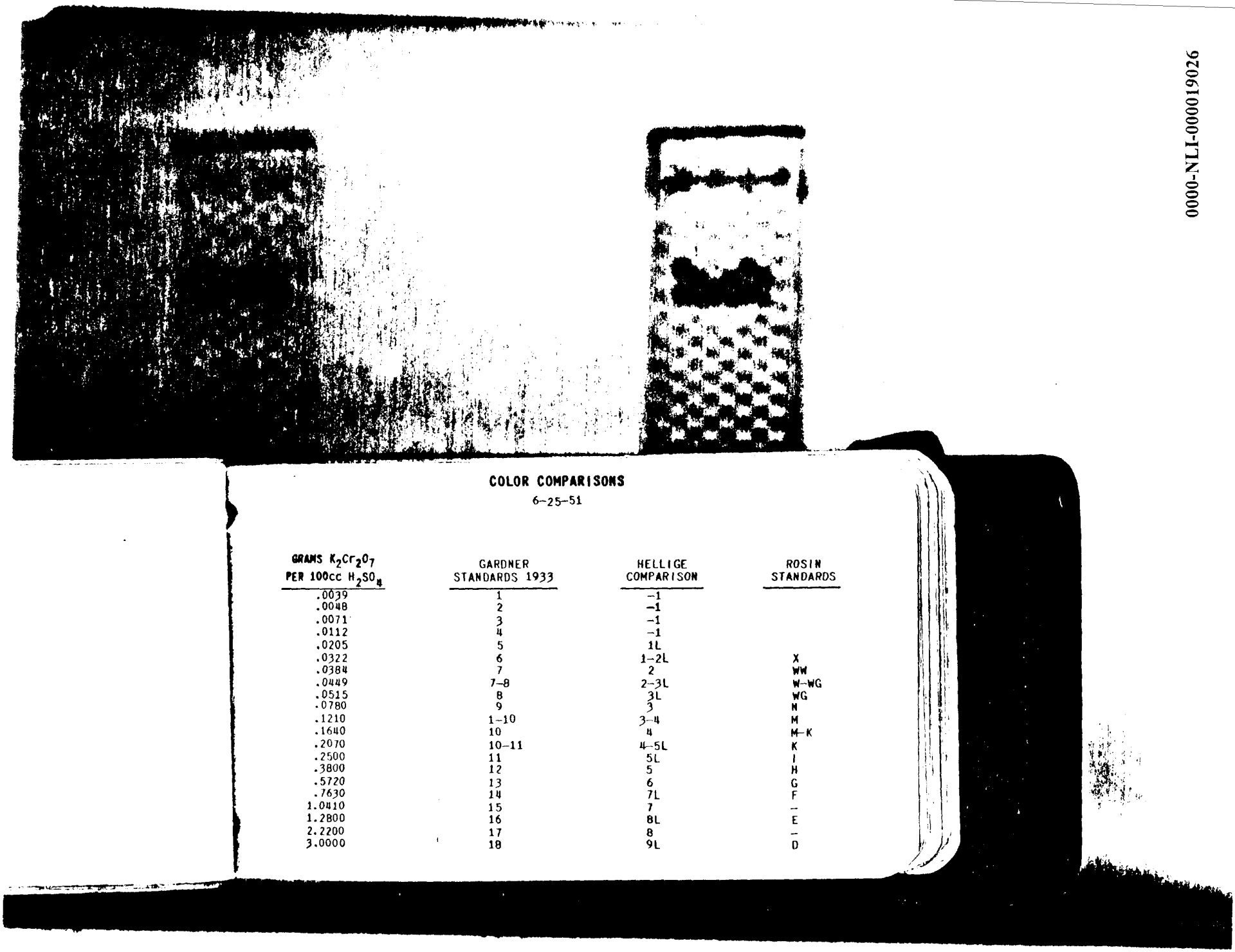
STANDARD POISE	GARDNER-HOLDT TUBES	SECONDS #4 FORD CUP	SECONDS GARDNER-HOLDT	LITHO INK STANDARDS GARDNER
5.00	S	154	7.30	00
5.50	T	166	8.10	
6.27	U		9.20	
8.00	U-V		11.60	0
8.84	V		13.00	
10.70	W		15.70	
12.90	X		18.90	
14.40	X+		21.10	1
17.60	Y		25.80	
22.70	Z		33.30	
23.50	Z+		35.00	2
27.00	Z1		39.60	
34.00	Z2		49.85	
36.20	Z2+		53.10	
46.30	Z3		67.90	
62.00	Z4		91.00	4
63.40	Z4+		93.00	
98.50	Z5		144.50	
120.00	Z5+		176.41	5
148.00	Z6		217.10	
200.00				6



A AND Z2 OIL MIXTURES

6-25-51

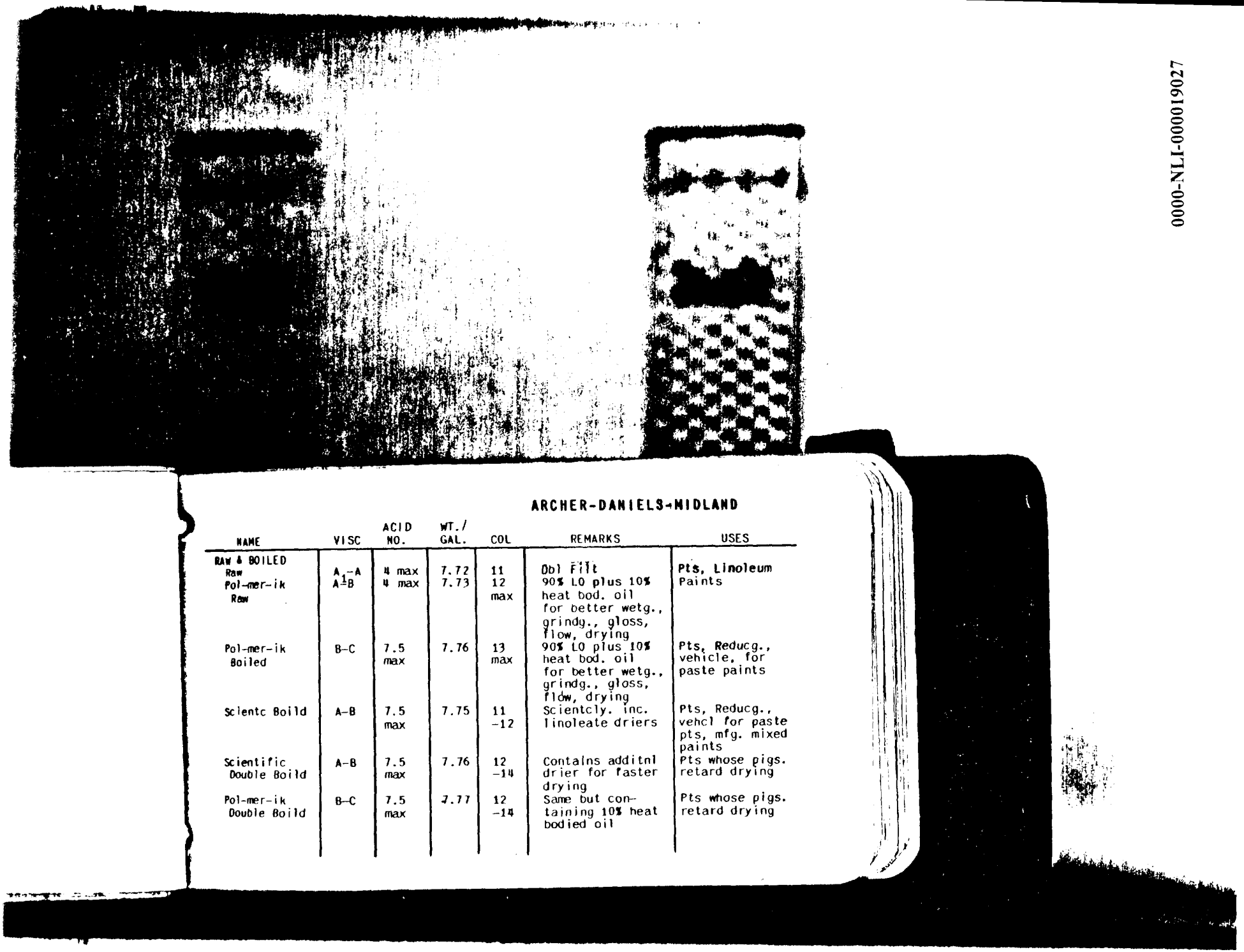
GH	VISCOSITY POISES	% OF A	#p.G.	G.p.#	GH	VISCOSITY POISES	% of A	#p.G.	G.p.#
A	.50	100	7.75	.1290	Q	4.35	52	7.89	.1267
B	.65	94	7.77	.1287	R	4.70	49	7.90	.1266
C	.85	88	7.79	.1284	00	4.80	48	7.90	.1266
D	1.00	84	7.80	.1282	S	5.00	47	7.91	.1264
E	1.25	80	7.81	.1280	T	5.50	45	7.92	.1262
F	1.40	75	7.83	.1277	U	6.27	41	7.93	.1261
G	1.65	72	7.84	.1275	0	8.00	36	7.94	.1259
000	1.80	71	7.84	.1275	V	8.84	34	7.95	.1258
H	2.00	70	7.84	.1275	W	10.7	30	7.96	.1256
I	2.25	68	7.85	.1274	X	12.9	24	7.98	.1253
J	2.50	65	7.86	.1272	1	14.4	19	7.99	.1251
K	2.75	63	7.86	.1272	Y	17.6	17	8.00	.1250
L	3.00	61	7.87	.1271	Z	22.7	10	8.02	.1247
M	3.20	59	7.87	.1271	2	23.5	8	8.03	.1245
N	3.40	57	7.88	.1269	Z1	27.0	5	8.04	.1244
O	3.70	56	7.88	.1269	3	34.0	0	8.05	.1242
P	4.00	53	7.89	.1267	Z2	36.2	0	8.05	.1242



COLOR COMPARISONS

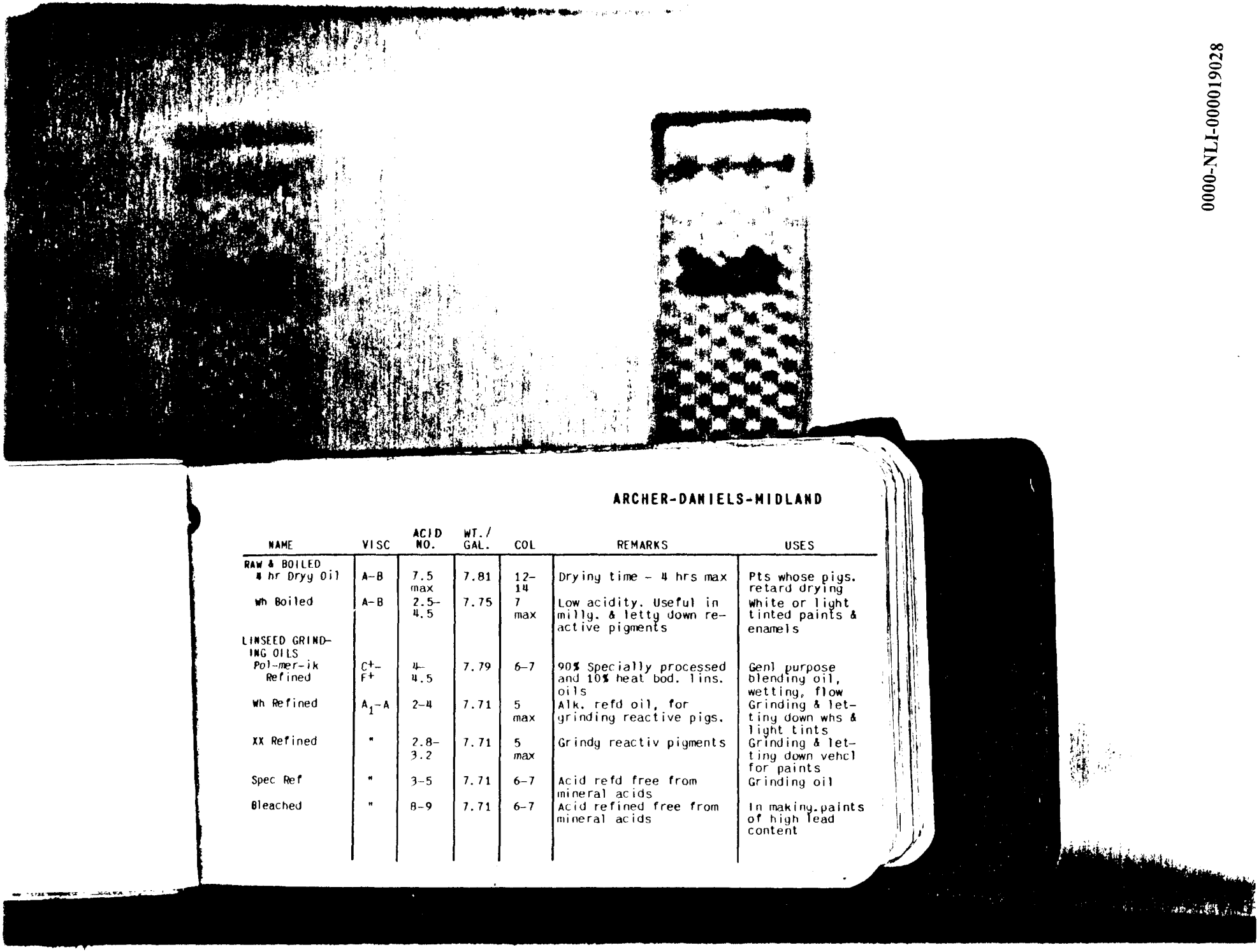
6-25-51

GRAMS $K_2Cr_2O_7$ PER 100cc H_2SO_4	GARDNER STANDARDS 1933	HELLIGE COMPARISON	ROSIN STANDARDS
.0039	1	-1	
.0048	2	-1	
.0071	3	-1	
.0112	4	-1	
.0205	5	1L	
.0322	6	1-2L	X
.0384	7	2	WW
.0449	7-8	2-3L	W-WG
.0515	8	3L	WG
.0780	9	3	N
.1210	1-10	3-4	M
.1640	10	4	M-K
.2070	10-11	4-5L	K
.2500	11	5L	I
.3800	12	5	H
.5720	13	6	G
.7630	14	7L	F
1.0410	15	7	-
1.2800	16	8L	E
2.2200	17	8	-
3.0000	18	9L	D



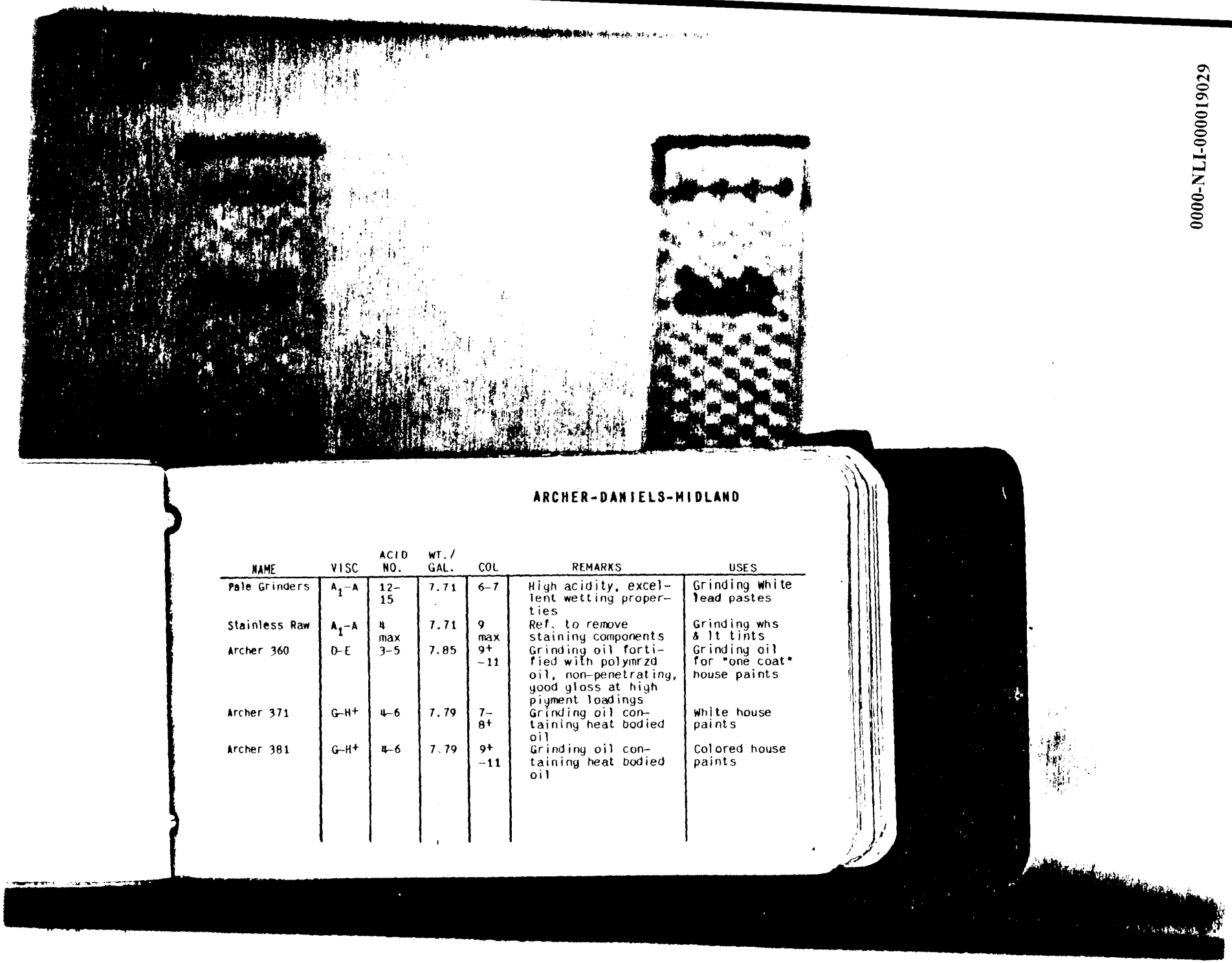
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
RAW & BOILED						
Raw	A-A	4 max	7.72	11	Dbl Filt	Pts, Linoleum
Pol-mer-ik	A-B	4 max	7.73	12 max	90% LO plus 10% heat bod. oil for better wetg., grindg., gloss, flow, drying	Paints
Raw						
Pol-mer-ik Boiled	B-C	7.5 max	7.76	13 max	90% LO plus 10% heat bod. oil for better wetg., grindg., gloss, flow, drying	Pts, Reducg., vehicle, for paste paints
Scientc Boild	A-B	7.5 max	7.75	11 -12	Scientcly. inc. linoleate driers	Pts, Reducg., vehcl for paste pts, mfg. mixed paints
Scientific Double Boild	A-B	7.5 max	7.76	12 -14	Contains additnl drier for faster drying	Pts whose pigs. retard drying
Pol-mer-ik Double Boild	B-C	7.5 max	7.77	12 -14	Same but containing 10% heat bodied oil	Pts whose pigs. retard drying



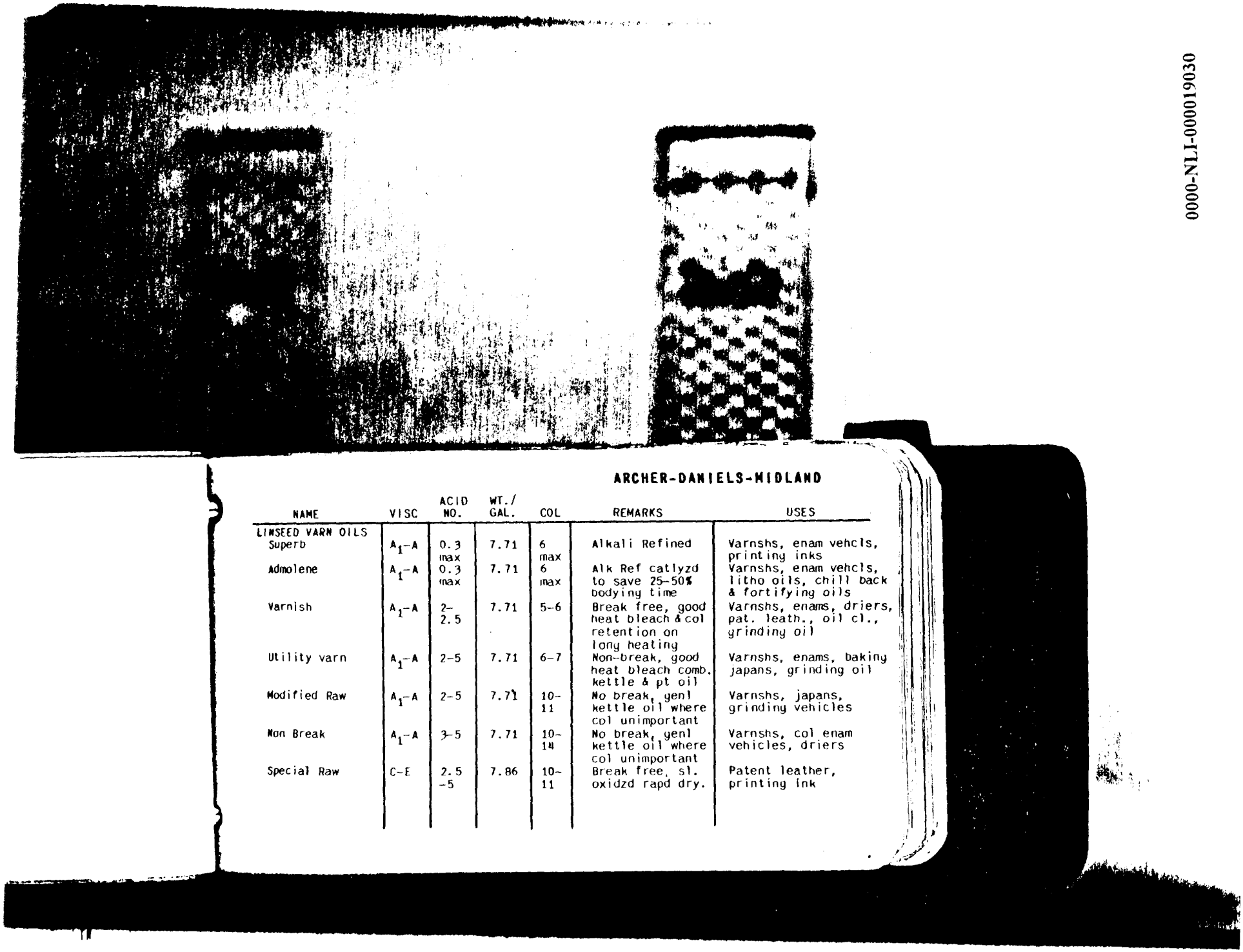
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
RAW & BOILED						
4 hr Dryg Oil	A–B	7.5 max	7.81	12–14	Drying time – 4 hrs max	Pts whose pigs. retard drying
Wh Boiled	A–B	2.5–4.5	7.75	7 max	Low acidity. Useful in milly. & letty down reactive pigments	White or light tinted paints & enamels
LINSEED GRINDING OILS						
Pol-mer-ik Refined	C+–F+	4–4.5	7.79	6–7	90% Specially processed and 10% heat bod. lins. oils	Genl purpose blending oil, wetting, flow
Wh Refined	A_1–A	2–4	7.71	5 max	Alk. refd oil, for grinding reactive pigs.	Grinding & letting down whs & light tints
XX Refined	"	2.8–3.2	7.71	5 max	Grindg reactiv pigments	Grinding & letting down vehcl for paints
Spec Ref	"	3–5	7.71	6–7	Acid refd free from mineral acids	Grinding oil
Bleached	"	8–9	7.71	6–7	Acid refined free from mineral acids	In making paints of high lead content



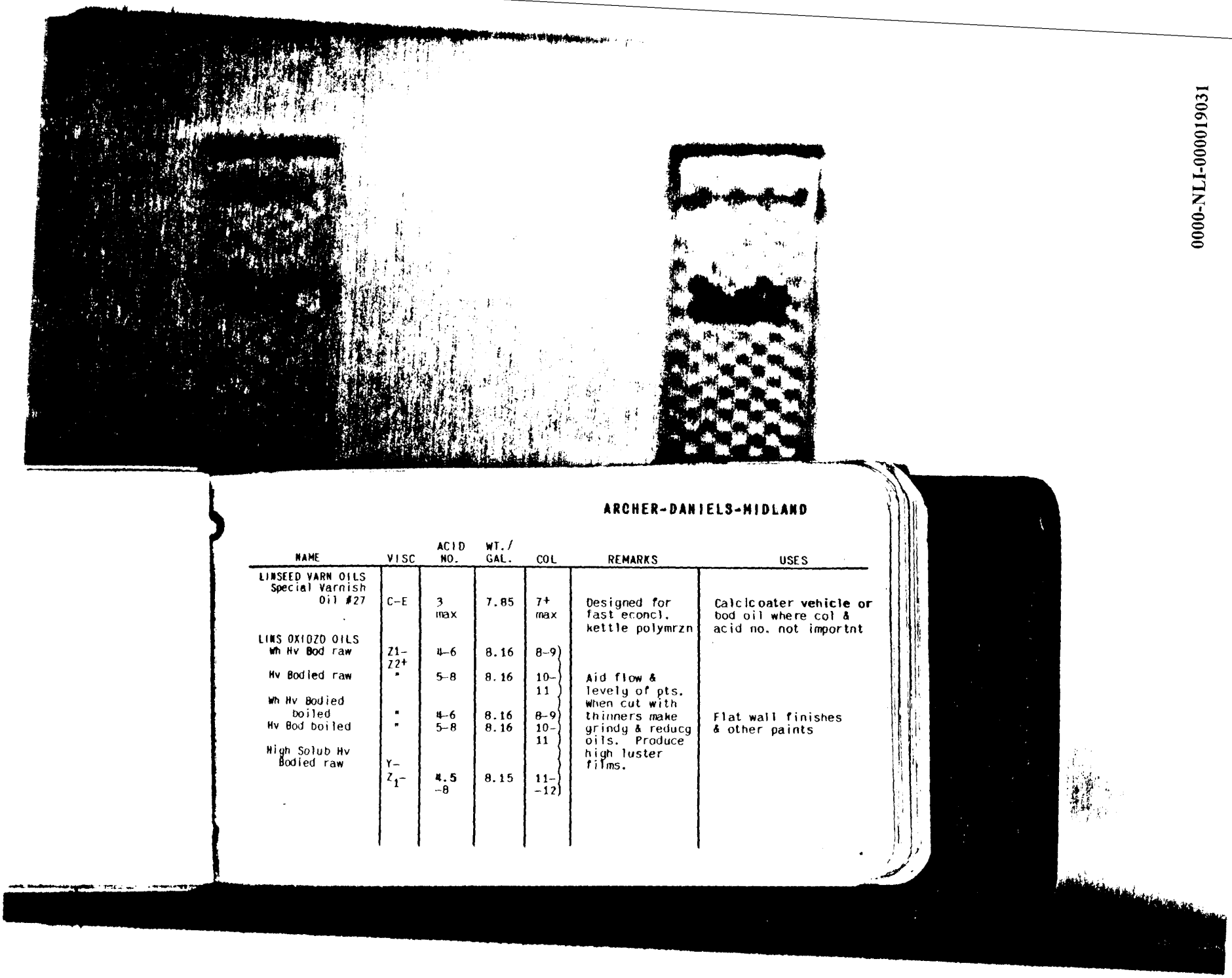
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
Pale Grinders	A_1–A	12–15	7.71	6–7	High acidity, excellent wetting properties	Grinding White lead pastes
Stainless Raw	A_1–A	4 max	7.71	9 max	Ref. to remove staining components	Grinding whs & lt tints
Archer 360	D–E	3–5	7.85	9+ –11	Grinding oil fortified with polymrzd oil, non-penetrating, good gloss at high pigment loadings	Grinding oil for "one coat" house paints
Archer 371	G–H+	4–6	7.79	7–8+	Grinding oil containing heat bodied oil	White house paints
Archer 381	G–H+	4–6	7.79	9+ –11	Grinding oil containing heat bodied oil	Colored house paints



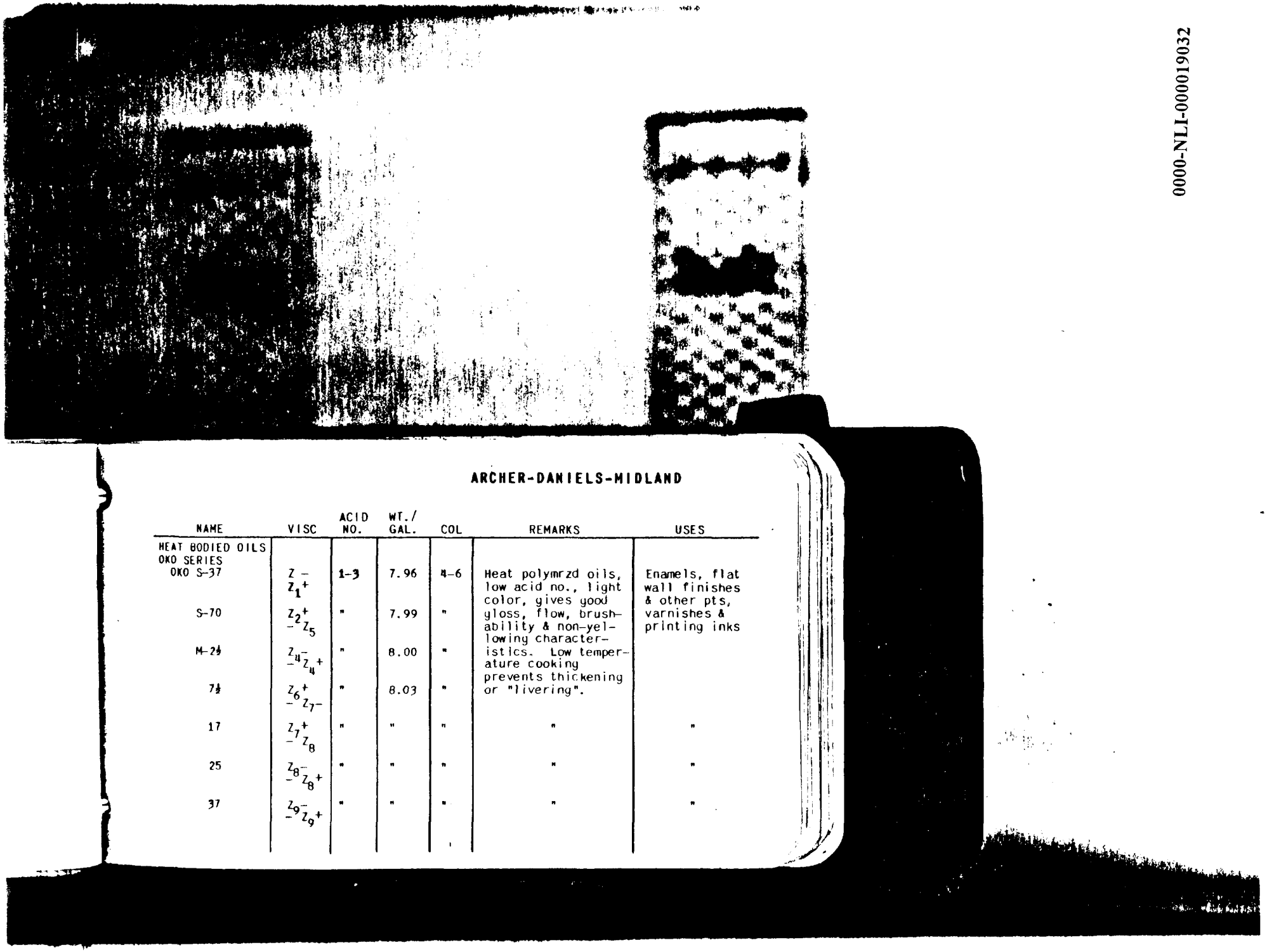
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
LINSEED VARN OILS						
Superb	A_1-A	0.3 max	7.71	6 max	Alkali Refined	Varnshs, enam vehcls, printing inks
Admolene	A_1-A	0.3 max	7.71	6 max	Alk Ref catlyzd to save 25-50% bodying time	Varnshs, enam vehcls, litho oils, chill back & fortifying oils
Varnish	A_1-A	2-2.5	7.71	5-6	Break free, good heat bleach & col retention on long heating	Varnshs, enams, driers, pat. leath., oil cl., grinding oil
Utility varn	A_1-A	2-5	7.71	6-7	Non-break, good heat bleach comb. kettle & pt oil	Varnshs, enams, baking japans, grinding oil
Modified Raw	A_1-A	2-5	7.71	10-11	No break, genl kettle oil where col unimportant	Varnshs, japans, grinding vehicles
Non Break	A_1-A	3-5	7.71	10-14	No break, genl kettle oil where col unimportant	Varnshs, col enam vehicles, driers
Special Raw	C-E	2.5-5	7.86	10-11	Break free, sl. oxidzd rapd dry.	Patent leather, printing ink



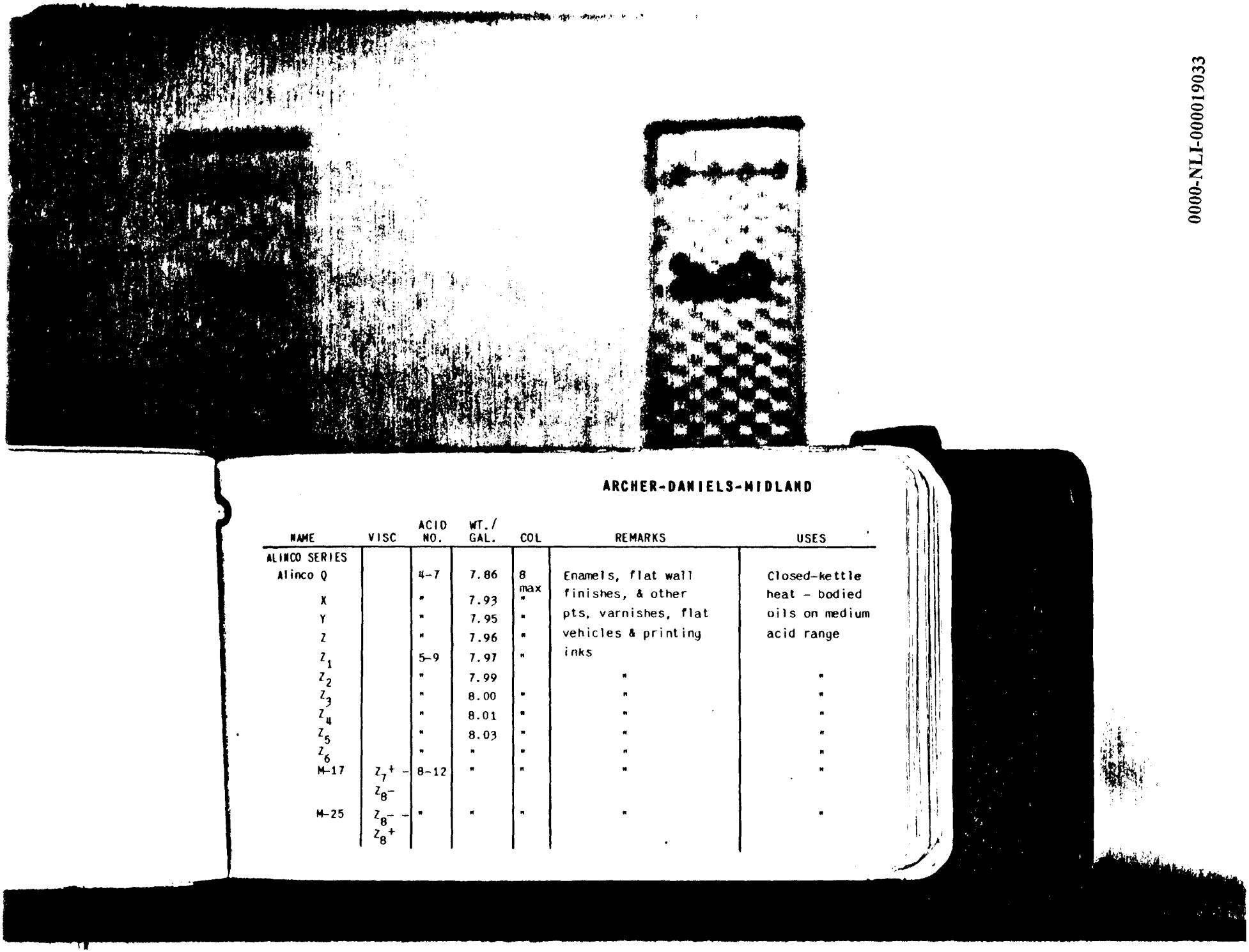
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
LINSEED VARN OILS Special Varnish Oil #27	C-E	3 max	7.85	7+ max	Designed for fast econcl. kettle polymrzn	Calclcoater vehicle or bod oil where col & acid no. not importnt
LINS OXIDZD OILS Wh Hv Bod raw	Z1-Z2+	4-6	8.16	8-9		
Hv Bodied raw	"	5-8	8.16	10-11	Aid flow & levely of pts. When cut with thinners make grindy & reducg oils. Produce high luster films.	
Wh Hv Bodied boiled	"	4-6	8.16	8-9		Flat wall finishes & other paints
Hv Bod boiled	"	5-8	8.16	10-11		
High Solub Hv Bodied raw	Y-Z_1-	4.5 -8	8.15	11--12		



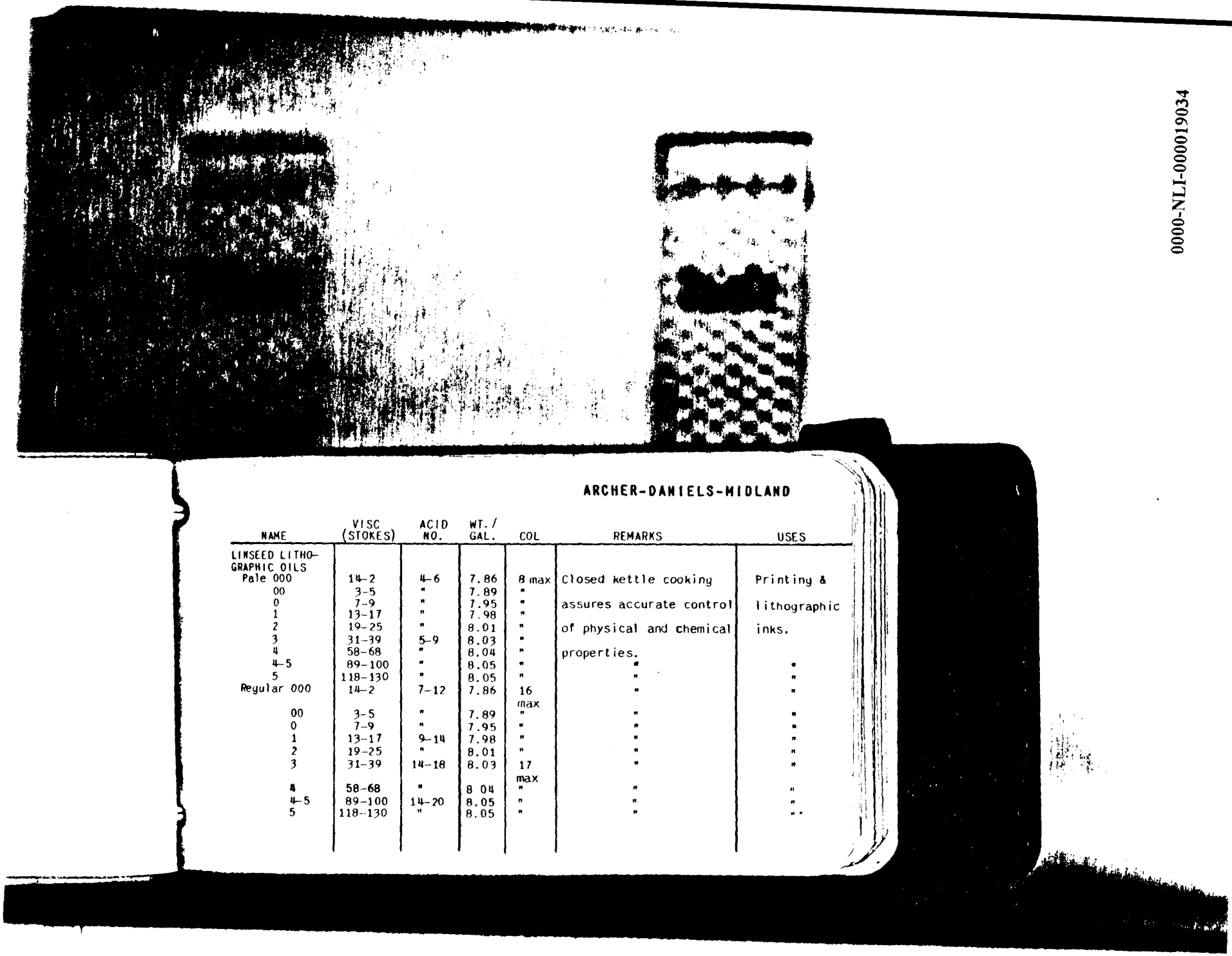
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
HEAT BODIED OILS OKO SERIES						
OKO S-37	$Z-Z_1^+$	1-3	7.96	4-6	Heat polymrzd oils, low acid no., light color, gives good gloss, flow, brushability & non-yellowing characteristics. Low temperature cooking prevents thickening or "livering".	Enamels, flat wall finishes & other pts, varnishes & printing inks
S-70	$Z_2^+-Z_5$	"	7.99	"		
M-2½	$Z_4^--Z_4^+$	"	8.00	"		
7½	$Z_6^+-Z_7^-$	"	8.03	"		
17	$Z_7^+-Z_8$	"	"	"	"	"
25	$Z_8^--Z_8^+$	"	"	"	"	"
37	$Z_9^--Z_9^+$	"	"	"	"	"



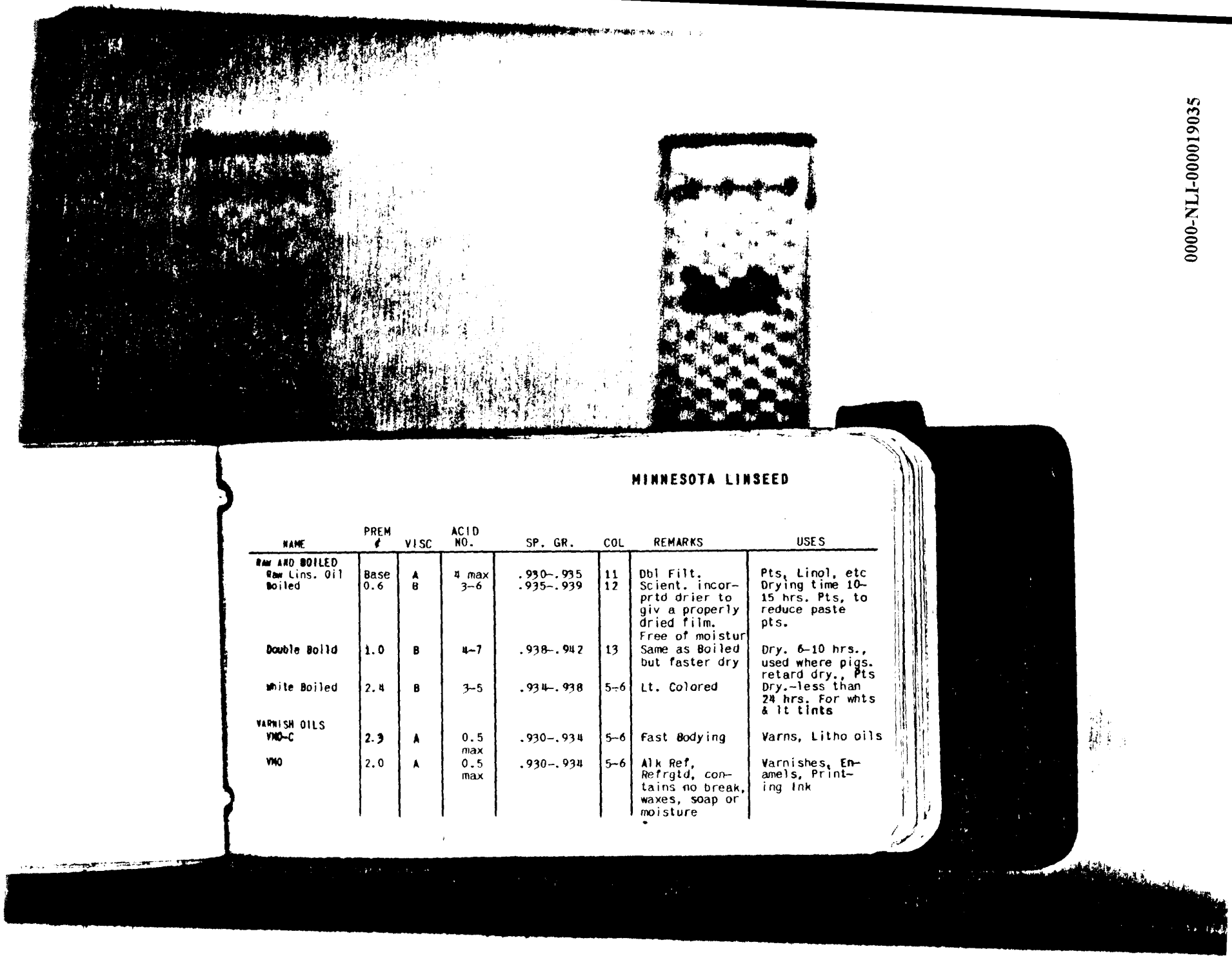
ARCHER-DANIELS-MIDLAND

NAME	VISC	ACID NO.	WT./ GAL.	COL	REMARKS	USES
ALINCO SERIES						
Alinco Q		4-7	7.86	8 max	Enamels, flat wall finishes, & other pts, varnishes, flat vehicles & printing inks	Closed-kettle heat - bodied oils on medium acid range
X		"	7.93	"		
Y		"	7.95	"		
Z		"	7.96	"		
Z_1		5-9	7.97	"		
Z_2		"	7.99		"	"
Z_3		"	8.00	"	"	"
Z_4		"	8.01	"	"	"
Z_5		"	8.03	"	"	"
Z_6		"	"	"	"	"
M-17	$Z_7^+ - Z_8^-$	8-12	"	"	"	"
M-25	$Z_8^- - Z_8^+$	"	"	"	"	"



ARCHER-DANIELS-MIDLAND

NAME	VISC (STOKES)	ACID NO.	WT./ GAL.	COL	REMARKS	USES
LINSEED LITHO-GRAPHIC OILS						
Pale 000	14-2	4-6	7.86	8 max	Closed kettle cooking	Printing &
00	3-5	"	7.89	"		
0	7-9	"	7.95	"	assures accurate control	lithographic
1	13-17	"	7.98	"		
2	19-25	"	8.01	"	of physical and chemical	inks.
3	31-39	5-9	8.03	"		
4	58-68	"	8.04	"	properties.	
4-5	89-100	"	8.05	"	"	"
5	118-130	"	8.05	"	"	"
Regular 000	14-2	7-12	7.86	16 max	"	"
00	3-5	"	7.89	"	"	"
0	7-9	"	7.95	"	"	"
1	13-17	9-14	7.98	"	"	"
2	19-25	"	8.01	"	"	"
3	31-39	14-18	8.03	17 max	"	"
4	58-68	"	8 04	"	"	"
4-5	89-100	14-20	8.05	"	"	"
5	118-130	"	8.05	"	"	"

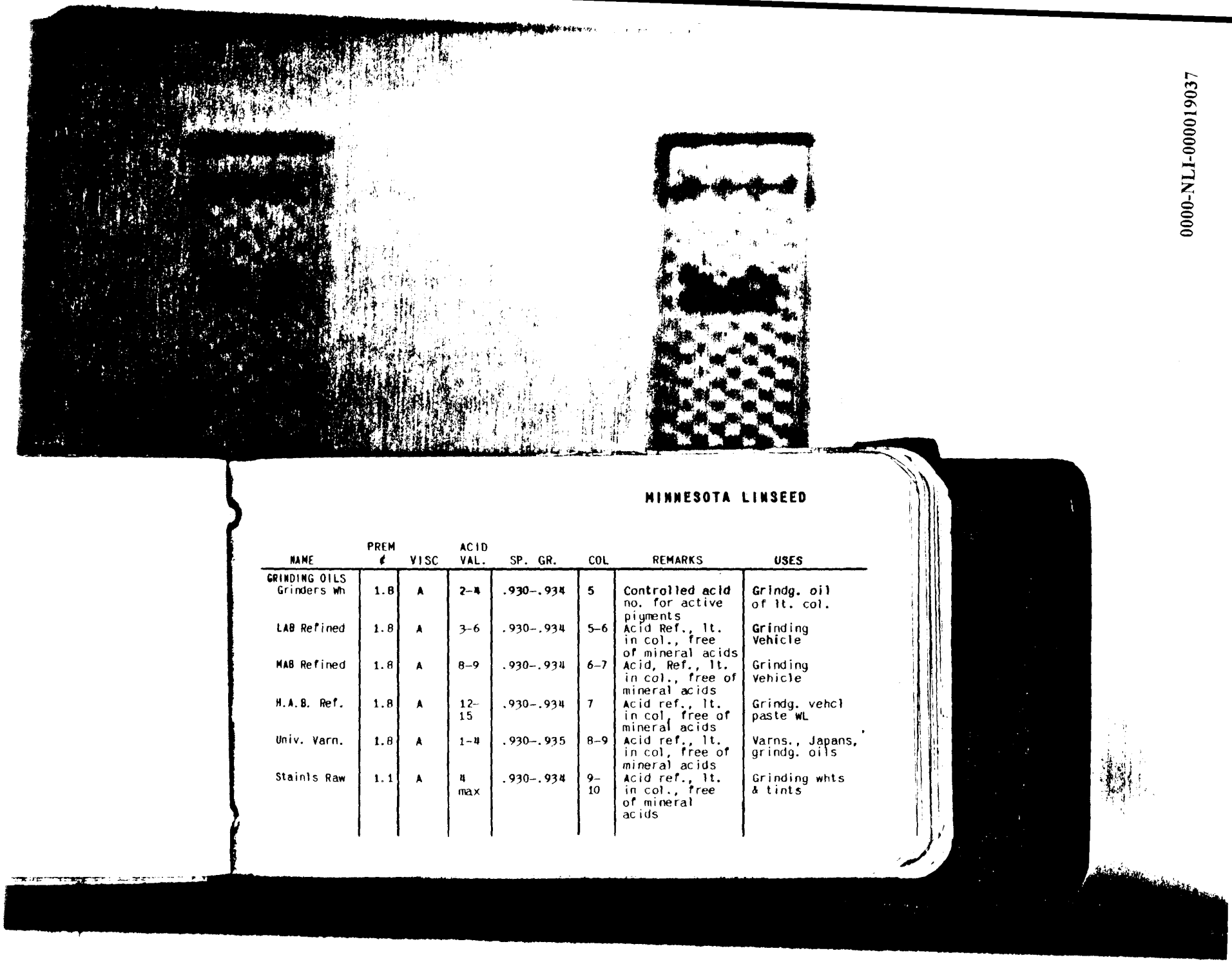


MINNESOTA LINSEED

NAME	PREM ¢	VISC	ACID NO.	SP. GR.	COL	REMARKS	USES
RAW AND BOILED							
Raw Lins. Oil	Base	A	4 max	.930-.935	11	Dbl Filt.	Pts, Linol, etc
Boiled	0.6	B	3-6	.935-.939	12	Scient. incorprtd drier to giv a properly dried film. Free of moistur	Drying time 10-15 hrs. Pts, to reduce paste pts.
Double Boild	1.0	B	4-7	.938-.942	13	Same as Boiled but faster dry	Dry. 6-10 hrs., used where pigs. retard dry., Pts
White Boiled	2.4	B	3-5	.934-.938	5-6	Lt. Colored	Dry.-less than 24 hrs. For whts & lt tints
VARNISH OILS							
VMO-C	2.3	A	0.5 max	.930-.934	5-6	Fast Bodying	Varns, Litho oils
VMO	2.0	A	0.5 max	.930-.934	5-6	Alk Ref, Refrgtd, contains no break, waxes, soap or moisture	Varnishes, Enamels, Printing Ink

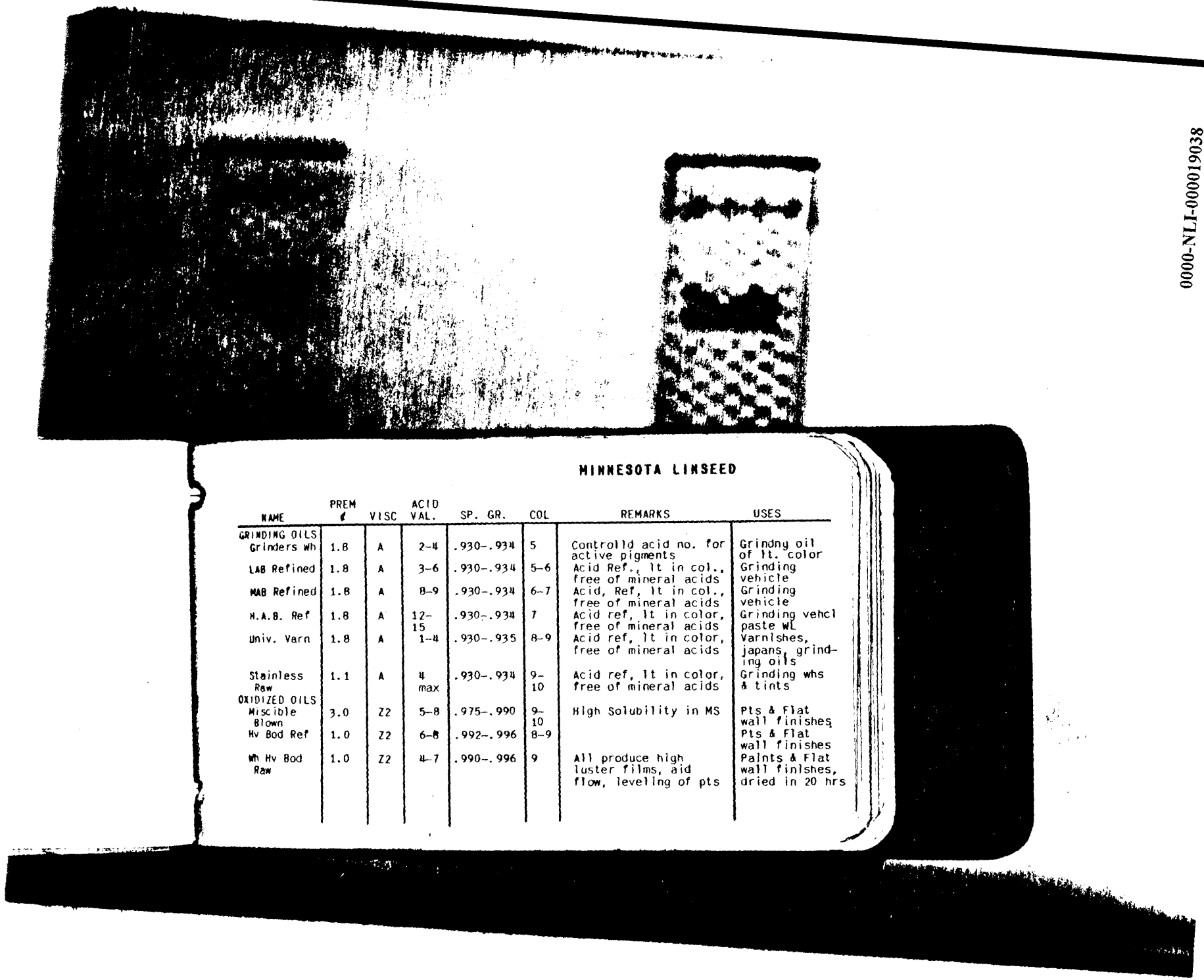
MINNESOTA LINSEED

NAME	PREM ℓ	VISC	ACID NO.	SP. GR.	COL	REMARKS	USES
VARNISH OILS Ink Oil	2.0	B-C	2-4	.940-.944	4-5		Litho Varns, Printing Inks. Varns, drier, enamels
MINN VO	1.8	A	2-3	.930-.934	5-6	Same qual. as VMO, but hgr acid value	
UNIV. YARN	1.8	A	1-4	.930-.935	8-9	Comb. Kettle & grind. oil, non-break	Varns, japans, grinding oils
Non-break Raw	0.8	A	3-5	.930-.934	9	Takes good bleach where color is not important, break free	Dark colored varnishes, driers
Aged Raw	0.4	D	3-6	.948-.952	10	Rapid Bodying, break-free	Litho varns, patent leather, linoleum



MINNESOTA LINSEED

NAME	PREM ¢	VISC	ACID VAL.	SP. GR.	COL	REMARKS	USES
GRINDING OILS							
Grinders Wh	1.8	A	2–4	.930–.934	5	Controlled acid no. for active pigments	Grindg. oil of lt. col.
LAB Refined	1.8	A	3–6	.930–.934	5–6	Acid Ref., lt. in col., free of mineral acids	Grinding Vehicle
MAB Refined	1.8	A	8–9	.930–.934	6–7	Acid, Ref., lt. in col., free of mineral acids	Grinding Vehicle
H.A.B. Ref.	1.8	A	12–15	.930–.934	7	Acid ref., lt. in col, free of mineral acids	Grindg. vehcl paste WL
Univ. Varn.	1.8	A	1–4	.930–.935	8–9	Acid ref., lt. in col, free of mineral acids	Varns., Japans, grindg. oils
Stainls Raw	1.1	A	4 max	.930–.934	9–10	Acid ref., lt. in col., free of mineral acids	Grinding whts & tints

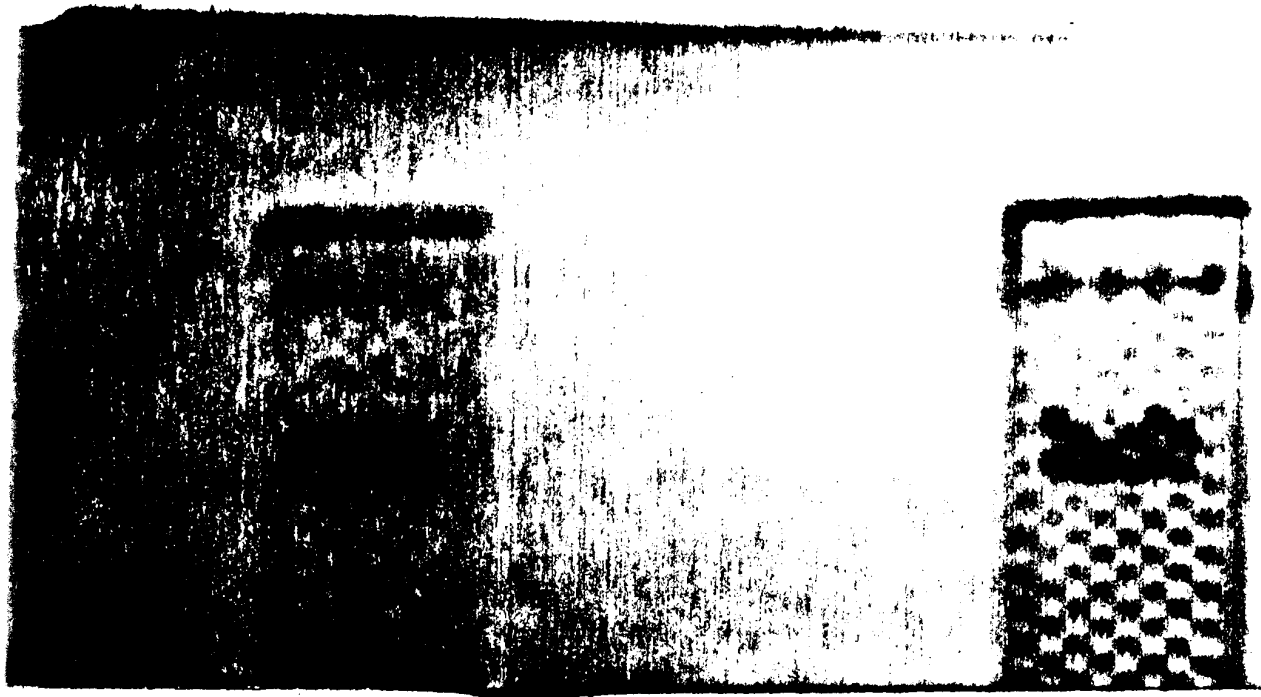


MINNESOTA LINSEED

NAME	PREM ¢	VISC	ACID VAL.	SP. GR.	COL	REMARKS	USES
GRINDING OILS							
Grinders Wh	1.8	A	2–4	.930–.934	5	Controlld acid no. for active pigments	Grindny oil of lt. color
LAB Refined	1.8	A	3–6	.930–.934	5–6	Acid Ref., lt in col., free of mineral acids	Grinding vehicle
MAB Refined	1.8	A	8–9	.930–.934	6–7	Acid, Ref, lt in col., free of mineral acids	Grinding vehicle
H.A.B. Ref	1.8	A	12–15	.930–.934	7	Acid ref, lt in color, free of mineral acids	Grinding vehcl paste WL
Univ. Varn	1.8	A	1–4	.930–.935	8–9	Acid ref, lt in color, free of mineral acids	Varnishes, japans, grinding oils
Stainless Raw	1.1	A	4 max	.930–.934	9–10	Acid ref, lt in color, free of mineral acids	Grinding whs & tints
OXIDIZED OILS							
Miscible Blown	3.0	Z2	5–8	.975–.990	9–10	High Solubility in MS	Pts & Flat wall finishes
Hv Bod Ref	1.0	Z2	6–8	.992–.996	8–9		Pts & Flat wall finishes
Wh Hv Bod Raw	1.0	Z2	4–7	.990–.996	9	All produce high luster films, aid flow, levelling of pts	Paints & Flat wall finishes, dried in 20 hrs

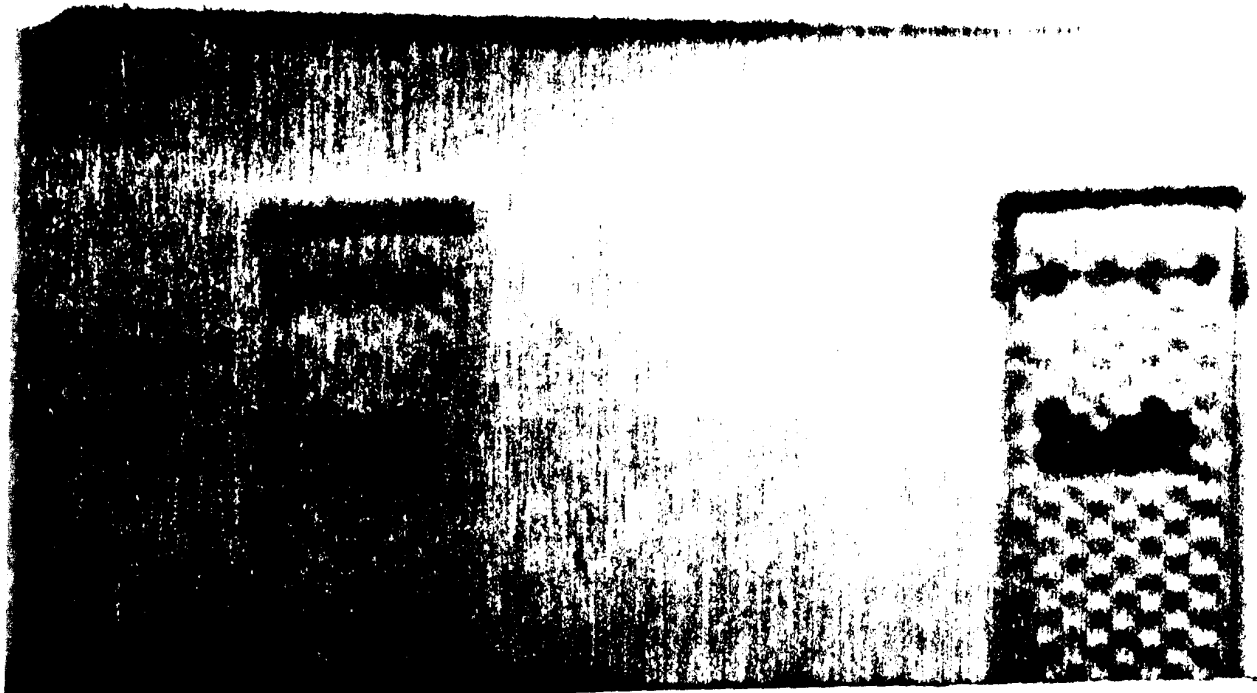
MINNESOTA LINSEED

NAME	PREM ¢	VISC	ACID VAL.	SP. GR.	COL	REMARKS	USES
OXIDIZED OILS							
Med Bodied Blown	3.0	Z2	5-8	.975-.990	9-10	Hg Solblty in MS	Pts & Flat wall finishes
Hv Bod Ref	1.0	Z2	6-8	.992-.996	8-9		Pts & Flat wall finishes
Hv Bod Raw	1.0	Z2	4-7	.990-.996	9	All prod hy lustr films, aid flow, levlng, of pts	Pts & Flat wall finishes
Hv Bod Bld	1.0	Z2	4-7	.990-.995	9		Pts & Flat wall finishes
Hv Bodied Raw	0.8	Z2	5-8	.983-.995	10-11	Cut with MS for grindg & reducg oils	Pts & Flat wall finshs, dried in 20 hrs
Hv Bod Boiled	0.8	Z2	5-8	.983-.995	10-11		
HEAT BOD OILS							
Polymrzd Oils:							
Wp thr. Z Bod	4.0		6-	.948-.973	8 max		Varn Blendg, Caulkg Cpds, Pts
Z2 thru Z6	5.0		12 8-20	.960-.975	8 max		Varn Blendg, Caulkg Cpds, Pts



MINNESOTA LINSEED

NAME	PREM ¢	VISC	ACID VAL.	SP. GR.	COL	REMARKS	USES
OXIDIZED OILS							
Wh Hv Bod Boiled	1.0	Z2	4–7	.990–.995	9		Pts & Flat wall finishes
Hv Bod Raw	0.8	Z2	5–8	.983–.995	10–11	Cut with MS for grinding & reducing oils	Pts & Flat wall finishes, dried in 20 hrs
Hv Bod Boiled	0.8	Z2	5–8	.983–.995	10–11		
HEAT BOD OILS							
Polymerized Oils:							
up thr. Z Body	4.0		6–12	.948–.973	8 max		Varnish Blending, Caulking Cpds, Pts
Z2 thru Z6	5.0		8–20	.960–.975	8 max		Varnish Blending, Caulking Cpds, Pts

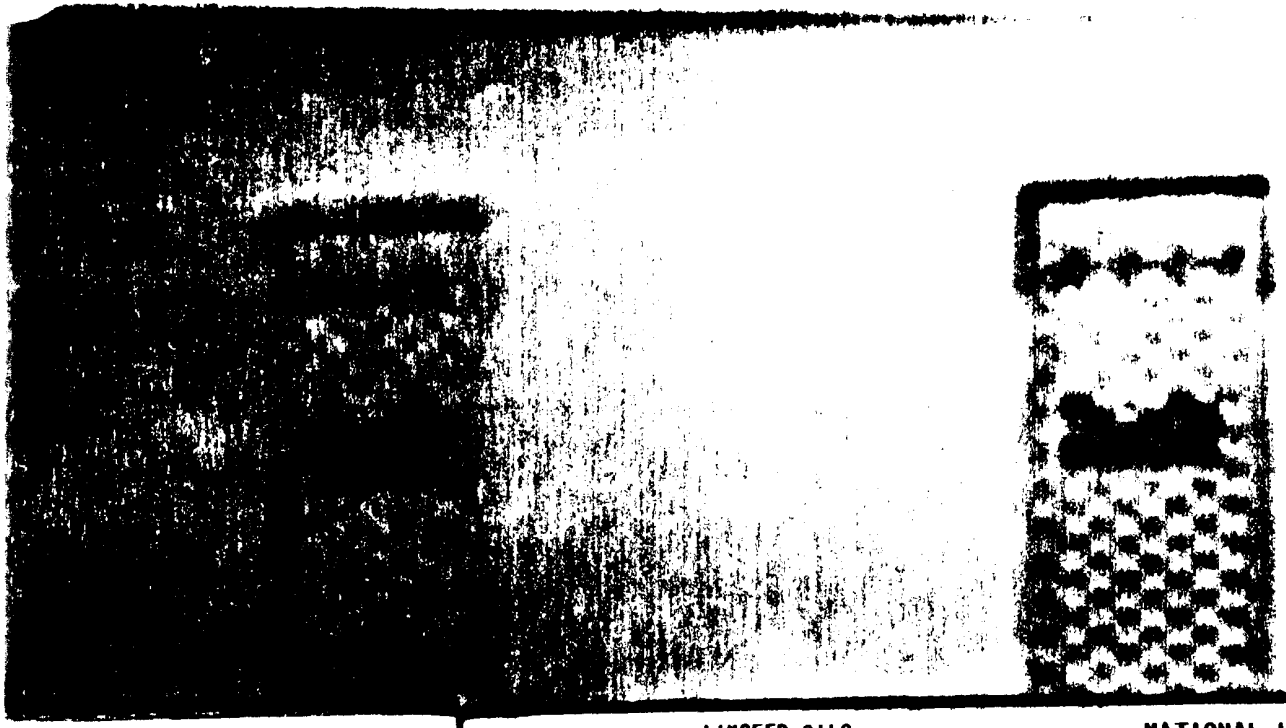


LINSEED OILS

NATIONAL LEAD COMPANY

6-25-51

NO.	NAME	PREM. #	VISC.	ACID NO	LBS./ GAL	COLOR (GARDNER)	PROCESS	USES
1	Raw	Base	A	2-4	7.73	11-12	Aged & filtered	
2	Pale Boiled	0.6	B	4-6	7.78	10-11	Driers added	Reducing pastes.
4	Kettle Boiled	0.6	B	5-7	7.79	14-15	in special	Reducing pastes, good
5	Kettle Double Boiled	1.0	B	5-7	7.80	17-18	processes.	wetting of pigment and surfaces
11	Aged Raw	0.4	D	3-7	7.87	8-10	Oxidized.	Printing ink, patent leather,
12	A T. Bodied Raw	0.5	O	4-6	7.97	8-9	"	linoleum, oilcloth
13	Heavy Bodied Raw	0.8	Z2	6-8	8.26	8-10	"	Flow in flat paints
14	Heavy Bodied Boiled	0.8	Z2	6-8	8.26	8-10	" with driers	" " "
16	Bleached Bodied Boiled	1.0	Z2	6-8	8.26	6-8	added	Flat white paints
17	Miscible Blown	1.5	Z2	4-6	8.26	7-8	Spec. proc.	High volatile content paints.
21	Stainless Raw	1.1	A	2-4	7.73	11-12	Chem treated.	White pastes.
23	Grinders '	1.8	A	9-12	7.73	7-8	Acid refined.	Grndg. hg Pb content pastes
25	Refined	1.8	A	4-6	7.73	5-7	" "	Ext. HP, short fluffy paint.
27	Zino	1.8	A	2-3	7.73	4-5	Chem treated	Hg zinc cont. paints

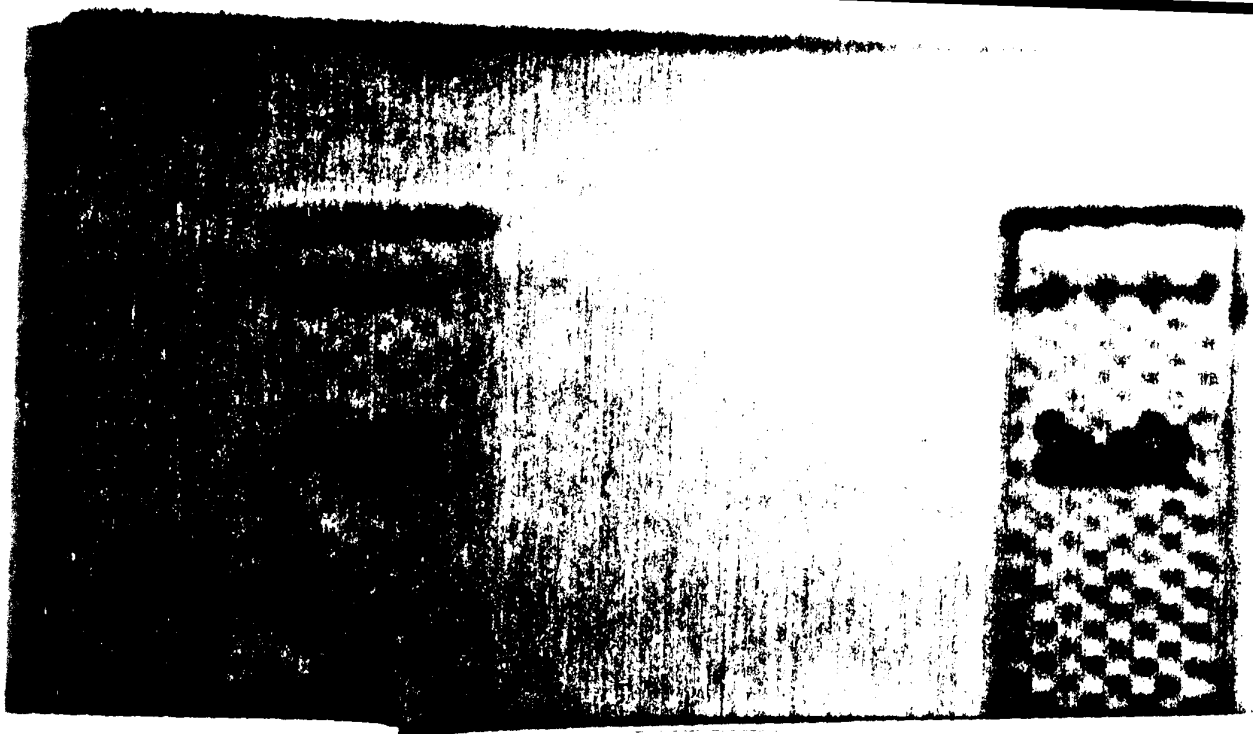


LINSEED OILS

NATIONAL LEAD COMPANY

6 25-51

NO	NAME	PREM. ¢	VISC.	ACID NO	LBS/ GAL	COLOR (GARDNER)	PROCESS	USES
30	Non-Break C.T.	0.8	A	2-4	7.73	11-12	Chem. treat.	Low cost varnishes
31	Non-Break S.H.	0.8	A	2-5	7.73	11-12	Mech. treat.	" " "
33	Diamond V	0.7	A	5-9	7.73	9-11	Acid refd.	High drier content varnishes
35	General Purp.	1.8	A	2-4	7.73	5-6	Bleached	Varns & paint
37	AA Varnish	1.8	A	2-3	7.73	5-6	Chem. treat.	Light col. varn. & pt grndg. oil
41	E W Varnish	1.8	A	1-3	7.73	4-5	Chem. treat	Light col. varn.
43	Perfection	2.0	A	0.1-0.6	7.73	4 5	Alkali ref	Lt. col hg gr. varn.
45	Bodifast	2.3	A	0.1-1.0	7.73	5-6	Alkali ref.&	For fast kettling operations.
47	Superfast	3 3	B	2 0-3 0	7.82	6-7	spec. treat.	For ex-fast kettling operations
51	Pale Heat Bodied A+	4.0	A+	1.5-3.0	7.73	4	Heat Bodied	Pts, Varns, Enamels
53	Q	4.0	Q	3.6	7.91	5-6		
55	Z2	5.0	Z2	9 11	8.01	6 7		
57	Z5	5.0	Z5	10 12	8.03	6 8		
61	Dutchoil, Ref.	1.2	A+	3 5	7.73	10 12	Polymrzd by	Excel. pig wetting, good gloss, flow
63	Dutchoil, Hvy Body	3.1	Z2	13 18	8.01	12 14	spec. proc.	Hgh gloss, durability in pts, enamels.



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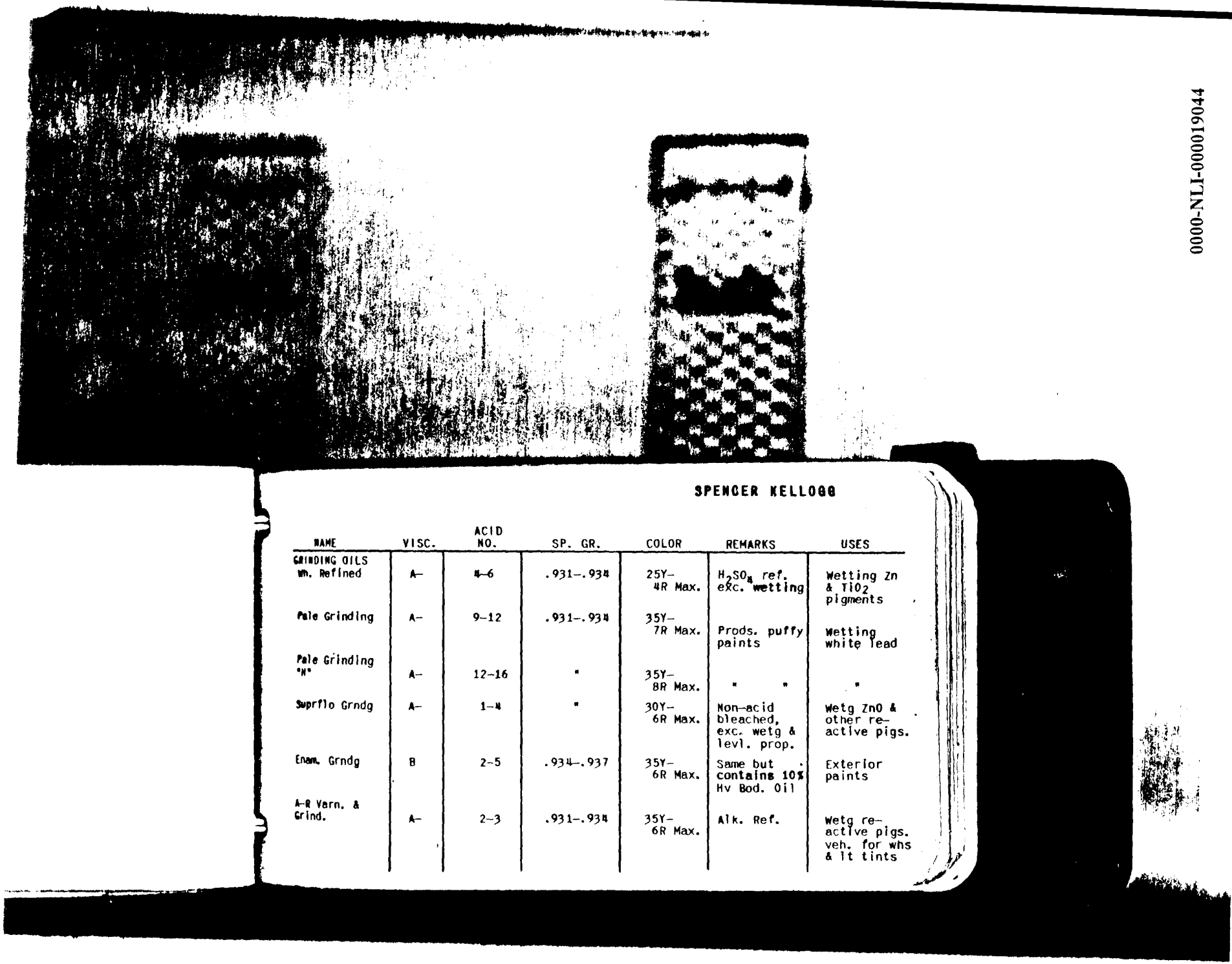
710-OILS
Approximate Constants

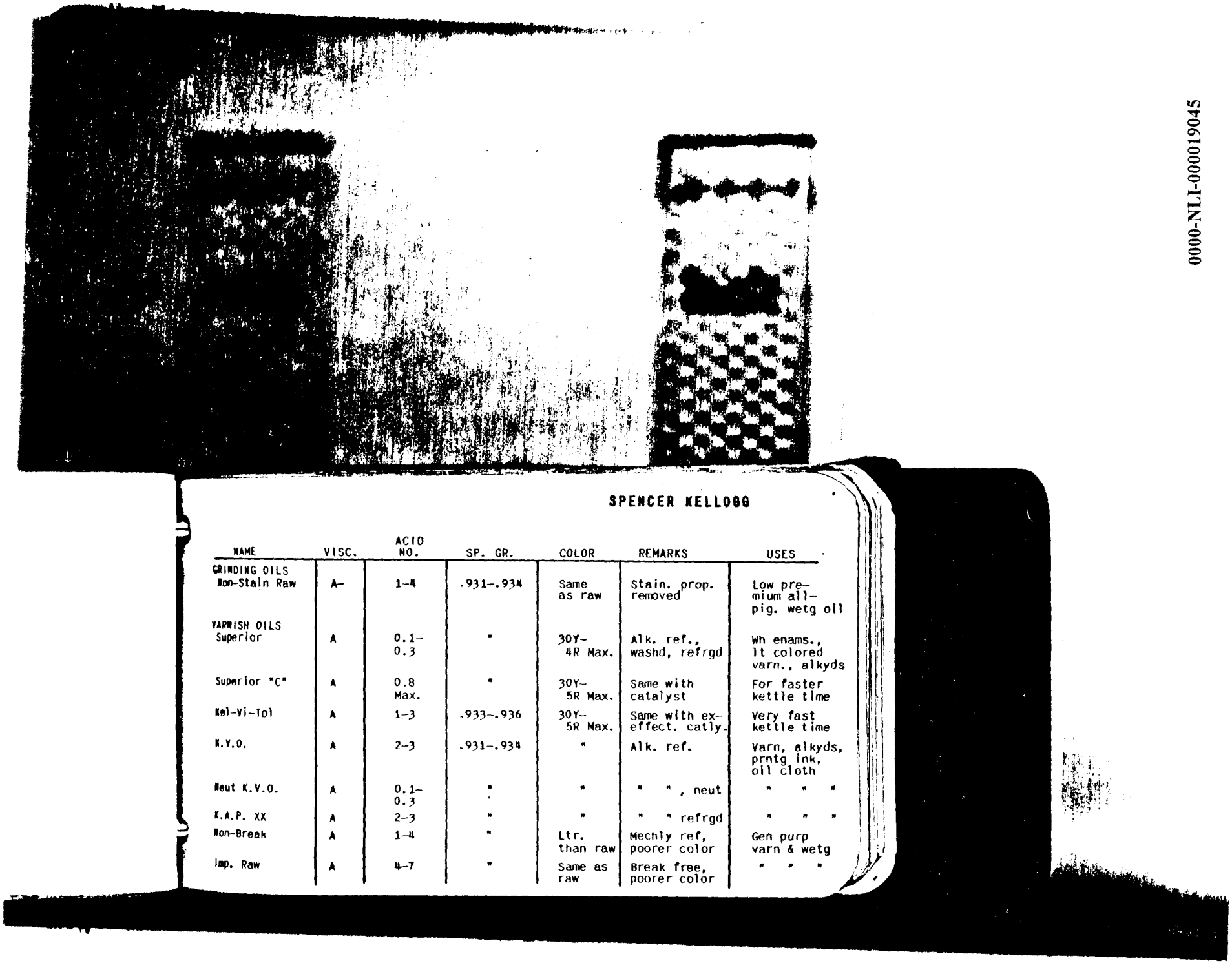
VISC.	POISES	ACID NO.	IODINE NO.	SAP. NO.	SP. GRAV.	GALS. PER #	# PER GAL.	COLOR (G)	GEL TIME 565°F.
Z2	36	14–15	130–140	192–198	968–970	.1247	8.02	14–15	60 min.
Z8	600	15–18	100–120	192–198	973–977	.1239	8.07	15–16	20 min.

TYPE	100 GAL. ESTER GUM VARNISH			20 GAL. MODIFIED PHENOLIC VARNISH		
	HOT PADDLE STRING 600°F. TIME	VISCOSITY 66% N.V.		HOT PADDLE STRING 585°F. TIME	VISCOSITY 50% N.V.	
		G. H.	POISES		G. H.	POISES
710-Z2	70 min.	V	10.70	57 min	G	1.65
710-Z8	24 min.	X	12.9	26 min.	I	2.25
L.O.Z-2	114 min.	V	8.84			



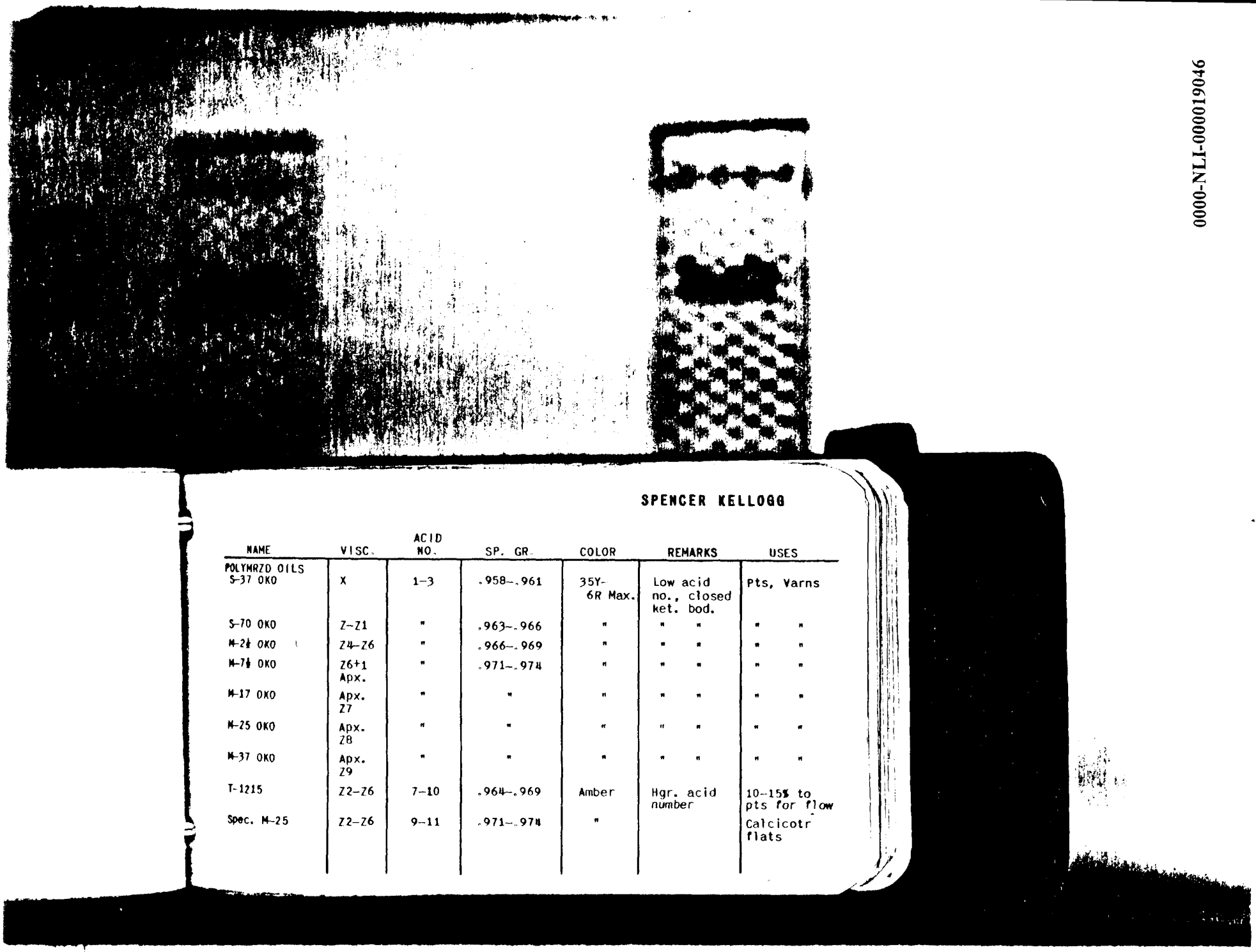
SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
GRINDING OILS Wh. Refined	A–	4–6	.931–.934	25Y–4R Max.	H_2SO_4 ref. exc. wetting	Wetting Zn & TiO_2 pigments
Pale Grinding	A–	9–12	.931–.934	35Y–7R Max.	Prods. puffy paints	Wetting white lead
Pale Grinding "N"	A–	12–16	"	35Y–8R Max.	" "	"
Suprflo Grndg	A–	1–4	"	30Y–6R Max.	Non-acid bleached, exc. wetg & levl. prop.	Wetg ZnO & other reactive pigs.
Enam. Grndg	B	2–5	.934–.937	35Y–6R Max.	Same but contains 10% Hv Bod. Oil	Exterior paints
A-R Varn. & Grind.	A–	2–3	.931–.934	35Y–6R Max.	Alk. Ref.	Wetg reactive pigs. veh. for whs & lt tints



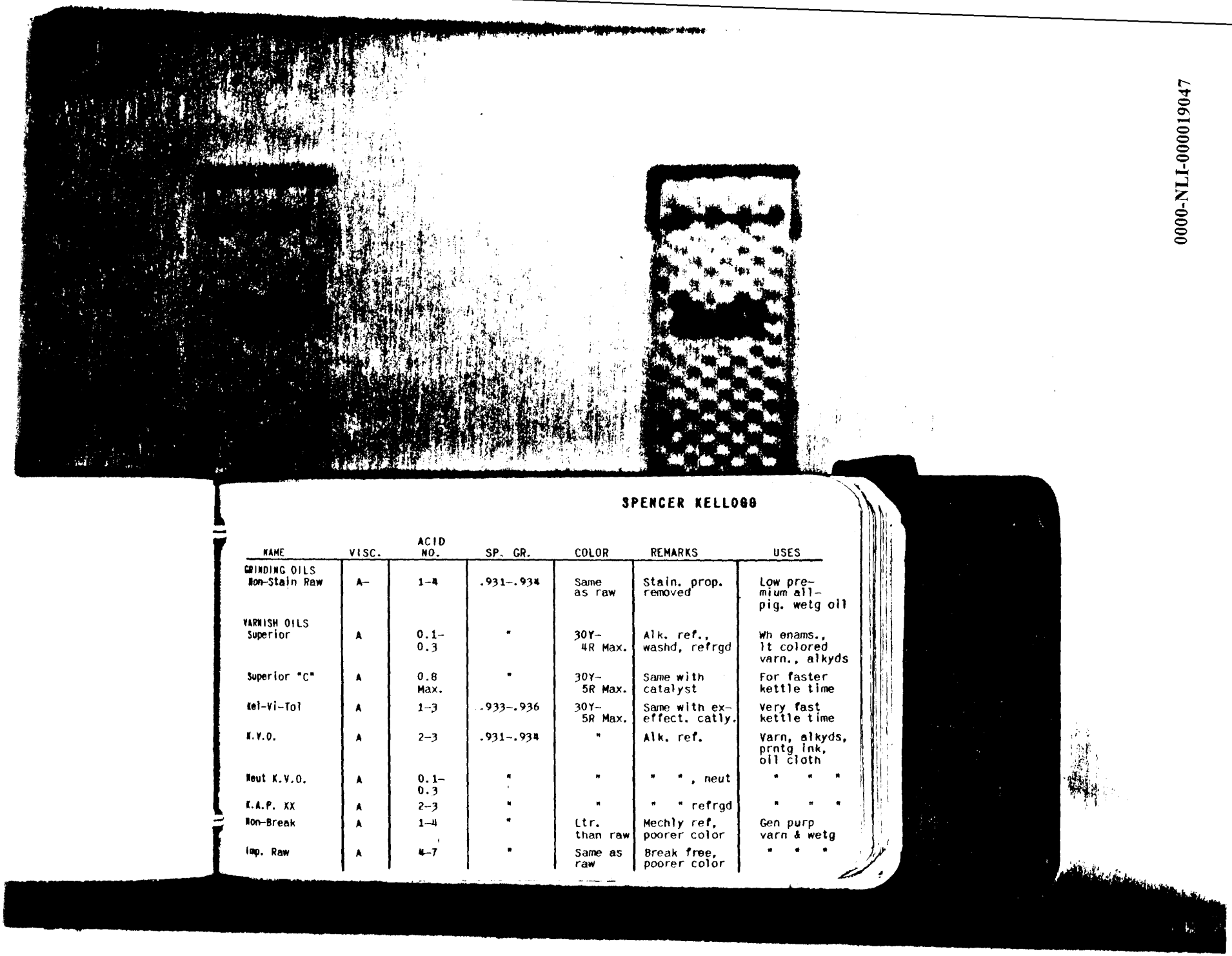
SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
GRINDING OILS						
Non-Stain Raw	A–	1–4	.931–.934	Same as raw	Stain. prop. removed	Low premium all-pig. wetg oil
VARNISH OILS						
Superior	A	0.1–0.3	"	30Y–4R Max.	Alk. ref., washd, refrgd	Wh enams., lt colored varn., alkyds
Superior "C"	A	0.8 Max.	"	30Y–5R Max.	Same with catalyst	For faster kettle time
Kel-Vi-Tol	A	1–3	.933–.936	30Y–5R Max.	Same with ex-effect. catly.	Very fast kettle time
K.V.O.	A	2–3	.931–.934	"	Alk. ref.	Varn, alkyds, prntg ink, oil cloth
Neut K.V.O.	A	0.1–0.3	"	"	" " , neut	" " "
K.A.P. XX	A	2–3	"	"	" " refrgd	" " "
Non-Break	A	1–4	"	Ltr. than raw	Mechly ref, poorer color	Gen purp varn & wetg
Imp. Raw	A	4–7	"	Same as raw	Break free, poorer color	" " "



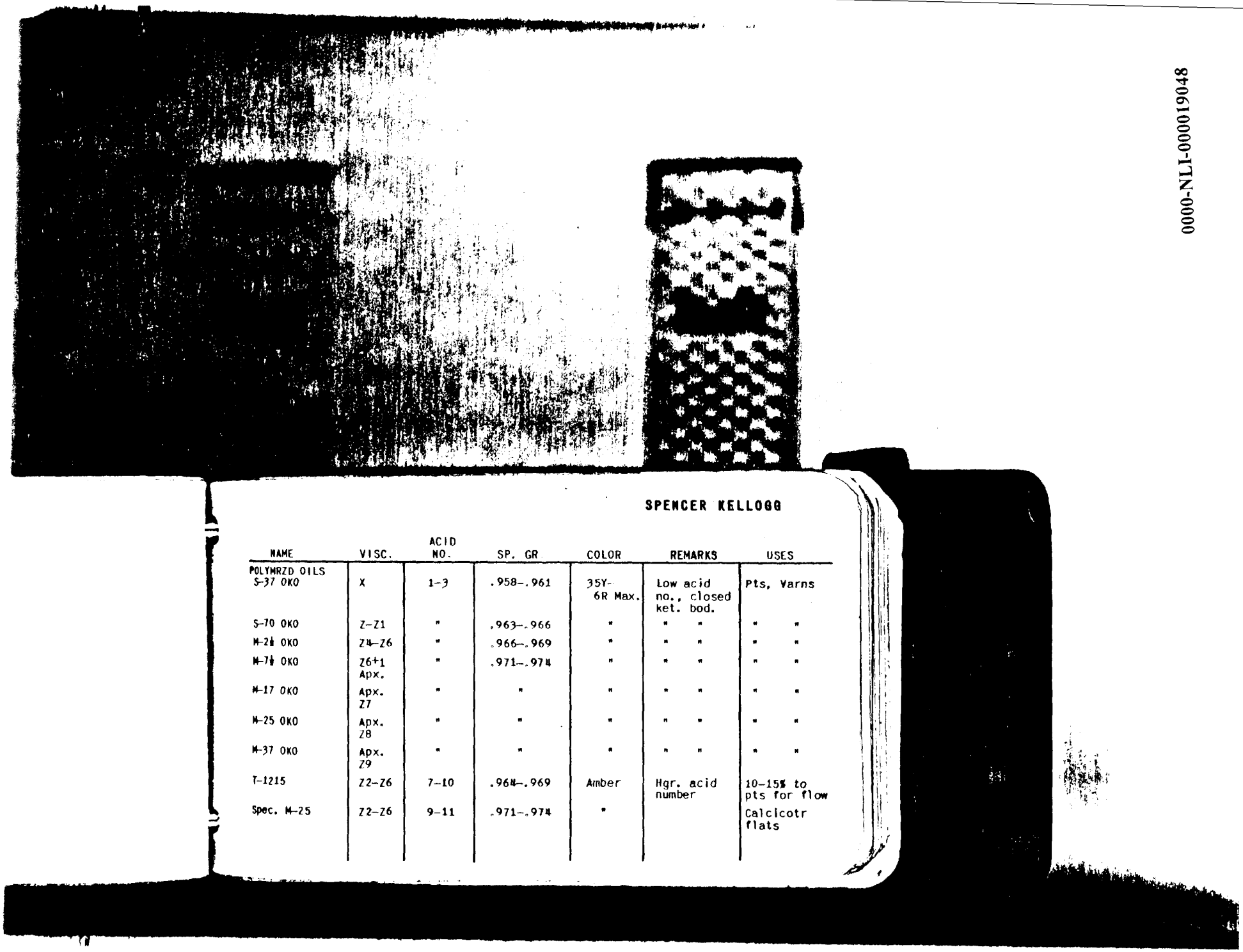
SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
POLYMRZD OILS S-37 OKO	X	1–3	.958–.961	35Y-6R Max.	Low acid no., closed ket. bod.	Pts, Varns
S-70 OKO	Z–Z1	"	.963–.966	"	" "	" "
M-2½ OKO	Z4–Z6	"	.966–.969	"	" "	" "
M-7½ OKO	Z6+1 Apx.	"	.971–.974	"	" "	" "
M-17 OKO	Apx. Z7	"	"	"	" "	" "
M-25 OKO	Apx. Z8	"	"	"	" "	" "
M-37 OKO	Apx. Z9	"	"	"	" "	" "
T-1215	Z2–Z6	7–10	.964–.969	Amber	Hgr. acid number	10–15% to pts for flow
Spec. M-25	Z2–Z6	9–11	.971–.974	"		Calcicotr flats



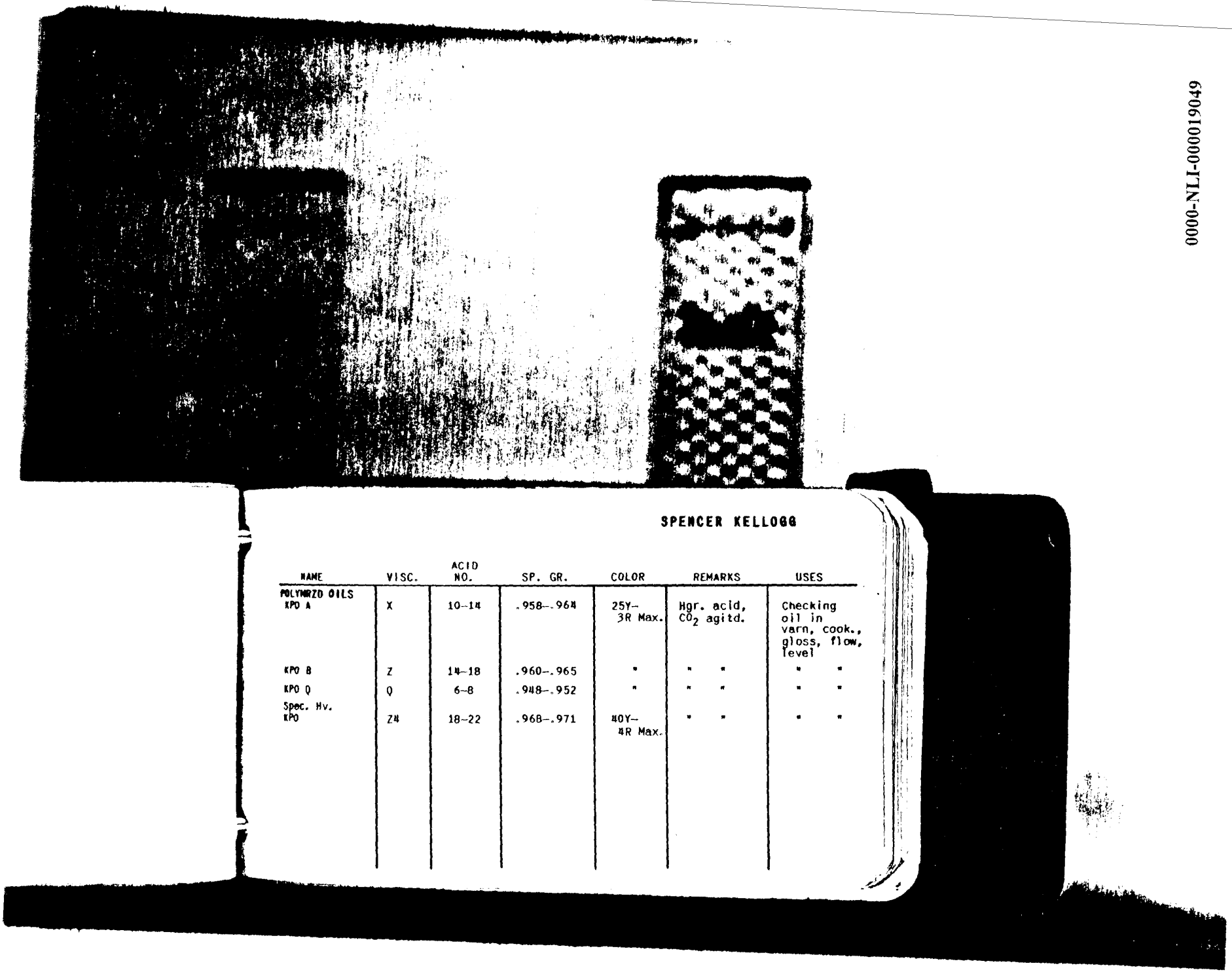
SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
GRINDING OILS Non-Stain Raw	A-	1-4	.931-.934	Same as raw	Stain. prop. removed	Low premium all-pig. wetg oil
VARNISH OILS Superior	A	0.1-0.3	"	30Y-4R Max.	Alk. ref., washd, refrgd	Wh enams., lt colored varn., alkyds
Superior "C"	A	0.8 Max.	"	30Y-5R Max.	Same with catalyst	For faster kettle time
Kel-Vi-Tol	A	1-3	.933-.936	30Y-5R Max.	Same with ex-effect. catly.	Very fast kettle time
K.V.O.	A	2-3	.931-.934	"	Alk. ref.	Varn, alkyds, prntg ink, oil cloth
Neut K.V.O.	A	0.1-0.3	"	"	" " , neut	" " "
K.A.P. XX	A	2-3	"	"	" " refrgd	" " "
Non-Break	A	1-4	"	Ltr. than raw	Mechly ref, poorer color	Gen purp varn & wetg
Imp. Raw	A	4-7	"	Same as raw	Break free, poorer color	" " "



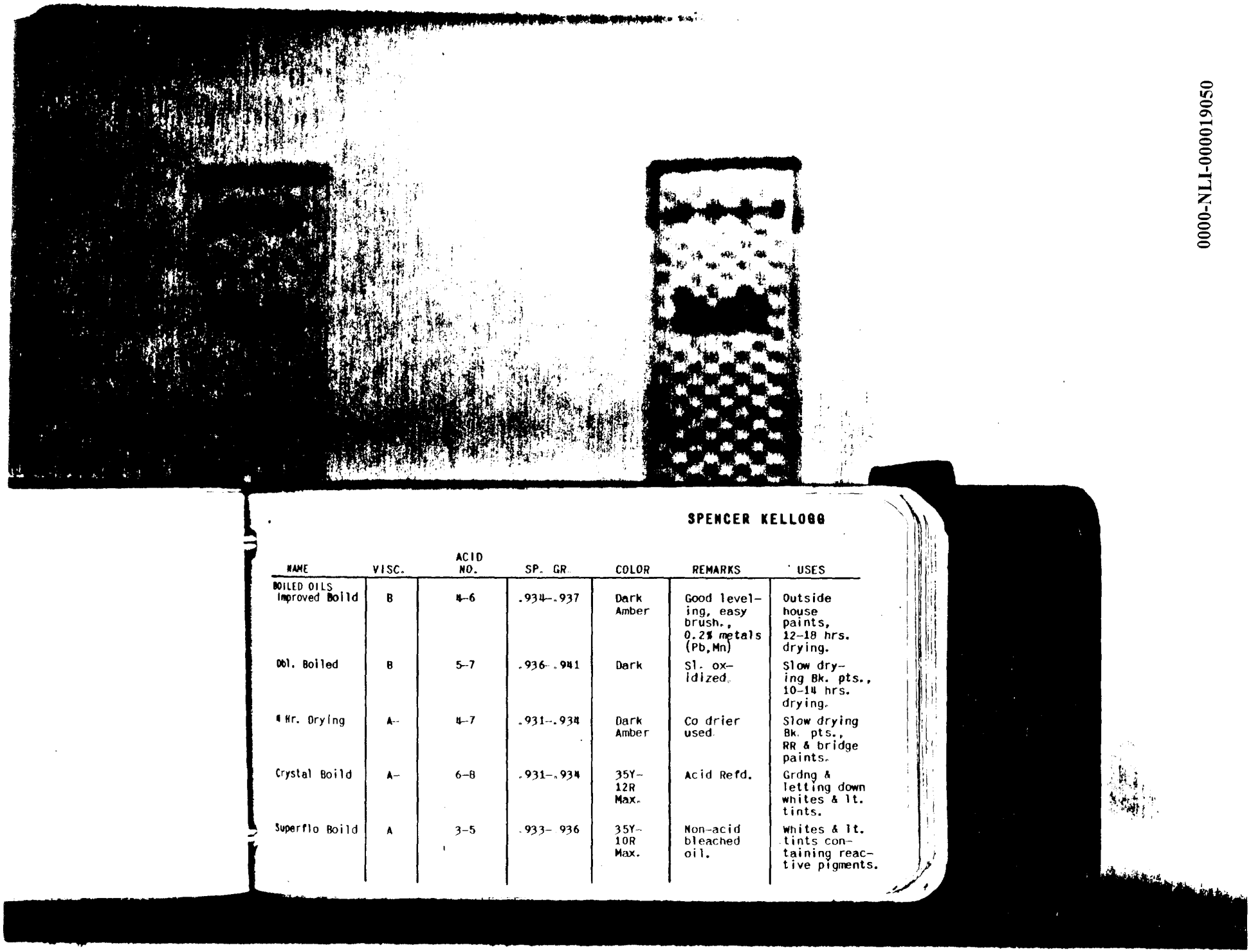
SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR	COLOR	REMARKS	USES
POLYMRZD OILS S-37 OKO	X	1-3	.958-.961	35Y-6R Max.	Low acid no., closed ket. bod.	Pts, Varns
S-70 OKO	Z-Z1	"	.963-.966	"	" "	" "
M-2½ OKO	Z½-Z6	"	.966-.969	"	" "	" "
M-7½ OKO	Z6+1 Apx.	"	.971-.97½	"	" "	" "
M-17 OKO	Apx. Z7	"	"	"	" "	" "
M-25 OKO	Apx. Z8	"	"	"	" "	" "
M-37 OKO	Apx. Z9	"	"	"	" "	" "
T-1215	Z2-Z6	7-10	.96½-.969	Amber	Hgr. acid number	10-15% to pts for flow
Spec. M-25	Z2-Z6	9-11	.971-.97½	"		Calcicotr flats



SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
POLYMRZD OILS						
KPO A	X	10–14	.958–.964	25Y–3R Max.	Hgr. acid, CO_2 agitd.	Checking oil in varn, cook., gloss, flow, level
KPO B	Z	14–18	.960–.965	"	" "	" "
KPO Q	Q	6–8	.948–.952	"	" "	" "
Spec. Hv. KPO	Z4	18–22	.968–.971	40Y–4R Max.	" "	" "

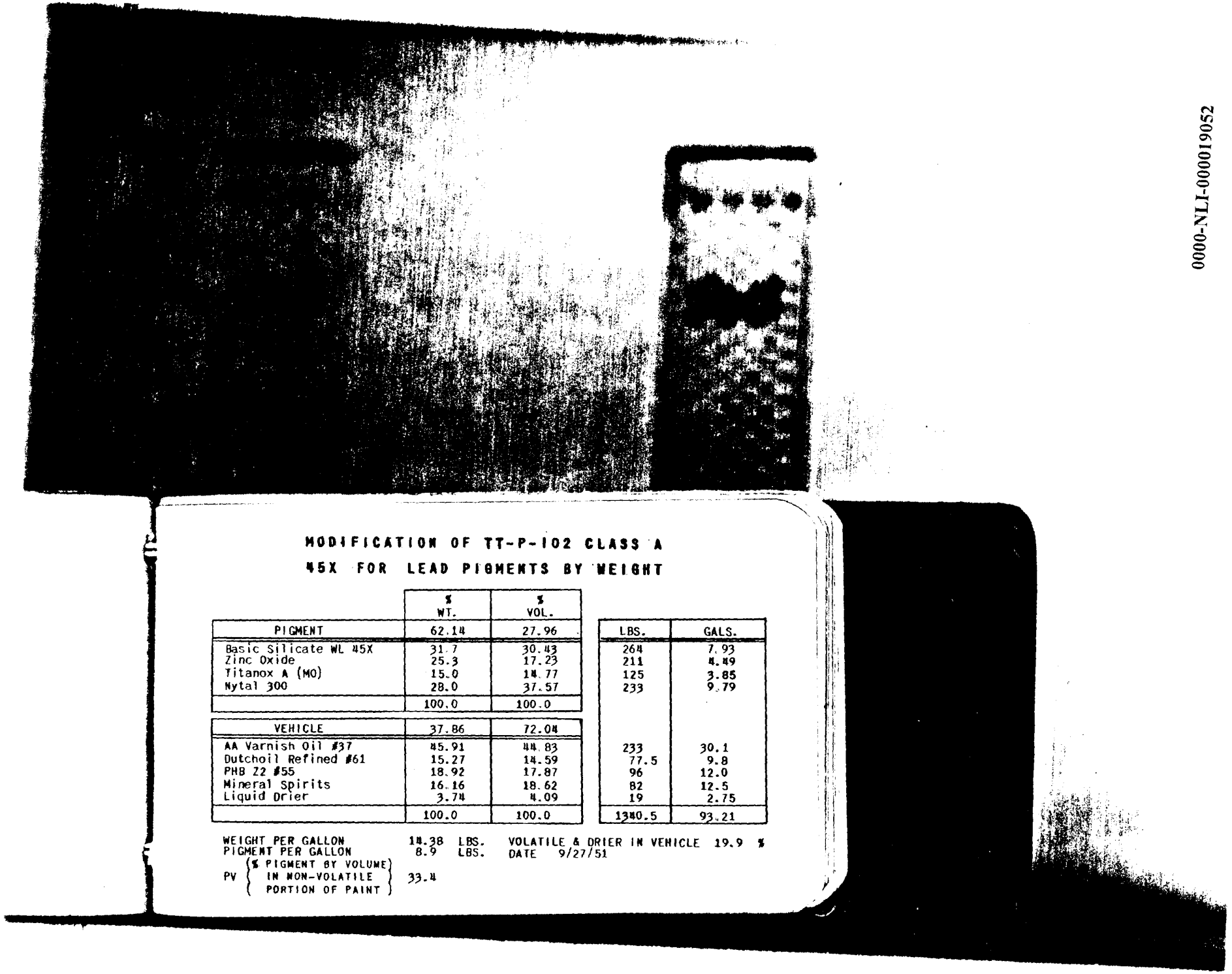


SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
BOILED OILS Improved Boild	B	4–6	.934–.937	Dark Amber	Good leveling, easy brush., 0.2% metals (Pb,Mn)	Outside house paints, 12–18 hrs. drying.
Dbl. Boiled	B	5–7	.936–.941	Dark	Sl. oxidized.	Slow drying Bk. pts., 10–14 hrs. drying.
4 Hr. Drying	A–	4–7	.931–.938	Dark Amber	Co drier used.	Slow drying Bk. pts., RR & bridge paints.
Crystal Boild	A–	6–8	.931–.934	35Y–12R Max.	Acid Refd.	Grdng & letting down whites & lt. tints.
Superflo Boild	A	3–5	.933–.936	35Y–10R Max.	Non-acid bleached oil.	Whites & lt. tints containing reactive pigments.

SPENCER KELLOGG

NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
BOILED OILS Sp. Lt. BOILD	A	4–6	.933–.938	30Y– 8R Max.		Grndg non– reactive pigments (TiO2).
OXIDIZED OILS Diamond K	Z2–Z3	6–9	.992–.994	Yell. Amber		Economical pt. oil, 15 hr. drying.
" Diamond K	"	8–12	.994–.996	Lt. Yell.	Prod. from highly bleached oil	" " "
Pale Bod Varn	"	6–9	.992–.996	Yell. Amber	No drying catalyst	Economical pt oil.
Miscible Diam. K	"	7–11	.994–.996	Yell. Amber	Highly misc. in MS	House pts., flat pts.; for wetting.
Rv. Bod Raw	Y	6–9	.982–.984	Yell. Amber	Contains no drier	Semi–flats where col. not problem.



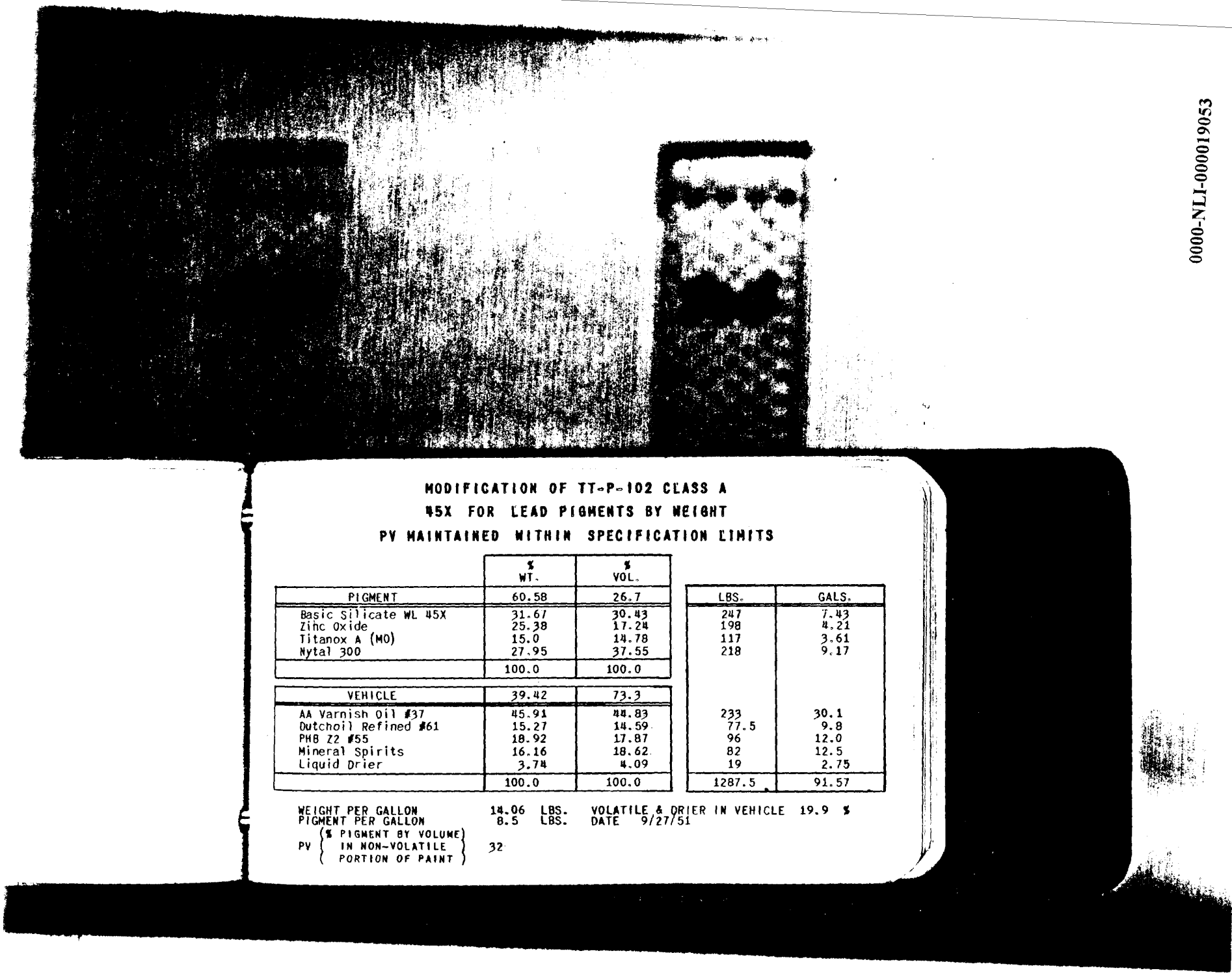
MODIFICATION OF TT-P-102 CLASS A

45X FOR LEAD PIGMENTS BY WEIGHT

	% WT.	% VOL.	LBS.	GALS.
PIGMENT	62.14	27.96		
Basic Silicate WL 45X	31.7	30.43	264	7.93
Zinc Oxide	25.3	17.23	211	4.49
Titanox A (MO)	15.0	14.77	125	3.85
Nytal 300	28.0	37.57	233	9.79
	100.0	100.0		
VEHICLE	37.86	72.04		
AA Varnish Oil #37	45.91	44.83	233	30.1
Dutchoil Refined #61	15.27	14.59	77.5	9.8
PHB Z2 #55	18.92	17.87	96	12.0
Mineral Spirits	16.16	18.62	82	12.5
Liquid Drier	3.74	4.09	19	2.75
	100.0	100.0	1340.5	93.21

WEIGHT PER GALLON 14.38 LBS. VOLATILE & DRIER IN VEHICLE 19.9 %
PIGMENT PER GALLON 8.9 LBS. DATE 9/27/51

PV { % PIGMENT BY VOLUME IN NON-VOLATILE PORTION OF PAINT } 33.4



MODIFICATION OF TT-P-102 CLASS A
45X FOR LEAD PIGMENTS BY WEIGHT
PV MAINTAINED WITHIN SPECIFICATION LIMITS

	% WT.	% VOL.	LBS.	GALS.
PIGMENT	60.58	26.7		
Basic Silicate WL 45X	31.67	30.43	247	7.43
Zinc Oxide	25.38	17.24	198	4.21
Titanox A (MO)	15.0	14.78	117	3.61
Nytal 300	27.95	37.55	218	9.17
	100.0	100.0		
VEHICLE	39.42	73.3		
AA Varnish Oil #37	45.91	44.83	233	30.1
Dutchoil Refined #61	15.27	14.59	77.5	9.8
PHB Z2 #55	18.92	17.87	96	12.0
Mineral Spirits	16.16	18.62	82	12.5
Liquid Drier	3.74	4.09	19	2.75
	100.0	100.0	1287.5	91.57

WEIGHT PER GALLON 14.06 LBS. VOLATILE & DRIER IN VEHICLE 19.9 %
PIGMENT PER GALLON 8.5 LBS. DATE 9/27/51

PV { % PIGMENT BY VOLUME IN NON-VOLATILE PORTION OF PAINT } 32

TT-P-102 - CLASS B

PIGMENT	% WT.	% VOL.	LBS.	GALS.
HTS White Lead	31.9	20.72	266	4.75
Zinc Oxide	25.0	19.33	208	4.43
Titanox RANC - -	12.0	12.48	100	2.86
Nytal 300	31.1	47.47	259	10.88
	100.0	100.0		

VEHICLE	38.0	74.6		
AA Varnish Oil #37	45.49	44.51	232	30.0
Dutchoil Refined #61	15.69	14.84	80	10.0
PHB 22 #55	18.82	17.80	96	12.0
Mineral Spirits	16.08	18.55	82	12.5
Liquid Drier	3.92	4.30	20	2.9
	100.0	100.0	1343	90.32

WEIGHT PER GALLON 14.87 LBS. VOLATILE & DRIER IN VEHICLE 20.0 %
PIGMENT PER GALLON 9.2 LBS. DATE 9/27/51
PV { (% PIGMENT BY VOLUME IN NON-VOLATILE PORTION OF PAINT) } 30.6

TT-P-102 - CLASS B; 45X MODIFICATION

	% WT.	% VOL.	LBS.	GALS.
PIGMENT	58.7	25.4		
Basic Silicate WL 45X	21.79	20.72	158	4.75
Zinc Oxide	28.69	19.33	208	4.43
Titanox RANC	13.79	12.48	100	2.86
Nytal 300	35.73	47.47	259	10.88
	100.0	100.0		
VEHICLE	41.3	74.6		
AA Varnish Oil #37	45.49	44.51	232	30.0
Dutchoil Refined #61	15.69	14.84	80	10.0
PHB Z2 #55	18.82	17.80	96	12.0
Mineral Spirits	16.08	18.55	82	12.5
Liquid Drier	3.93	4.30	20	2.9
	100 0	100.0	1235	90.32

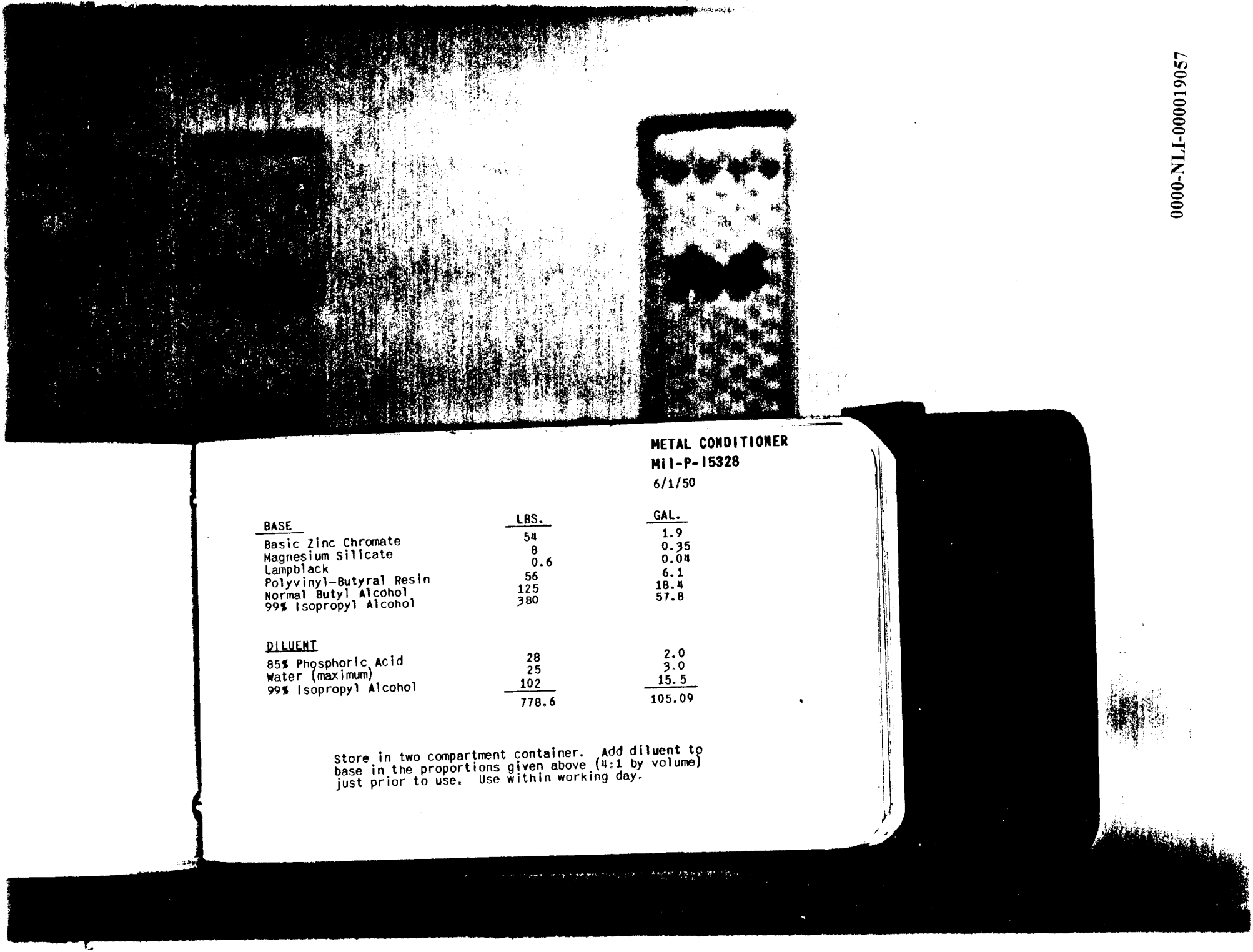
WEIGHT PER GALLON 13.67 LBS. VOLATILE & DRIER IN VEHICLE 20.0 %
PIGMENT PER GALLON 8.0 LBS. DATE 9/27/51
PV (% PIGMENT BY VOLUME IN NON-VOLATILE PORTION OF PAINT) 30.6

0000-NLI-000019056

NAVY #116
6/1/49

51.9% PIGMENT	%	LBS.	GAL.
Red Lead, 95% Grade	55.0	380	5.1
Zinc Yellow	10.1	70	2.3
Mica	9.4	65	2.8
Indian Red	1.4	10	0.2
Magnesium Silicate	23.2	160	6.7
Aluminum Stearate	0.9	6	0.7
48.1% VEHICLE			
Alkyd Resin Solution (TT-R-266, Type I)	64.9	415	52.5
Dipentene	3.9	25	3.5
Petroleum Spirits & Drier	31.2	199.4	29.3
		1330.4	103.1

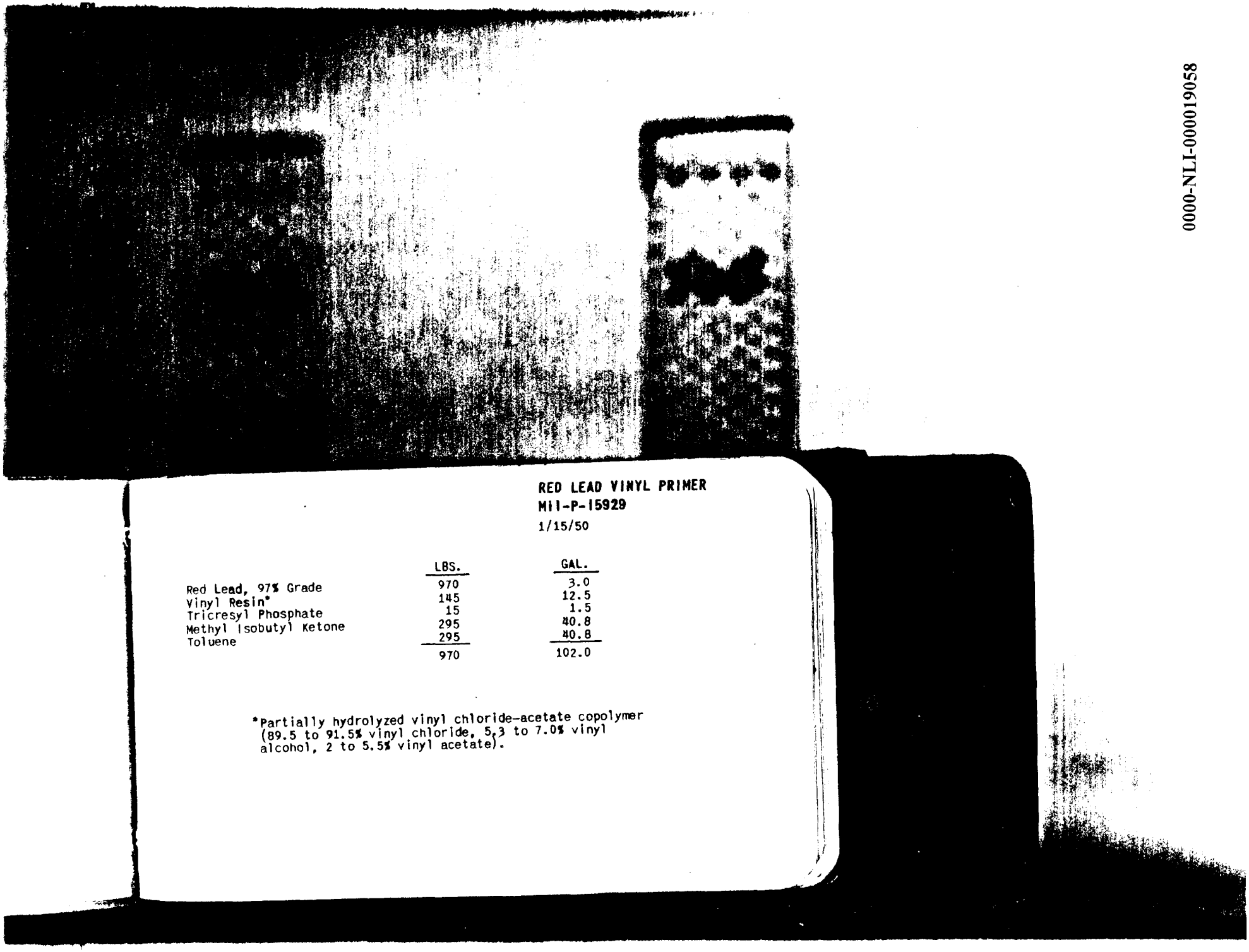
PV 34.8
Wt/Gal. 12.9 Lbs.



METAL CONDITIONER
Mil-P-15328
6/1/50

BASE	LBS.	GAL.
Basic Zinc Chromate	54	1.9
Magnesium Silicate	8	0.35
Lampblack	0.6	0.04
Polyvinyl-Butyral Resin	56	6.1
Normal Butyl Alcohol	125	18.4
99% Isopropyl Alcohol	380	57.8
DILUENT		
85% Phosphoric Acid	28	2.0
Water (maximum)	25	3.0
99% Isopropyl Alcohol	102	15.5
	778.6	105.09

Store in two compartment container. Add diluent to base in the proportions given above (4:1 by volume) just prior to use. Use within working day.



RED LEAD VINYL PRIMER
MIL-P-15929
1/15/50

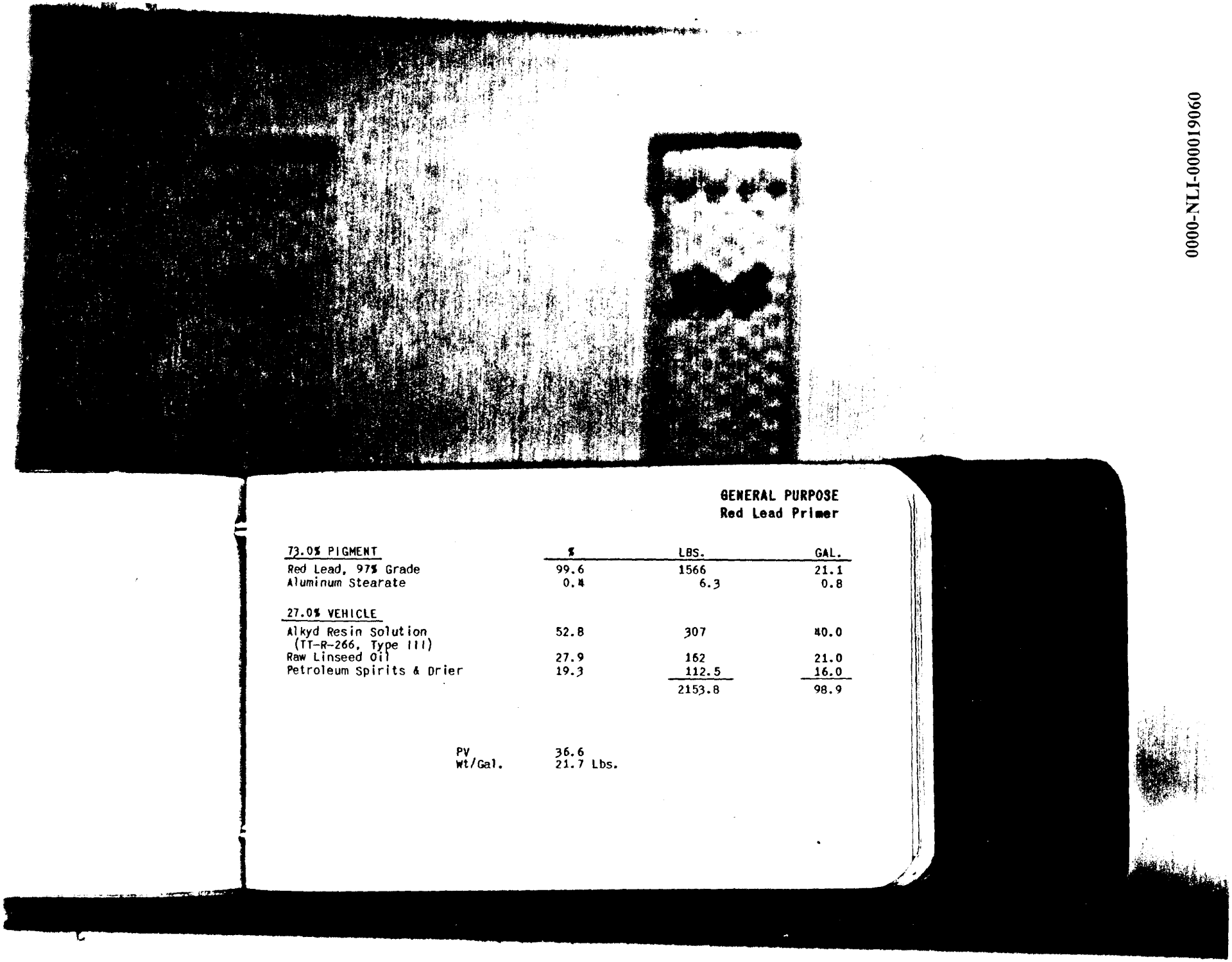
	LBS.	GAL.
Red Lead, 97% Grade	970	3.0
Vinyl Resin*	145	12.5
Tricresyl Phosphate	15	1.5
Methyl Isobutyl Ketone	295	40.8
Toluene	295	40.8
	970	102.0

*Partially hydrolyzed vinyl chloride-acetate copolymer (89.5 to 91.5% vinyl chloride, 5.3 to 7.0% vinyl alcohol, 2 to 5.5% vinyl acetate).

RED LEAD-IRON OXIDE
Shop Primer

75.0% PIGMENT	%	LBS.	GAL.
Red Lead, 95% Grade	75.0	1364	18.4
Red Iron Oxide	24.7	450	12.2
Aluminum Stearate	0.3	5	0.6
25.0% VEHICLE			
Raw Linseed Oil	56.1	340	44.0
Alkyd Resin Solution (TT-R-266 Type II)	30.0	182	23.0
Petroleum Spirits & Drier	13.9	84	12.0
		2425	110.2

PV 34.7
Wt/Gal. 22.0 Lbs.



GENERAL PURPOSE
Red Lead Primer

73.0% PIGMENT	%	LBS.	GAL.
Red Lead, 97% Grade	99.6	1566	21.1
Aluminum Stearate	0.4	6.3	0.8
27.0% VEHICLE			
Alkyd Resin Solution (TT-R-266, Type III)	52.8	307	40.0
Raw Linseed Oil	27.9	162	21.0
Petroleum Spirits & Drier	19.3	112.5	16.0
		2153.8	98.9

PV 36.6
Wt/Gal. 21.7 Lbs.

	5	6	7	8	9	
	36	43	50	57	65	
30	675	670	665	660	655	30
	289	287	285	283	280	

	5	6	7	8	9	
	34	41	48	55	62	
33	647	643	638	633	628	33
	319	316	314	312	310	

	5	6	7	8	9	
	33	40	47	54	60	
35	629	625	619	615	611	35
	338	335	334	331	329	

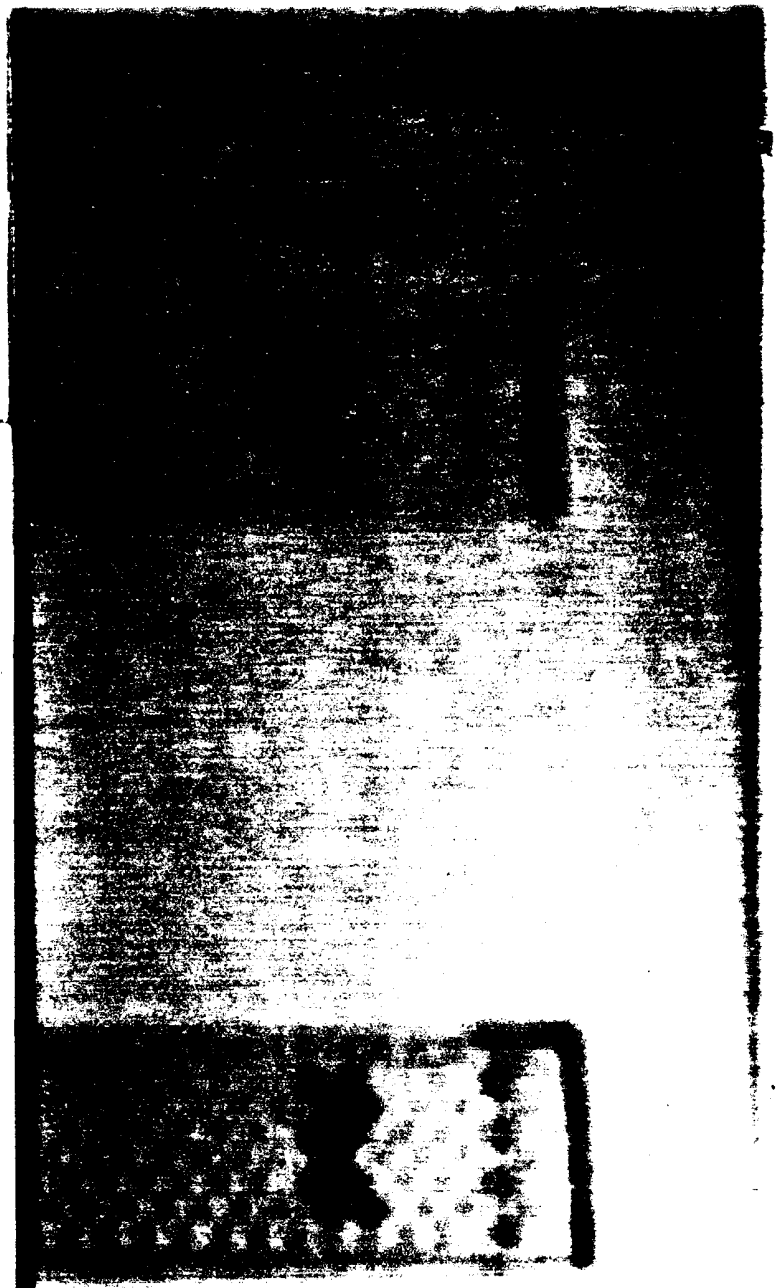
	5	6	7	8	9	
	31	37	43	50	56	
40	582	578	574	570	566	40
	388	385	383	380	378	

	5	6	7	8	9	
	28	34	40	46	52	
45	535	531	528	525	521	45
	437	435	432	429	427	

	5	6	7	8	9	
	26	30	36	42	48	
50	487	485	482	479	476	50
	487	485	482	479	476	

	5	6	7	8	9	
	23	28	33	38	43	
55	440	437	435	433	431	55
	537	535	532	529	526	

	5	6	7	8	9	
	21	25	29	34	38	
60	392	390	388	386	385	60
	587	585	583	580	577	
	5	6	7	8	9	



	10	11	12	13	14	
	95	105	115	124	134	
5	860	850	841	832	823	5
	45	45	44	44	43	

	10	11	12	13	14	
	94	104	114	123	133	
6	852	842	833	824	815	6
	54	54	53	53	52	

	10	11	12	13	14	
	93	103	113	122	132	
7	843	834	825	816	807	7
	64	63	62	62	61	

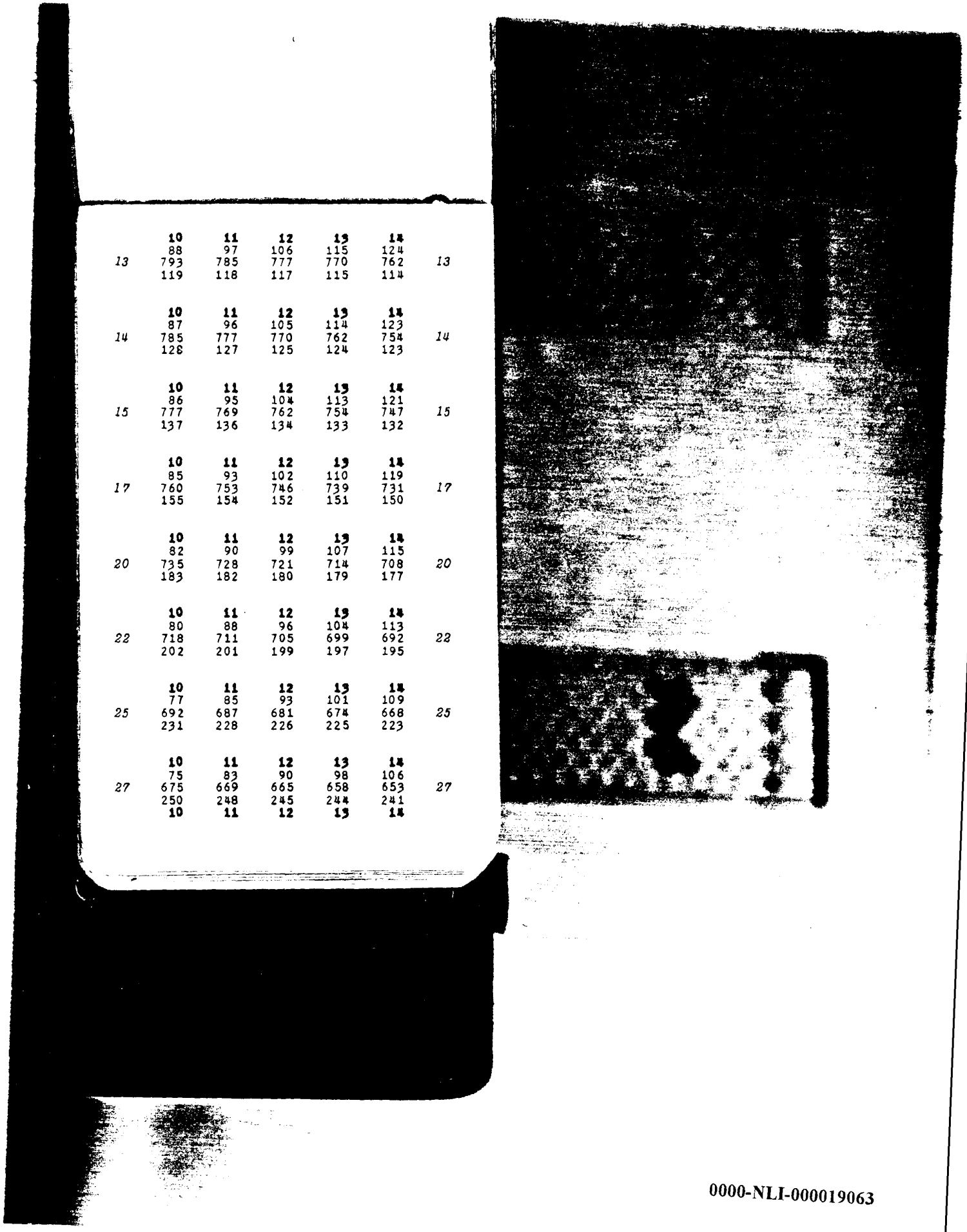
	10	11	12	13	14	
	93	102	111	121	130	
8	835	826	818	809	800	8
	72	72	71	70	70	

	10	11	12	13	14	
	92	101	110	120	129	
9	827	818	810	801	793	9
	81	81	80	79	78	

	10	11	12	13	14	
	91	100	109	119	128	
10	818	810	801	793	785	10
	91	90	90	88	87	

	10	11	12	13	14	
	90	100	108	118	127	
11	810	800	794	786	778	11
	100	100	98	96	95	

	10	11	12	13	14	
	89	98	107	116	125	
12	801	794	786	778	770	12
	110	108	107	106	105	
	10	11	12	13	14	



	10	11	12	13	14	
	88	97	106	115	124	
13	793	785	777	770	762	13
	119	118	117	115	114	

	10	11	12	13	14	
	87	96	105	114	123	
14	785	777	770	762	754	14
	128	127	125	124	123	

	10	11	12	13	14	
	86	95	104	113	121	
15	777	769	762	754	747	15
	137	136	134	133	132	

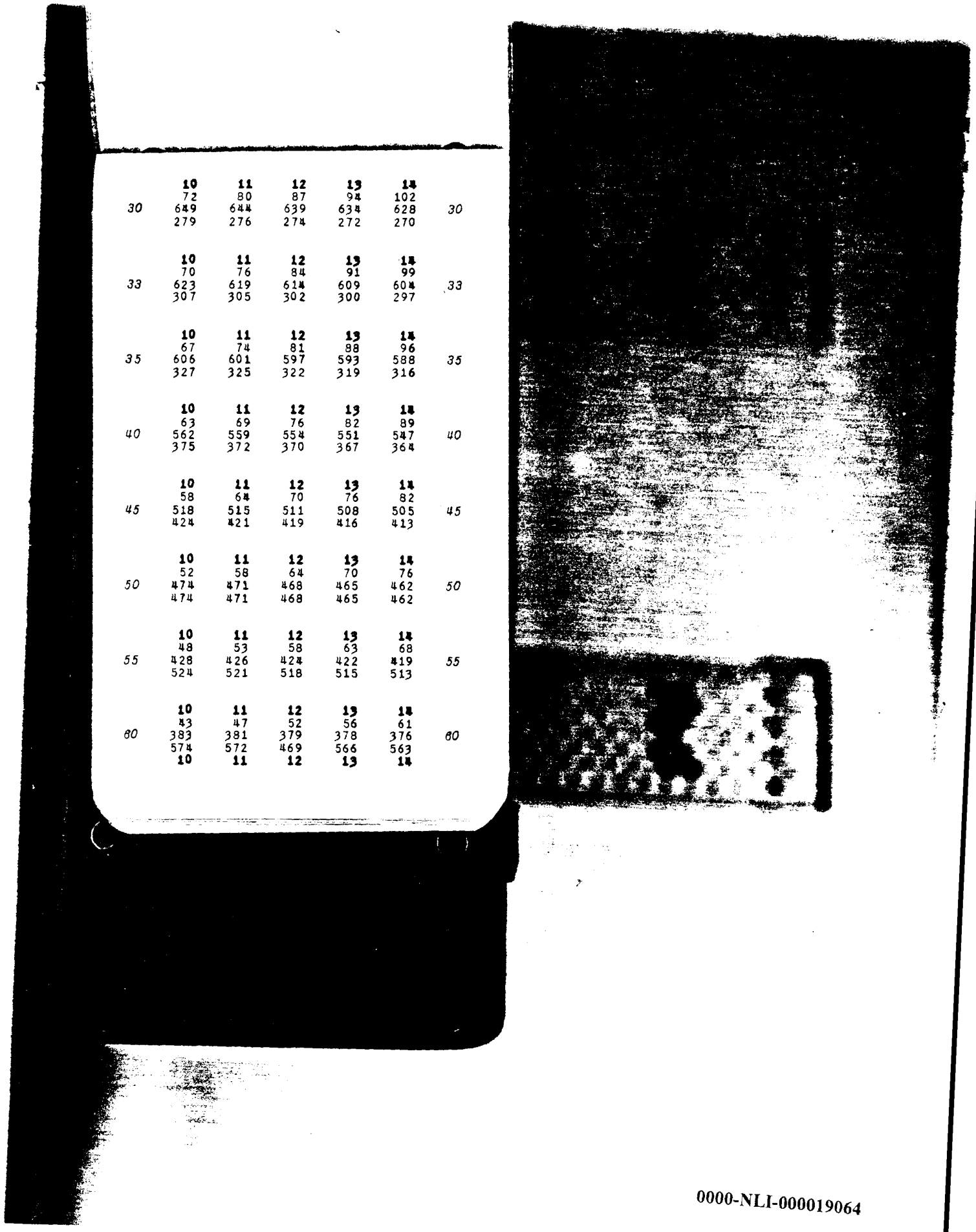
	10	11	12	13	14	
	85	93	102	110	119	
17	760	753	746	739	731	17
	155	154	152	151	150	

	10	11	12	13	14	
	82	90	99	107	115	
20	735	728	721	714	708	20
	183	182	180	179	177	

	10	11	12	13	14	
	80	88	96	104	113	
22	718	711	705	699	692	22
	202	201	199	197	195	

	10	11	12	13	14	
	77	85	93	101	109	
25	692	687	681	674	668	25
	231	228	226	225	223	

	10	11	12	13	14	
	75	83	90	98	106	
27	675	669	665	658	653	27
	250	248	245	244	241	
	10	11	12	13	14	



	10	11	12	13	14	
	72	80	87	94	102	
30	649	644	639	634	628	30
	279	276	274	272	270	

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45	518	515	511	508	505	45
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	524	521	518	515	513	

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	15	**16**	**17**	**18**	**19**	
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	15	**16**	**17**	**18**	**19**	
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	86	85	84	83	83	
	15	**16**	**17**	**18**	**19**	
	136	145	154	163	173	
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	15	**16**	**17**	**18**	**19**	
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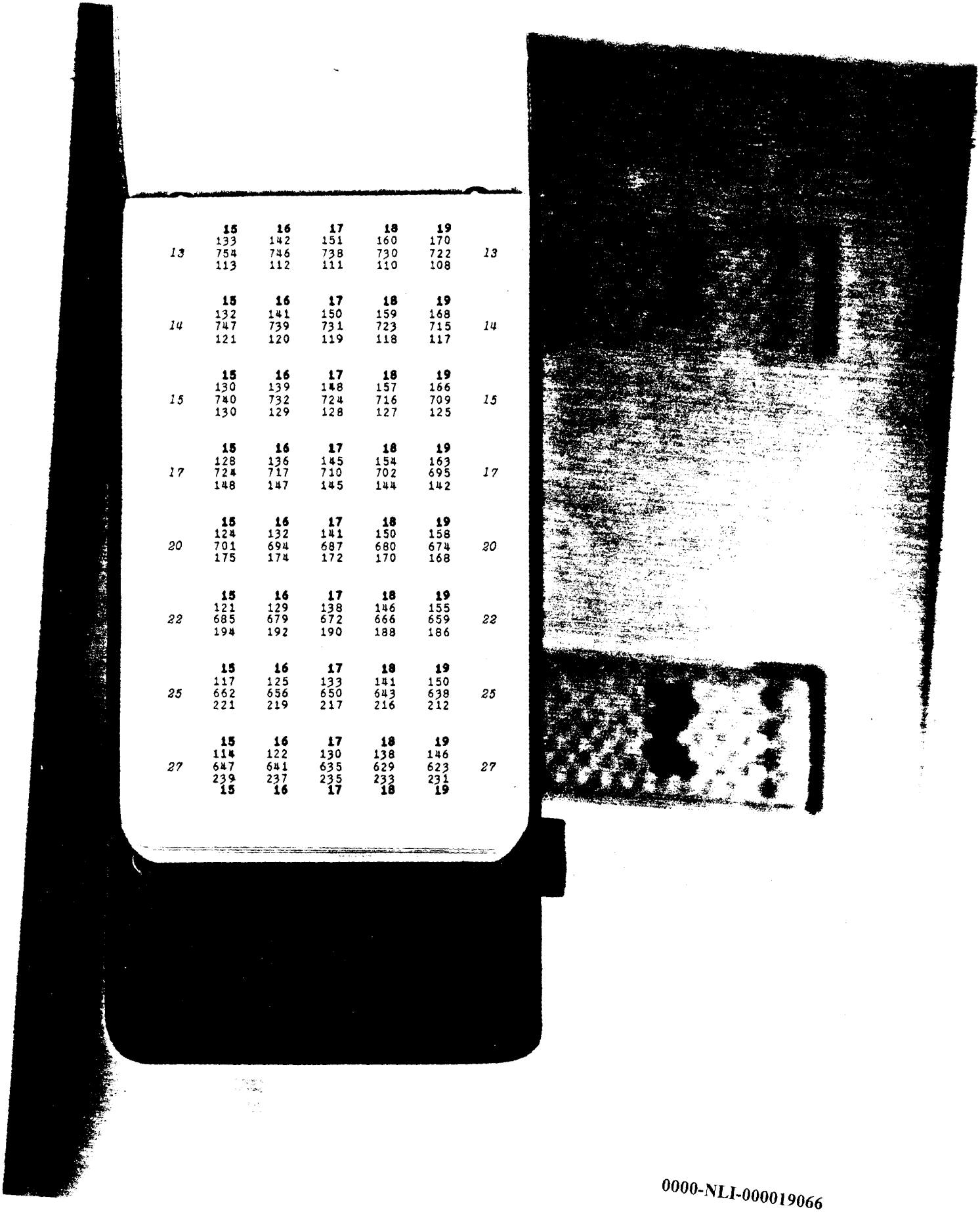

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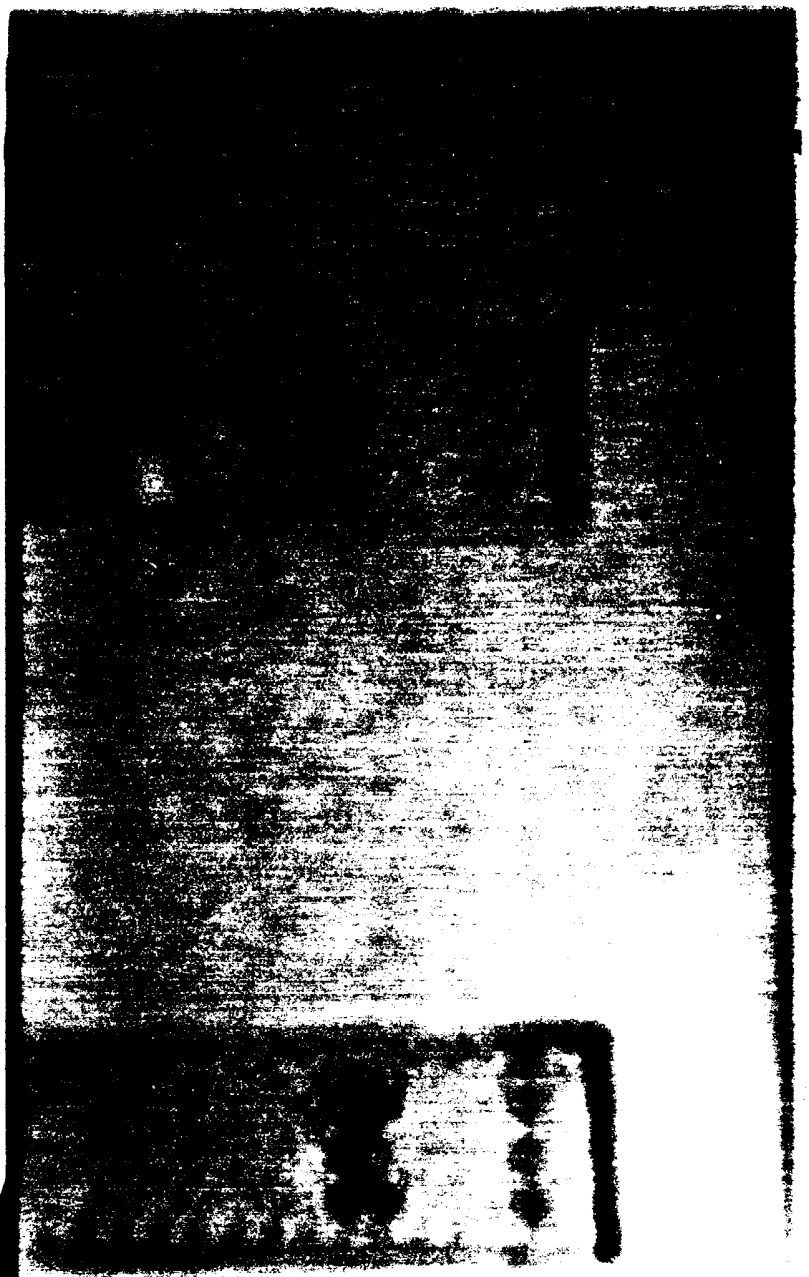

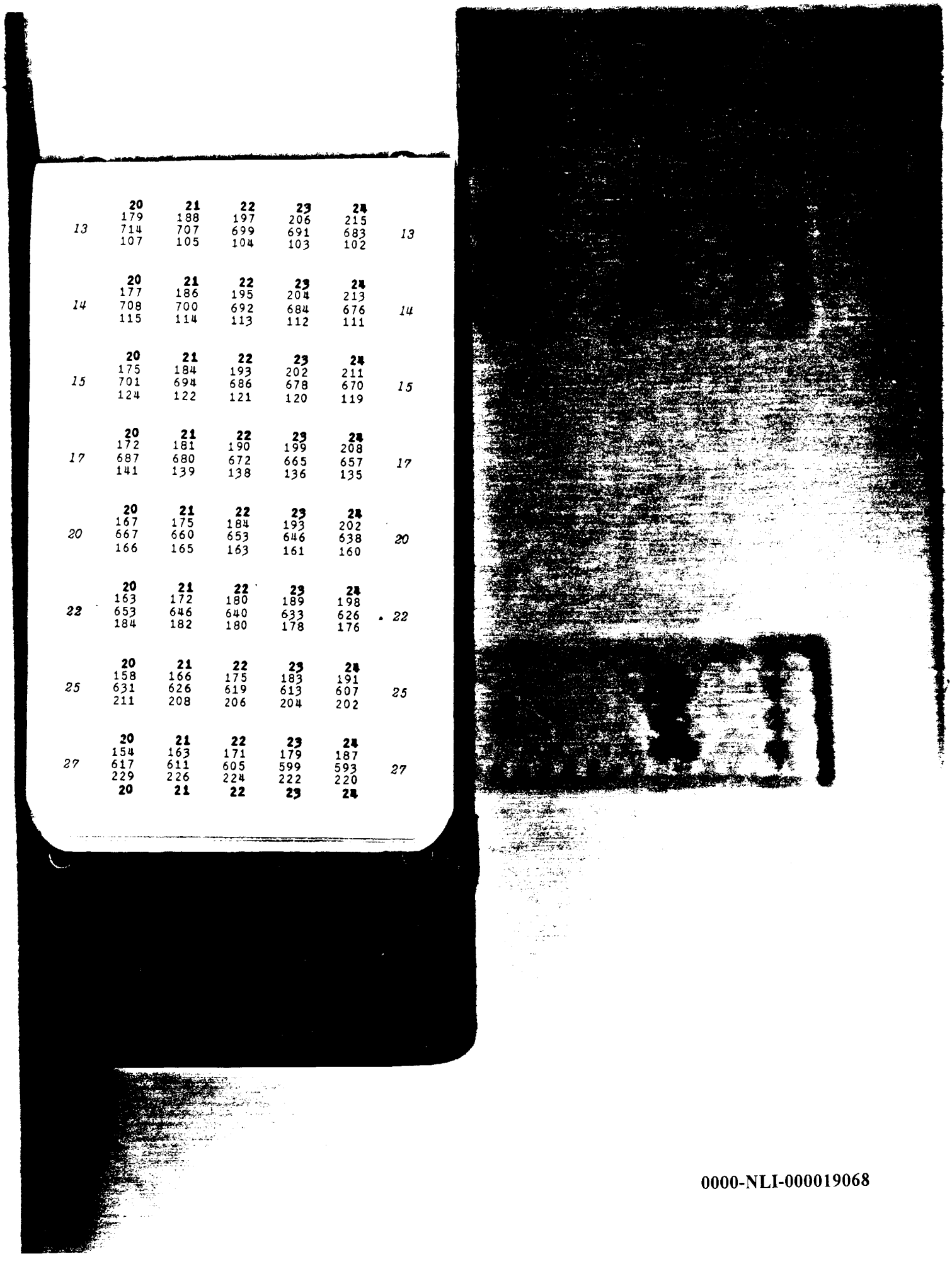

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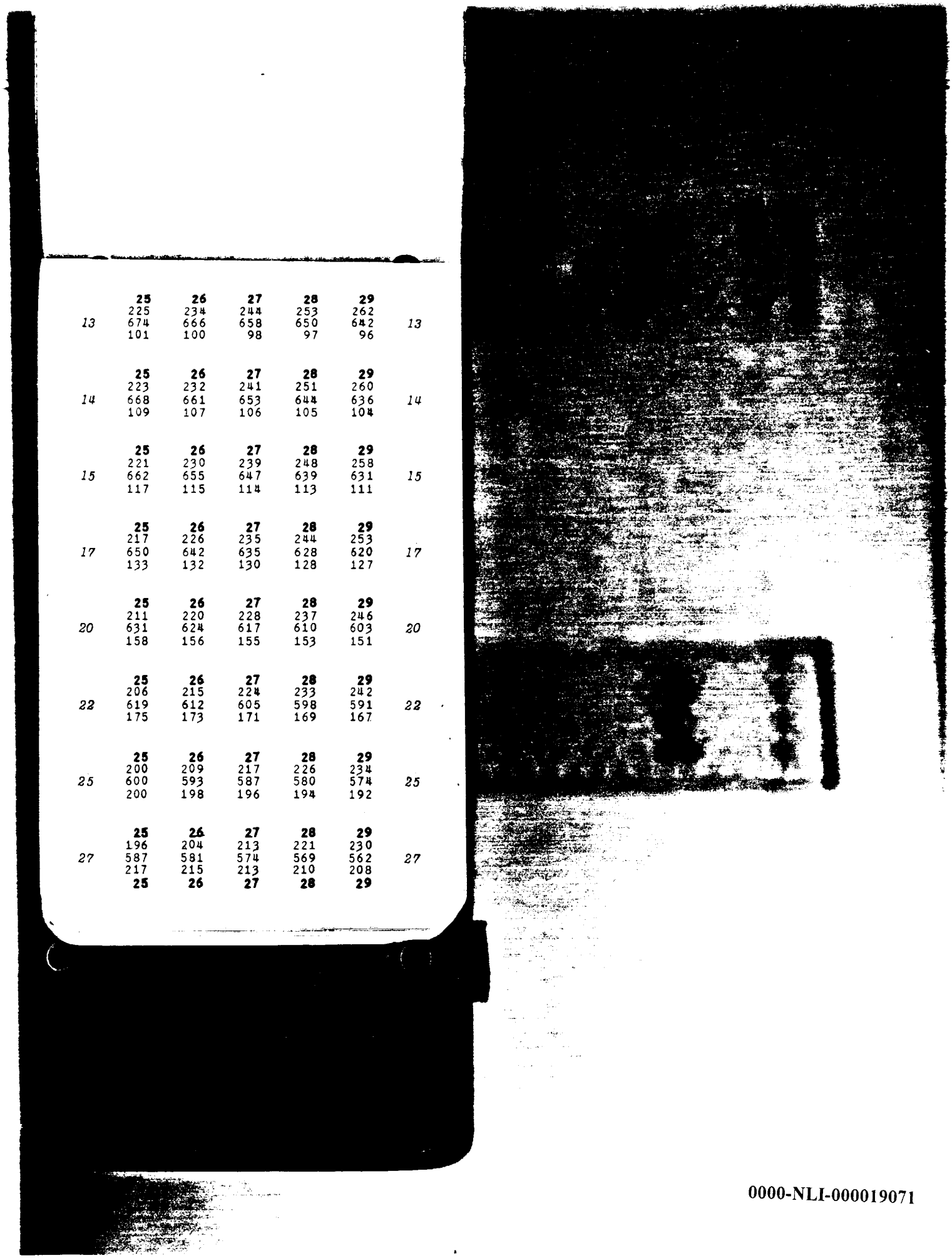

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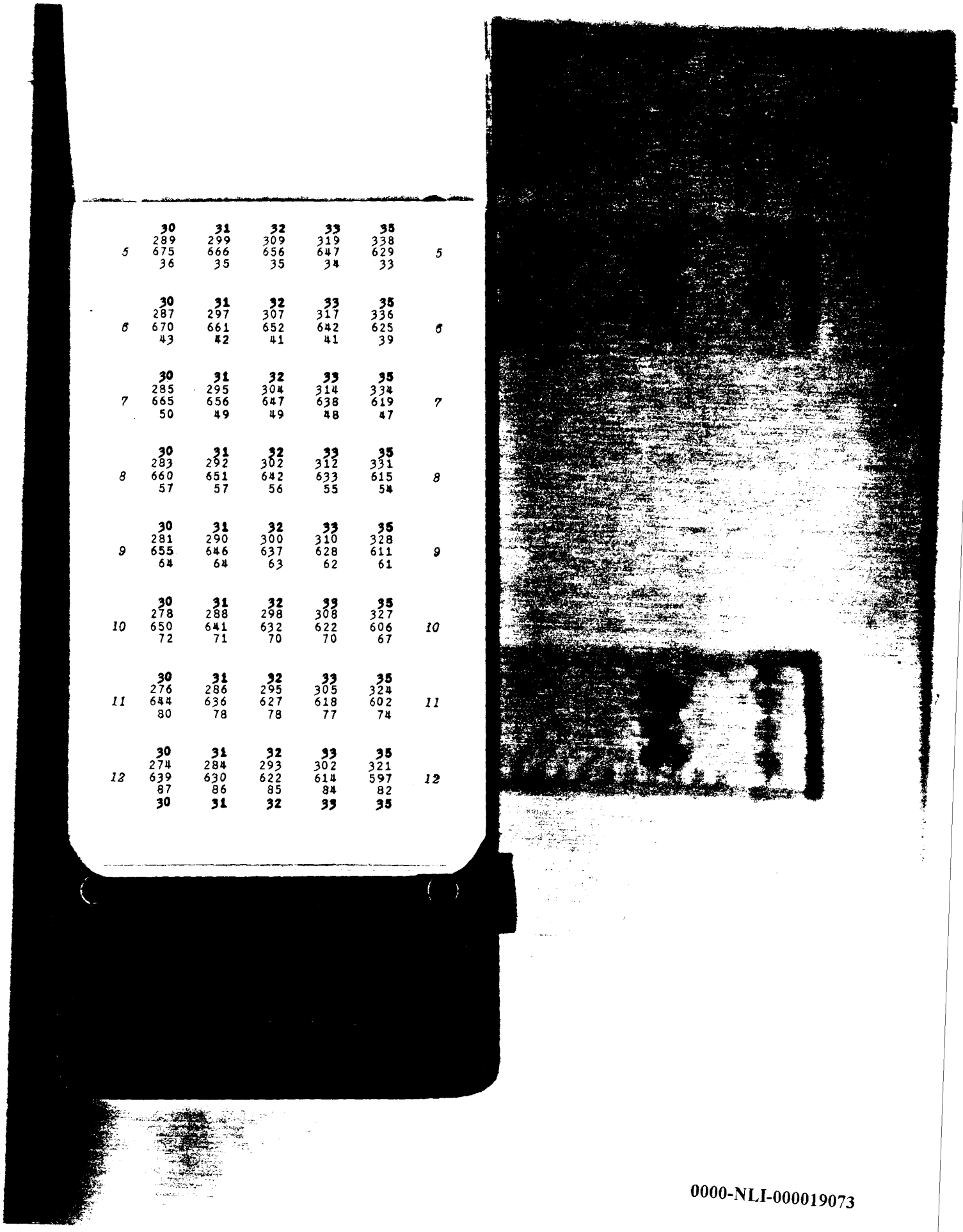

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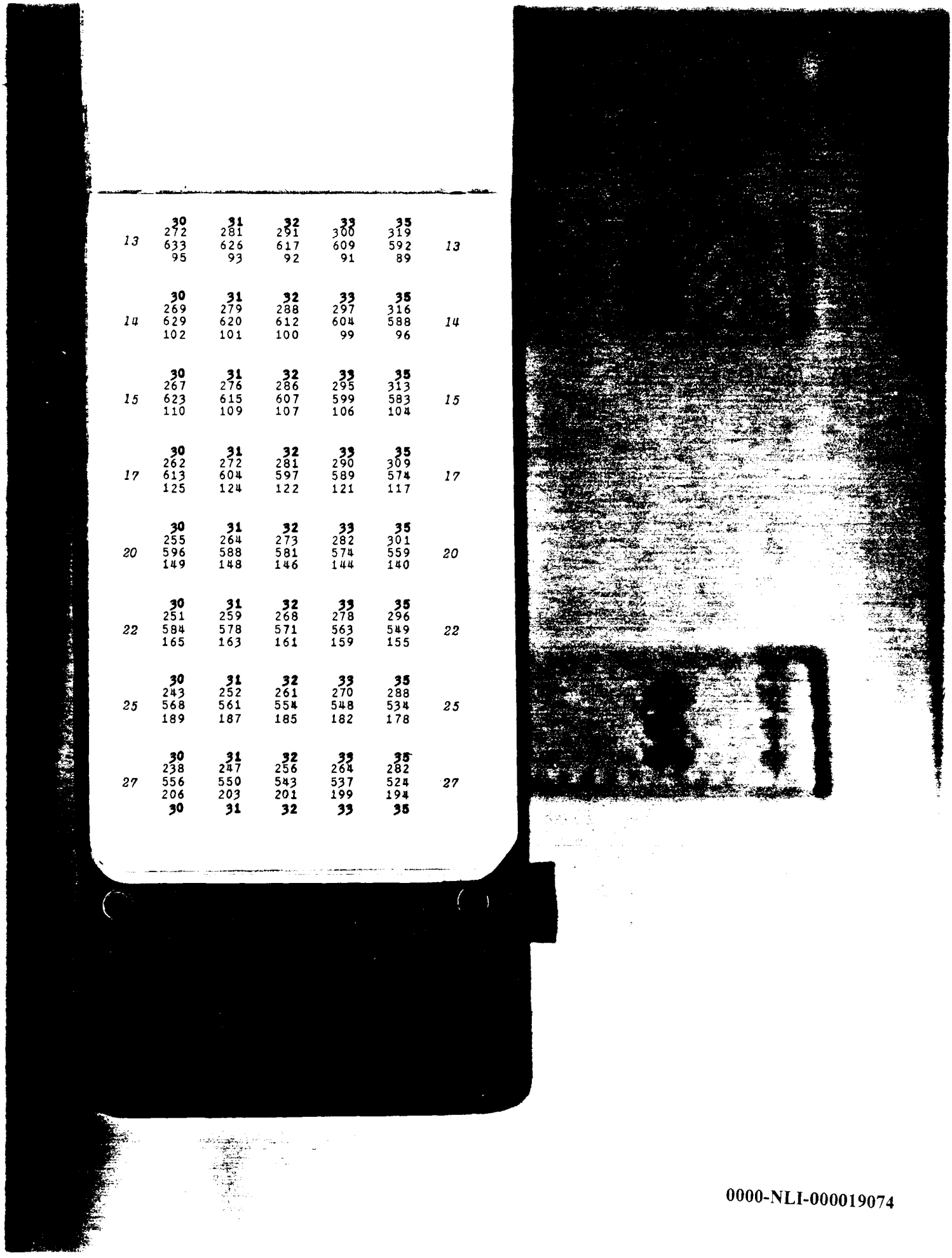

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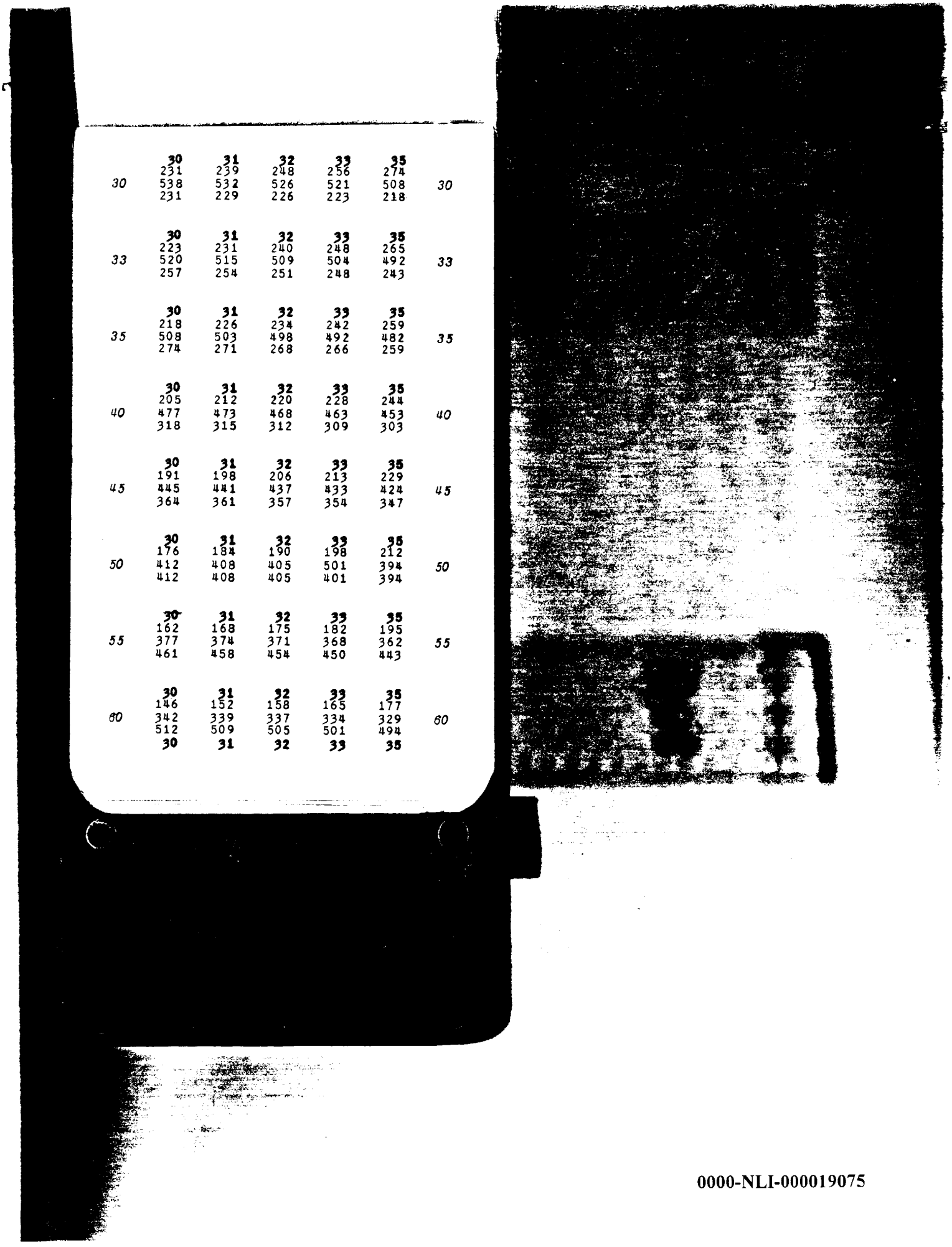

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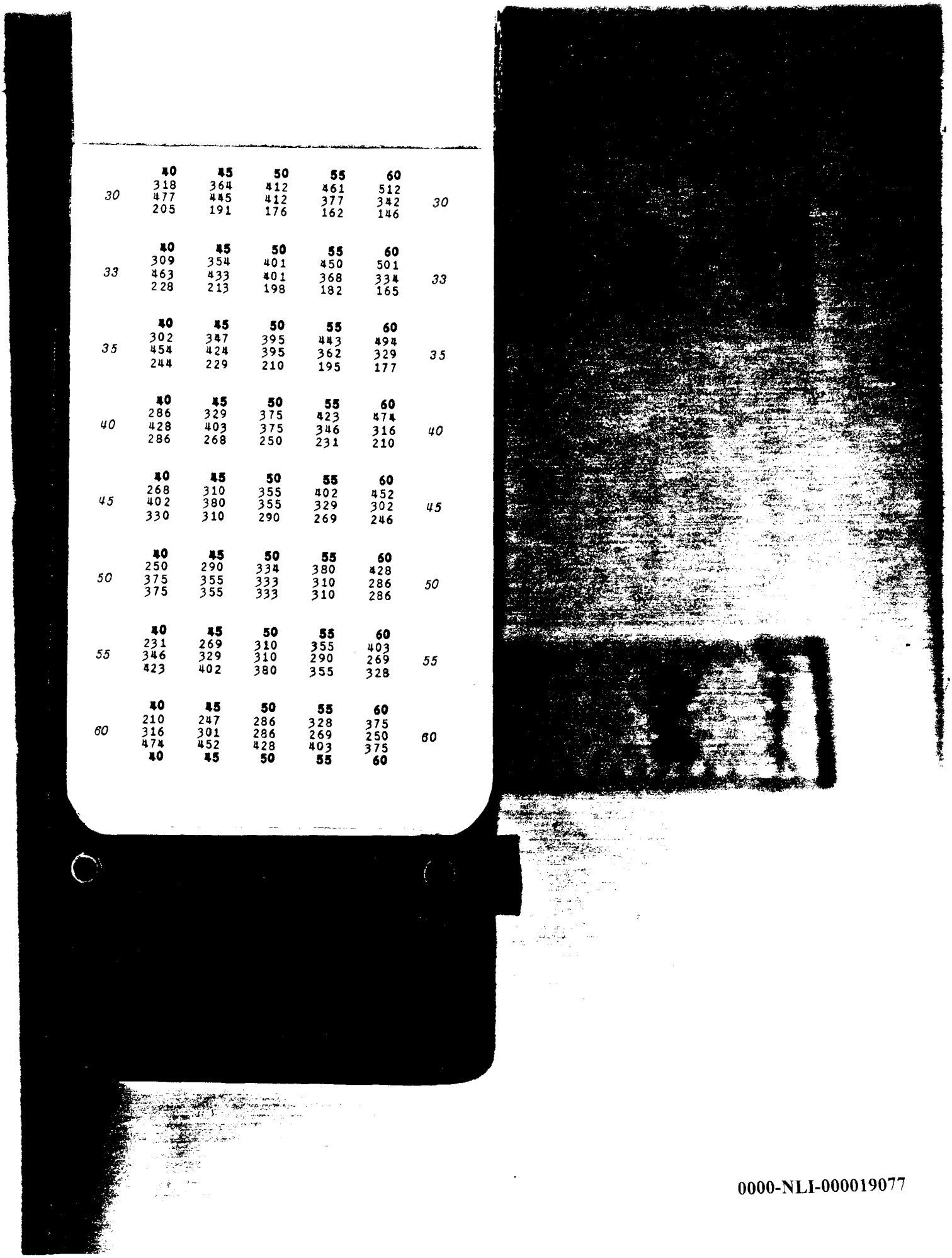

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	316	301	286	269	250	60
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	40	45	50	55	60	

TABLE OF PROPERTIES OF "DUTCH BOY" VINYL STABILIZERS

PRODUCT	TRIBASE	PLUMB-O-SIL A	PLUMB-O-SIL B	PLUMB-O-SIL C
COMPOSITION	Monohydrous tribasic ld sulfate	Coprecipitated lead orthsilct & silica gel	Coprecipitated lead orthsilct & silica gel	Coprecipitated lead orthsilct & silica gel
FORMULA	$3PbO \cdot PbSO_4 \cdot H_2O$	Complex structure	Complex structure	Complex structure
MOLECULAR WT.	990	- -	- -	- -
BASIC LEAD CONTENT ($PbO) 1. Total 2. Safe 3. Reactive	90.1 67.3 67.3	60-61 30-60 30-60	49-50 25-50 25-50	45-48 23-48 23-48
COLOR and FORM	fine white powder	soft white powder	soft white powder	soft white powder
NON-LEAD CONTENT	8.1% SO_3	39-40% SiO_2	50-51% SiO_2	38-42% SiO_2
REFRACTIVE INDEX	2.1	1.67	1.58-1.60	1.58

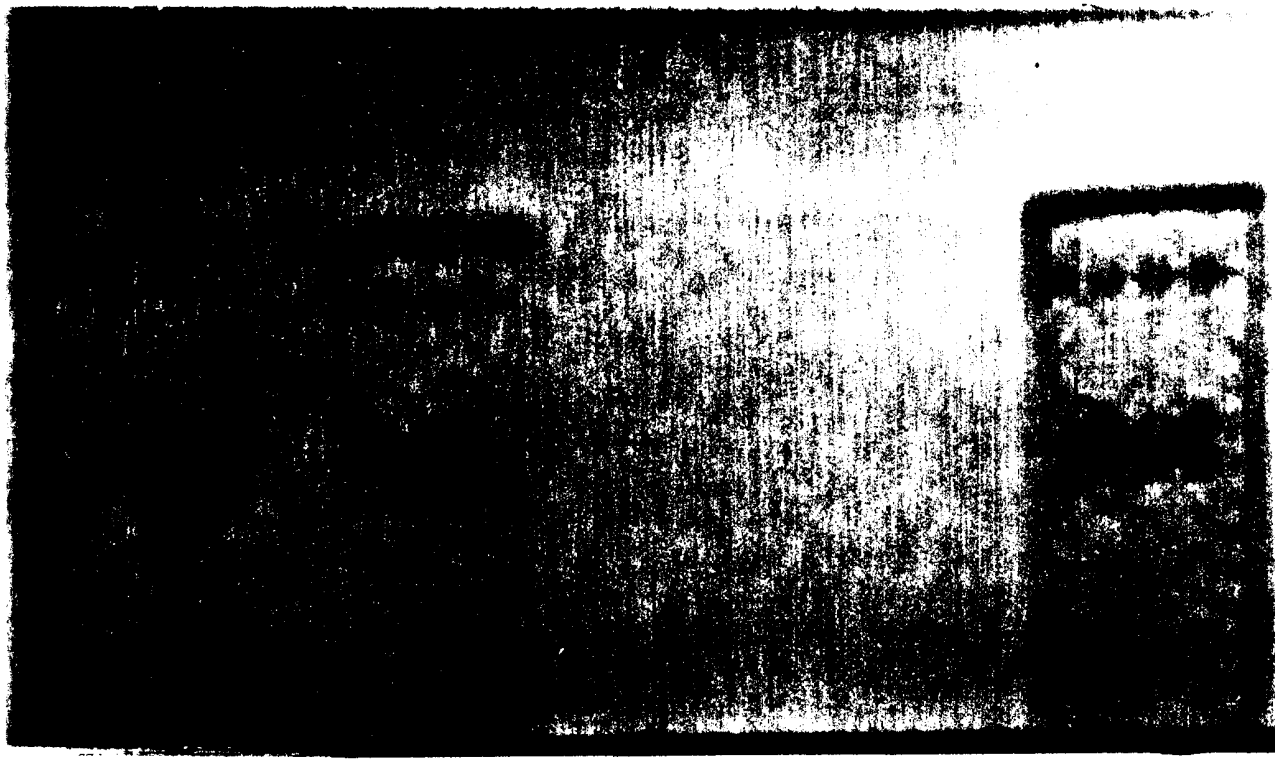


TABLE OF PROPERTIES OF "DUTCH BOY" VINYL STABILIZERS

PRODUCT	TRIBASE	PLUMB-O-SIL A	PLUMB-O-SIL B	PLUMB-O-SIL C
SPECIFIC GRAVITY	7.1	4.1	3.3	2.96
SOLUBILITY	insoluble in all common solvents	insoluble in all common solvents	insoluble in all common solvents	insoluble in all common solvents
RECOMMENDED APPLICATION				
1. Special	Hg quality elec vinyl compounds	Translucent polyvnyldene chlrd resins	Translucent polyvinyl chlrd resins	Translucent polyvinyl chlrd resins
2. Plasticizer Recommended	Types, I IIB, IV, V	all types (especly good with Types IIA & III)	all types (especly good with Types IIA & III)	all types (especly good with Types IIA & III)
3. Suggested Formulations	I, XVII, XX	XVII	II, III, IV, V, VI, VII, IX, X, XI, XII XIV, XV	II, III, IV, V, VI, VII, IX, X, XI, XII XIV, XV

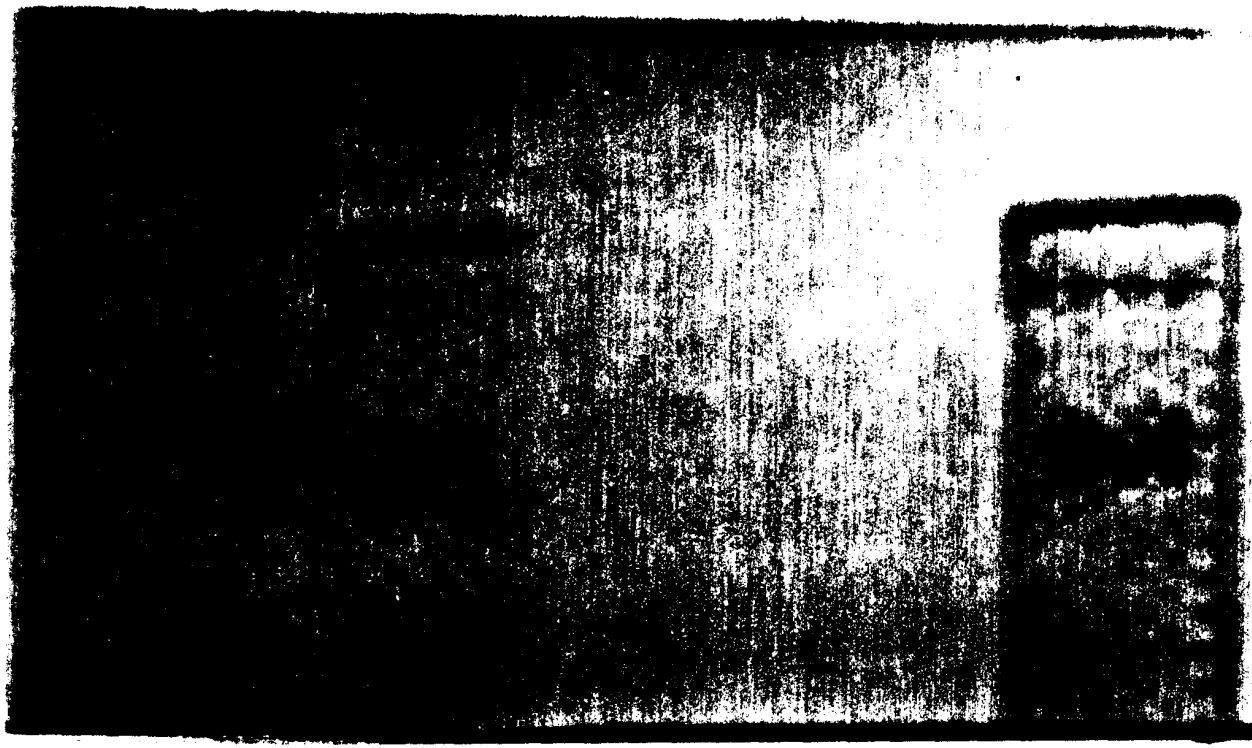
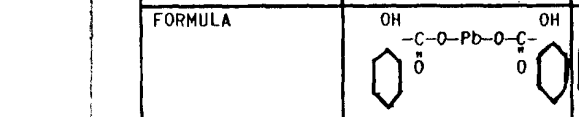
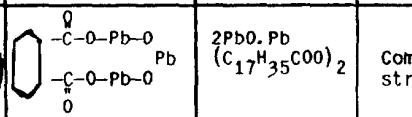


TABLE OF PROPERTIES OF "DUTCH BOY" VINYL STABILIZERS

PRODUCT	NORMASAL	DYTHAL	DS-207	TRIBS-E	DYPHOS
COMPOSITION	Normal lead salicylate	Dibasic lead phthalate	Dibasic lead stearate	Basic ld sil sulft	Dibasic lead phospht
FORMULA			$2PbO.Pb(C_{17}H_{35}COO)_2$	Complx struct	$2PbO \cdot PbHPO_3 \cdot \frac{1}{2}H_2O$
MOLECULAR WT.	481	817	1220	663	743
BASIC LEAD CONTENT (%PbO) 1. Total 2. Safe 3. Reactive	46.0	81.9 54.5 81.9	54.9 31.5 54.9	69 45.5 45.5	90.2 60 90.2
COLOR and FORM	soft creamy wh crystalline powder	fluffy yellow wh crystaline powder	soft wh pwdr (unctuous)	fin wh powder	fine aciculr wh crys
NON-LEAD CONTENT	57.4% - salicylic acid	19.1% phthlc anhydr	46.5% stearic acid	23.9% SiO_2 6.2% SO_3	11.2% phos acid
REFRACTIVE INDEX	1.78	1.99	1.60	2.1	2.25

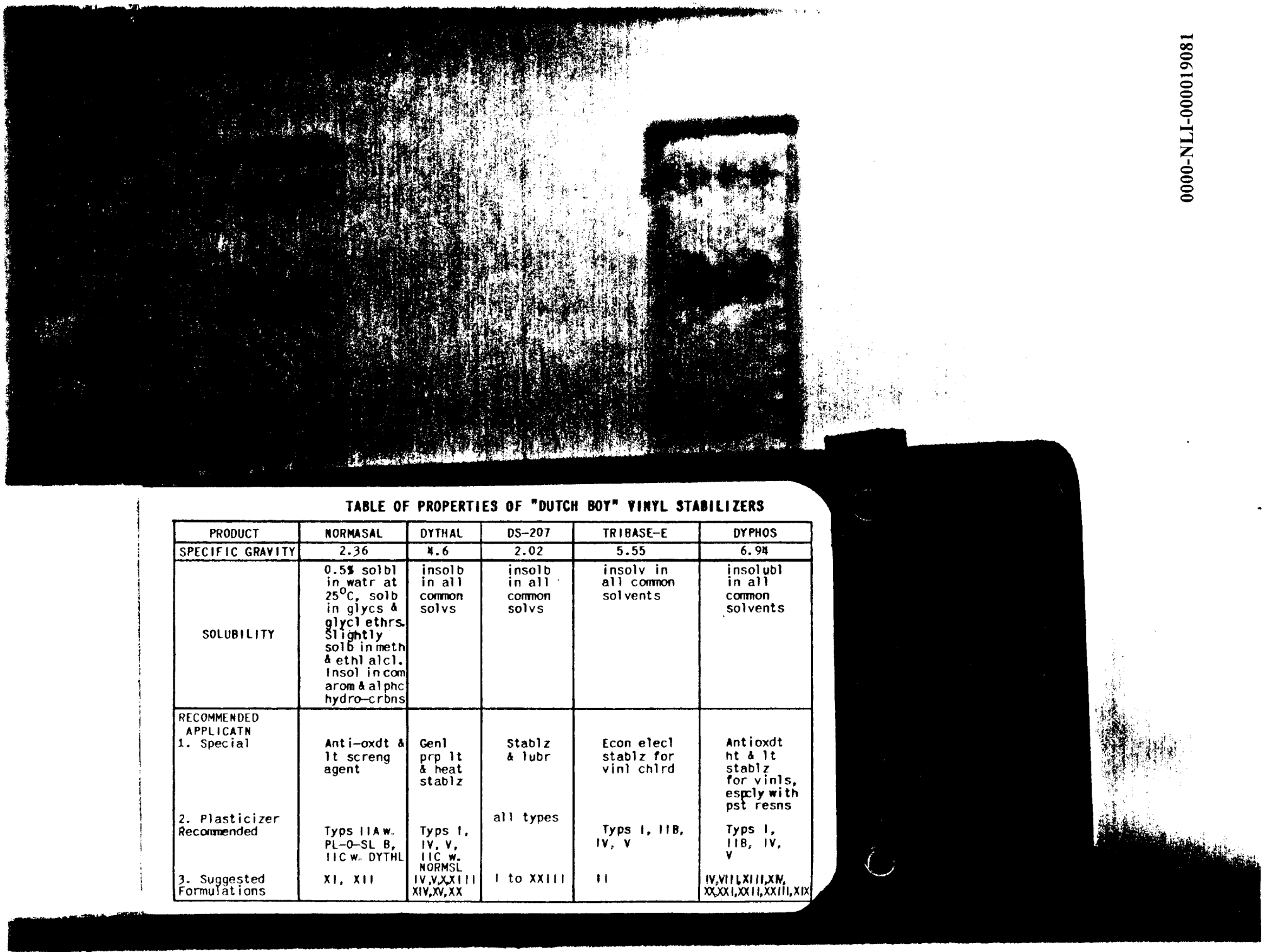
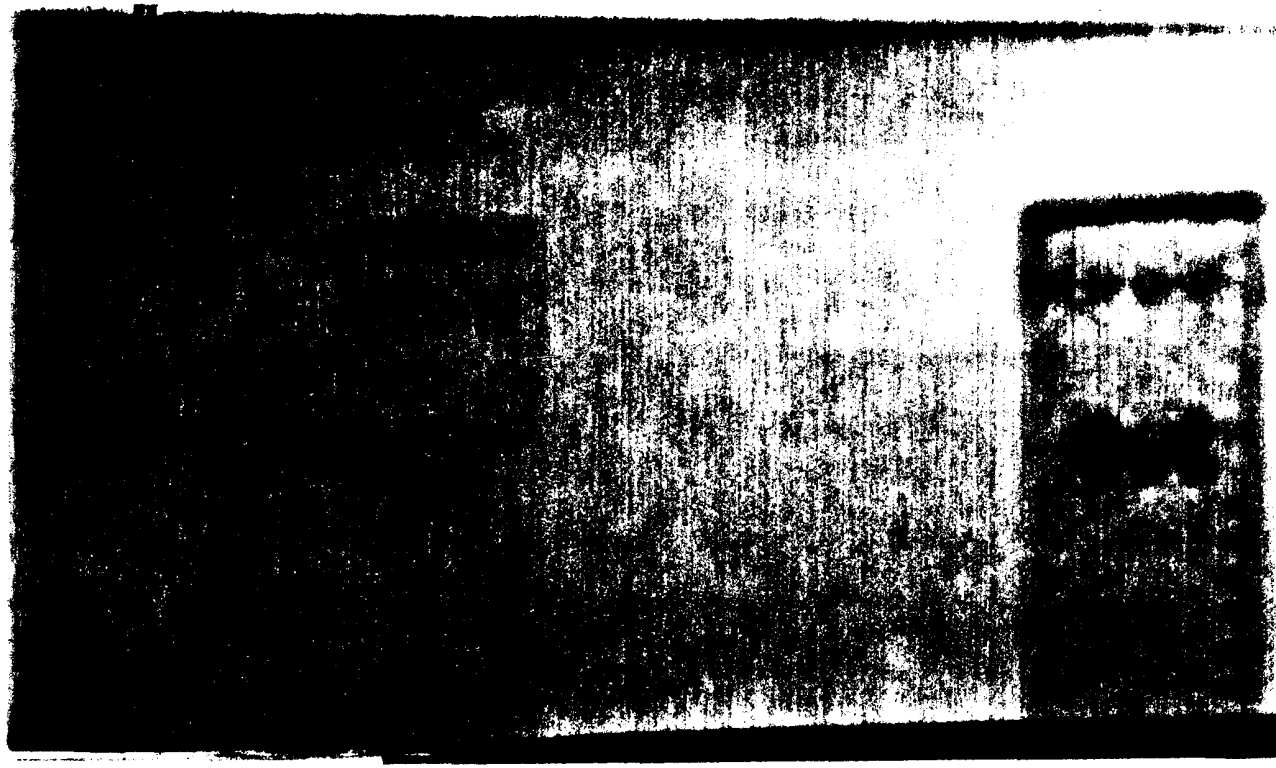


TABLE OF PROPERTIES OF "DUTCH BOY" VINYL STABILIZERS

PRODUCT	NORMASAL	DYTHAL	DS-207	TRIBASE-E	DYPHOS
SPECIFIC GRAVITY	2.36	4.6	2.02	5.55	6.9#
SOLUBILITY	0.5% solbl in watr at 25°C, solb in glycs & glycl ethrs. Slightly solb in meth & ethl alcl. Insol in com arom & alphc hydro-crbns	insolb in all common solvs	insolb in all common solvs	insolv in all common solvents	insolubl in all common solvents
RECOMMENDED APPLICATN					
1. Special	Anti-oxdt & lt screng agent	Genl prp lt & heat stablz	Stablz & lubr	Econ elecl stablz for vinl chlrd	Antioxdt ht & lt stablz for vinls, espcly with pst resns
2. Plasticizer Recommended	Typs IIA w. PL-O-SL B, IIC w. DYTHL	Typs I, IV, V, IIC w. NORMSL	all types	Typs I, IIB, IV, V	Typs I, IIB, IV, V
3. Suggested Formulations	XI, XII	IV,V,XIII XIV,XV,XX	I to XXIII	II	IV,VII,XIII,XIV, XX,XXI,XXII,XXIII,XIX



The prices are for standard drum quantities f.o.b. Manufacturing Plant. Less than drum quantities add 1¢ per pound, except for initial order.

For carload or mixed carloads quantities of the above items totalling 40,000 lbs. or more the price is 1¢ per pound less.

Terms: Thirty days net.

Inter-branch billings of these products will be made at 3-3/4¢ below the above prices, except for Bentones which are 4¢ below and for those made at Perth Amboy which are 1¢ below.

Prices subject to change without notice.

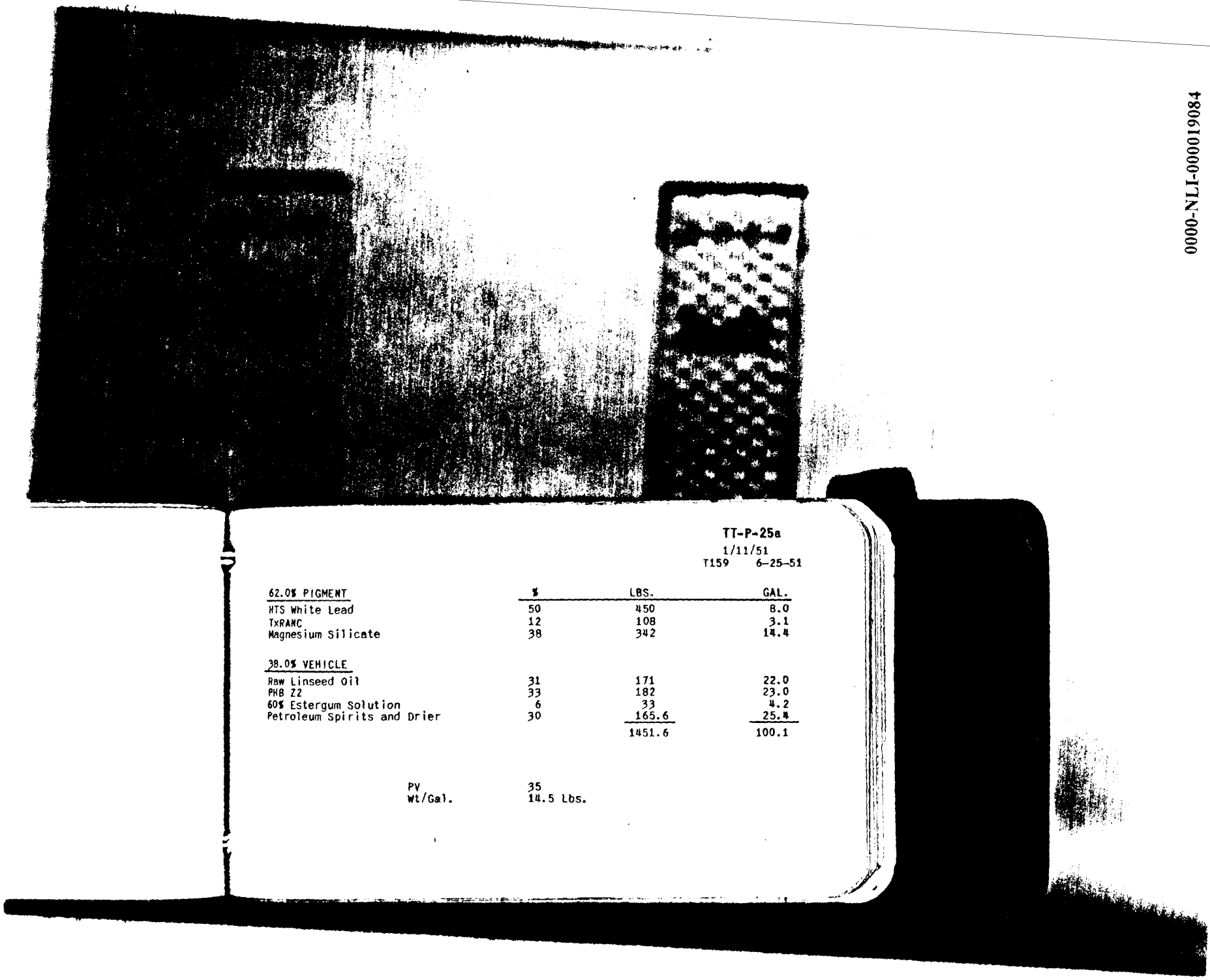
° Made at Phila., Pa.
°° " " Perth Amboy, N. J.
°°° " " St. Louis, Mo.

For ordering less than standard drum quantities the following standard factory sample drums are available:

Plumb-O-Sil A	40	lbs. net
Plumb-O-Sil B	25	" "
Plumb-O-Sil C	25	" "
Tribase	75	" "
Normasal	25	" "
DS-207	40	" "
Dythal	40	" "
Dyphos	40	" "

SPENCER KELLOGG

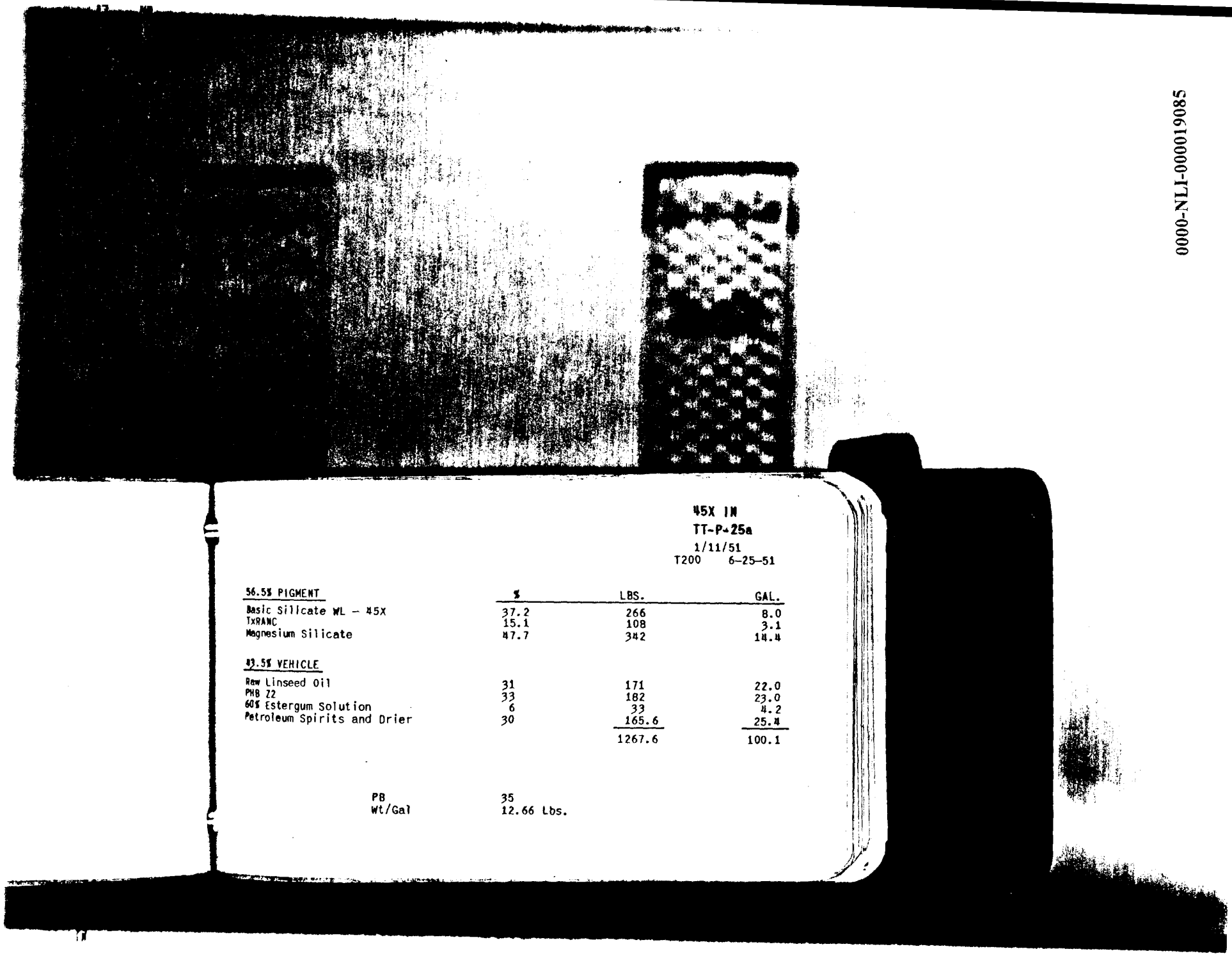
NAME	VISC.	ACID NO.	SP. GR.	COLOR	REMARKS	USES
BOILED OILS Hv Bod Boild	Z	6–9	.982–.984	Yell. Amber	Contains drier (Mn)	Semi-flats where col. 15 hr dryg.
SEMI-OXIDIZED Aged	E	3–6	.948–.951	Yell. Amber	Polymrzs fast, yields elastic films	Patent Leather, Lith. varn, linoleum.
Sp. Ink Oil	C	2–4	.944–.946	30Y– 4R Max.	Lt. col.	Hv trans. lith. varn.
Pat. Leather Special	B	4–6	.940–.945	Same as Raw	Sl. oxi-dized, polymrzs rapidly, exc. elas.	Patent leather



TT-P-25a
1/11/51
T159 6-25-51

62.0% PIGMENT	%	LBS.	GAL.
HTS White Lead	50	450	8.0
TxRANC	12	108	3.1
Magnesium Silicate	38	342	14.4
38.0% VEHICLE			
Raw Linseed Oil	31	171	22.0
PHB Z2	33	182	23.0
60% Estergum Solution	6	33	4.2
Petroleum Spirits and Drier	30	165.6	25.4
		1451.6	100.1

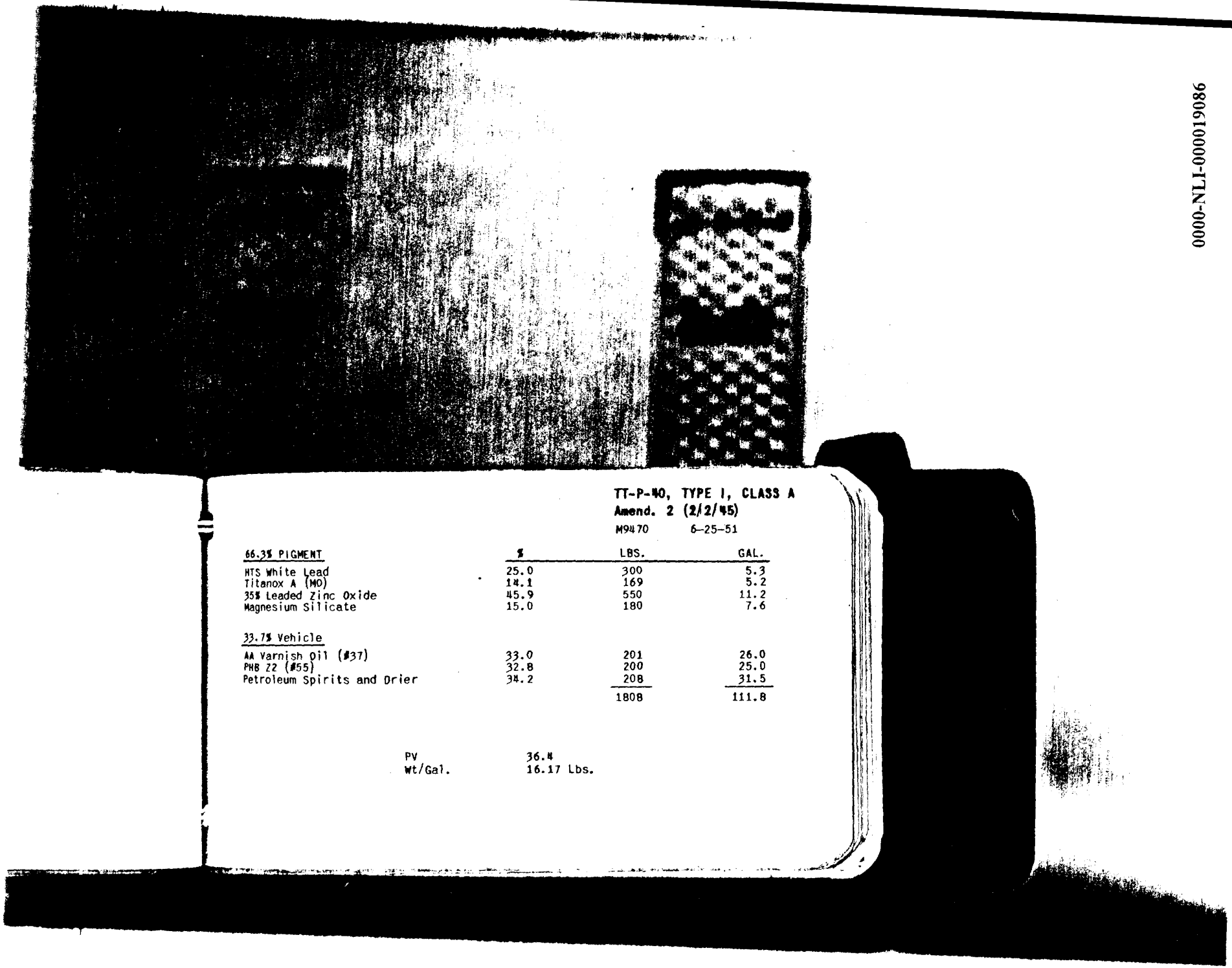
PV 35
Wt/Gal. 14.5 Lbs.



45X IN
TT-P-25a
1/11/51
T200 6-25-51

56.5% PIGMENT	%	LBS.	GAL.
Basic Silicate WL – 45X	37.2	266	8.0
TxRANC	15.1	108	3.1
Magnesium Silicate	47.7	342	14.4
43.5% VEHICLE			
Raw Linseed Oil	31	171	22.0
PHB 22	33	182	23.0
60% Estergum Solution	6	33	4.2
Petroleum Spirits and Drier	30	165.6	25.4
		1267.6	100.1

PB	35
Wt/Gal	12.66 Lbs.



TT-P-40, TYPE I, CLASS A
Amend. 2 (2/2/45)
M9470 6-25-51

66.3% PIGMENT	%	LBS.	GAL.
HTS White Lead	25.0	300	5.3
Titanox A (MO)	14.1	169	5.2
35% Leaded Zinc Oxide	45.9	550	11.2
Magnesium Silicate	15.0	180	7.6
33.7% Vehicle			
AA Varnish Oil (#37)	33.0	201	26.0
PHB 22 (#55)	32.8	200	25.0
Petroleum Spirits and Drier	34.2	208	31.5
		1808	111.8

PV 36.4
Wt/Gal. 16.17 Lbs.

45X IN
TT-P-40, Type I, Class A
Amend. 2 (2/1/45)
T25 6-25-51

	$	LBS.	GAL.
61.3% PIGMENT			
Basic Silicate WL - 45X	33.8	276	8.7
Titanox A (MO)	17.2	140	4.3
Zinc Oxide	30.6	250	5.3
Magnesium Silicate	18.4	150	6.3
38.7% VEHICLE			
AA Varnish Oil (#37)	33.0	170	22.0
PHB 22 (#55)	33.0	170	21.2
Petroleum Spirits and Drier	34.0	175	26.4
		1331	98.2

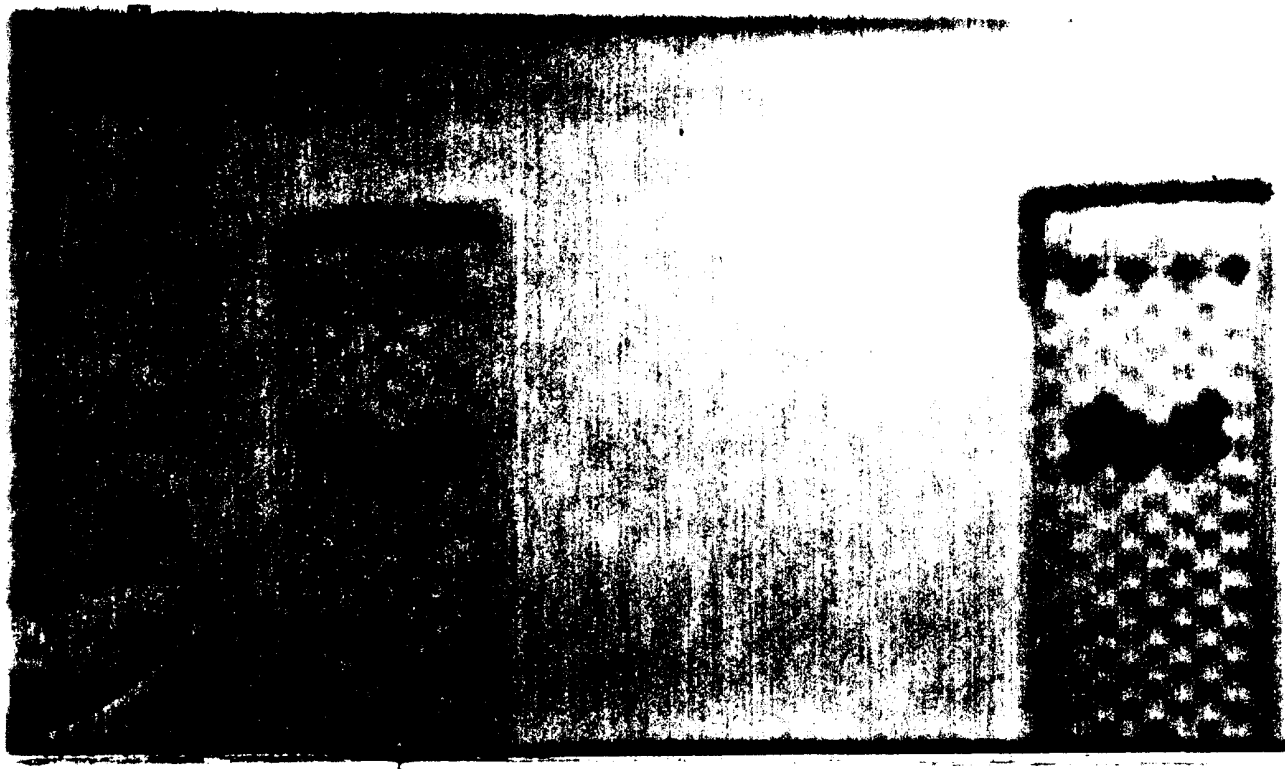
PV 36.3
Wt/Gal. 14.13 Lbs.

45X replaces lead and part of zinc oxide by volume

TT-P-86
9/9/39

	%	LBS.	GAL.
77.5% PIGMENT			
Red Lead, 97% Grade	100	1957	26.4
22.5% VEHICLE			
Raw Linseed Oil	94.4	536	69.0
Petroleum Spirits & Drier	5.6	32	4.5
		2525	99.9

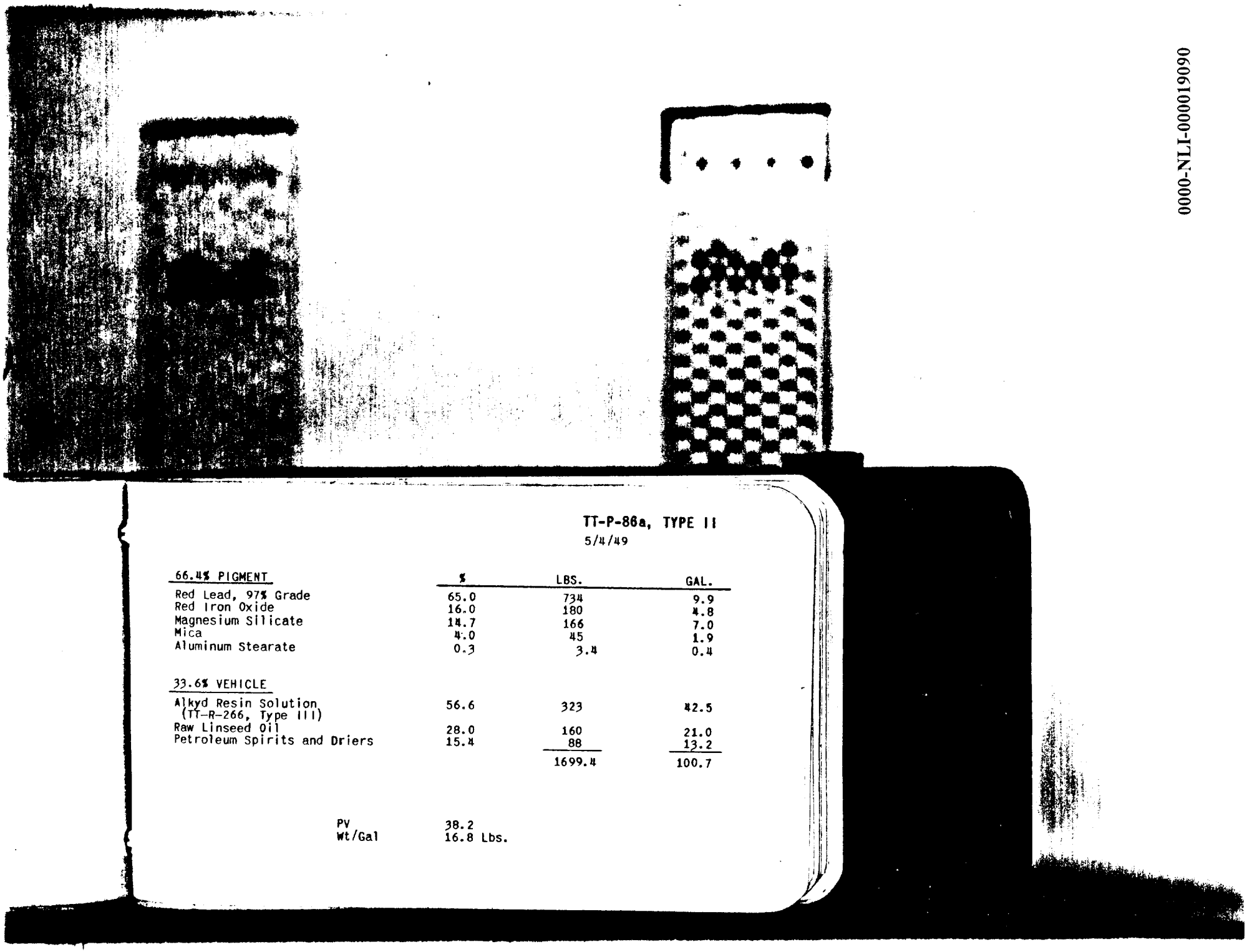
PV 27.7
Wt/Gal. 25.2 Lbs.



TT-P-86a, TYPE I
5/4/49

77.7% PIGMENT	%	LBS.	GAL.
Red Lead, 97% Grade	99.6	1897	25.6
Aluminum Stearate	0.4	5.7	0.7
22.3% VEHICLE			
Raw Linseed Oil	48.3	263	34.0
PHB Z2 (#55)	17.6	96	12.0
Petroleum Spirits and Driers	34.1	186	27.8
		2447.7	100.1

PV	36.4
Wt/Gal	24.4 Lbs.



TT-P-86a, TYPE II
5/4/49

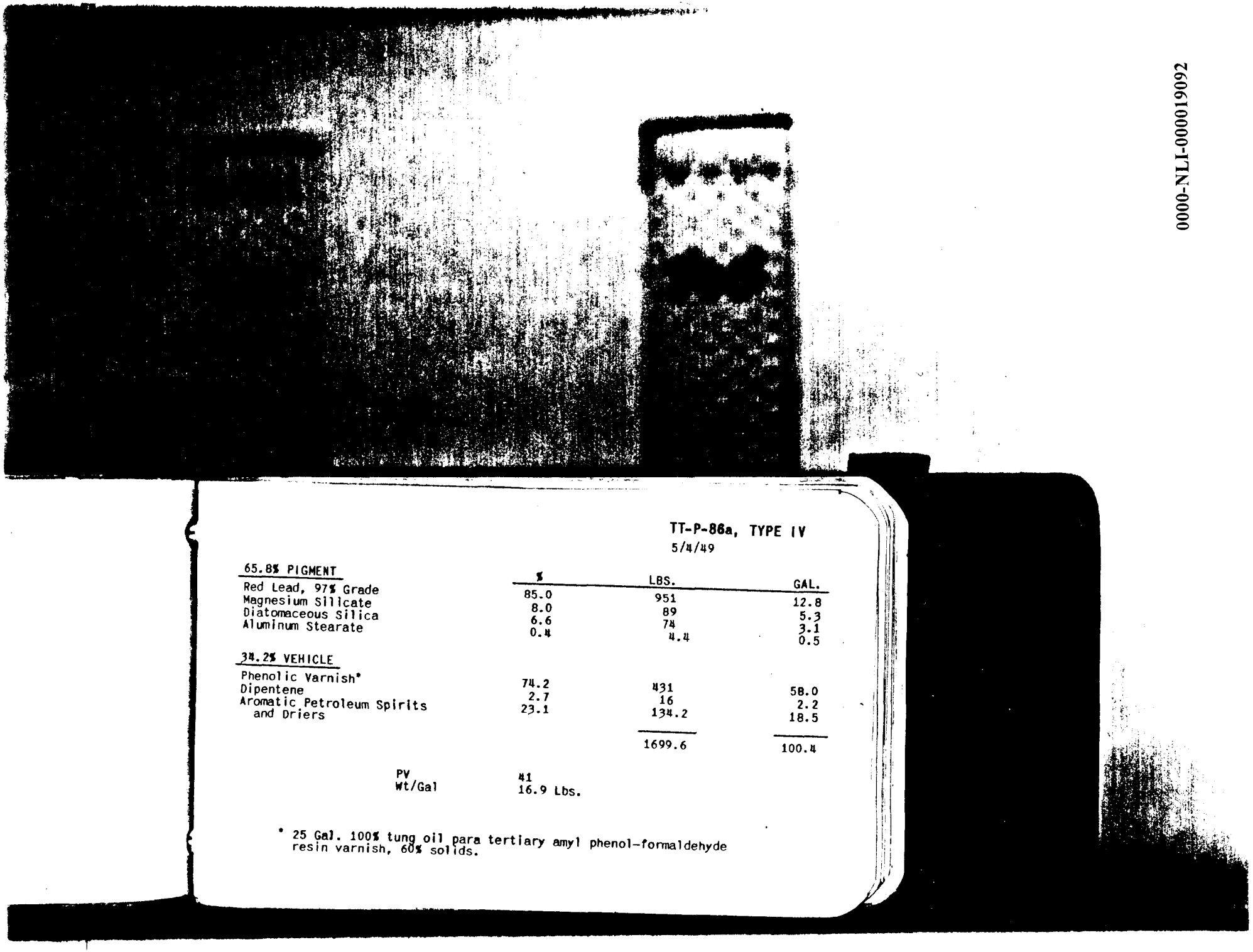
66.4% PIGMENT	%	LBS.	GAL.
Red Lead, 97% Grade	65.0	734	9.9
Red Iron Oxide	16.0	180	4.8
Magnesium Silicate	14.7	166	7.0
Mica	4.0	45	1.9
Aluminum Stearate	0.3	3.4	0.4
33.6% VEHICLE			
Alkyd Resin Solution (TT-R-266, Type III)	56.6	323	42.5
Raw Linseed Oil	28.0	160	21.0
Petroleum Spirits and Driers	15.4	88	13.2
		1699.4	100.7

PV 38.2
Wt/Gal 16.8 Lbs.

TT-P-86a, TYPE III
5/4/49

	%	LBS.	GAL.
67.3% PIGMENT			
Red Lead 97% Grade	99.7	1275	17.2
Aluminum Stearate	0.3	3.8	0.4
32.7% VEHICLE			
Alkyd Resin Solution (TT-R-266, Type III)	84.2	523	69.0
Aromatic Petroleum Spirits and Driers	15.8	98.3	13.0
		1900.1	99.6

	Pv
wt/Gal.	37.8
	19.1 Lbs.

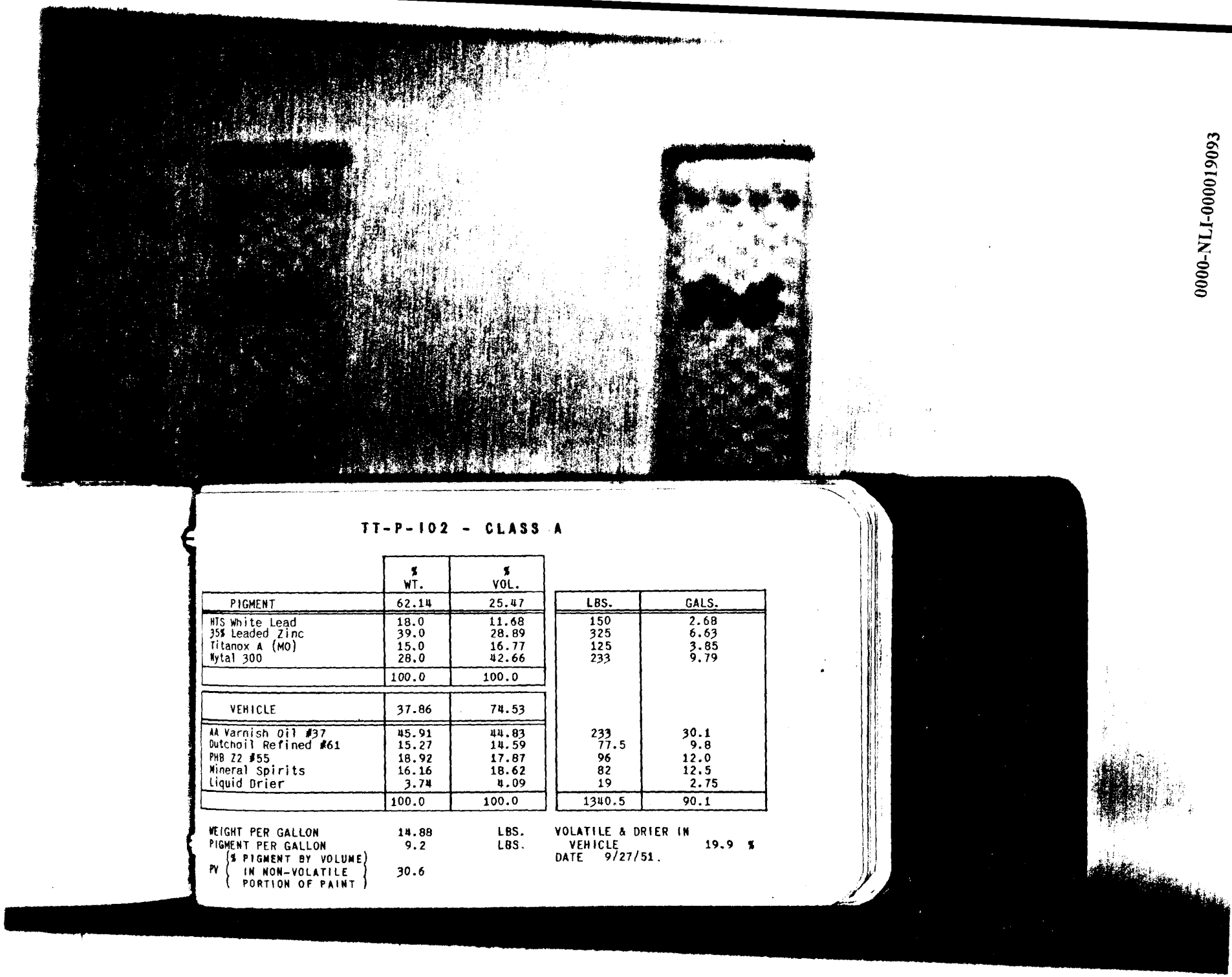


TT-P-86a, TYPE IV
5/4/49

	%	LBS.	GAL.
65.8% PIGMENT			
Red Lead, 97% Grade	85.0	951	12.8
Magnesium Silicate	8.0	89	5.3
Diatomaceous Silica	6.6	74	3.1
Aluminum Stearate	0.4	4.4	0.5
34.2% VEHICLE			
Phenolic Varnish*	74.2	431	58.0
Dipentene	2.7	16	2.2
Aromatic Petroleum Spirits and Driers	23.1	134.2	18.5
		1699.6	100.4

PV 41
Wt/Gal 16.9 Lbs.

* 25 Gal. 100% tung oil para tertiary amyl phenol-formaldehyde resin varnish, 60% solids.

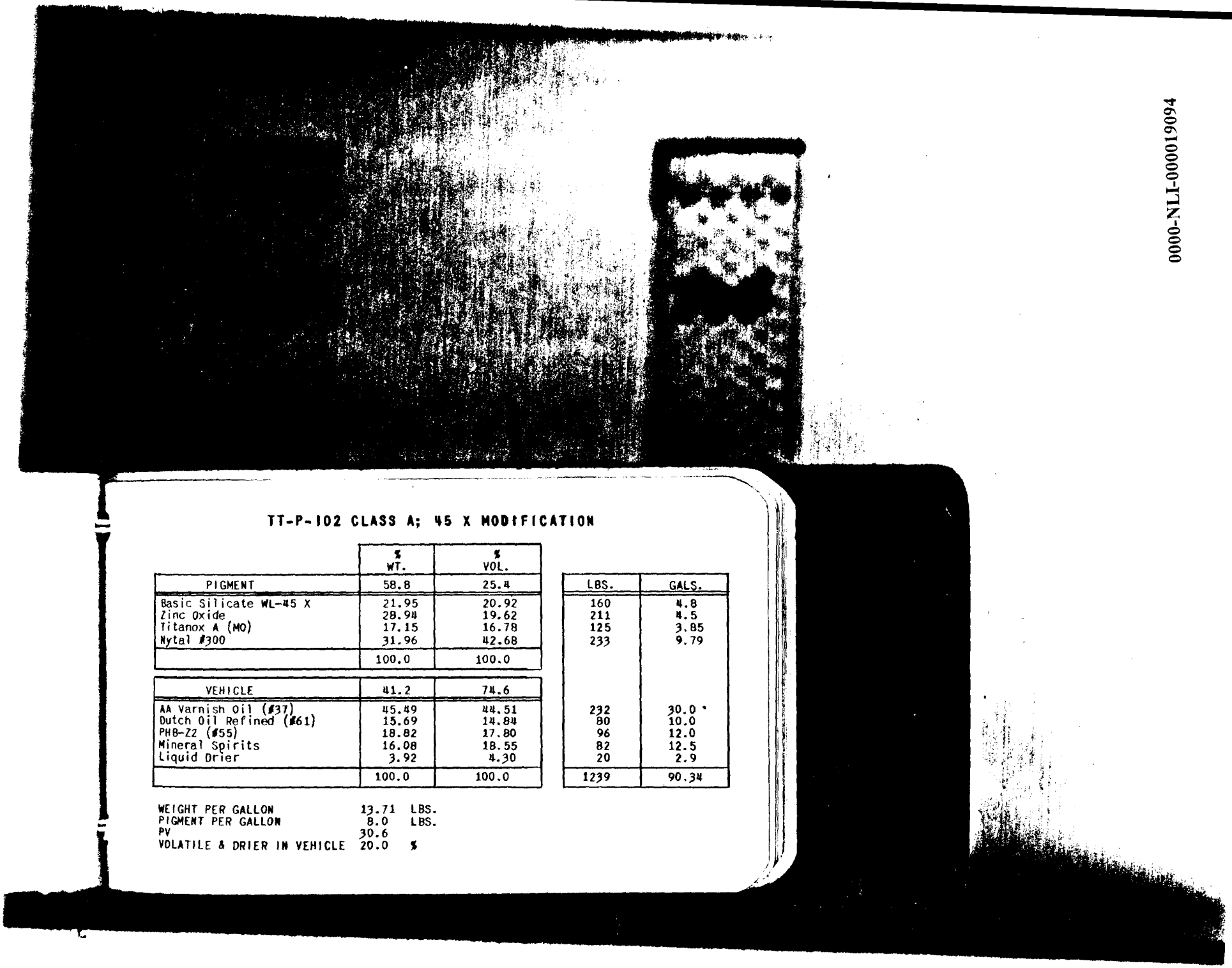


TT-P-102 - CLASS A

	% WT.	% VOL.	LBS.	GALS.
PIGMENT	62.14	25.47		
HTS White Lead	18.0	11.68	150	2.68
35% Leaded Zinc	39.0	28.89	325	6.63
Titanox A (MO)	15.0	16.77	125	3.85
Mytal 300	28.0	42.66	233	9.79
	100.0	100.0		
VEHICLE	37.86	74.53		
AA Varnish Oil #37	45.91	44.83	233	30.1
Dutchoil Refined #61	15.27	14.59	77.5	9.8
PHB 22 #55	18.92	17.87	96	12.0
Mineral Spirits	16.16	18.62	82	12.5
Liquid Drier	3.74	4.09	19	2.75
	100.0	100.0	1340.5	90.1

WEIGHT PER GALLON 14.88 LBS.
PIGMENT PER GALLON 9.2 LBS.
PV (% PIGMENT BY VOLUME IN NON-VOLATILE PORTION OF PAINT) 30.6

VOLATILE & DRIER IN VEHICLE 19.9 %
DATE 9/27/51.



TT-P-102 CLASS A; 45 X MODIFICATION

	% WT.	% VOL.	LBS.	GALS.
PIGMENT	58.8	25.4		
Basic Silicate WL-45 X	21.95	20.92	160	4.8
Zinc Oxide	28.94	19.62	211	4.5
Titanox A (MO)	17.15	16.78	125	3.85
Nytal #300	31.96	42.68	233	9.79
	100.0	100.0		
VEHICLE	41.2	74.6		
AA Varnish Oil (#37)	45.49	44.51	232	30.0
Dutch Oil Refined (#61)	15.69	14.84	80	10.0
PHB-Z2 (#55)	18.82	17.80	96	12.0
Mineral Spirits	16.08	18.55	82	12.5
Liquid Drier	3.92	4.30	20	2.9
	100.0	100.0	1239	90.34

WEIGHT PER GALLON	13.71	LBS.
PIGMENT PER GALLON	8.0	LBS.
PV	30.6	
VOLATILE & DRIER IN VEHICLE	20.0	%