

LEAD INDUSTRIES ASSOCIATION

60 EAST 42ND STREET

NEW YORK 17, N. Y.

SUBJECT TO REVISIONRED LEAD TECHNICAL COMMITTEE MEETING MINUTES

New York, N. Y.

September 29, 1958

A meeting of the Red Lead Technical Committee of the Lead Industries Association was held in the office of the Association on September 29, 1958.

PRESENT

L. L. Carrick, Chairman
Paul Whitford
J. O. Johnstone
R. P. Bates
L. K. Zimmerman

REPRESENTING

Lead Industries Association
The L. L. Fisher Co.
B. and L. Products, Inc.
National Lead Co.
National Lead Co.

Robert L. Ziefeld, Secretary-Treasurer
David M. Borcine, Secretary to Committee
Schrade F. Rattie, Director of Research
O. F. Shobe, Consultant to L.I.A.
Eli W. Turner, Lead Industries Association

The meeting was called to order at 9:30 A.M. with Dr. Carrick presiding.

The minutes of the previous meeting of May 8 and 9, 1958 were approved.

The secretary introduced Dr. Schrader F. Rattie to the committee, pointing out that Dr. Rattie had been appointed Director of Research for the Lead Industries Association and the American Zinc Institute.

REPORT BY OVEN F. SHOBE

At the request of the chairman, Owen F. Shobe, Consultant to the L.I.A. then reported on his field and research activities. In the latter connection he presented to the committee for inspection panels painted with L.I.A. Project 26 formulations, both primers and primers with top coats that had been on exposure 1,216 hours in a weatherometer.

As a result of the inspection of these panels it was decided to prepare five top coat paints, three greens and two grays, substituting white lead silico-chromate for white lead and for comparative purposes using the same vehicle as in L.I.A. Formula 2630: paint a straight clay vehicle, chosen to prepare the paints and exposure to be made at Florida and New Orleans.



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At the request of Mr. Shobe, the secretary distributed copies of L.I.A. Formulas 2620, 2624, 2625, 2626, 2627 and 2628, attached as per Exhibit "A."

The secretary was also requested to hold a quart sample of L.I.A. Formula 2612 in his office for a period of six months, after which the paint was to be examined for shelf life.

1959 PROGRAM

RESEARCH - It was decided to continue those research projects now under way and to institute one new project on I-coat machinery finishes, the test to be made primarily for tint retention and corrosion resistance. It was decided to use existing machinery engine specifications substituting anti-corrosive pigments for one or more of the pigments now included in these specifications. The exposure sites decided upon were Sayville, L.I., N. Y., New Orleans, La., and Washington, D. C.

It was also recommended that an attempt be made to have a machinery manufacturers, Government agencies, Toll road authorities and State Highway departments cooperate in the project by requesting they make their own tests with our recommended machinery finishes for both new and maintenance painting.

The secretary was thereupon requested to write to the various machinery manufacturing companies, Government agencies, Toll road authorities and highway departments for a copy of their machinery annual specification, a color chip and a sample of the paint. It was further suggested that the secretary's letter be as explicit as possible in describing the test project so that their cooperation may be more easily secured.

ADVERTISING - The committee recommended that the phrase "Lead Anti-Corrosive Pigments" be used in all advertising instead of the term "Red Lead." Also that data on lead pigmented top coat paints should be included in the advertisements.

It was also suggested that the marine market be exploited and that at least a six-page schedule in "Marine Engineering/Log" or some similar publication be considered. Further it was recommended that a direct mail campaign be aimed at this field and suggested that a Red Lead Technical Letter and a brochure could be used for this purpose.

It was pointed out that there were several lead containing paints for use in this field that have an excellent history of fine performance. These are L.I.A. 328, U. S. Navy 126 and the Maritime Commission's MC-501, all of which could be used in our advertising and direct mail campaign.

With respect to the highway market the committee agreed that in addition to space in "Engineering News-Record" some consideration be given to other media in this field such as "Roads & Streets" and the magazine published by the American Road Builders' Association. If necessary, the committee felt that a lesser number of insertions in "Engineering News-Record" could be used so as to provide for funds for these other publications.

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RED LEAD TECHNICAL LETTERS - The committee recommended the issuance of a Technical Letter on lead-containing top-coat paints, or the results of L.I.A. Project 26 if completed during 1959, plus the issuance of the two previously approved Technical Letters, one on ship-bottom paints and the other, a compilation of all previous Red Lead Technical Letters.

The secretary reported that Mr. Bates had written him offering his suggestions on how best to proceed in the preparation of a Technical Letter that would be a compilation of all previous Letters. The secretary was thereupon instructed to distribute copies of his recommendation to the committee.

REVIEW OF L.I.A. PROJECTS

Inspection data from the Joplin, Mo., and Chalmette, La., test sites for L.I.A. Projects 19, 23, 24 and 25 were submitted as per Exhibit "B" attached.

Of particular interest was the inspection data for L.I.A. Project 24 which included the paint "Blackled G." It can be noted this paint failed completely after only one year exposure at both sites. This confirmed similar data developed at the Sayville, L.I., test site.

BUILDING RESEARCH INSTITUTE CONFERENCE

The chairman asked if there were any members of the committee planning to attend the Building Research Institute's Conference on Field Applied Paints and Coatings at the Shoreham Hotel, Washington, D. C., on December 3 and 4, 1958. After some discussion, the committee recommended that one of the L.I.A. representatives attend.

The meeting adjourned at 4:30 P.M.

Paul M. Brina
Secretary to the Committee

COPY

NATIONAL LEAD COMPANY
Research Laboratories
105 York Street
Brooklyn 1, N. Y.

August 29, 1957

Mr. D. M. Borsina
Lead Industries Association
60 East 42 Street
New York 17, N.Y.

Dear Dave:

I have reviewed Technical Letters No. 6 through 12 for the purpose of determining how the pertinent information may be combined into one new letter. I offer the following suggestions for committee consideration.

1. Use Technical Letter No. 6 as a base to which formulas appearing in later literature may be added. I believe certain formulas in No. 6 might be deleted to keep the total number down.

2. Each formula listed should be given a new permanent number. I do not approve listing the same formula in different letters and assigning a new code each time.

Another way around this would be to refer to the paint's Lead Industries Association number each time and in addition assign a number corresponding to the letter number.

3. The surface preparation data in the Table of Letter No. 11 could be incorporated in the formula table of Letter No. 6.

4. The new letter could contain one or two page digests on each of the subjects discussed in the various letters - for example: Hydraulic Structures, Bridge Structures (Highway and Railroad), Rolling Stock, Galvanized Iron, etc. These could include suggested systems in tabular form where desirable including notes on surface preparation.

5. The formulas of the several finishes appearing in different letters should be listed. These as well as the primers can then be referred to in the texts dealing with specific subjects.

A new letter of this type will take a lot of effort and will no doubt be expensive. It will be worth it if it is done well - in a streamlined easy to read style. It could, if we are not careful, become ponderous and a waste of money.

Very truly yours,

RPA/fo

R. P. Bates

N2770.01

EXHIBIT (A)

L.I.A. FORMULA 2620
MORTAGE GREEN FINISH COAT
FOR BRIDGES, TANKS AND STRUCTURAL STEEL

This new fast drying structural paint, because of its synthetic vehicle, has good chemical and exceptional humidity resistance. The phenolic resin penetrating liquid thoroughly saturates loose rust and porosity on any spots missed in touch-up priming. It may be applied by brush, spray or roller, and provides excellent durability on applications to a dry film thickness of 1-1/2 to 2 mils.

	<u>Composition</u>	<u>Per Cent</u>	<u>Pounds</u>	<u>Gallons</u>
Pigment:	White Lead	41.0	266.0	4.67
	Rutile Titanium Dioxide			
	(non-chalking)	12.65	82.2	2.33
	Zinc Oxide (acicular)	12.65	82.2	1.76
	Basic Lead Silico Chromate			
		25.35	164.4	4.78
	Asbestine (Nytal 300 or equal)	6.30	41.1	1.71
	Syan Green (Copper Phtholocyanine)	1.35	9.0	.50
	Bentone 34	.7	5.1	.33
		<u>100.0</u>		
Vehicle:	Alkyd Varnish*	58.8	380.0	48.47
	Phenolic Resin Penetrating			
	Liquides*	16.1	104.5	14.00
	Phenolic Varnishes*	9.0	57.5	7.65
	Aromatic Mineral Spirits			
	(320°-390°)	7.47	45.4	6.40
	Diacetone Alcohol	6.20	39.8	5.10
	Lead Naphthenate (24% Pb)	.75	4.9	.48
	Manganese Naphthenate (6% Mn)	.15	1.0	.16
	Zinc Naphthenate (8% Zn)	1.20	10.18	1.26
	Anti-Skinning agent (Quaiacol)	.33	2.3	.32
		<u>100.00</u>	<u>1295.58</u>	<u>100.00</u>
	Pigment	50.2	Non Volatile by volume	63.2%
	Vehicle	49.8	Non Volatile by weight	78.4%
	Wt. per gal.	12.95	Viscosity	80-90 Krebs Units
	PV	25.6	Grind (Hegeman)	6-7
	Dry to Touch	3 to 5 hours		
	Dry to Recoat	18 to 24 hours		
	Reduction for spray	8 to 10 parts of material to 1 part V M & P		
		Naphtha or Toluol.		
	Reduction for brush	Brush full body.		

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- * Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the sine neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

<u>Alkyd Varnish</u>	
Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

Run in a covered agitator kettle with CO₂ blanket. Run alkali refined linseed, penta erythritol and glycerine to 200° F. Add litharge and gain 450° F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500° F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - Z to Z 1, NV 69-71%, acid no. (reduced) 4; color 5 (Hellige)
Wt. 7.8 - 8.0

- ** Phenolic Resin Penetrating Liquid: This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal. - 7.40 to 7.44	Non Volatile by wt. - 82-83%
Viscosity - A - one bubble	Resin or Resin derivative - absent
Iodine No. - 110 to 120	Hydroxyl Value - 1.3 to 1.5
Saponification- No. 135-150	Acid No. - 10 to 12

- *** Phenolic Resin Varnish:

Cooking Procedure

CK R 2432 Phenolic Resin	- 200 lb.
CK R 0036 Phenolic Resin	- 50 lb.
Tung Oil	- 62 gallons
Z-3 Low acid kettlebodied linseed	6-3/4 gallons
Aromatic Mineral Spirits	
(320°-390°)	- 10 gallons
Mineral Spirits (300°-400°)	- 65 gallons

Run phenolic resins and 31 gallons of Tung Oil to 550° F., hold 5 minutes, add 31 gallons of Tung Oil, gain 475° F., and hold for body (15 to 25 minutes). Off fire, check with Z-3 Linseed, cool and reduce.

Body R, NV 64%, Wt. 7.5 to 7.55 lb., Acid No. 20-23, color 5.

Suggested Directions for Use:

Prime or spot prime with L.I.A. 2612, L.I.A. 2614 primers, or with L.I.A. 2628, Buff Intermediate if the finish coat is to be white or a pastel color. Apply a heavy coat or coats of selected L.I.A. Finish Paint to a dry film thickness of at least 2 1/4 mils. by roller, brush or spray. Reduce, if necessary, with not more than 1 pint of V M & P Naphtha or Toluol to the gallon of finish coat. Dry 18 to 24 hours between coats.

L.I.A. Finish Coat colors other than black, white and aluminum, may be modified by intermixing or tinting with permanent colors ground in oil.

Where L.I.A. 2615 Aluminum, is to be the finish coat, apply to a dry film thickness of 1-1/4 1/4 mils. Dry 18 to 24 hours between coats.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y. (2620-2625-2626-2627)

L.I.A. FORMULA 262ADARK GREEN FINISH COAT
FOR BRIDGES, TANKS AND STRUCTURAL STEEL

This new fast drying structural paint because of its synthetic vehicle has good chemical and exceptional humidity resistance. The phenolic resin penetrating liquid thoroughly saturates loose rust and porosity on any spots missed in touch-up priming. It may be applied by brush, spray or roller and provides excellent durability on applications to a dry film thickness of 1-1/2 to 2 mils.

	<u>Composition</u>	<u>Per Cent</u>	<u>Pounds</u>	<u>Gallons</u>
Pigments:	White Lead	38.7	208.00	3.68
	Zinc Oxide (acicular grade)	11.6	62.50	1.33
	Basic Lead Silico Chromate			
	()	30.9	167.00	4.88
	Asbestos (Nytal 300 or equal)	11.6	62.50	2.63
	Phthalocyanine Green	3.9	20.80	1.20
	Zinc Yellow	1.44	7.80	.27
	Litharge	.93	5.22	.06
	Bentone 34	.91	5.22	.35
		100.00		
Vehicle:	Alkyd Varnish	58.80	386.00	49.90
	Phenolic Resin Penetrating			
	Liquid	16.20	106.00	14.30
	Phenolic Resin Varnishes	8.95	58.60	7.80
	Aromatic Mineral Spirits			
	(120°-190°)	7.43	46.20	6.90
	Diacetone Alcohol	6.18	40.50	5.20
	Lead Naphthenate (24% Pb)	.76	5.05	.50
	Manganese Naphthenate (6% Mn)	.19	1.30	.16
	Zinc Naphthenate (8% Zn)	1.14	10.40	1.30
	Anti-Skimming Agent (Guaiacol)	.35	2.34	.32
		100.00	1195.43	100.00
	Pigment	45.2%	Non volatile by volume	61.6%
	Vehicle	54.8%	Non volatile by weight	78.2%
	Wt. per gallon	11.9 lb.	Viscosity	80-90 Krebs Units
	TV	23.2	Grind (Hegman Gauge)	6-7

Dry to touch 3 to 5 hours
Dry to recoat 18 to 24 hours

Reductions Spray if necessary 8 to 10 parts material to 1 part V M & P Naptha or Toluol.

Brushes Full body.

- * Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the sine neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

<u>Alkyd Varnish</u>	
Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

Run in a covered agitator kettle with CO₂ blanket.

Run alkali refined linseed, penta erythritol and glycerine to 200° F. Add litharge and gain 45° F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500° F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - 2 to 2.1, NV 69-71%, acid no.(reduced) 4; color 5 (Hellige)
Wt. 7.8 - 8.0

- ** Phenolic Resin Penetrating Liquid: This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal. - 7.60 to 7.44	Non Volatile by wt. - 82-83%
Viscosity - 1 - one bubble	Rosin or Rosin derivative - absent
Iodine No. - 120 to 110	Hydroxyl Value - 1.3 to 1.5
Saponification No. 125-150	Acid No. - 10 to 12

- *** Phenolic Resin Varnish:

Cooking Process:

CK R 2612 Phenolic Resin	- 200 lb.
CK R 0036 Phenolic Resin	- 50 lb.
Tung Oil	- 62 gallons
Z-3 Low acid kettlebodied linseed	6-3/4 gallons
Aromatic Mineral Spirits	
(320°-390°)	- 10 gallons
Mineral Spirits (300°-400°)	- 65 gallons

Run phenolic resins and 31 gallons of Tung Oil to 550° F., hold 5 minutes, add 31 gallons of Tung Oil, gain 475° F., and hold for body (15 to 25 minutes). Off fire, check with Z-3 Linseed, cool and reduce.
Body K, NV 64%, Wt. 7.5 to 7.55 lb., Acid No. 20-23, color 5.

Suggested Directions for Use:

Prime or spot prime with L.I.A. 2612, L.I.A. 2614 primers, or with L.I.A. 2626, Buff Intermediate if the finish coat is to be white or a pastel color. Apply a heavy coat or coats of selected L.I.A. Finish Paint to a dry film thickness of at least 2 1/4 mils. by roller, brush or spray. Reduce, if necessary, with not more than 1 pint of V M & P Naphtha or Toluol to the gallon of finish coat. Dry 18 to 24 hours between coats.

L.I.A. Finish Coat colors other than black, white and aluminum, may be modified by intermixing or tinting with permanent colors ground in oil.

Where L.I.A. 2613 Aluminum, is to be the finish coat, apply to a dry film thickness of 1-1/4 1/4 mils. Dry 18 to 24 hours between coats.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y. (2620-2625-2626-2627)

L. I. A. FORMULA 2625BLACK FINISH COAT
FOR BRIDGES, TANKS AND STRUCTURAL STEEL

This new fast drying structural paint because of its synthetic vehicle has good chemical and exceptional humidity resistance. The phenolic resin penetrating liquid thoroughly saturates loose rust and porosity on any spots missed in touch-up priming. It may be applied by brush, spray or roller and provides excellent durability on applications to a dry film thickness of 1-1/2 to 2 mils.

<u>Composition</u>	<u>Per Cent</u>	<u>Pounds</u>	<u>Gallons</u>
Pigment: Black Oxide of Iron (Napies or equal)	42.0	90.50	2.20
Carbon Black (Beads)	10.5	22.60	1.47
Basic Lead Silico Chromate (L.C.)	21.15	45.20	1.32
Asbestine (Nytal 300 or equal)	21.15	45.20	1.90
Litharge	2.6	5.65	.07
Bentone 34	2.6	5.65	.37
	100.00		
Vehicle: Alkyd Varnish*	53.02	374.00	48.00
Phenolic Resin Penetrating Liquid**	16.32	115.50	15.70
Phenolic Resin Varnish***	14.93	106.00	14.12
Aromatic Mineral Spirits (320°-340°)	7.10	50.20	7.06
Diacetone Alcohol	6.20	44.00	5.66
Lead Naphthenate (24% Pb)	.75	5.44	.56
Manganese Naphthenate (6% Mn)	.15	1.80	.17
Zinc Naphthenate (8% Zn)	1.20	8.50	1.06
Anti-Skimming Agent (Quiaacol)	.33	2.53	.34
	100.00	922.77	100.00
Pigment	23.1	Non Volatile by volume	59.1%
Vehicle	76.9	Non Volatile by weight	70.5%
Wt. per gallon	9.23 lb.	Viscosity (75° F.)	80-90 Krebs Units
TV	12.6	Grind (Hegeman Gauge)	6-7

Theoretical coverage at 2 mils dry film (no loss) - 474 sq. ft.

Dry to touch 3 to 5 hours
Dry to recoat 18-24 hours

Reduction: Spray 8 to 10 parts of material to 1 part V M & P Naphtha or Toluol.

Brush: Full body.

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- * Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the same neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

<u>Alkyd Varnish</u>	
Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

Run in a covered agitator kettle with CO₂ blanket.
Run alkali refined linseed, penta erythritol and glycerine to 200° F. Add litharge and gain 450° F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500° F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - Z to Z 1, NV 69-71%, acid no.(reduced) 4; color 5 (Hellige)
Wt. 7.8 - 8.0

- ** Phenolic Resin Penetrating Liquid: This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal. - 7.40 to 7.44	Non Volatile by wt. - 62-63%
Viscosity - A - one bubble	Rosin or Rosin derivative - absent
Iodine No. - 110 to 120	Hydroxyl Value - 1.3 to 1.5
Saponification- No. 135-150	Acid No. - 10 to 12

- *** Phenolic Resin Varnish:

Cooking Procedure

CK R 2432 Phenolic Resin	- 200 lb.
CK R 0036 Phenolic Resin	- 50 lb.
Tung Oil	- 62 gallons
2-3 Low acid kettlebodied linseed	6-3/4 gallons
Aromatic Mineral Spirits	
(320°-340°)	- 10 gallons
Mineral Spirits (300°-400°)	- 65 gallons

Run phenolic resins and 31 gallons of Tung Oil to 550° F., hold 5 minutes, add 31 gallons of Tung Oil, gain 475° F., and hold for body (15 to 25 minutes). Off fire, check with 2-3 Linseed, cool and reduce.
Body K, NV 64%, Wt. 7.5 to 7.55 lb., Acid No. 20-23, color 5.

Suggested Directions for Use:

Prime or spot prime with L.I.A. 2612, L.I.A. 2614 primers, or with L.I.A. 2628, Buff Intermediate if the finish coat is to be white or a pastel color. Apply a heavy coat or coats of selected L.I.A. Finish Paint to a dry film thickness of at least 2 $\frac{1}{4}$ mils. by roller, brush or spray. Reduce, if necessary, with not more than 1 pint of V M & P Naphtha or Toluol to the gallon of finish coat. Dry 18 to 24 hours between coats.

L.I.A. Finish Coat colors other than black, white and aluminum, may be modified by intermixing or tinting with permanent colors ground in oil.

Where L.I.A. 2613 Aluminum, is to be the finish coat, apply to a dry film thickness of 1-1/4 $\frac{1}{4}$ mils. Dry 18 to 24 hours between coats.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y. (2620-2625-2626-2627)

L.I.A. FORMULA 2626LIGHT GRAY FINISH COATFOR BRIDGES, TANKS AND STRUCTURAL STEEL

This new fast drying structural paint because of its synthetic vehicle has good chemical and exceptional humidity resistance. The phenolic resin penetrating liquid thoroughly saturates loose rust and porosity on any spots missed in touch-up priming. It may be applied by brush, spray or roller and provides excellent durability on applications to a dry film thickness of 1-1/2 to 2 mils.

<u>Composition</u>	<u>Per Cent</u>	<u>Pounds</u>	<u>Gallons</u>
Pigments: White Lead	39.0	246.0	4.35
Rutile Titanium Dioxide (non chalking)	19.5	123.0	3.52
Zinc Oxide (acicular)	13.0	82.0	1.76
Basic Lead Silico Chromate	19.5	123.0	3.61
Asbestos (Nytal 300 or equal)	6.5	41.0	1.72
Phthalocyanine Blue	.5	2.5	.12
Persian Gulf Iron Oxide	1.2	7.7	.23
Bentone 34	.8	5.15	.34
	100.0		
Vehicle: Alkyd Varnish*	58.87	381.0	48.75
Phenolic Resin Penetrating Liquid**	16.10	105.0	14.10
Phenolic Resin Varnish***	9.00	58.0	7.70
Aromatic Mineral Spirits (320°-390°)	7.40	45.5	6.42
Diacetone Alcohol	6.20	40.0	5.14
Anti-Skinning Agent (Guaiacol)	.33	2.3	.32
Lead Naphthenate (24% Pb)	.75	4.94	.48
Manganese Naphthenate (6% Mn)	.15	1.26	.16
Zinc Naphthenate (8% Zn)	1.20	10.3	1.28
	100.00	1278.65	100.00
Pigment	49.4%	Non Volatile by volume	62.6%
Vehicle	50.6%	Non Volatile by weight	79.1%
Wt. per gallon	12.8 lb.	Grind (Hegeman Gauge)	6 - 7
PV	25	Viscosity	80-90 Krebs Units

Dry to touch 3 to 5 hours
Dry to recoat 18-24 hours

Reductions: Spray 8 to 10 parts material to 1 part of V M & P Naptha or Toluol.

Brush: Full body.

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- Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the same neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

<u>Alkyd Varnish</u>	
Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

Run in a covered agitator kettle with CO₂ blanket.

Run alkali refined linseed, penta erythritol and glycerine to 200° F. Add litharge and gain 450° F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500° F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - 2 to 2 1/2, NV 69-71%, acid no. (reduced) 4; color 5 (Hellige)
Wt. 7.8 - 8.0

- Phenolic Resin Penetrating Liquid: This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal. - 7.40 to 7.44	Non Volatile by wt. - 62-63%
Viscosity - 4 - one bubble	Resin or Resin derivative - absent
Iodine No. - 110 to 120	Hydroxyl Value - 1.3 to 1.5
Saponification No. 135-150	Acid No. - 10 to 12

- Phenolic Resin Varnish:

Cooking Procedure

CA R 2432 Phenolic Resin	- 200 lb.
CE R 0036 Phenolic Resin	- 50 lb.
Tung Oil	- 62 gallons
2-3 Low acid kettle-bodied linseed	6-3/4 gallons
Aromatic Mineral Spirits	
(520°-590°)	- 10 gallons
Mineral Spirits (300°-400°)	- 65 gallons

Run phenolic resins and 31 gallons of Tung Oil to 550° F., hold 5 minutes, add 31 gallons of Tung Oil, gain 475° F., and hold for body (15 to 25 minutes). Off fire, check with 2-3 Linseed, cool and reduce.

Body K, NV 64%, Wt. 7.5 to 7.55 lb., Acid No. 20-23, color 5.

Suggested Directions for Use:

Prime or spot prime with L.I.A. 2612, L.I.A. 2614 primers, or with L.I.A. 2628, Buff Intermediate if the finish coat is to be white or a pastel color. Apply a heavy coat or coats of selected L.I.A. Finish Paint to a dry film thickness of at least 2 1/4 mils. by roller, brush or spray. Reduce, if necessary, with not more than 1 pint of V M & P Naphtha or Toluol to the gallon of finish coat. Dry 18 to 24 hours between coats.

L.I.A. Finish Coat colors other than black, white and aluminum, may be modified by intermixing or tinting with permanent colors ground in oil.

Where L.I.A. 2615 Aluminum, is to be the finish coat, apply to a dry film thickness of 1-1/4 1/4 mils. Dry 18 to 24 hours between coats.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y. (2620-2625-2626-2627)

L.I.A. FORMULA 2639DARK GRAY FINISH COAT
FOR BRIDGES, TANKS AND STRUCTURAL STEEL

This new fast drying structural paint because of its synthetic vehicle has good chemical and exceptional humidity resistance. The phenolic resin penetrating liquid thoroughly saturates loose rust and porosity on any spots missed in touch-up priming. It may be applied by brush, spray or roller and provides excellent durability on applications to a dry film thickness of 1-1/2 to 2 mils.

<u>Composition</u>		<u>Per Cent</u>	<u>Pounds</u>	<u>Gallons</u>
Pigment:	White Lead	41.20	266.0	4.68
	Rutile Titanium Dioxide (non etching)	12.65	82.1	2.34
	Zinc Oxide (acicular grade)	12.65	82.1	1.75
	Basic Lead Silico Chromate (	25.35	164.4	4.79
	Asbestine (Nytal 300 or equal)	6.35	41.1	1.71
	Phthalocyanine Blue	.20	1.3	.07
	Lump Black	.80	5.2	.35
	Bentone 34	.80	5.2	.34
		100.00		
Vehicle:	Alkyd Varnish*	58.80	380.0	48.50
	Phenolic Resin Penetrating Liquid**	16.20	104.3	14.1
	Phenolic Varnishes	8.95	57.5	7.63
	Aromatic Mineral Spirits (320°-390°)	7.43	45.4	6.40
	Diacetone Alcohol	6.18	39.8	5.10
	Lead Naphthenate (24% Pb)	.76	4.9	.48
	Manganese Naphthenate (6% Mn)	.19	1.2	.16
	Zinc Naphthenate (8% Zn)	1.14	10.2	1.28
	Anti-Skinning Agent (Quiaacool)	.35	2.3	.32
		100.00	1293.2	100.00
	Pigment	90.2	Non volatile by volume	63.2
	Vehicle	49.8	Non volatile by weight	78.4
	Wt. per gallon	12.93 lb.	Viscosity	80-90 Krebs Units
	PV	25.6	Grind (Hegeman Gauge)	6-7

Dry to touch 3 to 5 hours
Dry to recoat 18 to 24 hours

Reductions: Spray, if necessary, 8 to 10 parts material to 1 part
V M & P Naphtha or Toluol.

Brush: Full body.

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- Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the sine neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

Alkyd Varnish

Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

Run in a covered agitator kettle with CO₂ blanket.

Run alkali refined linseed, penta erythritol and glycerine to 200° F. Add litharge and gain 450° F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500° F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - 2 to 2 1/2, NV 69-71%, acid no. (reduced) 4; color 5 (Hellige)
Wt. 7.8 - 8.0

- Phenolic Resin Penetrating Liquid: This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal. - 7.40 to 7.44	Non Volatile by wt. - 82-85%
Viscosity - 4 - one bubble	Rosin or Rosin derivative - absent
Iodine No. - 110 to 120	Hydroxyl Value - 1.3 to 1.5
Saponification No. 135-150	Acid No. - 10 to 12

- Phenolic Resin Varnish;

Cooking Procedure

CK R 2432 Phenolic Resin	- 200 lb.
CK R 0036 Phenolic Resin	- 50 lb.
Tung Oil	- 62 gallons
2-3 Low acid kettle-bodied linseed	6-3/4 gallons
Aromatic Mineral Spirits (320°-390°)	- 10 gallons
Mineral Spirits (300°-400°)	- 65 gallons

Run phenolic resins and 31 gallons of Tung Oil to 550° F., hold 5 minutes, add 31 gallons of Tung Oil, gain 475° F., and hold for body (15 to 25 minutes). Off fire, check with 2-3 Linseed, cool and reduce.

Body 8, NV 64%, Wt. 7.5 to 7.55 lb., Acid No. 20-23, color 3.

Suggested Directions for Use:

Prime or spot prime with L.I.A. 2612, L.I.A. 2614 primers, or with L.I.A. 2628, Buff Intermediate if the finish coat is to be white or a pastel color. Apply a heavy coat or coats of selected L.I.A. Finish Paint to a dry film thickness of at least 2 $\frac{1}{4}$ mils. by roller, brush or spray. Reduce, if necessary, with not more than 1 pint of V M & P Naphtha or Toluol to the gallon of finish coat. Dry 18 to 24 hours between coats.

L.I.A. Finish Coat colors other than black, white and aluminum, may be modified by intermixing or tinting with permanent colors ground in oil.

Where L.I.A. 2615 Aluminum, is to be the finish coat, apply to a dry film thickness of 1-1/4 $\frac{1}{4}$ mils. Dry 18 to 24 hours between coats.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y.
(2620-2623-2626-2627)

L.I.A. FORMULA 2628

FAST DRYING INTERMEDIATE COAT

FOR USE ON BRASS, TANKS AND STRUCTURAL STEEL

This new fast drying synthetic intermediate coat has an 18 to 24 hour drying time for recoating. It has good chemical resistance and excellent resistance to blistering from exposure to high humidity and moisture.

The Phenolic Resin Penetrating Liquid content of the vehicle provides for better wetting of rust and surface porosity than can be accomplished with a similar product based on a linseed oil vehicle. Its controlled luster and strong solvent content will prevent crawling trouble in cold weather painting.

	Composition	Percent	Pounds	Gallons
Pigment:	White Lead	49.1	386.0	6.79
	Rutile Titanium Dioxide			
	(non chalking)	14.7	116.0	3.19
	Basic Lead Silico Chromate	19.6	154.0	4.52
	Asbestine (Nytal 300 or equal)	12.3	96.6	4.06
	Celite (Johns Manville 289 or equal)	3.7	29.0	1.73
	Bentone 34	.6	4.8	.32
		100.0		
Vehicle:	Alkyd Varnish*	52.8	320.0	41.00
	Phenolic Resin Penetrating			
	Liquides	26.6	161.0	21.70
	Aromatic Mineral Spirits			
	(320-390)	11.3	68.5	9.63
	Diacetone Alcohol	6.05	36.6	4.81
	Lead Naphthenate (2% Pb)	1.04	6.15	.60
	Manganese Naphthenate (6% Mn)	.20	1.21	.15
	Zinc Naphthenate (8% Zn)	1.53	9.65	1.20
	Anti-Skimming Agent (Guaiacol)	.46	2.81	.30
		100.00	1392.32	100.00

Pigment	56.5	Non Volatile by volume	64.4%
Vehicle	43.5	Non Volatile by weight	82.1%
Wt. per gallon	13.9 lb.	Viscosity - 80-90 Krebs Units	
PV	32.2	Grind (Hegman Gauge)	5-6

Dry to touch 4 to 6 hours
Dry to recoat 18-24 hours

Reduction: Spray - If necessary, 8 to 10 parts material to 1 part V N & P Naphtha or Toluol.

Brush: Full body

* Alkyd Varnish is TT-R-266 Type II, Class A, held strictly to the sine neutrality test called for in the specification. A typical formula for an alkyd which works properly in this formula is processed as follows:

<u>Alkyd Varnish</u>	
Alkali Refined Linseed Oil	2944 lb.
Penta Erythritol	336 lb.
Glycerine	314 lb.
Phthalic Anhydride	1290 lb.
Litharge	1-3/4 lb.
Mineral Spirits	1900 lb.

PAGE 2
 L.I.A. FORMULA 2628
BUFF INTERMEDIATE COAT
FOR USE ON BRIDGES, TANKS AND STRUCTURAL STEEL

Run in a covered agitator kettle with CO₂ blanket.

Run alkali refined linseed, penta erythritol and glycerine to 200°F. Add litharge and gain 450°F. Hold for monoglyceride (1-1/2 to 2 hours) until clear in denatured alcohol. Add phthalic anhydride, gain 500°F. and hold for acid number and viscosity. Off fire, cool and reduce.

Body - 2 to 2 1/2, MV 69-71%, acid No. (reduced) 4; color 5 (Hellige)
 Wt. 7.8 - 8.0.

**** Phenolic Resin Penetrating Liquid:** This is an ingredient which may be purchased from The Glidden Co., Union Commerce Building, Cleveland 14, Ohio. The Glidden Co. has a patent application covering this type of wetting agent which has the following properties:

Wt. per gal	- 7.40 to 7.44	Non Volatile by wt.	- 82-83%
Viscosity	- A - one bubble	Rosin or Rosin derivative	- absent
Iodine No.	- 110 to 120	Hydroxyl Value	- 1.3 to 1.5
Saponification	- No. 135-150	Acid No.	- 10 to 12

Suggested Directions for Use:

Surface Preparation: Where an overall prime coat under L.I.A. 2628 Buff Intermediate Coat as in certain repaint work is not to be used, remove all scaly rust and loose or peeling paint by scraping, chipping, sanding and wire brushing, or by sandblasting where available. Remove grease, oil or waxy deposits with a thorough solvent wash. Use small amounts of solvent at a time and replenish frequently to avoid depositing a thin layer of oil or grease over the work. Remove off soluble salt deposits with clean water. Grind or rasp off any sharp points of metal before spot priming with L.I.A. 2614 Quick Drying Red Lead Primer, L.I.A. 2612 Chromatized Red Lead Primer, or other suitable product.

Intermediate Coat: Apply a heavy coat of L.I.A. 2628 Buff Intermediate Coat by brush, roller or spray to a dry film thickness of at least 2 1/4 mils. Reduce the Intermediate, if necessary, with not to exceed one pint of V M and P Naphtha or Toluol to the gallon of intermediate for spray. Allow to dry 18 to 24 hours of normal weather before applying a finish coat.

L.I.A. 2628 Buff Intermediate is recommended for use where the finish coat is to be white or a pastel shade for ease in securing solid hiding of the finish coat.

For additional information, write to Lead Industries Association, 60 East 42nd Street, New York 17, N.Y.

Exhibit "B"

L.I.A. Project, 19

45° South
Joplin, MissouriExposed: March '54
Inspected: Sept. '58

Inspection Data:

Prior

TT-P-641b, I

LIA 6-27

PG-21-103
(BL-ZnCrO₄-Ext.in PFO
Fract.L.O.)PM-7-20
(BL-ZnCrO₄-Ext.in raw l.o.)PM-1-4
(BL-ZnCrO₄-Ext.in JV-161 -
short oil phenolic)PM-7-9
(BL-ZnCrO₄-Ext.in Raw L.O.
+ small Ext. of JV-41)PG-25-15
(BL-ZnCrO₄-Ext.in #2508,
-long oil- alkyl)PG-25-17
(Red Lead-Met.Lead.in Raw
L.O.)Galvanized 12" X 18" in Duplicate
Lithoform Treated Untreated

Topcoat Erosion

Topcoat Erosion

No failure

No failure

No failure

Severe loss of
adhesion in top-
coated areasLoss of adhesion in
topcoated areasLoss of adhesion in
topcoated areas

No failure

No failure

Loss of adhesion
in topcoated areaLoss of adhesion
in topcoated areaLoss of adhesion
in topcoated areaLoss of adhesion
in topcoated area

No failure

No failure

Topcoat: 2 1/2 Al Parts in VAR 20

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Exhibit "B"

L.I.A. Project #23

45° South

Chalmette, La.
Inspection DateExposed: April 1957
Inspected: Aug. 1958RUST PATTERNS

Panel Numbers	L.I.A. Print No.	Areas			
		#1	#2	#3	#4
01	501	9			9
02	502				
03	503	9			
04	504	9			
05	505	9			
06	506	9			
07	511	9			
08	512	8			
09	513	7			
010	515	9			
011	516	9			
012	517	9			
013	518	9			9
014	519	9	9	9	9
015	520	9			9
016	521	9			
017	522	9			
018	523	9			
019	524	0	9 (check)		
020	525	0	9		
021	526				
022	527	9			4

Notes:

Panels exposed in duplicate
 Panels shipped by N.I.L. direct to Chalmette

Area #1 1 coat primer
 Area #2 2 coats primer
 Area #3 2 coats primer & 1 Topcoat
 Area #4 1 coat primer & 1 Topcoat

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L.I.A. PROJECT #24

Exhibit #B

45° South
Joplin, Missouri Inspection Data

Exposed Aug. '97
Inspected Sept. '98

RUST RATINGS

<u>Primer One Coat</u>	<u>Good Blasted</u>	<u>100% Rust Wire Brushed</u>	<u>50% Rust Wire Brushed</u>
TT-P-86a, I	10	10	10
Type I with PPG Fr. et. L.O.	10	10	10
Type I with O'Brien Thera-Ting Oil	10	10	10
Type I with 5% Pb Nap.h.on Vehicle Solids	10	10	10
TT-P-86a, II	10	10	10
Type II with 5% Pb Nap.h.on Vehicle Solids	10	10	10
Blacklnd G	0	1	3

Notes: Panels Used: 6" x 12" hot-rolled steel.

Paint System: 1 Brush Coat - 2 mils dry.

Cincinnati, L. Inspection Data

Exposed: Aug. '97
Inspected: Aug. '98

RUST RATINGS

<u>Primer - One Coat</u>	<u>Good Blasted</u>	<u>100% Rust Wire Brushed</u>	<u>50% Rust Wire Brushed</u>
TT-P-86a, I	10	10	9
Type I with PPG Fr. et. L.O.	10	10	9
Type I with O'Brien Thera-Ting Oil	10	10	9
Type I with 5% Pb Nap.h.on Veh. Solids	10	10	9
TT-P-86a, II	9	7	9
Type II with 5% Pb Nap.h.on Veh. Solids	10	9	8
Blacklnd G	0	0	0

Notes: Panels Used: 6" x 12" hot-rolled steel.

Paint System: 1 Brush coat - 2 mils dry.

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Exhibit "B"

L.I.A. Project #23

45° South

Joplin, Missouri

Exposed: Oct. '57

Inspected: Sept. '58

Inspection Date.

Primer	L.I.A. No.	Rust Rating	
		1-Coat Primer	2-Coat Primer
Calcium Phosphate Control	2501	7*	9*
Red Lead repl. Cr. Pl. by vol.	2502	10	10
Red Lead + Fe ₂ O ₃ repl. Cr. Pl. by coat.	2503	10	10
Rustalume 6769	2504	10	10
LIA 9-1	2505	10	10
LIA 9-4	2506	10	10
IT-P-641b, Type I	2508	10	10

* also covered with Mildew

Notes: Panels Used: 6" X 12" hot-rolled, sand-blasted, 100% rusted, then wire brushed.

Paint System:

2 coats Primer	2 coats Primer 1 Topcoat
1 coat Primer	1 Coat Primer 1 Topcoat

Topcoated Areas - No Failure
Topcoat Used - LIA #2507 (Moss Green)

Galvanized Panels - No Failure

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Exhibit "B"

Painting ScheduleExposed 31 October 1957

LIA Project #29

Joplin
45° SouthPanel Numbers

100% Rusty Wire Brushed	New Galvanized Solvent Washed
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R275	R281
R276	R282
R277	R283
R278	R284
R279	R285
R280	R286
R288	R287

L.I.L. Print Number
(Primers)Brush Applied, 2 days dry

#2501
#2502
#2503
#2504 (Rustolcum #769)
#2505 (L-3-463) (LIA 9-1)
#2506 (L-3-464) (LIA 9-4)
#2508 (TT-P-641b, I)

Topcoat for all panelsLIA #2507
(K Massachusetts Green)Paint System for all Panels:

2 coats Primer	2 coats Primer 1 Topcoat
1 coat Primer	1 coat Primer 1 Topcoat

Description of Prints P.V.

#2501 Ca Plumb to Control	38
#2502 Red Lead for Ca Plumbate by volume	38
#2503 Red Lead-Fe ₂ O ₃ for Ca Plumbate by cost.	38
#2504 Rustolcum #769	—
#2505 LIA 9-1	43.9
#2506 LIA 9-4	41.4
#2507 Green Topcoat	27
#2508 TT-P-641b, Type I	38.1

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Exhibit "B"

U.I.L. Project #25

45° South

Charlottesville, Va.

Inspection Date

Exposed: Nov. '57

Inspected: Aug. '58

Primers	LIA No.	RUST R. TIME			
		1 Primer	2 Primer	1 Primer 1 Topcoat	2 Primer 1 Topcoat
Calcium Plumbate Control	2501	3	5	9	10
Red Lead repl. Ca. Pl. by Vol.	2502	9	10	10	10
Red Lead + Fe ₂ O ₃ repl. Ca. Pl. by cost	2503	10	10	10	10
Bastolium #769	2504	2	8	8	10
LIA 9-1	2505	9	10	10	10
LIA 9-4	2506	10	10	10	10
TT-P-641b, Type I	2508	10	10	10	10

Notes: Panels Used: 6" x 12" hot-rolled steel, sand-blasted, 100%
 rusted, then wire brushed.

Topcoat used: LIA #2507 (Hess Green)

Paint System:

2 coats Primer	2 coats Primer 1 Topcoat
1 Coat Primer	1 Coat Primer 1 Topcoat

The only failure on the Galvanized Set was on the Calcium Plumbate Control, #2501, which had 9 rust on the 1 prime coat area and 3 crack & flake on the 2 prime coat area.

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Exhibit 80

Painting ScheduleExposed 7 Nov. 1957LIA Project #25
New Orleans

South

Panel Numbers

100% Rusted Wire Brushed	New Galvanized Solvent Washed
B360	B366
B361	B367
B362	B368
B363	B369
B364	B370
B365	B371
B332	B393

L.I.A. Print Number
(Primers)Prush applied, 2 mils dry

#2501
#2502
#2503
#2504 (Rustolium #769)
#2505 (E-3-463) (LIA 9-1)
#2506 (E-3-464) (LIA 9-4)
#2508 (TT-P-641b, I)

Topcoat for all panelsLIA #2507
(Massachusetts Green)Paint System for all Panels:

2 coats Primer	2 coats Primer 1 Topcoat
1 coat Primer	1 coat primer 1 Topcoat

Description of Paints

P.V.

#2501 C. Plumb to Control	38
#2502 Red Lead for C. Plumb to	38
by volume.	
#2503 Red Lead-Pu0 ₃ for	38
C. Plumb to by cost	
#2504 Rustolium #769	—
#2505 LIA 9-1	43.3
#2506 LIA 9-4	41.4
#2507 Green Topcoat	27
#2508 TT-P-641b, Type I	38.1