

LEAD INDUSTRIES ASSOCIATION

400 LEXINGTON AVENUE

NEW YORK 17, N. Y.

RED LEAD DIVISION

TENTATIVE DRAFT
CONFIDENTIAL
SUBJECT TO REVISION

RED LEAD TECHNICAL COMMITTEE

New York, New York

December 16, 17, 1948

A meeting of the Red Lead Technical Committee of the Lead Industries Association was held on December 16, 17, 1948 in the offices of the Association. The following persons were in attendance:

Present

Mr. George Diehlman
Mr. A. C. Goets
Dr. J. O. Johnstone
Mr. O. F. Shobe

Representing

National Lead Company
Eagle-Picher Company
Hammond Lead Products, Inc.
The Glidden Company

Dr. L. L. Carrick, Director of Red Lead Research, Meeting Chairman
Mr. Robert L. Ziegfeld, Secretary, Lead Industries Association
Mr. C. J. Vander Valk, Technical Director

REPORT ON STATUS OF PRIMER PAINTS SUBMITTED FOR TESTS BY THE NORFOLK AND PHILADELPHIA NAVAL SHIPYARDS.

The meeting was begun at 10:00 A. M. on December 16 with a review of the status of the two cooperative projects with the Navy.

It was reported by the technical director that the fifteen L. I. A. bottom paint systems had been applied during the week of November 29 at the Norfolk Naval Shipyard following as closely as was proved practicable the application procedures submitted by the Red Lead Technical Committee. Notable exceptions were the complete vinyl systems where five coats of the anticorrosive primers were needed to attain a 3 mil minimum dry film thickness instead of two coats as prescribed in the proposed outline of the project.

Except for the vinyl systems, all of the L. I. A. systems comprised two coats of red lead base anticorrosive paint at a total minimum film thickness of 3 mils and two coats of Navy cold plastic anti-fouling (Navy 105) at a dry film thickness of approximately five mils.



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All L. L. A. anticorrosive paints were applied both over phosphate treated sandblasted steel and over washcoat primers applied to sandblasted steel.

Duplicate panels of all of the systems included in the project were prepared for total immersion in sea water at Sayville, Yorktown, Virginia (Norfolk Naval Shipyard's test barge), Miami Beach, Florida and Wrightville Beach, North Carolina. The dimensions of the panels coated for immersion at Sayville, Yorktown and Miami were 10" x 12" x 1/8". The panels prepared for exposure at Wrightville were 6" x 12" x 1/8".

The entire project embraced thirty seven bottom paint systems applied to a total of 296 panels.

The anticipated date of exposure at all four test sites was on or about January 1, 1949.

It was also reported that the nine red lead base primers submitted to the Philadelphia Naval Shipyard for tide range and atmospheric had been applied during the week of November 22 in accordance with directions supplied with each paint.

Two coats of each primer were applied with automatic spray equipment to a total dry film thickness of 3-4 mils. The L. L. A. primer paints and the control paints were applied to ten acid pickled - phosphate treated 6" x 12" steel panels; five for Sayville exposure and five for Florida exposure.

The present Navy Specification 52-P-18 formulation, the tentative revision of 52-P-18 and U. S. Maritime Specification 52-MC-29 were included as controls.

RED LEAD PAINT FORMULATIONS FOR NEW EDITION OF LEAD HANDBOOK.

The Committee was asked by Mr. Liegfeld to suggest red lead paint formulations for inclusion in the chapter on red lead in the proposed revision of "Useful Information About Lead" to be called "The Lead Handbook."

After considerable deliberation the Committee agreed that the following formulations would be appropriate.

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FOR ATMOSPHERIC EXPOSUREPaint A (Federal Specification TT-P-86, Sept. 9, 1939)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	100.0	1957	26.4
	100.0		
VEHICLE: Raw Linseed Oil	94.3	536	69.1
Petroleum Spirits and Drier	5.7	39	4.5
	100.0	2525	100.0

Pigment by weight 77.56
 Vehicle by weight 22.58
 Weight per Gallon 25.25 lb.

PP (Percent pigment by volume
 in non-volatile portion of
 paint) 27.6

Paint B (Proposed Tentative Federal Specification TT-P-86a,
Type 1)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	99.7	1860.	25.96
Aluminum Stearate	0.3	5.5	0.64
	100.0		
VEHICLE: Raw Linseed Oil	49.0	268.	34.80
Pale Heat Bodied Linseed Oil (2-2 Viscosity)	17.0	90.8	11.60
Mineral Spirits	29.0	154.5	23.80
Drier*	5.0	26.4	3.48
	100.0	2399.2	100.00

Pigment by weight 77.84
 Vehicle by weight 22.28
 Weight per gallon 24 lbs.

PP (Percent pigment by volume
 in non-volatile portion of
 paint) 346

*Federal Specification TT-P-86a, Type 1

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Paint C (Proposed Tentative Federal Specification TT-P-86a,
Type II)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	65.0	71.6	10.30
Iron Oxide (85% Fe ₂ O ₃)	16.0	18.4	4.96
Magnesium Silicate	14.5	16.8	7.13
Mica	4.2	4.6	1.95
Aluminum Stearate	0.3	3.5	0.42
	100.0		
VEHICLE: Alkyd Resin*	57.0	327	40.96
Raw Linseed Oil	28.0	163	20.90
Mineral Spirits	14.1	83.5	12.80
Lead Naphthenate Drier (2 1/2% Pb)	0.6	4.2	0.44
Cobalt Naphthenate Drier (6% Co)	0.3	1.7	0.20
	100.0	1726.9	100.00

Pigment by weight 66.4%

Vehicle by weight 33.6%

Weight per Gallon 17 lbs.

PV (Percent pigment by volume
in non-volatile portion of
paint) 38%

*Medium oil length linseed modified glyceryl phthalate alkyd (3% phthalic anhydride), 50% solution in mineral spirits.

Paint D (Proposed Tentative Federal Specification TT-P-86a,
Type III)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	99.7	1275	17.20
Aluminum Stearate	0.3	3.5	0.46
	100.0		
VEHICLE: Alkyd Resin*	84.0	522.5	67.90
Aromatic Petroleum Spirits	14.5	90.	13.70
Cobalt Naphthenate (6% Co)	0.3	1.9	0.20
Antioxidants and Wetting Agents	1.2	7.6	0.74
	100.0	1900.5	100.00

Pigment by weight 67.3%

Weight per Gallon = 19 lbs.

Vehicle by weight 32.7%

PV (Percent pigment by volume in non-volatile portion of paint) 38%

*This alkyd is identical to that specified in the vehicle of Paint C.

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Paint E

Composition	Percent	Pounds	Gallons
PIGMENT: Red Lead	60.0	696	9.42
Siliceous Iron Oxide (75-85% Fe_2O_3)	20.0	232	6.92
Magnesium Silicate	20.0	232	9.75
	100.0		
VEHICLE: Raw Linseed Oil	64.0	349	44.85
Linseed Oil (2-2 Body)	5.0	26	3.30
Thinner and Drier ^a	31.0	169	25.76
	100.0	1706	100.00

Pigment by weight 60%

Vehicle by weight 32%

Weight per Gallon 17 lbs.

PV (Percent pigment by volume
in non-volatile portion of
paint) 35%

^aThe addition of aluminum stearate up to 0.3% by weight of pigment is suggested to maintain suspension of the pigment in the vehicle.
^aDrier: 0.3% lead, 0.02% manganese, 0.02% cobalt based on oil content.

Paint F

Composition	Percent	Pounds	Gallons
PIGMENT: Red Lead (97% Grade)	60.0	698	9.44
Siliceous Iron Oxide (75-85% Fe_2O_3)	20.0	233	6.45
Magnesium Silicate	20.0	233	9.78
	100.0		
VEHICLE: Linseed Oil	50.0	276	35.21
Varnish (See Note below)	20.0	109	14.41
Thinner and Drier ^a	30.0	164	24.71
	100.0	1711	100.00

Pigment by weight 60%

Vehicle by weight 32%

Weight per Gallon 17 lbs.

PV (Percent pigment by volume
in non-volatile portion of
paint) 30%

^aDrier: 0.3% lead, 0.02% manganese, 0.02% cobalt based on oil content.

NOTE: It was decided to include this formulation with the reservation that an ester gum or modified phenolic varnish be specified that is compatible with red lead. Mr. Shobe agreed to make up and furnish information on a suitable varnish.

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Paint G

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	64.7	592	8.00
Iron Oxide (85% Fe ₂ O ₃)	16.0	146	4.30
Magnesium Silicate	14.8	135	5.70
Mica (325 Mesh)	4.0	37	1.60
Aluminum Stearate	0.5	4.6	0.55
	100.0		
VEHICLE: Alkyd Resin Solution*	45.2	374	34.68
Phenolic Varnish**	33.7	204	27.15
Aromatic Petroleum			
Spirits	19.9	121	17.22
Lead Naphthenate (24.5%)	1.0	5.8	0.60
Cobalt Naphthenate			
(6% Co)	0.1	0.9	0.10
Manganese Naphthenate			
(6% Mn)	0.1	0.9	0.10
	100.0	1521.2	100.00

*linseed modified glyceryl phthalate alkyd containing 25% phthalic anhydride, solution contains 70% solids by weight.

**33 gallon para-phenyl phenolic varnish containing in the oil phase 60% tung oil and 40% linseed oil. Non-volatile content by weight is 60%. Viscosity = D (Gardner Heldt)

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FOR CONTINUOUS DILUTION IN FRESH WATERPaint M (Proposed Tentative Federal Specification TT-P-86a,
Type IV)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	85.0	990	12.85
Diatomaceous Silicon	8.0	89.6	5.36
Magnesium Silicate	6.6	76	3.10
Aluminum Stearate	<u>0.40</u>	<u>4.4</u>	<u>0.53</u>
	100.0		
VEHICLE: Phenolic Varnish*	76.0	432	57.70
Aromatic Petroleum			
Spirits	22.4	129.7	17.70
Lipentine	2.75	16	2.26
Antioxidants	0.5	2.2	0.27
Lead Naphthenate (24% Pb)	0.23	1.4	0.15
Cobalt Naphthenate			
(6% Co)	0.06	0.3	0.04
Manganese Naphthenate			
(6% Mn)	<u>0.06</u>	<u>0.3</u>	<u>0.04</u>
	100.00	1699.9	100.00

Pigment by weight 65.9%

Vehicle by weight 34.1%

Weight per Gallon 17 lbs.

PV (Percent pigment by volume
in non-volatile portion of
paint)

41%

*Phenolic Varnish

Phenolic Resin (100% pure tertiary amyl phenol-
formaldehyde resin) 20.25%

Tung Oil (F. S. JJJ-Q-35) 39.75

Mineral Spirits (F. S. TTT-T-291a, Grade 1) 40.00

100.00%

Cooking Procedure: Heat all the resin and oil to 465° F. in 40 minutes. Hold the batch at this temperature long enough (35-40 minutes) to obtain the desired viscosity when thinned to the specified solids content. Water-cool and thin with mineral spirits.

Oil Length 25 gallons Color (Hollings) 9

Non Volatile 59-61% Wt. per Gallon 7.5 lbs.

Viscosity (G-H) F-H

Drying Time:

Set to touch 2 hrs.

Print free 8 hrs.

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FOR MARINE ATMOSPHERES AND
INTERMITTENT IMMERSION IN SEA WATERPaint 1 (U. S. Maritime Commission Specification S2-Mc-501)

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (P. 2, TT-2-191a, Type 1, Grade C)	55.6	380	5.14
Zinc Yellow (P. 3, TT-2-415, Type 1)	10.2	70	2.31
Mica	9.4	65	2.41
Indian Red	1.4	10	0.20
Magnesium Silicate (S2-MC-52), Type 1)*	23.3	160	6.70
Aluminum Stearate	0.3	2	0.24
	100.0		
VEHICLE: Alkyd Resin (S2-MC-501, Type 1)*	66.0	415	52.00
Aromatic Naphtha (Type 111)	16.7	105	14.00
Petroleum Spirits (P. 3, TT-2-291a, Grade 11)	17.3	110	17.00
	100.0	1317	100.00

Notes: Litharge may be added as drier up to 6 pounds per 100 gallons.

Pigment by weight 52%
Vehicle by weight 48%
Weight per Gallon Not under 12.8 lbs.

PV (Percent pigment by volume in non-volatile portion of paint) 33%

*S2-MC-501 - A linseed oil modified glyceryl phthalate alkyd.

Non-Volatile - 70 ± 1%
Wt. per gallon - 8 lbs.
Phthalic Anhydride - not under 2%

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FOR CONTINUOUS DILUTION IN SEA WATER.Paint 4

<u>Composition</u>	<u>Percent</u>	<u>Pounds</u>	<u>Gallons</u>
PIGMENT: Red Lead (97% Grade)	55.0	365.0	4.93
Zinc Oxide	10.0	66.3	1.41
Zinc Yellow (Zinc Chromate)	10.0	66.3	2.20
Siliceous Iron Oxide (85% Fe ₂ O ₃)	6.9	45.8	11.23
Magnesium Silicate	10.0	66.3	2.78
Mica (325 Mesh)	7.9	52.5	2.25
Aluminum Stearate	0.2	1.4	0.17
	100.0		
VEHICLE: Alkyd Resin Solution [®]	11.2	214.0	26.75
Phenolic Varnish LR-265 [™]	49.3	318.0	41.09
Mineral Spirits	7.4	48.0	7.31
Ri Flash Naphtha	9.7	62.5	8.64
Lead Naphthenate (24% Pb)	0.3	1.9	0.20
Cobalt Naphthenate (6% Co)	0.1	0.8	0.09
	100.0	1304.8	

Pigment by weight 50.6 (approximate)
 Vehicle by weight 49.4 (approximate)
 Weight per Gallon 13.1 (approximate)

PV (Percent pigment by volume
 in non-volatile portion of
 paint)

29

This formulation constitutes a revision of L.I.A. Paint No. 33. The pigmentation in L.I.A. 33 was changed to include water ground mica and to exclude diatomaceous silica. It was decided to retain the V-26 vehicle.

Mr. Diehlman agreed to prepare a sample of the revised formulation to determine its practicability.

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It was decided that a paragraph be included preceding each red lead formulation in the new handbook to clarify its application and limitations. The technical director said he would do this and present the copy for the Red Lead Technical Committee approval before publication of the handbook.

RED LEAD BASE PAINTS FOR THE NEW YORK CONSOLIDATED EDISON COMPANY

At the previous meeting of the Red Lead Technical Committee on November 3 the technical director informed those present that he had been called in by Mr. Galloway, Engineer in charge, Structural Engineering Bureau, of the Consolidated Edison Company to discuss mixed pigment red lead paints for application as shop coats for structural steel and in general maintenance work.

The committee was told that Consolidated Edison was seriously considering the abandonment of their present red-lead-in-oil primer paint because of its high cost and other objections of a minor nature. It was suggested by the Consolidated personnel that a few mixed pigment type formulations be submitted for performance tests.

On consideration of this matter at the November 3 meeting, the Committee selected four red lead base mixed pigment formulations for submission to the Consolidated Edison Company. Mr. Diehlman prepared one quart samples of each of these paints shortly thereafter.

In subsequent conversations with Consolidated Edison by both Mr. Diehlman and the technical director, several new problems arose involving various paint applications. In view of the scope and variety of Consolidated Edison paint applications, tentative arrangements were made to meet for a comprehensive discussion with the entire group of engineers concerned with paint problems.

In view of all that had transpired since the November 3 meeting it was suggested that Mr. Diehlman and the technical director hold the planned meeting with the Consolidated Edison personnel before any specific paint formulations or samples be submitted. The Committee approved this procedure.

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GAS HOLDER PAINTS

In accordance with the decision of the Red Lead Technical Committee meeting on October 8, 1948 to initiate cooperative projects on gas holder paints, the following seven formulations were selected for this purpose.

Paint No. 1

Federal Specification TT-P-86a, Type I.

Paint No. 2

Pigments:	Red Lead (97% Grade)	50.0%
	Iron Oxide (85% Fe_2O_3)	10.0%
	Magnesium Silicate	14.6%
	Diatomaceous Silica	5.0%
	Mica (325 Mesh)	20.0%
	Aluminum Stearate	0.4%

With Litharge packaged separately and amounting to 1% of total pigmentation by weight.

VEHICLE:	Phenolic Varnish (In Type IV, TT-P-86a)	74.0%
	Aromatic Petroleum Spirits	22.4%
	Lipentine	2.8%
	Antioxidants	0.5%
	Lead Naphthenate (24% Pb)	0.2%
	Cobalt Naphthenate (6% Co)	0.05%
	Manganese Naphthenate (6% Mn)	0.05%
	PV (of paint ready for use)	3%

Paint No. 3

PIGMENT:	Red Lead (97% Grade)	40.0%
	Iron Oxide (85% Fe_2O_3)	25.0%
	Diatomaceous Earth	9.6%
	Mica (325 Mesh)	25.0%
	Aluminum Stearate	0.4%

VEHICLE:	Varnish LV-195	100.0%
	(3) gallon BR254 - Tung - Linseed Varnish)	

PV = 3%

Mr. Diehlman agreed to furnish Paint Nos. 1, 2 and 3.

Paint No. 4

PIGMENT:	Red Lead (97% Grade)	40.0%
	Iron Oxide (85% Fe_2O_3)	15.0%
	Magnesium Silicate	14.6%
	Mica (325 Mesh)	30.0%
	Aluminum Stearate	0.4%

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With Litharge packaged separately and amounting to 20%
of total pigmentation by weight.

VEHICLE: L. I. A. No. 27 100%

PV = 35%

Paint No. 5

PIGMENT: Red Lead (97% Grade)	30.0%
Zinc Dust	50.0%
Mica (325 Mesh)	19.6%
Aluminum Stearate	0.4%

VEHICLE: Combination of linseed oil and V-175, (Sufficient
linseed oil for grinding and then enough V-175 to
obtain proper consistency)

PV = (must be determined)

Paint No. 6

Same pigmentation as used in Paint No. 2 with a
vehicle consisting of 50% thermalized tung oil and
50% linseed oil.

PV = 35%

A complete vinyl system including Bakelite P-10 anticorrosive (red
lead in vinyl resin vehicle) will also be included if it proves
practical to prepare gas holder surfaces properly.

Mr. Shobe agreed to furnish Paint Nos. 4, 5 and 6 and the paints
for the vinyl system if included.

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DISCUSSION OF REPORT FOR PUBLICATION ON THE L.I.A. ATMOSPHERIC PROGRAM

The latest draft of the report planned for publication describing the Lead Industries Association Atmospheric Program was reviewed. The following recommendations were made and agreed upon by the Committee.

Binder

It was decided to print the following title on the binders:
"CORROSION INHIBITIVE PAINTS FOR IRON AND STEEL EXPOSED TO THE ATMOSPHERE"

It was suggested and agreed that the following brief explanation should be printed on the front cover of the binders:

"A Technical Report On The Study Of Conventional And Synthetic Type Corrosion Inhibitive Primer Formulations For Protection Of Iron And Steel Surfaces In Atmospheric Exposure."

Cover Sheet - Page 1

In addition to the project title and signature as found on the binder, the cover sheet will contain the following title in the upper right hand corner:

"Report No. 1 - Description of Project Corrosion Inhibitive Paint Study"

It was also decided to include this title in the upper right hand corner of every page of the report.

Pages 2 and 3

The Committee condensed the two introductory sections into one section reading as follows:

"The maintenance and specification engineer, the paint formulator and others are constantly faced with the problem of selecting the most effective paint system for protecting ferrous metals subjected to atmospheric exposure. For this reason, and because of the ever-changing nature of paint technology, a comprehensive investigation of metal protective paints has been undertaken to aid in the solution of this problem.

"This is a preliminary report describing in detail both the test procedure and the paint compositions in this investigation.

"Ninety-two conventional and the newer synthetic type corrosion inhibitive primer formulations applied on flat panels are exposed at five sites. Also, to simulate actual conditions encountered in painting structural steel, angle iron specimens in duplicate were exposed at two of the test sites.

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"In planning this project, the Red Lead Technical Committee of the Lead Industries Association did not rely entirely on its own information and experience when dealing with other than lead pigments. Other formulations were included which were based on the experience of proponents of other pigments."

Other Changes and Additions

It was decided to include a table of contents at the beginning of the report and another one preceding the detailed tables of pigmentations, vehicles and paints. The latter table of contents would aid in the location of specific information in a necessarily long and complicated series of tables. The tables were also retitled to aid in cross referencing.

Among the changes proposed and agreed upon for the map of exposure sites were the elimination of New York City, the simplification of the title to "Exposure Sites", a notation pertaining to the semi-tropical climate of New Orleans and the inclusion of a more realistic structural steel building among the symbols above the map.

Several other minor changes and additions were also agreed upon. These along with the changes noted above will be incorporated into another draft of this proposed publication. This draft will be circulated to the Red Lead Technical Committee members for comment before it is submitted to the printer.

NEXT MEETING

It was agreed to hold the next meeting of the Red Lead Technical Committee on February 24 and 25, 1949.

The meeting was adjourned at 4:00 P. M. on December 17.


C. J. Vander Valk
Technical Director