

LEAD INDUSTRIES ASSOCIATION

480 LEXINGTON AVENUE

NEW YORK 17, N. Y.

RED LEAD DIVISION

TENTATIVE DRAFT
CONFIDENTIAL
SUBJECT TO REVISION

RED LEAD TECHNICAL COMMITTEE

New York, New York

May 2, 3, 4, 1949

A meeting of the Red Lead Technical Committee was held on May 2, 3, 1949 at Sayville, New York and on May 4, 1949 in the offices of the Lead Industries Association.

Present

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

Representing

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

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

INSPECTION OF L.I.A. PROJECTS AT SAYVILLE, NEW YORK

A complete inspection was made on May 2 of all L.I.A. paint specimens exposed at Sayville, both at the Marine Basin and at the Atmospheric Station.

The results of this inspection are enclosed with these minutes as Exhibit A. The formulations of the test paints follow the inspection records for each project. Also included in Exhibit A is a report on the latest inspections of the galvanized iron specimens (Project 10) at both Joplin and Sayville.

PUBLICATION OF PROGRESS REPORTS ON THE NEW L.I.A. ATMOSPHERIC PROGRAM (PROJECT 14)

After various methods of publishing the future inspection data on the L.I.A. Corrosion Inhibitive Paint Project were discussed it was agreed that a single page tabular form would be most desirable.

It was decided to publish only the corrosion ratings in the progress reports since most specifiers and users of metal protective paints are primarily interested in the breakdown of the film as evidenced by rust formation. This would also permit briefer and more readable reports. It was also decided to publish average ratings for each duplicate set of angle irons.



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It was agreed that each published progress report should contain a restatement of the project objectives contained in the introductory report.

Because the progress reports must eventually list data for 95 primers on one type of specimen at three exposure sites and two types of specimens at two exposure sites, all under two different finish paint coats, a single page report form would necessitate a carefully designed folded chart. Since the organization of a suitable chart is largely a problem of printing layout and mechanics, the Technical Director was advised to work out a few practical schemes with the aid of a printing expert for the approval of the Committee. The Technical Director said he would do this prior to the next Committee meeting.

INSPECTION RECORDS FOR THE NEW ATMOSPHERIC PROGRAM

It was decided that the inspection records of the L.I.A. Atmospheric Program should contain complete data on each exposed specimen at every location. This is to include edge and general performance ratings on corrosion, peeling, checking, cracking, flaking, chalking and detailed commentary on special or unusual conditions as they occur.

Two suggested inspection sheet layouts were submitted by Dr. L. L. Carrick for consideration of the Committee. These were selected by Dr. Carrick as the best of fifteen proposals submitted by his students at the University of Michigan. The Committee examined these carefully and agreed that a slight revision of one of these forms might prove practical. A photostat of this proposed layout is attached to these minutes as Exhibit B.

The Technical Director was requested to give further consideration to suitable inspection forms and to submit further proposals to the Committee at the next meeting.

GAS HOLDER PROJECT (L.I.A. Project No. 15)

At the Red Lead Technical Committee meeting held on December 17, 1948 six primer paints were formulated for cooperative service test projects on gas holders. Since these formulations consisted of revisions of existing L.I.A. primers, it was considered essential to test their practicability in the laboratory before submitting samples to cooperators. Mr. Diehlman and Mr. Shobe agreed to prepare these paints.

These proposed primer paints were subsequently formulated and tested for total immersion at the laboratories of The Glidden Company. Wherever the formulations called for litharge, paint batches were prepared with the original specified amount of litharge and with the litharge omitted. These detailed formulations and the total immersion test results were submitted by Mr. Shobe and are attached to these minutes as Exhibit C.

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On the basis of this experimental work it was decided to submit the following formulations to cooperators for gas holder service tests (refer to Exhibit C):

#4 Primer and litharge
#4 Primer (OL-57623)
#6 Primer and litharge
#6 Primer (OL-57625)
#2 Primer and litharge

In addition, Mr. Diehlman suggested the inclusion of primer paint M-7129. This was approved by the Committee.

It was agreed that the technical director should proceed immediately with arrangements to have test strips of these primers exposed on several gas holders in scattered geographic locations.

These test strips are to be at least 8 feet long and placed on the lowest telescoping section of the gas holder so that part of the strip is normally immersed in the water seal and the remainder of the strip normally exposed to the atmosphere. The strips are to be comprised of systems consisting of one and two coats of primer with one and two topcoats.

The topcoats are to consist of the attached topcoat formulation (OL-57640) and an aluminum-alkyd paint if consistent with the cooperators painting practices.

It was next reported that Mr. Goets and the technical director had recently inspected two of the gas holders in Cincinnati with Mr. M. J. Pfeiffer of the Cincinnati Gas and Electric Company. Some of the structural details of the telescoping gas holders were described and those present were told of Mr. Pfeiffer's willingness to cooperate in a service test program. Mr. Goets then submitted a letter from Mr. Pfeiffer containing a review of the painting schedule followed on the two gas holders. A copy of this letter is attached as Exhibit D.

LABELING OF RED LEAD PAINTS

At the request of Mr. Alex Stewart of the National Lead Company, a session of the Red Lead Technical Committee was held on May 4 in the Association offices to reconsider resolutions previously drawn up on the labeling of red lead and paints containing red lead.

Since Mr. Stewart was unable to attend, he was represented by Mr. Ralph Baker and Mr. M. Whitson of the National Lead Company.

After a review of the resolutions drawn up on December 6, 1945 by the Red Lead Technical Committee at the request of Mr. M. Q. MacDonald of the National Paint, Varnish and Lacquer Association,

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a new set of resolutions was proposed for consideration of the member companies manufacturing red lead.

The original, newly proposed and reworded newly proposed resolutions on labeling are attached as Exhibit E. The reworded new resolutions were suggested by Mr. Ziegfeld to clarify the statements in the new resolutions and for consistency in wording and are intended to convey the same meaning.

It was decided to circulate these original and new resolutions among the member companies manufacturing red lead for comment and to reconsider the advisability of adopting new standards of labeling at the next committee meeting.

NEXT MEETING

The next meeting was tentatively scheduled for June 30 and July 1, 1949 at Atlantic City, New Jersey immediately following the A.S.T.M. convention.

The meeting was adjourned at 12:30 P.M. on May 4.

C. A. Vander Valk
C. A. Vander Valk
Technical Director
Red Lead Division

EXHIBIT C

L. L. A. GAS HOLDER PROGRAM

11 DAYS WATER IMERSION

PRIMER NUMBER	1 COAT PRIMER ONLY	1 COAT PRIMER 1 COAT GL-57648
#1 Primer GL-57620	Blistered all over.	Blistered all over.
#2 Primer GL-57621	Blistered all over.	Slight blistering.
#2 Primer & litharge	Slight blistering all over.	Okay.
#3 Primer GL-57622	Slight blistering.	Slight blistering
#4 Primer GL-57623	Okay.	Okay.
#4 Primer & litharge	Okay.	Okay.
#5 Primer GL-57624	Few blisters.	Few scattered blisters.
#6 Primer GL-57625	Blisters at bottom only.	Okay.
#6 Primer & litharge	Few blisters at bottom only.	Okay.

L. I. A. GAS WOLVER PROGRAM
 PRESS #1 OL-57620

PIGMENT 65.9	WEIGHT %	WEIGHT % OF TOTAL	POUNDS FOR 100 GALLONS
Red Lead (97% Grade)	85	56.00	950.0
Diatomaceous Silica	8	5.30	90.0
Magnesium Silicate	6.6	4.36	74.0
Aluminum Stearate	.4	.26	4.5
VEHICLE 34.1	100%		
V-175 Phenolic Varnish (25 gal)	74.0	25.40	432.0
Aromatic Petroleum Spirite	22.4	7.50	127.0
Dipentene	2.75	.95	16.0
Anti Oxidants	.50	.23	2.0
Lead Naphthenate	.23		1.4
Cobalt Naphthenate	.06		.3
Manganese Naphthenate	.06		.3
	100%	100%	1447.5

WEIGHT PER GALLON = 178

PT = 415

CONSISTENCY = 80-KU

FINENESS OF GRIND = 4-5

L. I. A. GAS HOLDER PROGRAM

PRIMER #2 CL-57621

PIGMENT 53%	WEIGHT %	WEIGHT % OF TOTAL	POUNDS FOR 100 GALLONS
Red Lead (97% grade)	43.4	23.00	300
325 Mesh Mica	17.4	9.23	120
Asbestine	12.7	6.76	88
Aluminum Stearate	.4	.23	3
Distomaceous Silica	4.3	2.30	30
Iron Oxide (85% Fe_2O_3)	8.7	4.60	60
Litharge	13.1	6.90	90

VEHICLE 47%	100%		
V-175 Phenolic Varnish (25 gal)	74.5	35.00	455
Aromatic Petroleum Spirits	21.8	10.20	133
Dipentene	2.95	1.38	18
Lead Naphthenate	.26	.11	1.5
Cobalt Naphthenate	.06	.055	.32
Manganese Naphthenate	.06	.055	.32
Anti Oxidants	.37	.18	2.30
	100%	100%	1301.66

WEIGHT PER GALLON = 12.5 (without litharge)

PV = 35% (litharge added)

CONSISTENCY = 71-88

FINENESS OF GRIND = 4-5

L. I. A. GAS HOLDER PROBLEM

PRIMER #3 CL-57622

PIGMENT 50%	WEIGHT %	WEIGHT % OF TOTAL	POUNDS FOR 100 GALLONS
Red Lead (97% grade)	40.0	20.00	250
Red Oxide (85% Fe_2O_3)	25.0	12.50	156
325 Mesh Mica	25.0	12.50	156
Diatomaceous Silica	9.6	4.80	60
Aluminum Stearate	.4	.20	2.5
VEHICLE 50%	100%		
LV-195 Phenolic Varnish (33 gal)	74.7	37.40	465
Aromatic Petroleum Spirits	15.1	7.45	94
Anti Oxidants	.1	.10	1.25
Aromatic Petroleum Spirits	10.1	5.05	63.00
	100%	100%	1247.75

WEIGHT PER GALLON = 12.5/lb per gal.

PV = 35%

CONSISTENCY = 80-85

FINENESS OF GRIND = 4-5

L. I. L. GAS WELDER PROGRAM

PRIMER #4 CL-57623

PIGMENT 51%	WEIGHT %	WEIGHT % OF TOTAL	POUNDS FOR 100 GALLONS
Red Lead (97% grade)	33.30	17.00	220
Red Oxide (85% Fe_2O_3)	12.55	6.40	83
Asbestine	12.10	6.20	80
325 Mesh Mica	25.00	12.70	165
Aluminum Stearate	.30	.15	2
Litharge	16.75	8.50	110
VEHICLE 49%	100%		
L.I.L. 27 Vehicle (GRV-1561)	72.7	35.60	460
Aromatic Petroleum Spirits	26.1	12.75	165
Lead Manganese drier	1.2	.70	8
	100%	100%	1293

WEIGHT PER GALLON = 12.33 (without litharge)

TV = 35% (litharge added)

CONSISTENCY = 79-KU

FINENESS OF GRIND = 4-5

L. I. L. O.S. HOLDER PROGRAM

PRIMER #5 GL-57624

PIGMENT 63%	WEIGHT %	WEIGHT % OF TOT L	POUNDS FOR 100 GALLONS
Red Lead (97% grade)	30.0	18.80	300
325 Mesh Mica	19.6	12.30	196
Aluminum Stearate	.4	.25	4
Zinc Dust	50.0	31.60	500
VEHICLE 37%	100%		
Raw Linseed Oil	25.60	9.14	150
V-175 Phenolic Varnish (25 gal)	48.00	17.80	284
Aromatic Petroleum Spirits	25.60	9.56	150
Lead Naphthionate 24%	.68	.26	4
Cobalt Naphthionate 6%	.34	.13	2
Manganese Naphthionate 6%	.18	.06	1
	100%	100%	1591

WEIGHT PER GALLON = 15.89

PV = 35%

CONSISTENCY = 80-100

FINENESS OF GRIND = 4-5

L. I. L. O.S. HOLDER PROGRAM

PRIMER #6 CL-57625

PIGMENT	WEIGHT %	WEIGHT % OF TOT L	POUNDS FOR 100 GALLONS
Red Lead (97%)	43.7	26.00	378
325 Mesh Mica	17.4	10.60	151
Magnesium Silicate	12.8	7.65	111
Aluminum Stearate	.35	.20	3
Diatomaceous Silica	4.29	2.61	38
Red Oxide (85% Fe ₂ O ₃)	8.66	5.22	74
Litharge	12.80	7.65	111
VEHICLE	100%		
Thermolized Tung Oil #976	27.80	11.12	162
Raw Linseed Oil	27.80	11.12	162
Aromatic Petroleum Spirits	43.21	17.50	254
Lead Naphthonate (2%)	.77	.37	4.5
Cobalt Naphthonate (6%)	.21	.08	1.25
Manganese Naphthonate (6%)	.21	.08	1.25
	100%	100%	1453

WEIGHT PER GALLON = 13.64 (without litharge)

PV = 35% (litharge added)

CONSISTENCY = 80-KB

FINENESS OF GRIND = 4-5

L. I. L. G.S. HOLDER PROGRAM

TOPCOAT CL-57648

PIGMENT 35.64	WEIGHT %	WEIGHT % OF TOTAL	POUNDS FOR 100 GALLONS
Blue Lead	23.9	8.49	90
Non-Chalking TiO ₂	18.0	6.41	68
35% Loaded Zinc	35.9	12.72	135
Graphite	9.0	3.20	34
325 Mesh Mica	11.9	4.25	45
Ferrite Yellow	1.3	.47	5
VEHICLE 64.44	100%		
Phenolic Varnish (25 gal) 1329	61.5	39.60	420
#976 Thermolized Tung Oil	26.4	17.00	180
Solvent Naphtha	12.0	7.77	82
Anti Oxidants	.1	.09	1
	100%	100%	1060

WEIGHT PER GALLON = 10.64

PV = 17.75

CONSISTENCY = 160 sec. /4 Ford Cup 77°F.

FINENESS OF GRIND = 4-5

Red Lead Technical Committee Minutes - May 2 - 4, 1949 - Exhibit 3

THE CINCINNATI GAS & ELECTRIC COMPANY
P. O. Box 960
Cincinnati 1, Ohio

April 27, 1949

Mr. Alvin C. Goetz,
Eagle-Picher Sales Company,
American Building,
30 E. Central Parkway,
Cincinnati, Ohio

Dear Mr. Goetz:

I have reviewed our records on the painting done on the gas holders at Front & Rose Streets, over the past ten years and am listing some of the major jobs in accordance with our conversation of several weeks ago.

The No. 1 holder which is on the south side of Front Street, near the Power Plant had the major paint job on the exterior of the tank in 1938, when it was painted with a red lead primer, and an aluminum top coat. The crown of this tank was last painted with a red lead primer and a gray tank coating in October, 1941 and was spotted and re-painted in October, 1943. The steel structure of this holder was painted in 1935.

During the summer of 1948 about 65% of the crown area was scraped to bare metal and the entire crown re-painted with a rust proof synthetic paint and aluminum, obtained from the Metal Coating Products Company. At this same time (1948) the sides of the tank were spotted with a rust inhibitive red lead primer.

No. 6 holder, which is the first one we looked at on the corner of Second & Rose Streets had the tank painted with aluminum in October, 1947 and the frame work painted with a gray paint in October, 1944. The crown was also painted with aluminum in 1947.

Some cleaning and spotting is done each year, but this list gives the record of the major jobs which were performed. It seems that we are getting longer life from these paint jobs than I thought we were when I talked with you. I am sorry that I was delayed in getting this information to you. If there is any further information you would like to have, please let me know.

I enjoyed working with you and the rest of the committee at the N.A.C.E. convention and will be looking forward to seeing you again at the convention next year.

Yours very truly,

M. J. Pfeiffer

EXHIBIT E

- 1 - Original Resolutions approved by Red Lead Technical Committee on December 6, 1945.

EXCERPT OF RED LEAD TECHNICAL COMMITTEE
DECEMBER 6, 1945 MINUTES COVERING
THE LABELING OF RED LEAD AND RED LEAD PAINTS.

Consideration was given to a letter from the National Paint, Varnish and Lacquer Association regarding the labeling of red lead paint (circulated Nov. 29, 1945).

The subject was thoroughly discussed inasmuch as there was some question as to whether it should be opened at all since apparently there had not been too much difficulty with the labeling of red lead paints and since, also, some good paints contain red lead in rather small quantities which it might not be desirable to put at a disadvantage in comparison with other paints containing more red lead. However, the Committee finally decided that it would be well to make a recommendation to the Paint Association. It, therefore, adopted the following suggested wording, to be submitted for the further consideration of the managers of the Oil & Paint Divisions of member companies, before transmitting it to the Paint Association:

"On labels of and in advertising and statements relating to paints, pastes, and other pigmented compositions:

1. The term 'Red Lead' means only the pure commercial product composed of a mixture of Pb_3O_4 and PbO with not more than 1% impurities including moisture.
2. The term 'Pure Red Lead' used to designate a product should be used only when the pigmentation is solely red lead, except that not more than 2% by weight of the total pigment may be tinting materials added for the purpose of differentiating between two sorts of the same paint.
3. The term 'Red Lead' should be qualified by the word 'Modified' if red lead is mixed with other materials in a pigmentation, provided the red lead content is not less than 60% by weight of the pigmentation. The word 'Modified' should be printed immediately above, below, or adjacent to the word 'Red Lead' in letters equally conspicuous.
4. The term 'Red Lead' should not be used if a pigmentation contains less than 60% red lead by weight except to complete a formula printed on the label."

2 - How Resolutions proposed by Red Lead Technical Committee on May 4, 1949.

PROPOSED RESOLUTIONS FOR THE PROPER LABELING OF RED LEAD AND PAINTS
CONTAINING VARIOUS PROPORTIONS OF RED LEAD

1. The term "Red Lead" means only the pure commercial product composed of a mixture of Pb_3O_4 and PbO with not more than 1% impurities including moisture.
2. The term "Red Lead Paint" used to designate a product shall be used only when the pigmentation contains not less than 75% red lead.

The term "Red Lead Paint" may be modified by the word "pure" if not more than 1% by weight of the total pigmentation consists of materials added for the purpose of tinting to differentiate between two coats of the same paint and for suspension of the pigment.
3. The term "Red Lead" should be qualified by the word "base" if red lead is mixed with other materials in a pigmentation, provided the red lead content is not less than 40% by weight of the pigmentation. The word "base" should be printed immediately above, below or adjacent to the word "Red Lead" in letters equally conspicuous.
4. The term "Red Lead" should not be used if a pigmentation contains less than 40% red lead by weight except to complete a formula printed on the label.

3 - Recorded New Resolutions proposed by Red Lead Technical Committee
on May 4, 1949.

SUGGESTED RESOLUTIONS FOR THE PROPER LABELING OF RED LEAD AND P. LITS
CONTAINING VARIOUS PROPORTIONS OF RED LEAD

1. The term "Red Lead" means only the pure commercial product composed of a mixture of Pb_3O_4 and PbO with not more than 1% impurities including moisture.
2. The term "Red Lead Paint" used to designate a product shall be used only when the pigmentation contains not less than 75% red lead by weight.

The term "Red Lead Paint" may be modified by the word "pure" if not more than 1% by weight of the total pigmentation consists of materials added for the purpose of tinting to differentiate between two coats of the same paint and for suspension of the pigment.
3. The term "Red Lead Paint" used to designate a product shall be qualified by the word "Basic" if the pigmentation contains less than 75% and more than 40% red lead by weight. The word "Basic" should be printed immediately above, below or adjacent to the word "Red Lead Paint" in letters equally conspicuous.
4. The term "Red Lead" should not be used if a pigmentation contains less than 40% red lead by weight except to complete a formula printed on the label.



EXHIBIT A - R.L.T.C. MINUTES, MAY 2, 3, 4, 1949

INSPECTION RECORDS

LEAD INDUSTRIES ASSOCIATION PROJECTS

Sayville, Long Island, New York

Inspected by: Mr. George Diehlman
Mr. A. C. Goetz
Dr. J. O. Johnstone
Mr. O. F. Shobe
Dr. L. L. Carrick
Mr. C. J. Vander Valk

Date of Inspection: May 2, 1949

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LIA07725

INSPECTION RECORD

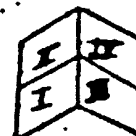
L-1A: Project: No. 1

Type of Specimen: Angle

Date Exposed: 5-9-43

Date Inspected: 5-2-49

Elapsed Time: 72 Months



PANEL	PAINT	PICKERIZATION	VEHICLE	CORROSION RATINGS				COMMENTS
				AREA I 1 PRIMER COAT	AREA II 2 PRIMER COATS	AREA III 1 PRIMER COAT 1 TOPCOAT	AREA IV 2 PRIMER COATS 1 TOPCOAT	
4489A	3	P-5	V-14	5	9	10	10	First Choice Formulation on page 3
4510A	24	P-6	V-14	5	9	8	9	Second Choice Formulation on page 4
4507A	21	P-5	V-10	3	10	10	10	Third Choice Formulation on page 5
4487A	1	P-5	V-15	3	9	10	10	Fourth Choice Formulation on page 6
4508A	22	P-6	V-11	3	9	9	10	Fifth Choice Formulation on page 7
4491A	5	P-5	V-16	2	10	10	10	Sixth Choice Formulation on page 8
4506A	20	P-5	V-9	3	8	9	10	Seventh Choice Formulation on page 9
4513A	27	P-5	V-12	2	8	9	10	Eighth Choice Formulation on page 10
4486A	2	P-6	V-15	3	8	10	10	
4450A	4	P-6	V-14	1	5	10	10	
4492A	6	P-6	V-16	1	7	10	10	
4493A	7	P-5	V-5	0	5	10	10	
4494A	8	P-6	V-5	0	2	10	10	
4495A	9	P-5	V-6	3	7	10	10	
4496A	10	P-6	V-6	0	4	10	10	

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PANEL	PAINT	PENETRATION	VEHICLE	CORROSION RATINGS				COMMENTS
				Area I 1 PRIMER COAT	Area II 2 PRIMER COATS	Area III 1 PRIMER COAT 1 TOPCOAT	Area IV 2 PRIMER COATS 1 TOPCOAT	
4497A	11	P-5	V-7	0	6	10	10	
4498A	12	P-6	V-7	0	4	10	10	
4499A	13	P-7	V-5	0	5	10	10	
4500A	14	P-8	V-5	0	3	10	10	
4501A	15	P-9	V-5	0	1	8	10	
4502A	16	P-6	V-19	0	2	7	9	
4503A	17	P-2	V-2	3	5	8	10	52-P-18 Same as 4501A. Mfg. by Glidden.
4504A	18	P-2	V-2	1	4	9	9	52-P-18 Same as 4501A. Mfg. by S-8.
4505A	19	P-6	V-8	2	7	10	10	
4509A	23	P-6	V-17	2	5	2	7	
4511A	25	P-6	V-13	1	5	8	10	
4512A	26	P-5	V-13	1	5	8	9	
4514A	28	P-6	V-12	0	4	8	10	
4515A	29	P-1	V-1	0	5	10	10	U.S.N.C. Spec. 1 Class III 6/6/79

FORMULATIONS OFBEST PAINES IN PROJECT

Panel No. 4489A
 Paint No. 3
 Pigmentation No. P-5
 Vehicle No. V-14

COMPOSITIONPIGMENT 57.7% by weight

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Cellite	5.0%
	<u>100.0%</u>

VEHICLE 42.3% by weight

JV-105C Varnishes	91.0%
Mineral Spirits	<u>9.0%</u>
	100.0%

Wt. per gallon = 14.11 lb.

JV-105C Varnish.

100.0% Durez 420
 494.0% Linseed Oil 22 (60 gallons)
 369.0% Mineral Spirits
 48.5% High Flash Naphtha
 34.0% Jipentine
 20.6% Lead Naphthenate, 21d
 5.8% Cobalt Naphthenate, 6d
 8.3% Manganese Naphthenate 6d

Wt. per Gal: 7.54; B-C, Viscosity, Oil Length 60 Cals
 Non-Volatile 55%

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4510A
Paint No. 24
Pigmentation No. P-4
Vehicle No. Y-4

COMPOSITION

PIGMENT 68%

Red Lead	36.8%
Iron Oxide	53.3%
Cellite	9.9%
	100.0%

VEHICLE 32%

LV-195 Varnish	82.4%
Butanol	1.9%
Sevasol #5	15.7%
	100.0%

Wt. per gal. 17.170

LV-195 Varnish.

5780 Bakelite Resin M254
5960 Perfection Oil, Linseed
9020 Tung Oil
8.750 Lead Naphthenate, 245
3.370 Cobalt Naphthenate, 60
1.60 Manganese Naphthenate, 60
9770 Sevasol #4
1620 Dipentone
1330 Cellosolve
830 Toluol
420 High Flash Naphtha

Wt. per Gallon: 7.750; Viscosity C; Color 10 +
Non-Vol 60%

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4507A
Paint No. 21
Pigmentation No. P-5
Vehicle No. V-10

Composition

PIGMENT 62%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestine	10.0%
Calcite	5.0%
	<u>100.0%</u>

VEHICLE 38%

LV-197 Varnish	25.0%
Raw Linseed Oil	60.0%
Pale Heat Bodied Linseed Oil	5.0%
Liquid Drier	2.0%
Sorvasol #5	8.0%
	<u>100.0%</u>

Wt. per gal. 15.6%
Non-Volatile 78.5% by wt.

LV-197 Varnish.

750# Amberol 7.7 Unit
235# Castung, #403, 23 Viscosity
592# Pale Heat Bodied Linseed Oil (Q Viscosity)
92# Lead Naphthenate, 2lb
73# Cobalt Naphthenate, 6lb
297# Sorvasol #4

Wt. per gal. = Viscosity 7 - Color 13 - Non-Volatile 54%

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4487A
Paint No. 1
Pigmentation No. P-5
Vehicle No. V-15

Composition

PIGMENT 61%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Cellite	5.0%
	<u>100.0%</u>

VEHICLE 37%

E-P Lead Co., JV-61 B
Resin, BR2963e

100.0%
Wt. per gal. 15.71d

E-P Lead Co., JV-61 B Resin, BR2963e

100% Bakelite Resin BR2963
311d Dehydrated Castor Oil (Isoline SV)
151d Fish Oil (Varnish grade)
355d Mineral Spirits
464d Hi-Flash Naphtha
324d Dipentene Driers
19.5d Lead Naphthenate, 21d
3.9d Cobalt Naphthenate, 6d
7.8d Manganese Naphthenate, 6d

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4508A
Paint No. 22
Pigmentation No. P-6
Vehicle No. V-11

Composition

PIGMENT 68.1%

Red Lead	70.0%
Zinc Oxide	10.0%
Iron Oxide	10.0%
Asbestos	7.0%
Cellite	3.0%
	<u>100.0%</u>

VEHICLE 21.9%

LV-197 Varnish	21.18%
Raw Linseed Oil	60.90%
Pale heat bodied Linseed oil,	
22	6.71%
Liquid Uricer	1.82%
Sovasol #5	7.21%
	<u>100.00%</u>

Non-Volatile 80.2% by wt.
Wt. per gal. 18.34

LV-197 Varnish

750# Amberol P.7 Dark
2356# Castung, #403, 23 Viscosity
592# Pale Heat Bodied Linseed Oil (Q Viscosity)
92# Lead Naphthenate, 24#
73# Cobalt Naphthenate, 6#
2970# Sovasol #6
Wt. per gal.: 7.66 - Viscosity P - Color 13 -
Non-Volatile 54.8

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4491A
Paint No. 5
Pigmentation No. P-5
Vehicle No. V-16

Composition

PIGMENT 59%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Colite	5.0%
	<u>100.0%</u>

VEHICLE 41%

JV-112 Varnish	96.0%
Mineral Spirits	4.0%
	<u>100.0%</u>

Wt. per gal. 14.79
Non-Volatile 55%

JV-112 Varnish,

100% Bakelite Resin, BR2963
66% Oil No. 710, 23 Viscosity, Linseed Oil.
35% Mineral Spirits
66% Hi-Flash Naphtha
32% Dipentene
19.6% Lead Naphthenate, 24%
5.5% Cobalt Naphthenate, 6%
7.8% Manganese Naphthenate, 6%

Wt. per gal; 7.54; Non-Volatile 55%; 60 gal. oil length;
Viscosity B-C,

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4506A
Paint No. 20
Pigmentation No. P-5
Vehicle No. V-9

Composition

PIGMENT 48.7%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Cellite	5.0%
	100.0%

VEHICLE 38%

LV-197 Varnish	79.8%
Solasol #5	18.1%
Solvesso #2	1.9%

100.0%

Wt. per gal. 12.184

LV-197 Varnish:

750# Amberol P.7 Dark
2356# Castung, #403, 23 Viscosity
592# Pale Most Bodied Linseed Oil (4 Viscosity)
92# Lead Naphthenate, 24g
73# Cobalt Naphthenate, 6g
2978# Solvasol #6
Wt. per gal.: 7.464 - Viscosity P -
Color 13 - Non-Volatile 54g

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 4513A
Paint No. 27
Pigmentation No. P-5
Vehicle No. V-12

Composition

PIGMENT 58.2%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Celite	5.0%
	<u>100.0%</u>

VEHICLE 41.8%

LV-195 Varnish	91.8%
Solvent #2	<u>8.2%</u>
	100.0%

Non-Volatile 49.6% by wt.
Wt. per gal. 11.8lb

LV-195 Varnish

578# Bakelite Resin EP25
596# Perfection Oil, Linseed
902# Tung Oil
8.75# Lead Naphthenate, 4%
3.37# Cobalt Naphthenate, 6%
1.6# Manganese Naphthenate, 6%
977# Sovasol #4
162# Dipentene
133# Cellosolve
83# Toluol
42# High Flash Naphtha
Wt. per Gallon: 7.75; Viscosity C; Color 10; Non-Vol, 60%

INSPECTION RECORD

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L.I.A. Project: No. 2

Type of Specimens: Angle
 Date Exposed: 10-7-43
 Date Inspected: 5-2-49
 Elapsed Time: 67 Months.



CORROSION RATINGS

PANEL	PAINT	PIGMENTATION	VEHICLE	Area I 1 PRIMER COAT	Area II 2 PRIMER COATS	Area III 1 PRIMER COAT 1 TOPCOAT	Area IV 2 PRIMER COATS 1 TOPCOAT	COMMENTS
4856A	37	P-18	V-27	3	10	10	10	First Choice Formulation on page/2
4850A	35	P-16	V-19	6	10	10	10	Second Choice Formulation on page/7
4854A	36	P-16	V-28	5	10	10	10	Third Choice Formulation on page/4
4858A	38	P-16	V-34	4	10	10	10	Fourth Choice Formulation on page/5
4842A	32	P-5	V-14	4	10	10	10	Fourth Choice Formulation on page/6
4844A	33	P-16	V-26	4	10	10	10	Fourth Choice Formulation on page/7
4874A	52-P-18	P-2	V-2	5	9	9	10	Fifth Choice Formulation on page/8
4838A	30	P-5	V-5	0	3	10	10	
4840A	31	P-6	V-18	1	2	6	7	
4848A	34	P-16	V-27	2	10	10	10	
4862A	39	P-19	V-34	0	9	10	10	
4866A	40	P-20	V-19	2	10	10	10	
4868A	41	P-20	V-20	0	8	10	10	
4870A	UP-18-20A	P-1	V-1	0	6	8	10	

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 1056A
Paint No. J
Pigmentation No. P-18
Vehicle No. V-27

Composition

PIGMENT 56.6%

Red Lead	55.0%
Lead Chromate Monobasic	20.0%
Zinc Oxide	10.0%
Asbestos	10.0%
Cellite	5.0%

100.0%
Wt. per gallon 15.6%

VEHICLE 43.4%

Isoline Dist. Fatty Acids	31.6%
Glycerine	16.8%
Phthalic Anhydride	22.0%
Mineral Spirits	60 gal.

Wt. per gal. 15.6%

FORMULATIONS OF

TEST PAINTS IN PROJECT 1

Paint No. 1050A
Paint No. 35
Pigmentation No. P-16
Vehicle No. V-19

Composition

PRIMER 61.25

Red Lead	55.0%
Zinc Oxide	20.0%
Zinc Chrom.	10.0%
Iron Oxide	7.0%
Carbonate	10.0%
Cellulose	8.0%
	<u>100.0%</u>

VEHICLE 26.0%

UF-257 Varnish	60.0%
Medium Linseed Oil Alkyd	40.0%
(35% phenolic anhydride)	<u>100.0%</u>

Wt. per gal. 16.67
Non-Volatile Solids by weight

oil-257 Varnish - is a 6 gallon, 100% linseed oil (22 viscosity)
Varnish, containing in the resin portion 50% by weight by owner
K-24 and 50% butoxide Resin 800432.

FORMULATION OF
BEST PAINTS IN PROJECT 1

Panel No. L85A
Paint No. 36
Pigmentation No. P-16
Vehicle No. V-28

Composition

PIGMENT 53.3%

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Chrom.	10.0%
Iron Oxide	7.0%
Asbestos	10.0%
Cellite	8.0%
	100.0%

VEHICLE 46.7%

Phthalic Anhydride	111.0%
Pakelite IR-10025	1.0%
Glycerine	136.0%
Phthalic Anhydride	1.0%
Linseed Oil Fatty Acids	252.0%
Solvent #3	492.0%
Solvent #4	123.0%

Wt. per gal. 14.4%

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. L852A
Paint No. 38
Pigmentation No. P-16
Vehicle No. V-14

Composition

PIGMENT 57%

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Chrom.	10.0%
Iron Oxide	7.0%
Asbestine	10.0%
Cellite	8.0%
	<u>100.0%</u>

VEHICLE 43%

JV-105C ₂	91.0%
Mineral Spirits	9.0%
	<u>100.0%</u>

Wt. per gal, 14.58

oJV-105C₂

100.0% Duros 420
494.0% Linseed Oil 22 (60 gallons)
369.0% Mineral Spirits
49.5% High Flash Naphtha
34.0% Dipentene
20.6% Lead Naphthenate
5.8% Cobalt Naphthenate, 6%
8.3% Manganese Naphthenate, 6%

Wt. per gal: 7.54; A-C, Viscosity, Oil Length 60
Gal; Non-Volatile 55%

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 4042A
Paint No. 32
Pigmentation No. A-5
Vehicle No. V-14

Composition

PIGMENT 58.0%

Red Lead	45.0%
Zinc Oxide	10.0%
Iron Oxide	30.0%
Asbestos	10.0%
Cellite	5.0%
	<u>100.0%</u>

VEHICLE 42.0%

JV-105C	91.0%
Mineral Spirits	9.0%
	<u>100.0%</u>

Wt. per gal. 14.5#
Non-volatile 50% by weight

JV-105C

100.0% Durez 420
494.0% Linseed Oil 22 (60 gallons)
369.0% Mineral Spirits
48.5% High Flash Naphtha
34.0% Vapentine
20.6% Lead Naphthenate, 21%
5.8% Cobalt Naphthenate, 6%
8.3% Manganese Naphthenate, 6%

Wt. per Gal. 7.5# S-C, Viscosity, Oil Length 60
Gal. Non-Volatile 55%

FORMULATIONS OFBEST PAINTS IN PROJECT 1

Panel No. L844
 Paint No. 3
 Pigmentation No. P-16
 Vehicle No. V-14

CompositionPIGMENT 52.0%

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Chrom.	10.0%
Iron Oxide	7.0%
Asbestos	10.0%
Celite	8.0%

100.0%

VEHICLE 47.2%

Alkyd Linseed Oil (35 % phthalic anhydride)	40.0%
LY-198 Varnish with BR-5432 for breakdown	60.0%

100.0%

Non-volatile 57.5% by weight
 Wt. per gal. 11.94

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No: 4874A
Paint No:
Pigmentation No. P-2
Vehicle No. V-2

Composition

PIGMENT 46.1%

Zinc Chrom.	54.97%
Raw Sienna	4.96%
Titanox AA	15.07%
Asbestos	25.00%
	100.00%

VEHICLE 53.9%

Phenolic Varnish	43.26%
Resin Alkyd	19.91%
Dipentene	8.81%
Paint Thinner	25.62%
Lead Naphthenate	2.00%
Cobalt	0.20%
Manganese	0.20%
	100.00%

Wt. per gal. 11½
Non-volatile 40% by wt.

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INSPECTION RECORD

L.T.A. PROJECTS: 3, 4, 7a, 7b
 Type of Specimen: Flat
 Date Exposed: 10-13-66
 Date Inspected: 5-2-69
 Elapsed Time: 55 Months

2 primer
 coats

1 topcoat
 5B-NC-6

Inspection Ratings

PANEL	PAINT	PIGMENTATION	VEHICLE	CORROSION		PEELING		COMMENTS
				EDGE	GENERAL	EDGE	GENERAL	
L68A	116	P-26	V-27	8	10	9	10	First Choice Formulation on page 25
L69A	132	P-32	V-27	7	9	9	10	Second Choice Formulation on page 26
L95A	183	P-36	V-19	8	9	8	10	Third Choice Formulation on page 27
L13A	30	P-5	V-5	7	9	9	10	Fourth Choice Formulation on page 28
L70A	118	P-27	V-27	7	9	8	9	Fifth Choice Formulation on page 29
L72A	120	P-28	V-27	7	9	8	9	Fifth Choice Formulation on page 30
L90A	138	P-16	V-27	7	9	7	8	Sixth Choice Formulation on page 31
L11A	33	P-16	V-26	2	4	2	4	PV 28.5
L15A	35	P-16	V-19	6	6	5	7	PV 39.8
L16A	33a	P-16	V-26	3	5	4	6	Same as L11A but with PV 30.
L17A	33b	P-16	V-26	4	5	4	6	Same as L11A but with PV 35.
L18A	33c	P-16	V-26	4	6	5	7	Same as L11A but with PV 40.
L19A	33d	P-16	V-26	5	6	5	6	Same as L11A but with PV 43.
L20A	35a	P-16	V-19	3	6	4	6	Same as L15A with PV 30.
L21A	35b	P-16	V-19	1	3	1	3	Same as L15A with PV 35.

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Inspection Ratings

PANEL	PAINT	POTENTIATION	VEHICLE	CORROSION		PEELING		COMMENTS
				EDGE	GENERAL	EDGE	GENERAL	
k22A	35e	P-16	V-19	3	3	3	4	Same as k15A with PV = 40
k23A	35d	P-16	V-19	4	6	5	7	Same as k15A with PV = 43
k24A	36a	P-16	V-28	3	7	6	8	PV = 30
k25A	36b	P-16	V-28	4	6	5	8	Same as k24A with PV = 35
k26A	36c	P-16	V-28	5	6	5	7	Same as k24A with PV = 40
k27A	36d	P-16	V-28	3	5	5	6	Same as k24A with PV = 43
k28A	40a	P-20	V-19	0	1	0	2	PV = 30
k29A	40b	P-20	V-19	1	6	2	6	Same as k28A with PV = 35
k30A	40c	P-20	V-19	1	6	2	6	Same as k28A with PV = 40
k31A	40d	P-20	V-19	1	4	1	5	Same as k28A with PV = 43
k32A	41a	P-20	V-28	5	7	6	8	PV = 30
k33A	41b	P-20	V-28	2	6	4	6	Same as k32A with PV = 35
k34A	41c	P-20	V-28	2	7	5	6	Same as k32A with PV = 40
k35A	41d	P-20	V-28	2	7	5	6	Same as k32A with PV = 43
k36A	42a	P-20	V-26	1	5	2	4	PV = 30
k37A	42b	P-20	V-26	1	5	2	4	Same as k36A with PV = 35
k38A	42c	P-20	V-26	0	5	0	4	Same as k36A with PV = 40
k39A	42d	P-20	V-26	0	5	0	4	Same as k36A with PV = 43

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Inspection Ratings

PANEL	PAINT	PROMINENT	VEHICLE	CORROSION		FADING		COMMENTS
				EDGE	GENERAL	EDGE	GENERAL	
440a	40a	P-72	V-19	4	5	5	6	Omear V-2-1/2 in vehicle
441a	44	I-72	V-19a	5	6	5	7	Same as 440a with Omear RS in vehicle
442a	45	I-72	V-19b	5	7	6	8	Same as 440a with Castung 103 replacing L. O.
443a	45	I-72	V-19c	7	8	7	9	Same as 440a with Omear RS and Castung 103 replacing L.O.
444a	47	I-72	V-19d	6	7	7	8	Same as 440a with tung oil replacing L. O.
445a	U.S.M.C. 52nd Class XXII			0	3	0	4	
446a	52nd-18			7	8	8	9	
447a	48	P-72	V-19e	1	4	1	4	Same as 440a with tung oil replacing L. O. and with Omear RS.
449a	49	P-16	V-19a	3	6	3	6	
450a	50	P-16	V-19b	0	1	0	2	
451a	51	P-16	V-19c	0	1	0	2	
452a	52	P-16	V-19d	4	6	5	7	
454a	33	P-16	V-26	3	6	3	6	
455a	54	P-16	V-26a	2	3	2	4	Same as in 444a except Jares 570 replaces BR-9432 in vehicle.
456a	55	P-16	V-26b	2	4	2	4	Same as 444a except Ambrol 226 replaces BR-9432 in vehicle.
457a	83	P-16	V-26c	0	4	0	4	Same as in 444a except BR 254 replaces BR-9432 in vehicle.
458a	56	P-20	V-27	4	8	5	9	
459a	34a	P-16	V-27	6	8	7	9	

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Inspection Ratings

PANEL	PAINT	PIGMENTATION	VEHICLE	CORROSION		PEELING		COMMENTS
				EDGE	GENERAL	EDGE	GENERAL	
460A	37e	P-18	V-27	4	8	6	9	
461A	97	P-16	V-19	1	4	1	5	
462A	98	P-16	V-52	0	4	0	4	
463A	99	P-71	V-19	3	5	3	6	
464A	100	P-71	V-52	1	3	1	4	
465A	101	P-71	V-19	0	3	1	4	
466A	102	P-16	V-19	0	3	1	4	Same 461A except vehicle coated by John Le Lewis instead of Sherin-Williams
468A	116	P-25	V-27	8	10	9	10	
469A	117	P-27	V-19	6	7+	6	8	
470A	118	P-27	V-27	7	9	8	9	
471A	119	P-28	V-19	6	9	7	8	
472A	120	P-28	V-27	7	9	8	9	
473A	121	P-32	V-19	4	8	5	8	
474A	122	P-32	V-27	3	5	3	6	
475A	123	P-33	V-19	2	4	2	5	
476A	124	P-33	V-27	4	6	4	7	
477A	125	P-34	V-19	4	5	4	5	

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Inspection Ratings

PANEL	PAINT	STONEMENTATION	VEHICLE	CORROSION		CRACKING		COMMENTS
				EDGES	GENERAL	EDGES	GENERAL	
475A	126	P-34	V-27	6	8	7	7	
479A	127	P-39	V-19	2	3	2	4	
480A	128	P-39	V-27	7	8	7	8	
481A	129	P-41	V-19	0	2	0	2	
482A	130	P-41	V-27	6	8	7	8	
483A	131	P-42	V-19	2	6	2	6	
484A	132	P-42	V-27	7	9	9	10	
485A	133	P-43	V-19	2	6	2	6	
486A	134	P-43	V-27	7	8	7	9	
487A	135	P-45	V-19	6	7	6	7	
488A	136	P-45	V-27	3	6	4	5	
489A	137	P-46	V-19	1	3	1	4	
490A	138	P-46	V-27	7	9	7	8	
491A	179	P-29	V-19	1	3	2	4	
492A	180	P-30	V-19	6	8	6	7	
493A	181	P-31	V-19	3	5	3	5	
494A	182	P-35	V-19	2	6	3	6	
495A	183	P-36	V-19	8	9	8	10	

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Inspection Ratings

PANEL	PAINT	PIGMENTATION	VEHICLE	CORROSION				COMMENTS
				EDGE	GENERAL	EDGE	GENERAL	
L96A	93	P-16	V-40	0	3	0	3	
L97A	9508	P-16	V-19	0	2	0	3	
L98A	94	P-16	V-41	6	8	6	8	
L99A	95	P-16	V-42	4	7	5	6	
S00A	96	P-16	V-43	7	8	7	8	
S01A	13e	P-16	V-40	0	4	0	4	
S02A	MC-S2-A Class III			0	5	0	6	
S03A	S2-P-1E			1	6	2	6	
S04A	S2-MC-23			0	6	0	7	
S05A	S2-MC-29			4	7	5	6	

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. L68A
Paint No. 116
Pigmentation No. P-26
Vehicle No. V-27

Composition

PIGMENT 54.5%

Red Lead	56.0%
Litharge	14.0%
Micalith-O	30.0%
	100.0%

VEHICLE 45.5%

Ysoline Dist. Fatty Acids	36.5%
Glycerine	16.0%
Phthalic Anhydride	27.0%
Mineral Spirits	60 gal.

FORMULATION OF
BEST PAINTS IN PROJECT 1

Panel No. 481A
Paint No. 132
Pigmentation No. P-42
Vehicle No. V-27

Composition

PIGMENT

Red Lead	70.0%
Zinc Yellow	10.0%
Mica-lith-O	20.0%
	100.0%

VEHICLE

A castor oil alkylid Body 2.
Acid No. 10.4 Non. Val.
50.8% by wt. Glycerol
phthalate 45%

Isoline Dist. Fatty Acids	36.6
Glycerine	16.6
Phthalic Anhydride	22.6
Mineral Spirits	60 gal.

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 495A
Paint No. 183
Pigmentation No. P-36
Vehicle No. V-19

Composition

PIGMENT 55.4%

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Yellow	10.0%
Mica (325 Mesh)	<u>25.0%</u>
	100.0%

VEHICLE 44.6%

LV-257 Varnish	60.0%
Medium L.O. Alkyd (35% phth. anhyd)	<u>40.0%</u>
	100.0%

40% Bakelite 3360
60% Herculyn
20 gal. Kellin Oil
Mineral Spirits and Drier

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 413A
Paint No. 30
Pigmentation No. P-6
Vehicle No. V-5

Composition

PIGMENT 56.7%

Red Lead	70.0%
Zinc Oxide	10.0%
Iron Oxide	10.0%
Magn. Sil.	7.0%
Dia. Silica	3.0%

100.0%

VEHICLE 43.3%

Raw Linseed Oil	1.25 pt.
V-705 CI Varnish	2.25 pt.
#2963 Bakelite Varnish	2.25 pt.
D-29 Drier	0.25 pt.
Solvent #3	2.125 pt.

Non-Vol. 44.2% by wt.
PV = 30.38
Wt./Gal. 14.7 lb.

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 470A
Paint No. 118
Pigmentation No. P-27
Vehicle No. V-27

Composition

PIGMENT 45.8%

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Yellow	10.0%
Iron Oxide	7.0%
Mica lith-O	18.0%
	100.0%

VEHICLE 54.2%

See Vehicle in Panel No. 464A.

TV = 33
wt./Gal 14.3 lb.

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 4721
Paint No. 120
Pigmentation No. P-28
Vehicle No. V-27

Composition

PIGMENT

Red Lead	55.0%
Zinc Oxide	10.0%
Zinc Yellow	10.0%
Micalith-O	25.0%
	100.0%

VEHICLE

See Vehicle in Panel No. 484A.

PV = 33

Panel No. 4901
Paint No. 138
Pigmentation No. P-46
Vehicle No. V-27

Composition

PIGMENT 55.5%

Red Lead	55.0%
Zinc Oxide	20.0%
Micalith-O	25.0%
	100.0%

VEHICLE 44.5%

See Vehicle in Panel No. 484A.

PV = 33
Wt./Oal. 14.3 lbs.

FORMULATIONS OF
BEST PAINTS IN PROJECT 1

Panel No. 490
Paint No. 138
Pigmentation No. P-46
Vehicle No. V-27

Composition

PIGMENT 55.5%

Red Lead	55.0%
Zinc Oxide	20.0%
Mica lith-G	25.0%
	100.0

VEHICLE 44.5%

L.I.L. No. 270	100.0%
	100.0%

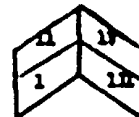
*Castor oil alkyl Body 2.
Acid No. 10.4 Non-volatile = 50.8%
Glyceryl phthalate = 45%

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INSPECTION RECORD

L.I.I. Project: No. 7c

Type of Specimens: single
 Date Exposed: 10-13-46
 Date Inspected: 5-4-49
 Elapsed Time: 55 Months



PANEL	PAINT	PENETRATION	VEHICLE	AREA I 1 PRIMER COAT	CORROSION RATINGS			COMMENTS
					AREA II 2 PRIMER COATS	AREA III 1 PRIMER COAT 1 TOPCOAT	AREA IV 2 PRIMER COATS 1 TOPCOAT	
226A	88a	P-85	V-64	10	10	10	10	First Choice Formulation on page 33
222A	85	P-88	V-51	7	10	10	10	Second Choice Formulation on page 34
230A	89	P-85	V-53	6	10	10	10	Third Choice Formulation on page 35
213A	75	P-88	V-11	1	10	10	10	
211A	76	P-88	V-37	3	10	10	10	
215A	77	P-88	V-15	3	10	10	10	
216A	78	P-89	V-15	1	5	9	10	
217A	79	P-89	V-17	5	10	10	10	
212A	80	P-88	V-18	2	9	7	9	
219A	81	P-88	V-35	0	3	7	7	
220A	82	P-88	V-19	3	10	8	10	
221A	84	P-88	V-50	2	6	8	10	
223A	86	P-88	V-16	3	10	9	10	
224A	87	P-85	V-63	4	9	7	8	
225A	87a	P-85	V-63	0	1	6	7	
226A	87b	P-85	V-63	5	10	10	10	
227A	88	P-85	V-64	2	7	10	10	
228A	88b	P-85	V-64	4	8	10	10	
231A	90	P-85	V-64	5	10	10	10	
232A	U.S.M.C. 52-MC-29			1	9	10	10	
233A	U.S.M.C. 52-MC-29			0	5	7	8	
234A	M.D. Spec. 52-P-18			4	10	10	10	
235A	35	P-16	V-19	2	8	10	10	
236A	33	P-16	V-26	1	7	10	10	
237A	37	P-18	V-27	1	8	10	10	

FORMULATIONS OFBEST PAINTS IN PROJECT

Panel No. 225A
 Paint No. 59a
 Pigmentation No. P-85
 Vehicle No. V-64

PIGMENT

Red Lead	60.0%
Zinc Yellow	13.0%
Iron Oxide	2.0%
Mica (J25 Mesh)	10.0%
Magnesium Silicate	15.0%
	<u>100.0%</u>

VEHICLE Oil Length = 40 gallons, Cooking Temp. = 535°F.

Bakelite Resin BR17700	13.1%
Linseed Oil	40.8%
Mineral Spirits	46.1%
	<u>100.0%</u>

PV = 37.5%

FORMULATIONS OF
BEST PAINTS IN PROJECT

Panel No. 222A
Paint No. 85
Pigmentation No. P-58
Vehicle No. V-51

PIGMENT

Red Lead	55.0%
Iron Oxide	10.0%
Zinc Oxide	10.0%
Zinc Yellow	7.0%
Magnesium Silicate	10.0%
Diatomaceous Silica	<u>8.0%</u>

100.0%

VEHICLE Oil Length = 25 gallons, Cooking Temp. = 450° F.

Bakelite Resin 33254	17.0%
Linseed Oil	33.0%
Mineral Spirits	39.1%
Xylene	6.1%
Dipentene	<u>4.8%</u>

100.0%

TV = 40%

FORMULATION OF
BEST PAINTS IN PROJECT

Panel No. 230a
Paint No. 89
Pigmentation No. P-85
Vehicle No. V-63

PIGMENT

Red Lead	60.0%
Zinc Yellow	13.0%
Iron Oxide	2.0%
Mica (325 Mesh)	10.0%
Magnesium Silicate	<u>15.0%</u>
	100.0%

VEHICLE Oil Length = 25 gallons, Cooking Temp. = 585°F.

Bakelite Resin BR 17700	17.7%
Linseed Oil	34.5%
Mineral Spirits	<u>47.8%</u>
	100.0%

PT = 42%

PRIMER PAINTS FOR GALVANIZED IRON
LEAD INDUSTRIES ASSOCIATION PROJECT NO. 10

Report of Thirty-Five Month Inspections
 at Joplin and Sayville

Purpose

To develop red lead base primers for galvanized iron surfaces.

Scope

Two one hundred percent red lead and three red lead base primers were selected for performance tests on variously treated galvanized surfaces. Two zinc dust-zinc oxide primers were selected as controls. These consisted of a zinc dust-zinc oxide-lined oil paint conforming to Federal Specification TT-P-641, Type I and a zinc dust-zinc oxide-alkyd resin paint suggested by the New Jersey Zinc Company. The primer formulations are included in the table of inspection results.

An aluminum topcoat paint was chosen consisting of a pigmentation conforming to Federal Specification TT-A-463, Type I, March 6, 1942 and a vehicle conforming to Federal Specification TT-V-41, Type I, October 5, 1939. This paint contained 2 lb. of aluminum paste per gallon of vehicle.

The types of surfaces constituting the base for each paint system were:

1. Unweathered and untreated.
2. Unweathered and washed with mineral spirits.
3. Unweathered and treated with copper sulfate.
4. Unweathered and treated with Lithoform, a proprietary solution sold by the American Paint Company
5. Surfaces weathered for 3, 6 and 9 months.

The base specimens consisted of spangled galvanized iron panels, 12 in. by 18 in.

Method of Exposure

The panels were exposed at an angle of 45° to the horizontal facing due south.

Exposure Sites

The panels were exposed at the Eagle-Fischer Company test site at Joplin, Missouri and at the National Lead Company test site at Sayville, Long Island.

Dates of Exposure

The panels were exposed at Joplin on June 16, 1946 and at Sayville on June 25, 1946.

Pre-treatment Procedures - Joplin

The unweathered panels were given surface treatments as follows:

1. No treatment.
2. The panels were brushed with a stiff bristle brush in mineral spirits.
3. A 50 per sulfate solution (8 oz. per gallon) was brushed on the panels.
4. The panels were treated with Lithoform #2 according to the manufacturer's direction.

The weathered panels were merely wiped thoroughly with a dry rag before painting.

Directions:

1. Clean surface - remove all paint or oil. Scrub surface lightly with fine steel wool.
2. Apply Lithoform by brush or spray. (It was brushed.)
3. Wash coating with cold water, being certain wash water is kept clean.
4. Dry the coating with clean rags or allow it to air dry.
5. Paint.

Joplin Painting Diagram

2 Primer Coats	1 Primer Coat
1 Topcoat	1 Topcoat
2 Primer Coats.	1 Primer Coat

18"

12"

Pre-treatment Procedures - Greenville

The following directions apply to 6 and 9 months weathered panels. Wash the panels with mineral spirits and to the bottom third of the panels, which has been weathered 6 and 9 months, respectively, a ply a wash coat of Lithoform No. 2 according to the manufacturer's directions. (These were the same directions followed at Joplin. See "Pre-treatment Procedures - Joplin" for these directions.)

1a. The panels receiving the copper sulfate wash are to be treated as follows:

Steel wash the panels lightly and to the bottom third of the remaining panels of each weathered set apply a solution of copper sulfate, 8 oz. per gallon, allow to remain on the panel for 30 minutes, rinse off with water, and allow to dry before painting.

The remaining unweathered panels were painted as follows:

1. The lower third of one half the number of this group of panels was treated with lithoform and topped with the aluminum paint.
2. The lower third of the other half of this group of unweathered panels received the copper sulfate treatment described above.

Sayville Painting Diagram

1 Primer Coat 1 Topcoat	2 Primer Coats 1 Topcoat
1 Primer Coat	2 Primer Coats
1 Primer Coat CRITICAL TREATMENT	2 Primer Coats

18"

12"

CONCLUSIONS:

Notes: Because of differences in panel layout and treatment procedures at Joplin and Sayville, correlation of the results at the two sites must be limited to the unweathered panel sections. Also, since none of the topcoated areas at Sayville received copper sulfate or lithoform treatments, the comparison is limited to the sections washed with mineral spirits only.

1. With the exception of Point No. 14, a comparison of the limited results shows generally good correlation between the Joplin and Sayville tests. Especially good correlation was obtained for the two primer coat areas and the two topcoated areas.
2. Of the paints exposed at both exposure sites, the zinc dust-zinc oxide compositions are performing considerably better than those based on red lead.

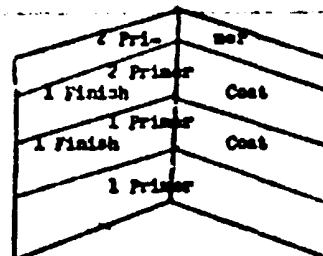
3. The outstanding difference between equivalent areas exposed at the two sites is the prevalence of failure by chalking and crusting at Joplin. Thus far all of the failures at Seyville have been due to pooling.
4. Weathering of the panels has had considerable effect on the performance of the red lead primer coated areas. Except for some chalking and erosion, which did not detract substantially from the protective performance of the paint systems, none of the weathered areas showed signs of failure either at Joplin or Seyville.
5. An important advantage of the zinc dust over the red lead base paints is the ability of the zinc dust paints to adhere to unweathered and chemically untreated surfaces.
6. Neither the oil vehicle 100% red lead formulations (164, 165) nor the phenolic vehicle mixed pigment red lead formulations (166, 167, 168) matched the all around performance of the oil vehicle or alkyd vehicle zinc dust formulation (170, 171) as primers for galvanized steel surfaces.
7. The five primers exposed exclusively at Seyville, containing various proportions of red lead and zinc dust have shown excellent performance to date. With the exception of paint No. 274 these primers contain straight alkyd vehicles. The pigmentation of paint No. 274, prepared with a phenolic vehicle, consists mainly of zinc dust.
8. On the basis of the results obtained to date, it appears that satisfactory red lead and extended red lead primers for galvanized surfaces can be prepared with low and medium oil content alkyd resins.

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INSPECTION RECORD

L. L. A. Projects No. 14

Type of Specimen: Angle
 Date Exposed: 9/15/48
 Date Inspected: 5/2/49
 Elapsed Time: 8 months



NOTE: Only those specimens showing some degree of failure are listed in the following table. All other specimens were rated 10 in all areas. Definite deterioration was limited to the one coat primer areas.

Specimen Number	CORROSION		Comments	Corrosion Inhibitive Pigment	
	Edge	General		Kind	Amount in Pigmentation
A203A	9e	10		Red Lead	99.5
A203B	9e	10		Red Lead	99.5
A204B	9e	10		Red Lead	99.5
A205B	9e	10		Red Lead	99.5
A206B	9e	10		Red Lead	99.5
A209A	9e	10		Red Lead	74.5
A211B	9e	10		Red Lead	74.5
A213B	9e	10		Zinc Chromate	24.5
A214B	9e	10		Zinc Chromate	24.5
A215 B-D	-	-	Undermining of mill scale - severe edge corrosion.	Zinc Chromate	24.5
A216B	-	-	Undermining of mill scale - severe edge corrosion.	Zinc Chromate	24.5

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Specimen Number	CORROSION		Comments	Corrosion Inhibitive Pigment	
	Edge	General		Kind	Percent in Pigmentation
A225B	9+	10		Zinc Chromate	24.5
A239B	9+	10		Zinc Chromate Red Lead	10.0 5.5
A246B	9	10	(Bad Mill scale on 1 panel)	Red Lead	65.0
A252B	9+	10		Red Lead Zinc Chromate	39.5 7.0
A254B-D	7	10	(Same bad mill scale)	Zinc Chromate	14.5
A257B-D	-	-	1 rust spot	Zinc Chromate	14.5
A261B	9+	10		Zinc Chromate	25.0
A263B	9+	10		Zinc Dust	80.0
A266B	9+	10		Zinc Chromate	20.0
A297A	10	7		35.65 Co. Primed Lead Chromate	72.0
A297B	10	7		35.65 Co. Primed Lead Chromate	72.0
A299A	10	9		Basic Lead Carbonate	72.0
A299B	8+	8+		Basic Lead Carbonate	72.0
A301A	9+	10		Basic Lead Sulphate	72.0

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Specimen Number	CORROSION		Comments	Corrosion Inhibitive Pigment	
	Edge	General		Kind	Percent In Pigmentation
AJ01B	9*	10		Basic Lead Sulphate	72.0
AJ02A	9	10		Zinc Chromate	55.0
AJ02B	9	10		Zinc Chromate	55.0
AJ10	9*	10		Sublimed Blue Lead	99.5
AJ12B	9*	10		Basic Lead Chromate	34.5
AJ31B	9*	10		Red Lead	85.0

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L. I. A. Project: No. 14

Type of Specimens: Flat
 Date Exposed: 9/15/48
 Date Inspected: 5/2/49
 Elapsed Time: 8 months

1 Primer	2 Primer
1 Finish	1 Finish
1 Primer	2 Primer

NOTE: Only those specimens showing some degree of failure are listed in the following table. All other specimens were rated 10 in all areas. Definite deterioration was limited to the one coat primer areas.

Specimen Number	CORROSION		Comments	Corrosion Inhibitive Pigment	
	Edge	General		Kind	Amount in Pigmentation
A204A	-	-	2 pinpoint rust spots on 1 coat area.	Red Lead	99.5
A227A	-	-	Foreign particles in 1 and 2 coat primer areas, some rust staining around particles. Area to be piece from wire brush.	Zinc Chromate	49.5
A297A	10	8	Many scattered pinpoint rust spots.	35.65 Co. Fumed Lead Zinc	72.0
A297b	10	9	Many scattered pinpoint rust spots.	35.65 Co. Fumed Lead Zinc	72.0
A301A	10	9	Many scattered pinpoint rust spots in localized areas	Basic Lead Sulphate	72.0