43

EVALUATION OF ORGANIC ZINC COATINGS

FINAL REPORT

by

DAVID G. AZAR
Chemical Research Engineer

Research Project No. 69-1Ch(B)
Louisiana HPR 1(7)

Research Report No. 43

Conducted by
LOUISIANA DEPARTMENT OF HIGHWAYS
Research and Development Section
In Cooperation with
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ABSTRACT

The Louisiana Department of Highways undertook this research project to find a more economical and time saving method for coating a steel bridge. Louisiana is presently using a four coat system of Basic Lead Silico Chromate for steel structures. This evaluation was to study the cost and accelerated life of an Organic Zinc Primer together with its appropriate topcoat versus the cost and life of the presently used Basic Lead Silico Chromate coating.

There were five types of organic zinc rich primers studied:

1. Epoxy Polyamide
2. Phenoxy
3. Non-Catalyzed Epoxys
4. Chlorinated Rubber
5. Modified Epoxys

Each of the aforementioned generic types of Organic Zinc Rich Primers together with its respective topcoat was evaluated and an approved qualified products list for each complete system was made based on the results of accelerated exposures (salt fog and weatherometer tests).

The following conclusions were obtained from the results of this report.

1. Salt Fog and Weatherometer results indicated that for accelerated exposure, Organic Zinc Rich Primers together with its appropriate topcoat performed as well as the Basic Lead Silico Chromate coating system.

2. Organic Zinc Primers together with its appropriate topcoat can be applied for $0.70/ft.^{2} whereas the Basic Lead Silico Chromate system can be applied for $0.87/ft.^{2}.

Based on the aforementioned life expectancy and cost data, Organic Zinc Primers together with its topcoat appears to be a better coating system in life expectancy versus cost/ft.^{2} than Louisiana Department of Highways Specifications Basic Lead Silico Chromate system.

INTRODUCTION

Louisiana is presently using a coating system that requires four applications of paint. This type of system can be expensive for steel bridges due to the following:

1. Labor for applying four coats of paint.
2. Scaffolding procedures.
3. Loss of time due to drying.

In this research project, an attempt was made to evaluate organic zinc primers together with respective tipcoats (vinyl epoxy, etc.) for use as an alternate to the Basic Lead Silico Chromate system.

This organic zinc system should provide the following advantages:

1. Galvanic zinc protection
2. Less scaffolding procedures
3. Fast drying
4. Resistance to atmospheric contamination.

PURPOSE

The purpose of this study was to evaluate the cost versus life expectancy of organic zinc primers as compared to the conventional Louisiana Department of Highways Specification Basic Lead Silico Chromate paint system using accelerated means of corrosion such as salt-spray exposure and carbon-arc weatherometer exposure.

METHOD OF PROCEDURE

The method of preparation of test panels and procedure for exposure are as follows:

1. Salt-Spray Cabinet - Three steel panels, 4" x 8" x 1/8" were sand blasted to a SSPC-10 near white finish for each system evaluated. The organic zinc primers were applied to a thickness of two to three mils. One set of steel panels were coated with a Basic Lead Silico Chromate paint system for comparative evaluation. The organic zinc coated panels were removed when the Basic Lead Silico Chromate panels began to show undercutting. This device was operated at a salt concentration of 18%, 130°F and a atomizing pressure of 8 psi.

2. Weatherometer Cabinet - Two steel panels, 3" x 6" x 24 gauge, were painted with each topcoat studied. One set of steel panels were coated with Louisiana Department of Highways Specification Basic Lead Silico Chromate paint system for comparative evaluation. This test was to evaluate weathering characteristics of each topcoat. The weatherometer was operated at a relative humidity of 88%, a black panel temperature of 150°F and water pressure of 20 psi. There are 102 minutes of light and 18 minutes of water spray per cycle.

3. Physical Tests - Physical tests of all paints were conducted as well as infra-red spectra on paint vehicles. These tests provided a means of evaluating the topcoats as to chemical resistance.

4. Cost Estimate - A cost estimate of the paint system was determined as follows:

    a. Cost of sand blasting per square foot of steel surface.
    b. Cost of scaffolding per square foot of steel surface.
    c. Cost of paint per coat per square foot of steel surface coated.
    d. Overall life expectancy of paints based on accelerated corrosion tests. This final estimate was subjective based on percentage of paint life completed during accelerated exposure.

DISCUSSION OF RESULTS

Table 1 of the appendix is a summary of the accelerated test results of all paint systems studied. An examination indicates that one chlorinated rubber organic zinc primer blistered excessively when exposed to salt fog conditions. All phenoxy organic zinc primers blistered excessively through the topcoat during salt fog exposure. This indicated a tight topcoat which did not allow the escape of hydrogen gas bubbles formed from the slow curing phenoxy zinc. The other generic types of organic zinc primers together with topcoats did not show any undercutting and gave good galvanic protection under salt fog conditions.

The Basic Lead Silico Chromate system began to undercut after two weeks salt fog exposure. Since Basic Lead Silico Chromate is the accepted coating for steel bridges, two weeks salt fog exposure has been accepted as the criterion for approving organic zinc primers with topcoats for steel protection only. During this exposure period these must show no signs of undercutting or blistering and fair galvanic protection is required.

Weatherometer Exposure

Weatherometer data, from Table 1, indicated that the aluminum topcoats, regardless of the generic type of the vehicle, performed very well with 500 hours exposure. At the duration of this exposure the aluminum topcoats showed no discoloration or chalking. The grey topcoats, of different generic type vehicle, showed slight deterioration of color after the designated 500 hour exposure period. The grey Basic Lead Silico Chromate topcoat oxidized at approximately the same rate as the grey epoxy and vinyl topcoats. Therefore, it can be said that the topcoats used with the organic zinc rich primers resist ultra-violet light waves as well as the grey Basic Lead Silico Chromate topcoat and it can be surmised that these more sophisticated topcoats will weather as well as the grey Basic Lead Silico Chromate topcoat . A minimum value of 500 hours of Weatherometer exposure has been selected as a criterion for approving topcoats used over organic zinc primers. At the end of this exposure period, for a topcoat to be approved, only slight discoloration and/or slight chalking is acceptable. For any organic zinc system to be approved successful completion of salt fog and weatherometer exposure is necessary.

Cost Versus Life

According to local contractors, the averages cited below are the approximate cost for sandblasting, materials, and scaffolding. The cost estimate for the Basic Lead Silico Chromate, and organic zinc coatings are tabulated as follows:

Basic Lead Silico Chromate (Four-Coat System)

Sandblasting	= $.40/ft.^{2} (SSPC-6)	= $.40
Scaffolding	= $.07 x 4/ft.^{2}	= $.27
Material Cost	= $.02 x 4/ft.^{2}	= $.08
Application Cost	= $.03 x 4/ft.^{2}	= $.12
		$.87/ft.^{2}

Organic Zinc and Topcoat (Two-Coat System)

Sandblasting	= $.50/ft.^{2} (SSPC-10)	= $.47
Scaffolding	= $.07 x 1/ft.^{2}	= $.07
Material Cost	= $.05 x 2/ft.^{2}	= $.10
Application Cost	= $.03 x 2/ft.^{2}	= $.06
		$.70/ft.^{2}

According to the aforementioned tabulation organic zinc coatings are cheaper to apply than the four coat system of Basic Lead Silico Chromate

Table 2 of the appendix lists all the physical tests conducted on approved coatings only. The chemical resistance test included immersion of coated panels in 0.1N HCl and 0.1N NaOH solutions. A subjective rating of excellent, good, fair, and poor will be given for each topcoat. The primers were not immersed in the acid and alkali solutions. The other physical tests together with the infra-red spectra were used to write specifications for both construction and maintenance painting, for the organic zinc primers and topcoats.

CONCLUSIONS

The advantages of the two coat system (organic zinc primer with its appropriate topcoat) over Basic Lead Silico Chromate are as follows:

1. Galvanic protection to steel
2. More economical to apply
3. Time saving
4. Good chemical resistance
5. Prevent undercutting
6. Good ultra-violet resistance

RECOMMENDATIONS

The following is a list of coatings that were recommended to the Maintenance Department as an alternate to the Basic Lead Silico Chromate system based on findings of this research project:

1. Amercoat Paint Company, Brea, California
   a. Amercoat No. 62
   b. Amercoat No. 72

2. Standard Paint and Varnish Company, New Orleans, Louisiana
   a. Stapon 3050
   b. Stapon 3056

3. Admiral Paint Company, Lake Charles, Louisiana
   a. DM-1144
   b. CM-1662

4. Enjay Chemical Company, Baton Rouge, Louisiana
   a. Rust Ban CR 6875
   b. Rust Ban LD 7198

5. Carboline Paint Company, St. Louis, Missouri
   a. Carboline No. 655
   b. Carboline 190HB-W

6. Prufcoat Paint Company, Baton Rouge, Louisiana
   a. Zinc Prime 100
   b. Prufcoat No. 545

7. Bywater Sales and Service, New Orleans, Louisiana
   a. OZR No. 309
   b. Byco No. 30

8. Southern Imperial Paint Company, New Orleans, Louisiana
   a. Zinc Primer No. X-50
   b. Jet Set No. 120

9. Napko Paint Company, Houston, Texas
   a. Napko - 2Z
   b. Thixovin No. 5452

10. Mobil Paint Company
    a. Mobil Zinc No. 4-P-22
    b. Val Chem No. 89 Series V-6

The results from Table 2, together with Infra-red Spectra on each coating, from the aforementioned list were tabulated and specifications governing these systems are included in the appendix under Table 3. These specifications were submitted to the Bridge Design Section for inclusion in bridge painting contracts as an alternate to Basic Lead Silico Chromate paint.

APPENDIX

TABLE 1
SUMMARY OF ACCELERATED TEST RESULTS

Source	Generic Type	Avg. Mils	Weatherometer Exposure	Salt Fog Exposure
Amercoat Corporated	Modified-non catalyzed-epoxy zinc rich primer. Epoxy polyamide topcoat	3.50 3.00	Slight discoloration & chalking.	No undercutting, good galvanic protection.
Standard Paint & Varnish Co.	Epoxy polyamide zinc primer Catalyzed epoxy topcoat	3.50 3.00	No discoloration, & no chalking.	No undercutting, good galvanic protection.
Napko Paint Co. System (1)	Modified polyhydroyl resin zinc rich primer. Vinyl topcoat	3.75 2.00	No discoloration & slight chalking.	No undercutting, good galvanic protection.
Napko Paint Co. System (2)	Epoxy zinc rich primer Epoxy ester aluminum topcoat	3.75 2.00	No discoloration & no chalking.	No undercutting, good galvanic protection. Excessive blistering.
Carboline Paint Co.	Epoxy polyamide zinc rich primer. Epoxy polyamide topcoat	3.00 3.00	Discoloration & slight chalking.	No undercutting, good galvanic protection.
Admiral Paint Co.	Epoxy polyamide zinc rich primer. Epoxy polyamide topcoat	4.00 2.00	No discoloration & no chalking.	No undercutting, good galvanic protection.
Enjay Chemical Co.	Chlorinated rubber zinc rich primer. Chlorinated rubber topcoat	4.00 2.00	No discoloration & no chalking.	No undercutting, good galvanic protection.
Reliance Universal	Epoxy catalyzed zinc rich primer. Epoxy topcoat	4.50 2.00	Slight discoloration & no chalking.	No undercutting, fair galvanic protection, excessive blistering.

TABLE 1 (CONT'D)

Source	Generic Type	Avg. Mils	Weatherometer Exposure	Salt Fog Exposure
Mobil Paint Co. System (2)	Epoxy polyamide zinc rich primer. Epoxy topcoat	3.50 2.75	Slight discoloration & slight chalking.	No undercutting, good galvanic protection.
Bywater Sales & Service	Epoxy zinc rich primer Modified epoxy topcoat	2.75 3.25	Slight discoloration & no chalking.	No undercutting, good galvanic protection.
Bywater Sales & Service	Phenoxy zinc rich primer Epoxy topcoat	3.00 3.00	Slight discoloration & no chalking.	No undercutting, good galvanic protection & excessive blistering.
Southern Imperial Paint Co.	Chlorinated rubber zinc rich primer. Chlorinated rubber topcoat	3.00 3.25	Slight discoloration & no chalking.	Blistered excessively.
Southern Imperial Paint Co.	Modified epoxy zinc rich stainless steel pigment. Primer and epoxy topcoat	3.25 3,25	Slight discoloration & no chalking.	No undercutting, good galvanic protection.
Prufcoat Paint Co.	Epoxy polyamide zinc rich primer. Vinyl epoxy topcoat	3.00 3.00	Slight discoloration & no chalking.	No undercutting, good galvanic protection.
Mobil Paint Co. System (1)	Phenoxy zinc rich primer Modified epoxy topcoat	3.50 3.00	Slight discoloration & slight chalking.	No undercutting, fair galvanic protection, excessive blisterin
Basic Lead Silico Chromate	Linseed Oil alkyd resin	5.00 1.75	Slight discoloration and slight chalking	Undercutting alone scribe in 2 weeks.

TABLE 2
PHYSICAL TEST RESULTS OF ACCEPTED COATINGS

Manufacturer	Solids Content	Volatile Content	Wt. per Gallon	Dry Touch	Recoat Time	Chemical Resistance
Standard Paint Company						
Stapon 3050 zinc primer	79.1%	20.9%	19 lbs.	20 min.	8 hrs.	-
Stapon 3056 epoxy topcoat	54.0%	46.0%	9.5 lbs.	45 min.	-	Good
Amercoat Paint Company						
Amercoat No. 62 zinc primer	78.3%	21.7%	19 lbs.	12 min.	2 hrs.	-
Amercoat No. 72 epoxy topcoat	64.1%	25.9%	12.2 lbs.	1 hr.	-	Good
Admiral Paint Company						
DM-1144 zinc primer	80.1%	19.9%	21 lbs.	30 min.	6 hrs.	-
CM-1662 epoxy topcoat	45.1%	54.9%	9.5 lbs.	30 min.	-	Good
Carboline Paint Company						
No. 655 zinc primer	70.1%	29.9%	17.1 lbs.	30 min.	8 hrs.	-
190HB-W epoxy topcoat	81.0%	19.0%	13 lbs.	45 min.	-	Good
Enjay Chemical Company						
CR-6875 zinc primer	74.3%	25.7%	20 lbs.	15 min.	3 hrs.	-
LD-7198 chlorinated rubber topcoat	55.2%	44.8%	10.3 lbs.	45 min.	-	Good
Napko Paint Company						
2Z zinc primer	75.8%	24.2%	18.5 lbs.	15 min.	5 hrs.	-
Thixovin No, 5452 vinyl topcoat	47.6%	52.4%	9.4 lbs.	30 min.	-	Good
Prufcoat Paint Company						
100 zinc primer	88.0%	22.0%	24 lbs.	15 min.	24 hrs.	-
Series 545 epoxy topcoat	69.9%	30.1%	11.8 lbs.	30 min.	-	Good
Southern Imperial Paint Company						
X-50 zinc primer	56.1%	43.9%	13.4 lbs.	15 min.	24 hrs.	-
Jet Set 120 epoxy topcoat	69.1%	30.9%	12.1 lbs.	1 hr.	-	Good

TABLE 2 (CONT'D)
PHYSICAL TEST RESULTS OF ACCEPTED COATINGS

Manufacturer	Solids Content	Volatile Content	Wt. per Gallon	Dry Touch	Recent Time	Chemical Resistance
Bywater Sales and Service						
OZR No. 309 zinc primer	73.2%	26.8%	18.6 lbs.	15 min.	24 hrs.	-
Byco No. 30 epoxy topcoat	72.2%	27.8%	12.0 lbs.	45 min.	-	Good
Mobil Paint Co.						
Zinc No. 4-P-22	82.0%	18.0%	20.0 lbs.	30 min.	24 hrs.	-
Val Chem 89 Series V-6	73.0%	27.0%	12.2 lbs.	5 hrs.	-	Good
Basic Lead Silico Chromate						
1st Coat	79.0%	21.0%	13.8 lbs.	4 hrs.	24 hrs.	-
2nd Coat	88.6%	13.4%	15.2 lbs.	5 hrs.	24 hrs.	-
3rd Coat	87.3%	12.7%	13.9 lbs.	6 hrs.	24 hrs.	-
Topcoat	67.0%	33.0%	10.1 lbs.	2 hrs.	-	Fair

TABLE 3

Specifications for
All Approved Coatings

SYSTEM # 1

SPECIFICATIONS
FOR
BASIC LEAD SILICO CHROMATE PAINT

DESCRIPTION: These specifications set forth material requirements for basic lead silico chromate paint to be used in a three or four-coat paint system over properly prepared structural steel surfaces to be permanently exposed. The four-coat paint system will use 1st, 2nd, 3rd and 4th coats of paint and the three-coat system will use only 1st, 3rd and 4th coats of paint as specified herein.

The shop coat (prime coat) for structural steel on new construction shall be in accordance with the requirements of A(1).

The first prime coat for existing steel structures shall be in accordance with the requirements of A(2), unless otherwise specified.

The final field coat (4th coat) shall meet the requirements of either "D(1)-Bright Green Paint" or "D(2)-Cement Gray Paint," as specified.

REQUIREMENTS:

A(1). 1st Coat Basic Lead Silico Chromate Brown Paint (Shop prime coat or first prime coat for steel on new construction).

(a) Pigment. The pigment shall be well ground and be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM Designation: D 1648)	93.2	- - -
Siliceous Red Iron Oxide (85% Fe_2O_3)	5.0	6.1
Organo Montmorillonite	0.5	0.7

(b) Liquid. The liquid shall consist of not less than 52% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be composed of raw linseed oil and alkyd resin combined in the approximate proportions of 1:1 respectively by weight and shall contain a minimum of 7.0% phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the requirements of Federal Specification TT-R-266, Type III. Small quantities of grinding and wetting aids may be used if desired.

(c) The paint shall consist of:

	Min.	Max.
Pigment	57.0%	- - -
Vehicle	- - -	43.0%
Weight/Gallon, Pounds @ 77°F	13.5	- - -
Water	- - -	0.5%
Coarse Particle and Skins (Total Residue Retained on 325 Sieve Based on Paint)	- - -	1.0%
Fineness of Grind (North Standard)	4	- - -
Viscosity (Stormer - Krebs Units) @ 77°F	72	83
Drying Time:		
Set to Touch, hours	- - -	4
Dry Through, hours	- - -	16

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 58.4% by Weight	
Basic Lead Silico Chromate (ASTM Designation: D 1648)	93.5
Siliceous Red Iron Oxide (85% Fe_2O_3)	5.9
*Organo Montmorillonite	0.6
	100.0

*Prewet with 30% by weight of methyl alcohol:water - (95:5) before adding to grind.

VEHICLE - 41.6% by Weight	
Raw Linseed Oil (AASHO Designation: M 125-60)	26.7
Alkyd Resin (TT-R-266, Type III)	52.3
Mineral Spirits	18.7
6% Zirconium Catalyst	1.2
6% Manganese Naphthenate	0.4
6% Cobalt Naphthenate	0.2
Anti-Skinning Agent	0.2
Methyl Alcohol:Water (95:5)	0.3
	100.0

P V (% pigment by volume in nonvolatile portion of paint): 39.7

Volatile and drier in vehicle: 44.9%

A(2). 1st Coat Basic Lead Silico Chromate Brown Paint (First prime coat for existing steel structures and maintenance painting).

(a) Pigment. The pigment shall be well ground and be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM Designation: D 1648)	94.0	- - -
Siliceous Red Iron Oxide (85% Fe_2O_3)	4.0	5.5
Organo Montmorillonite	0.5	0.7

(b) Liquid. The liquid shall consist of not less than 69% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be composed of raw linseed oil and alkyd resin combined in the approximate proportions of 2.3:1 respectively by weight and shall contain a minimum of 7.0% phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the

requirements of Federal Specification TT-R-266, Type 1, Class A or B. A drier combination of 0.14% zirconium, 0.04% Manganese, and 0.02% Cobalt metals furnished in soluble form based on the nonvolatile vehicle of the paint, shall be used. Small quantities of grinding and wetting aids may be used if desired.

(c) The paint shall consist of:

	Min.	Max.
Pigment	64.0%	- - -
Vehicle	- - -	36.0%
Weight/Gallon, Pounds @ 77°F	15.0	- - -
Water	- - -	0.5%
Coarse Particle and Skins (Total Residue Retained on 325 Sieve Based on Paint)	- - -	1.0%
Fineness of Grind (North Standard)	4	- - -
Viscosity (Stormer - Krebs Units) @ 77°F	72	80
Dry Firm, Hours	18	- - -

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 64.58% by Weight	
Basic Lead Silico Chromate (ASTM Designation: D 1648)	94.43
Siliceous Red Iron Oxide (85% Fe_2O_3)	4.97
*Organo Montmorillonite	0.60
	100.00

*Prewet with 30% by weight of methyl alcohol:water - (95:5) before adding to grind.

VEHICLE - 35.42% by Weight	
Raw Linseed Oil (AASHO Designation: M 125-60)	48.46
Alkyd Resin (TT-R-266, Type 1, Class A)	30.81
Mineral Spirits	17.94
6% Zirconium Catalyst	1.58
6% Manganese Naphthenate	0.47
6% Cobalt Naphthenate	0.24
Anti-Skinning Agent	0.18
Methyl Alcohol:Water (95:5)	0.32
	100.00

P V (% pigment by volume in nonvolatile portion of paint): 38.1

Volatile and drier in vehicle: 29.9%

B. 2nd Coat Basic Lead Silico Chromate Maroon Paint.

(a) Pigment. The pigment shall be well ground and be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM Designation: D 1648)	64.0	- - -
Siliceous Red Iron Oxide (85% Fe_2O_3)	- - -	35.5
Organo Montmorillonite	0.5	0.7

(b) Liquid. The liquid shall consist of not less than 72% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be composed of raw linseed oil and alkyd resin combined in the approximate proportions of 2:1 respectively by weight and shall contain a minimum of 7.6% phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the requirements of Federal Specification TT-R-266, Type 1, Class A or B. A drier combination of 0.14% Zirconium and 0.04% Manganese metals furnished in soluble form based on the nonvolatile vehicle of the paint, shall be used. Small quantities of grinding and wetting aids may be used if desired.

(c) The Paint shall consist of:

	Min.	Max.
Pigment	62.0%	- - -
Vehicle	- - -	38.0%
Weight/Gallon, pounds at 77°F	14.8	- - -
Water	- - -	0.5%
Coarse Particles and Skins (total residue retained on 325 sieve based on paint)	- - -	1.0%
Fineness of Grind (North Standard)	4	- - -
Viscosity (Stormer - Krebs Units) at 77°F	74	84
Dry Firm, hours	18	- - -

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 62.26% by Weight	
Basic Lead Silico Chromate (ASTM - D 1648)	64.42
Siliceous Red Iron Oxide (85% Fe_2O_3)	34.79
*Organo Montmorillonite	0.59
	100.00

*Prewet with 30% by weight of methyl alcohol:water - (95:5) before adding to grind.

	% By Weight
VEHICLE - 37.74% by Weight	
Raw Linseed Oil (AASHO M 125-60)	47.56
Alkyd Resin (TT-R-266, Type 1, Class A)	34.44
Mineral Spirits (Hv)	14.76
Anti-Skinning Agent	0.16
6% Zirconium Catalyst	1.80
6% Manganese Naphthenate	0.49
Methyl Alcohol:Water (95:5)	0.30
Soya Lecithin	0.49
	100.00

PV (% pigment by volume in nonvolatile portion of paint): 34.8

Volatile and drier in Vehicle: 27.84%

C. 3rd Coat Basic Lead Silico Chromate Grey Paint

(a) Pigment. the pigment shall be well ground and be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM - D 1648)	65.6	- - -
Chalk Resistant Rutile Titanium Dioxide	- - -	16.6
Acicular Zinc Oxide	- - -	5.8
Fibrous Magnesium Silicate and Tinting colors (Lampblack and Phthalocyanine Blue) No Iron Blue permitted	- - -	11.5
Organo Montmorillonite	0.5	- - -

(b) Liquid. The liquid shall consist of not less than 69% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be composed of raw linseed oil and alkyd resin combined in the approximate proportions of 2:1 respectively by weight and shall contain a minimum of 7.5% phthalic anhydride. The alkyd resin, furnished as a solution, shall meet the requirements of Federal Specification TT-R-266, Type 1, Class A or B. Small quantities of grinding and wetting aids may be used if desired.

(c) The paint shall consist of:

	Min.	Max.
Pigment	56.5%	- - -
Vehicle	- - -	43.5%
Weight/Gallon, pounds @ 77°F	13.5	- - -
Water	- - -	0.5%
Coarse Particles and Skins (total residue retained on 325 sieve based on paint)	- - -	1.0%
Fineness of Grind (North Standard)	4	- - -
Viscosity (Stormer- Krebs Units) @ 77°F	72	82
Dry Firm, hours	18	- - -

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 57.7% by Weight	
Basic Lead Silico Chromate (ASTM - D 1648)	67.80
Titanox RANC	15.52
Zinc Oxide	5.13
Magnesium Silicate	9.77
Lampblack	0.81
Phthalocyanine Blue	0.36
*Organo Montmorillonite	0.61
	100.00

*Prewet with 30% by weight of methyl alcohol:water - (95:5) before adding to grind.

VEHICLE - 42.3% by Weight	
Raw Linseed Oil (AASHO M 125-60)	46.83
Alkyd Resin (TT-R-266, Type 1, Class A)	33.33
Mineral Spirits	18.00
6% Zirconium Catalyst	1.17
6% Manganese Naphthenate	0.23
Anti-Skinning Agent	0.16
Methyl Alcohol:Water (95:5)	0.28
	100.00

PV (% pigment by volume in nonvolatile portion of paint): 32.5

Volatile and drier in vehicle: 30%

D(1). 4th Coat Basic Lead Silico Chromate (Bright Green Paint).

(a) Pigment. The pigment shall be well ground and be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM - D 1648)	64	- - -
Titanium Dioxide, Rutile Nonchalking	18	- - -
Tinting colors (C.P. Chrome Yellow Light Phthalocyanine Green)	B a l a n c e	
Organo Montmorillonite	0.8	1.0

(b) Liquid. The liquid shall consist of not less than 47.0% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be an alkyd resin conforming to Federal Specification TT-R-266, Type 1, Class A or B. The thinner shall be essentially mineral spirits meeting Federal Specification TT-T-291a, Grade 1. Small quantities of grind and wetting aids may be used if desired.

(c) The paint shall consist of:

	Min.	Max.
Pigment	30.5%	- - -
Vehicle	- - -	69.5%
Weight/Gallon, pounds	9.8	- - -
Water	- - -	0.5%
Coarse Particles and Skins (total residue retained on 325 sieve based on paint)	- - -	1.0%
Fineness of Grind (North Standard)	5	- - -
Viscosity (Stormer - Krebs Units)	65	75
Dry Firm, hours	- - -	8

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 31.0% by Weight	
Basic Lead Silico Chromate (ASTM - D 1648)	64.2
Titanox RANC	18.4
Chrome Yellow, Light	11.0
Phthalocyanine Green	5.5
*Organo Montmorillonite	0.9
	100.0

*Prewet with 30% by weight of methyl alcohol:water - (95:5) before adding to grind.

	% By Weight
VEHICLE - 69.0% by Weight	
Alkyd Resin (TT-R-266, Type 1, Class A)	67.2
Mineral Spirits	30.7
Zirconium Catalyst, 6%	1.2
Cobalt Naphthenate, 6%	0.3
Manganese Naphthenate, 6%	0.3
Anti-Skinning Agent	0.2
Methyl Alcohol:Water (95:5)	0.1
	100.0

PV (% pigment by volume in nonvolatile portion of paint): 20.1

Volatile and drier in vehicle: 53.0%

D(2). 4th Coat Basic Lead Silico Chromate (Cement Gray Paint).
(a) Pigment. The pigment shall be composed of:

	Min. %	Max. %
Basic Lead Silico Chromate (ASTM - D 1648)	39.0	- - -
Titanium Dioxide, Rutile Non-Chalking	57.0	- - -
Phthalocyanine Blue and Lampblack	B a l a n c e	
Organo Montmorillonite	0.7	0.9

(b) Liquid. The liquid shall consist of not less than 50% nonvolatile vehicle, the balance to be combined drier and thinner. The nonvolatile vehicle shall be an alkyd resin conforming to Federal Specification TT-R-266, Type 1, Class A or B. The thinner shall be essentially mineral spirits meeting Federal Specification TT-T291a, Grade 1. Small quantities of grind and wetting aids may be used if desired.

(c) The paint shall consist of:

	Min.	Max.
Pigment	33.0%	- - -
Vehicle	- - -	67.0%
Weight/Gallon, pounds @ 77°F	10.0	- - -
Water	- - -	0.5%
Coarse Particles and Skins (Total residue retained on 325 sieve based on paint)	- - -	1.0%
Fitness of Grind (North Standard)	5	- - -
Viscosity (Stormer - Krebs Units) @ 77°F	68	75
Dry Film, hours	- - -	8

The material which follows is a suggested batching formulation that will meet the requirements of the prior stated composition.

	% By Weight
PIGMENT - 33.6% by Weight	
Basic Lead Silico Chromate (ASTM - D 1648)	39.10
Titanox RANC	58.66
*Organo Montmorillonite	0.84
Phthalocyanine Blue	1.40
	100.00

*Prewet with methyl alcohol, 30% by weight: water - (95:5) before adding to grind.

	% By Weight
VEHICLE - 66.4% by Weight	
Alkyd Resin (TT-R-266, Type 1, Class A)	72.8
Mineral Spirits AASHO M 128-60	24.9
6% Zirconium Catalyst	1.4
6% Cobalt Naphthenate	0.3
6% Manganese Naphthenate	0.3
Anti-Skinning Agent	0.2
Methyl Alcohol:Water (95:5)	1.0
	100.0

Conforms to: Federal Standard No. 595-16314

PV (% Pigment by volume in nonvolatile portion of paint): 20.8

Volatile and Drier in Vehicle: 49.1%

E. APPLICATION: Coating must be capable of being applied to the required film thickness by brush, roller or spray application methods without difficulty at temperatures above 40 degrees F. and shall exhibit no running, streaking, sagging, wrinkling, or other film defects.

F. COLOR: The color shall be as specified in the purchase requisition for the paint of a particular coat. Color chips are available upon request from the Department's Central Testing Laboratory.

G. HIDING POWER: Shall be sufficient to obtain complete hiding when applied at normal spreading rates.

H. PACKAGING AND STORAGE: The material shall be shipped in five (5) gallon, full lid, metal containers meeting the latest requirements of the Interstate Commerce Commission for shipping containers for materials, unless other size containers are specified. The containers shall have appropriate descriptive labels with necessary instructional information.

The material as supplied and after one year storage shall show no skinning or settling, color change, nor thickening or livering that cannot be readily brought to stable consistency by normal mixing procedures.

SYSTEM # 2

SPECIFICATIONS

Standard Paint & Varnish Company
3300 River Road
P.O. Box 826
Harvey, Louisiana 70058

A - ORGANIC ZINC PRIMER (STAPON #3050)

1. Generic Type - Epoxy - Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

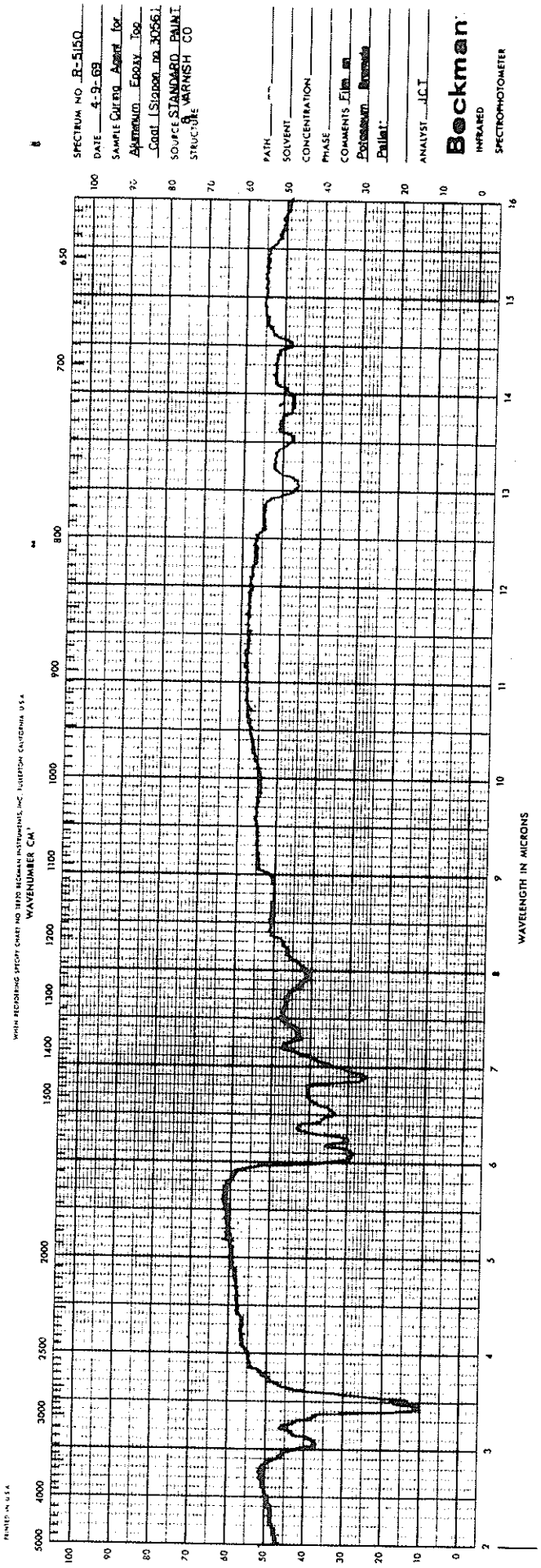
a.	Solids content, %, minimum	76.0
b.	Volatile content, %, maximum	24.0
c.	Wt./gallons, pounds, minimum	17.0
d.	Pot life @ 70°F, hours, minimum	8.0
e.	Recoat time, hours, minimum	8.0
f.	Dry to touch, minutes, maximum	45.0
g.	Infra-red Spectra (zinc paint vehicle)	Pass
h.	Infra-red Spectra (curing agent, zinc paint	Pass

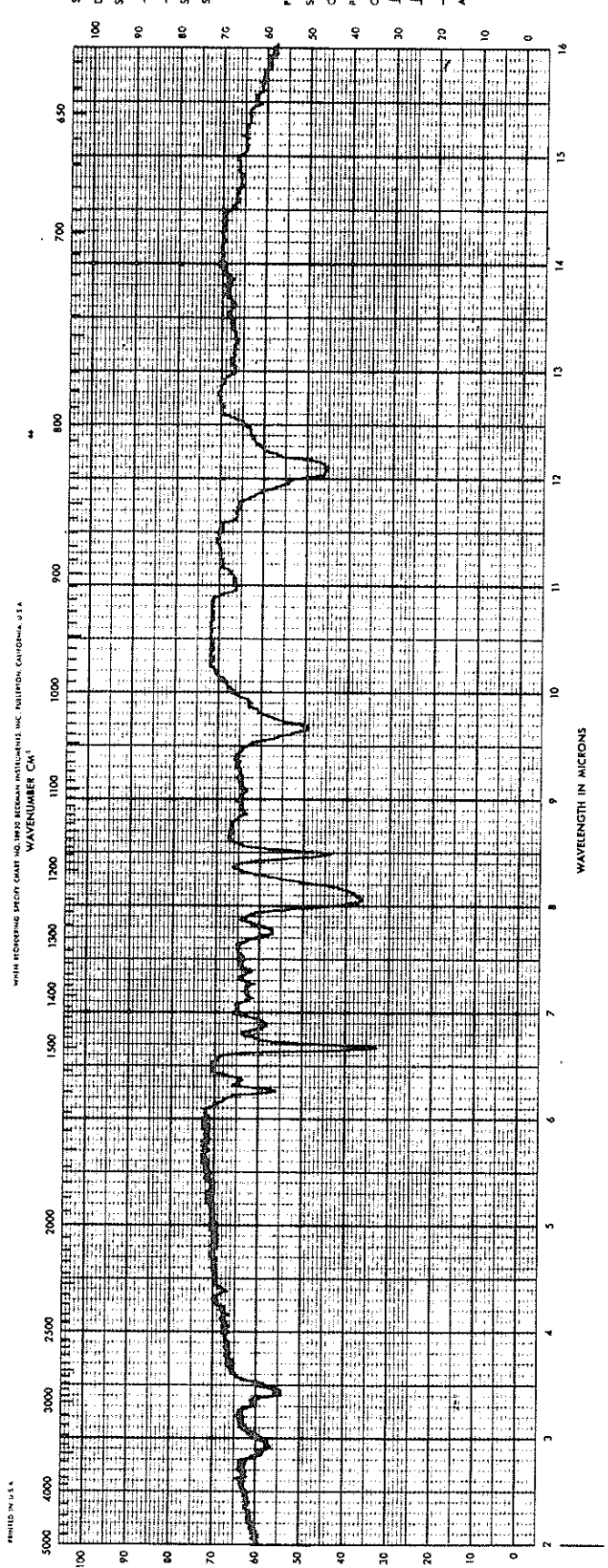
B - ALUMINUM EPOXY TOPCOAT (STAPON #3056)

1. Generic Type - Catalyzed - Epoxy
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	46.0
b.	Volatile content, %, maximum	54.0
c.	Wt./gallons, pounds, minimum	8.5 - 10.5
d.	Pot life @ 70°F, hours, minimum	8
e.	Dry touch, hours, maximum	1
f.	Infra-red Spectra (Aluminum paint vehicle)	Pass
g.	Infra-red Spectra (curing agent aluminum paint)	Pass

C - THINNER (T-3810 & T-3806)


SPECTRUM NO R-5150
DATE 4-9-69
SAMPLE Curing Agent for Aluminum Epoxy Top Coat (Sloan no 30561
SOURCE STANDARD PAINT & VARNISH CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS
PRINTED IN U.S.A.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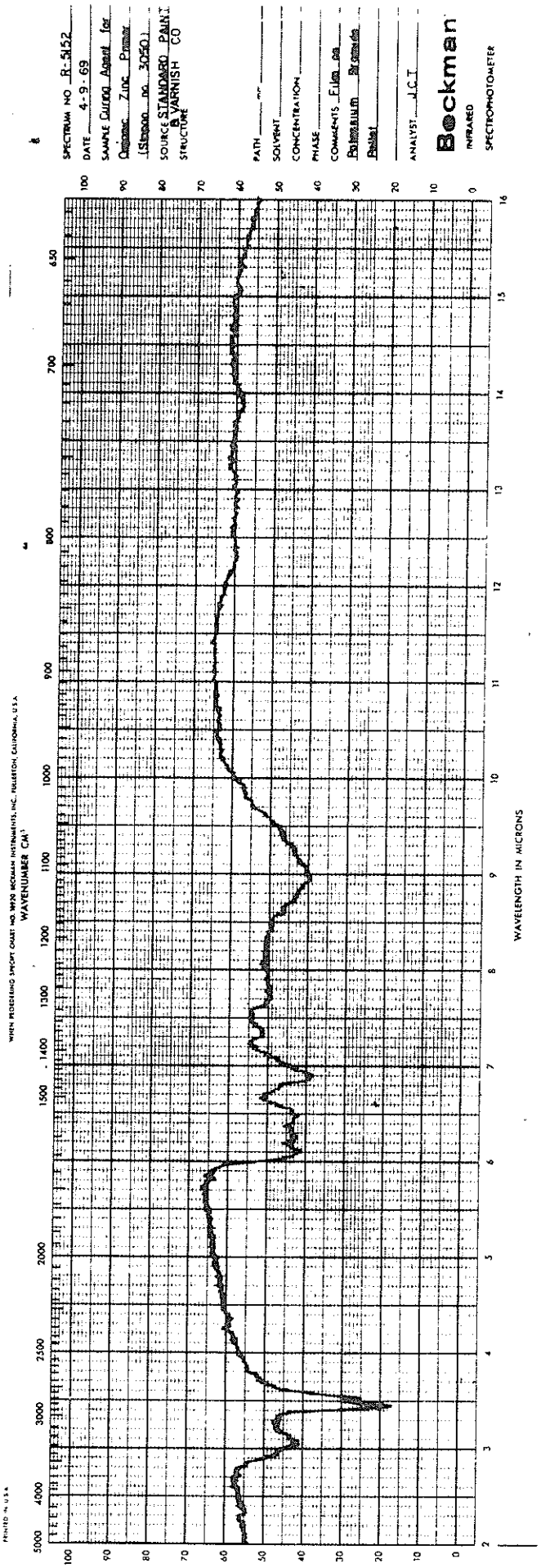
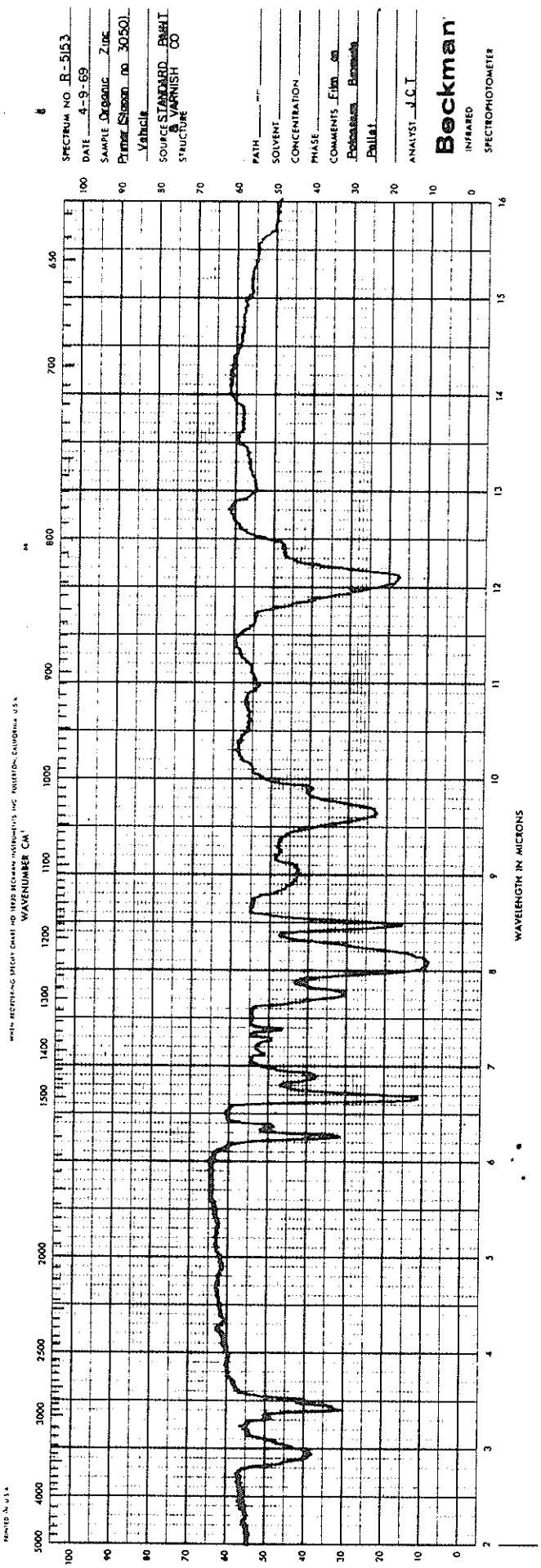
DATE 4-9-69
SAMPLE Aluminum Epoxy Top Coat (Stapon no.3056) Vehicle
SOURCE STANDARD PAINT & VARNISH CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS
PRINTED IN U.S.A.


SPECTRUM NO R-5452
DATE 4-9-69
SAMPLE Curing Agent for Organic Zinc Primer (Stepan no. 3050)
SOURCE STANDARD PAINT & VARNISH CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Polyethylene Plate
ANALYST J.C.T
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS
WHEN RESEARCH SPECTRA CHART NO. 10930 BECKMAN INSTRUMENTS, INC., FULLERTON, CALIFORNIA, U.S.A.
PRINTED IN U.S.A.


SPECTRUM NO. R-5153
DATE 4-9-69
SAMPLE Organic Zinc Primer Silicon no 3050) Vehicle
SOURCE STANDARD PAINT & VARNISH CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

SYSTEM # 3

SPECIFICATIONS

Amercoat Corporation
201 North Berry Street
Brea, California

A - ORGANIC ZINC PRIMER (AMERCOAT #62)

1. Generic Type - Modified Non-Catalyzed Epoxy Zinc Rich Primer
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	70.0
b. Volatile content, %, maximum	30.0
c. Wt./gallons, pounds, minimum	17.0
d. Pot life @ 70°F, minimum	1 week
e. Recoat time, hours, minimum	3
f. Dry touch, minutes, maximum	30
g. Infra-red Spectra	Pass

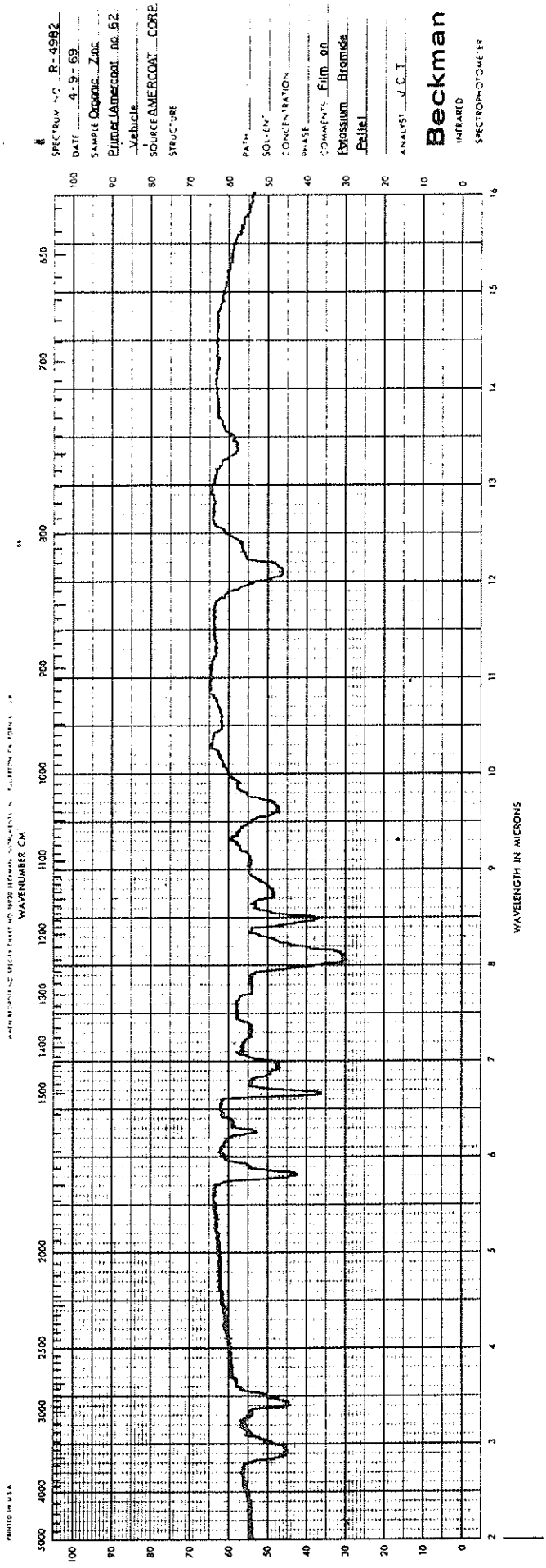
B - GREY EPOXY TOPCOAT (AMERCOAT #72)

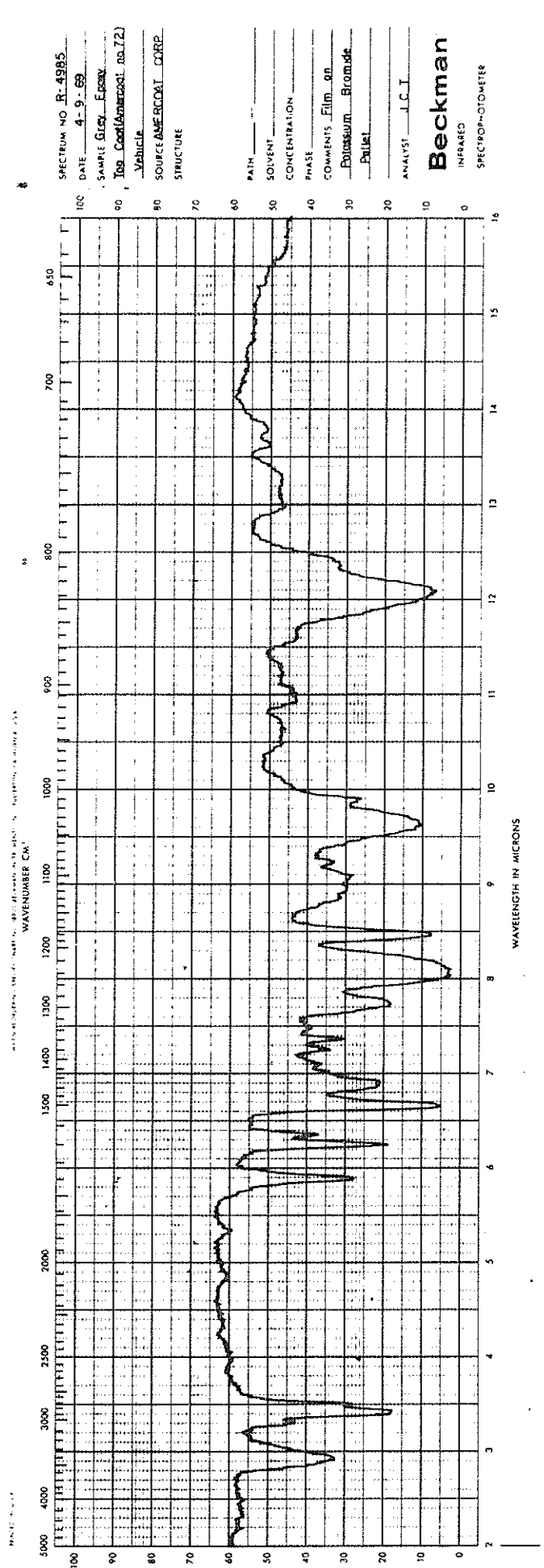
1. Generic Type - Epoxy - Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

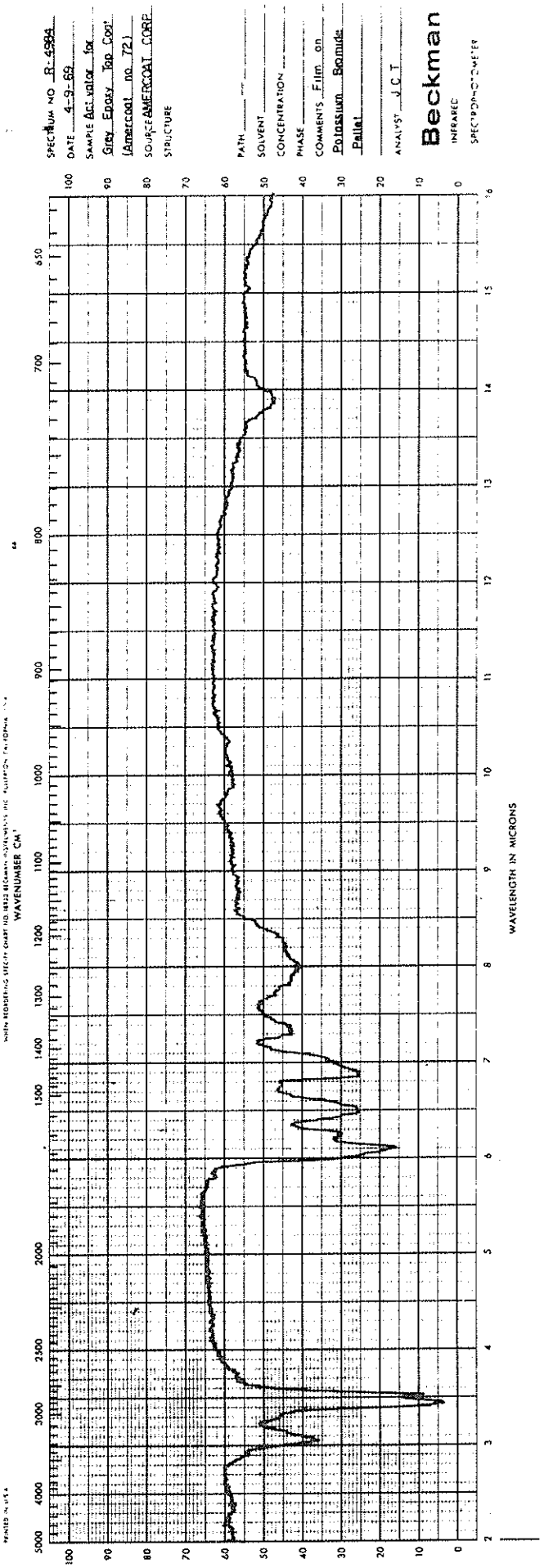
a. Solids content, %, minimum	60.0
b. Volatile content, %, maximum	40.0
c. Wt./gallons, pounds	9.0 - 11.0
d. Pot life @ 70°F, hours, minimum	8
e. Dry touch, hours, maximum	2
f. Infra-red Spectra (Comp B)	Pass
g. Infra-red Spectra (Comp A)	Pass

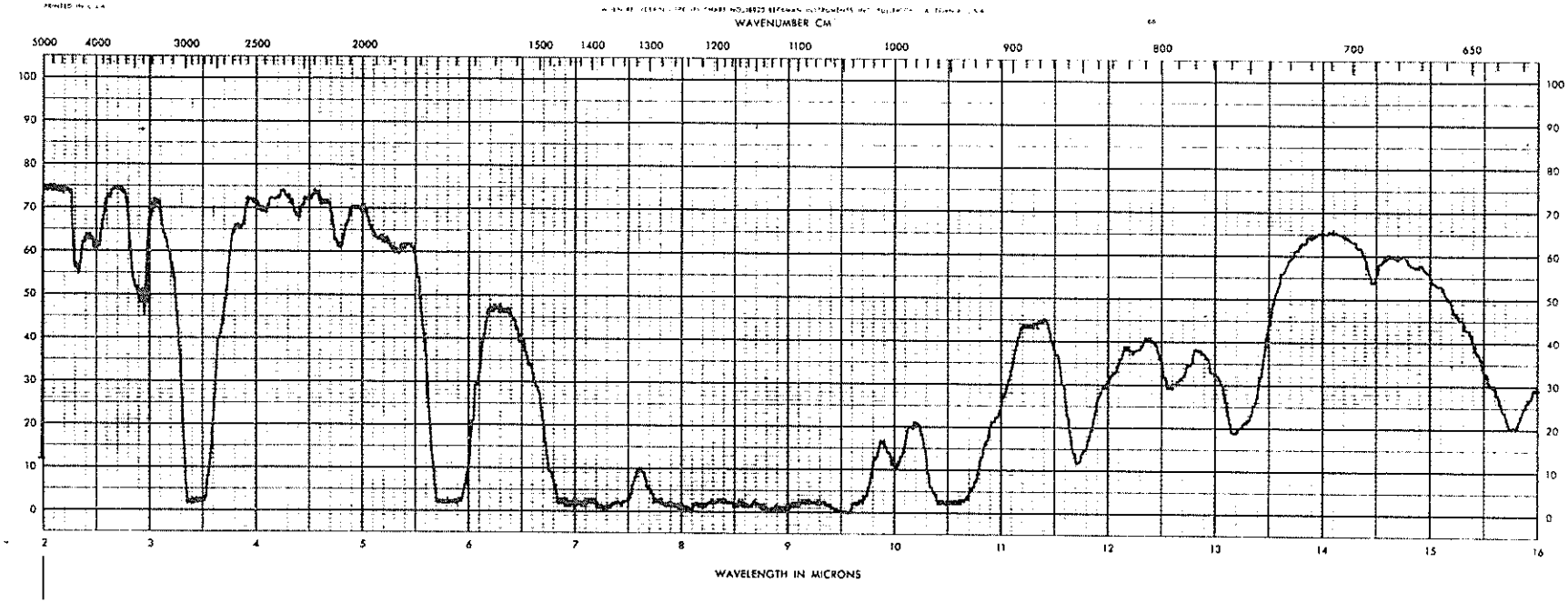
C - THINNERS (AMERCOAT #9 & AMERCOAT #6)

1. Amercoat #9 - Physical Properties
   a. Infra-red Spectra — Pass
2. Amercoat #6 - Physical Properties
   a. Infra-red Spectra — Pass


SPECTRUM NO. R-4982
DATE 4-9-69
SAMPLE Organic Zinc Primer/Amercoat 66 62 Vehicle
SOURCE AMERCOAT CORP.
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM
WAVELENGTH IN MICRONS


SPECTRUM NO R-4985
DATE 4-9-69
SAMPLE Grey Epoxy
Top Coat(Aerocoat no.72)
Vehicle
SOURCE AMERCOAT CORP
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on
Potassium Bromide
Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO R-4984
DATE 4-9-69
SAMPLE Activator for Grey Epoxy Top Coat (Americoat no. 72)
SOURCE AMERCOAT CORP
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J C T
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

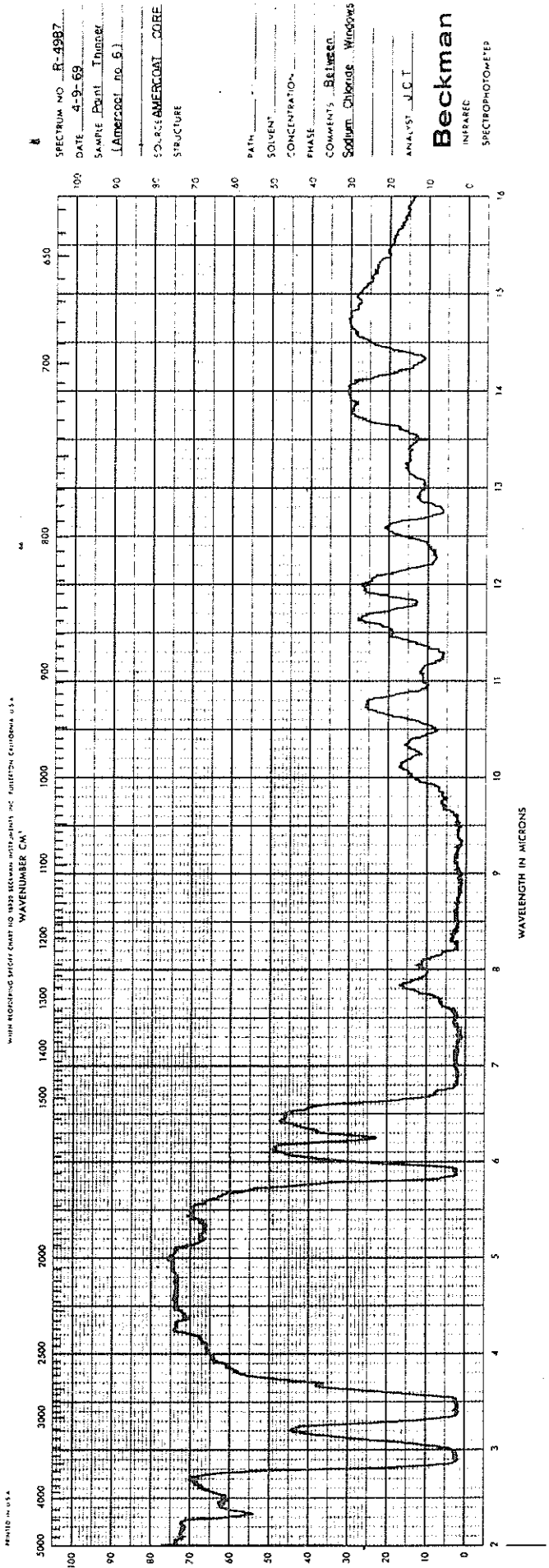


SPECTRUM NO R 4986
DATE 4-9-69
SAMPLE Paint Thinner
(Amercoat no 9)
SOURCE AMERCOAT CORP
STRUCTURE

PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Between
Sodium Chloride Windows

ANALYST J.C.T.

Beckman
INFRARED
SPECTROPHOTOMETER


SPECTRUM NO R-4987
DATE 4-9-69
SAMPLE Paint Thinner
(Amercoat no. 61
SOURCE AMERCOAT CORE
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Between
Sodium Chloride Windows
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

SYSTEM # 4

SPECIFICATIONS

Admiral Paint Company
124 Ryan Street
Lake Charles, Louisiana 70601

A - ORGANIC ZINC PRIMER (DM-1144)

1. Generic Type - Epoxy -Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	80.0
b. Volatile content, %, maximum	20.0
c. Wt./gallon, pounds, minimum	21.0
d. Pot life @ 70°F, hours, minimum	12
e. Recent time, hours, minimum	6
f. Dry touch, minutes, maximum	45
g. Infra-red Spectra (vehicle for zinc)	Pass
h. Infra-red Spectra (activator for zinc)	Pass

B - ALUMINUM EPOXY TOPCOAT (CM-1662)

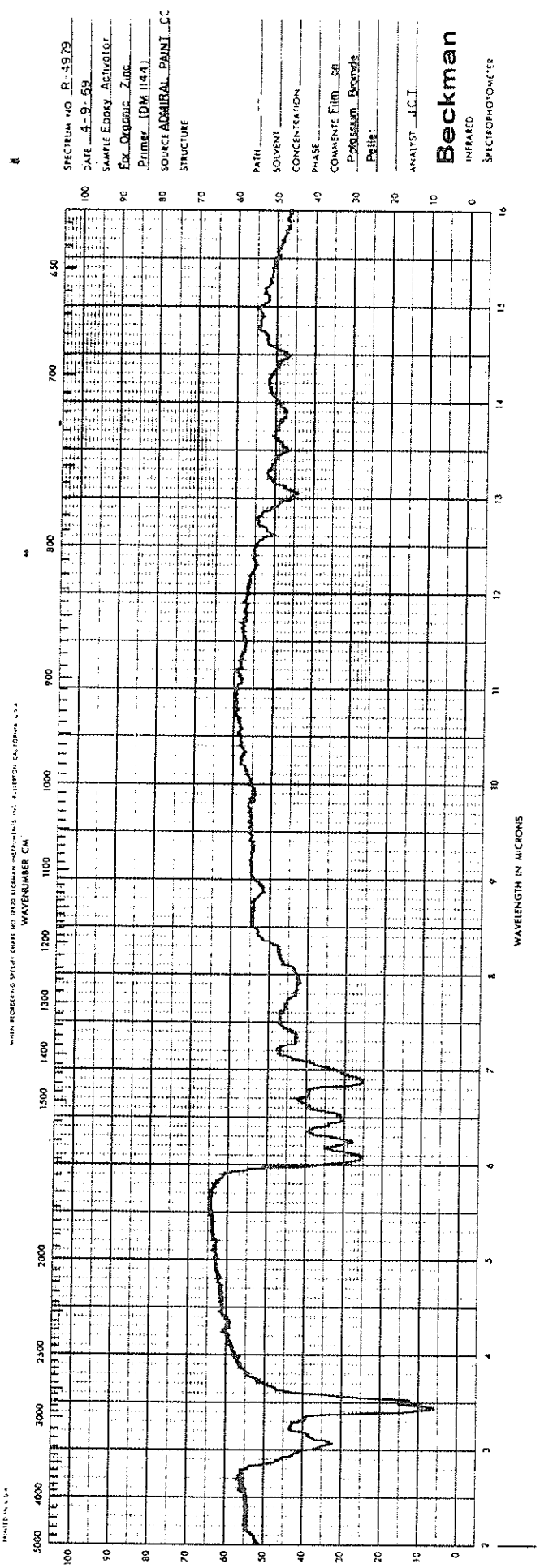
1. Generic Type - Epoxy - Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

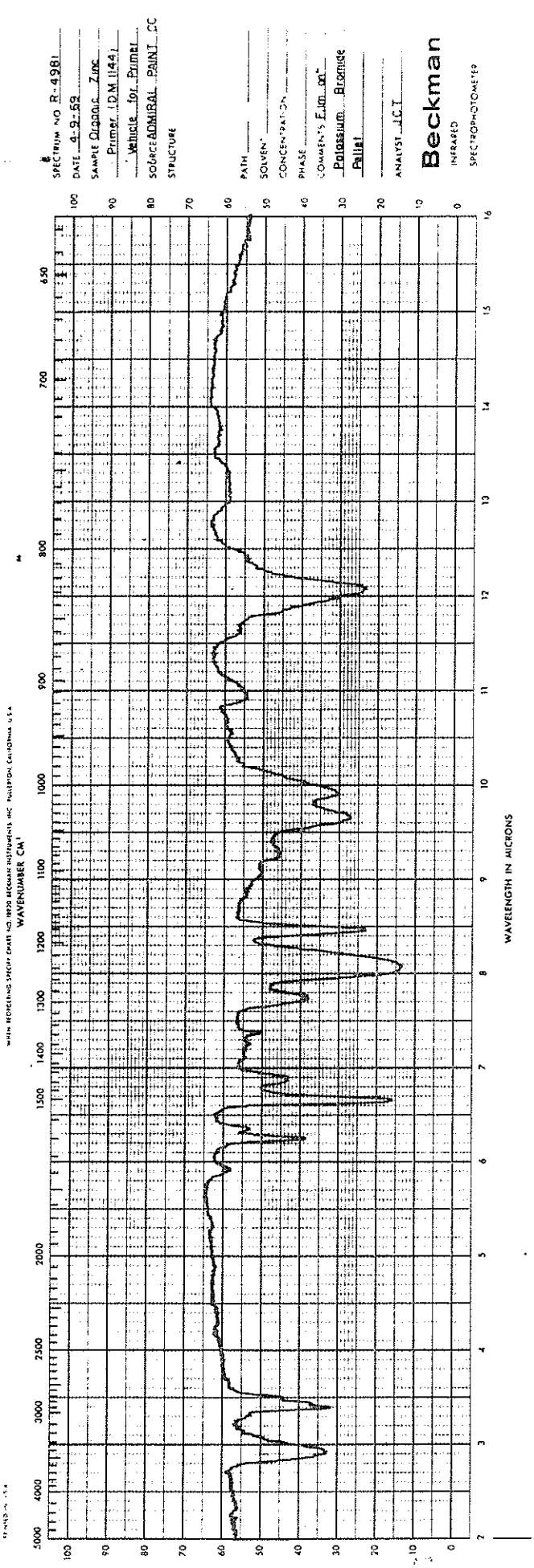
a. Solids content, %, minimum	40
b. Volatile content, %, maximum	60
c. Wt./gallon, pounds	8.5-10.5
d. Pot life @ 70°F, hours, minimum	12
e. Dry touch, minutes, maximum	45
f. Infra-red Spectra (aluminum epoxy)	Pass
g. Infra-red Spectra (activator)	Pass

C - THINNER (DM-I)

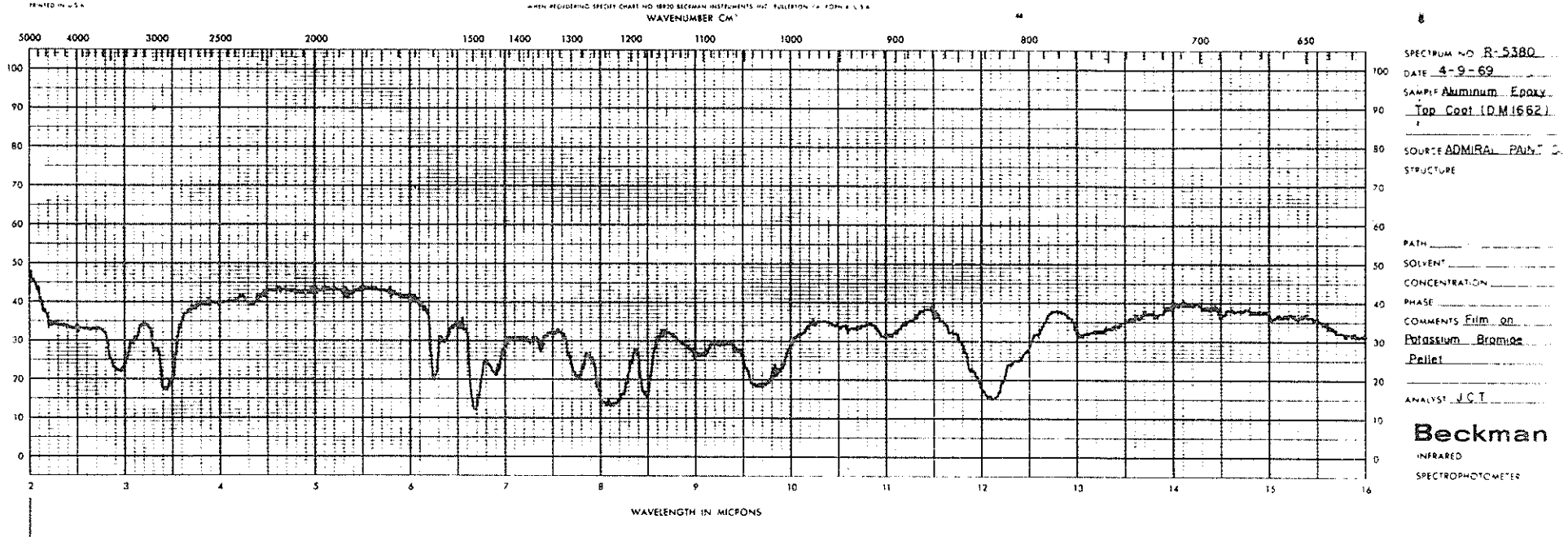
1. Physical Properties

a. Infra-red Spectra	Pass

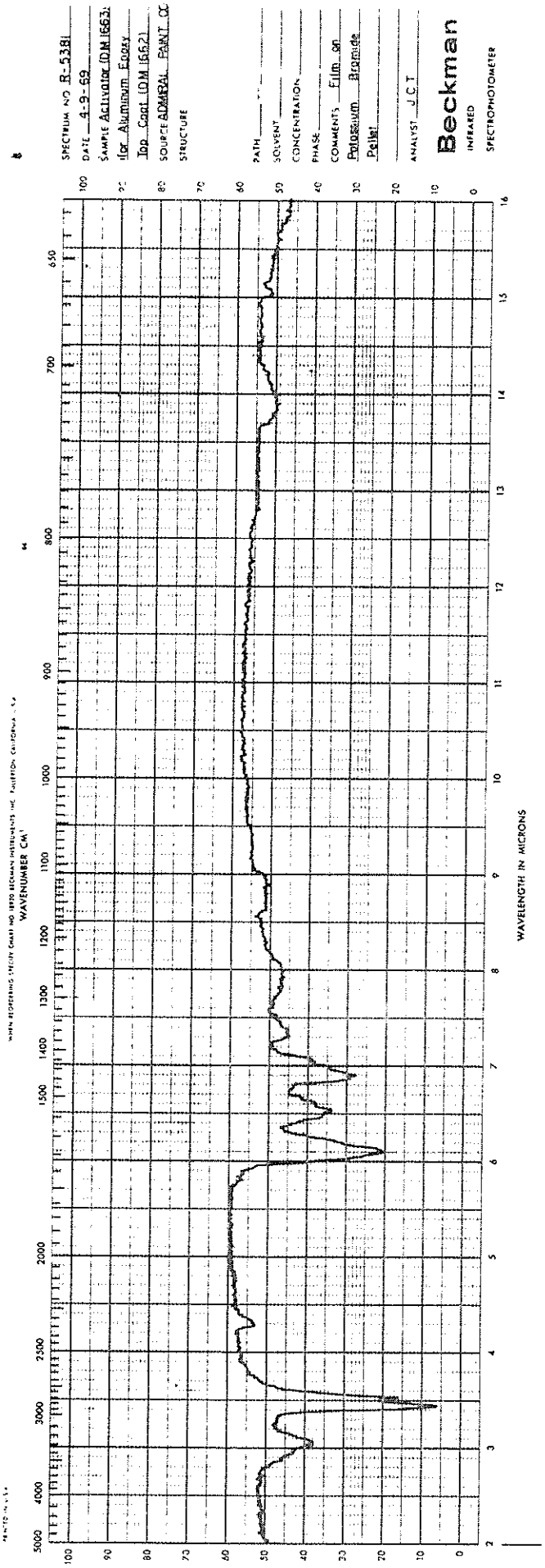

SPECTRUM NO R-4979
DATE 4-9-59
SAMPLE Epoxy Activator
For Organic Zinc
Primer (DM 1144)
SOURCE ADMIRAL PAINT CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on
Potassium Bromide
Pellet
ANALYST HCT
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM
WAVELENGTH IN MICRONS

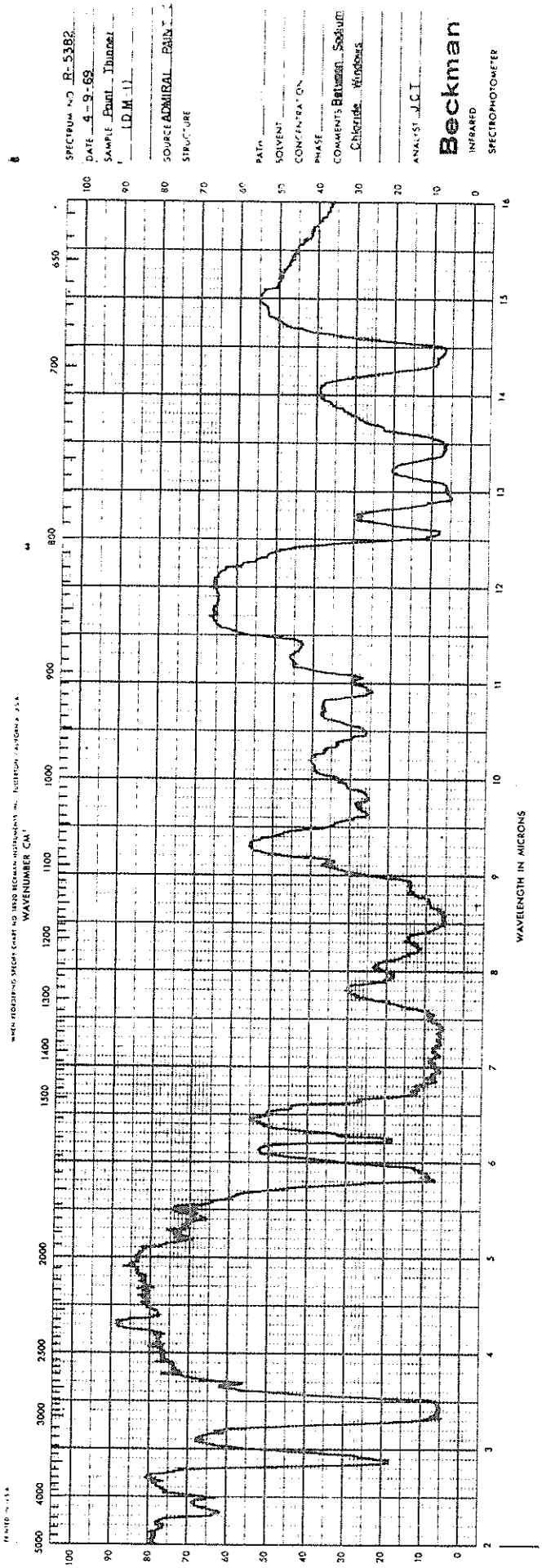


System #4
Page 3 of 6 pages



System #4
Page 4 of 6 pages


SPECTRUM NO R-5381
DATE 4-9-69
SAMPLE Activator (DM 1663)
for Aluminum Epoxy
Top Coat (DM 1662)
SOURCE ADMIRAL PAINT CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on
Potassium Bromide
Pellet
ANALYST J C T
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO R-5382
DATE 4-9-69
SAMPLE Paint Thinner
LDM 11
SOURCE ADMIRAL PAINT
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Between Sodium Chloride Windows
ANALYST JCT
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

SYSTEM # 5

SPECIFICATIONS

Carboline Company
328 Hanley Industrial Court
St. Louis, Missouri 63144

A - ORGANIC ZINC PRIMER (CARBOLINE 655)

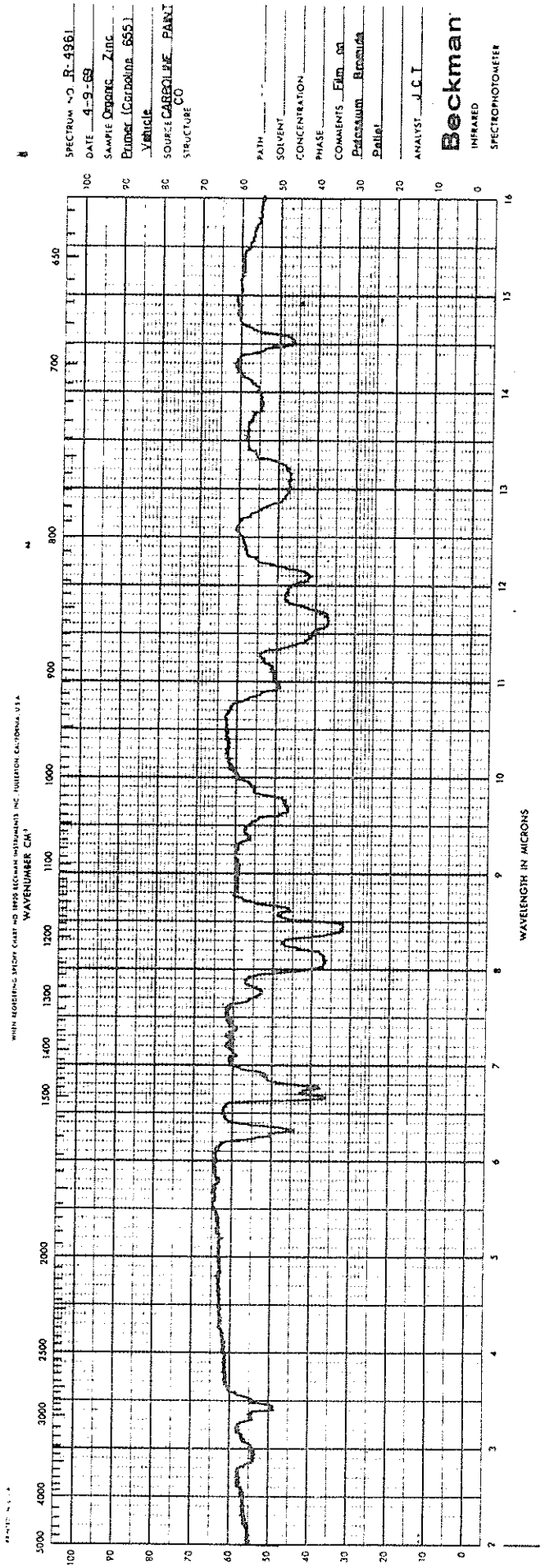
1.	Generic Type - Epoxy - Polyamide	
2.	Dry Film Thickness - 3.0 mils minimum	
3.	Physical Properties	
	a. Solids content, %, minimum	68
	b. Volatile content, %, maximum	32
	c. Wt./gallons, pounds, minimum	15
	d. Pot life @ 70°F, minimum	6
	e. Recoat time, hours, minimum	8
	f. Dry touch, minutes, maximum	45
	g. Infra-red Spectra (activator)	Pass
	h. Infra-red Spectra (zinc vehicle)	Pass

B - GREY EPOXY TOPCOAT (CARBOLINE 190HB-W)

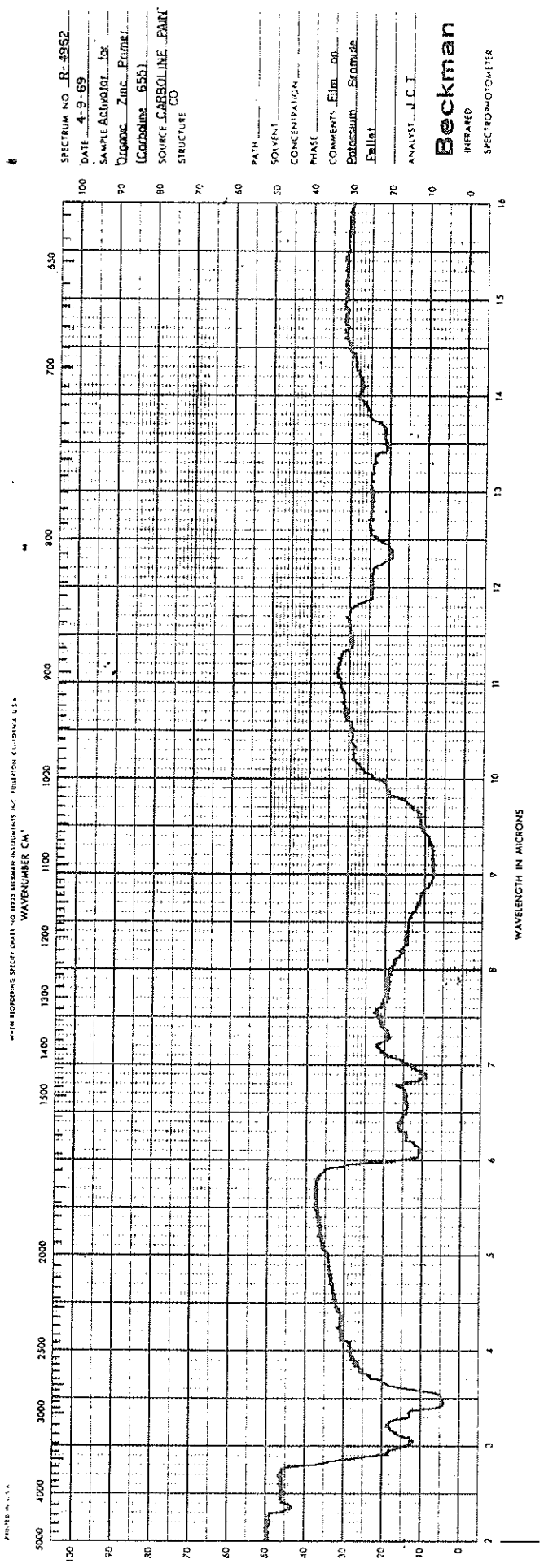
1.	Generic Type - Epoxy - Polyamide	
2.	Dry Film Thickness - 3.0 mils minimum	
3.	Physical Properties	
	a. Solids content, %, minimum	80.0
	b. Volatile content, %, maximum	20.0
	c. Wt./gallons, pounds	12-14
	d. Pot life @ 70°F, hours, minimum	4
	e. Dry touch, hours, maximum	1
	f. Infra-red Spectra (190 HBW Activator)	Pass
	g. Infra-red Spectra (190 HBW)	Pass

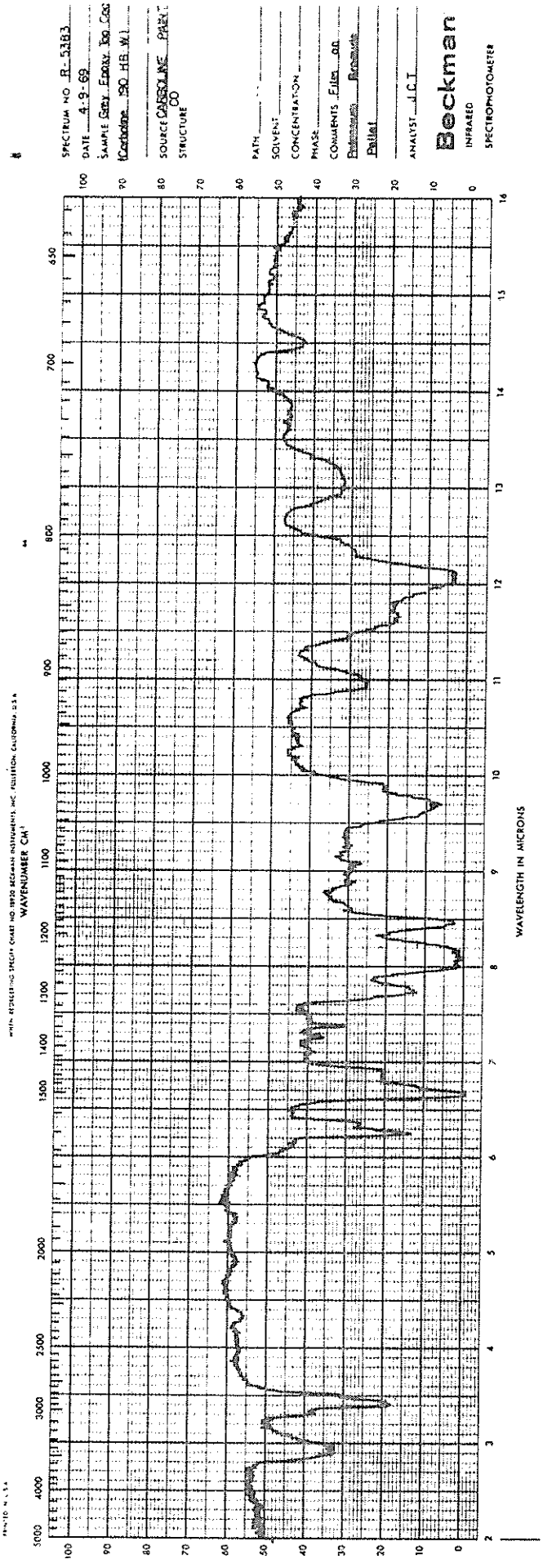
C - THINNER (CARBOLINE #15 & #25)

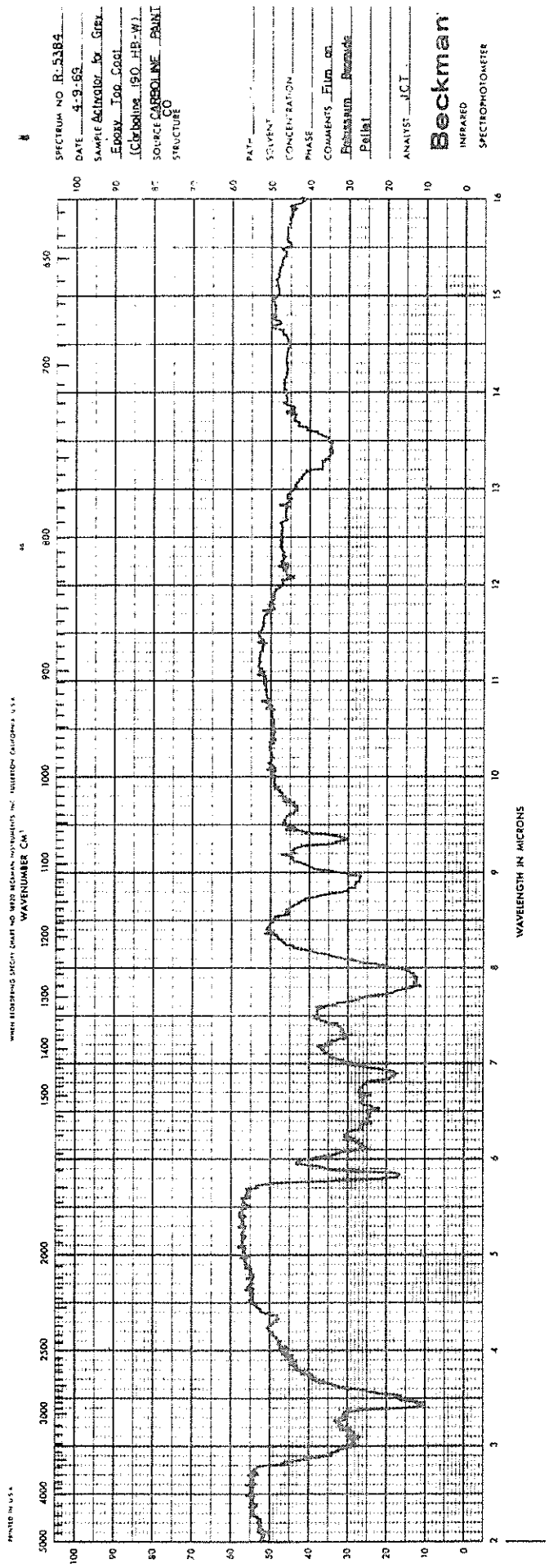
1.	Physical Properties (Carboline #15)	
	a. Infra-red Spectra	Pass
2.	Physical Properties (Carboline #25)	
	a. Infra-red Spectra	Pass

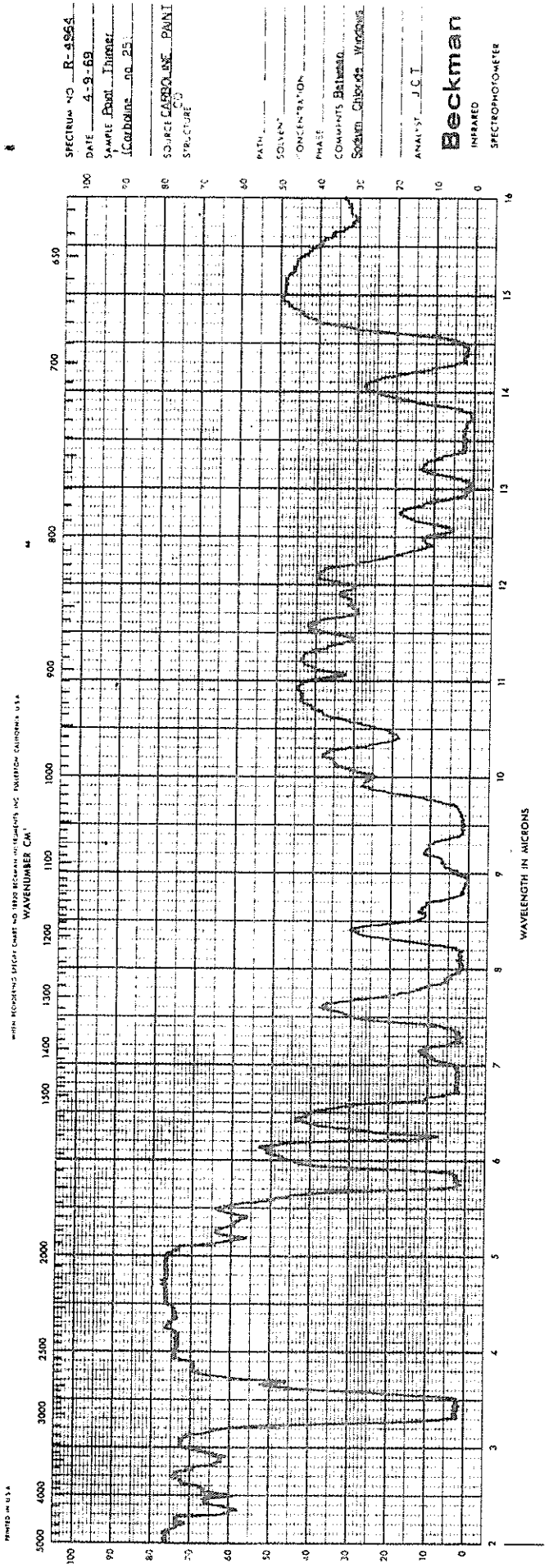


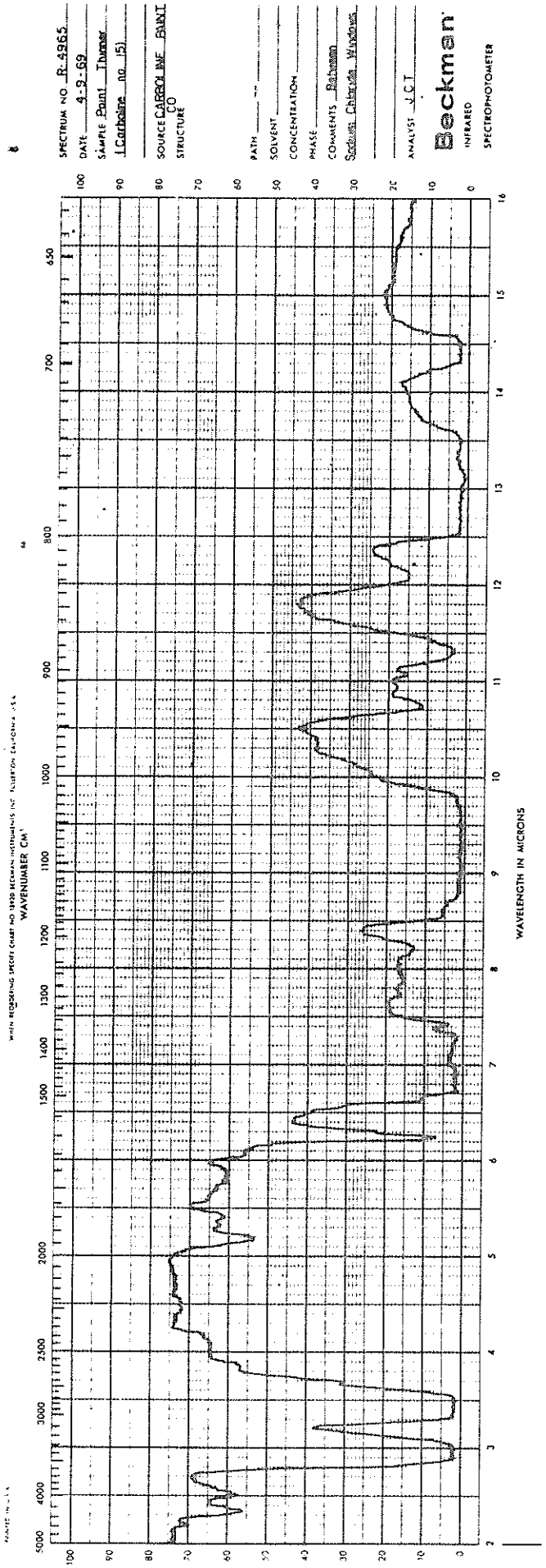
System #5
Page 2 of 7 pages


SPECTRUM NO R-4952
DATE 4-9-69
SAMPLE Activator for Organic Zinc Primer (Carboline 655)
SOURCE CARBOLINE PAINT
STRUCTURE CO
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO R-5383
DATE 4-9-69
SAMPLE Gatty Epoxy Top Coa
Carbolene 290 HB W.I
SOURCE GASOLINE PAINT
STRUCTURE CO
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on
Potassium Bromide
Pellet
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM-1
WAVELENGTH IN MICRONS


SPECTRUM NO R-5384
DATE 4-9-69
SAMPLE Actnolor Jr. Grey Epoxy Top Coat (Chrbolene 190 HB-W)
SOURCE CARBOLINE PAINT CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST JCT
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO R-4964
DATE 4-9-69
SAMPLE Paint Thinner
(Carboline no 25
SOURCE CARBOLINE PAINT
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Between Sodium Chloride Windows
ANALYST J C T
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS
%T


SPECTRUM NO R-5965
DATE 4-9-69
SAMPLE Paint Thinner
(Carbolene no 15)
SOURCE CARBOLINE PAINT CO
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Beckman
Sodium Chloride Windows
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

SYSTEM # 6

SPECIFICATIONS

Napko Company
P. O. Box 14509
Houston, Texas 77021

A - ORGANIC ZINC PRIMER (NAPKO 2-Z)

1. Generic Type - Modified Polyhydroxy Ether Resin
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	72.0
b. Volatile content, %, maximum	28.0
c. Wt./gallon, pounds, minimum	17.0
d. Pot life @ 70°F, minimum	1 week
e. Recoat time, hours, minimum	5
f. Dry touch; minutes, maximum	30
g. Infra-red Spectra	Pass

B - ALUMINUM GREY VINYL TOPCOAT (THIXOVIN NO. 5452)

1. Generic Type - Vinyl Copolymer
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	44.0
b. Volatile content, %, maximum	56.0
c. Wt./gallon, pounds	8.5-10.5
d. Pot life @ 70°F, hours, minimum	1 week
e. Dry touch, hours, maximum	1
f. Infra-red Spectra	Pass
g. Infra-red Spectra	Pass

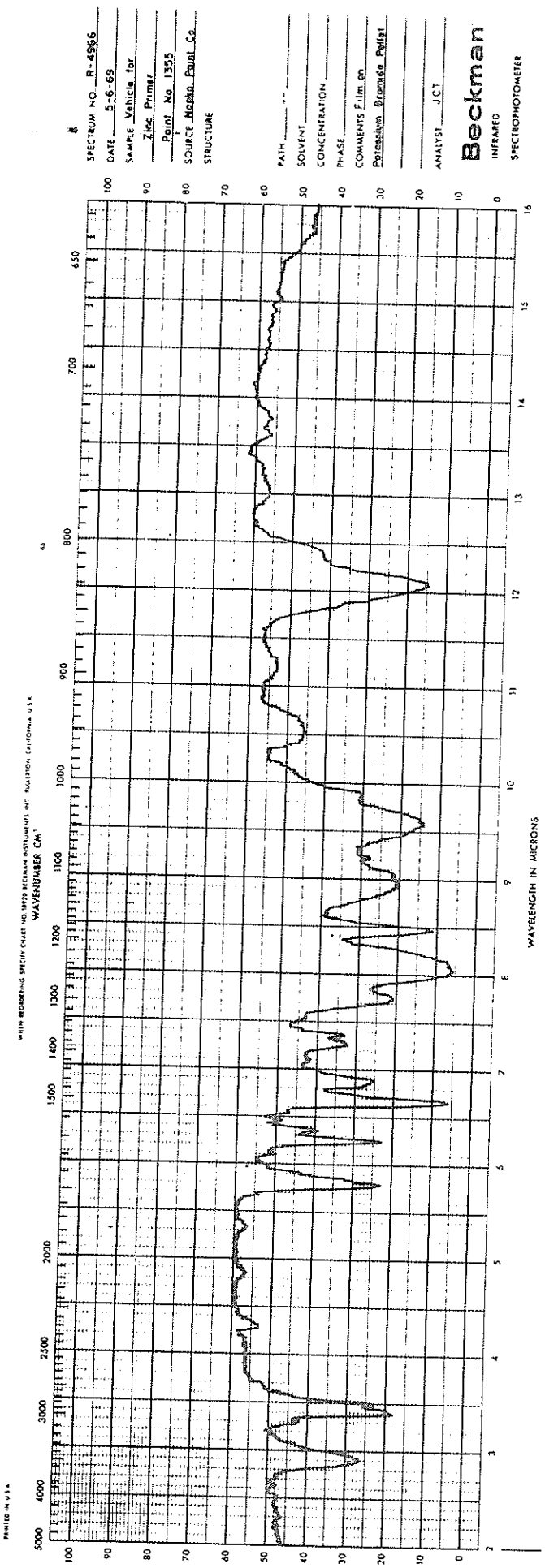
C - THINNERS (NAPKO NOS. 218E AND 211L)

1. NAPKO NO. 218E - Physical Properties

a. Infra-red Spectra	Pass

2. NAPKO NO. 211L - Physical Properties

a. Infra-red Spectra	Pass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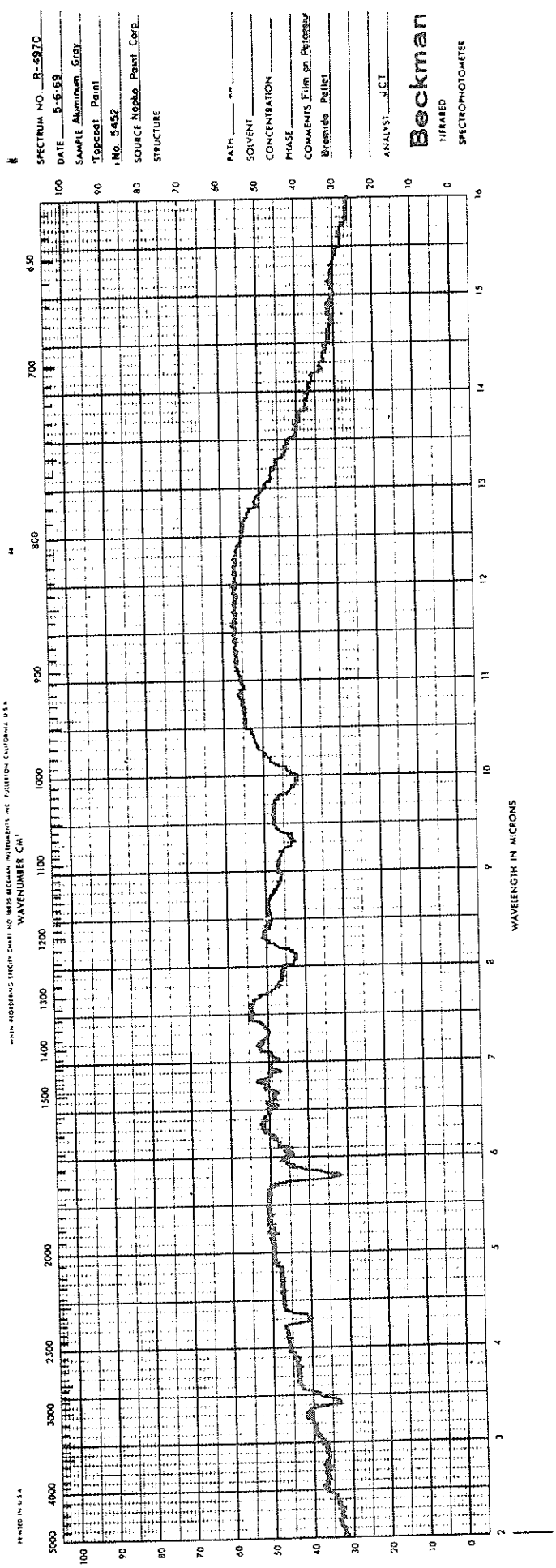
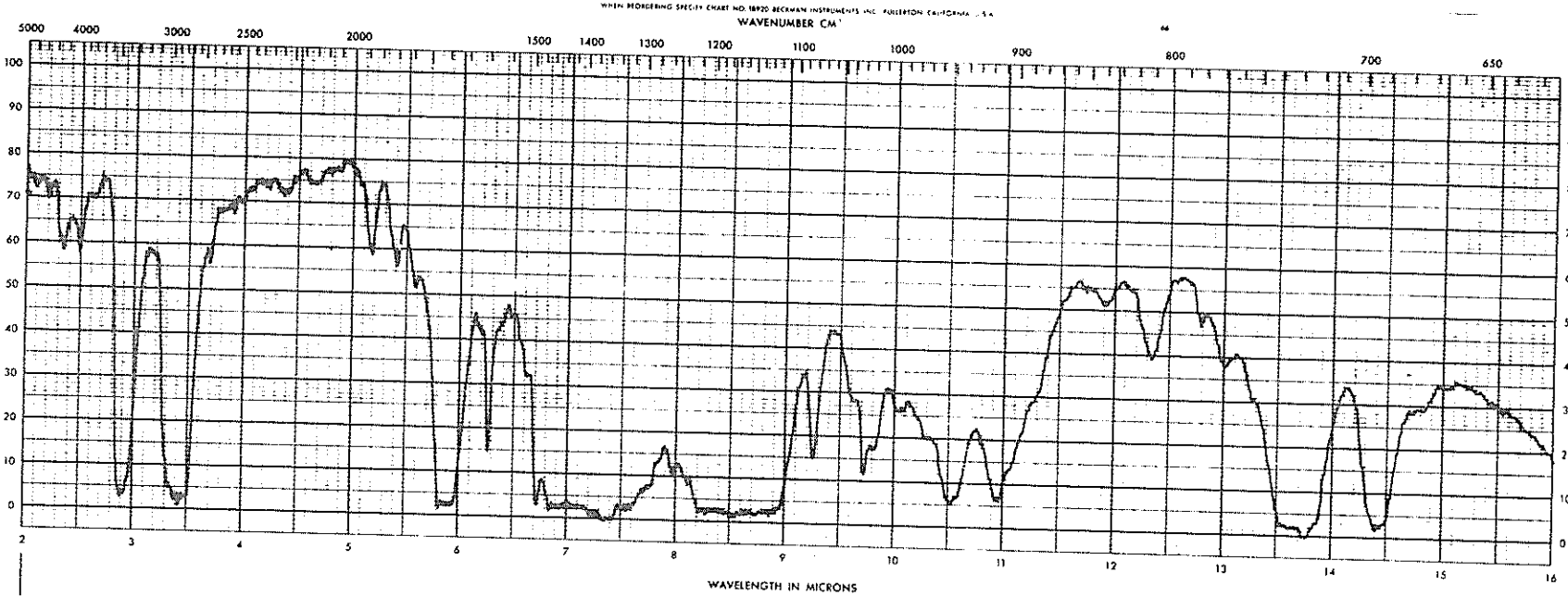
DATE 5-6-69
SAMPLE Vehicle for
Zinc Primer
Paint No 1355
SOURCE Nasa Paint Co
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on
Potassium Bromide Pellet
ANALYST JCT
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

System #6
Page 3 of 5 pages





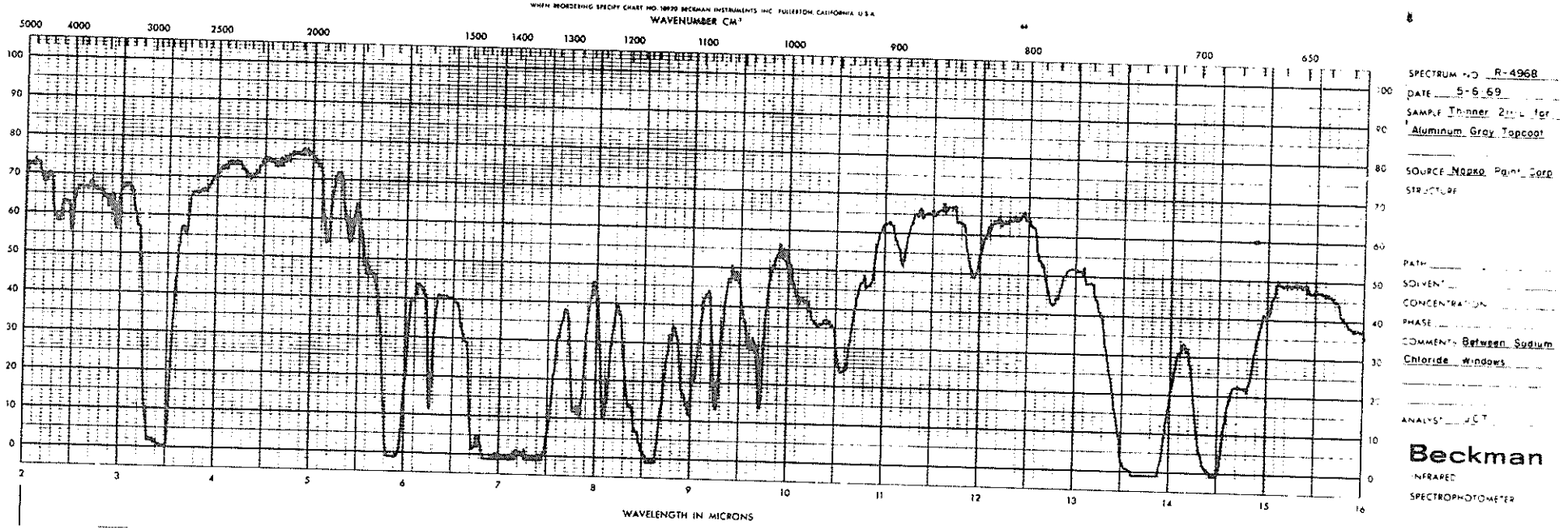
SPECTRUM NO. R-4969
DATE 5-6-69
SAMPLE Thinner 218-E for Zinc Primer Paint
SOURCE Napko Paint Corp
STRUCTURE

PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Between Sodium Chloride Windows

ANALYST JCT

Beckman
INFRARED
SPECTROPHOTOMETER

System #6
Page 4 of 5 pages



System #6
Page 5 of 5 pages

SYSTEM # 7

SPECIFICATIONS

Enjay Chemical Company
1821 Wooddale Court
Baton Rouge, Louisiana 70806

A - ORGANIC ZINC PRIMER (RUST-BAN CR6875)

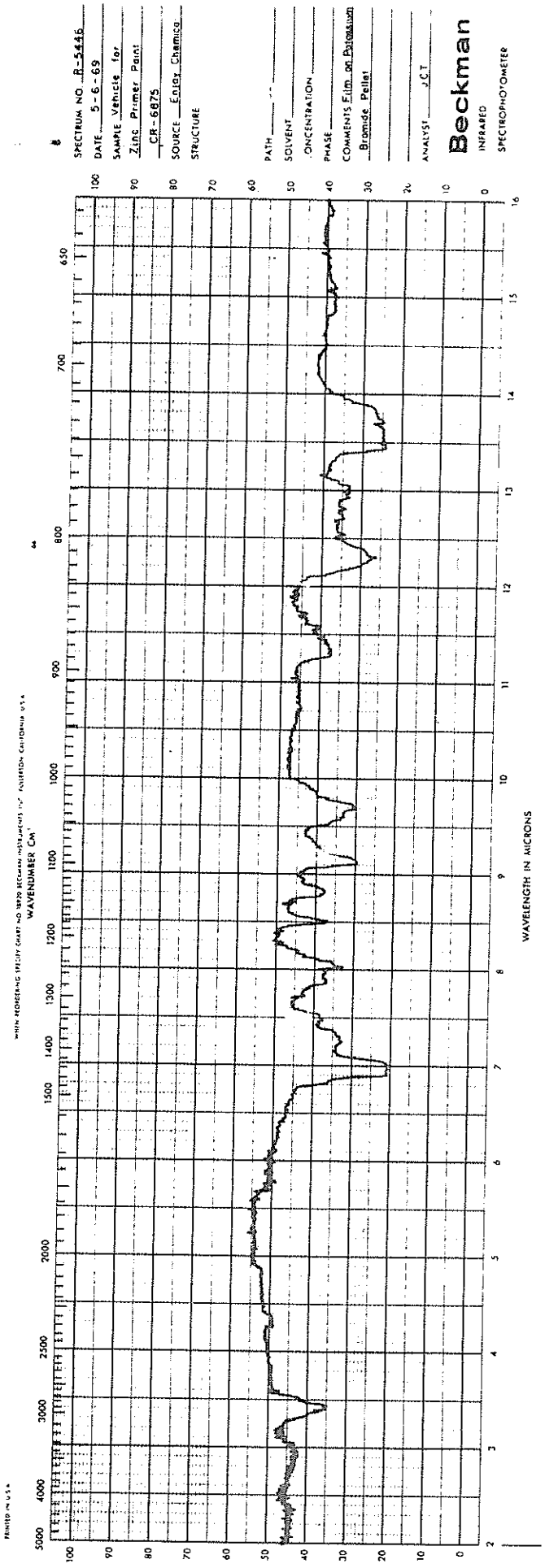
1. Generic Type - Chlorinated Rubber
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

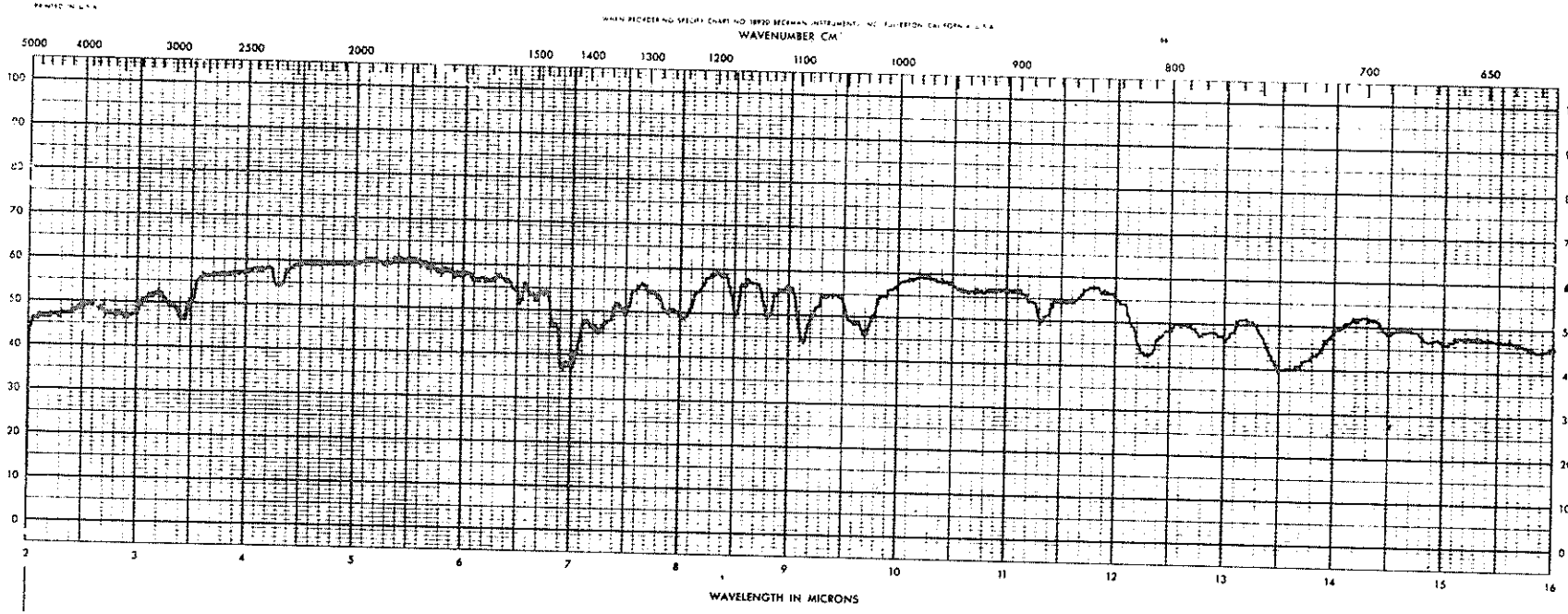
a. Solids content, %, minimum	72.0
b. Volatile content, %, maximum	28.0
c. Wt./gallon, pounds, minimum	19.0
d. Pot life @ 70°F, minimum	1 week
e. Recoat time, hours, minimum	3
f. Dry Touch, minutes, maximum	15
g. Infra-red Spectra	Pass

B - ALUMINUM TOPCOAT (RUST-BAN LD7198)

1. Generic Type - Chlorinated Rubber
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	51.0
b. Volatile content, %, maximum	49.0
c. Wt./gallon, pounds	9.0-11.0
d. Pot life @ 70°F, minimum	1 week
e. Dry touch, hours, maximum	1
f. Infra-red Spectra	Pass


SPECTRUM NO. R-5446
DATE 5-6-69
SAMPLE Vehicle for Zinc Primer Paint
CR-6875
SOURCE Enjay Chemical
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassium Bromide Pellet
ANALYST J.C.T
Beckman
INFRARED SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS



SPECTRUM NO B-5445
DATE 5-6-69
SAMPLE Aluminum Chloring
Rubber Paint
(LD-7198)
SOURCE Enjay Chemical Co
STRUCTURE

PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS Film on Potassiu
Bromide Pellet

ANALYST J C T

Beckman
INFRARED
SPECTROPHOTOMETER

System #7
Page 3 of 3 pages

SYSTEM # 8

SPECIFICATIONS

Mobil Corporation
Maintenance and Marine Coatings
P. O. Box 3431
Beaumont, Texas

A. Organic Zinc Primer (Mobil Zinc No. 4-P-22)

1. Generic Type - Epoxy, polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a. Solids content, %, minimum	80
b. Volatile content, %, maximum	20
c. Wt./gallon, lbs., minimum	20
d. Pot Life @ 70°F, hours, minimum	20
e. Recoat Time, hours, minimum	24
f. Dry Touch, minutes, maximum	45
g. Infra-red Spectra (Comp. A)	Pass
h. Infra-red Spectra (Comp. B)	Pass

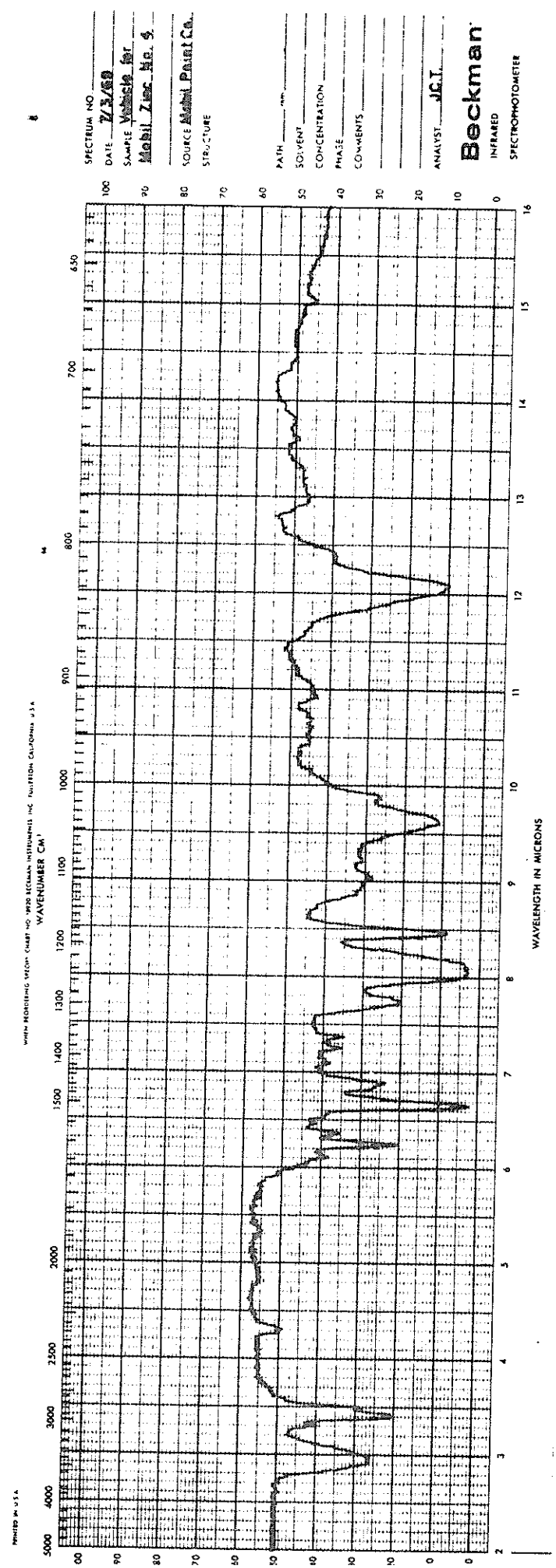
B. Val-Chem Hi-Build Epoxy (89 Series V-6)

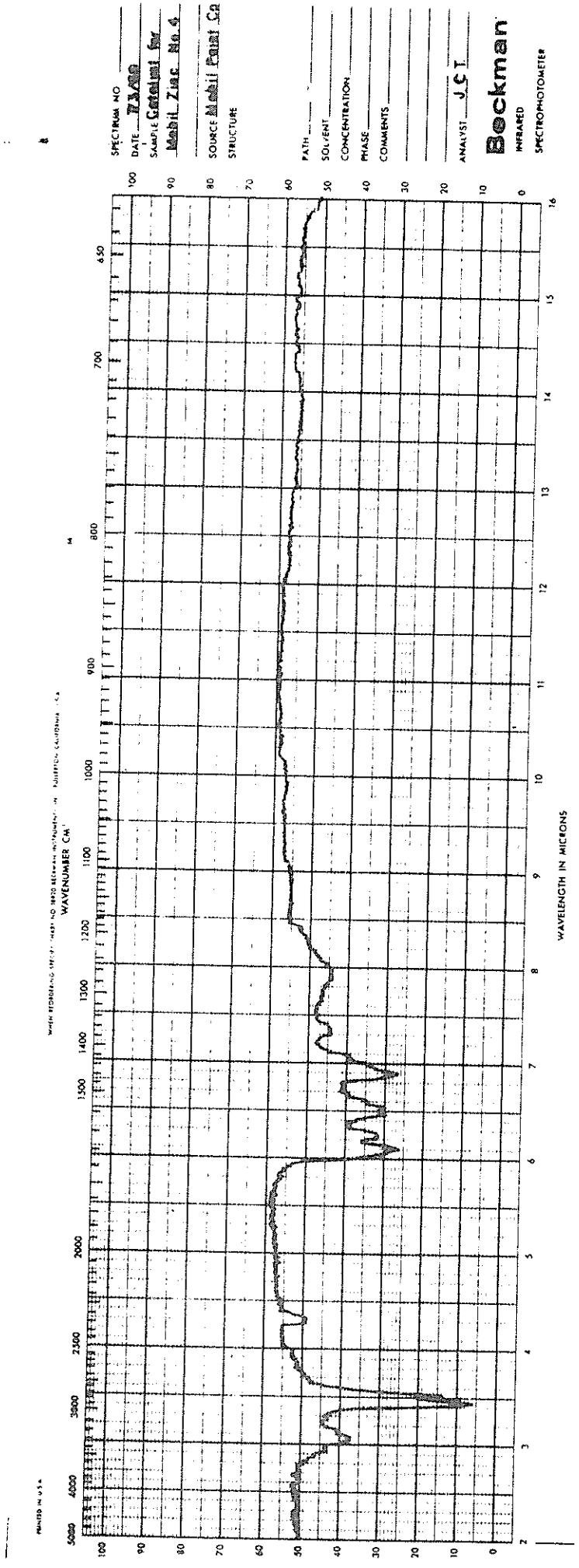
1. Generic Type - Epoxy, Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

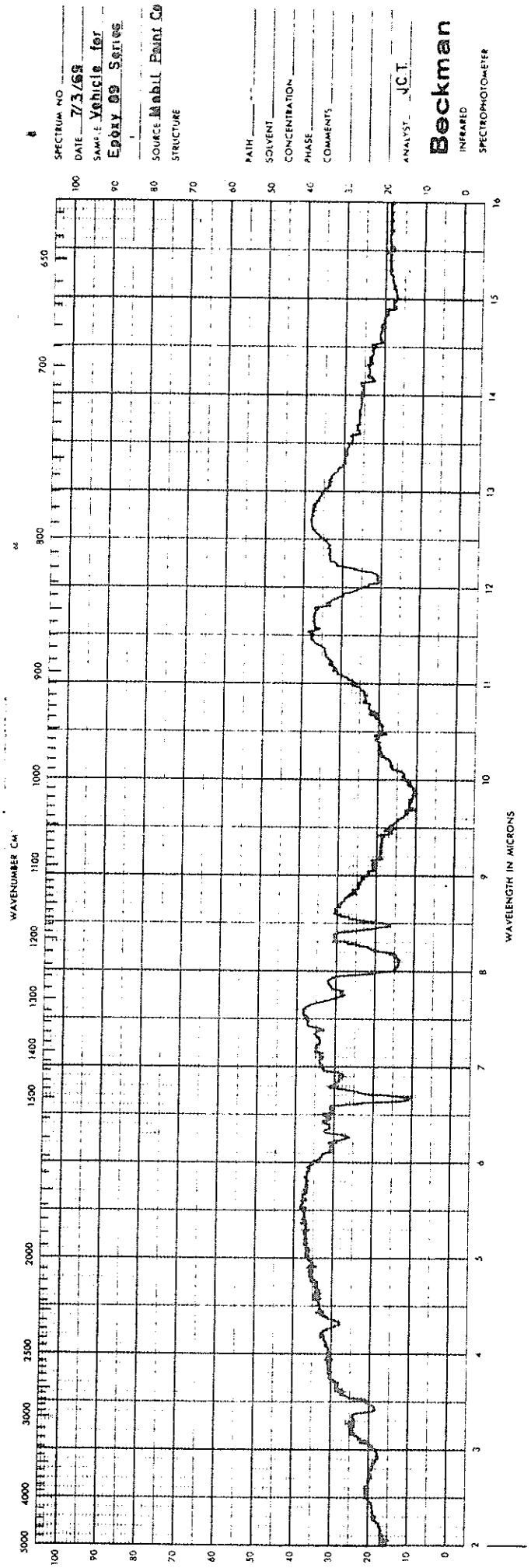
a. Solids content, %, minimum	72.0
b. Volatile content, %, maximum	28.0
c. Wt./gallon, lbs, minimum	11-13
d. Pot Life @ 70°F, hours, minimum	24
e. Dry Touch, hours, maximum	5
f. Infra-red Spectra (Comp. A)	Pass
g. Infra-red Spectra (Comp. B)	Pass

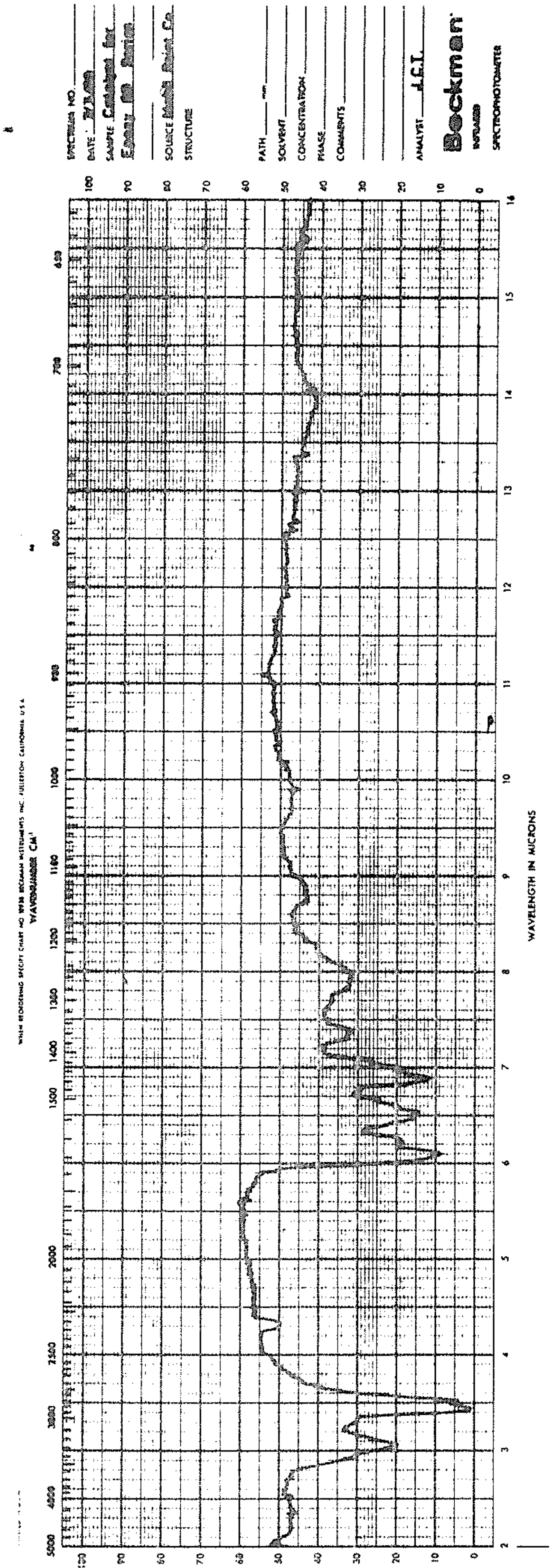
C. Thinner (7-T-25)

1. Infra-red Spectra — Pass


SPECTRUM NO
DATE 7/3/69
SAMPLE Vehicle for Mobil Zinc No. 6
SOURCE Mobil Paint Co.
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO
DATE 7 AUG
SAMPLE Catalyst for
Mobil Zinc No. 4
SOURCE Mobil Paul Sa
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS
ANALYST JCT
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS


SPECTRUM NO
DATE 7/3/68
SAMPLE Vehicle for Epoxy 09 Series
SOURCE Mobil Paint Co
STRUCTURE
PATH
SOLVENT
CONCENTRATION
PHASE
COMMENTS
ANALYST J.C.T.
Beckman
INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS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INFRARED
SPECTROPHOTOMETER
WAVENUMBER CM⁻¹
WAVELENGTH IN MICRONS

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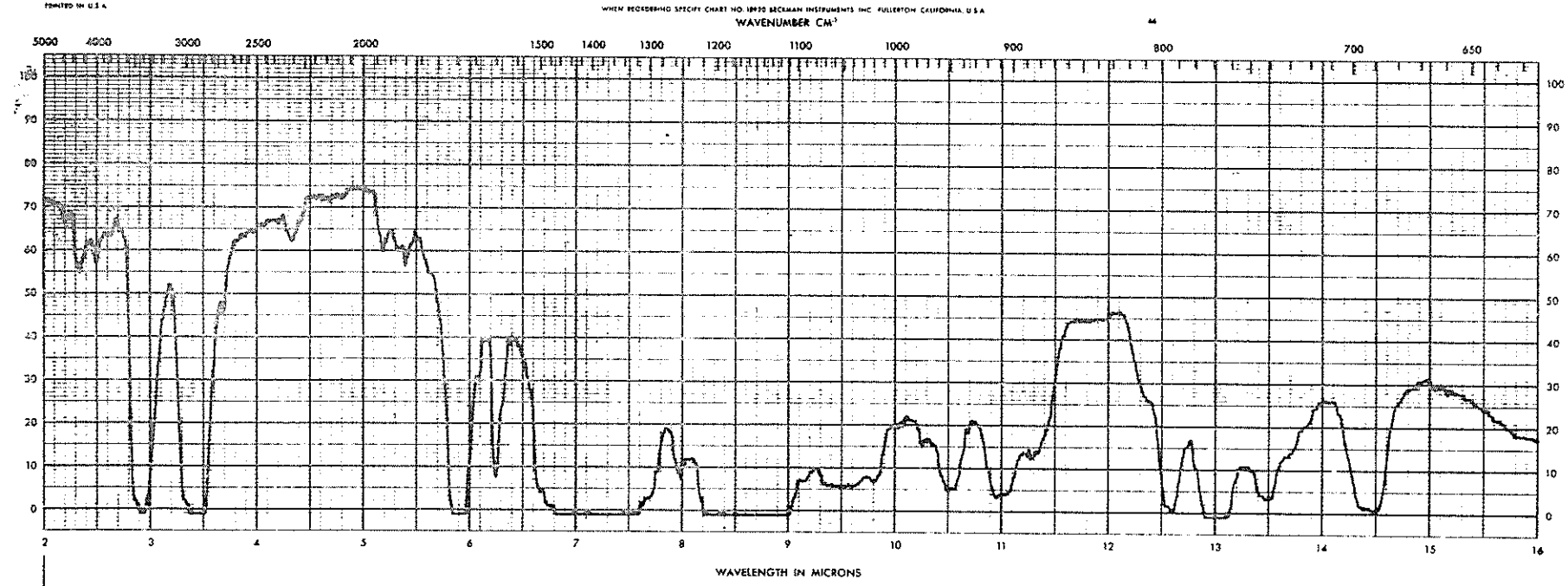
WHEN RECORDING SPECIFY CHART NO. 10930 BECKMAN INSTRUMENTS INC. FULLERTON, CALIFORNIA, U.S.A.



SPECTRUM NO. _____

DATE 7/3/69

SAMPLE Thinner
7-T-25

SOURCE Mobil Paint C

STRUCTURE

PATH _____

SOLVENT _____

CONCENTRATION _____

PHASE _____

COMMENTS _____

ANALYST J.C.T.

Beckman

INFRARED
SPECTROPHOTOMETER

System # 8
Page 6 of 6 days

SYSTEM # 9

SPECIFICATIONS

Southern Imperial Coatings Company
New Orleans, Louisiana

A - ORGANIC ZINC PRIMER (NO. X-50)

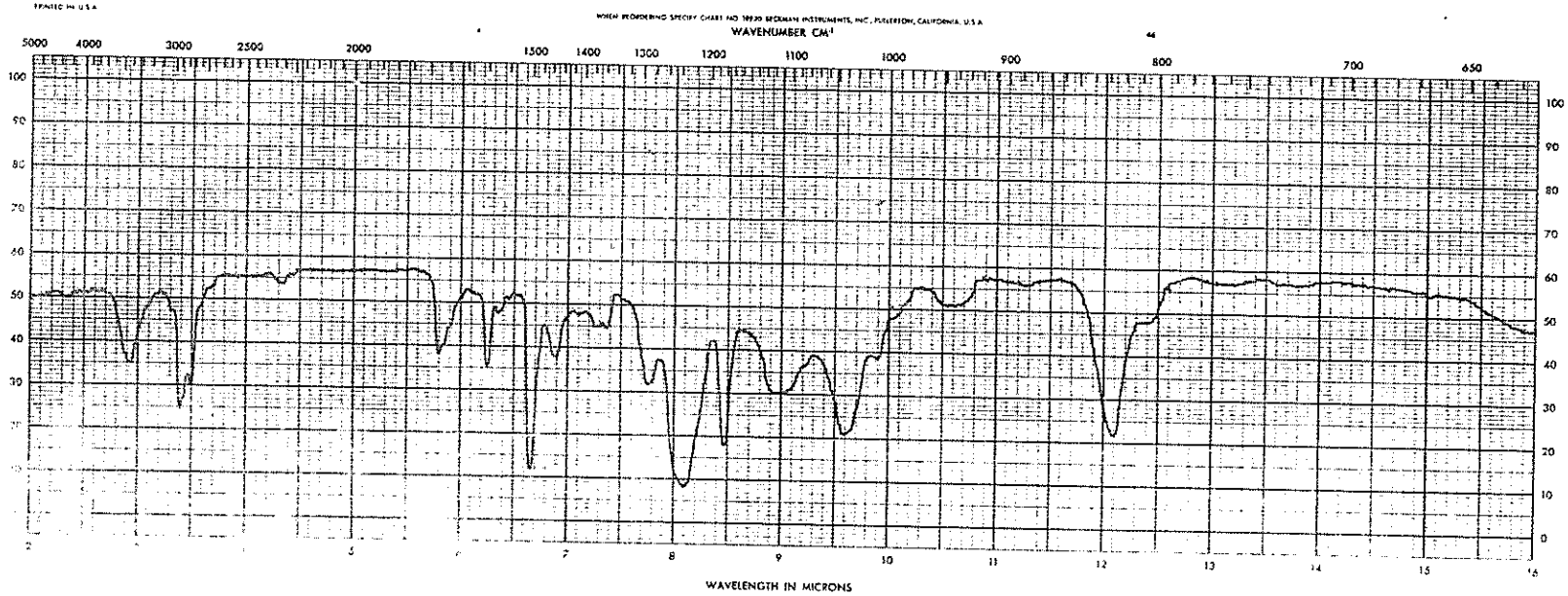
1. Generic Type - Modified Non-Catalyzed Epoxy Zinc Primer
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	55.0
b.	Volatile content, %, maximum	45.0
c.	Weight/gallon, pounds, minimum	13.0
d.	Pot Life @ 70°F, minimum	6 weeks
e.	Recoat Time, hours, minimum	24
f.	Dry Touch, minutes, maximum	30
g.	Infra-red Spectra	Pass

B - GREY EPOXY TOPCOAT (JET SET NO. 120 HI-BUILD EPOXY)

1. Generic Type - Catalyzed Epoxy
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	60.0
b.	Volatile Content, %, maximum	40.0
c.	Weight/gallon, pounds	11.0
d.	Pot Life @ 70°F, hours, minimum	12
e.	Dry Touch, hours maximum	2
f.	Infra-red Spectra (Comp. B)	Pass
g.	Infra-red Spectra (Comp. A)	Pass



SPECTRUM NO. _____

DATE 7/23/69

SAMPLE ZINC RICH STAINLESS STEEL PRIMER NO. X50

SOURCE SOUTHERN IMPERIAL CORP

STRUCTURE NEW ORLEANS, LA

PATH _____ mm

SOLVENT _____

CONCENTRATION _____

PHASE _____

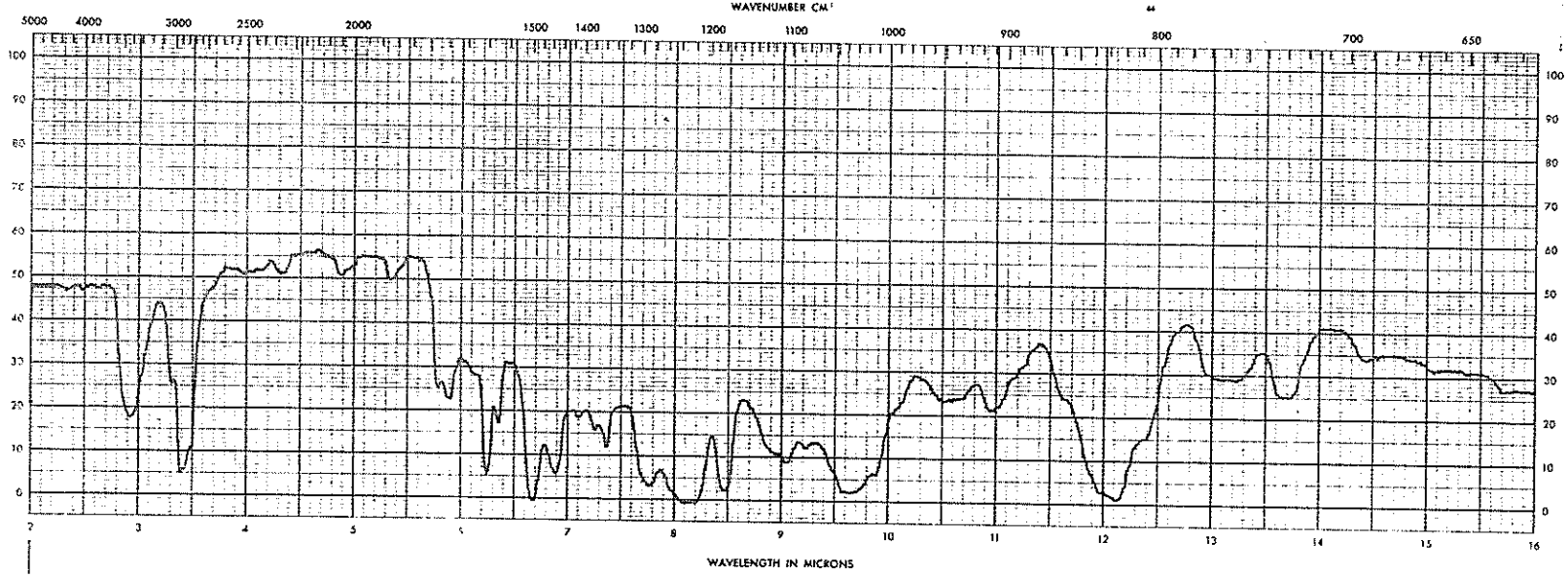
COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST JCT

Beckman

INFRARED

SPECTROPHOTOMETER



SPECTRUM NO. _____

DATE 7/23/69

SAMPLE JET SET 120 HI-BUILD EPOXY TOPCOAT

SOURCE SOUTHERN IMPERIAL CO

STRUCTURE NEW ORLEANS, LA.

PATH _____ mm

SOLVENT _____

CONCENTRATION _____

PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST J.C.T.

Beckman

INFRARED

SPECTROPHOTOMETER

SYSTEM # 10

SPECIFICATIONS

By Water Sales
1620 Franklin Avenue
New Orleans, Louisiana

A - ORGANIC ZINC PRIMER (OZR NO. 309)

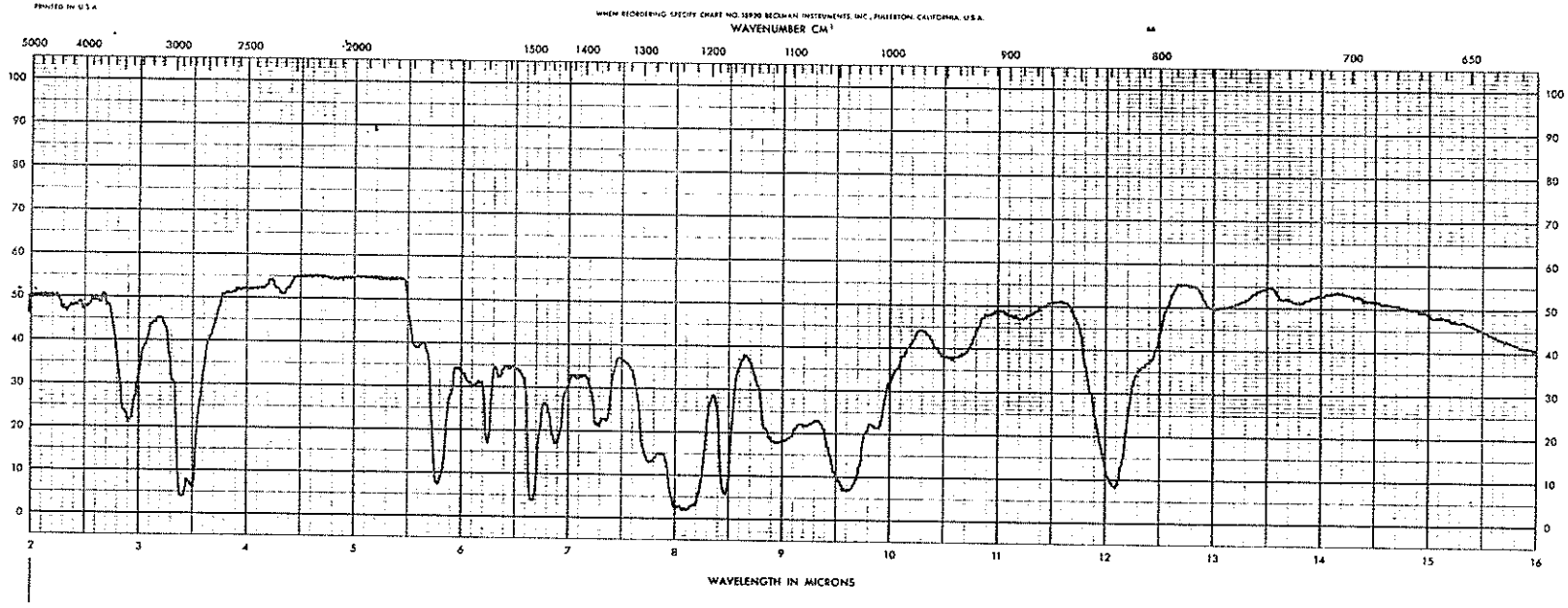
1. Generic Type - Polymeric Organic Zinc Rich
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	71.0
b.	Volatile content, %, maximum	29.0
c.	Weight/gallon, pounds, minimum	17.0
d.	Pot Life @ 70°F, minimum	12 hours
e.	Recoat Time, hours, minimum	24
f.	Dry Touch, minutes, maximum	30
g.	Infra-red Spectra	Pass

B - GREY EPOXY TOPCOAT (BYCO NO. 30)

1. Generic Type
2. Dry Film Thickness 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	62.0
b.	Volatile content, %, maximum	38.0
c.	Weight/gallon, pounds	10.0
d.	Pot Life @ 70°F, hours, minimum	12
e.	Dry Touch, hours, maximum	2
f.	Infra-red Spectra (Comp. B)	Pass
g.	Infra-red Spectra (Comp. A)	Pass



SPECTRUM NO. _____

DATE 7/23/69

SAMPLE PORTER PEREECT ZINC PRIMER NO 309 GREEN GRAY

SOURCE BY WATER SALES CO.

STRUCTURE NEW ORLEAN, LA.

PATH _____ mm

SOLVENT _____

CONCENTRATION _____

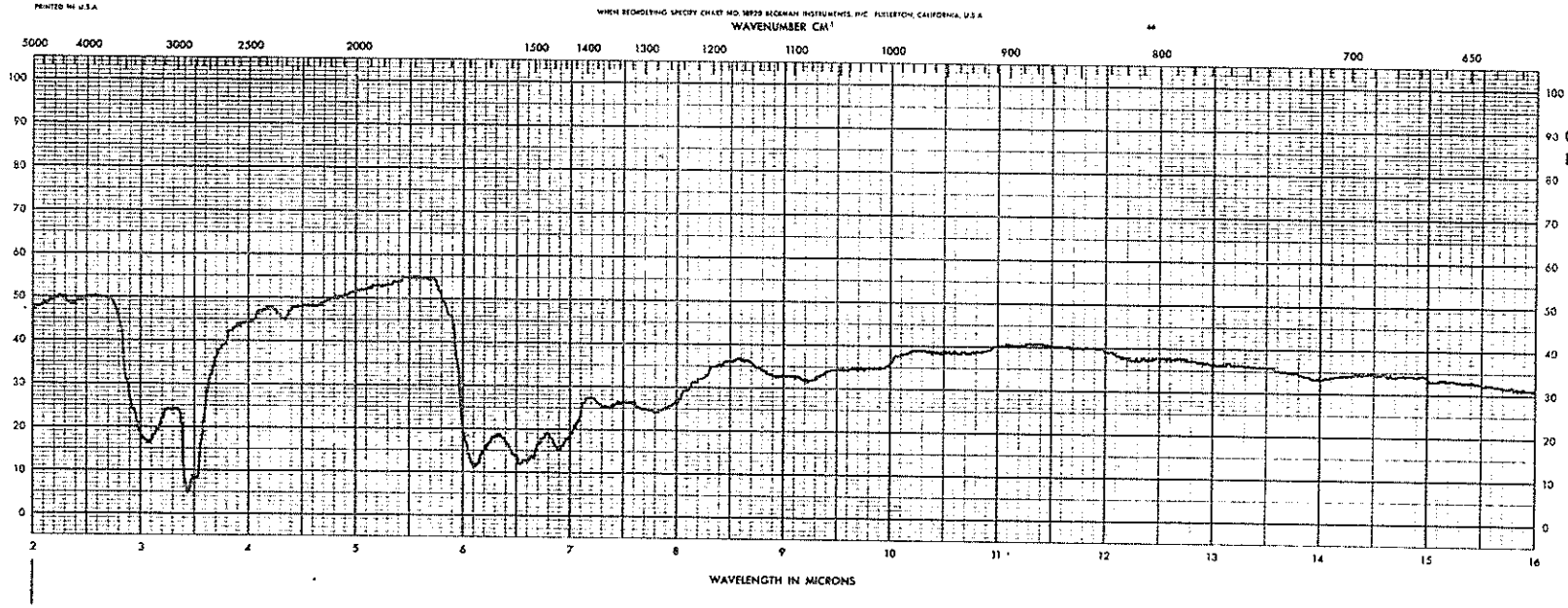
PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST J C T

Beckman

INFRARED SPECTROPHOTOMETER



SPECTRUM NO. _____

DATE 7 / 23 / 69

SAMPLE BYCO NO.30
CATALYST FOR NO.30
LIGHT GREY TOP COAT

SOURCE BYWATER SALES CO

STRUCTURE NEW ORLEANS, LA

PATH _____ mm

SOLVENT _____

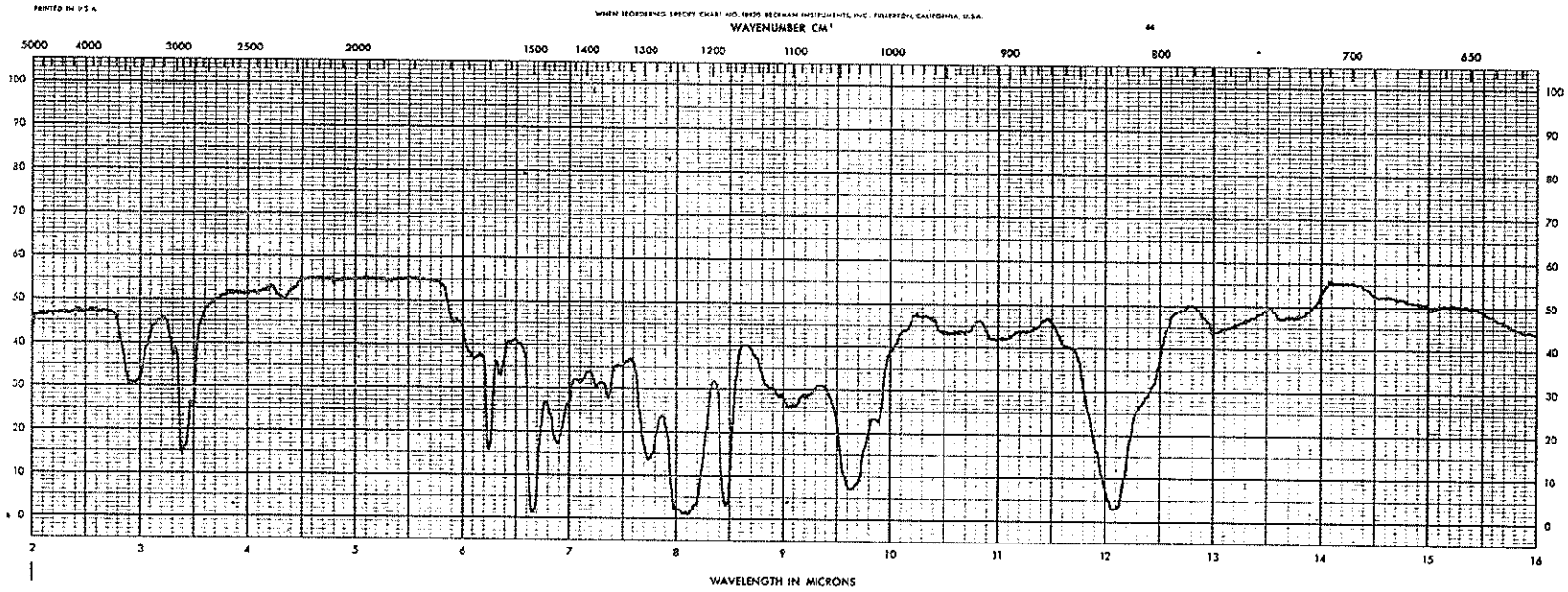
CONCENTRATION _____

PHASE _____

COMMENTS FILM ON
POTASSIUM BROMIDE
PELLET

ANALYST JCT

Beckman
INFRARED
SPECTROPHOTOMETER



SPECTRUM NO. _____
DATE 7 / 23 / 69
SAMPLE NO. 30 EPOXITE LT GREY EPOXITE (26231) TOP COAT
SOURCE BYWATER SALES CO.
STRUCTURE

PATH _____ mm
SOLVENT _____
CONCENTRATION _____
PHASE _____
COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST JCT

Beckman
INFRARED
SPECTROPHOTOMETER

SYSTEM # 11

SPECIFICATIONS

Prufcoat Paint Co.
Grow Chemical Co.
Baton Rouge, Louisiana

A - ORGANIC ZINC PRIMER

1. Generic Type - Epoxy-Zinc Rich
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	86.0
b.	Volatile content, %, maximum	14.0
c.	Weight/gallon, pounds, minimum	23.0
d.	Pot Life @ 70°F, minimum	12 hours
e.	Recoat Time, hours, minimum	24 hours
f.	Dry Touch, minutes, maximum	30
g.	Infra-red Spectra (Vehicle)	Pass
h.	Infra-red Spectra (Activator)	Pass

B - LIGHT GREY EPOXY TOPCOAT

1. Generic Type - Epoxy Polyamide
2. Dry Film Thickness - 3.0 mils minimum
3. Physical Properties

a.	Solids content, %, minimum	60.0
b.	Volatile Content, %, maximum	40.0
c.	Weight/gallon, pounds, minimum	10.0
d.	Pot Life @ 70°F, hours, minimum	12
e.	Dry Touch, hours, maximum	1
f.	Infra-red Spectra (Comp. B)	Pass
g.	Infra-red Spectra (Comp. A)	Pass

C - THINNER

1.	Infra-red Spectra	Pass

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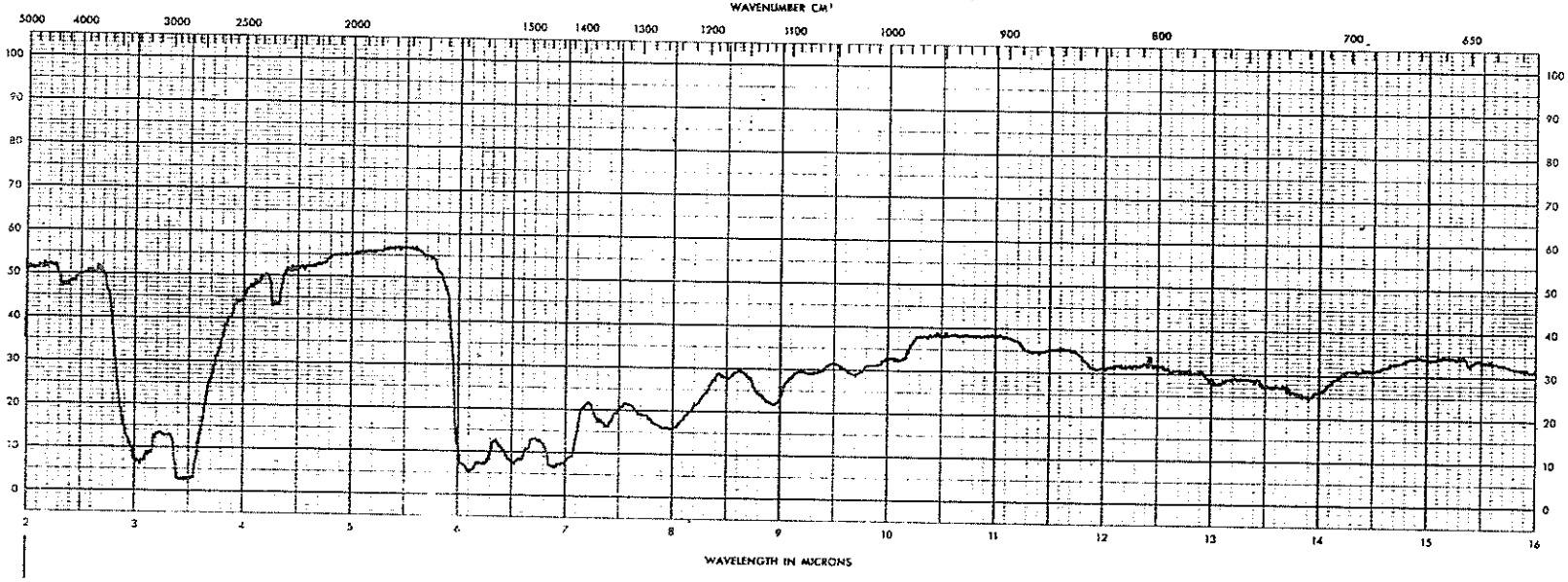
WHEN REORDERING SPECIFY CHART NO. 10020 BECKMAN INSTRUMENTS, INC., FULLERTON, CALIFORNIA, U.S.A.



GRAPH 1

SPECTRUM NO. _____

DATE 5/6/60

SAMPLE CATALYST FOR ZINCPRIME ~~400~~ PRIMER

SOURCE ~~GROW CHEM CO~~

STRUCTURE ~~BATON ROUGE, LA~~

PATH _____ mm

SOLVENT _____

CONCENTRATION _____

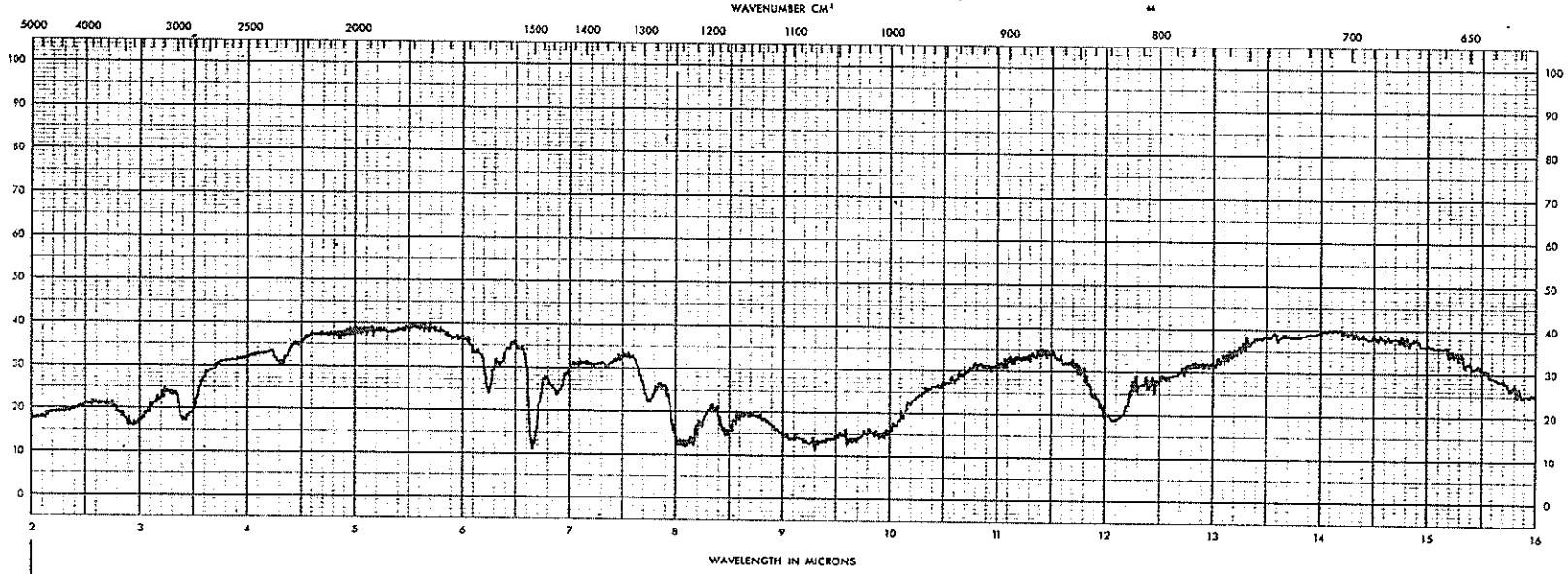
PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST JCT

Beckman
INFRARED
SPECTROPHOTOMETER

GRAPH 2



SPECTRUM NO. _____

DATE 5/6/69

SAMPLE ZINCPRIME M66
PRIMER VEHICLE

SOURCE GROW CHEM CO.

STRUCTURE BATON ROUGE LA

PATH _____ mm

SOLVENT _____

CONCENTRATION _____

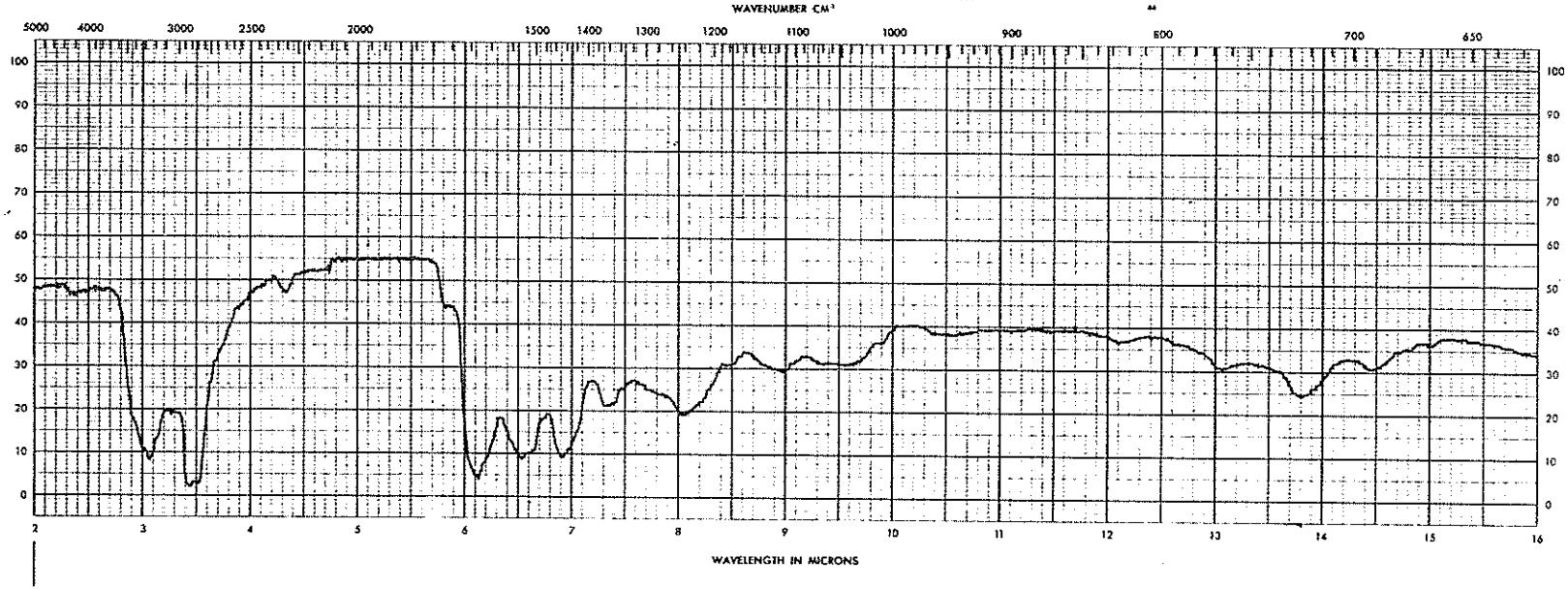
PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST J.G.T.

Beckman
INFRARED
SPECTROPHOTOMETER

GRAPH 3



SPECTRUM NO. _____

DATE 7/28/89

SAMPLE ~~5150 SERIES~~ EPOXY CATALYST FOR ~~5150 SERIES~~ EPOXY LT GREY TOP COAT

SOURCE ~~PRIMECOAT DIV GROW CHEM C~~

STRUCTURE

PATH _____ mm _____

SOLVENT _____

CONCENTRATION _____

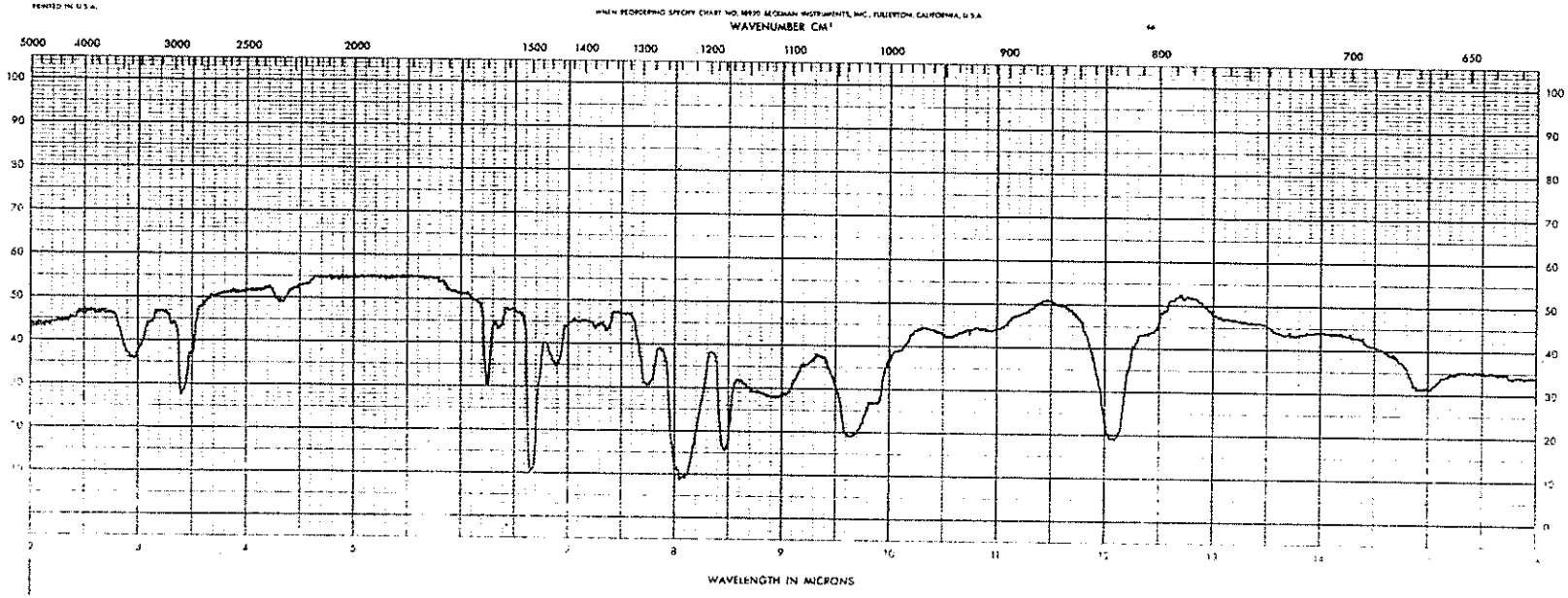
PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

ANALYST ~~JGT~~

Beckman
INFRARED
SPECTROPHOTOMETER

GRAPH 4



SPECTRUM NO. _____

DATE ~~7/23/~~69

SAMPLE ~~B15 SERIES~~ EPOXY LT GRAY TOP COAT

SOURCE ~~GROW CHEM CORP.~~

STRUCTURE ~~BATON ROUGE, LA.~~

PATH _____ mm _____

SOLVENT _____

CONCENTRATION _____

PHASE _____

COMMENTS FILM ON POTASSIUM BROMIDE PELLET

_____

ANALYST ~~DCT~~

Beckman

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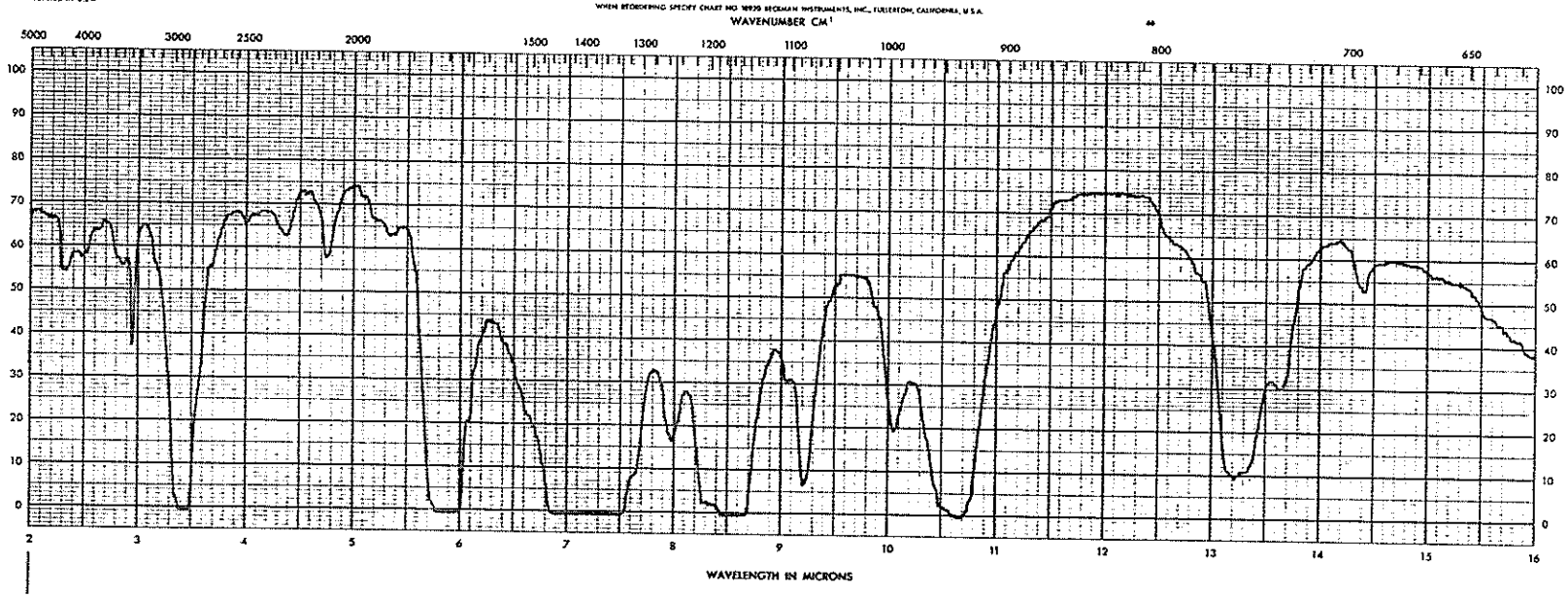

GRAPH No.

SPECTRUM NO. ____

DATE 7/23/69

SAMPLE ~~T-10~~ PAINT THINNER

SOURCE ~~GROW CHEM CORP~~ ~~BATON ROUGE, LA.~~

STRUCTURE

PATH ____ mm

SOLVENT ____

CONCENTRATION ____

PHASE ____

COMMENTS BETWEEN SODIUM CHLORIDE WINDOWS

ANALYST J.C.T.

Beckman

INFRARED SPECTROPHOTOMETER