

A FORMULARY OF PAINTS AND OTHER COATINGS

VOLUME II

Compiled by
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PREFACE

The physical aspects of paint chemistry and technology are well covered in many up-to-date texts and the reader is strongly advised to become acquainted with this material before using this formulary.

This volume and the ones that will follow are a catalogue of formulas reflecting the state of the art in the paint industry. It is meant to serve as a tool for anyone who must turn out quality paint products, without the fiscal luxury of developing completely new, untested prototypes. However, this is not a cookbook. Most of the formulas contained are starting-point preparations that do require refining. It is that giant leap from nothing to a workable idea that this series attempts to make.

Anyone familiar with coatings knows it is impossible to have distinct chapters dealing with only one product. Of the chapters presented here almost all contain major elements of the others. The descending logical sequence of each chapter is loosely built on:

- A. Use (primer, enamel, exterior paint, interior paint, luminescent paint, etc.) and special characteristics
- B. Vehicle (oil, alkyd, epoxy, latex, etc.)
- C. Color (if any specified)

Unless otherwise specified, all formulas have the quantities of ingredients given in parts by weight. Where test results were available, they follow the formula. A list of abbreviations that are used throughout the formulary is included.

All constituents appearing by their trademark name are printed in bold-face type, and the manufacturers' names and addresses appear after the list of alphabetized tradenames in the Appendix.

PREFACE TO VOLUME II

This second volume of A Formulary of Paints and Other Coatings has been prepared because of the popular response to the first volume. All the formulas in this volume are new and up-to-date. The original format of categorical breakdown has been adhered to as it provides the user with a simple means of locating specific formulas.

We gratefully acknowledge the contributors for their cooperation in providing the formulations that have made this book possible.

ABBREVIATIONS

a	approximately
b.p.	boiling point
C	degrees Celsius
cm ²	centimeters squared
cps	centipoise(s)
CPVC	critical pigment volume concentration
F	degrees Fahrenheit
ft ²	square feet
g	gram(s)
gal	gallon(s)
hr	hour(s)
in.	inch(es)
in-lb	inch-pounds
KU	Krebs Units
lb	pound(s)
max	maximum
min	minute
Min	minimum
no.	number
NV	nonvolatile
%	percent
P/B	pigment to binder
PBW	parts by weight
pH	hydrogen ion concentration
PHG	per hundred gallons
PVaC	polyvinyl acetate
PVC	pigment volume concentration
rpm	revolutions per minute
s	second(s)
sol'n.	solution
theor.	theoretical
visc.	viscosity
VNV	vehicle nonvolatile
vol.	volume
Wt.	weight

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Chapter I

PRIMERS

A primer is the first "gluelike", pigmented coat that acts as the interface between the finished coat and the substrate. It must be wettable and penetrable to achieve substrate adhesion, while ensuring compatibility with the finish coats.

Interior Primer Sealer

Formula No. 1

(Acrylic)

	lb	gal
Water	393.0	47.18
Latekoll D (8%)	70.0	8.28
Daxad 30	5.0	0.52
Igepal CO-630	3.0	0.34
PMA-30	1.0	0.09
Titanox R-901	100.0	3.00
Veroc #1	85.0	3.77
Mica (325 mesh)	30.0	1.28

Add in order listed and mix on a high speed disperser for 10 min, then let down as follows:

Texanol	20.0	2.53
Ethylene Glycol	40.0	4.32
Acronal 290 D	249.6	28.69
PVC (%)		35.0
NV by Wt. (%)		35.1

NV by Vol. (%)	23.0
lb/gal	9.97
Visc. (KU)	74 ± 5

No. 2

(Latex)

	lb	gal
Charge the following to the tank:		
Tamol 731 (25%)	8.0	0.88
Triton CF-10	2.0	0.23
Colloid 600	1.0	0.13
Water	20.0	2.40
Hexylene Glycol	20.0	2.62
Ethylene Glycol	15.0	1.62
Super Ad-It	1.0	0.13
Hydroxyethyl Cellulose—2.5% (QP-4400)	30.0	3.60

Add the following at low speed, 1900 fpm:

Ti Pure R-901	125.0	3.75
Snowflake	200.0	8.86

Grind on high-speed dispersion equipment for 10 min, then add at low speed:

Water	20.0	2.40
Colloid 600	1.0	0.13
Rhoplex AC-22	440.0	49.72
Hydroxyethyl Cellulose—2.5% (QP-4400)	160.0	19.20
Water	50.0	6.00

Adjust pH to 9.5 with ammonium hydroxide (28%).

PVC (%)	39.2
Total Solids (%)	47.5
Visc.—Initial (KU)	86

Vinyl Acrylic Primer

Formula No. 1

(Sealer)

	lb	gal
KTPP	1	0.1
Water	100	12.0
Tamol 731-25	9	1.0
Triton X-102	4	0.5
Ethylene Glycol	20	2.1
Vicron 15-15	150	6.7
Cellosize QP-15,000 (2.5% sol'n.)	100	12.0
Ti Pure R-901	150	4.5
ASP-400	50	2.3
Mistron HGO-55	125	5.4
Metasol 57 (sol'n.)	2	0.3
Foamicide 677	2	0.3
Cellosize QP-15,000 (2.5% sol'n.)	100	12.0
Texanol	16	2.0
Varaqua 936	318	35.0
Water	75	9.0
PVC (%)		49.8
Total NV by Wt. (%)		54.1
lb/gal		11.62
Visc. (KU)		95-100

No. 2

(Blister and Stain-Resistant)

Water	175.0
Daxad 30	10.0
Nopco NDW	1.0
Metasol 57	1.8
Lead Silicate	115.0
Zopaque R-88	125.0
Silver Bond B	100.0

Mix on a high speed mill and add:

Texanol	7.0
Ethylene Glycol	35.0
Natrosol 250 MR	5.0
Nopco NDW	1.0
Par Cryl 400	495.0
Water	45.0
Ammonium Hydroxide	2.0
Yield (gal)	100
PVC (%)	30
Solids (%)	52
Visc. (KU)	74-80
pH	9.5

No. 3

(Blister and Stain-Resistant)

Water	205.0
Daxad 30	10.0
Nopco NDW	1.0
Metasol 57	1.8
Lead Silicate	115.0
Titanox RA-NC	125.0
Silver Bond B	100.0

Mix on high speed mixer and add:

Texanol	7.0
Ethylene Glycol	35.0
Natrosol 250 MR	5.0
T&W 345-100 Super Alkyd	25.0
Lead (24%)	1.0
Manganese (6%)	0.5
Nopco NDW	1.0
ParCryl 400	440.0
Water	40.0
Ammonium Hydroxide	2.0

Yield (gal)	100
PVC (%)	30
Solids (%)	52
Visc. (KU)	74-80
pH	9.5

Interior Wall Primer

(Latex—Fast-Drying)

	lb	gal
Charge into mixer under agitation:		
Water	100.0	12.0
Ethylene Glycol	10.0	1.0
KTPP	1.2	0.1
Colloid 677	2.5	0.3
Strodex SEK-50	6.0	0.7
ASP-400	120.0	5.7
Cellosize QP-4400 (1½% sol'n.)	132.0	15.7
Titanox 2032	75.0	2.2
Atomite	150.0	6.7
Cosan 635W	1.0	—

Disperse in high speed mill then add slowly with agitation:

Water	117.0	14.0
Colloid 677	1.5	0.2
Ucar Latex 365 or 366	384.0	42.7

Note:

Protect thickener solution with 0.08% **PMA-30** if stored prior to use.

VPC (%)	40
CPVC (%)	52
Visc. (KU)	75-80
lb/gal	10.8
Total Solids (%)	45.5

Alkyd Spray Primer*(Fast-Dry Enamel—Sand Grind)*

	lb	gal
Varcopol 470-60	114	15.0
VM&P Naphtha	195	31.0
M-P-A 60	4	0.5
Desertalc 55	150	6.5
ASP-400	175	8.1
Titanox RA-50	150	4.3
Xylol	43	6.0
Sand grind		
Varcopol 470-60	228.0	30.0
Cobalt Naphthenate (6%)	1.4	0.2
Exkin #2	0.6	0.1
PVC (%)		43.2
Vehicle NV by Wt. (%)		35.5
Total NV by Wt. (%)		64.2
lb/gal		10.43
Visc. (KU)		60-65

Anticorrosive Styrene-Acrylic Primer

Formula No. 1

(Spray)

Disperse		
Zinc Chromate ZCYT 746		42.0
Red Oxide 15866		41.0
Bermocoll E320GK (4% aq. sol'n.)		29.0
Calgon S (10% aq. sol'n.)		11.0
Then add, in order		
Ammonia (0.880-0.885 s.g.)		11.0
Water		11.6
Vinacryl 7175		853.0
Hercules Defoamer 1512M		1.0
Acticide MPM		0.4
PVC (%)		5.5
Total NV by Wt. (%)		51
Visc. at 25 C (cps)		60

No. 2
(Brushing)

Mix

Bermocoll E320GK (4% aq. sol'n.)	48.0
Calgon S (25% aq. sol'n.)	28.0
Hercules Defoamer 1512M	0.1

Mix, then add to the above

Vinacryl 7175	522.0
Potassium Hydroxide (50% aq. sol'n.)	10.0

Then add quickly, with minimum shear

Zinc Chromate ZCYT 746	43.0
Red Oxide 15886	80.0
Talc AT1	268.4
Hercules Defoamer 1512M	0.1
Acticide MPM	0.4

PVC (%)	34.5
Total NV by Wt. (%)	66.6
Visc. at 25 C (cps)	≈ 460

No. 3
(White-Brushing or Spray)

Disperse

Bermocoll E320GK (4% aq. sol'n.)	66.0
Calgon S (10% aq. sol'n.)	18.0
Water	80.0
Zinc Phosphate	158.0
Tioxide R-CR2	103.0

Then add, in order

Ammonia (0.880-0.885 s.g.)	10.5
Vinacryl 7175	564.0
Hercules Defoamer 1512M	0.1
Acticide MPM	0.4
PVC (%)	21.9
Total NV by Wt. (%)	54.6
Visc. at 25 C (cps)	≈ 420

Acrylic Corrosion-Inhibiting Primer

	Formula No. 1		No. 2		No. 3	
	<i>(Lead Silico Chromate)</i>		<i>(Calcium Zinc Molybdate)</i>		<i>(Strontium Chromate)</i>	
	lb	gal	lb	gal	lb	gal
Grind paste:						
Neocryl A-601	383.1	45.59	—	—	—	—
Dispersant	5.8	0.70	—	—	—	—
Antifoam	3.1	0.43	2.5	0.26	2.5	0.26
Red Iron Oxide	29.3	0.93	2.5	0.34	2.5	0.34
Lead Silico Chromate	263.8	7.74	—	—	—	—
Mica (325 mesh)	58.7	2.55	—	—	—	—
Titanium Dioxide	—	—	178.9	5.37	178.9	5.37
Calcium Zinc Molybdate	—	—	57.9	2.32	—	—
Strontium Yellow	—	—	—	—	71.8	2.32
Water	—	—	222.9	26.79	222.9	26.79
Propylene Glycol	—	—	31.0	3.59	31.0	3.59

Procedure:

Grind on high speed disperser 10-15 min/3600-4500 fpm

Let down:

Neocryl A-601

Propylene Glycol

Antifoam

Ammonium Hydroxide (28%)

Neutralizer

Thickener

203.4	24.20	483.7	57.56	483.7	57.56
27.0	3.13	—	—	—	—
2.7	0.37	—	—	—	—
2.3	0.31	—	—	—	—
—	—	24.8	3.18	24.8	3.18
—	—	5.0	0.59	5.0	0.59
116.8	14.05	—	—	—	—

Total NV by Wt. (%)

PVC (%)

P/B Ratio

lb/gal

Visc. (cps)

pH

50.0	41.6	42.1
35	31	31
65/35	60/40	62/38
11.0	10.1	10.2
550	500	500
9.0	9.5	9.5