

**WATER-BASED
PAINT
FORMULATIONS**

Volume 4

Ernest W. Flick

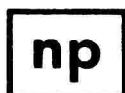
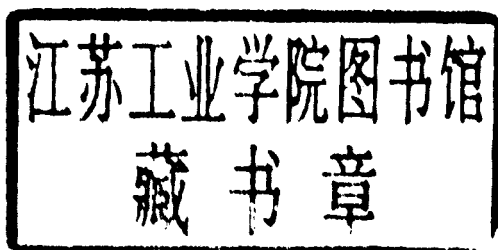
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WATER-BASED PAINT FORMULATIONS

Volume 4

by

Ernest W. Flick



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WATER-BASED PAINT FORMULATIONS

*In Memory
of
My Mother and Father*

Preface

This collection of 232 up-to-date water-based trade and industrial formulations will be of value to technical and managerial personnel in paint manufacturing companies and firms which supply raw materials or services to these companies, and to those interested in less hazardous, environmentally safer formulations. The book will be useful to both those with extensive experience as well as those new to the field. This book includes new and different formulations than those included in the previously published *Industrial Water-Based Paint Formulations* and *Water-Based Paint Formulations*.

The data consist of selections of manufacturers' suggested formulations made at no cost to, nor influence from, the makers or distributors of these materials. The information given is presented as supplied; the manufacturer should be contacted if there are any questions. Only the most recent data supplied us has been included. Any solvent contained is minimal.

The table of contents is organized in such a way as to serve as a subject index. The formulations described are divided into sections which cover exterior, interior, and exterior and/or interior water-based paints, enamels, and coatings, as indicated below:

- I. Coatings and Topcoats
- II. Coil Coatings
- III. Enamels
- IV. Enamels—Baking
- V. Exterior Paints and Related Products
- VI. Interior Paints and Related Products
- VII. Lacquers
- VIII. Primers
- IX. Sealants and Related Compounds
- X. Stains
- XI. Miscellaneous

Each formula has been placed in the chapter which is most applicable. The reader, if seeking a formula for a specific end use, should check each chapter which could possibly apply.

In addition to the above, there are two other sections which will be helpful to the reader:

- XII. A chemical trade name section where trade-named raw materials are listed with a chemical description and the supplier's name. The specifications which the raw materials meet are included if applicable.
- XIII. Main office addresses of the suppliers of trade-named raw materials and/or formulations.

Included in the descriptive information for each formulations, where available, the following properties may be listed: viscosity, solids, content, % nonvolatiles, pigment volume concentration, density, pH, spatter, leveling, sag resistance, scrub stability, freeze-thaw stability, ease of application, gloss foaming, cratering, brightness, opacity, water spotting, adhesion to chalk, brush clean-up, reflectance, and sheen.

Ernest W. Flick

Notice

To the best of our knowledge the information in this publications is accurate; however, the Publisher does not assume any responsibility or liability for the accuracy or completeness of, or consequence arising from, such information. These formulations do not purport to contain detailed manufacturing nor user instruction, and by its range and scope could not possibly do so. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the Author or Publisher.

Water-based paint raw materials could be toxic, and therefore, due caution should always be exercised in the use of these hazardous materials. Final determination of the suitability of any information or product for use contemplated by any user, and the manner of that use, is the sole responsibility of the user. We strongly recommend that users seek and adhere to a manufacturer's or supplier's current instructions for handling each material they use.

The Author and Publisher have used their best efforts to include only the most recent data available. The reader is cautioned to consult the supplier in case of questions regarding current availability.

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Section I

Coatings and Topcoats

Acrylic Emulsion/Urea-Formaldehyde
Wood Clearcoat Modification

K-Flex UD-320W is an aliphatic, saturated, water soluble resin modifier. This urethane diol modifying resin imparts improved stain resistance to the forced dry (thermoset) wood clearcoat formulation below.

What makes this formulation unique, is the absence of neutralizing amines. As a result, a free acid catalyst may be used (Nacure 155) and lower temperature cures may be achieved. A pot life of 24-48 hours is possible.

WB Wood Clearcoat Modification:

Component:	%K-Flex UD-320W		
	0%	5%	10%
Beetle 65	24.5	24.5	24.5
Methanol	2.4	2.4	2.4
Silwett L-77	0.4	0.4	0.4
Rhoplex AC-1024	49.2	44.2	39.3
Water	7.2	9.4	11.5
Exxate 700	1.4	1.4	1.4
Chemcor AS-35-3	4.1	4.1	4.1
K-Flex UD-320W	0.0	2.8	5.5
Nacure 155	4.9	4.9	4.9
Methanol	5.9	5.9	5.9

Formulation Procedure:

1. The components were added in the order as presented, for easier incorporation.
2. The Nacure 155 catalyst was pre-diluted with the methanol below it in the formulation before incorporation, with a Nacure 155/Methanol ratio of 45.5/54.5.

Substrate: Birch Faced Plywood

Sealer: Self Sealed (2 Coats, 2 bakes)

Sealer/Topcoat, WFT: 20-25u (0.8-1.0 mil)/Coat

Sealer/Topcoat Bake: 10 min./71C (160F)

4 Hour Spot Test

Stain Test:	0% UD-320W	10% UD-320W
Acrylic/UD-320W/B-65	50/0/50	40/10/50
Coffee	Severe Haze	Light Stain
Milk	Severe Haze	No Effect
Mustard	No Effect	Light Stain
Water	Severe Haze	No Effect
Lemon Juice	Slight Haze	No Effect

No effect was seen in the 4 hour spot test in any of the formulations with ketchup, nail polish remover, isopropanol, liquid cleaner or lipstick.

Drawdowns made over Aluminum panels and baked 10 minutes at 160F resulted in an H pencil hardness and 100+ MEK double rubs.

SOURCE: King Industries: Formulation WR-26

Aliphatic Wood Coating Formulation
(Sancure 825/Rhoplex CL-104)

<u>Blend:</u>	<u>Pounds</u>
Rhoplex CL-104 (38% Solids)	134.2
Water	33.8

Add following with good agitation:

Dowanol DPM	12.75
Hexyl Carbitol	2.55

Mix 10-15 minutes

Sancure 825 (34% Solids)	100.0
Surfactant Package (Premix the following):	
Surfynol 104H	2.6
Surfynol DF-110L	1.3
DC-14	1.3
Mineral Spirits	1.3
Surfynol DF-70	0.7

Add and mix 30 minutes

Adjust to desired viscosity using Acrysol RM825 (Rohm & Haas Co.)
 If required, flow is enhanced by addition of very low levels of
 Fluorad FC-129 (3M Corp.) as a 10% solution in water.

NOTE: Avoid excessive use of fluorocarbons, as sharp surface
 tension drops can cause recoat problems and strong foaming
 tendencies.

Always adjust to desired viscosity range prior to evaluating
 flow/level and deaeration properties. Low viscosity can
 yield "Picture-Framing" and/or a "Fish-Eye" effect. High
 viscosity can yield poor deaeration properties.

Surfynol additives have been shown to provide the following
 benefits:

- *Color uniformity of stains
- *Early stain lapping resistance
- *Consistent wetting, flow and leveling on various woods
- *Foam control

With no detrimental effect upon:

- *Topcoat recoatability and intercoat adhesion
- *Gloss retention upon aging
- *Tannin bleed resistance
- *Water sensitivity
- *Chemical resistance

SOURCE: Air Products & Chemicals, Inc.: Surfynol Surfactants:
 Formulation A (B.F. Goodrich)