

Paints, Pigments, Varnishes & Enamels Technology Handbook (with Process & Formulations) 2nd Revised Edition

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The use of paints, varnishes and enamels for decoration is nearly as old as human culture itself. These are widely used in homes as well as in industry because painted surfaces are attractive and easy to keep clean. Paint is generally made up of a pigment. It is a chemical material, which alters the color of reflected or transmitted light due to wavelength-selective absorption. Varnish is a transparent, hard, protective finish or film primarily used in wood finishing but also for other materials. Varnish is traditionally a combination of a drying oil, a resin, and a thinner or solvent. The technology of paints, varnishes and enamels is changing rapidly and becoming more complex each day. The paint industry is an important segment of the chemical industry. Enamel paint is paint that air dries to a hard, usually glossy, finish, used for coating surfaces that are outdoors or otherwise subject to wear or variations in temperature.

The Indian paint industry has seen a gradual shift in the preferences of people from the traditional whitewash to higher quality paints like emulsions and enamel paints with improvement in lifestyle. India is the second largest consumer of paint in Asia. Over the past few years, the Indian paint market has substantially grown and caught the attention of many major players. The market for paints in India is expected to grow at 1.5 times to 2 times GDP growth rate in the coming years. In terms of volumes, pigments demand is expected to reach 4.4 million tonnes. Due to increased Government funding for infrastructure, demand for paints both in industrial and decorative segment is set to rise, thereby rendering Indian paint industry to be poised for further growth.

This handbook is designed for use by everyone engaged in the paints, pigments, varnishes and enamels industry. It provides all the information of the various formulae and processes of paints, pigments, varnishes and enamels.

The major content of the book are paint testing, color in paint, maintenance paints, emulsion paints, exterior or interior paints, exterior or interior multicolor paints, exterior swimming pool paints and enamels, interior ceiling paints, metal paints, marine paints, enamel paints, interior fire- retardant paints, interior gloss paints, paint formulation, manufacture of natural copal varnishes, floor paints and enamels, varnishes, lacquers and floor finishes, white pigments, colored pigments, pigment dispersion etc. The book contains addresses of plant & machinery suppliers with their Photographs.

It will be a standard reference book for professionals, entrepreneurs, those studying and researching in this important area and others interested in the field of paints, pigments, varnishes and enamels technology.

1. TESTING OF RAW MATERIALS FOR COATINGS

Pigments

Oil Absorption

Color

Tinting Strength of Colored pigments

Tinting Strength of White Pigments

Coarse Particles

Oils

Mono-Di-and Triglycerides

Instrumental Analysis of Oils

Gas Chromatography

Resins, Polymers, Plasticizers

Solvents

2. PAINT TESTING

Importance of testing

Classification

Discernment of Appropriate Qualities

Selection of Test

Conduct of Test

Interpretation of Results

Establishment of Standard Variances

Color Testing

Incorrect Standards And Test Procedures in Industry

Statistical Analysis

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Tristimulus Values X, Y, Z

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Sample Preparation for Color Measurement

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Color Control by Instrumentation

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Sacrificial Metal
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Rubber Base
Vinyl Chloracetate
Principles of Effective Maintenance Painting
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Intermediate and Finish Coating

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Types of Surfactants
Behavior of Emulsions
Protective Colloid
pH
Emulsion Formation
Emulsion Polymerization
Polymerization.
Ingredients
Post-emulsification
Stability of Emulsions

6. EXTERIOR OR INTERIOR PAINTS

Exterior or Interior White Medium Texture Masonary Paint
(TT-C-00555) (Styrene-Acrylate/Chlorinated Paraffin)
Exterior or Interior White Medium Texture Masonary Paint
(TT-C-00555) (Styrene-Acrylate/Chlorinated Paraffin/Resin)
Exterior or Interior White Medium Texture Masonry Paint
(TT-C-00555) (Styrene-Butadiene/Chlorinated Paraffin)
Exterior or Interior White Medium Texture Masonry Paint
(Vinyl Toluene-Acrylate/Chlorinated Paraffin)
Exterior or Interior White Medium Texture Masonry Paint
(TT-C-00555) (Vinyl Toluene-Butadiene/Chlorinated Paraffin)
Exterior or Interior General Purpose Aluminum Paint (Alkyd)
Exterior or Interior General-Purpose High-Quality Aluminum Paint (Coumarone-
Indene/Menhaden Oil)

7. EXTERIOR OR INTERIOR MULTICOLOR PAINTS

Exterior or Interior White Multicolor Paint
(Vinyl Toluene-Butadiene)
Exterior or Interior Tint Base Multicolor Paint
(Vinyl Toluene-Butadiene)
Exterior or Interior Black Multicolor Paint
(Vinyl Toluene-Butadiene)
Exterior or Interior Red Multicolor Paint
(Vinyl Toluene-Butadiene)
Exterior or Interior Varnish
Exterior or Interior Clear Varnish (Polyurethane)

8. EXTERIOR SWIMMING POOL PAINTS AND ENAMELS

Exterior White Swimming Pool or Masonry Paint
(Chlorinated Rubber/Hydrocarbon Resin/Chlorinated Paraffin)
Exterior Semigloss Blue Swimming Pool Paint
(TT-P-95A) (Styrene-Acrylate)
Exterior Gloss Blue Swimming Pool Paint
(Styrene-Acrylate)
Exterior Gloss Blue Swimming Pool Paint
(TT-P-95A) (Styrene-Acrylate)
Exterior Blue Swimming Pool Enamel
(Chlorinated Rubber/Chlorinated Paraffin)
Exterior Light Green Swimming Pool Enamel
(Two Component: Urethane-Catalyst)

9. INTERIOR CEILING PAINTS

Interior Flat White Ceiling Paint (Alkyd)
Interior Flat White Ceiling Paint (Alkyd)
Interior Flat White Ceiling Paint (Alkyd)
Interior Flat White High-Quality Low Cost Ceiling Paint (Alkyd)

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Lower Cost Utility Red Oxide Primer
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Deep Yellow Aerosol Enamel
Gray Automotive Enamel
Gray Automotive Enamel
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Iron Oxide - Zinc Chromate Primer
Epoxy-Ester Zinc Chromate Spraying Primer
Lead Silico Chromate Primer

Baking Primers

Red Lead Metal Primer

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Iron Oxide Primer

Red Primer

Automotive Flash Primer

Strontium Chromate Primer

Appliance and Metal Furniture Primer

Detergent-Resistant Appliance Primer

Stainless Steel Industrial Maintenance Primer

Gray Baking Sanding Primer Surfacer

Uses

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Epoxy White Gloss Enamel

White Enamel

White Brushing Enamel

White Metal Deco Enamel

Machinery Enamel

Gray Enamel

Epoxy Green Enamel

Clear Epoxy Coating

Application

Epoxy Clear Film

Black Aerosol Enamel

Gray Spraying Finish

Uses

Unpigmented Can Coating

Can Coating and Drum Lining

Unpigmented Drum Lining

Clear Interior Drum Lining

Uses

Unpigmented Tank Lining

High Solids Tank Liner

Chemical Resistant Metal Coating

White Roller Coat Tube Enamel

Red Lead-Iron Oxide Mastic Coating

Resin Coating

Procedure

Aluminum Paint

Interior Mill White Gloss Enamel

(Triamino-Ester)

Coil Coating - Resistant Siding Type

Polyester White Coil Coating Enamel

White High Gloss Electrocoating

Primer for Galvanized

Red Iron Oxide Primer

Procedure

Dark Grey Single Coat or Primer

Beige Single Coat

Latex Maintenance Enamels

Exterior Latex Metal Paint

Interior Latex Flat Wall Paint for Machine and Tube Colorants

Latex Aluminum Paint
Latex Aluminum Paint
Zinc Chromate, Corrosion Inhibiting Primer
Maintenance Primer
Acrylic Lacquer Aerosol Metal Coating
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Directions for Use
Precautions
Aerosol Aluminum Enamel
Aerosol High Temperature Aluminum Paint
Package
Directions for use
Precautions
Lead Primer
Lead Silico Chromate Primer
Anticorrosive Primer
Anticorrosive Chlorinated Rubber Thick Coatings Primers
Anticorrosive Chlorinated Rubber Topcoats
Thixotropic Zinc Chromate Primer

11. MARINE PAINTS

Marine Anticorrosive Primer High Flash Point Solvent
Marine Anti-Fouling Ship-Bottom Paint with High Flash Point
Marine Vinyl/Alkyd Enamel (Black)
Grey Marine Vinyl/Alkyd Enamel
Zinc Dust Primer
Underwater Coating
Composition of Rosin-Vinyl Antifouling Paints
(Nonvolatile Portion Only)
Rosin Antifouling Coatings
Chlorinated Rubber Marine High-Build Coatings with Inhibiting Pigment for Airless Spray
Metallic Lead Primer
Chlorinated Rubber Antifouling Coatings
Chlorinated Rubber Antifouling Marine Paint System
(Metallic Coatings)
(Thick Coatings)
(Antifouling Topcoat)
Marine Coating for Cold, Damp Weather Application
Marine Primer for Cold, Damp Weather Application
Tri-Amino Marine Enamel
Tri-Amino Marine Spar Varnish

12. ENAMEL PAINTS

Semi-Gloss Enamel
White Semi-Gloss Enamel
Dark Green Porch and Deck Enamel
High Quality Semi-Gloss Enamel
Black Rapid-Dry Enamel
Gloss White Architectural Enamel
Semigloss Tint Base
Odorless Alkyd Gloss Enamel
Odorless High Gloss White
Nonpenetrating Semi-Gloss
Nonpenetrating Gloss Enamel

Spraying Red Automotive Enamel
Alkyd Aerosol Enamels
Aerosol Packing
White Aerosol Enamel
Deep Yellow Aerosol Enamel
Stipple Gloss Enamel
High Solids, Light Blue Enamel
Preparation of Base Component
High Solids, Beige Enamel
Preparation of Base Component
White Tinting Enamel
Black Aerosol Enamel
White Aerosol Enamel
Epoxy-Amine High Solids White Spray Coating
Epoxy Solventless Enamel
Gloss Enamel
Semigloss Enamel
Painter's Enamel
Gray High Solids Epoxy-Polyamide Spraying Enamel
Vanoxy Green, Enamel
Red Epoxy Enamel
Epoxy Green Enamel
Epoxy White Enamel
Yellow Gloss Epoxy Enamel
Gloss White Enamel
Blue Gloss Enamel
Yellow Industrial Enamel
Automotive and Equipment White Enamel
Bright Red Automotive Enamel
Industrial Orange Enamel

13. INTERIOR FIRE-RETARDANT PAINTS

Interior Intumescent Fire-Retardant White Paint
Interior Intumescent Fire-Retardant White Paint
Interior Intumescent Fire-Retardant White Paint
Interior Intumescent Fire-Retardant White Paint
Interior Fire-Retardant White Paint

14. INTERIOR GLOSS PAINTS

Interior Gloss White Paint (Acrylic)
Interior Gloss White Paint (Acrylic)
Interior Gloss White Paint (Acrylic)
Interior Gloss White Paint (Acrylic)
Interior Gloss White Paint (Acrylic)
Interior Gloss White Paint (Acrylic/Vinyl Acetate-Acrylic)
Interior Gloss White Paint (Acrylic/Vinyl Acetate-Acrylic)
Interior Gloss White Paint (Latex)
Interior Gloss White Paint (Styrene-Acrylate)
Interior Gloss White Paint (Vinyl Acetate)
Interior Gloss White Paint (Vinyl Acetate-Acrylic)
Interior Gloss White Paint [Vinyl Acetate-Acrylic(S)]
Interior Gloss White Paint (Vinyl Acetate-Ethylene)
Interior Gloss White Paint (Vinyl Acetate-Ethylene)
Interior Gloss White Paint (TT-p-1511A, Type II) (Acrylic)

Interior Full Gloss White Paint (Acrylics)
Interior High Gloss White Paint (Acrylic)
Interior Gloss White And Tint Base Paint (Vinyl Acetate)
Interior Gloss White And Tint Base Paint
Interior Gloss White and Tint Base Paint
Interior Gloss White And Tint Base Paint
(Vinyl Acetate - Ethylene)
Interior Gloss Tint Base Paint (Vinyl Acetate-Ethylene)
Interior gloss enamels
Interior Gloss White Enamel (Acrylic)
Interior Gloss White Enamel (Acrylic-Styrene/Alkyd)
Interior Gloss White Enamel (Alkyds)
Interior High Gloss White Enamel (Acrylic)
Interior High Quality Gloss White Enamel (Acrylic)
Interior High Quality Gloss White Enamel (Acrylic)
Interior High Quality Gloss White Enamel (Acrylic)
Interior High Quality Gloss White Enamel (Acrylic)
Interior High Quality Gloss White Enamel (Acrylic)
Interior Medium Cost Gloss White Enamel (Acrylic)
Interior Gloss White And Tint Base Enamel (Acrylic)
Interior Gloss White And Tint Base Enamel (Alkyd)
Interior High Gloss White And Tint Base Enamel (Alkyds)

15. INTERIOR SEMIGLOSS WHITE PAINTS

Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior Semigloss White Paint (Vinyl Acetate-Acrylic)
Interior High Quality Semigloss White Paint
(Vinyl Acetate)
Interior High Quality Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior High Quality Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior High Quality Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior High Quality Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior Low Cost Semigloss White Paint (Acrylic)
Interior Low Cost Semigloss White Paint (Acrylic)

Interior Low Cost Semigloss White Paint (Acrylic)
Interior Low Cost Semigloss White Paint (Acrylic)
Interior Low Cost Semigloss White Paint (Acrylic)
Interior Low Cost Semigloss White Paint (Vinyl Acetate)
Interior Low Cost Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior Medium Priced Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior Medium Priced Semigloss White Paint
(Vinyl Acetate-Acrylic)
Interior Semigloss White and Tint Base Paints
Interior Semigloss White and Tint Base Paint (Acrylic)
Interior Semigloss White and Tint Base Paint
(Vinyl Acetate)
Interior High Quality Semigloss White and Tint Base Paint (Acrylic)
Interior Low Cost Semigloss White and Tint Base Paint
(Vinyl Acetate)
Interior Low Cost Semigloss White and Tint Base Paint
(Vinyl Acetate)
Interior Low Cost Semigloss White and Tint Base Paint
(Vinyl Acetate-Acrylic)
Interior Semigloss Tint Base Paint
Interior Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Medium Tint Base Paint (Acrylic)
Interior Semigloss Pastel Tint Base Paint (Acrylic)
Interior High Quality Semigloss Tint Base Paint (Acrylic)
Interior Semigloss Enamel
Interior Semigloss White Enamel (Acrylic)
Interior Semigloss White Paint (Acrylic)
Interior Semigloss White Enamel (Acrylic)
Interior Semigloss White Enamel (Acrylic)
Interior Semigloss White Enamel (Acrylic)
Interior Medium Gloss White Enamel (Acrylic)
Interior Medium Gloss White Enamel (Acrylic)
Interior High Quality Semigloss White Enamel (Acrylic)
Interior High Quality Semigloss White Enamel (Acrylic)
Interior High Quality Semigloss White Enamel (Acrylic)
Interior Low Cost Semigloss White Enamel
(Vinyl Acetate)
Interior Moderate Cost Semigloss White Enamel (Acrylic)
Interior Semigloss White and Tint Base Enamel (Alkyd)
Interior Semigloss White and Tint Base Enamel (Alkyd)
Interior Semigloss White and Tint Base Enamel
(Vinyl-Acetate Acrylic)
Interior Semigloss White and Tint Base Enamel
(Vinyl-Acetate Acrylic)
Interior High Semigloss White and Tint Base Enamel
(Alkyd/Acrylic)

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Raw Materials
Manufacture
Cost
Performance
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Critical Pigment Volume Concentration
Pigments
Vehicle
Solvents and Driers
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Computer

17. MANUFACTURING TECHNOLOGY

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 - 1.2 Powder Coating Manufacture
 - 1.3 Resin Manufacture
2. Equipments
3. Laboratory Equipment
4. Quality Control
5. Automation

18. THE MANUFACTURE OF NATURAL COPAL VARNISHES

Disintegration or Size Reduction of the Copal
Method of Heating
Stirring
Capacity of the Kettle
Condensation of Vapours
Addition of Drying Oil
Addition of Driers – Lithorge, etc.
Addition of Liquid Driers and Thinners
Temperature Measurement
Discharging
Access to the Inside of the Kettle
Flanged or Welded Bottoms
Choice of Metal
Special Accessories
Fire Risks
Special Plant Designs
Choice of Running Kettle
General Plant Arrangement

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Charging the Vessel with Bitumen
Heating and Sweating
Addition of Resin
Addition of Oil
Addition of Driers
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20. THE MANUFACTURE OF SPIRIT VARNISHES

Spirit Manila Varnishes
Shellac Varnishes
Accroides Varnishes
Oxidised Rosin Varnishes
Phenolic Resin Varnishes
Urea-formaldehyde Resin Varnishes
Hydrocarbon Base Varnishes

21. FLOOR PAINTS AND ENAMELS

Medium Tint Base Paint (Vinyl Acetate-Acrylic/Epoxy)
Gray Floor Paint (Acrylic)
Green Floor Paint (Vinyl Acetate-Acrylic/Epoxy)
Red Floor Paint (Vinyl Acetate-Acrylic/Epoxy)
Gray Floor Enamel (Acrylic/Alkyd)

22. INTERIOR CONCRETE PAINTS AND ENAMELS

Interior White Concrete Floor Paint (TT-P-0091D) (Styrene-Butadiene)
Interior Brown Concrete Enamel (Styrene-Butadiene)
Interior Battleship Gray Concrete Enamel
(Styrene-Butadiene)
Interior Light Gray Concrete Enamel (Styrene-Butadiene)
Interior Olive Gray Concrete Enamel (Styrene-Butadiene)
Interior Silver Gray Concrete Enamel (Styrene-Butadiene)
Interior Dark Green Concrete Enamel (Styrene-Butadiene)
Interior Tile Red Concrete Enamel (Styrene-Butadiene)
Interior Yellow Concrete Enamel (Styrene-Butadiene)

23. EXTERIOR WHITE ENAMELS

Exterior Low Gloss White Low-Odor Enamel
(Two-Component, Epoxy-Polyester)
Exterior Low Gloss White Low-Odor Enamel
(A.P.A. Approved) (Two-Component, Epoxy-Polyester)
Exterior Low Gloss White Low-Odor Enamel
(A.P.A. Approved) (Two-Component, Epoxy-Polyester)
Exterior Low Gloss White Low-Odor Enamel
(TT-C-545D Type) (Two-Component, Epoxy-Polyester)
Exterior Semigloss White Enamel (Alkyd)
Exterior Semigloss White Enamel (TT-E-490B) (Alkyd)
Exterior Semigloss White Low-Odor Enamel
(Two-Component: Epoxy Polyester)
Exterior Semigloss White Low-Odor Enamel
(Two-Component: Epoxy-Polyester)
Exterior Semigloss White Enamel (Styrene-Acrylate)
Exterior Semigloss White Enamel (Styrene-Acrylate)
Exterior Gloss White Color-Retentive Enamel (Acrylic)
Exterior Gloss White Enamel (Alkyd)
Exterior Gloss White Fast-Drying Enamel (Alkyd)

Exterior Gloss White Fast-Drying Enamel (Alkyd)
Exterior Gloss White Odorless Enamel (Alkyd)
Exterior Gloss White Trim Enamel (Alkyd)
Exterior Gloss White Enamel
(Two-Component: Epoxy-Polyester)
Exterior Gloss White Low-Odor Enamel
(Two-Component: Epoxy-Polyester)
Exterior Gloss White Enamel (Oxazoline)
Exterior Gloss White Enamel (Styrene-Acrylate)
Exterior Gloss White Enamel (Styrene-Acrylate)
Exterior Gloss White Marine and General Purpose Low-Cost Enamel (Urethane)
Exterior White Rapid-Drying Enamel (Alkyd)
Exterior White Enamel (Urethane)
Exterior White Tile-Like Enamel
(Two-Component: Urethane-Catalyst)

24. EXTERIOR OR INTERIOR ENAMELS

Exterior or Interior Gloss White Enamel (Alkyd)
Exterior or Interior Gloss White Enamel (Alkyd)
Exterior or Interior Gloss Blue Enamel
(Alkyd/Hydrocarbon Resin)
Exterior or Interior Gloss Gray Enamel
(Alkyd/Hydrocarbon Resin)
Exterior or Interior Gloss Green Enamel
(Alkyd/Hydrocarbon Resin)
Exterior or Interior Gloss Yellow Enamel
(Hydrocarbon Resin)

25. VARNISHES, LACQUERS AND FLOOR FINISHES

Cold-Blend Spar Varnish – Metal
General-Purpose Utility Varnish
Crown Cap Varnish
Furniture Rubbing Varnish
Four-Hour Floor and Trim Varnish
Clear Floor Varnish
Flatted Alkyd Varnish
Alkyd Rubber Lacquer
Epoxy Clear Coating
Epoxy-Amine Clear Coating
Epoxy Clear Coating
Clear Flexible Epoxy-Amine Exterior Coating
Flatting Base
Clear Varnish
Gray Floor Enamel
MFMA Gym Floor Finish – 40% Solids
General Purpose Varnish – 50% Solids.
Marine Spar Varnish
Chemically Resistant Varnish
Overpaint Varnish
Porch and Deck Varnish
Venetian Blend Varnish
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Directions for Use
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Protective Acrylic Coating for Copper Metal
Acrylic Lacquer
Clear Sanding Sealer
Varnish
Maroon Floor Varnish
(Phenolic Resin)
Shellac Primer Sealer
Furniture Lacquer
Cold-Blend Floor Varnish
Maroon Floor Paint
Vehicle
Gray Floor Enamel
Dull Finish Varnish
Flooring Primer
Green Floor Enamel
Red Floor Enamel

26. PIGMENTS - GENERAL CLASSIFICATION AND DESCRIPTION

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The Hiding Power of Paint

Part B. Supplemental Pigments

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General Properties of Supplemental Pigments

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The Major Supplemental Pigments

The Future of Supplemental Pigment Technology

27. WHITE PIGMENTS

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The Reactive White Pigments

Basic Carbonate White Lead

28. COLORED PIGMENTS

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Zinc Yellows

Strontium Yellow

Nickel Titanate Yellow

Nickel Azo Yellow

Cadmium Yellow

Yellow Iron Oxide

Hansa Yellows

Benzidine Yellows

Vat Yellows

Chrome Orange

Molybdate Orange

Cadmium Orange

“Mercadium” Orange
Benzidine Orange
Dinitraniline Orange
Vat Dye Oranges
Chrome Greens
Chromium Oxide
Hydrated Chromium Oxide
Copper Phthalocyanine Green
Organic Green Toners
Iron Blues
Copper Phthalocyanine Blues
Ultramarine Blue
Organic Blue Toners
Indanthrone Blue
Carbazole Dioxazine Violet
Organic Violet Toner
Mineral Violet
Quinacridone Violet
Lithols
Para Reds
Toluidine Reds
BON (-OxynaphthOic) Reds and Maroons
Lithol Rubine
Chlorinated Para Red
Quinacridone reds and maroons
Red Iron Oxide
Cadmium Red and Maroons
“Mercadium” Reds and Maroons
Red Lead
Thioindigo Reds and Maroons
Arylide Maroons
Siennas, Ochres and Umbers
Carbon Blacks, Lampblacks and Bone Blacks
Tinting Properties of Colored Pigments
Chrome Yellows
Zinc Yellows
Basic Zinc Chromate
Strontium Yellow
Nickel Titanate Yellow
Nickel Azo Yellow
Cadmium Yellow
Yellow Iron Oxide
Hansa Yellow
Benzidine Yellow
Vat Yellows
Chrome Orange
Molybdate Orange
Cadmium Orange
“Mercadium” Orange
Benzidine Orange
Dinitraniline Orange
Vat Dye Orange
Chrome Greens

Chromium Oxide
Hydrated Chromium Oxide
Copper Phthalocyanine Green

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Premixers

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30. ADDRESSES OF PLANT & MACHINERY SUPPLIERS

31. PLANT & MACHINERY PHOTOGRAPHS

About NIIR

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

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Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

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