Modern Technology of Printing & Writing Inks (with Formulae & Processes) 2nd Revised Edition

Author: NIIR Board of Consultants & Engineers
Format: Paperback
ISBN: 9788178330822
Code: NI75
Pages: 480
Price: Rs. 1,475.00 **US$** 39.86
Publisher: Asia Pacific Business Press Inc.
Usually ships within **5** days

Ink is a liquid or paste that contains pigments or dyes and is used to colour a surface to produce an image, text, or design. Ink is used for drawing or writing with a pen, brush, or quill. Thicker inks, in paste form, are used extensively in letterpress and lithographic printing. Ink can be a complex medium, composed of solvents, pigments, dyes, resins, lubricants, solubilizers, surfactants, particulate matter, fluorescents, and other materials. The components of inks serve many purposes; the ink's carrier, colorants, and other additives affect the flow and thickness of the ink and its appearance when dry.

India is among the fast growing printing & writing ink markets globally spurred by the rapid expansion of the domestic print markets. Backed by a strong demand from key end user segments such as package printing, newsprint, publishing and other commercial printing, the printing ink market in India has registered strong growth over the years. The printing ink industry is fragmented with hundreds of manufacturers and a large number of players in the unorganised sector.

Printing ink sector in India witnessed a growth of around 7.5% per annum during the Past years. Printed packaging accounts for around 27% of the demand for printing inks in India followed by newspapers at 20%. Commercial printing/promotional and printed advertising together account for around 19% of the demand. Other key end user segments for printing inks include books and stationery. With the print sector forecast to grow at around 8% per annum, in coming years, printing ink segment is expected to grow strongly.

This handbook is designed for use by everyone engaged in the printing & writing ink industry and the associated industries. It provides all the information required by the ink technical for the day-to-day formulation of inks. It supplies the details of the manufacturing methods, including large-scale production, and gives guidance on achieving quality assessment and total quality management specifications. The book also describes properties and uses of the raw materials used in the formulation of printing & writing inks.

The major content of the book are the colour and colour matching, raw materials, printing inks, ink formulations, applications problems, writing inks, project profile, how to estimate, order & handle ink, testing of writing & miscellaneous inks, testing of printing inks, rollers, waterborne inkjet inks. The book contains addresses of raw material suppliers, plant & machinery suppliers with their Photographs.

This book will be a mile stone for the entrepreneurs, existing units, libraries etc.

Contents

1. INTRODUCTION

Visual Characteristics of Inks
The colour of Inks
The Transparency and opacity of printing inks
The gloss of printing inks
The nature of Printing Inks As Determined By The printing Process
Flexographic and gravure inks
Lithographic and letterpress inks
Screen Inks
The drying characteristics
Absorption drying
Oxidation drying
Evaporation drying
Chemical drying
Radiation induced drying
The Adhesive Nature of Printing Inks
The Resistance properties of Printing Inks
Lightfactness
Heat resistance
Abrasion resistance
Product resistance
Weathering

2. THE PRINTING PROCESSES

The Letterpress Process
Press Configurations
The Platen press
Flat-bed cylinder press
Rotary presses
Letterpress forme production
Original plates
Line Plates
Halftone plates
Duplicate plates
Make-ready:
Substrates
Applications
Rotary Ink
Quickset Ink
High-gloss Ink
Moisture-set Ink
Water-Washable Ink
New Ink
Miscellaneous Job Ink
The Offset Lithographic Process
The Printing unit
The damping system,
The offset blanket
Press Configurations
The small offset press
Larger sheet-fed presses
Web offset presses

Blanket-to-blanket press
Common-Impression drum presses
Three-cylinder presses
Oithographic platemaking
Presensitised surface plates
Wipe-on Plates
Deep-etch plates
Multi-metal plates
Electrostatic imaged plates
Chemical diffusion transfer plates
Photodirect plates
Laser exposed plates
Direct image plates
The driographic plate
Process control
Platemaking control
Control in colour printing
Inkduct pre-setting and control
Substrates and inks
Ultra-violet (UV) euring inkds 25
Infra-red radiation 25
Inks for lithography
Dry offset of Letterst
Fundamentals of Lithography
Lithographic Problems
The Gravure process
The printing unit
The inking system
Doctor blades
The impression roll
Drying system
Press Configurations
Gravure cylinder preparation
Conventional etching
Single bath etching
Halftone Process
Double positive system-halftone gravure
Halftone gravure
Mechanical engraving
Lasergravure
Press control systems
Substrates and inks
Applications
Gravure Inks
The Flexographic Process
The printing unit
Press configurations
Flexographic platemaking
Rubber plates
Photopolymer plates
Plate mounting
Applications
Flexographic Inks

Flexographic Problems,
The screen printing process
Press configurations
Screen Stencil Manufacture
Mounting the Screen
Application of the stencil
After treatment
Substrates and inks
Application
Electrostatic Printing
Copper Plate and Die Stamping
Non-Impact Printing processes
Ink-jet Printing
Continuous jet
Impulse or drop on demand
Electrophotography
Print Recognition
Letterpress
Flexography
Lithography
Offset Letterpress
Gravure
Screen Printing
Non_Impact printing
Substrate Selection
General Paper properties
Runnability
Printability

2. COLOUR AND COLOUR MATCHING
The Physical nature of Colour
Light Sources
The Perception of colour
The eye
Defective colour vision
Chromatic adaptation and colour constancy
Metamerism
Dichrosim
Illumination quality and levels
Additive and Subtractive Colour Mixing
The additive primaries
The subtractive primaries
The CIE System
Origins of colour in Printed Material
Pigments
Dyes
Origins of colour
Transparency and opacity
Colour Strenghtss
Substrate effects
Colour Index Classificaton
Graphic Reproduction

Three-colour printing
Four-Colour printing
Under colour removal
Masking
Half-tone dots
Dot gain
Dot Generation
The Measurement of Colour
Colorimeters
Densitometer
spectrophotometers
Optical geometry
The Recording of Colour data And the Specification of colour
Colour Difference
Colour Matching
Selection of raw materials
Matching techniques
The colour circle
Procedures
Oil Inks
Liquid Inks
Instrumental Colour match Prediction

3. RAW MATERIALS
Pigments
Yellow Pigments
Diarylide Yellows
Ironoxide yellows
Tartrazine yellow lake
Chrome yellows
Cadmium yellows
Fluorescent yellow
Orange Pigments
DNA Orange
Pyrazolone orange
Diarylide orange
Fast Orange 52G
Benzimidazolone orange HL
Ethyl lake red C
Red Pigments
Para Red
Naphthol Red (Or Permanent Red Frre)
Toluidine Red
Permanent Red 'R' (Chlorinated Para Red)
Carmine F.B.
Naphthol F4R
Naphtho Red LF
Permanent Red FRL
Bordeaux FRR (F4R)
Naphthol Red
Naphthol Red Light
Naphthol Red Dark

Lithol reds
Bon Red (Lack red C Bon)
Lake Red C
Lithol Rubin 4B
BON Maroon
PMTA Pink, rhodamine 6 G
Molybdate Orange, Chrome Scarlet, Orange Chrome
Calmium Red
BON Arylamide Red, Naphthol Red FGR
Quinacridone MagentaY
Naphthol Carmine FBB
Copper Ferrocyanide Pink
Naphthol Red F5RK
Benzimidazolone Carmine HF3C
Naphthol Rubine F6B
Benzimidazolone Carmine HF4C
Rubine Red 6B
Quinacridone Magenta B
Benzimidazolone Red HF2B
Naphthol Red F6RK
Azo Magenta G
Anthraquinone Scarlet
Quinacridone Violet
Benzimidazolone Bordeaux HF 3 R
Green Pigments
Blue Pigments
Violet Pigments
Brown Pigments
Black Pigments
White Pigments and Extenders
Pearlescent Materials
Metallic Pigments
Fluorescent Pigments
General Properties of Pigments
Acid Dyes
Basic Dyes
Solvent Dyes
Disperse Dyes
Drying Vegetable Oils
Linseed oil
Tung oil (China wood oil)
Oiticica oil
Dehydrated castor oil
Other oils
Marine oils
Non -dryign oils
News inkd oils
Non-drying vegetable oils
Resins
Natural Resins
Shellac
Manila copal
Asphalts

Starch and dextrin
Gum arabic
Synthetic resins
Pure phenolic resins
Rosin-modified phenolic resins
Pigment Interactions
Hard resin interactions
Film-forming properties
Hydrocarbon resins
Polystyrene resins and copolymers
Terpene resins
Silicone resins
Alkylated urea formaldehyde resins
Alkylated melamine formaldehyde resins
Polyamide resins
Poly (amide imide) resins
Chlorinated rubber
Cyclised rubber (isomerised rubber)
Vinyl resins
Polyvinyl alcohol
Ketone resins
Acrylic resins
Epoxide resins
Polyisocyanates and polyurethanes
Nitrocellulose, N/C (Cellulose nitrateCN)
Ethyle cellulose
Ethyl hydroxyethyl cellulose (EHEC)
Cellulose acetate propionate (CAP)
Cellulose acetate butyrate (CAB)
Sodium carboxymethyl cellulose (CMC)
Chemical constitution
Section V: Solvents
Hydrocarbon Solvents
Low boiling petroleum distillate-alipatic
White spirt
Paraffin oil (kerosene0
High boiling petroleum distillates-aliphatic
Hydrocarbon solvents- naphthenic
Aromatic hydrocarbons
High boiling aromatic solvents
Alcohols
Glycols
Ketones
Esters
Section VI : Plasticisers
Section VII: Waxes
Synthetic waxes
Polyethylene waxes
Polytetrafluoroethylene
Halogenated hydrocarbon waxes
Fatty acid amides
Petroleum waxes
Slack wax

Scale wax
Fully refined paraffin wax
Pettrolatum or petroleum jelly
Microcrystalline waxe
Ceresin wax
Montan wax
Montan esters
Natural waxes
Beeswax
Carnauba wax
Miscellaneous natural waxes
Section VIII : Driers
Liquid Driers
Cobalt
Paste Driers
Section IX Miscellaneous Additives
Chelating Agents
Antioxidants
Surfactants
Anionic Surfactants
Cationic surfactants
Non-Ionic surfactants
Amphoteric surfactants
Deodorants and Reodorants
Pure Chemicals
Alkalis
Defoaming Agents
Laking Agents
Tannic Acid
Tannic acid substitutes
Raw Materials For Radiation Curing Systems
Pigment Selection
Prepolymers
Epoxy acrylates
Polyester acrylates and unsaturated polyesters
Urethance acrylates
Reactive Diluents
Photoinitiators
Additives and Inhibitors

4. PRINTING INKS
Manufacture of Inks and varnishes
General Requirements
The Manufacturig Processes
The manufacture of oleo-resinous systems
Deaeration and potting
The manufacture fo polyer/solvent systems
Varnish manufacture
Cavitation mixer
Rotor/stator mixer
Manufacture of additives
Liquid ink manufacture

Ball mills
Bead Mills
Chips
Pigment chip manufacture
Manufacture of dye-based inks
Mixing Equipment
Butterfly mixers (Change pan)
Rotor and stator high speed mixers.
The 'star' impeller type
The high-speed disperser
The fixed or on-line mixer
High-speed mixing
Milling Equipment
Three-roll mills
Floating-rolling system
Development of single cst rollers
Bead mills.
Open sieve mill
Closed sieve mill
Gap separation mill
John mill
Tex mill
Dyno mill
STS mill
Electronically controlled Copra mill
Boa 500 mill (Buhler Brothers Ltd)
Co-ball mill
Microflow mill
Ball milling
Disavantages of ball mills
Handling, Storage and manufacture of uv Inks
Manufacture of newspaper Inks
Modern production trends
Computerisation
Costs of production and related subjects
Maintenance strategy in the printing ink industry
On failure maintenance
'Fixed time' maintenance
'Condition based maintenance
Computers and maintenance
The future
Plant control system
Further plant features
Manufacturing plant

5. INK FORMULATIONS
Letterpress Ink
Platen ink for absorbent papers
Cylinder press ink of uncoated papers
Quick-set inks of cated paper
Letterpress ink dryign by oxidation
Water-reducible inks

Process inks
Newspaper Coloured Inks
Rotary black inks for newspapers
Formula A: General-Purpose low mist black
Formula B : Ink rail
Formula C : Page-Pak
Formula D : Keyless Inking (Indirect flexo)
Lithoraphic Inks
Typical inks and Varnishers
Inks and varnishes for sheet-fed paper printing
Sheet-feed label inks
Small -offset
Inks and varnishes for sheet-fed carbon board printing
Ink for sheet-fed impervious substrate printing
Inks for web-offset paper printing
Coldset
Heatset
Gravure Inks
Publication Inks
Inks for catalogue printing
Packaging inks for paper and board lables
Metallic lable inks
Paper wrapper inks
Carton Inks
Foil inks
Foil board laminates
Inks for polyethylene film
Inks for treated polypropylene films
Coated polypropylene films
Cellulose films
Polyester fims
Wallcoverings
Inks for paper
Vinyl coated wallcoverings
Speciality systems
Metallic inks
Aluminium-based inks
Pearlescent inks
flexographic Inks
Sye-based inks
Pigmented inks for specific substrates
Paper and board
Nitrocellulose coated films
PVdC Co-polymer coated film
Polyolefin films
Metal and metallised substrates Almuminium foil
Metallic inks
Screen Inks
Inks for paper and board
Thin film screen inks
Ultra thin film screen inks
Oxidation drying gloss inks
Inks for Impervious surfaces

Metal signs
Metal containers
Inks for sheet plastic
inks for glass
Inks for Plastic containers
Polythene containers
PVC containers
Textile Inks
Daylight fluorescent Inks
Process inks
Uv and Electron Beam curing Inks
Inks for day offset application on plastics and metal
Ultraviolet curable silk screen
Ultraviolet curable varnish and coatings
Non-Mipact Printing
Electrostatic imaging
Inks for jet printing
Typical ink formulations
Inks for the Electronics Industry
Printed circuit products
Inks for Wallcoverings
Textile Transfer Inks
Sterilisation Inks
Metal Decorating Inks.
Decorationof sheets
Printing a pre-formed container
letterset Printing

6. APPLICATION PROBLEMS
Stocking in the Pile or Rewind
picking
Fill In
Poor Binding and Rub
Setoff
Piling and Caking
Trapping
Show Through and Strike Through
Ink Not Following the Fountain
Ink flying and Misting
Ghosting, Shadow, Streaks, and Slurs
Ink Drying on rollers
Plate Wear
Crystallization

7. WRITING INKS
Manufacture of Writing Inks
Packing
Inks for writing and Fountain Pens
Ferrogalo-tannate inks
Standard Copying and Record Ink
Standard Writing ink

Iron gallate Inks : (Ink Powders and Tablets)
Manufacture of Inks Tablets
Action of Hydrochloric Acid and Sulphuric Acid in Inks
Pormulae for Various Blue-Black Inks
Manufacture fo iron gallo-tannate inks
Manufacture
Aging of writing
Dating a document
Dye based Fountain Pen Inks
Washable Inks
Quick drying Inks
Alkaline Writing Inks
blue Alkaline Writing Inks
Prussian Blue Inks
Ball Point Pen Inks
Stamp-Pad Inks
Basic dyes
Acid dyes
Method of Manufacture
Inks for Recording Instruments
Drawing Inks-Black and Coloured
Black Drawing Inks
Coloured Drawing Inks
Marking Inks
Preparation of silver Inks
Aniline black Inks
Inks containing other metals
Coloured marking Inks ;
Ink for Multiple Copies purposes
Hectograph Inks;
Method of Preparation
Stencil Duplicating Inks
Inks of Hectograph Carbon Papers, Carbon Papers and Typewriter Ribbons
Inks or Carbon Papers
Hectograph Carbon Papers
Stencil Sheets
Felt, Pen, Sign Pen, Fibre Tip Inks
Mothod of Manufacture
Al;cohol Based Inks
Hydrocarbon Based Inks
Invisible or Sympathetic Inks
Inks for Special Materials
Inks for Plastics
Ink for Marking Photographs
Ink for stamping oiled stencils
Inks for Glass and Porcelain
Ceramic Inks
Ink for Metals
Time Card Ink
Meat Stamping Ink
Show Card Inks
Embossing Inks
Ruling Inks

Artist Colours
Colour Combination
a) Water Pints

8. PROJECT PROFILE

9. HOW TO ESTIMATE, ORDER & HANDLE INK
Estimatin Ink Requirements
Ordering Ink
Handling Inks

10. TESTING OF WRITING & MISCELLANEOUS INKS
Writing Inks
Sedimentation Test
Hue and Intensity
Clogging Test
Stability Test
Total Solids
Iron Content
Gravimetric Method
Determination of Corrosion
Ball Point Pen Inks
Stamps pad Inks
Determination of Glycerol Content
Assessing the performance of stamp-pad ink
Drawing Inks
Opacity or Transparency
Mold Growth
Marking Inks
Stencil Inks
Viscosity
Drying time
Presence of toxic and noxious materials
Caution
Presence of Aniline Oil
Miscibility with thinner
Stability
Skinning property
Dup;icating Inks
Test for Lead

11. TESTING OF PRINTING INKS
Specific Gravity
Viscosity
Penetration
Molecular Refraction
Refractive Index

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.

NPCS also publishes varies process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

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.

NIIR PROJECT CONSULTANCY SERVICES , 106-E, Kamla Nagar, New Delhi-110007, India. **Email**: npcs.india@gmail.com **Website**: NIIR.org