

Logo

106-E, Kamla Nagar, New Delhi-110007, India.
Tel: 91-11-23843955, 23845654, 23845886, +918800733955
Mobile: +91-9811043595
Email: npcs.ei@gmail.com, info@entrepreneurindia.co
Website: www.entrepreneurIndia.co

The Complete Technology Book on Printing Inks

Code: NI109	Format: paperback
Indian Price: ₹1000	US Price: \$100
Pages: 640	ISBN: 8178330482
Publisher: Asia Pacific Business Press Inc.	

Description

The beginning of ink making is something of a mystery. It is certain however, that the development of the art of writing preceded the invention of ink by almost a thousand years. Today inks are divided into two classes: printing inks and writing inks. Printing is a process for reproducing text and images, typically with ink on paper using a printing press. It is often carried out as a large scale industrial process, and is an essential part of publishing and transaction printing. Different techniques and printing equipments are employed for each printing practices. The demand for innovative printing practices has been on a high in recent times. There are various kinds of printing processes; lithographic process, the gravure process, offset printing process etc. different types of inks derived from different processes are ball pen inks, bleachable inks, fluorescent inks, fast drying ink, automatic press inks, rotary press inks, coated paper inks, planographic inks, lithographic inks, offset tin printing inks etc. The Printing Ink industries have grown significantly during the last decade and this industry is characterized by exceeding high margin profit. As we read newspapers, magazines, and books on a daily basis therefore inks are found in almost every aspect of human activity. The worldwide printing inks market is projected to register a CAGR of about 2.8%. Printing inks market embodies the strength of the global as well as regional economies. With its high correlation to a national GDP, the printing inks market is cyclical in nature, with economic ups and downs amplifying the demand patterns. The world printing inks market is projected to grow moderately over the next couple of years.

The major contents of the book are pigment in the printing inks, manufacturing of printing inks, storage and testing of raw materials, planographic inks, lithographic inks, factors effecting visual appearance of ink film, factors effecting visual appearance of ink film, method of mixing metallic powder and varnish, the principle of reproducing

photographs by printing methods, etc.

In this book an attempt has been made to bring together the useful manner as possible the fundamental Principles of ink making. The book contains formulae processes and other relevant information of the manufacturing of different types of printing inks.

Content

1. Introduction

2. Printing Inks

3. Printing Ink Vehicles

Vegetable Drying Oils

Linseed Oil and Linseed Oil Varnishes

Lithographic Varnish

China Wood Oil or Tung Oil

Soya Bean Oil

Perilla Oil

Other Vegetable Drying Oils

The Vegetable Semi-Drying Oils

Cottonseed Oil

Rapeseed Oil

The Vegetable Non-Drying Oils

Mineral Oils

Animal Oils

Terrestrial Animal Oils

Marine Animal Oils

Rosin Oils

Pitch Varnishes

4. Pigment in the Printing Inks

Pigments

Nature

Minerals

Carbonic sources

Botanical

From animals

Black Pigments

Lamp black

Russian black

Coal or gas

Wooden coal
Ivory coal
Bones
Parish black
Lead and graphite
Composition black
White Pigment
White lead
Antimony
Chinese white
Transparent white
Blainfix white
Yellow Pigments
Chrome yellow
Cadmium yellow
Ochres yellow
Gummy material
Minerals
Red Pigment
Vermillion
Carmine
Lac
Lake pigment
Kothernial lake
Madar
Blue Pigment
Prusian blue
Ultramarine blue
Reflex blue
Oriental blue
Cobalt blue
Indigo blue
Green Pigment
Emerald green
Chrome green
5. Manufacturing of Printing Inks
Storage and Testing of Raw Materials
Mixing operation
Mixing machines
Milling process

Delivery part of the machine
Quality control
Packing and selling
6. Typographic Printing Inks
Job Press Inks
Job Black
Job Press Bright Red
Job Press Green
Automatic Press Inks
Automatic Press Black
Automatic Press Red
Flatbed Cylinder Press Inks
Cylinder Press Black
Cylinder Press Peacock Blue
Rotary Press Inks
Rotary Press Red
Rotary Press Black
Web Press Inks
Web Press News Black
Perfecting Press Red
The Relation of Ink to Stock
Bond and Ledger Paper Inks
Bond Bronze Blue
Bond Black
Coated Paper Inks
Coated Paper Red
Coated Paper Yellow Lake
Super-calendered Paper Inks
Super Paper Red
Super Paper Blue
Parchment Paper Inks
Parchment Black
Parchment Red
Carton Stock Inks
Carton Yellow
Carton Red
Inks for Machine Finished Paper
Machine Finished Red
Machine Finished Blue
Glassine and Cellophane Inks

Glassine Violet
Glassine Green
Halftone Black Inks
High Grade Halftone Black
Publication Halftone Black
Process Inks
Process Transparent Yellow
Process Blue
Process Red
7. Planographic Inks
Lithographic Inks
High Grade Lithographic Black
Lithographic Peacock Blue Ink
Lithographic True Blue
Offset Printing Inks
Offset Red for Lake C
Offset Milori Blue
Offset Tin Printing Inks
Tin Printing Reddish Blue
Tin Printing Medium Yellow
Dry Offset Printing Inks
Dry Offset Red for Lake C
Dry Offset Bronze Blue
Photogelatin Inks
Photogelatin Blue
Photogelatin Black
8. Intaglio Printing Inks
Copper Plate Engraving Inks
Copper Plate Black
Copper Plate Blue
Steel Plate Engraving Inks
Steel Plate Black
Toner Blue Ink for Plate Black
Steel Plate Orange
Stamping Inks
Gloss Stamping Red
Dull Stamping Black
Photogravure Inks
Photogravure Picture Black
Photogravure Brown

Rotary Photogravure Inks
Plateless Engraving or Thermographic Inks
Dense Black for Plateless Engraving
True Blue for Plateless Engraving
9. Printing Inks and Colour
Subtractive Theory of Colours
Additive Theory of Colours
Reproduction of Colour By Printing Ink
Classification of Colours
Primary colours
Secondary colours
Tertiary colours
Examples of tertiary colours
Factors effecting visual appearance of ink film
Influence of colours
Cold colours
Warm colours
Terminology Related to Colour
Contrast
Harmony
Hue
Tint
Shade
Tone
Analogous colours
Complementary colours
Density in colour
Transparent and opaque colours
10. Qualities of Offset Inks
Working Qualities
Optical Qualities
Effects After Printing
11. Gravure Printing Inks
Characteristics of Gravure Inks
Vehicles in the Gravure Inks
Considerations for Purchasing Inks
12. Printing Inks for Letterpress
News ink
Inks for platen and cylinder machines
Moisture-set inks

Important Points

Quick-set inks

Cheque inks

Heat-set inks

Important Points

Metallic inks

Method of mixing metallic powder and varnish

Precautions

Aniline inks

Neo-set Inks

13. The Nature of Printing Ink

The Three Main Printing Systems

Typographic Method

Lithographic Method

Intaglio Method

General Properties of Letterpress Inks

The Silk Screen Method

The Principle of Offset Printing

Methods of Ink Drying

Relation between the Printing Process, Ink, And Paper

The Principle of Reproducing Photographs by Printing Methods

The Actinic Tanning of Gelatine

Letterpress Half-tone Plate Reproduction

The Principle of Photogravure

Half-tone Printing Using Dots Letter Press (or Litho)

Photogravure Printing Using Square Cells

Print Recognition

Differences in Litho and Offset-Litho Printing

Differences in Typographic Printing

14. The Colloidal Nature and Rheology of

Printing Inks

Ink Compared to Colloidal Dispersions

Flocculation

Types of Flow

Fluidity

Newtonian Flow

Plasticity

Plastic Flow

Consistency

Thixotropy

Measurement of Thixotropy
Pseudo-plastic Flow
Dilatant Flow
The Empirical Flow Test
Rheological Specifications of An Ink
Flow Requirements of Letterpress Inks
Supply of Ink from the Duct
Behaviour of Ink in the Duct
Distribution of Ink on the Press
Impression
Special Flow Requirements of News Inks
Flow Requirements of Offset Inks
Flow Requirements of Copper-plate Inks
Ink Tack
Nature of Tack
Measurement of Ink Tack
Elasticity and Plastic Flow
Elasticity
Relaxation Time
Fundamental Rheological Properties
15. Inorganic Pigments and Extenders
Nature of Pigments
The Oil Adsorption of Pigments
Opaque White Pigments
Transparent White Pigments And Extenders
Barytes And Blanc Fixe
Alumina Hydrate
Gloss White
Whiting or Chalk, CaCO_3
Mica
Silica, SiO_2
Magnesium Carbonate
The Use of Extenders In Printing Inks
Ultramarine
Bronze Blue, Iron Blue, Or Ferrocyanide Blue
Lead Chromes
Orange Basic Chrome
Chrome Red
Molybdade Orange and Molybdated Scarlet Chrome
Zinc Chrome on Zinc Yellow

Cadmium Pigments

Red Lead, Pb_3O_4

Vermilion, HgS

Brunswick Green And Miliori Green

Zinc Chrome Greens

Guignet's Green, Chrome Oxide Green

Natural Iron Oxide Pigments

Manufactured Iron Oxide Pigments

Uses of Inorganic Pigments in Printing Inks

16. Ink in Relation to Paper

The Nature of Paper

The Fundamentals of Paper Making

Conversion of Raw Materials to 'Half Stuff'

Rag Half Stuff

Esparto Half Stuff

The Treatment of Wood

Sulphite Method For Chemical Wood

Caustic Soda Method For Chemical Wood

Soda Sulphate Method For Chemical Wood

Mechanical Wood Treatment

Beating

Hand-made Paper

Machine-made Paper

Methods of Glazing Paper

Special Finishes

Opacity Improvements

Watermarking

Wove, Laid, and Twin-wire Paper

Storage of Printing Papers

Paper Troubles And Remedies

Fading of Tinted Printings

Fluffing or Dusting

Picking or Plucking

Static Electricity In The Stock

Types of Printing Paper

The Penetration of Ink Into Paper

Measurement of The Penetration of Ink into Paper

The Penetration of Slow-drying Inks Into Paper

Drying by Absorption

The Transfer of Letterpress Inks from Forme to Paper

Complete Contact of Paper Surface with Ink Film
Maximum Ink Acceptance Capacity of the Paper
Excess Ink on the Forme
General Requirements of Printing Paper
Printability of Offset Paper
General Requirements of Printing Ink in Relation to Stock
17 The Typographic Process
Stereotypes
Half-tone Engravings in zinc and Copper
Line Blocks
Printing Machines
The Hand Press
Platen Machines
Vertical Platen Machines
Automatic Platens
Cylinder Machines
The Vertical Miehle
Miehle Two-revolution Cylinder Machine
Letterpress Rotaries
Machine Design And Make-ready in Relation to Ink
Letterpress, Typographic, or Relief Printing Inks
Factors Involved In Formulating the Ink
Making Platen and Cylinder Inks
Rotary News Inks
Type of News Ink Formulation
Ink Spray or Fly.
Berk's Heat-set Black News Ink
Flatbed News Inks
Type of Flatbed News Ink Formulation
Cheap Magazine Inks
Type of Cheap Rotary Magazine Ink
Slow-speed Rotary Magazine Inks
Formulation
Uses
Drying Oil Black Ink
Letterpress Inks Based on Special Varnishes:
Non-reactive Resin in Drying Oil
Non-reactive Resin in Drying-oil Ink
Letterpress Inks Based on Synthetic Resins
Letterpress Ink Formulations

Thinning and Reducing Platen and Cylinder Inks

Double-tone Letterpress Inks

I.C.I. Double-tone Letterpress Inks

Yellow-black Double-tone Ink

Nitrocellulose Inks

Special Letterpress Inks

Letterpress Ink Worries and Cures

Caking

Collecting Dirt

Colour Drift or Colour Variation

Colour Fade

Crystallization

Fast Drying Ink

Ink Flying or Spraying

Ink Retreat From Fountain Roller

Insufficient Gloss

Mottle

Picking or Plucking

Powdering or Chalking

Repeats or Ghost Duplicates

Set-off or Offset

Show-through

Slur

Trapping

Wipe

18. Special Inks

Ball Pen Inks

Bleachable Inks

Fluorescent Inks

Phosphorescent Pigments

Fluorescent Pigments

Pigment Manufacture

Printing

Silk-screen Fluorescent Printing

Power Press Printing

Invisible or Sympathetic Inks

Heat-sensitive Type

Water-sensitive Type

Chemically-sensitive Type

Metallic Inks

Pigments

Stock

Media

Letterpress Metallic Inks

Gravure Metallic Inks

Silk-screen Ceramic Metallic Inks

Printing Metallic Inks

Pigmentation

Summary

Washable Fabric Inks and Textile Marking Inks

Water-colour Inks

Inks for Special Reuirements

Low Odour Inks

Rub-resistant Inks

19. Natural Resins, Modified Natural Resins, and Bituminous Materials

Nature of Resins

Classification of Resins

Congo Copal

Manila Copal

Sierra Leone Copal

Zanzibar Copal

Amber

Damar

Rosin or Colophony

Rosin Oil

Polymerized Rosin

Hydrogenated and Oxidized Rosins

Tall Oil

Shellac

Sandarac

Mastic

Zein

Modified Natural Resins

Ester Gum

Lime-hardened Rosin

Bituminous Materials Nature

Asphalts

Bitumens

Pitches

Firnigrals and Iranolins

Uses in Printing Inks

20. Aniline, Dye-spirit, or Flexographic Inks

Transparent Aniline Inks

Uses And Advantages

Basic Dyes Suitable for Transparent Aniline Inks

Media

Pigmented Flexographic Inks

Synthetic Resins For Spirit Inks

Maleics

Pure Phenolics

Unesterified Rosin Modified Cresol-formaldehyde

Resins

Unesterified Rosin Modified Phenol-formaldehyde Resins

Miscellaneous Phenolics

Ketone-aldehyde Base Synthetic Resins

Spirit Type, Flexographic Ink Formulations

Flexographic Inks Not Based On Alcohol

Aniline Machines

21. Drying Oils,

The Nature of Drying Oils

The Acids Present In Drying Oils

Properties of Semi-drying Oils

Linseed Oil

Production of Raw Linseed Oil

The Refining of Linseed Oil

Bleaching of Refined Linseed Oils

Comparison of the Properties of Acid

Boiled Linseed Oil

Blown Linseed Oil

Heat-bodied Linseed Oil Or Stand Oil

Plant For Making Stand Oils

Catalysts For Bodying Linseed Oil

Improved Stand Oils

The Chemical Changes in the Heat Bodying
of Linseed Oil

Tung Oil

Properties of Tung Oil

Dehydrated Castor Oil (D.C.O.)

Castor Oil

Following The Dehydration

D.C.O. Stand Oils
Blown Dehydrated Castor Oil
Perilla Oil
Oiticica Oil
Stillingia Oil
Soya Bean Oil
Sunflower Oil
Tobaccoseed Oil
The Drying Oil Fatty Acids
Linseed Oil Fatty Acids (L.O.F.A.)
Dehydrated Castor Oil Fatty Acids (D.C.O.F.A.)
Semi-drying Oil Fatty Acids
Further Drying Oils
Improved Drying Oils By Processing
Fundamentally Modified Drying Oils
Vulcanized or Sulphurized Oils
Styrenated Oils
Maleinized Oils
Epoxidation And Hydroxylation Of Drying Oils
The Use Of Drying Oils In Printing Inks
22. Printing Ink Driers or Siccatives
Nature of Ink Driers
General Use of Driers
Paste And Liquid Driers
Theory of the Promotion of Drying
Methods of Preparation of Liquid Driers
Properties of Liquid Driers
Appearance of The Driers
Standard Specifications
The Use of Driers In Printing Inks
23. Ink on Surfaces other than Paper
General Principles
Cellophane Printing
Moisture-proof Viscous Film Printing
Polyethylene or Polythene Film Printing
Printing on Lacquers and Varnished Surfaces
Printing on Rubber
Printing on P.V.C.
Printing on Metal and Metal Foil
Printers' Use For Roller Coating

Roller Coatings

Cold-set Inks

24. Solvents, Diluents, and Plasticizers

General Properties of Solvents

Boiling Range

Flash Point

Evaporation Rate

Solvent Retention

Solvent Balance

Viscosity Changes During Drying

Solvent Power

Undesirable Solvent Properties Instability

Bad Odour

Bad Colour

Impurities

Toxicity

Petroleum Alkanes

Natural Petroleum

Petroleum Ether

S.B.P. Spirit

Petroleum Spirit, Ligroin Or Gasoline

White Spirit (W/S)

Mineral Oils

Coal-tar Hydrocarbons

Benzene C_6H_6

Toluene, $C_6H_5CH_3$, Methyl Benzene

Solvent Naphthas

Light Naphtha

Heavy Naphtha or Aromatic White Spirit (A.W.S.)

Terpene Solvents

Turpentine

Oxidized Turpentine

Dipentene, $C_{10}H_{16}$

Pine Oils

Hydrogenated Naphthalene Solvents

Decalin, $C_{10}H_{18}$

Tetralin $C_{10}H_{12}$

Alcohol Solvents

Ethanol, Ethyl Alcohol, CH_3CH_2OH

Isopropanol

Butanol $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

Methyl Isobutyl Carbinol (M.I.B.C.)

Diacetone Alcohol Or Dical

Benzyl Alcohol $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$

Glycol Solvents

Ethylene Glycol $\text{HO}.\text{CH}_2\text{CH}_2\text{OH}$ (E.g.)

Diethylene Glycol $\text{HO}.\text{CH}_2\text{CH}_2\text{O}.\text{CH}_2\text{CH}_2\text{OH}$. (D.E.G.)

Propylene Glycol $\text{CH}_3.\text{CHOH}.\text{CH}_2\text{OH}$ (P.G.)

Dipropylene Glycol $\text{HO}.\text{(CH}_2\text{)}_3\text{O}.\text{(CH}_2\text{)}_3\text{OH}$ (D.P.G.)

Hexylene Glycol, 2 Methyl, (2, 4) Pentanediol (H.G.)

Ethers

Di-ethyl Ether, $\text{C}_2\text{H}_5.\text{O}.\text{C}_2\text{H}_5$

The Ether Alcohols or Cellosolves

Methyl Cellosolve / $\text{CH}_3.\text{O}.\text{(CH}_2\text{)}_2.\text{OH}$

Cellosolve, Ethylene Glycol Monoethyl Ether

Butyl Cellosolve $\text{CH}_3.\text{(CH}_2\text{)}_3.\text{O}.\text{(CH}_2\text{)}_2.\text{OH}$

The Carbitols

Carbitol

Methyl Carbitol

Ketones

Acetone

Methyl Ethyl Ketone (M.E.K.) $\text{CH}_3.\text{CO}.\text{C}_2\text{H}_5$

Methyl Isobutyl Ketone (M.i.b.k.)

Isophorone, $\text{C}_9\text{H}_{18}\text{O}$

Sextone B, Methyl Cyclohexanone

Acetonyl Acetone, 2,5 Hexanediol

Furfural

Ester Solvents

Butyl Acetate. $\text{C}_4\text{H}_9.\text{COO}.\text{CH}_3$

Butyl Lactate $\text{C}_4\text{H}_9\text{COO}.\text{CHOH}.\text{CH}_3$

Plasticizers

Di-butyl Phthalate (D.B.P.)

Tri-phenyl Phosphate (T.P.P.)

Tri-cresyl Phosphate (T.C.P.)

Triacetin

Ethyl Abietate

Solvents From Petroleum

25. Printing Ink Carbon Blacks

Carbon Black

Manufacture of Impingement Channel Blacks

Furnace Combustion Blacks

Furnace Thermal Decomposition Blacks

Lamp Black

Charcoal Black

Bone Black

Mineral Black

Graphite

Cabot Nigrometer Scale

26. Waxes

Nature of Waxes

Mineral Waxes

Paraffin Wax

Microcrystalline Wax

Petroleum Jelly

Ozokerite

Montan Wax

Vegetable Waxes

Carnauba Wax

Candelilla Wax

Animal Waxes

Beeswax

Wool Wax or Lanolin

Tallow

Synthetic Waxes

Carbowaxes

Condensation Waxes or Glycol Ester Waxes

Acrawax

Chlorinated Naphthalenes

Polyethylene Waxes

Polyamide Waxes

Other Waxes

Uses of Waxes in Printing Inks

27. Selection of Media and Pigments for Printing

Suitability of a Resin for Letterpress and

Planographic Inks

Suitability of a Resin for Gravure Inks

Common Film Defects

Blooming or Blushing

Bubbling

Chalking

Checking
Cissing
Cracking or Flaking
Orange Peel
Pin-holding or Pitting
Wrinkling or Shrivelling
Webbing
Selection of Pigments
Comparison of Bronze, Ultramarine, and Monastral Blues
Nature of the Pigments
Masstone
Reduced Tones
Density and Oil Adsorption
Ease of Grinding
Resistance to Soap, Fats, Solvents, Water and Oils
Stability to Chemicals
Stability to Heat
Stability to Light
Pigmentation Limit
Length and Rheological Properties
Expense
Special Faults
Recommendations
Comparison of Chrome, Hansa, and Benzidine Yellows
Nature of Pigments
Specific Gravity, Opacity, Oil Adsorption and Brilliancy
Grinding and Rheological Properties
Stability to Heat and Light
Stability to Acids and Alkalis
Resistance to Fat, Soap, Wax, Oil, Alcohol, and Water
Special Advantages and Defects
Four-colour Process Pigments
Madder Lake Scale Test
28. Surface-Active Agents, Anti-oxidants, And
Adhesives
Surface-active Agents
Properties
Mode of Action
Evidence of Action
Types of Surface-active Agents

Lecithin

Uses in Printing Inks

Anti-oxidants

Guaiacol

Methyl Ethyl Ketoxime

Adhesives

Gum Arabic

Starch

Dextrin

29. Analysis and Calculation

Detection of Driers in Varnishes

Identification of White Pigments

Examination of Ash for Inorganic Pigments

Ink Analysis

Method

Ink Technology Calculations

30. Principles of Ink Formulation

Colour Matching

Grinding

Consistency

Drying Times

Length of Ink

Printed Appearance

Machine Performance

Fading

Special Requirements

31. The Intaglio Process

Copper Plate Engraving

Mezzotinting

Principles of Photogravure

Preparing the Photogravure Copper Sleeve

Rotogravure Machines

Offset Gravure

Die Stamping

Hand Die-stamping Machines

Counter-sunk Dies

Power Press Die Stamping

Intaglio Inks

Types of Media for Copper-plate Inks

Principles and Characteristics of Steel-plate

Photogravure Inks
Rotary Photogravure (Rotogravure)
Rotogravure Ink Characteristics
Simple Examples of Gravure Inks
Synthetic Resins for Gravure
Gravure Printing on Foil and Plastic Sheeting
Special Gravure Inks
Howard's Gravure Formulations
Die-stamping Inks
Characteristics of Die-stamping Inks
Die-stamping Media
Letterpress Imitation Die-stamping
Gravure Ink Worries and Cures
Hard and Porous Prints
Pearling
Poor Highlights
Poor Neutral Greys
Static Electricity in the Paper
Sticking When Re-reeling the Web
Weak or Patchy Reproduction
32. The Lithographic Process
Branches of Lithographic Reproduction
Senefelder's Lithographic Stone
Modern Lithographic Plates
Photolithography
Bimetallic Plates
Trimetallic Plates
Offset Lithography
Pantone Dry Lithography
Collotype Direct Lithography
Direct Lithographic and Offset Machines
Principle of Offset Rotary Machines
Xerographic Printing
The Lithographic Process
Principle of Lithography
Essential Properties of Lithographic Inks
The Importance of Correct Ink-water Balance
Offset Ink Formulation
Conventional Direct Litho and Offset Inks
Defective Offset Media

Anomalous Lithographic Drying
Dry-offset Inks
Bronze Preparations
Tin Printing Offset Inks
Lithographic Ink Worries and Cures
Drying Too Fast
Embossing the Blanket
Fluffing
Greasing
Image Detail Disappears
Image Thickens
Ink Retreating from Fountain Roller
Piling
Rollers Stripping
Scumming
Spotty Ink Drying
Tinting
Worries Due to Using Etch
33. Directory Section

About NIIR Project Consultancy Services (NPCS)

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and/or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry. NPCS also publishes various technology books, directories, databases, detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists, and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureaus, consultants and consultancy firms as one of the inputs in their research.

NIIR PROJECT CONSULTANCY SERVICES

106-E, Kamla Nagar, New Delhi-110007, India.

Tel: 91-11-23843955, 23845654, 23845886, +918800733955

Mobile: +91-9811043595

Email: npcs.ei@gmail.com, info@entrepreneurindia.co

Website: www.entrepreneurIndia.co