

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 Book on Printing Technology with Process Flow Diagrams, Plant Layouts and Machinery Details (Offset, Gravure, Flexographic, Security, Web Offset and Pad Printing) 3rd Revised Edition**

<b>Code:</b> NI111	<b>Format:</b> paperback
<b>Indian Price:</b> ₹1895	<b>US Price:</b> \$150
<b>Pages:</b> 512	<b>ISBN:</b> 9788194099512
<b>Publisher:</b> Asia Pacific Business Press Inc.	

### **Description**

"The Complete Book on Printing Technology" is a comprehensive guide designed to serve as an invaluable resource for individuals and enterprises interested in the printing industry. This book covers a wide array of printing methods including offset, gravure, flexographic, security, web offset, and pad printing. Each chapter is meticulously crafted to provide readers with detailed insights into the processes, machinery, and technological advancements in the field of printing.

### **Overview of the Book**

This book provides a historical overview of the printing industry, tracing its evolution from traditional techniques to modern digital methods. It covers the inception of movable type, lithography and various printing forms like Offset, Gravure and Screen Printing, setting the stage for deeper exploration into each method.

The book also covers modern methods like 3D and Digital Printing, highlighting their applications across various industries. It also explores UV Printing and its components, providing a futuristic outlook on printing technologies.

The global commercial printing market size was valued at USD 494.53 billion and is anticipated to grow at compound annual growth rate (CAGR) of 3.0%. The increasing need of businesses and enterprises for advertising materials such as brochures and pamphlets is driving the demand for commercial printing services. Advertising is one

of the excellent marketing tools. Increasing technological proliferation, such as faster presses and new color & toner technology, allows better production capabilities and superior quality. Additionally, technical development of printing techniques proves to provide cost-effectiveness and efficiency for bulk printing. The cost-effectiveness can prevent the restraining impacts of digital media on printing services to a certain extent.

This book serves as an invaluable resource for entrepreneurs, startups, business owners, and technical personnel in the printing industry. It offers a blend of historical context, technical detail, and practical guidance, making it a comprehensive manual for both novices and experienced professionals in the field. Additionally, the detailed process flow diagrams, plant layouts, and contact details for machinery suppliers make it a practical guide for setting up or upgrading printing facilities.

"The Complete Book on Printing Technology" is an essential read for anyone involved in or entering the printing industry, providing the knowledge and tools needed to navigate the complexities of various printing methods and their applications in today's market.

## **Content**

1. Introduction 1.1 History of Printing 1.1.1 Invention of Movable Type 1.1.2 Lithography 1.1.3 Offset Printing 1.1.4 Intaglio 1.1.5 Gravure 1.1.6 Flexography 1.1.7 Screen Printing 1.1.8 Digital Printing 1.1.9 Hybrid Printing 1.2 Uses and Applications of Printing 1.3 Types of Printing 1.3.1 Offset Lithography 1.3.2 Digital Printing 1.3.3 Flexography 1.3.4 Gravure Printing 1.3.5 Screen Printing 1.3.6 Letterpress Printing 1.3.7 Thermal Printing 1.3.8 3D Printing 1.4 Structure of the Printing Industry 1.4.1 Pre-Media 1.4.2 Prepress 1.4.3 Press (Printing) 1.4.4 Postpress/Finishing 2. How to Start Printing Business 3. Plant Layout Description of Printing Business 4. Gravure Printing 4.1 History of Gravure Printing 4.2 Principles of Gravure Printing Process 4.2.1 Intaglio/Gravure Method 4.3 Advantages of Gravure 4.4 Limitations of Gravure 4.5 Characteristics 4.6 Main Sections of Gravure Printing Machine 4.6.1 Unwind Section 4.6.2 Printing Section 4.6.3 Drying Section 4.6.4 Rewind Section 4.7 Gravure Image Carrier Preparation 4.7.1 Hand Engraving and Printing 4.7.2 Gravure Image Carriers 4.7.3 Manufacturer of Gravure Cylinders 4.7.4 Gravure Cylinder Imaging 4.7.5 Gravure Engraving 4.8 Gravure Cylinder Preparation Methods 4.8.1 Preparing of Gravure Cylinder by Conventional Method or Carbon Tissue Method 4.8.2 Electronic/Electromechanical Engraving of Gravure Cylinders 4.8.3 Laser Engraving/Laser Cutting Process 4.9 Structure of Gravure Cylinder 4.9.1 Gravure Cylinder 4.9.2 Gravure Cylinder Components 4.9.3 Copper Plating and Polishing 4.9.4 Reusing the Cylinders 4.9.5 Ballard Shell Cylinders 4.10 Gravure Drying System 4.10.1

Gravure Drying Chamber 4.10.2 Gravure Solvent Recovery System 4.10.3 Higher LELs due to Solvent Recovery 4.10.4 Other Environmental-Friendly Solvent Removal/Reduction Systems Incineration (Thermal Oxidation) 4.11 Doctor Blade - Structure, Types, Mechanism 4.11.1 Doctor Blade 4.11.2 Structure and Mechanism of Gravure Doctor Blade 4.11.3 Types of Doctor Blade 4.12 Impression Roller - Structure, Types, Mechanisms 4.12.1 Structure and Mechanism of Gravure Impression Roller 4.12.2 Types of Gravure Impression Roller 4.13 Gravure Presses 4.13.1 Press Configurations for Packaging 4.13.2 Gravure Label Presses 4.13.3 Gravure Publication Presses 4.14 Solvent Based Inks, Water Based Inks, Uv and Eb Inks 4.14.1 Gravure Solvent Based Inks 4.14.2 Gravure Water-Based Inks 4.14.3 Gravure Uv Curing Inks 4.14.4 Eb-Curing Inks and Coatings 5. Screen Printing 5.1 History of Screen-Printing 5.2 Principles of Screen Printing Process 5.3 Procedure for Screen Printing 5.4 The Screen Printing Process Offers Several Advantages 5.5 Applications of Screen Printing 5.5.1 Screen Printing on Flat Surfaces 5.5.2 Screen Printing on Curved Surfaces 5.6 Main Sections of a Flatbed Screen Printing Machine 5.6.1 Frame 5.6.2 Base 5.6.3 Screen Fabric 5.6.4 Squeegee 5.7 Image Carriers Used for Screen Printing 5.7.1 Negative and Constructive Creation 5.7.2 Making a Screen Frame 5.8 Various Methods of Preparing Image Carriers for Screen Printing 5.8.1 Preparing the Screen by Knife-Cut Stencil Method 5.9 Photographic Methods of Making Screen Image Carriers 5.9.1 Preparing the Screen by Gelatine Process ("Direct" Method) 5.9.2 Screen Making By Photo Sensitive Films (5-Star Film) Method (Indirect or Transfer Method) 5.9.3 Chromaline Film Method of Screen Making (Direct/Indirect Method) 5.10 Mesh Selection 5.10.1 Mesh (Woven Screen Printing Fabric) 5.10.2 Materials Used for Screen Printing Fabrics 5.11 The Squeegee 5.12 Squeegee Selection 5.12.1 Shapes of Squeegee Blades 5.12.2 Squeegee Hardness 5.12.3 Squeegee Materials 5.13 Screen Pretreatment 5.14 Screen Stretching/Tensioning 5.14.1 Basic Steps in Screen Stretching/Tensioning 5.15 Stretching the Screen Printing Fabric 5.15.1 Manual Stretching 5.15.2 Machine Stretching 5.16 Types of Screen Printing Machines 5.16.1 Container Printing Machines 5.16.2 The Flatbed Hinged Frame Press 5.16.3 Automatic Flatbed Hinged Frame Screen Presses 5.16.4 The Rotary Screen Press 5.16.5 Carousel Machines 5.17 Screen Printing Inks 5.17.1 Components of Inks and Ink Systems 5.18 Screen Printing Ink Types 5.18.1 Decalcomanias Inks 5.18.2 Circuit Board Inks 5.18.3 Inks for Posters 5.18.4 Metallic Enamel Inks 5.18.5 Paints for Polymers 5.18.6 Glass Inks 5.18.7 Textiles and Garments: Platisols and Emulsions 5.19 Control of Screen Printing Ink Quality 5.19.1 Appropriate Quality Control Tests for Screen Printing Inks 5.20 Typical Screen Printing Equipment 5.20.1 Printer and Films 5.20.2 Mesh Screen 5.20.3 The Inks 5.20.4 Squeegees 5.20.5 Printing Press 5.20.6 Belt Dryer 5.21 Silk Screen Printing Process 5.21.1 Design Drafting 5.21.2 Choose and Prepare the Mesh Screen 5.21.3 Expose the Emulsion Paint to Light Source 5.21.4 Prepare the Stencil 5.21.5 Prepare for Screen Printing 5.21.6 Print the Design 5.21.7 Heat-Cure and Finish the Print 5.22 Types of

Screen Printing Process 5.22.1 Grayscale Printing 5.22.2 Spot-Color Printing 5.22.3 CMYK (4-Color Printing) 5.22.4 Duotone Printing 5.22.5 Half-Tone Printing 5.22.6 Simulated Process Printing 6. Flexographic Printing 6.1 History 6.2 Benefits and Drawbacks of Flexographic Printing 6.2.1 Benefits of Printing in Flexographic Form 6.2.2 The Drawbacks of Printing Flexographically 6.3 Various Substrates That Flexography Can Print On 6.3.1 Plastic Film 6.3.2 Foil 6.3.3 Corrugated Board 6.4 A Vast Variety of Inks for Flexography Use 6.4.1 Water-Based 6.4.2 Solvent-Based 6.4.3 Energy-Curable (UV & EB-Based) 6.5 Mainstream Types of Flexographic Printing Press 6.5.1 Stack Press 6.5.2 Central Impression (CI) Press 6.5.3 In-Line Press 6.5.4 Wide-Web Press (Substrates of 21-80 Inches) 6.5.5 Narrow-Web Press (Substrates' Length d" 20 Inches) 6.6 The Fundamentals of Flexography the Process of Printing 6.6.1 Flexographic Printing Process 6.6.2 Main Sections of Flexography Printing Machines (Presses) 6.7 All Flexographic Presses are made up of Four Basic Sections Typically Mounted in Succession Between Sturdy side Frames 6.7.1 Unwind Section 6.7.2 Printing Section 6.7.3 Drying Section 6.7.4 Rewind Section 6.8 Flexographic Image Carrier Preparation 6.8.1 Flexographic Plate 6.8.2 Structure of Flexographic Plate 6.9 Plate Preparation Methods 6.9.1 Rubber Plates Preparation 6.9.2 Photopolymer Flexographic Plates 6.9.3 Laser Engraving 6.10 Types of Flexo Inking Systems 6.10.1 Two-Roll Ink Metering System 6.10.2 Modified Two-Roll with a Doctor Blade Ink Metering System 6.10.3 Reverse Angle Doctor Blade Ink Metering System 6.10.4 Chambered Doctor Blade Ink Metering System 6.11 Types of Anilox Cells and Cleaning Systems 6.11.1 The Anilox Roll 6.11.2 Anilox Roll Specifications 6.12 Types of Anilox Roll Based on Cell Shapes 6.12.1 Inverted Pyramid 6.12.2 Quadrangular Cell 6.12.3 Trihelical Cell 6.13 Types of Anilox Rolls Based on Roller Surfaces 6.13.1 Laser-Engraved Ceramic Anilox Rolls 6.13.2 Conventional (Or) Mechanically Engraved Chrome Anilox Rolls 6.14 Types of Anilox Roll Cleaning Systems 6.14.1 Roll Cleaning System 6.14.2 Jet Wash Type System 6.14.3 Powder Blasting System 6.14.4 Polymer Bead Blasting System 6.14.5 Dry Ice System 6.14.6 Laser Cleaning System 6.14.7 Ultrasonics 6.14.8 Alpha Sound 6.15 Types of Flexo Plate Cylinders 7. 3D Printing 7.1 Types of 3D Printing 7.1.1 Binder Jetting 7.1.2 Direct Energy Deposition 7.1.3 Material Extrusion 7.1.4 Material Jetting 7.1.5 Powder Bed Fusion 7.1.6 Sheet Lamination 7.1.7 VAT Photopolymerization 7.2 Different Types of 3D Printing Technologies and Their Applications 7.3 An STL File: What is it? 7.4 3D Printing Process 7.4.1 3D Modelling 7.4.2 Saving the 3D Model 7.4.3 Preparing the 3D Model for Printing 7.4.4 Checking and Saving the Print File 7.4.5 3D Printing 7.4.6 Post-Processing 7.5 How 3D Printing Works? 7.6 Key Industries Leveraging 3D Printing 7.6.1 Applications in Medicine and Dentistry 7.6.2 Defense and Aerospace 7.6.3 The Automobile Industry 7.6.4 Personal and Consumer Products 7.6.5 Aeronautics and Space Travel 7.6.6 Customized Apparel and Style 7.6.7 Culinary Arts and Food 8. Digital Printing 8.1 Types of Digital Printing 8.2 Digital Print Media and Products 8.3 Benefits of Digital Printing 8.4 Digital Printing

Process 8.5 Which Type of Machinery is used in Digital Printing? 8.5.1 Prepress Stage Machinery 8.5.2 Essential Machinery for the Printing Stage 8.6 The Role of Pile Turners in Digital Printing 8.7 Digital Printing in Packaging and Labels 8.7.1 Label Presses and Corrugated Packaging Printers 8.7.2 Colour Label Presses 8.7.3 Corrugated Printers 9. Ultra Violet (UV) Printing 9.1 Benefits of UV Printing 9.2 History of UV Printing Process 9.3 Which Materials are Suitable for UV Printing? 9.4 Which Parts Make up a UV Printing Machine's Core? 9.4.1 Printheads 9.4.2 PCB (Printed Circuit Board) 9.4.3 Curing Light 9.4.4 Machine Body 9.4.5 Guide Rail 9.4.6 The Process of Printing in Ultra-Violet (UV) 9.4.7 LED UV Printing 9.5 The UV Printing Process 10. Offset Printing Technology 10.1 The Offset Lithographic Process's Past 10.2 Lithography and Offset Printing Fundamentals 10.3 The Offset Printing Principle 10.4 Configuration and Structure of Sheetfed Offset Press 10.4.1 Single Color Offset Press 10.4.2 Multi-Color Sheet-Fed Presses 10.4.3 Convertible Press 10.5 Types of Sheetfed Offset Press 10.5.1 Inline Press 10.5.2 Stack Type Press 10.5.3 Blanket to Blanket Press 10.5.4 Common Impression Cylinder Presses 10.6 Sheet Control and Delivery in Offset Press 10.7 Types of Automatic Feeder 10.7.1 Single Sheet Feeder or Successive Sheet Feeder 10.7.2 Stream Feeder 10.8 Feeder Head Components 10.9 Sheet Registering Devices 10.10 Early Sheet Detectors (or) Electromechanical Type Sheet Detectors 10.11 Sheet Insertion Devices 10.12 Delivery Section 10.13 Offset Press Printing Unit 10.13.1 Establishing a Sheetfed Printing Press 10.14 Types of Blankets 10.14.1 Conventional Blanket (or) Non-Compressible Blankets 10.14.2 Compressible Blankets 10.15 Construction of Inking System 10.15.1 Roller Setting 10.15.2 Roller the Distance Between the Plate and the form Roller 10.15.3 Setting Form Roller to Oscillator 10.16 Ink System Issues 10.17 Dampening System 10.17.1 Construction of Dampening System 10.17.2 Composition of Dampening Solution 10.17.3 Dampening Solution pH 10.17.4 Conductivity of the Dampening Solution 10.17.5 Dampening System Roller Setting 10.17.6 Conventional Dampening System 10.17.7 Continuous Dampening System 10.17.8 Dahlgren Dampening System 11. Textile Printing 11.1 Textile Printing's Historical Background 11.2 Printing Method 11.2.1 Block Printing 11.2.2 Screen Printing 11.2.3 Engaved Roller Printing 11.2.4 Transfer Printing 11.2.5 Stencilling 11.2.6 Digital Printing 11.2.7 Rotary Screen Printing 11.2.8 Direct Printing 11.2.9 Discharge Printing 11.2.10 Resist Printing 11.2.11 Ink-Jet Printing 11.2.12 Heat-Transfer Printing 11.3 Early Textile Printing Methods 11.4 Comparison Between Dyeing and Printing 11.5 Enter Digital Direct Reactive Textile Printing 11.6 Wet Printing Techniques 11.6.1 Preparation of the Print Paste 11.6.2 Printing the Fabric 11.6.3 Drying the Printed Fabric 11.6.4 Fixation of the Printed Dye or Pigment 11.6.5 Afterwashing 11.7 Printing Methods 11.7.1 Flat-Bed Screen Printing 11.7.2 Rotary Screen Printing 11.7.3 Screen Engraving 11.7.4 Laser Engraving 11.7.5 Engraved Roller Printing 11.7.6 Heat Transfer Printing 11.7.7 Digital Ink-Jet Printing 12. CTP (Computer to Plate) 12.1 What is a CTP Machine? 12.2 Technology 12.3 Computer-to-

Plate Advantage 12.4 Computer to Plate versus Computer to Film 12.5 CTP Method  
12.5.1 Internal Drum Imagesetters 12.5.2 External Drum Imagesetters 12.5.3 Flat-Bed  
Imagesetters 12.6 Types of CTP-Plates (Computer-to-Plate) 12.6.1 Photopolymer Plates  
12.6.2 Silverhalogen Plates 12.6.3 Thermal Plates 12.7 Advantages of CTP vs. CTF 12.8  
Disadvantages of CTP vs. CTF 12.9 CTP Process 12.9.1 Digital File Preparation 12.9.2  
Computer-to-Plate Imaging 12.9.3 Plate Development 12.9.4 Mounting on the Printing  
Press 12.9.5 Printing 12.10 What Types Of CTP Plates 12.10.1 Silver Salt Diffusion  
Transfer Type 12.10.2 The Polymer Compound Type 12.10.3 Silver Salt Emulsion and  
Polymer Compound Composite Type 12.10.4 Spray Mask Type 12.10.5 Thermal Type  
12.11 The Definition of Thermal CTP Technology 12.11.1 Classification of Thermal CTP  
technology 13. Pad Printing 13.1 Description of Parts 13.2 The History of Pad Printing  
13.3 Pros and Cons of Pad Printing 13.4 Limitations of Pad Printing 13.5 How to Pad  
Print? 13.6 Basic Components of Pad Printers 13.6.1 Pad Printer 13.6.2 Pad Print Ink  
Cup 13.6.3 Pad Print Ink 13.6.4 Printing Pad 13.6.5 Pad Printing Plate 13.7 Pad Printing  
Vs. Screen Printing: What're The Differences? 13.8 Which Industry Applications Print  
With Pad Printing? 13.9 Factors to Consider During Pad Printing 14. Web Offset Printing  
14.1 Design of Web Machines 14.2 Reel Stand Unit 14.3 Web Control Unit 14.4 Printing  
Units 14.5 Main Parts of Printing Unit 14.6 Delivery Operations 14.7 Ancillary  
Operations by Delivery Unit 14.8 Colour and Its Reproduction 14.9 Classification of  
Colours 14.9.1 Primary Colours 14.9.2 Secondary Colours 14.9.3 Tertiary Colours  
14.9.4 Influence of Colours 14.10 Terminology Related to Colour 14.11 Quality Control  
in Printing 14.12 During Printing 14.13 After Printing 15. Security Printing 15.1 Credit  
Cards 15.2 Caliper and Dimensions 15.3 Hologram 15.4 Hologram Types 15.5 Uses  
15.6 Numbering with Micr Ink on Rotary Presses 15.6.1 Ink Agitation 15.6.2 Heat  
Fountains 15.6.3 Distribution of Ink 15.6.4 Form Rollers and Impression Cylinders  
15.6.5 Cam Setting 15.6.6 Setting form Rollers 15.6.7 Impression Cylinders 15.6.8  
Setting Impression 15.6.9 Speeds 15.7 Methods in Security Printing 15.7.1 Substrates  
in Security Printing 15.7.2 Security Inks 15.7.3 RFID Hidden Security Features 15.7.4  
RFID Tag Categories 15.7.5 RFID Tag Shapes and Sizes 15.7.6 Printing 15.8  
Prospective Developments in Rfid Tags and Security Printing 16. High Security Printing  
for Banknote 16.1 Specialized Substrates 16.2 Intaglio Printing 16.3 Watermarks 16.4  
Security Inks 16.5 Holograms and Kinegrams 16.6 Microprinting 16.7 See-through  
Registers 16.8 Serial Numbers 16.9 UV Features 16.10 Digital Authentication 17.  
Security Printing for Tax Labels, and Other Securities 17.1 Specialized Inks and Dyes  
17.2 Substrate Security 17.3 Intaglio Printing 17.4 Microprinting 17.5 Holograms and  
Foins 17.6 Guilloche Patterns 17.7 Serial Numbers and Barcodes 17.8 Digital  
Authentication 17.9 Implementation Considerations 18. BIS Standards 19. Plant  
Layout, Process Flow Chart & Diagram 20. Photographs of Plant and Machinery with  
Suppliers Contact Details • Rotary Screen Printing Machine • Flexographic Roll to Roll  
Printing Machine • High Speed Flexo Printing Machine • 3 Color Satellite Unit

RottaSpeed Web Offset Machine • Offset Printing Machine • Pad Printing Machine • Automatic Heat Press • Black and White Digital Print Production System • Flexographic Printing Machine • Fully Automatic Printing Head • Single Colour Electro Pneumatic Pad Printing Machine • Manual Pad Printing Machines • Label Printing Press • Offset Machines • Automatic Heat Transfer Machine • Semi-Automatic Screen Printing Machine • Flatbed Screen Printing Machine • Multi Cage Screen Stretching Machine • Digital LED UV Flatbed Printing Machine • Mini Offset Printing Machine • Rotogravure Printing Machine • CTP Offset Printing Computer to Plate Machine • Four Color Offset Machine • 5 Color B1 Offset Lithographic Printing Machine with Spot Coating

## **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](mailto:npcs.ei@gmail.com), [info@entrepreneurindia.co](mailto:info@entrepreneurindia.co)

Website: [www.entrepreneurIndia.co](http://www.entrepreneurIndia.co)