Printing is a process for reproducing text and image, 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. Modern technology is radically changing the way publications are printed, inventoried and distributed. Printing technology market is growing, due to technological proliferation along with increasing applications of commercial printing across end users.

In India, the market for printing technology is at its nascent stage; however offers huge growth opportunities in the coming years. The major factors boosting the growth of offset printing press market are the growth of packaging industry across the globe, increasing demand in graphic applications, the wide range of application in various industry, and industrialization. 3D printing market is estimated to garner $8.6 billion in coming years. The global digital printing packaging market is expected to exceed more than US$ 40.02 billion by 2026 at a CAGR of 13.9%. Computer-to-plate systems are increasingly being combined with all digital prepress and printing processes.

This book is dedicated to the Printing Industry. In this book, the details of printing methods and applications are given. The book throws light on the materials required for the same and the various processes involved. This popular book has been organized to provide readers with a firmer grasp of how printing technologies are revolutionizing the industry.

The major content of the book are principles of contact (impression), principles of noncontact printing, coated grades and commercial printing, tests for gravure printing, tests for letterpress printing, tests for offset printing, screen printing, application of screen printing, offset lithography, planography, materials, tools and equipments, sheetfed offset machines, web offset machines, colour and its reproduction, quality control in printing, flexography, rotogravure, creative frees printer, shaftless spearheads expansion, digital printing, 3D printing, 3D printing machinery, book binding, computer-to-plate (ctp) and photographs of machinery with suppliers contact details.

A total guide to manufacturing and entrepreneurial success in one of today's most printing industry. This book is one-stop guide to one of the fastest growing sectors of the printing industry, where opportunities abound for manufacturers, retailers, and entrepreneurs. This is the only complete handbook on the commercial production of printing products. It serves up a feast of how-to information, from concept to purchasing equipment.
1. INTRODUCTION
   History
   Four Major Printing Processes
   Relief Printing Process
   The Process
   Letter Press Printing Process
   Plano Graphic
   Offset
   The Advantages of Offset Printing Include
   Screen Printing Process
   Other Printing Methods
   Digital Printing
   Paper for Printing

2. MODERN PRINTING TECHNIQUES
   Printing (Press Operation)
   Colour Printing
   How a Printing Press Works
   The Latest Technologies in Printing Industry
   Digital Inkjet Printing
   3D Printing Rise
   Software Innovations
   Hybrid Print Technologies
   Efficient Technology
   Special Printing Technologies
   Basic Principles of Hybrid Printing System
   Hybrid Printing System Concepts of Combining Conventional Printing Technologies
   Hybrid Printing Systems Combining NIP Technologies
   Hybrid Printing Systems Combining Conventional and NIP Technologies
   Hybrid Printing Systems Combining Computer to Press/Direct Imaging with NIP Technologies
   Hybrid Printing Systems Combining Conventional Printing Technologies with Computer to Press
   Technologies
   Basic Principles of Waterless Offset Printing
   Advantages/Merits of Waterless Printing
   Qualitative Advantages
   Production Advantages
   Ecological Advantages
   Basic Principle of Digital Printing
   Flow Chart of Digital Composition of a Printed Page
   Direct Imaging (with master)
   Computer to Print (without master)
   Scope and Job suitability of Digital Printing Process
   Digital Printing has a very bright future because
   Digital Printing is Suitable for
   Basic Principle of Direct Imaging
   Once Imagebale Master (Plate Imaging)
   Re-imagebale Master (Surface Imaging)

3. PRINCIPLES OF CONTACT (IMPRESSION)
   PRINTING PROCESSES
   Introduction
   Printing Methods
The Printing System
Preparatory Sections
Halftone Photography
Platemaking
Printing
Binding and Finishing
Inks for Letterpress and Lithography
Speciality Printing

4. PRINCIPLES OF NONCONTACT PRINTING
   Introduction
   Impactless printing system for variable printing
   Summary

5. COATED GRADES AND COMMERCIAL PRINTING
   Coated and Commercial Papers
   Coating Methods
   Coating Materials
   Adhesives
   Coated Paper Properties and Use

6. TESTS FOR GRAVURE PRINTING
   Introduction
   Print Smoothness
   Gravure Print Testing

7. TESTS FOR OFFSET PRINTING
   Introduction
   Runnability
   Surface Strength
   Water Resistance
   Mechanical Properties
   Web Runnability

8. SCREEN PRINTING
   Select Correct Screen Printing Fabric
   An Antistatic Stencil Mesh
   Screen Printing Frames
   Stretching Equipment
   Correct Stretching
   Adhesives
   The Manufacture of Diapositives
   Stencils
   The Diapositive

9. APPLICATION OF SCREEN PRINTING
   Screen Printing Accessories
   Stencils
   Chemicals Used and Formulations
   Common Faults in Screen Printing
   Printing Unit
   Automatic Screen Printing Machine
   Screen Printing on Different Surfaces
   Inks for Screen Printing

10. OFFSET LITHOGRAPHY
    Printing Processes
    Origin and History of Lithography
    Job Planning
    Evolution of Offset Printing

NIIR Project Consultancy Services (NPCS) 3/9
Offset Machine Construction
Pre-Make Ready and Make Ready
Setting the Machine for Operation
Small Offset
Running Problems
Colour
Rollers

11. PLANOGRAPHY
Origin of Planography
Principle of Planographic Printing
Direct Printing Process
Offset Printing Process
Working Process

12. MATERIALS, TOOLS AND EQUIPMENTS
Lithographic varnish
Acids
Turpentine
French Chalk
Resin
Asphaltum
Paraffin
Driers
Sponge
Dampening Cloth
Vaseline
Tools and Equipments
Scraper
Ink Knife
Wrench
Proofing Devices
Mechanical Features
Automatic Proof Presses
Qualities of a Good Proof

13. SHEETFED OFFSET PRINTING
Names of the machines
Mechanical Features
Lubrication
Sheet feeding mechanism
Sheet board
Functions of blowers
Functions of the blower foot
Sheet lifting and forwarding
Sheet Controls
Sheet Register
Sheet Insertion and Transfer
Inking System
Distribution System
Multiroll System
Wash-up device
Adjustment of Rollers
Different Dampening Systems
Cleaning of Dampeners
Construction of the machine
Working on the cleaning machine
Plate Cylinder
Blanket Cylinder
Impression Cylinder
Adjustment of Cylinders
Advantages of Both Principles
Delivery Mechanism
Anti-setoff Spray
Miscellaneous Operations

14. WEB OFFSET PRINTING
Driving Mechanism
Printing Units
Main Parts of Printing Unit
Inking System
Delivery Unit
Folding Unit
Ancillary Operations by Delivery Unit

15. COLOUR AND ITS REPRODUCTION
Terminology Related to Colour
Mixing and Matching of Colors
Sequence of Colours in Printing

16. QUALITY CONTROL IN PRINTING
Before Printing
During Printing
After Printing

17. FLEXOGRAPHY
Flexography
Flexographic Platemaking
Photochemical Change
Rotary Principle
Rubber Plates
Substrates
Paper and Board

18. ROTOGRAVURE

19. DIGITAL PRINTING
Introduction
Important Things We Should Know About Digital Printing
Types of Digital Printing
1. Inkjet Printer
2. Laser Printer
Important Features of Laser Printer
Advantages of Digital Printing
Benefits of Digital Printing Design & Printing
1. Cheaper Printing
2. High quality

Difference between Screen Printing and Digital Printing
Screen Printing
Digital Printing
Comparison between Digital Printing and Press Printing
Digital Printing
Press Printing

20. 3D PRINTING
Introduction
History of 3D Printing
How Does 3D Printing Work?
Technology
3D Printing Applications
1. Medical and Dental
2. Aerospace
Complex Designs
Weight Reduction
Improved Strength and Durability
Major Savings
3. Automotive
4. Jewellery
5. Art/Design/Sculpture
6. Architecture
7. Fashion
8. Food
Benefits of 3D Printing
Advantages of 3D Printing in Manufacturing
1. 3-D Printers are Becoming More Affordable
2. Quicker Turnaround Times for Prototyping
3. Quicker Product Launches
4. Competitive Advantage
5. Reduction in Manufacturing Errors
6. Complex Geometries
7. Mass Customization
8. Less Tooling
9. Fewer Costs
10. Environmentally Friendly
Benefits of 3D Printing in Healthcare
What Materials do 3D Printers Use?
1. Plastics
   (a) Nylon (Polyamide)
   Features
   (b) PLA Filament
   Features
   (c) ABS Filament
   Features
   (d) PVA Filament
2. Powders
3. Resins
   Features
4. Other Materials
How do the Different 3D Printing Technologies Work?
1. Fused Deposition Modeling (FDM)
How does FDM Work?
Materials for FDM
ABS (Acrylonitrile Butadiene Styrene)
ABSi (Acrylonitrile Butadiene Styrene – Biocompatible)
ABS-M30 (Acrylonitrile Butadiene Styrene)
ABS-M30i (Acrylonitrile Butadiene Styrene – Biocompatible)
PC (Polycarbonate)
ABS-ESD7 (Acrylonitrile Butadiene Styrene – Static-Dissipative)
PC-ABS (Polycarbonate ABS)
PC-ISO (Polycarbonate ISO)
Ultem 9085
2. Stereolithography and Digital Light Processing (SLA & DLP)
3. Selective Laser Sintering (SLS)
4. Material Jetting (PolyJet and MultiJet Modeling)
5. Binder Jetting
6. Metal Printing (Selective Laser Melting and Electron Beam Melting)

Electron Beam Melting
Characteristics
Selective Laser Melting Applications
7. PolyJet Photopolymer
Benefits of Polyjet
Realistic Finish
Greater Choices
Multiple Materials and Colors
Polyjet Materials
1. Digital Materials
2. Digital ABS
3. High Temperature
Wide Range of Applications
4. Transparent
3D Print Clear and Tinted Prototypes
3D Printing With Transparent Material
3D Print Translucent Shades and Patterns
Wide Range of Applications
5. Rigid Opaque
6. Polypropylene-like
3D Print Tough, Flexible Models
7. Bio-compatible
3D Print Medical Devices
3D Printing With Bio-compatible Material
8. Rubber-like
3D Print Flexible, Soft-touch Models
3D Printing With Rubber-like Material
8. Syringe Extrusion
9. Other Methods
3D Printing is a Game Changer
21. 3D PRINTING MACHINERY
   Airwolf AW3D HD
   SLA 3D Printing Machine
   3D Printing Machine
   Makerbot Replicator
   Dual Head 3D Printer
   Prototyping Machine
   Flashforge Finder
   3D Systems Cube
   3D Jet
   Formlabs
22. BOOK BINDING
   Terms and Techniques
   Cutting & Folding
   Folded Sheet or Section Binding
Book Binding Methods
Perfect Binding
Hardcover/Case Binding
Saddle Staple (Fold, Staple, Trim) Binding
Wiro Binding
Automatic Book Binding Machine
Programmable Logic Controllers (PLC)
Perfect Book Binding Machine
Disc Perfect Binding Machine
Perfect Binding Line
Thread Book Sewing Machine Semi Automatic

23. COMPUTER-TO-PLATE (CTP)
CTP Technologies
Regulatory Requirements
Plate Development
Visible Laser Plates Using Silver Halide
Thermal Laser Plates Using Ablation
Plate Making Process Steps
Temperature Control for Computer to Plate Technology
Process
Platesetter Cooling
Plate Processor Cooling
CTP Technology in Offset Printing
Digital Plate Setter UV CTP Machine

24. PROCESS FLOW DIAGRAMS & LAYOUTS

25. PHOTOGRAPHS OF MACHINERY WITH SUPPLIER’S CONTACT DETAILS
Single Color Offset Printing Machine
Two Color Satellite Offset Printing Machine
Offset Printing with Numbering and Perforating Machine
Web Offset Printing Machine
Color Screen Printer
Flatbed Screen Printer
Automatic Sheetfed Offset Printing Machine
Sheetfed Offset Machine
Mini Offset Printing Machine
Flexographic Printing Machine
Label Master Flexographic Printing Press
Poly Offset Printing Machines
Prepress Equipments
Flip Top Printing Down Frame Single/Double Sided Machine
Instant Start Metal Halide Plate Exposure
Plate Coating Whirler
Plate Curing Equipment
Damper Roller Washer
Vertical Process Camera
3M Plate Processor
Computer-to-Screen Exposure System
IGP Plate Processor
Screen CTP System
Inkjet CTP System (Computer to Plate Machine)
Rotogravure Printing Machine
4 Hi Tower (Automatic)
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.


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.

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