

# Handbook on Printing Technology (Offset, Flexo, Gravure, Screen, Digital, 3D Printing with Book Binding and CTP)5TH Edition

**Author:** NIIR Board of Consultants & Engineers

**Format:** Paperback

**ISBN:** 9788194099505

**Code:** NI73

**Pages:** 616

**Price:** Rs. 1,875.00 US\$ 45.00

**Publisher:** Asia Pacific Business Press Inc.

Usually ships within **5** days

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.

# Contents

## Contents

1. INTRODUCTION	1
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	15
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 Imageable Master (Plate Imaging)	
Re-imageable Master (Surface Imaging)	
3. PRINCIPLES OF CONTACT (IMPRESSION)	
PRINTING PROCESSES	33
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 82  
Introduction  
Impactless printing system for variable printing  
Summary  
5. COATED GRADES AND COMMERCIAL PRINTING 105  
Coated and Commercial Papers  
Coating Methods  
Coating Materials  
Adhesives  
Coated Paper Properties and Use  
6. TESTS FOR GRAVURE PRINTING 117  
Introduction  
Print Smoothness  
Gravure Print Testing  
7. TESTS FOR OFFSET PRINTING 123  
Introduction  
Runnability  
Surface Strength  
Water Resistance  
Mechanical Properties  
Web Runnability  
8. SCREEN PRINTING 130  
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 177  
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 218  
Printing Processes  
Origin and History of Lithography  
Job Planning

Evolution of Offset Printing  
Offset Machine Construction  
Pre-Make Ready and Make Ready  
Setting the Machine for Operation  
Small Offset  
Running Problems  
Colour  
Rollers  
11. PLANOGRAPHY 257  
Origin of Planography  
Principle of Planographic Printing  
Direct Printing Process  
Offset Printing Process  
Working Process  
12. MATERIALS, TOOLS AND EQUIPMENTS 266  
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 402  
Qualities of a Good Proof  
13. SHEETFED OFFSET PRINTING 282  
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 358  
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 391  
Terminology Related to Colour  
Mixing and Matching of Colors  
Sequence of Colours in Printing  
16. QUALITY CONTROL IN PRINTING 398  
Before Printing  
During Printing  
After Printing  
17. FLEXOGRAPHY 407  
Flexography  
Flexographic Platemaking  
Photochemical Change  
Rotary Principle  
Rubber Plates  
Substrates  
Paper and Board  
18. ROTOGRAVURE 413  
19. DIGITAL PRINTING 421  
Introduction  
Digital Printing  
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 438

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 491

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 501

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) 513  
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 527  
25. PHOTOGRAPHS OF MACHINERY WITH SUPPLIER'S  
CONTACT DETAILS 549  
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)  
3 Colour + Stack Unit (Manual)  
Finishing System  
UV Inkjet Digital Printing System  
Perfecting Production System  
Tape Binder  
High Light Color System  
Color Printer  
Digital Press  
Digital Color Press  
Manual Offset Printing Machine  
Rotogravure Printing Machine  
Black and White Digital Print Production System  
Digital Printing Machine  
Paper Binding Machine

## 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 various 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](mailto:npcs.india@gmail.com) **Website:** [NIIR.org](http://NIIR.org)

Sat, 03 Aug 2024 15:13:27 +0530