

# Handbook on Printing Technology (Offset, Flexo, Gravure, Screen, Digital, 3D Printing) 3rd Revised Edition

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

**Format:** Paperback

**ISBN:** 9788178331768

**Code:** NI73

**Pages:** 568

**Price:** Rs. 1,495.00 **US\$** 150.00

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

Usually ships within **5** days

Printing is a process of producing copies of text and pictures. Modern technology is radically changing the way publications are printed, inventoried and distributed. There are a wide variety of technologies that are used to print stuff. The main industrial printing processes are: Offset Lithography, Flexography, Digital Printing (Inkjet & Xerography), Gravure, Screen Printing.

3D printing which is also referred as additive printing technology that enables manufacturers to develop objects using a digital file and variety of printing materials. Global market for 3D printing material include polymers, metals and ceramics. In addition, 3D printing offers a wide array of applications in various industries, namely consumer products, industrial products, defense & aerospace, automotive, healthcare, education & research and others.

In India, the market for printing technology is at its nascent stage; however offers huge growth opportunities in the coming years. Digital printing is now taking much more share, particularly in graphics (i.e. non-packaging applications). Digital's share of the whole market doubles in constant value terms from 9.5% to 19.7% and 3D printing market is estimated to garner \$8.6 billion in coming years.

This handbook is designed for use by everyone engaged in the printing section and students who are pursuing their career in printing technology. It provide all information on modern printing methods, techniques, testing's for printing, application of different printing and machinery used for printing.

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 and Photographs of Machinery with Suppliers Contact Details.

This book will be a mile stone for its readers who are new to this sector, will also find useful for professionals, entrepreneurs, those studying and researching in this important area.

# Contents

## 1. Principles of Contact (Impression)

Introduction

Printing Methods

The Printing System

Preparatory Sections

Halftone Photography

Platemaking

Printing

Binding and Finishing

Inks for Letterpress and Lithography

Speciality Printing

## 2. Principles of Noncontact Printing

Introduction

Impactless printing system for variable printing

Summary

## 3. Coated Grades and Commercial Printing

Coated and Commercial Papers

Coating Methods

Coating Materials

Adhesives

Coated Paper Properties and Use

## 4. Tests for Gravure Printing

Introduction

Print Smoothness

Gravure Print Testing

## 5. Tests for Letterpress Printing

Printing Smoothness

Uniformity for paper surface

## 6 Tests for Offset Printing

Introduction

Runnability

Surface Strength

Water Resistance

Mechanical Properties

Web Runnability

## 7. 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

## 8. 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  
9. Offset Lithography  
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  
10. Planography  
Origin of Planography  
Principle of Planographic Printing  
Direct Printing Process  
Offset Printing Process  
Working Process  
11. 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  
12. Sheetfed Offset Machines  
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  
13. Web Offset Machines  
Driving Mechanism  
Printing Units  
Main Parts of Printing Unit  
Inking System  
Delivery Unit  
Folding Unit  
Ancillary Operations by Delivery Unit  
14. Colour and its Reproduction  
Terminology Related to Colour  
Mixing and Matching of Colors  
Sequence of Colours in Printing  
15. Quality Control in Printing  
Before Printing  
During Printing  
After Printing  
16. Flexography  
Flexography  
Flexographic Platemaking  
Photochemical Change  
Rotary Principle  
Rubber Plates  
Substrates  
Paper and Board  
17. Rotogravure  
18. Creative Frees Printer  
Popular Product with Powerful Appeal  
Topical Information Mix  
Individual Brand of Success  
Production-Driven Investment  
As Horst Brostler Explains  
Flexibility in Many Spheres  
Super-Wide Rotogravure Presses in Big Demand  
Brownie points of gravure  
New Techniques for Handling Giant Reels

Bigger Core Diameters Needed to  
Handle Higher Speeds  
A Host of Optimised Details  
Light Weight Guide Rollers  
Process Computer Systems With Visualisation  
19. Shaftless Spearheads Expansion  
Economic Efficiency—the Clincher  
Eightfold Increase in Sales  
Confidence in KBA Technology  
Commissioning to a Tight Schedule  
20. Digital Printing  
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  
21. 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  
22. 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  
23. 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)  
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

## 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.

---

**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)

Thu, 25 Apr 2019 08:15:57 +0530