

# Polymers and Plastics Technology Handbook

**Author:** NIIR Board

**Format:** Paperback

**ISBN:** 8178330768

**Code:** NI84

**Pages:** 424

**Price:** Rs. 750.00 US\$ 19.95

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

Usually ships within **5** days

Plastics play a very important role in our daily lives. Throughout the world the demand for plastic, particularly plastic packaging, continues to rapidly grow. Polymer technology deals with the manufacture and production of polymer and synthetic substances. Plastic is incredibly versatile and can be made from different ingredients, moulded into any shape, and put to a huge range of uses across industry and the rest of society, from carrier bags to electrical cables. Polymer energy system is an award winning, innovative, proprietary process to convert waste plastics into renewable energy. Some of the important example of polymers and plastics are polytetra fluoroethylene (PTFE), polyether sulphone (PES), phenol-formaldehyde (PF), polyolefins, vinyl polymers, thermoplastic polyesters, polysulfones, poly(phenylene sulfide), etc. Polymers are the most rapidly growing sector of the materials industry. The Indian plastic industry has taken great strides. In the last few decades, the industry has grown to the status of a leading sector in the country with a sizable base. The material is gaining notable importance in different spheres of activity and the per capita consumption is increasing at a fast pace. Continuous advancements and developments in polymer technology, processing machineries, expertise, and cost effective manufacturing is fast replacing the typical materials in different segments with plastics. On the basis of value added, Indian share of plastic products industry is about 0.5% of national GDP.

The major contents of the book are properties and applications of speciality plastics, thermoset plastics, applications of recycle plastics, introduction of polymer science, polymer additives, blends and composites, commodity thermoplastics and fibres etc. This book also consists of raw material suppliers for plastic and plastic products, manufacturers of plastic, processing machinery, plastics processing machinery and equipment (foreign), machinery and equipment for plastic converting, extruders and extrusion lines, injection moulding machines, presses and accessories, blow moulding and thermoforming machines etc. The book has been designed with the idea of blending and integrating basic polymer science and the technology of plastics into a composite structure. This book is an outcome of an endeavour in the direction of polymer and plastic processing. It would be of immense use to entrepreneurs, consultants, students and libraries etc.

## Contents

### 1. PROPERTIES AND APPLICATIONS OF SPECIALITY PLASTICS

Polytetra Fluoroethylene (PTFE)

Characteristics

Applications

Thermoplastic Polyurethanes (TPU)

Characteristics

Applications  
Polysulphones (PSO)  
Characteristics  
Applications  
Polyether Sulphone (PES)  
Characteristics  
Applications  
Polyphenylene Sulphide (PPS)  
Characteristics  
Applications  
Polyphenylene Ether (PPE)  
Characteristics  
Applications  
Polyether Etherketone (Peek)  
Characteristics  
Applications  
Polyarylates  
Characteristics  
Applications  
Polyamide-Imide (PAI)  
Characteristics  
Applications  
Polyether-Imide (PEI)  
Characteristics  
Applications  
Liquid Crystal Polymers (LCP)  
Characteristics  
Applications  
2. PROPERTIES AND APPLICATIONS OF  
THERMOSET PLASTICS  
Phenol-Formaldehyde (PF)  
Characteristics  
Applications  
Amino Plastics  
Characteristics  
Applications  
Melamine Formaldehyde  
Urea Formaldehyde  
Epoxy Resins  
Characteristics  
Applications  
Unsaturated Polyester Resins  
Characteristics  
Applications  
Polyurethane  
Characteristics  
Applications  
Silicones  
Silicone forms  
Characteristics  
Applications  
Silicone fluids  
Silicone Resins

Silicone Elastomers

### 3. APPLICATIONS OF RECYCLED PLASTICS

Introduction

Recycled LDPE

Recycled HDPE

Recycled Polypropylene

Recycled PVC

Recycled PS

Recycled PET

Recycled Commingled Plastics Waste

### 4. INTRODUCTION TO POLYMER SCIENCE

Classification of Polymers

Thermoplastics and Thermosets

Classification Based upon Polymerization Mechanism

Classification Based upon Polymer Structure

Polymer Structure

Copolymers

Tacticity

Geometric Isomerism

Nomenclature

Molecular-Weight Distribution

Molecular-Weight Averages

### 5. POLYMER ADDITIVES, BLENDS AND COMPOSITES

Additives

Plasticizers

Fillers and Reinforcements

Other Important Additives

Polymer Blends

Interpenetrating Networks

Mechanical Properties

Composite Fabrication

Reference

### 6. COMMODITY THERMOPLASTICS AND FIBERS

Thermoplastics

Polyolefins

Vinyl Polymers

Thermoplastic Polyesters

Fibers

Natural and Synthetic Fibers

Cellulose

Noncellulosics

Fiber-Spinning Operations

### 7. ENGINEERING AND SPECIALTY POLYMERS

Engineering Plastics

Polyamides

ABS

Polycarbonates

Modified Poly(phenylene oxide)

Acetal

Polysulfones

Poly(phenylene sulfide)

Engineering Polyesters

Fluoropolymers

Specialty Polymers  
Polyimides and Related Specialty Polymers

Ionic Polymers  
Polyaryletherketones  
Specialty Polyolefins

Inorganic Polymers  
Liquid-Crystal Polymers  
Conductive Polymers  
High-Performance Fibers  
Other Specialty Polymers

## 8. POLYMER PROCESSING AND RHEOLOGY

Extrusion  
Molding  
Calendering  
Coating  
Non-Newtonian Flow  
Viscosity of Polymer Solutions and Suspensions  
Constitutive Equations  
Elastic Properties of Polymeric Fluids  
Pressure (Poiseuille) Flow  
Drag Flow  
Capillary Rheometer  
Couette Rheometer  
Cone-and-Plate Rheometer  
Rheometric Characterization of Polymer Solutions and Melts  
Introduction to the Modeling of Polymer-Processing  
Operations: Extrusion  
Appendices

## 9. COMPONENTS OF A THERMOPLASTIC STRUCTURAL COMPOSITE

Thermoplastic Matrix Resins  
Chain Extendable Resins  
Amorphous Thermoplastics  
Orientable Polymer Matrices  
Semi-crystalline Thermoplastic Polymers  
Polymer Blends and Compounds  
The 'Victrex' Range of Aromatic Polymers  
This allows for easy crystallization of the  
polyetherketone family.  
Polyetheretherketone  
Reinforcing Fibres  
Organic Polymeric Fibres  
Inorganic Filaments  
Carbon Fibres  
High Strength Carbon Fibres  
Interfaces and Interphases  
Wetting of the Fibre by the Resin  
Chemical Bonding  
Mechanical Interlocking  
Crystalline Interactions  
Thermoplastic Structural Composite Materials

## 10. PROCESSING SCIENCE AND MANUFACTURING TECHNOLOGY

Processing Science  
Chemical Change  
Thermophysical Properties  
Rheology  
The Analysis of Processing Operations  
Manufacturing Technology  
Consolidation  
Continuous Consolidation  
Tape Placement  
Continuous Forming  
Stamping  
Diaphragm Forming  
Incremental Processing  
Machining  
Assembly Technologies  
Fasteners  
Adhesive Bonding  
Solvent Bonding  
Fusion Bonding  
Interlayer Bonding  
Rework, Repair and Reclaim  
Quality in Processing

#### 11. DIRECTORY

Raw Material Suppliers for Plastic and Plastic Products  
Manufacturers of Plastic Processing Machinery  
Plastics Processing Machinery and Equipment (Foreign)  
Machinery and Equipment for Plastic Converting  
Extruders and Extrusion Lines  
Injection Moulding Machines  
Presses and Accessories  
Blow-Moulding and Thermoforming Machines  
Machinery for converting Reaction Resins  
(Unsaturated Polyesters, Epoxies)  
Coating Lines  
Other Plastics Converting Machines  
Miscellaneous Plastic Machineries

## 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)

Thu, 30 May 2024 06:46:06 +0530