

The Complete Technology Book on Plastic Films, HDPE and Thermoset Plastics

Author: NIIR Board of Consultants & Engineers

Format: Paperback

ISBN: 8178330113

Code: NI182

Pages: 608

Price: Rs. 1,175.00 US\$ 125.00

Publisher: Asia Pacific Business Press Inc.

Usually ships within **5** days

Plastic Films, HDPE and Thermoset Plastics are now an accepted part of the industrial and domestic scenes but this growth has been comparatively recent. Plastic films are typically used for sealing food items in containers to keep them fresh over a longer period of time. Plastic wrap, typically sold on rolls in boxes with a cutting edge, clings to many smooth surfaces and can thus remain tight over the opening of a container without adhesive or other devices. The past several years have seen numerous plastic films developed for the packaging industry, the most used today being polyethylene. Cast polypropylene film, like polyethylene film is unoriented (not stretched), but it was found that an improved film could be obtained by orientation (stretching the cast in one or more directions). Biaxial orientation is the process whereby the continuous cast film or sheet of plastic is heated up to brings it to a temperature that makes it stretchable. BOPP film possesses superior tensile strength, flexibility, toughness, shrink ability, good barrier and optical characteristics. The use of polyethylene terephthalate film is increasing considerably in recent years in videos audio magnetic tapes, computer tapes, photo and X ray films, power capacitors, insulation tapes and metalling for artificial zari. High density polyethylene (HDPE) or polyethylene high density (PEHD) is a polyethylene thermoplastic made from petroleum. The major applications of HDPE are in the manufacturing of containers, pipes, house wares, toys, filament, woven sacks, film, wire and cable insulation. HDPE is lighter than water, and can be moulded, machined, and joined together using welding (difficult to glue). Thermoset, or thermosetting plastics are synthetic materials that strengthen during being heated, but cannot be successfully remolded or reheated after their initial heat forming. This is in contrast to thermoplastics, which soften when heated and harden and strengthen after cooling. Thermoplastics can be heated, shaped and cooled as often as necessary without causing a chemical change, while thermosetting plastics will burn when heated after the initial molding. Additionally, thermoplastics tend to be easier to mold than thermosetting plastics, which also take a longer time to produce (due to the time it takes to cure the heated material).

Some of the astonishing fundamentals of the book are salient features of contemporary, technology and current research, three basic processes: advances, modern polyethylene, processes using high yield catalysts, solution polymerization processes, polyolefins, low density polyethylene, polyvinylidene chloride (PVDC), vinyl chloride/vinyl acetate copolymers, polyvinyl acetate, polyvinyl alcohol, physical and chemical properties, manufacturing methods, extrusion of film, slit die extrusion (flat film extrusion), comparison of blow and cast film processes, water cooled polypropylene film, calendaring, solvent, casting, casting of regenerated cellulose film, orientation of film, expanded films, plastics net from film, unsaturated polyester and vinyl ester resins, thermoset polyurethanes, guidelines and theories in compounding polyurethane elastomers, compounding for thermoset polyurethane elastomers, cellulose and cellulose derivatives, thermoplastic polymers etc.

The present books offer an up to date overview of the processing of plastic films, HDPE and thermoset

plastics. This book is suitable for entrepreneurs, researchers, professionals, technical institutions etc.

Contents

CHAPTER 1 BOPP FILMS

Background
Structural Development of Plastics in India
History of films
Film Properties
Applications of Films
Process of Manufacture
Tenter Process
Comparison of the processes
Polyester Films
Raw materials
Capital equipment
General

CHAPTER 2 SALIENT FEATURES OF CONTEMPORARY TECHNOLOGY AND CURRENT RESEARCH

Introduction
Three basic processes: Advances
Modern polyethylene processes using high yield catalysts
Solution polymerization processes
Slurry processes
Gas phase processes
Processing
Comparative evaluation of contemporary technologies
Process selection based on capability
Latest development

CHAPTER 3 POLYOLEFINS

Low density polyethylene
Properties
Uses 120
Irradiated Polyethylene
High density polyethylene
Properties
Uses 123
Polypropylene
Properties
Poly (Methyl pentene) (TPX)
Ethylene/vinyl acetate copolymers (EVA)
Properties
Poly (BUTENE-1)
Properties
Uses 129
Melt flow index (MFI)

CHAPTER 4 VINYL

Polyvinyl Chloride (PVC)
Properties
Polyvinylidene chloride (PVDC)

Vinyl chloride/Vinyl acetate copolymers
Polyvinyl acetate
Polyvinyl alcohol

CHAPTER 5 MECHANICAL PROPERTIES

Tensile and yield strength elongation and young's modulus
Test Methods
Burst strength
Impact strength
Impact Fatigue
Tear strength
Puncture penetration test
Stiffness
Flex resistance
Coefficient of friction
Blocking

CHAPTER 6 PHYSICAL AND CHEMICAL PROPERTIES

Optical properties
Light transmission
'See-Through' Clarity
Haze
Gloss
Permeability
Water vapour permeability
Gas Permeability
Odour Permeability
Density
Heat sealability
Dimensional stability
Water absorption
Effect of chemicals
Effect of Light
Effect of Temperature
High Temperature
Low Temperature
Flammability

CHAPTER 7 MANUFACTURING METHODS

Extrusion of Film
Slit Die Extrusion (Flat Film Extrusion)
Comparison of Blow and Cast Film Processes
Water Cooled Polypropylene Film
Calendering
Solvent Casting
Casting of regenerated cellulose film
Orientation of film
Expanded films
Plastics Net From Film

CHAPTER 8 HEALTH SAFETY OF PLASTICS FILMS

Overall system
Base Lines for Evaluation

Food Spoilage
Toxicity and Adulteration
Interactions
Safety evaluation Mass transfer
Law
Licensing Type Systems
International trade
Individual countries
United Kingdom
USA

CHAPTER 9 ODOUR AND TAINT IN PLASTICS FILMS

Intrroduction to organolepsis and tainting
Causes of tainting
Loss of Volatile Material From Food to Environment
Diffusion of Volatilies, additives, and Volatile Residual Reactants
 from Plastics to Food
Vapour From Environment t to Food
Micro-organisms to Food
Marco-Organisms to Food
Radiation from Environment to Food Stuff
Assessment
Samples
Food
Tests Methodology
Remedies
Masking and Counteraction
Conclusions

CHAPTER 10 SEALING OF FILMS

Mechanical methods
Heat sealing
Sealing of oriented film
High frequency heating
Ultrasonic sealing
Adhesives
Choice of method

CHAPTER 11 PRINTING ON PASTICS FILMS

Pre treatment
Solvent treatment
Chemical treatments
Flame treatment
Electrical treatment
Tests for efficiency of pre- treatment
Method of Printing
Screen printing
Letterpress
Flexographic printing
Photogravure printing
Hot stamping
Electrostatic printing
Printing inks
Vaccum metallisation

CHAPTER 12 WRAPPING EQUIPMENT

- Wrapping with thermoplastics films
- Feeding the Wrapping Material
- Forming the pack
- Closing the pack
- Continuous wrapping machines
- Pouch making equipment
- Sachet making machines
- Vacuum and gas packaging
- Shrink wrapping
- Scope of Process
- Types of Shrink Wrap
- Shrink wrapping equipment
- Tray Erection
- Film Wrapping and Sealing
- Shrink Tunnels
- Properties of heat shrinkable films
- Shrink Temperature
- Degree of Shrinkage
- Shrink Tension
- Pallet overwrapping
- General advantages and problems

CHAPTER 13 UNSATURATED POLYESTER AND VINYL ESTER RESINS

- Unsaturated polyesters
- Vinyl ester resins
- Compounding of unsaturated polyester and vinyl ester resins
- Applicable manufacturing processes
- Recent Developments

CHAPTER 14 THERMOSET POLYURETHANES

- Introduction
- Polyurethane Chemistry
- What are Polyurethanes ?
- Polyurethane raw materials and moisture
- Handling of polyurethane components
- Types of polyurethane systems
- Advantages of addition
- Range and types of polyurethane products
- Polyurethane uses
- Neoprene Lubricant Adhesive #106
- Polyurethane Coatings
- Components for Polyurethanes
- Industrial Mathematics for Polyurethanes
- Terminology
- Guidelines and Theories in Compounding Polyurethane Elastomers
- Compounding for Thermoset Polyurethane Elastomers
- General consideration
- Appendix
- Method for Preparation of MDI Prepolymers

CHAPTER 15 CROSSLINKED THERMOPLASTICS

- Crosslinking of thermoplastics

Effects of Crosslinking on Polymer
Chemical Crosslinking
Rotational molding
Post irradiation effects
Acrylates

CHAPTER 16 MISCELLANEOUS

Nylons (Polyamides)
Polycarbonate
Polyethylene terephthalate (Polyester)
Acrylic multipolymer
Propylene/vinyl chloride copolymer
Rubber hydrochloride
Fluoropolymers
Polyvinyl Fluoride
Polyurethane
Polyimides

CHAPTER 17 IONOMERS

Properties

CHAPTER 18 STYRENE POLYMERS AND COPOLYMERS

Polystyrene
High impact polystyrene
Expanded polystyrene
Styrene/acrylonitrile copolymer (SAN)
Acrylonitrile/Butadiene/Styrene (ABS)

CHAPTER 19 CELLULOSE AND CELLULOSE DERIVATIVES

Regenerated cellulose
Substituted Celluloses
Cellulose nitrate (Celluloid)
Cellulose acetate
Cellulose Triacetate
Cellulose acetate/butyrate (CAB)

CHAPTER 20 THERMOPLASTIC POLYMERS

Polymerization Concepts
Polymerization Mechanisms
Methods of Polymerization

CHAPTER 21 THERMOSET POLYMERS

Crosslinked Polymers
Thermoset Polyester
Polyurethane Elastomers
Polyimides
Ladder polymers

CHAPTER 22 PROCESSING AND FABRICATION

Orientation of molecules and fibers
Reinforced thermoset processing
Thermoplastic processing
Molds

Mixing equipment
Adhesive Application

CHAPTER 23 BAG AND SACK MANUFACTURE

Nature of the film
Bags made from tubular film
Bags made from Flat Film
Heavy duty sack manufacture

CHAPTER 24 THERMOFORMING

Methods of thermoforming
Vaccum forming
Skin pachaging
Pressure forming
Matched mould forming
Machine variables
Heating
Cooling
Moulds
Trimming
Printing
Materials and applications
PVC
Toughened polystyrene
Biaxially oriented polystyrene
ABS
Low density polyethylene
High density Polyethylene
Polypropylene
Cellulose acetate
Cellulose acetate/butyrate
Polycarbonate
Cold forming

CHAPTER 25 LAMINATION

Coating
Predetermined systems
Reverse roll coaters
NIP roll coaters
Gravure coaters
Calender coating
Curtain coating
Extrusion coating
Adhesive lamination
Wet bonding
Dry bonding
Coextrusion
Cross laminated film

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 **Website:** NIIR.org

Sun, 20 May 2018 19:37:55 +0530