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 bring 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
CHAPTER 4 VINYLs
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
Introduction to organolepsis and tainting
Causes of tainting
Loss of Volatile Material From Food to Environment
Diffusion of Volatiles, 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
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 adduction
Range and types of polyurethane products
Polyurethane uses
Neoprene Lubricant Adhesive #106
Polyurethane Coatings
Components for Polyurethanes
Industrial Mathematics for Polyurethanes
Terminology
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
Vacuum forming
Skin packaging
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
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 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.