Disposable Products Manufacturing Handbook

Author: NPCS Board of Consultants & Engineers

Format: Paperback ISBN: 9789381039328

Code: NI261 Pages: 528

Price: Rs. 1,575.00 US\$ 42.56

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Usually ships within 5 days

Disposable Products Manufacturing Handbook (Plastic Cups, Cutlery, Paper Cups, Banana Leaf Plates, Facial Tissues, Wet Wipes, Toilet Paper Roll, Sanitary Napkins, Baby Diapers, Thermocol Products, PET Bottles)

Everyday life products manufacturers worldwide produce a multitude of items that are intended for one use only. A disposable is a product designed for a single use after which it is recycled or is disposed as solid waste. The term often implies cheapness and short-term convenience rather than medium to long-term durability. The term is also sometimes used for products that may last several months distinguish from similar products that last indefinitely.

The fast moving life and modernization simultaneously lead to the necessity of disposables in one's life. One cannot wash utensils all the time, neither can afford to arrange fine and good cutlery of glass or steel in a party for the guest. At such times, people rush for the disposables available in the market with variety of colors and designs.

For a manufacturer, to produce disposables is a good deal keeping in view the present demand and growth in the market. This handbook is a complete well to do package for a layman to understand the basic steps to be followed for setting up a plant for a particular disposable product. The book contains raw material details, product manufacturing process, machinery details, images with raw material and machinery suppliers. The Disposable Products Manufacturing Handbook is about producing Plastic Cups, Cutlery, Paper Cups, Banana Leaf Plates, Facial tissues, Wet Wipes, Toilet Paper Roll, Sanitary Napkins, Baby Diapers, Thermocol Products, PET Bottles that are used by masses in their day to day life. This well-established text provides a comprehensive coverage of the manufacturing processes adopted to manufacture various disposable products. It gives a holistic view of products produced, which has inputs from diverse fields. The book discusses the importance and objectives of processes and material used for the production of disposable products. Many examples have been provided to illustrate the concepts discussed.

Contents

INTRODUCTION
 Plastic
 Polypropylene
 Polystyrene (PS)
 Different Types of Disposable Products in Market
 Pet Bottles

Thermocol & Its Products

Paper Cup

Plastic Cutlery

Facial Tissue, Wet Wipes and Toilet Rolls

Plastic Cups

Disposable Banana Leaf Plates

Baby Diaper and Sanitary Napkin

Diaper

Sanitary Napkin

2. PLASTICS

Introduction

Composition

Additives

Classification

Thermoplastics & Thermosetting Polymers

Other Classifications

Biodegradability

Natural vs. Synthetic

Crystalline vs. Amorphous

Properties of Plastics

Toxicity

Plastics & Their Uses

3. THERMOPLASTIC

Stress Strain Graph of Thermoplastic Material

Acrylic

Nylon

Polyethylene

Polypropylene

Polystyrene

Polyvinyl Chloride

Teflon

Properties of Various Thermoplastic Products

4. THERMOSETTING PLASTIC

Process

Properties and Their Uses

Examples

5. POLYETHYLENE

Structure of Polyethylene

Process

Monomer

Polymerization

Production of Polyethylene

From Naphtha

As a Gas

Properties

Physical Properties

Chemical Properties

Classification

LDPE

Properties

Chemical Resistance

LDPE Quick Facts

Production of LDPE

Applications

LLDPE

Production and Properties

Processing

Properties

Physical Properties

Application

HDPE

Properties

Physical Properties

Chemical Properties

HDPE Resistance

HDPE Quick Facts

Production of HDPE

Applications

Properties Comparison Chart for LDPE and HDPE

Processing Polyethylene into Products

The Making of Molded Products

The Making of Foil

The Making of Multi-Layer Foil

The Making of Sheets

The Making of Foam Applications for Insulation

Additions

Joining

6. POLYETHYLENE TEREPHTHALATE (PET OR PETE)

Production

Dimethyl Terephthalate Process

First Step

Second Step

Terephthalic Acid Process

General Process Involved in the Manufacturing of PET

Properties

General Properties

Application

Sustainable

Polyethylene Terephthalate Films

Intrinsic Viscosity

A PET soft drink bottle

Fiber Grade

Film Grade

Bottle Grade

Monofilament, Engineering Plastic

Property Chart for PET

Drying of PET

Copolymers

Degradation

Acetaldehyde

Antimony

Safety

Bottle Processing Equipment

7. POLYPROPYLENE

Chemical and Physical Properties

Polypropylene Resistance

Polypropylene Quick Facts

Polypropylene Fabrication

Degradation

Synthesis

Industrial Processes

Manufacturing

Properties & Applications

A Common Application for Polypropylene is as Bi-Axially Oriented Polypropylene (BOPP)

Other Useful Properties

PP Structure

PP Parameters

Basic Types of PP

Crystallinity

Presence of Selected Additives during Polymerization

Antioxidants and Stabilizers

Nucleants and Clarifiers

Antistatic Agents

Chemical Resistance

Stress Cracking Resistance

Permeability

Organoleptics

Notch Effects

8. POLYSTYRENE

Structure

Polymerization

Atactic Polystyrene

Syndiotactic Polystyrene

Properties of Polystyrene

Properties of Polystyrene

Physical Properties

Mechanical Properties

Optical Properties

Thermal Properties

Electrical Properties

Chemical Properties

Uses

Strength, Durability, Comfort, Safety

Applications of PS

Packaging

Appliances

Consumer Electronics

Construction

Medical

Other

Degradation

Biodegradation

Incineration

Forms Produced

Sheet or Molded Polystyrene

Disposable Polystyrene Razor

Foams

Expanded Polystyrene

Extruded Polystyrene Foam

Fused Cell Expanded Polystyrene Foam

Copolymers

Oriented Polystyrene

9. INJECTION MOULDING

Process Characteristics

Advantages of Injection Molding

Disadvantages of Injection Molding

Applications

Examples of Polymers Best Suited for the Process

Equipment

Mold

Injection Molding Die with Side Pulls

Mold Design

Mold Storage

Tool Materials

Machining

Cost

Injection Process

What is Injection Molding Cycle?

Different Types of Injection Molding Processes

Process Cycle

Equipment

Injection Unit

Clamping Unit

Machine Specifications

Tooling

Mold Base

Mold Channels

Mold Design

Materials

Tolerances and Surfaces

Power Requirements

Molding Defects

Silver Streaks

Short Shot

Jetting

Flow Marks

Color Streaks

Weld Lines

Flash

Delamination

Stringiness

Sink Marks

Warping or Twisting

10. EXTRUSION MOULDING

Types of Extrusion

Plastic Extrusion

Single Screw Extrusion Machinery

Extrusion Dies

Screw Design

Cooling and Sizing Equipment

Pros and Cons of Extrusion Molding

Pros

Cons

Defects

11. COMPRESSION MOULDING

Process Definition

Process Characteristics

Process Schematic

Pros & Cons of Compression Moulding

Pros

Cons

12. BLOW MOLDING

Typologies of Blow Molding

Extrusion Blow Molding

Continuous Extrusion Equipment

Intermittent Extrusion Machinery

Advantages of Blow Molding

Disadvantages of Blow Molding

Spin Trimming

Injection Blow Molding

Disadvantages

Injection Stretch Blow Molding Process

Advantages

Disadvantages

Process Explanation

Advantages

Disadvantages

What is PET Blow Moulding?

PET Blow Moulding Process

Advantages of Blow Molding

Defects & Troubleshooting

Blow Moulding Glossary

13. THERMOFORMING

Vacuum Thermoforming

Process

Applications

Pressure Thermoforming

Advantages of Pressure Forming

Applications for Pressure Forming

Mechanical Thermoforming

Thin Gauge and Heavy (Thick) Gauge Thermoforming

Types of Thermoforming Molds

Applications

Benefits

When and Where does Thermoforming Fit?

Plastics Used

Thermoforming Materials

ABS

HDPE

HIPS

PETG

PC

Acrylic

Chart of Plastic Materials - Advantages, Disadvantages and Industry Examples

Advantages of Thermoforming

Pros & Cons of Thermoforming

Pros

Cons

14. PLASTIC CUPS

Introduction

Plastic Cups

Manufacturing Method

Thermoforming

Heating

Forming

Cooling

Trimming

Machine Type

Application of Thermoforming Technique

Raw Material

Steps

Polypropylene Characteristics

Compatibility of Polypropylene with Common Products

Properties of Poly Propylene

Specific Gravity

Mechanical Properties

Electricals

Chemical Resistance

Specification of Thermoforming Machines

Moulds

Glass

Cups

Plates

Spoons

Printing on Polypropylene

Printing on Cups, Glasses and Plates

Roto Gravure Printing

For Multicolor Printing

Flow Diagram for Disposable Plastic Cups

Plant and Machinery Details

Thermoforming Machine

Specifications

Thermoformable Extrusion Line

Mono & Multilayer Thermoformable Sheet Lines

Specifications

Plastic Cup thermoforming Machine

Usage

Hydraulic Automatic Cup Making Machine

Parameter

Functions and Characteristics

Complete Line: Extrusion + Cup Making Machine

Plastic Sheet Extruder

A. Main Parameters

B. Configuration and Specification

1. Main Extruder: one

2. Non-stop Fast Screen Changer With Double-sieve: one set

3. Die-Head

Calendar Roll Stack: one

4. Thermostat System: Two sets (Only use for making PS sheet)

5. Air Cooling Stand: one

6. Trimming Unit: one

7. Haul Off Unit: one

8. Single-shaft Winder (One set)

9. Electronic Control Cabinet: one set

10. Waste sheet re-winder: one set

Main Technical Data

Feature

Key Electric Components

Assistant Machines

Automatic Cup Stacking Machine

Usage

Main Technical Parameter

Screw Air Compressor

Industrial Chiller (Air Cooled)

Model Specification

Thermoforming/Vacuum Forming Sheet Extrusion Line

PP/PS Specification

Multi-Laye Cp-Extrusion Sheet Line

Technical Specification

Features

HIPS / ABS / PC / PMMA / PS Extrusion Sheet Line

Technical Specification

Suppliers of Plant & Machinery

Raw Material Suppliers

15. BABY DIAPER & SANITARY NAPKINS

Introduction

Baby Diaper

Types of Diapers

Disposable

Reusable: Cloth Diaper

Sanitary Napkins

Uses and Applications

Baby Diaper

Sanitary Napkin

Properties of Baby Diapers

Properties of Sanitary Napkins

Advantages & Disadvantages of Disposable Diaper

Features of Disposable Baby Diapers

Components of Disposable Diaper

Raw Materials for Manufacturing of Disposable Diaper

Absorbent Pad

Nonwoven Fabric

Other Components

Diaper Structure

Diaper Acceptance Criteria

Function of Baby Diaper

Manufacturing Process

Formation of the Absorbent Pad

Preparation of the Nonwoven

Assembly of the Components

Mathematical Models for Disposable Diaper Manufacturing

By-Products/Waste

Quality Control

Process Flow Sheet for Baby Diapers Manufacture

Absorbent Pad Formation

Formation of Tops heet and Bottom sheet from Non-Woven Fabric

Assembly of Components

Preparatory Processes for Sanitary Napkins

Opening

First Stage is Opening

Second Stage

Third Stand Kiering Bleaching & Washing

Bleaching

Sterilisation

Dry Heat

Auto Claving

Exposure to Ethylene Oxide

Hydro - Extracting

Drying

Raw Materials Required

Raw Materials Description

Roll Pulp

Non-Woven Fabric

Polyethylene Film

Tissue

Hot Melt & Polyextruded Adhesive

Pressure Sensitive Adhesive

Silicone Release Paper

Specifications of the Raw Materials

Wood Pulp

Non-Woven Fabric

Silicone Release Paper

Hot Melt

Process of Maufacture of Sanitary Napkins

- (A) Preparation of Cotton Lint Sliver
- (1) Cotton Opening
- (2) Lapping
- (3) Carding
- (4) Draw Frame
- (5) Tissue Paper Wrapping
- (B) Manufacture of Sanitary Napkins
- (1) Cone Winding
- (2) Knitting & Insertion of Tissue paper Wrapped Sliver
- (3) Cutting & Looping of Both Ends of Sanitary Napkins
- (4) Packing

Process Flow Sheet for Sanitary Napkins

Disposable Diaper Machine Photographs

Full Servo Baby Diaper Making Machine

Specifications

Full Servo Pull-Up Baby Diaper Machine

Specifications

Main Technical Parameter

Main Function Features

Sanitary Napkins Machinery Photographs

Fast & Easy Packing Wing Style Sanitary Napkin Equipment

Equipment Functions

Structure & Configuration

Main Technical Parameter

Fast-Easy Packing Women Sanitary Pad Machine

Function & Assemble Parts

Structure & Character

Main Technical Parameter

Sanitary Napkin Production Line

Main Machine

Crusher

Model: Multiple-Function Machine for Sanitary Napkin

Main Production Line

Specifications

Suppliers of Plant and Machinery (For Baby Diapers)

Suppliers of Raw Materials

Suppliers of Plant and Machinery (For Sanitary Napkins)

Raw Materials Suppliers

16. DISPOSABLE BANANA LEAF PLATE

Introduction

Function

Properties of Banana Leaf Plates

Use and Application of Banana Leaf Plates

Utility

Area of Usage

Raw Material

Banana Tree/Leaves

Manufacturing Process of Banana Leaf Plates

Process Steps

Description

Flow Diagram

Machinery Description

Leaf Plate Making Machine

Description

Materials

Construction

Working

Leaf Plate Making Machine

Machinery Details

Suppliers of Plant and Machinery

Suppliers of Raw Material

17. FACIAL TISSUE & BABY WET WIPES

Introduction

What is a Tissue Paper?

Properties

Production

Applications

Hygienic Tissue Paper

Facial Tissues

Paper Towels

Wrapping Tissue

Toilet Tissue

Table Napkins

Facial Tissue

Properties

Manufacturing Process for Facial Tissues

Steps

Pulping and Retting

Pressing

Creping

Reeling and Cutting

Uses of Facial Tissue

Size

Effects

Wet Wipes

Introduction

Production

Uses

Baby Wipes

Cleansing Pads

Industrial Wipes

Pain Relief

Personal Hygiene

Manufacturing Process Flow Diagram for Facial Tissue & Wet Wipes

Pet Care

Healthcare

Facial Tissue and Wet Wipes Machine Details

Facial Tissue Machine

Specifications

Professional Facial Tissue Machine

Specification

Wallet Pocket Facial Tissue Machine

Specification

Full-Automatic Box-drawing Facial Tissue Machine

Descriptions

Function and Features

Technical Data

The Name of Spare Part of the Machine

Specification of Raw Material

Industrial Facial Tissue Making Machine

Supplier of Plant and Machinery

Suppliers of Raw Material

18. PAPER CUPS

Introduction

Advantages of Paper Cups

Waterproofing

Printing on Paper Cups

Properties of Paper Cups

Environmental Impact

Recycling

Paper vs. Plastic

Emission

Habitat Loss Trees Used

Lids

Uses & Applications

Per Case Contents Measurements

Manufacture

Process Flow Chart

Other Processes

1. Paper Cup Manufacturing Process

Cup Forming Process

2. Paper Cup Making Machine Technical Data

Complete Production Line for Paper Cup Forming

Flow Chart

1. High Speed Extrusion Laminating Machine

Process 1

2. Four Color Flexographic Printing Machine

Process 2

3. Computerized Micro-Gap Flat Creasing and Die Cutting Machine

Process 3: Cut the Printed Roll Paper into Small Pieces

4. High Dpeed Paper Slitting Machine

Process 4: Split the Big Roll PE-Coated Paper into Small Roll Paper

5. Middle Dpeed Paper Cup Forming Machine

Machinery with Specifications

1. High Speed Extrusion Laminating Machine

Features of High Speed Extrusion Laminating Machine

Main Parameters of High Speed Extrusion

2. Four-color Flexographic Printing Machine Laminating Machine

Specifications of Four-color Flexographic Printing Machine

3. Creasing & Cutting Machine

Description of Creasing & Cutting Machine

Features of Creasing & Cutting Machine

Technical Parameters of Creasing & Cutting Machine

4. Middle Speed Paper Cup Forming Machine

Characteristics

Advantages of Middle Speed Paper Cup Forming Machine

Technical Parameters

5. Paper Cup Forming Machine

Main Parameters of Paper Cup Forming Machine

6. Double Side PE Coated Paper Cup Machine

Description of Double Side PE Coated Paper Cup Machine

Technical Parameters of Double Side PE Coated Paper Cup Machine

Suppliers of Plant and Machinery

Suppliers of Raw Material

19. PET BOTTLES

Introduction

Uses & Applications

Production of Base (Amorphous) Pet Chips

Properties

Main Advantage of PET

Food Grade

Aesthetics

Strength

Weight

Airtight & Leak Proof

Chemical Resistance

Manufacturing Process

Plasticizing the PET

Injection Molding the PET Preform

Heating the PET Preform

Process Flow Diagram

Stretch Blow Molding the PET Container

PET Container Ejector

Machinery Suppliers

Pet Stretch Blow Molding Machine

Technical Specifications

Pet Blow Molding Machine

Specification

PET Bottle Making Machine

Technical Specifications

High Pressure Three Cylinder Air Compressor

Specification

Automatic Pet Blow Moulding Machine

Two Stage PET Blow Moulding Machine

Features of Automatic Pet Blow Moulding Machine

Machine Technical Specifications

Air Recovery System

Hydraulic Injection Moulding Machine

Injection Moulding Machine

Injection Moulding Machine

Horizontal Injection Moulding Machines

Injection Moulding Machine

Injection Moulding Machine

Injection Moulding Machine

Suppliers of Plant and Machinery

Suppliers of Raw Material

20. THERMOCOL & ITS PRODUCTS

Introduction

Typical Properties

Applications

Uses & Applications

Food Packaging

Properties of Thermocol

Light Weight

Durability

Moisture Resistance

Thermal Efficiency

Shock Absorption

Versatility

Ease of Use

Environmental Benefits

Manufacturing Process

Basic Raw Material Required

Basic Plant and Machinery Required

For Plates

For EPS Glass & Cups

Method Used

Process

Making Styrene

Making Polystyrene

Preparing the Beads

Making Expanded Polystyrene Foam (EPF)

Molding

Making Extruded, Expanded Polystyrene Foam

Cutting, Bonding and Coating

EPS Products (Plates/Cups/Glasses)

Raw Material & Availability

Moulding

Main Equipment and Technical Parameter

For Plates

1. PS Foam Sheet Extrusion Line

Components

A. Mixer

B. Automatic Feeding System (Automatic Self-control System)

C. 1st Extruder

High pressure Butane Pump

D. 2nd Extruder

- E. Cooling System
- F. Hauling-off System
- G. Winding Device
- 2. Automatic Vacuum Forming Machine

Components

- 3. Double Worktables Hydraulic Cutting off Machine (PLC controlling)
- 4. Crusher
- 5. Recycling System

For EPS Glass & Cups

A. Material expander: (1 set)

B. Dryer: 1setC. Crusher: 1set

D. Central System of Sending Material: 1set

E. Foaming Machine: 4 setsF. Other Assistant Equipments

Water Tank (10m3): 2
 Cooling Water Tower

3. Centrifuge

4. Air Compressor

Manufacturing Process

Basic Raw Material Required

Basic Plant and Machinery Required

For EPS Glass, Cups and Plates

Process Description

Process Flow Diagram

Flow Diagram for EPS (Thermocol) Plates/Cups/Glasses

Raw Material, Product & Machinery Photographs

Fully Automatic Shape Moulding Machine

Features & Technical Specification

Automatic EPS Shape Moulding Machine

Fully Automatic EPS Shape Molding Machine

Automatic Thermocol Packing Machine

EPS Pre-Expander Machine

EPS Preformer

EPS/Thermocol Block/Sheet Cutting Machine

Tech Details

PD Foam Sheet Extrusion Line

Automatic Vacuum Forming Machine

Features

Technical Specification of Automatic Vacuum Forming Machine

Automatic EPS Foam Cup Molding Machine

EPS Foam Cup Making Machine

Foam Cup Manufacturing Machine

Technical Data

Suppliers of Plant & Machinery

Suppliers of Raw Material

21. PLASTIC CUTLERY

Introduction

Importance of Plastic Cutlery

#1 - Cost

#2 - Convenience

Problems

#1 - The Vast Majority of Plastic Cutlery cannot be Recycled

#2 - It creates Waste

Properties of Plastic Cutlery Items

Uses of Disposable Plastic Cutlery Items

Manufacturing Process

Disposable Plastic Cutlery Items

Basic Raw Material Used

Basic Plant and Machineries Required

Step 1: Loading

Step 2: Liquification

Step 3: Mould Loading

Step 4: Moulding

Step 5: Packaging

Product Specification

Process Flow Diagram

Plant & Machinery Details

Injection Moulding Machine

Component List for Injection Moulding Machine

Technical Parameter

Types of Machine

Spare Parts

Mould for the Production of Plastic Spoons

Cutlery Packaging Machine

Product Description

Scope of Application

Features

Universal Machinery

Manufacturing Factory 1

Manufacturing Factory 2

Packaging Machine

Rotary Packing Machine

I. Main Performance and Structure Features

II. Application

III. Optional Devic

IV. Specification

Suppliers of Plant & Machineries

22. TOILET PAPER ROLLS

Introduction

Description

Bleaching of Fibers

Chemicals

Material

Color and Design

Manufacturing Process Flow Diagram for Toilet Paper Roll

Uses

Manufacturing Process for Toilet Paper Rolls

Toilet Paper Machinery Details

Full-automatic High-speed Rewinding and Perforated Toilet Paper Machine

Description of the Equipment

Features

Technical Data
Optional Equipment
The Name of Spare Part of the Machine
Specification of Raw Paper
Toilet Paper Cutting Machine
Functions and Features
Main Technology Parameter
Toilet Roll Embossing Machine
Specifications
Toilet Paper Processing Equipments

- Rewinding Machine
- 2. Toilet Paper Rolls Slitter
- Sealing Machine
- 4. Product

Supplier of Plant and Machinery

Suppliers of Raw Material

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 varies 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 Website: NIIR.org

Wed, 24 Apr 2024 22:50:53 +0530