TABLE OF CONTENTS

Acknowledgements

CHAPTER ONE - PERSPECTIVE ON PACKAGING

- What Is Packaging?
- Primitive Packaging
- From Rome to the Renaissance
- The Industrial Revolution
- The Evolution of New Packaging Roles
- Packaging in the Late 20th Century
- Modern Packaging
- Environmental and Sustainability Issues
- The Modern Packaging Industry

CHAPTER TWO - PACKAGING FUNCTIONS

- Introduction
- The Contain Function
- The Protect/Preserve Function
- Food Preservation
- The Transport Function
- The Inform/Sell Function

CHAPTER THREE - GRAPHIC DESIGN

- Introduction
- Demographics and Psychographics
- The Retail Environment
- Fundamental Messages
- Equity and Brand Names
- Color
- Graphic Design Basics
- Package Design and Marketing Studies

CHAPTER FOUR - PACKAGE PRINTING AND DECORATING

- Introduction
- Color
- Artwork
- Preparation for Printing
- Proofing
- Printing Methods
- Relief Printing: Flexography and Letterpress
- Lithography
- Gravure Printing
• Comparing Flexography, Lithography and Gravure
• Other Package Decoration Techniques
• Printing Dimensional Packages
• Labeling

**CHAPTER FIVE - PAPER AND PAPERBOARD**
• Source and Preparation of Fiber
• Representative Paper-Making Machines
• Paper Characterization
• Paper Types
• Paperboard Grades
• Paper Characterization Methods

**CHAPTER SIX - PAPERBOARD CARTONS**
• Paperboard Package Classifications
• Folding Carton Design
• Selecting the Correct Paperboard
• The Carton Production Process
• Basic Tube-style Folding Cartons
• Basic Tray-style Folding Cartons
• Beverage Baskets and Setup Boxes
• Paperboard Resources

**CHAPTER SEVEN - METAL CANS AND CONTAINERS**
• Background
• Can-making Steels
• Three-piece Steel Cans
• Two-piece Drawn Cans
• Impact Extrusion
• Can Dimensioning
• Protective Coatings for Cans
• Decoration
• Aerosols

**CHAPTER EIGHT - GLASS CONTAINERS**
• Glass Types and General Properties
• Commercial Glass Manufacturing
• Bottle Manufacturing
• Bottle Design Features

**CHAPTER NINE - POLYMER CHEMISTRY FOR THE NONCHEMIST**
• Introduction to Plastics
• Polarity and Material Properties
• Hydrocarbons and Polyethylene
• Other Packaging Polymers
• Molecular Structure and Properties
• Thermal Behavior
• Density and Yield
• Thermoplastic and Thermoset Polymers

**CHAPTER TEN - SHAPING PLASTICS**
• Selecting the Material and the Process
CHAPTER ELEVEN - PLASTIC APPLICATIONS

- Polyethylene (PE)
- High-density Polyethylene (HDPE)
- Low-density Polyethylene (LDPE) and Linear Low-density Polyethylene (LLDPE)
- Polystyrene (PS)
- Polypropylene (PP)
- Poly(ethylene terephthalate) (PET)
- Poly(vinyl chloride) (PVC)
- Poly(vinylidene chloride) (PVDC)
- Poly(vinyl acetate) (PVAC) and Ethylene-vinyl Acetate (EVA)
- Polyamide (PA or nylon)
- Poly(vinyl alcohol) (PVAL) and Ethylene-vinyl Alcohol (EVOH)
- Ethylene Acid Copolymers and Ionomers
- Other Packaging Polymers
- Additives
- Characterizing Plastic Materials
- Chemical Properties

CHAPTER TWELVE - CLOSURES

- Selection Considerations
- Container and Closure Dimensioning
- Metal Closures
- Closure Seals
- Plastic Closures
- Injection Molds and Closure Design
- Closure Application
- Tamper-Evident Closures
- Child-Resistant Closures
- Special Closures and Functions

CHAPTER THIRTEEN - ADHESIVES

- Introduction to Adhesives
- Theories of Adhesion
- Surface Treatment
- Solidification
- Common Classes of Packaging Adhesives
- Adhesive Application
- Viscosity
- Adhesive Selection and Considerations
- Inspecting Bond Failures

CHAPTER FOURTEEN - FLEXIBLE PACKAGING LAMINATES
Laminates
- Aluminum Foil
- Vacuum Metallizing
- Other Non-Organic Coatings and Barrier Treatments
- Laminate Structural and Physical Properties
- Flexible Bags, Pouches and Sachets
- Sealability
- Barrier Properties
- Aesthetics and Other Properties
- Laminating Processes
- Specifying Laminates
- Examples of Laminates

CHAPTER FIFTEEN - CORRUGATED FIBERBOARD
- Historical Perspective
- Corrugated Board
- Properties and Tests
- Carrier Rules and Regulations
- Corrugated Boxes
- Corrugated Box Printing
- Special Board Treatments
- Corrugated Container Quality Assurance

CHAPTER SIXTEEN - DISTRIBUTION PACKAGING
- Distribution Packaging: A Systems Approach
- Tracking Distribution Losses
- The Warehouse
- Unit Loads
- Good Distribution Practice
- Evaluating Distribution Packaging

CHAPTER SEVENTEEN - SHOCK, VIBRATION AND COMPRESSION
- Shock
- Quantifying Shock Fragility
- Cushioning Against Shock
- Vibration
- Compression
- Estimating Required Compression Strength

CHAPTER EIGHTEEN - PACKAGING MACHINERY
- Automated Production
- The New Production Line
- Package Design and Machinability
- Speed
- Buffers
- Straight-line and Rotary Systems
- Changeovers
- Machine Controls
- Upgrading Existing Equipment
- Filling Systems
- Liquid Filling
- Dry-product Filling
Introduction to Statistical Process Control

CHAPTER NINETEEN - APPLIED PACKAGING
- Carded Display Packaging
- Blister Packaging
- Carded Skin Packaging
- Chub Packages
- Fiber Cans
- Collapsible Tubes
- Plastic and Paper Bags
- Bar Codes
- Security Labeling
- Durable Goods Packaging
- Wood Packaging
- Pharmaceutical Packaging
- Creative Designs
- Molded Pulp Containers and Forms

CHAPTER TWENTY - THE PACKAGE DEVELOPMENT PROCESS
- Managing the Packaging Function
- Project Scope
- Package Development Process
- Specifications
- Case Study: Redesign of an Oil Battle and Shipping System
- An Example of Graphic Design Development
- Package Designer’s Checklist

Index