

**CONTROL**   
**TECHNIQUES**

# **PACKAGING INDUSTRY**

**DRIVE OBSESSED**



# INTRODUCTION TO PACKAGING

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# INTRODUCTION

Packaging technology has been undergoing rapid development over the past few decades, with consumers reliant on packaging for food safety and transportability in particular. The growth of supermarkets and convenience foods would not have been possible without developments in packaging.

Recent advances in environmentally friendly packaging are helping packaging manufacturers meet demand for recyclable products as consumers seek to reduce waste and limit the harmful impact of modern living on the environment. Sustainability is a major issue for the packaging industry moving forward as companies reliant on the industry are obliged to comply with changing government legislation encouraging recycling.

In this document you will find high level information on packaging technology, an overview of mainstream packaging machines, and the associated processes.

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# PACKAGING INDUSTRY

Packaging technology spans a broad scope, which includes enclosing or protecting products for distribution, storage, sale, and use. Packaging also refers to the process of design, evaluation, and production of packages. Packaging can be described as a coordinated system of preparing goods for transport, warehousing, logistics, sale, and end use.

Packaging is a mode of transport and protection for other products and also plays a role in attracting customers through aesthetic display. Packaging also fills the function of labeling products, for example setting out how the product should be stored or used.

## By Material

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- Paper & Board Packaging
- Plastic Packaging
- Metal Packaging
- Glass Packaging
- Wood Packaging
- Others

## By Function

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- Transport Packaging
- Consumer Packaging

## By Goods

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- Food Packaging
- Drugs Packaging
- Electronic Product Packaging
- Tobacco Packaging
- Chemical Packaging

## By Requirement

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- Humidity-Controlled Packaging
- Antistatic Packaging
- Vacuum Packaging
- Tetra Packaging

# TYPES OF PACKAGING

The diagram below shows some commonly used types of packaging. The concepts of Primary Packaging, Secondary Packaging, and Tertiary Packaging are standardized in ISO CD 18601.

## Primary Packaging

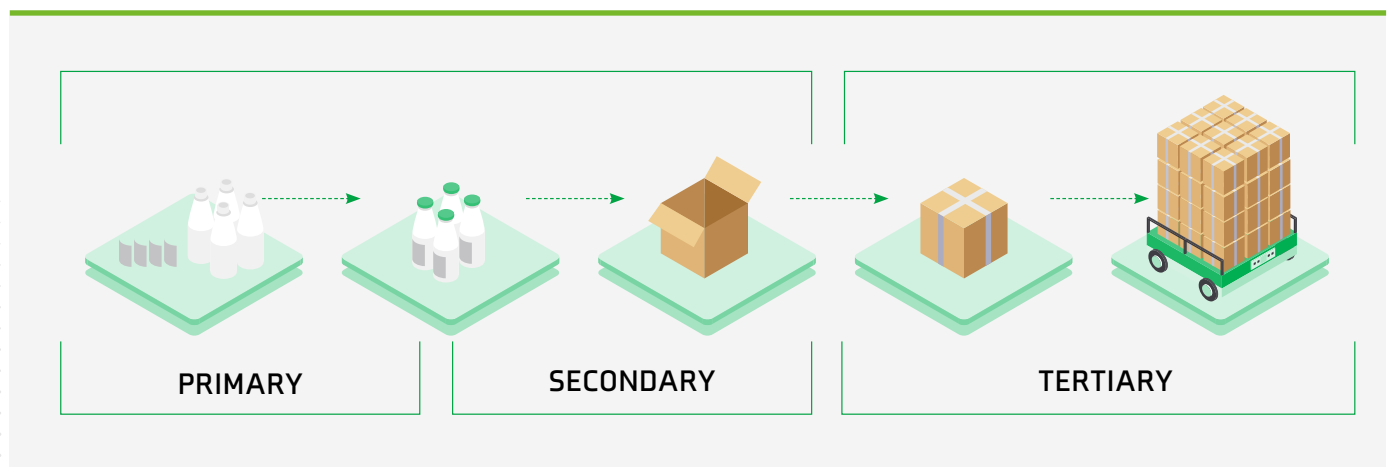
Constitutes the packaging designed to come into direct contact with the product.

## Secondary Packaging

Also known as Group Packaging, groups a given number of primary packaging units together into a convenient unit at the point of sale. Secondary packaging typically has one of two roles: it can be a convenient means to replenish the shelves; or it can group primary packaging units into a package for purchase. It can be removed without affecting the product's properties and generally defines the unit handled by the retailer.

## Tertiary Packaging

Also known as Transport Packaging, is designed to ensure damage-free handling and transport of several grouped packages. The term “transport packaging” does not include road, rail, ship, or air containers. Transport packaging is normally a shipping unit such as an outer case, a pallet, or a crate.



# PACKAGING MACHINES

- Packaging machines can be used for complete or partial packaging processes of product.
- Besides filling, wrapping, and capping, the packaging process also includes pretreatment and end-of-line processes such as cleaning, palletizing, and removing product.
- The packaging machines are used to improve productivity, reduce labor, meet mass production goals, and maintain sanitary requirements.

## BEVERAGE BOTTLING LINE

Blow Molder, Rinser, Filler, Capper, Labeler, Shrink/  
Paper Wrapping, Case Packing, Palletizer, etc.

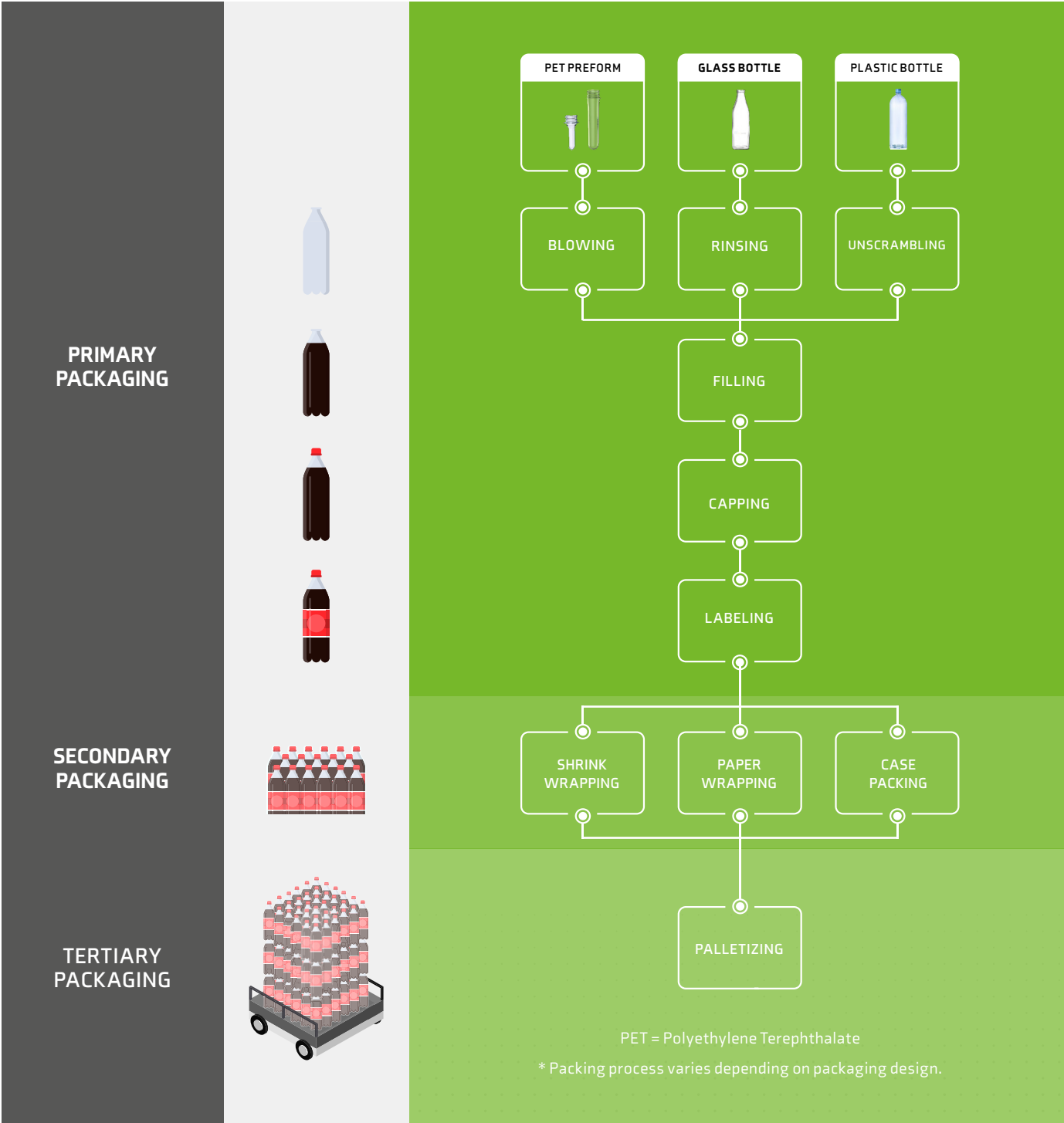
## PACKAGING LINE

Vertical Form, Fill and Seal (VFFS), Horizontal Form,  
Fill and Seal (HFFS), Horizontal Flow Wrapping,  
Cartoner, Case Packing, Palletizer, etc.

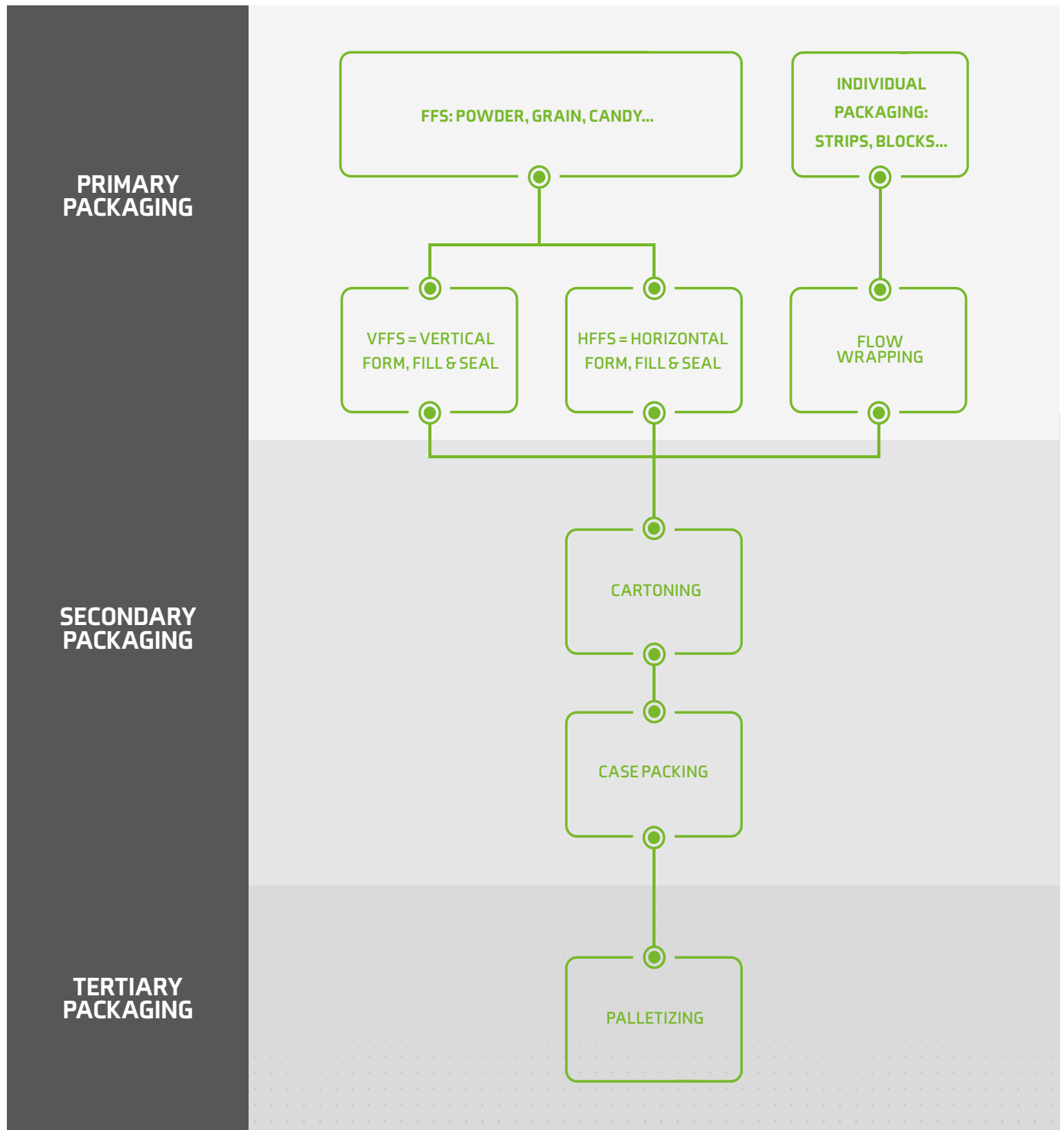
## OTHER PACKAGING MACHINE

Can Filling Line, Thermo Form Fill, Seal Line, etc.

# LIQUIDS PACKAGING



# SOLIDS PACKAGING





# MACHINE PERFORMANCE LEVELS



## PREMIUM LINE

- Speeds greater than 800 ppm.
- Precise control.
- Robust.
- Reduced vibrations.
- Drive system contains high performance frequency inverters and servo drives.



## STANDARD LINE

- Speeds up to 800 ppm.
- High accuracy.
- Drive system contains frequency inverter, servo drives, and mechanical shaft.



## BASIC LINE

- Speeds up to 200 ppm.
- Basic drive performance without accuracy requirement.
- Drive by mechanical shaft or a low cost servo drive or frequency inverter.

# GENERAL PURPOSE DRIVES

Most applications in the Packaging Industry involve a speed control strategy in which the drive regulates the operating speed at a setpoint that may be adjusted from time to time. Our drives are designed to accommodate the rapid changes, rising cost, and the numerous challenges faced by the packaging industry today. Our drives have significant advantages that reduce power consumption and mechanical wear. We offer best-in-class solutions for the packaging industry customer base that spans the globe. Our goal is to stay ahead of the competition with the latest trends and designs.

## Commander

Fractional to 200 HP AC Controls



## KB Electronics

Fractional to 5 HP AC Controls



## KB Electronics

Fractional to 5 HP DC Controls



## Key Applications

- Open Loop Control of Feeder Conveyors
- Stretch Wrappers
- Winders and Auxiliary Motors
- Automatic Stretch Wrappers
- Capping Machines
- Cartoning Machines
- Converting Machines
- Feeding Machines
- Label Dispensers
- Placing Machines
- Slitting Machines

## Key Benefits

- 1 Lower Cost of Ownership • Reduced Machine Cost
- 2 Increase Operator Safety • Maximize Production Uptime
- 3 Improve Finished Product Quality • Energy Savings
- 4 Rapid Installation and Simple to Operate

## Key Features

- 1
  - Free 5-Year Warranty (terms and conditions apply) - CT
  - Wide Power Range up to 200 HP - CT
  - Built-in PLC (Programmable Logic Controller) - CT
  - Built-in RFI filter (Radio Frequency Interference) - CT
  - Economical Indoors or Out (eliminates secondary enclosure) - KB
  - Rugged dye-cast aluminum NEMA 4X / IP65 - KB
  - Dual voltage input up to 2 HP (one drive fits all) - KB
  - Optional Power On/Off AC Line Switch - KB
- 2
  - Built-in STO (Safe Torque Off) COMMANDER C300 - CT
  - FDA approved version for food applications (KBAC & KBDA Series) - KB
  - GFCI compatible with sensitivity adjustment - KB
- 3
  - High Performance Induction Motor Control (RFC) - CT
  - Efficient Permanent Magnet Motor Control (KBVF 4G Series) - KB
- 4
  - Communications Plug-In Options: PROFIBUS, EtherCAT, Ethernet, EtherNet/IP, DeviceNet, CANopen, Modbus RTU, Modbus TCP and PROFINET - CT
  - Easy to install and simple to operate - KB
  - Customization: Ready to Use "Out-of-the-Box" (MOQ as low as 100 pcs) - KB

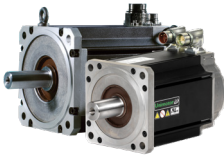
# MOTION AND MACHINE CONTROL

Packaging machine builders face various challenges ranging from rapidly changing customer demands to overall competitive pressures on throughput and cost. Packaging machines are inherently motion-centric and Control Techniques' Motion Made Easy® solution – PTi210 Intregation Module and PowerTools Studio software is the easiest and most reliable way to quickly build and execute many of the high performance motion profiles used by packaging machines today.

**Digitax Servo Drives**  
Fractional to 7.5 kW



**Unimotor Servo Motors**  
0.72 to 136 Nm



**Unidrive AC/Servo Drives**  
1 to 4,200 HP



## Key Applications

- Pressure Sensitive Labeling – Utilize queues, camming, or registration moves
- Filling – Servo piston filling and capping
- Form, Fill and Seal – Winding, feeding, sealing, and cutting
- Wrapping – Material registration control
- Palletizing – Controlling gantry pick and place

## Key Benefits

- 1 Increase throughput - augment speed, accuracy and reliability of discrete operations and positioning to reduce scrap and increase yield
- 2 Decrease costs - minimize enclosure size, changeover time, total cost of ownership
- 3 Increase Operator Safety - Ease of Use

## Key Features

- 62.5µs Current Loop and 250µs Position and Speed Loop update rates that can increase the line speed of most applications
  - 1 • 300% peak overload ability for 250ms for high acceleration and deceleration dynamic performance
  - Maximize control capability - access speed, positioning, registration, camming, and queuing
- 
- Built-in PLC
  - Digitax HD common bus structure
  - 2 • Harsh environments protection - conformal coating
  - Drive and Motor temperature monitoring and protection
  - Programming software included (no charge)
  - Patented air flow management design
- 
- Built-in Safe Torque Off Rated SIL3/PLe
  - MiS210 Safety Module for Unidrive M700 with SIL3/PLe motion funtions and CIP Safety communications
  - 3 • Functional Safety encoder options with Unimotor HD
  - Motion Made Easy - PTi210 and PowerTools Studio software



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