

# Diploma in Packaging

## Module 1 Syllabus

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## UNIT 1: INTRODUCTION TO PACKAGING

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Candidates are required to have an in-depth understanding of the following:

### Packaging Principles

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1. Describe the evolution of packaging.
2. Explain why packaging is required.
3. Define primary, secondary, and tertiary packaging, and how they work together.
4. Describe the technical requirements of a package.
5. Describe how aspects of packaging are made into marketing tools.
6. Identify typical specifications for the key components of packaging.
7. Describe the environmental issues related to packaging.

## UNIT 2: PRIMARY PACKAGING MATERIALS

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Candidates are required to have an in-depth understanding of the following:

### Glass Bottles

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1. Explain the key advantages and disadvantages of glass bottles.
2. Sketch a profile of a glass bottle listing the main parts of the bottle.
3. Understand the sources of raw material for making a glass bottle.
4. Explain how glass colour is created.
5. Describe the glass bottle manufacturing process.
6. Explain the causes of the main bottle faults.
7. Describe a palletisation specification for empty glass bottles.

### Other Bottles

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1. Explain the advantages and disadvantages of plastic bottles.
2. Describe the various forms of plastic used to make bottles and their advantages and disadvantages.
3. Describe the technologies available to make plastic bottles and the benefits each gives.
4. Describe the process of making a plastic bottle.
5. Review the various alternatives for making bottles from other materials.

### Bottle Closures

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1. Review the options for bottle closures.
2. Describe the process of crown cork manufacture.
3. Compare the advantages and disadvantages of the common bottle closures.

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## Cans and ends

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1. Explain the key advantages and disadvantages of cans.
2. Describe a profile of a can, listing the main parts of the can.
3. Review the design criteria for cans and can ends.
4. Explain how cans are made.
5. Describe the can end manufacturing process.
6. Explain can inspection techniques.
7. Provide a typical palletisation specification for empty cans.

# UNIT 3: SECONDARY AND TERTIARY PACKAGING MATERIALS

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Candidates are required to have an in-depth understanding of the following:

## Paper Packaging Materials

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1. Describe the main uses of paper and cardboard in packaging.
2. Explain the steps taken to manufacture paper and cardboard for packaging.
3. Describe the advantages and disadvantages of the various forms of paper packaging.
4. List a typical specification for the main forms of paper packaging.

## Plastic Packaging

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1. Describe the main uses of plastic in packaging.
2. Explain the steps taken to manufacture plastic for packaging.
3. Describe the environmental aspects and impacts of plastic packaging.

## Adhesives

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1. Describe the history of the development of adhesives.
2. Evaluate the various types of adhesives and list their uses.

## UNIT 4: PRODUCTION PREPARATION

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Candidates are required to have an in-depth understanding of the following:

### Product Dilution, Carbonation and Storage

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1. Demonstrate the benefits of high gravity brewing (HGB) or beverage product production and dilution for high volume production.
2. Explain how deaerated water (DAW) is produced.
3. Evaluate the options to carbonate products.
4. Sketch a final product storage vessel explaining best practice principles for product storage.
5. Explain the risks to product quality associated with storage post-filter.

### Sterile Filtration

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1. Explain the theory of sterile filtration.
2. Describe the difference between nominal and absolute filter rating.
3. Review the options for sterile filtration technology.
4. Understand the tests that need to be done on sterile filters to ensure sterility.

### Pasteurisation

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1. Explain the theory of pasteurisation.
2. Describe how pasteurisation units are calculated.
3. Review the options for flash pasteurisation technology.
4. Understand the issues that flash pasteurisation can present.
5. Describe the process controls that are needed when running a flash pasteuriser.
6. Explain how a tunnel pasteuriser works.
7. Review the options for tunnel pasteurisation technology.
8. Understand the issues that tunnel pasteurisation can present.
9. Describe the process controls that are needed when running a tunnel pasteuriser.

## UNIT 5: SMALL PACK OPERATIONS

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Candidates are required to have an in-depth understanding of the following:

### Overview of Small Pack Lines

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1. Explain typical small pack line designs.
2. Understand the relationship between container design and packaging line operation.
3. Describe the considerations needed when designing a container to run efficiently on a packaging line.

## Pre- Filling Operations

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1. Describe the key processes in the pre-filler section of a packaging line.
2. Explain the various conveyor options used on packaging lines.
3. Understand the steps taken to prepare a container for filling.
4. Describe inspection techniques for empty containers.

## Filling and Closing Bottles

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1. Describe the issues in filling product into a container.
2. Review the various filling systems that are used for filling containers.
3. Sketch a glass bottle filling system.
4. Explain the mechanism that is used to fill a glass bottle.
5. Describe the common filling issues with glass bottles.
6. Sketch a PET bottle filling system.
7. Explain the mechanism used to fill a PET bottle.
8. Describe the common filling issues with PET bottles.
9. Review the advantages and disadvantages of aseptic filling.
10. Explain the precautions to be taken for aseptic filling.
11. Sketch a bottle crowner and explain how it works.

## Filling and Closing Cans

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1. Describe the issues with filling product into a can.
2. Describe the various filling systems used for filling cans.
3. Sketch a can filling system.
4. Describe common filling issues with cans.
5. Describe the advantages and disadvantages of aseptic filling.
6. Explain the precautions needed for aseptic filling.
7. Explain how a widget works in a can.
8. Sketch a can seamer and explain how it works.
9. Explain how a can double seam works.

## Post-filler Operations: Labelling, Coding and Post- filler Inspection

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1. Explain how a container is prepared for labelling and coding.
2. Sketch a labeller and describe the labelling process.
3. Review the benefits and issues with the main types of container labelling technology.
4. Demonstrate the need for coding and discuss the options available.
5. Describe the processes used to inspect containers after filling, labelling, and coding.

## Post-filling Operations: Secondary Packaging, Palletisation and Warehousing

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1. Understand the technical requirements of secondary packaging.
2. Examine the process and technology for secondary packaging in terms of container stability, ease of consumer use and waste disposal.
3. Explain the technical requirements of palletisation.
4. Describe the options for warehousing of packaged product.