Qualifications

General Certificate in Packaging Spirits

Examination Syllabus

Introduction

In advance of their examination, candidates will be expected to have full knowledge of the syllabus as examination questions can be asked from any of the topics as detailed below and in the learning materials. The examination may also include some calculation questions.

1: Overview – Spirit Types and their Packaging

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Definition of spirits and types of spirit	• A generic, non-legalistic definition of distilled spirit in terms of its typical ingredients and methods of production • Characteristics which differentiate white spirits, brown spirit and flavoured spirits
Definition of packaging and package types	• The definition of packaging in terms of its aims to meet the needs of the packager, customers, consumers, and typical regulatory requirements • The concept of due diligence to ensure consumer safety • A general knowledge of different types of packaging containers and their suitability to meet differing market conditions

2: Filtered Spirits Production, Storage and Handling

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Spirit filtration	• The purposes of spirits filtration • The basic principles of spirits filtration
Transfer of filtered spirits and spirits handling	• A working knowledge of the key operational procedures • Basic design features of plant and pipe work (not cleaning) • Significance of control of liquid and cost / health and safety aspect of spillage items • The essential plant items from the outlet of a filter to a bright spirit tank and from the bright spirit tank to a filling machine [A representation as a flow diagram]

Storage	• The purposes of storage (holding) • Equilibration and sampling • Minimum and maximum residence times • Spirit blending procedures • Calculations using spirit blend parameters

3: Ready to Drink (RTD) Production, Storage and Handling

Topics	**Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:**
RTD preparation	• Overview of RTD - ingredients and manufacture • RTD – preparation of a batch • RTD Packaging • Methods to avoid oxygen pick–up
Pasteurisation	• The purposes of pasteurisation • A description of pasteurisation and the concept of pasteurisation units (PU) • The significance of the presence of dissolved oxygen before pasteurisation
Types of pasteurisers and their principal features	• The principal features of plate (flash) and tunnel pasteurisers • The differences between tunnel and flash pasteurisers in the achievement of typical values • The diagrammatic representation of the beer/container flows through the sections/zones of plate and tunnel pasteurisers, and their typical operating parameters
Sterile filling	• The special arrangements at the filler for sterile filling

4: Glass Bottles and Associated Packaging Materials

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Bottle design	• A detailed description of the principal characteristics of a non-returnable bottle – shape, dimensions, suitability for spirits and RTD, special features, and wear and tear • A simple labelled diagram of a glass bottle, including the sealed closure
Glass bottle manufacture	• Glass bottle manufacture • Characteristics of glass colours • The importance of glass weight and dimensions • NRB permanent decoration • Glass recycling and sustainability
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5: Glass Bottling Line

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Principal plant items	• The purposes of each plant item • The key operational features of each plant item • The sequence of events for a bottling line from empties handling to finished products being discharged from the line [A representation of a total glass line operation as a labelled flow diagram]
Bottle filling systems	• The principal operating features of filling systems • A simple diagram of a filler • Sequence of events and processes during filling • A simple diagram of a bottle being filled • The control of filling levels and the causes of over / under filling • The use of a filling control chart system • Full bottle transfer and systems to prevent spillage and loss • The reasons for closure damage

Bottle capper and other closure methods	• The principal operating features of a capper and tolerances • A simple labelled diagram of a bottle closure • Other methods of closing a bottle

6: Bottle Washing and Inspection, Plant and Packaging Materials Preparation, and On-line Checks

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Empty bottle rinsing, inspection and full bottle inspection	• The purposes of bottle rinsing and inspection • Checking the effectiveness of inspection and reject systems • The purpose of full bottle checks • The importance of record keeping • Dealing with complaints • The implications of local and national legislation
Preparation of plant and packaging materials	• The procedures and checks carried out on a glass bottling line before production (including utilities) • Incoming quality control, on-line checks and processes carried out on a bottle prior to filling • Incoming quality control, on-line checks and processes carried out on packaging materials • The procedures for size, spirit type and package changes
On-line checks and record keeping	• The purposes of on-line checks during filling, sampling and record keeping • A qualitative working knowledge of all on-line production checks and recording of information for a glass bottling line

7: Labelling and Coding

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Labelling and coding	• The purposes of labelling and coding • The reasons for bar coding and radio frequency tracking devices • Locations on containers and final packages for coding information • The importance of record keeping

8: Assessment and Packaging Line Performance

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Efficiency reporting	• The purposes of efficiency reporting • Typical efficiency calculations and the analysis of data [Candidates will be presented with data to carry out typical calculations of performance indicators] • A description of a typical efficiency reporting system and its use for performance improvement • Visual performance measurement (VPM)
The “V-curve”	• Line capacity rating conventions • The basic principles of a “V-curve” applied to typical packaging lines • Rate limiting factors and critical processes • Machine cycle times and the reasons for maintaining a packaging line in balance
Spirit and packaging material losses	• The analysis of data and basic loss calculations [Candidates will be presented with data to carry out typical loss calculations] • The causes and control of spirit and material losses • Spirit and material losses

9: Warehousing

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Warehouse operations and best practices	• The purposes of a warehouse operation • The handling of empty and full packages with forklift trucks or mechanical systems • Reception and storage of packaging materials and pallets • The reasons for stock rotation • Working knowledge of a stock control system • A quantitative knowledge of the environmental storage conditions for packaged spirit and materials
Health and safety	• The hazards associated with warehousing and typical safety procedures to help avoid them • Typical housekeeping tasks • The importance of pest control • The importance of regular inspection checks for full and empty stock, pallets and packaging materials

	• Operator duties for fork lift truck operation:
	  ○ inspections at the beginning of a shift
	  ○ basic FLT maintenance requirements

10: Spirit Quality and Process Control for Packaging

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Key packaged beer parameters	• The significance of key parameters (including their units of measure) for monitoring spirit quality • Factors which can affect the values of these parameters during packaging
Process specifications	• The purpose of process specifications • The influence of packaging processes on final package parameters
Process control	• The principles of monitoring and adjustment to achieve product consistency and in-package specification • Statistical quality control charts • Typical specifications which differentiate spirit types • Typical applications for in-line and on-line instruments for process control

11: Spirit Quality – Sensory

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Terminology	• The reasons for adopting industry standard descriptors for the nose • The flavour wheel • The more commonly used components
Evaluation and tasting during processing	• Nosing profiling • Individual's ability to perform • Common faults / contamination by contact materials that may be detected by tasting during packaging operations

12: Legislation and the Packaging of Spirits

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Definition of excise tax	• A generic, non-legalistic definition of excise duties • Non-specific examples of international excise systems
Excise duty in relation to distilled spirits packaging	• Excise duty implications on the packaging line • Accounting for duty, importance of control of losses on the packaging line • Calculation of duty returns

13: Spirits Quality – Contamination in Packaging

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:

Non-microbiological contamination of spirit	• Sources of contamination from:
	  ○ empty containers and closures
	  ○ conveying systems
	  ○ plant cleaning
	  ○ oil and grease
	  ○ water and the atmosphere

Microbiological contamination and spoilage organisms of RTD	• The principal categories of spoilage organisms relevant to spirits and RTD packaging
	  ○ their microscopic appearance
	  ○ potential points of contamination in bright beer or container
	  ○ their respective characteristic effects on RTD in-package

Other organisms indicative of contamination of RTD	• Water-borne coliform (Escherichia, Enterobacter); • The implications of their presence
Detection and monitoring and control	• Methods of sampling for microbiological examination • Key sampling points • Laboratory detection methods • Routine practices to protect against infection • Special measures to eliminate on-going sources of infection

14: Quality Assurance and Management

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:

Features of a quality system	• The key features of a quality system:
	  ○ written specifications
	  ○ written procedures
	  ○ monitoring of performance
	  ○ corrective actions
	  ○ auditing
	  ○ regular reviews for improvement

Roles responsibilities and benefits	• The impact of individual actions on product and service quality • The control of documentation • The maintenance of conformity • The business benefits of an effective quality management system
Product safety	• The control of product safety • Hazard analysis and critical control points (HACCP) • The importance of traceability for product recall

15: Plant Cleaning – Detergents and Sterilising Agents

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Detergents (for the RTD line)	• Types of detergent (alkali, acid and neutral) • The constituents of detergents • The individual functions of the constituents • Criteria for choice of detergent for an application • Considerations for the use of hot detergent cleaning
Sterilants (for the RTD line)	• Types of sterilant as defined by the active agent • Criteria for choice of sterilant for an application • The effect of sterilant residues on RTD quality

Heat Sterilisation	• The use of steam as a sterilant
Safety	• The hazards associated with chemical cleaning and sterilising agents • Good practices for the storage of chemicals • Use of personal protective clothing • Procedures in case of accidental spillage or discharge of chemicals

16: Plant Cleaning – In-Place Cleaning Systems

Topics	**Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:**
Types of CIP systems	• The general differences between single use and recovery systems – advantages and disadvantages • The types of cleaning head used and reasons for their choice • The operating principles and diagrammatic representation of CIP systems
CIP cleaning cycles	• Typical cleaning programmes and cycle times • The function of each of the cleaning cycle stages
CIP plant design hygiene considerations	• Design features that minimise soil accumulation in brewery vessels and pipelines • Design features that facilitate vessel and pipeline cleaning using a CIP system • Design features which promote a hygienic working environment
General plant cleaning	• Cleaning plant surfaces, walls and floors • The constituents of foam cleaning agents • The use of foaming systems

17: Engineering Maintenance

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:

Objectives and approaches	• The key business reasons for an effective maintenance system
	• The features, advantages, disadvantages and applications of:
	  ○ no maintenance
	  ○ breakdown maintenance
	  ○ preventive maintenance
	  ○ predictive maintenance
	• The contribution of maintenance tasks to plant safety, reliability, quality, economics and environmental impact

Maintenance tasks	• A detailed description of key maintenance tasks:
	  ○ mechanical
	  ○ electrical
	  ○ calibration
	  ○ inspection
	  ○ condition monitoring
	  ○ cleaning of plant
	  ○ health and safety
	• Maintenance planning and record keeping
	• Autonomous maintenance

Systems for continuous improvement	• The key features of the following performance improvement systems: • Reliability Cantered Maintenance (RCM) • Total Productive Maintenance (TPM) • Workplace Organisation (5S)

18: Utilities – Water and Effluent in Packaging

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:

Water treatments	• The basic principles and diagrammatic representation treatment plants for:
	  ○ water filtration
	  ○ water sterilisation
	  ○ water softening / deionisation
	  ○ water de-aeration

Water types and uses	• Differentiation and typical uses of:
	  ○ de-aerated water
	  ○ process water
	  ○ service water
	• Legionella in cooling water and service water and the health risks associated with the organism
	• Points at which water is introduced into the process and the special water quality needed at these points

Sources of effluent and its measurement	• The nature and characteristics of effluent from principal packaging and bright beer room sources
	• The components of effluent quality:
	  ○ volume
	  ○ suspended solids (SS)
	  ○ chemical oxygen demand (COD)
	  ○ biological oxygen demand (BOD)
	  ○ pH
	  ○ temperature

19: Utilities – Process Gases

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Properties and applications	• The essential properties and quality of compressed air for use as a process gas • The essential properties of carbon dioxide and nitrogen for use as process gases • The significance of inertness • Typical uses for process gases • The economic importance of leak prevention
Health and safety issues	• Safe entry into tanks, cold rooms and other confined spaces • Safe handling and storage of compressed gas cylinders • Safety hazards associated with storage of liquid gases and their distribution in high-pressure mains

20: Packaging and the Environment

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Sustainability and climate change	• The concept of a sustainable industry • The role of carbon dioxide – the carbon cycle • Sources of carbon dioxide emissions
Conservation	• The principal energy consuming activities on a packaging line • Typical energy reduction strategies • Principal water consuming activities • Typical water conservation strategies
Packaging waste	• Waste generating activities and issues for disposal • Strategies to minimise packaging material and encourage recycling • The impact of packaging waste on household (consumer) recycling