



Qualifications

General Certificate in Cider Making

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: Cider Styles and Introduction

Introduction to the General Certificate in Cider Making

Topic	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Cider making process from fruit to finished product overview	<ul style="list-style-type: none">• Overview of the cider production process from raw materials intake to packaging.

Definition of Cider and the Main Cider Styles

Topic	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Definition of cider and main cider styles	<ul style="list-style-type: none">• A simple review of the legal definitions of cider and perry (pear cider) in the principle cider markets.• Cider styles.

2 Raw Materials

Apple Pomology and Pears

Topic	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Apple pomology & pears	<ul style="list-style-type: none">• Main types of apple and pears.• Primary constituents of the fruit.• Breeding and nurseries.

Sugars, Syrups and Other Raw Materials

Topic	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Sugars, syrups and other raw materials	<ul style="list-style-type: none">• Reasons for the use of syrups.• Types of syrup.• Types of acid• Use of sulphur dioxide

Cider Yeast

Topic	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Cider yeast	<ul style="list-style-type: none">• The major components of the yeast cell and how they function.• The process by which yeast cells grow and multiply.• The main sources of cider yeasts – wine yeasts.• The reasons for the selection of these yeasts.• The nutrients in apple juice used by yeast and the additional nutrients added in fermentation make up to supplement these nutrients

3 Milling Process

Orcharding and Harvesting

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Overview	<ul style="list-style-type: none">• Pre-harvest orchard management.
Process	<ul style="list-style-type: none">• Harvesting.• Harvesting process and key requirements.
Technology	<ul style="list-style-type: none">• Harvesting technology.• Hand vs. machine harvesting.

Fruit Intake and Pre-milling

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Overview	<ul style="list-style-type: none">• The purpose of the intake and pre-mill process.
Process	<ul style="list-style-type: none">• Delivery, intake and storage of fruit (if relevant).• Sorting and washing.• Uses of waste matter.
Technology	<ul style="list-style-type: none">• Intake and pre-Mill technology.

Milling and Pressing

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Fruit milling overview	<ul style="list-style-type: none"> The theory of why fruit is milled.
Fruit milling process	<ul style="list-style-type: none"> The importance of mash stand times and temperatures. How fruit cells break down. Enzyme additions and their purpose in preparing the mash for pressing
Fruit milling technology	<ul style="list-style-type: none"> The operating principles of a fruit mill.
Fruit pressing overview	<ul style="list-style-type: none"> The theory and purpose of the fruit press.
Fruit pressing process	<ul style="list-style-type: none"> Methods for the assessment of juice strength/clarity/solids content. Use of pomace as a co-product.
Fruit pressing technology	<ul style="list-style-type: none"> The operating principles and diagrammatic representation of a juice press. Typical cycle times for a press operation.

Juice Clarification and Concentrate Storage

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Juice clarification overview	<ul style="list-style-type: none"> • Reasons for juice clarification.
Juice clarification process	<ul style="list-style-type: none"> • Typical cycle times for a clarification operation. • Methods for the assessment of juice strength/clarity / solids content.
Juice clarification technology	<ul style="list-style-type: none"> • The operating principles and layout of juice clarification processes (by filtration or centrifugation).
Concentrate production and storage overview	<ul style="list-style-type: none"> • Reasons for concentrating juice and the theory of evaporation. • Storage conditions for fresh juice and concentrate.
Concentrate production and storage process	<ul style="list-style-type: none"> • Typical process times and process values of an evaporator. • Methods for the assessment of juice strength/clarity / solids content. • Quality measures to prevent spoilage in storage: the prevention of infection, colour pick up or flavour taints. • How long fresh juice and concentrate can remain in storage.
Concentrate production and storage technology	<ul style="list-style-type: none"> • The operating principles and diagrammatic representation of concentrate production processes (evaporative condensers).

4 Fermentation

Fermentation Preparation

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Fermentation preparation overview	<ul style="list-style-type: none">• Purpose of fermentation preparation• Reconstitution of juice content from concentrate.
Fermentation preparation process	<ul style="list-style-type: none">• Nutrient addition to support yeast growth and fermentation.• The use of sulphur dioxide and/or pasteurisation to sanitise the juice prior to fermentation.
Fermentation preparation technology	<ul style="list-style-type: none">• Benefits of sanitisation for standard fermentations.• Yeast addition methods (dry yeast rehydration) and the typical addition rate per hL.

Fermentation Process and Technology

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Fermentation overview	<ul style="list-style-type: none">• The principles of alcoholic fermentation and key outputs.• Typical stages of fermentation.
Fermentation process	<ul style="list-style-type: none">• Key flavour compounds produced by yeast.• The main phases and events of cider fermentations.• The role of dissolved oxygen.• Other factors affecting the phases of fermentations.• Other factors affecting the speed of fermentations.
Fermentation technology	<ul style="list-style-type: none">• The basic requirements of cider fermentation vessels.• The operating principles and diagram of fermentation vessels; the reasons for their choice and advantages and disadvantages.• Reasons for temperature control.• Procedures for the temperature control of fermentations

5 Maturation and Clarification

Maturation

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Maturation overview	<ul style="list-style-type: none">• Why cider is matured?• The purpose of warm maturation.
Maturation process	<ul style="list-style-type: none">• The impact of malolactic conversion on cider flavour.• Typical changes affecting cider flavour.• Typical times and temperatures appropriate to cider.
Maturation technology	<ul style="list-style-type: none">• Novel maturation processes, bottle maturation and keiving

Cider Clarification

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Clarification overview	<ul style="list-style-type: none">• The purpose of cider filtration and clarification
Clarification process	<ul style="list-style-type: none">• Purpose of cider clarification; nature of particles removed• Checks on clarity or particle count including typical values pre and post filtration.
Clarification technology	<ul style="list-style-type: none">• An understanding of the cider filtration process using microfiltration or depth filtration.• Other potential methods of clarification: centrifugation and fining.

6 Blending and Stabilisation

Blending

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Blending overview	<ul style="list-style-type: none">• The purpose of blending.
Blending process	<ul style="list-style-type: none">• The principle additions to adjust acidity, sweetness, colour and strength.• Flavoured ciders – awareness of the issues associated with adding flavouring juices and materials.
Blending technology	<ul style="list-style-type: none">• Blending options - manual and automated.

Secondary Filtration

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Secondary filtration overview	<ul style="list-style-type: none">• Why do we secondary filter cider?
Secondary filtration process	<ul style="list-style-type: none">• The process of secondary filtration.• Particles removed in the process.
Secondary filtration technology	<ul style="list-style-type: none">• The operating principles and diagrammatic representation of a secondary filter (cartridge or sheet filter).• Typical temperatures and porosities.

Pre-package Preparation

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Carbonation process and technology	<ul style="list-style-type: none">• Typical dissolved CO2 levels for different cider types.• Carbonation point locations.• The operating principles and layout of a carbonator..
Pre-package preparation process and technology	<ul style="list-style-type: none">• In-line pasteurisation prior to packaging process.• In-line pasteurisation technology• Sterile filtration prior to package process.• Sterile filtration technology
Preparation of unfiltered cider for packaging	<ul style="list-style-type: none">• Controlling cider clarity by managing yeast level.
Specific pre-package treatments for special ciders	<ul style="list-style-type: none">• Bottled conditioned cider process and technology

7 Cider Quality

Process Control

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Process and product consistency	<ul style="list-style-type: none">• Variation and variability in cider.• The purpose of a specification.• The concept of tolerance for specification ranges.• Simple statistical quality control procedures.• Simple methods for recording, reporting and the interpretation of data.• The key cider measurable parameters and their influence on quality.• The principles of monitoring and adjustment to achieve product consistency.• Typical applications for in-line and on-line instrumental process control.

Quality Management

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Features of a quality system	<ul style="list-style-type: none">• The definition and benefits of a quality management system.• The processes to implement a quality management system.• Examples of quality management systems and their key principles.
Food safety	<ul style="list-style-type: none">• The typical steps in implementing a HACCP system

Sensory Assessment

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Terminology, evaluation and tasting during cider making	<ul style="list-style-type: none"> • Flavour: What is it and where does it come from? • Importance of flavour control. • Role of sensory evaluation in controlling flavour. • The sensory assessor. • Preparing samples for sensory testing. • Sensory test room conditions. • Types of sensory tests and when to use them <ul style="list-style-type: none"> ○ Sample screening ○ Difference testing ○ Descriptive analysis ○ Flavour wheels ○ Flavour profiling.

Analytical Parameters

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
The spoilage of cider by oxygen	<ul style="list-style-type: none"> • Oxygen as a constituent of air. • Sensitivity of cider to small amounts of oxygen – typical levels causing spoilage. • Oxidation reactions to form flavour compounds. • Typical flavour descriptors for oxidation effects. • Typical points of exposure of cider to air. • Typical specified maximum levels. • Good practices to avoid oxygen pick-up. • The use of sulphur dioxide, ascorbic acid and potassium meta-bisulphite (KMS)..
Other key analytical parameters	<ul style="list-style-type: none"> • The significance of sugar analysis and the relationship to specific gravity. • Sugar/acidity balance in flavour balance. • Tannin, salt and juice content and the impact on flavour. • Alcohol measurement and alcohol impact on flavour

8 Hygiene

Microbiological contamination and control

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Microbiological contamination	<ul style="list-style-type: none">• Definition of bacteria and fungi and examples of those commonly found in cider mills• Methods for detecting microbiological contaminants.
Microbiological control	<ul style="list-style-type: none">• The principle ways to achieve microbiological control in a cider mill.• The types of chemical, light and heat sanitisers used.

Plant Cleaning

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
CIP systems	<ul style="list-style-type: none">• Four key factors for efficient plant cleaning.• The different types of detergents used and the reasons for their choice• The types of cleaning head used and reasons for their choice.• Differences between single use and recovery systems• The operating principles of CIP systems.
CIP cleaning cycles	<ul style="list-style-type: none">• Typical cleaning programs and cycle times.• The function of each of the cleaning cycle stages.
CIP plant design	<ul style="list-style-type: none">• Design features that minimise dirt accumulation in vessels and pipelines and encourage efficient cleaning• Design features which promote a hygienic working environment.

9 Engineering and the Environment

Engineering and Maintenance

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Cider plant maintenance	<ul style="list-style-type: none"> • The key business reasons for an effective maintenance system. • The features, advantages, disadvantages and applications of maintenance systems. • The contribution of maintenance tasks to plant safety, reliability, quality, economics and environmental impact. • Familiarity with key maintenance tasks:
Performance improvement	<ul style="list-style-type: none"> • The key features of the following performance improvement systems: - Reliability Centred Maintenance (RCM) - Total Productive Maintenance (TPM) - Workplace Organisation (6S).

Environment and Utilities

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Sustainability and climate change	<ul style="list-style-type: none"> • Principal energy consuming activities in a cider mill. • Typical energy reduction strategies. • Sustainable agriculture. • The role of carbon dioxide – the carbon cycle. • Sources of carbon dioxide emissions and CO2 recovery.
Water sources and treatments	<ul style="list-style-type: none"> • Characteristics and quality of an ideal cider mill water supply. • Sources of water for a cider mill. • The basic principles and layout of treatment plants for: - water filtration - water sterilisation - water softening / deionisation - water de-aeration
Water types and uses	<ul style="list-style-type: none"> • Differentiation and typical uses of: - de-aerated water - process water - service water. • Prevention of Legionella in water systems. • Points at which water is introduced into the process and the special water quality needed at these points. • Typical water conservation strategies.

Process gases	<ul style="list-style-type: none"> • The essential properties and quality of compressed air and oxygen for use as process gases. • 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. • Safe handling and storage of compressed gas cylinders. • Safety hazards associated with storage of liquid gases and their distribution in high-pressure mains.
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Effluent and Co-products

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
Sources of effluent and its measurement	<ul style="list-style-type: none"> • The nature and characteristics of effluent from principal cider operations. • The components of effluent quality: - volume - suspended solids (SS) - chemical oxygen demand (COD) - biological oxygen demand (BOD) - pH – temperature.
Co-products	<ul style="list-style-type: none"> • The definition of a co-product. • The potential value of a co-product to a cidemaker. • Recovery and reuse of pomace from the milling operation. • Waste yeast and lees disposal and reuse

Health and Safety

Topics	Candidates should understand and be able to explain and describe in simple terms, or demonstrate familiarity with:
General health and safety	<ul style="list-style-type: none"> • The essential precautions needed in the cider mill in order to make it a safe working environment.
Carbon dioxide safety	<ul style="list-style-type: none"> • The evolution of carbon dioxide from fermentations. • The hazards associated with carbon dioxide. • The monitoring / checking of atmospheres for safe working including a quantitative knowledge of exposure limits. • Safe working practices for fermenting room operations.
Chemical safety	<ul style="list-style-type: none"> • The hazards associated with chemical cleaning and sterilising agents. • Good practices for the storage of chemicals. • Use of personal protective clothing.

	<ul style="list-style-type: none">• Procedures in case of accidental spillage or discharge of chemicals.
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