Qualifications

Diploma in Distilling

Module 2

Examination Syllabus 2019

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Unit 1: Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Distillation theory	• Vapour/liquid equilibrium in ethanol/water distillation • Relationship between relative volatility and ethanol concentration • Theoretical plates • Deviations from theoretical behaviour • Azeotropes

Unit 2: Batch Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Design	• Still size • Still design and construction
Operation	• Still operation • Cutting points • Double and triple distillation • Measurement of ethanol concentration • Duration of still operation
Ethanol profiles	• Ethanol profile of wash still distillation • Ethanol profile of spirit still distillation • Importance of optimising ethanol recovery
Congener behaviour	• Types of congener • Effect of changes in spirit still cut points • Removal of congeners from the system
Pre-distillation influences on quality	• Water supply • Raw materials • Culture yeast(s) and fermentation • Microbial infection
Effects of copper	• Thermal degradations and the role of copper • Aspect ratios in still design and the effect on spirit quality • Removal of sulphur compounds by reaction with copper

Unit 3: Continuous Distillation

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Design	• Basic single-column continuous still • Two-column still systems • Multi-column still systems • Plate/column design • Heating of column stills
Operation	• Still operation • Start-up and close-down procedures • Re-distillation of spirit below specification
Ethanol profiles	• Wash strength • Ethanol profile in the rectifier column • Control of reflux ratio • Control of distillate concentration • Legal ethanol concentrations for grain whisky spirit and neutral spirit (UK/EU)
Congener distribution	• Types of congener • High volatile congeners in spirit and heads streams • Low volatile congeners in spent wash • Recycling of hot and cold feints • Recovery of fusel oil from rectifier column and recycling of ethanol
Pre-distillation effects on quality	• Water supply • Raw materials • Culture yeast(s) and fermentation • Microbial infection • Influence of copper in column stills

Unit 4: Post Distillation Modification of Flavour

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Basic concepts of maturation	• Characteristics of new and mature spirit • Immature characteristics to be removed • Desirable mature attributes
Principle factors involved in maturation	• Cask type • Spirit strength • Storage conditions, especially temperature and humidity • Effect of atmospheric oxygen
Properties of oak wood	• Physical properties: low porosity, internal structure, resistance to cracking • Chemical composition of oak wood • American and European oaks
Cask types and properties	• Manufacture of new casks • Refill casks • Matching of spirit to cask
General nature of maturation changes	• Physical and chemical effects during maturation
Cask filling	• Principles of cask filling
Non-matured spirits: gin and vodka	• Quality standards of cereals for gin and vodka production • Botanicals for distilled gin • Operation of gin still • Recovery of gin feints for re-use • Preparation and use of essences for non-distilled gin • Purification of spirit for vodka

Unit 5: Quality

Topic	Candidates should understand and be able to demonstrate using detailed examples:
Quality management	• Quality control principles and practices • Quality assurance principles and practices • International standards • Food safety • Procedures and controls • The basic principles of analytical and on-line measurement techniques • Hazard Analysis Critical Control Point (HACCP)
Laboratory analysis	• Basic analytical techniques and their use in distilling • The basic concepts applied to interpretation of analytical data
Sensory analysis	• Basic sensory techniques and their use in distilling
Hygiene	• Microbial contamination: • Preventing microbial contamination: • Cleaning-in-Place (CIP) principles • Design and operation of CIP systems • Detergents and sanitising agents • Detection and quantification of residual surface contamination