

Title	Demonstrate knowledge of engineering support services for beverage manufacturing plants		
Level	3	Credits	6

Purpose	People credited with this unit standard are able to explain: plant maintenance; the main requirements of beverage plant construction and design; the main requirements of packaging plant construction and design; instrumentation and process control; and engineering services found in beverage manufacturing plants.
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Classification	Food and Related Products Processing > Food Production - Beverages
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Available grade	Achieved
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Guidance Information

This unit standard is a general introduction to engineering support services. For specific information related to engineering safety see unit standard 2824, or understanding instrumentation and control see the level 3 unit standards 2630, 2632, 2634, 2636, 2638, 2653, 2659, 2663 and 2668. For specific information related to calibration and analytical aspects see unit standards 2665 and 2641.

Outcomes and performance criteria

Outcome 1

Explain plant maintenance.

Performance criteria

1.1 The explanation gives the need for plant maintenance in terms of its effect on plant and equipment and its contribution to efficient production.

1.2 The explanation relates the different types of maintenance in terms of employing a proactive or reactive approach.

Range maintenance types – breakdown, planned, preventative, condition monitoring.

1.3 The explanation describes a computerised maintenance system in terms of reasons for its use, how it fits into a computerised operating system, and what items the maintenance system contains.

- 1.4 The explanation describes management processes to achieve improved plant operational performance in terms of philosophy of approach and methods used.
- Range management processes – JIT (just in time), TPM (total productive maintenance), CI (continuous improvement).
- 1.5 The explanation outlines the role of lubrication in plant maintenance in terms of schedule of application, variety of lubricants, and their use within either a beverage or a packaging plant.

Outcome 2

Explain the main requirements of beverage plant construction and design.

Performance criteria

- 2.1 The explanation links the characteristics of materials to parts of a beverage production plant where they are used.
- Range materials – mild steel, stainless steel, copper, plastics, wood.
- 2.2 The explanation relates the causes and prevention of common forms of metal corrosion within a beverage production environment.
- Range types of metal corrosion – uniform, pitting, intergranular, stress, fatigue or non chemical; evidence of three is required.
- 2.3 The explanation describes features of major vessels, tanks and pipework in terms of materials used, shape, and size for a given beverage production area.
- Range features – processes performed, optimising cleaning.
- 2.4 The explanation relates types of valves to their application in a beverage production plant.
- Range valve types – butterfly, non-return, diaphragm, ball, angle, needle, gate, globe, double; evidence of three is required.
- 2.5 The explanation relates types of pumps to their application in a beverage production plant.
- Range pump types – centrifugal, rotary, gear, reciprocating-piston, peristaltic; evidence of three is required.
- 2.6 The explanation relates the control and sequencing of pumps and valves to the requirements of a production line in a beverage production plant.

Outcome 3

Explain the main requirements of packaging plant construction and design.

Performance criteria

- 3.1 The explanation outlines the layout of a specified beverage packaging line in terms of the placement of key machines, the flow of product, the degree of automation, safety and cleaning features.
- 3.2 The explanation outlines the set-up and change over procedures for packaging lines as they apply on a specified beverage packaging line.
- Range procedures – benefits of approach, personnel involved, method used.
- 3.3 The explanation outlines conveyor systems in terms of capacity, travel pattern, and suitability for products or materials.
- Range screw conveyors, belt conveyors, bucket elevators, pneumatic conveyors, chain or roller conveyors.
- 3.4 The explanation outlines the desired features of packaging conveyor system in terms of rate, speed, efficiency, minimum disturbance or damage, and minimum noise.
- 3.5 The explanation describes the line settings for a conveyor system in terms of guide rails, lubrication, and handling transfers and bends.
- Range line settings – single lane, multi lane.

Outcome 4

Explain instrumentation and process control.

Performance criteria

- 4.1 The explanation relates the types of instrumentation found to their purpose in a beverage production line.
- Range instrumentation – pressure, flow, temperature, level, mass.
- 4.2 The explanation describes instrument calibration procedures in terms of the quality assurance procedures which apply to a specified beverage production line.
- 4.3 The explanation outlines the basic principles of process control in terms of control types and where they would be used within a beverage production line.
- Range control types – proportional, integral, derivative.

- 4.4 The explanation describes information management systems in terms of philosophy of approach and methods used.

Range MIS (management information systems), CIM (computer integrated manufacturing), SCAD (supervisory control and data acquisition).

Outcome 5

Explain engineering services found in beverage manufacturing plants.

Performance criteria

- 5.1 The explanation gives the location of major components of plant electrical systems in a specified beverage production plant.

Range components – distribution, transformers, motors, heating, metering.

- 5.2 The explanation outlines the key electrical safety measures in place in a specified beverage production plant in terms of ensuring the safety of people and plant.

- 5.3 The explanation relates types of heating systems to their primary energy source and application on a beverage production line.

Range heating systems – conduction, convection, radiation.

- 5.4 The explanation outlines steam raising and distribution systems in terms of the equipment used and the use steam is put to in a specified beverage production plant.

- 5.5 The explanation outlines the type of refrigeration systems used in terms of the equipment and plant used, and the stages of production when refrigeration is required.

- 5.6 The explanation relates to the gas and service system used in a specified beverage production plant.

Range type of gas, use in production, process for collection, storage, and transfer of gas;
examples of gas types include but are not limited to – compressed air, carbon dioxide, oxygen.

- 5.7 The explanation outlines cleaning and service water supply in terms of sources, treatment, usage ratios, and resource consents.

- 5.8 The explanation outlines effluent control in terms of sources, monitoring, treatments, disposal, and resource consents.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	6 May 1999	31 December 2022
Review	2	19 August 2004	31 December 2022
Review	3	28 January 2021	31 December 2022

Consent and Moderation Requirements (CMR) reference

0111

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.