Title	**Describe and apply laboratory fundamentals in a primary products food processing operation**		
Level	**3**	**Credits**	**10**

Purpose	People credited with this unit standard are able to describe: environmental controls used in a laboratory; sampling used in a laboratory; and cleaning and sterilisation of laboratory equipment, in a primary products food processing operation. They will also be able to: use laboratory glassware handling techniques; measure volume in a laboratory, and calibrate a pipette; measure weight, perform calibration checks and effects of temperature, electrostatics and evaporation on weight under experimental conditions in a laboratory; measure temperature in a laboratory; measure pH in a laboratory; and apply laboratory practices, in a primary products food processing operation.

Classification	Primary Products Food Processing > Primary Products Food Processing - Operational Skills

Available grade	Achieved

Guidance Information

1 Legislation and standards relevant to this unit standard include but are not limited to:
- Hazardous Substances and New Organisms Act 1996;
- Health and Safety at Work Act 2015;
- Health and Safety in Employment Regulations 1995;
- Resource Management Act 1991;]
- NZS ISO/IEC 17025:2018 *General requirements for the competence of testing and calibration laboratories*, available at http://www.standards.co.nz; and any subsequent amendments.

2 Definitions
Organisational requirements – instructions to staff on policies and procedures which are documented in memo, electronic or manual format and are available in the workplace.
Primary products food processing operation – covers a meat, dairy, seafood, fruit and vegetable and honey processing, food and beverage manufacturing, and other related industries.

3 All evidence presented in this unit standard must be in accordance with organisational requirements.

Outcomes and performance criteria

Outcome 1

Describe environmental controls used in a laboratory in a primary products food processing operation.

Performance criteria

1.1 Describe the purpose of red line areas in terms of NZS/ISO 17025:2018.

1.2 Describe laboratory housekeeping requirements in terms of NZS/ISO 17025:2018.

1.3 Describe types of laboratory environmental tests in terms of NZS/ISO 17025:2018.

Range evidence of two tests is required.

Outcome 2

Describe sampling used in a laboratory in a primary products food processing operation.

Performance criteria

2.1 Describe methods of sampling.

Range methods may include but are not limited to – strategic, stratified, random, compositing, blending, auto samplers;
evidence of two different methods is required.

2.2 Describe the contamination factors that affect sample integrity in terms of their effect.

2.3 Describe the importance of sampling used in a laboratory in a primary products food processing operation.

Range importance may include but is not limited to – product types, types of containers, sample rates, sample identification, sampling areas, handling and storage, special precautions;
evidence of two factors is required.

Outcome 3

Describe the cleaning and sterilisation of laboratory equipment used in a primary products food processing operation.

Range laboratory equipment includes but is not limited to – glassware, plastic ware, utensils.

Performance criteria

3.1 Describe the cleaning equation in terms of its importance to the cleaning programme.

Range cleaning programme includes but is not limited to – soil type, surface type, standard required, safety.

3.2 Describe soil types in terms of the cleaning agents required to achieve clean surfaces.

3.3 Describe time, temperature and chemical concentrations in terms of the sterilisation requirements.

Range requirements include but are not limited to – heat (dry), heat (wet), alcohol.

Outcome 4

Use laboratory glassware handling techniques in a primary products food processing operation.

Performance criteria

4.1 Describe changes to the properties of laboratory glassware in terms of types of glass, chemical and heat resistance and co-efficient of expansion.

4.2 Describe the safe handling of glassware in terms of the properties of glass and laboratory safety requirements specified in NZS/ISO 17025:2018.

Range safe handling includes but is not limited to preventing – breakage, burns, implosion, explosion.

Outcome 5

Measure volume in a laboratory and calibrate a pipette in a primary products food processing operation.

Performance criteria

5.1 Record mathematical descriptions of volume measurement in terms of microliter, ml, litre and cubic capacity.

5.2 Measure volume of water using a pipette, burette, volumetric flask, measuring cylinder and micro-pipette.

5.3 Calibrate a pipette.

Range autopipette, volumetric pipette, graduated pipette; example of one pipette is required.

Outcome 6

Measure weight, perform calibration checks and effects of temperature, electrostatics and evaporation on weight under experimental conditions in a laboratory in a primary products food processing operation.

Performance criteria

6.1 Record mathematical descriptions of weight in terms of microgram, milligram, gram, kilogram, artefact standard and weight of liquids.

6.2 Set up balances for use in accordance with the manufacturer's specifications.

Range balances include but are not limited to – four decimal places, top-loading.

6.3 Perform calibration checks on the balances.

Range calibration checks include but are not limited to – four decimal places, top-loading.

6.4 Describe the effects of temperature, electrostatics and evaporation on weight under experimental conditions.

Outcome 7

Measure temperature in a laboratory in a primary products food processing operation.

Performance criteria

7.1 Describe the fundamental interval in terms of its effect on measuring temperature.

7.2 Describe the relationships between temperature units of measurement mathematically.

Range temperature units of measurement include but are not limited to – Fahrenheit, Celsius, and kelvin.

7.3 Describe thermometer calibration in terms of ice point, boiling point and traceability to the industry standard.

7.4 Read a thermometer in terms of the thermometer's accuracy limits.

Outcome 8

Measure pH in a laboratory in a primary products food processing operation.

Performance criteria

8.1 Describe acids and bases in terms of their relationship to the measurement of pH.

8.2 Test solutions to affect a colour change of the test indicator substance.

Range testing indicators include but are not limited to – litmus, phenolphthalein, methyl orange, bromothymol blue.

8.3 Describe pH scale in terms of logarithmic progression.

8.4 Describe care and maintenance of the pH meter and the electrodes in terms of the manufacturer's operating instructions.

8.5 Describe the requirement of traceable pH buffers in terms of the Certificate of Analysis that show the calibration of the pH probe is accurate.

8.6 Calibrate pH meter in accordance with the manufacturer's operating instructions.

8.7 Test solutions for pH, using a pH meter, and record the results.

Range solutions include but are not limited to – distilled water, milk, .01M HC1, .01 M NaOH, .01 M lactic acid.

Outcome 9

Apply laboratory practices in a primary products food processing operation.

Performance criteria

9.1 Describe environmental controls operating in the laboratory.

9.2 Sample products relevant to the site.

9.3 Clean microbiological and chemistry glassware and utensils.

9.4 Describe calibration status procedures of equipment and glassware in terms of volume, temperature, weight and pH.

9.5 Use balance for tests relevant to the job tasks in the workplace.

9.6 Use pH meters relevant to the job tasks in the workplace.

Replacement information	This unit standard replaced unit standard 4309.

Planned review date	31 December 2026

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	17 September 2015	31 December 2021
Review	2	24 October 2019	31 December 2024
Reinstatement	3	24 March 2022	N/A

Consent and Moderation Requirements (CMR) reference	0033

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

Please contact the Hanga-Aro-Rau Manufacturing, Engineering, and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.