Title	**Describe the operation of a milkfat fractionation process in a dairy processing operation**		
Level	**5**	**Credits**	**20**

Purpose	People credited with this unit standard are able to describe: the properties of the components of raw materials associated with milkfat; multi-stage milkfat fractionation processes for the manufacture of milkfat; handling and processing of raw materials and end products in the manufacture of milkfat fractions; and the cleaning of multi-stage milkfat fractionation production areas, in a dairy processing operation.

Classification	Dairy Processing > Milk Products

Available grade	Achieved

Guidance Information

1 Legislation and regulations relevant to this unit standard include but are not limited to:
- Animal Products Act 1999;
- Health and Safety at Work Act 2015;
- Animal Products (Dairy) Regulations 2005.

2 Definition
Milkfat fractions refers to the products manufactured using milkfat fractionation plant.

3 For assessment against this unit standard, it is expected that the candidate will be experienced in the operation of milkfat fractionation plant. This experience will include the handling of raw materials for the processing and packaging of the finished product.

Outcomes and performance criteria

Outcome 1

Describe the properties of the components of raw materials associated with milkfat in a dairy processing operation.

Performance criteria

1.1 Describe components of milkfat in terms of their influence on the properties of the final products.

Range components include but are not limited to – colouring compounds; short, medium, long, and unsaturated fatty acids; partial triglycerides; free fatty acids;
properties include but are not limited to – melting properties and crystallisation of triglycerides, seasonal variation.

1.2 Describe causes of lipolysis and oxidation of milkfat in terms of their influence on milkfat and the milkfat fractionation process.

1.3 Describe raw material acceptance requirements for milkfat fractionation in terms of achieving successful milkfat fractionation.

Range requirements include but are not limited to – oxygen, free fatty acids, insoluble matter (eg protein), water, soaps, detergents.

Outcome 2

Describe multi-stage milkfat fractionation processes for the manufacture of milkfat in a dairy processing operation.

Performance criteria

2.1 Describe the function, design, and operation of multi-stage milkfat fractionation equipment in terms of the manufacture of milkfat fractions.

Range equipment includes but is not limited to – crystallisers, membrane filters, alternative filters, basket centrifuge, de-aeration equipment, melting hoppers, fraction storage tanks.

2.2 Describe edible oil crystallisation in terms of the manufacture of milkfat fractions.

Range crystallisation includes but is not limited to – crystal forms, rate of crystallisation, nucleation, crystal growth, mixed crystals, entrainment, slurry characteristics.

2.3 Describe process variables in terms of the manufacture of milkfat fractions.

Range process variables include but are not limited to – raw materials, crystallisation temperatures, crystallisation time, agitation speed, filtration pressure.

2.4 Describe a multi-stage milkfat fractionation process in terms of the use of fractions for the manufacture and functionality of bakery products.

Range fractions include but are not limited to – solid fat content, melting or dropping point, colour, flavour, oxidation stability, functional consistency, blending of fractions.

2.5 Describe a multi-stage milkfat fractionation process in terms of the manufacture and functionality of spreadable butter and contrasts between it and standard butter.

Range contrasts include but are not limited to – melting profile as measured by the solid fat content and differential scanning calorimetry, spreadability, hardness.

Outcome 3

Describe handling and processing of raw materials and end products in the manufacture of milkfat fractions in a dairy processing operation.

Performance criteria

3.1 Describe safe handling in terms of hazards that may result in personal injury or harm.

Range personal hazards include but are not limited to – suffocation due to nitrogen blanketing of tanks, static electricity, hydraulic and pneumatic pressure, agitators, height.

3.2 Describe safe handling in terms of hazards that may affect plant performance.

Range plant performance hazards include but are not limited to – temperature (heat and cold), contamination.

Outcome 4

Describe the cleaning of multi-stage milkfat fractionation production areas in a dairy processing operation.

Performance criteria

4.1 Describe manual and automated cleaning of milkfat fractionation production areas in terms of factors affecting cleaning performance and operator safety.

Range factors include but are not limited to – toxicity and biological action of cleaning chemicals, frequency of cleaning, effects on plant performance, line pigging, wettability of fractions, fraction properties, chemical stability of filter cloths and membranes, temperature for cleaning, cleanliness of service water for fitter.

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	22 October 2002	31 December 2012
Revision	2	13 June 2003	31 December 2012
Rollover and Revision	3	20 June 2006	31 December 2014
Rollover	4	17 July 2009	31 December 2016
Review	5	18 June 2015	31 December 2024
Review	6	28 April 2022	N/A

Consent and Moderation Requirements (CMR) reference	0022

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

Comments on this unit standard

Please contact 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.