Title	**Describe anhydrous milkfat manufacturing in a dairy processing operation**		
Level	**5**	**Credits**	**15**

Purpose	People credited with this unit standard are able to describe: properties of raw materials and anhydrous milkfat (AMF) products; the handling and processing of raw materials used for the manufacture of AMF products; and AMF manufacturing processes for the manufacture of AMF products, 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 For assessment against this unit standard, it is expected that the candidate will be experienced in the operation of anhydrous AMF 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 properties of raw materials and AMF products in a dairy processing operation.

Performance criteria

1.1 Describe milk components in terms of their influence on the AMF manufacturing process and on the properties of the final products.

Range properties may include but are not limited to – sterols, vitamins, phospholipids, colouring compounds, fatty acids (short, medium, long, unsaturated), melting properties and crystallisation of triglycerides, seasonal variation;
evidence of five properties is required.

© New Zealand Qualifications Authority 2022

1.2 Describe the causes of lipolysis and oxidation of milkfat in terms of their influence on the AMF manufacturing process and on final AMF flavour and shelf-life.

Range causes may include but are not limited to – oxidation catalysts, peroxide value, free fatty acid, dissolved oxygen;
evidence of three causes is required.

1.3 Describe conditions for microbial contaminants, growth and control in terms of achieving AMF product and serum by-product specifications.

Range contaminants may include but are not limited to – pathogens, psychrotrophs, coliforms, thermophiles, yeasts, moulds;
evidence of three contaminants is required.

Outcome 2

Describe the handling and processing of raw materials used for the manufacture of AMF products in a dairy processing operation.

Performance criteria

2.1 Describe milk and cream handling in terms of manufacturing to meet final product specifications of AMF products.

Range product specifications may include but are not limited to – emulsion stability, fat globule membrane, gelling, microbial growth, lipolysis, neutralisation, solids not fat content;
evidence of four product specifications is required.

2.2 Describe the purposes of cream or AMF pasteurisation in terms of manufacturing to meet final product specifications of AMF products.

Range purposes may include but are not limited to – flavour management, lipase inactivation, free fatty acids, peroxide value, shelf-life;
evidence of three purposes is required.

Outcome 3

Describe AMF manufacturing processes for the manufacture of AMF products in a dairy processing operation.

© New Zealand Qualifications Authority 2022

Performance criteria

3.1 Describe the components of AMF plants in terms of the operating principles.

Range components may include but are not limited to – cream pre-heating plate heat exchanger, butter melting system, cream concentrating separator, phase inversion device (homogeniser), concentrate separator, neutralising system, polishing separator, dehydrator, cooling plate heat exchanger, packing silo, packaging system, buttermilk separator, beta-serum separator;
evidence of six components is required.

3.2 Describe AMF plant variables in terms of their effect on composition control and quality of AMF products.

Range variables may include but are not limited to – throughput, plant temperature, high fat cream fat content, homogenising pressure, recycle rates, separator back pressures, moisture content, caustic strength, mixing intensity, holding time, polishing water flow, dehydration temperature, vacuum, steam strip rate, dissolved oxygen content, process control, startup and shutdown;
evidence of six variables is required.

3.3 Describe AMF silo holding and packing in terms of product keeping quality, consistency, and pack integrity.

Range silo holding and packing may include but are not limited to – nitrogen blanketing, AMF silo agitation, packing fill rate, temperature, filling lance, drum filling, net weights, headspace flushing;
evidence of four silo holding and packing examples is required.

3.4 Describe AMF plant cleaning in terms of cleaning performance and operator safety.

Range cleaning performance may include but is not limited to – fat recovery, clean in place, separator cleaning, chemicals, flow rates;
evidence of three is required.

3.5 Describe separator operation in terms of equipment performance.

Range equipment performance may include but is not limited to – separator design, separating efficiency, separation zone, back pressures, desludging, safe operating procedures;
evidence of three is required.

3.6 Describe quality control and final product grading in terms of manufacturing AMF products to customer product purchase specifications.

Range quality control and grading may include but are not limited to – trace back, sensory evaluation;
evidence of two is required.

© New Zealand Qualifications Authority 2022

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	10 January 1994	31 December 2012
Revision	2	16 September 1997	31 December 2012
Review	3	5 July 1999	31 December 2012
Revision	4	13 June 2003	31 December 2012
Rollover and Revision	5	20 June 2006	31 December 2014
Rollover	6	17 July 2009	31 December 2016
Review	7	18 June 2015	31 December 2024
Review	8	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.

© New Zealand Qualifications Authority 2022