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GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 927

25 September 2009



SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Manufacturing and Assembly Processes

registered by Organising Field 06 – Manufacturing, Engineering and Technology, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at www.saqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and **no later than 26 October 2009**. All correspondence should be marked **Standards Setting – SGB for Manufacturing and Assembly Processes** and addressed to

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D. MPHUTHING

ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:**National Certificate: Cereals, Snacks, Pasta and Condiments Manufacturing**

SAQA QUAL ID	QUALIFICATION TITLE		
74189	National Certificate: Cereals, Snacks, Pasta and Condiments Manufacturing		
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	120	Level 3	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
20197	National Certificate: Food and Beverage Processing: Cereals, Snacks, Pasta, Spices, Condiments and Culinary Processing	Level 3	120	Will occur as soon as 74189 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This Qualification is an outcome of the revision of the National Certificate in Food and Beverage Processing: Cereals, Snacks, Pasta, Spices, Condiments and Culinary Processing NQF Level 3 (NLRD 20197).

A person acquiring this Qualification will be able to work in cereals, snacks, pasta or condiments manufacturing environment by performing all the necessary manufacturing processes applicable to the work environment, from intake of the raw material to product manufacturing and presentation of the final product for packaging. The learner will also apply quality control practices throughout the process to enhance quality assurance and food safety requirements of the final product.

This Qualification provides the learner with the opportunity to access skills and career opportunities in the following learning streams within the food manufacturing industry:

- Cereals manufacturing.
- Pasta manufacturing.
- Snacks manufacturing.
- Condiments manufacturing.

The following range statements are applicable to cereals, snacks, pasta or condiments manufacturing:

- Cereals: All types of dry, ready-to-eat, cold breakfast cereals, as well as dry, instant and non-instant breakfast cereals that need cooking or addition of hot water prior to consumption.

- Pasta: All types of dry pasta intended for further processing into meals.
- Snacks: All types of dry savoury snacks, e.g. chips, pretzels and popcorn.
- Condiments: Any relish, sauce or seasoning (including herbs and spices) added to food to impart flavour, or to compliment the dish. A condiment can be dry or in the form of a thick liquid or paste.

A person acquiring this Qualification will also be able to operate equipment applicable to the relevant manufacturing processes of his/her choice. Portable competencies such as performing quality control practices and knowledge about introductory microbiology and heating and cooling media will also be obtained. The person will be able to apply all relevant personal safety and food safety practices when performing relevant tasks.

This Qualification ensures mobility and progression within the cereals, snacks, pasta and condiments food manufacturing industry.

Rationale:

This Qualification addresses the workplace-based needs of the cereals, snacks, pasta or condiments manufacturing industry that have been expressed by both employers and employees. Typical learners will be:

- Persons who are currently working in a cereals, snacks, pasta or condiments manufacturing environment who do not have any formal qualification as recognition for their skills and knowledge.
- Learners with a broad knowledge and skills base in food handling practices who want to specialise in the cereals, snacks, pasta or condiments manufacturing industry.
- New entrants who want to develop employable skills in the cereals, snacks, pasta or condiments manufacturing industry.

This Qualification aims at providing formal recognition for competencies already obtained and will continue to do so by providing recognition to current workers in the cereals, snacks, pasta or condiments manufacturing industry. In addition, this Qualification provides the new entrant with the opportunity to obtain competencies in cereals, snacks, pasta or condiments manufacturing within the workplace, as well as in quality control and food safety practices, which will ensure food products that are healthy and safe for human consumption. In this way, value is added to workers' employability and competence and the sustainability of the cereals, snacks, pasta or condiments manufacturing industry is improved.

This Qualification provides the learner with competencies to be employed in different disciplines within the cereals, snacks, pasta or condiments manufacturing industry, as well as the flexibility to pursue careers within other sectors of the food manufacturing industry as indicated in the Articulation Possibilities. Besides manufacturing of cereals, snacks, pasta or condiments, the range of Core and Elective Unit Standards will allow the individual the opportunity to pursue careers within quality control, as well as to be introduced to some principles of team management and generic management. Skilled workers are one of the key players in better manufacturing standards and productivity, which may increase business prosperity. This Qualification will assist in social and economic transformation.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

- Communication at NQF Level 2.
- Mathematical Literacy at NQF Level 2.

Recognition of Prior Learning:

This Qualification may be achieved in part or completely through the Recognition of Prior Learning, which includes formal, informal and non-formal learning and work experience. Evidence can be presented in a variety of forms, including previous international or local qualifications, reports, testimonials, mentoring functions performed, portfolios, work records and performance records. As such, evidence should be judged according to the general principles of assessment. Learners who have met the requirements of any Unit Standard that forms part of this Qualification may apply for recognition of prior learning to the relevant ETQA. The applicant must be assessed against the specific outcomes and assessment criteria for the relevant Unit Standards. A Qualification will be awarded should a learner demonstrate that all the exit level outcomes of the Qualification have been attained.

Access to the Qualification:

Open to any person.

QUALIFICATION RULES

- All the Unit Standards in the Fundamental component (36 Credits) are compulsory.
- All the Unit Standards in the Core component (60 Credits) are compulsory.
- In addition, from the Elective component, the learner must choose one of the following Elective specialisations and complete Unit Standards to the value of 24 Credits from those listed for the specialisation. Elective strands include the following:

Cereals manufacturing; Choose the relevant Unit Standard(s) from the following list:

NLRD Number; Unit Standard title; NQF Level; Credits:

- ID 8863: Mill or grind a food product; NQF Level 3; 8 Credits.
- ID9072: Cook food products using continuous processing equipment; NQF Level 3; 8 Credits.
- ID 9070: Toast a food product in an oven toaster; NQF Level 3; 8 Credits.
- ID 8882: Roast beans or nuts; NQF Level 3; 8 Credits.
- ID 9074: Puff a food product using a pressure chamber; NQF Level 3; 9 Credits.
- ID 8808: Extrude food products using a continuous extruder; NQF Level 3; 10 Credits.
- ID 336761: Dry a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 336780: Cool a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 123355: Manufacture a dry food product by means of a roller dryer; NQF Level 4; 30 Credits.
- ID 9054: Coat or dip a food product using automated equipment; NQF Level 2; 6 Credits.

Snacks manufacturing; Choose the relevant Unit Standard(s) from the following list:

NLRD Number; Unit Standard title; NQF Level; Credits:

- ID 336762: Steep maize for manufacturing of corn snacks or starch; NQF Level 3; 4 Credits.
- ID 8783 : Peel fruit and vegetables for further processing; NQF Level 2; 4 Credits.
- ID 8784 : Shape fruit and vegetables for further processing; NQF Level 3; 10 Credits.
- ID 9054 : Coat or dip a food product using automated equipment; NQF Level 2; 6 Credits.
- ID 9072 : Cook food products using continuous processing equipment; NQF Level 3; 8 Credits.
- ID 8806 : Fry food products using vacuum or atmospheric frying equipment; NQF Level 3; 20 Credits.
- ID 8808: Extrude food products using a continuous extruder; NQF Level 3; 10 Credits.
- ID 9074: Puff a food product using a pressure chamber; NQF Level 3; 9 Credits.
- ID 9070: Toast a food product in an oven toaster; NQF Level 3; 8 Credits.

- ID 8882: Roast beans or nuts; NQF Level 3; 8 Credits.
- ID 336761: Dry a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 336780: Cool a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 336760: Pop maize kernels for manufacturing of popcorn; NQF Level 2; 3 Credits.

Pasta manufacturing; Choose the relevant Unit Standard(s) from the following list:

NLRD Number; Unit Standard title; NQF Level; Credits:

- ID 336759: Demonstrate an understanding of the origin, purpose and function of raw materials used in the manufacture of pasta products; NQF Level 3; 5 Credits.
- ID 8766: Mix or blend food raw materials for processing using automated equipment; NQF Level 2; 4 Credits.
- ID 8808: Extrude food products using a continuous extruder; NQF Level 3; 10 Credits.
- ID 336761: Dry a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 336780: Cool a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.

Condiments manufacturing; Choose the relevant Unit Standard(s) from the following list:

NLRD Number; Unit Standard title; NQF Level; Credits:

- ID 336762: Steep maize for manufacturing of corn snacks or starch; NQF Level 3; 4 Credits.
- ID 120234: Pasteurise, thermise or vaccreate a liquid food product by means of a plate or tubular heat exchanger; NQF Level 3; 12 Credits.
- ID 8823: Pasteurise a food product by means of a batch pasteuriser; NQF Level 3; 6 Credits.
- ID 120259: Separate liquids using a centrifugal separator; NQF Level 3; 8 Credits.
- ID 8764: Fumigate food raw materials before further processing; NQF Level 3; 8 Credits.
- ID 8863: Mill or grind a food product; NQF Level 3; 8 Credits.
- ID 9072: Cook food products using continuous processing equipment; NQF Level 3; 8 Credits.
- ID 8882: Roast beans or nuts; NQF Level 3; 8 Credits.
- ID 336761: Dry a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 336780: Cool a food product during the manufacturing of cereals, snacks, pasta or condiments; NQF Level 3; 4 Credits.
- ID 9068: Prepare and process an aqueous and oil emulsion; NQF Level 4; 15 Credits.

EXIT LEVEL OUTCOMES

1. Maintain and apply personal safety, food safety and quality control practices in a cereals, snacks, pasta or condiments manufacturing environment.
2. Carry out activities prior to manufacturing of cereals, snacks, pasta or condiments.
3. Manufacture cereals, snacks, pasta or condiments.
4. Communicate with clients in a variety of ways in a cereals, snacks, pasta and condiments manufacturing environment.

Critical Cross-Field Outcomes:

Critical Cross-Field Outcomes have been addressed by the exit level outcomes as follows:

Critical Cross-Field Outcomes:**Qualifying learners can:**

Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:

- Maintaining and applying food safety, personal safety and quality control practices in a cereals, snacks, pasta or condiments manufacturing environment.
- Problem solving during processing and manufacturing tasks.

Work effectively with others as a member of a team, group, organisation or community by:

- Applying team-work during maintenance, personal and product safety practices and manufacturing procedures.
- Co-ordinating one's work with that of others in the direct surrounding area.

Organise and manage oneself and one's activities responsibly and effectively by:

- Planning one's activities.
- Keeping organised, legible, coherent and focused records.

Collect, analyse, organise and critically evaluate information by:

- Performing quality control practices and evaluating the results.
- Keeping organised, legible, coherent and focused records.

Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:

- Reading and interpreting quality control documentation.
- Gathering and applying information regarding knowledge, processes and procedures in a cereals, snacks, pasta or condiments manufacturing environment.
- Keeping organised, legible, coherent and focused records.

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

- Working according to health and safety regulations.
- Performing quality control practices and evaluating the results.

Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation by:

- Problem solving during processing and manufacturing tasks.
- Reporting poor food safety, personal safety and hygiene conditions.
- Identifying poor quality products and reporting it.

Contribute to the full personal development of each learner and the social and economic development of the society at large by:

- Maintaining and applying food safety, personal safety and quality control practices in a cereals, snacks, pasta or condiments manufacturing environment.
- Carrying out activities prior to manufacturing of cereals, snacks, pasta or condiments.
- Manufacturing cereals, snacks, pasta or condiments.

- Communicating in variety of ways in a cereals, snacks, pasta or condiments manufacturing environment.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- Knowledge and comprehension of microbiology and the effect of micro-organisms on personal health, hygiene and food product safety are applied according to standard food microbiological principles.
- Quality control practices are carried out in the cereals, snacks, pasta or condiments manufacturing environment according to the quality assurance policy and standard operating procedures.
- Knowledge and comprehension regarding personal safety practices in a cereals, snacks, pasta or condiments manufacturing environment are applied according to standard operating procedures, safety requirements and current legislation.
- Critical Control Points (CCPs) in a cereals, snacks, pasta or condiments manufacturing environment are monitored as an integral part of the applicable Hazard Analysis Critical Control Point (HACCP) system.

Associated Assessment Criteria for Exit Level Outcome 2:

- The ability to receive raw materials for manufacturing purposes is demonstrated according to standard operating procedures.
- Raw materials are graded and sorted prior to manufacturing and according to standard operating procedures.
- Raw materials and products are stored and routed according to standard operating procedures.
- Knowledge and comprehension of heating and cooling media is applied according to standard operating procedures.

Associated Assessment Criteria for Exit Level Outcome 3:

- Planning for manufacturing, as well as personal, equipment and product preparations are done according to standard operating procedures.
- Quality control practices are carried out in the specific context of the learner's work environment and according to the quality assurance policy and standard operating procedures by measuring, interpreting and controlling analytical and quality control parameters.
- Knowledge and comprehension of heating and cooling media is applied according to standard operating procedures.
- Prepared raw materials are processed further into final cereals, snacks, pasta or condiment products according to standard operating procedures.
 - Range: Processing refers to any combination of the following, relating to the specific elective strand:
 - Pre-batching of raw materials.
 - Mixing or blending of raw materials.
 - Milling or grinding.
 - Peeling of fruit or vegetables.
 - Shaping of fruit or vegetables.
 - Maize steeping.
 - Cooking.
 - Centrifugal separation.
 - Toasting.
 - Roasting beans or nuts.
 - Puffing.
 - Extrusion.
 - Popping of maize kernels.

- o Drying.
- o Cooling.
- o Coating or dipping.
- o Frying.
- o Pasteurisation.
- o Fumigation.
- o Preparing and processing an aqueous and oil emulsion, e.g. mayonnaise.
- Processing parameters are set, monitored and controlled according to standard operating procedures.
- First line maintenance on manufacturing equipment is performed according to standard operating procedures.

Associated Assessment Criteria for Exit Level Outcome 4:

- Effective verbal communication is demonstrated during working with peers, colleagues and members of management.
- Quality control documentation is read and interpreted for application in further processing.
- Processing reports, records and documentation are identified, understood, organised, interpreted and presented in a legible, focused and coherent manner.
- Information is gathered and applied regarding knowledge, processes and procedures within a cereals, snacks, pasta and condiments manufacturing environment.

Integrated Assessment:

The applied competence (practical, foundational and reflexive competencies) of this Qualification will be achieved if a learner is able to perform all the necessary processes applicable to his/her work environment, from intake of the raw material to the final product ready for packaging.

The identification and solving of problems, team work, organising one-self, the using of applied science, the implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflexive competencies demonstrated. Assessment methods and tools must be designed to determine the whole person development and integration of applied knowledge and skills.

Applicable assessment tool(s) must be used to establish the foundational, reflexive and embedded knowledge applied to solve problems.

A detailed portfolio of evidence is required to prove the practical, applied and foundational competencies of the learner.

Assessors should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflexive competencies. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

The Exit Level Outcomes of this Qualification can be assessed in one application.

Unit Standards in the Qualification must be used to assess specific and Critical Cross-Field Outcomes.

INTERNATIONAL COMPARABILITY

The following countries all support and implement vocational training and education, but not on a structured Qualifications framework as found in South Africa:

- Germany.
- France.
- Italy.
- Switzerland.
- United States of America.
- Canada.
- India.

With regards to vocational training and education, most of these countries implement decentralised and market-orientated programmes, both in technical and commercial training. Vocational education and training has been an essential part of European Union policy since the very establishment of the European Community.

In Germany, for instance, although no information could be found about specific vocational training towards cereal, snacks, pasta or condiments manufacturing, this country does implement a very pertinent vocational training system. When leaving schools, 70% of German students take a course of vocational training, mostly within their so-called "dual system". This system combines practical, on-the-job training with theoretical instruction at a part-time vocational school. Through their close cooperation, private business, industry and the public sector are sharing responsibility: Training regulations are drawn at federal level, while the states oversee the vocational schools. There are three types of vocational schools in Germany:

- Part-time vocational schools (Berufsschulen):

In the dual system, the vocational schools complement the training received in a company. Trainees attend a part-time vocational school one or two days a week for three years. The schools teach general subjects and theories that are easier understood in the classroom than at work. Usually about 40% of the school work is in basic academic subjects such as languages, mathematics and sciences and about 60% in subjects directly related to the chosen profession. Performance is assessed in an exam and documented by a certificate issued mostly by the chamber of industry and commerce.

- The full-time vocational school (Berufsfachschule):

This school offers courses lasting one to three years. These can be part of an apprenticeship or even replace an apprenticeship entirely.

- The vocationally oriented upper secondary school (Fachoberschule):

This school admits students with an intermediate school certificate. Courses cover theoretical instruction as well as training workshops and on-the-job training. They generally last two years and qualify participants for the specialised college (Fachhochschule).

On-the-job training (apprenticeships), last between two and three and a half years, depending on the complexity of the occupation. During this period, the apprentice earns a training allowance. The professional requirements that have to be learned during the vocational training are spelled out in training regulations. Based on proposals from the business associations and trade unions, these regulations are regularly revised and updated. The training concludes with an examination conducted by a board of examiners, generally organised by the local chamber of industry and commerce. On the board of examiners are representatives of employers as well as vocational school teachers.

Although no company is obliged to provide training, over 500 000 firms in all branches of the economy, including the independent professions and the public service, provide vocational training. Larger enterprises have their own training workshops, but smaller firms train their apprentices right on the job. Very specialised firms pool their resources and send their apprentice's to inter-company training centres in order to broaden their vocational skills.

The above system therefore compares well with the NQF based education and training system of our country.

In France, there are three ways in which young people can obtain vocational training:

- Initial vocational training in the school system after the age of 15.
- Apprenticeships for the 16-25 age groups.
- Jobseekers in the 16-25 age groups who have left school without a vocational Qualification, with the aim of obtaining initial skills to enter the working world.

In addition, France also offers continuing vocational training for people who have already embarked on their working life or are just entering it, very similar to the NQF based education and training system of South Africa.

The vocational training system of Switzerland is similar to the dual system of Germany, i.e. training is divided between two bodies: the employer and the technical college. The employer's task is to teach the learner practical skills, while the college teaches him/her the necessary theory relating to the chosen field, as well as general subjects.

Vocational education in India aims to develop skilled manpower through diversified courses to meet the requirements of mainly the unorganised sector and to instil self-employment skills in people through a large number of self-employment oriented courses. Vocational education is imparted through Industrial Training Institutes (ITIs) and polytechnics.

One of the weaknesses of the Indian education system is that it does not give due importance to vocational education. As a result there is a mismatch between the skilled manpower required and skilled manpower available. This will hurt the economic growth of India in the long run. The mindset in India is to put higher value on university degrees than on attaining a vocational Qualification. This has resulted in a situation where on the one hand there are scores of unemployed graduates and on the other hand there is a huge shortage of skilled workers such as plumbers and electricians. This is a situation which seems very similar to our South African terrain of skills shortages.

Training programmes and best practices in manufacturing of cereals, snacks, pasta and condiments were compared for the following countries, which all implement a Qualifications framework system:

- England, Wales and Northern Ireland.
- Scotland.
- Australia.
- New Zealand.

On the National Qualifications Framework (NQF) of England, Wales and Northern Ireland, a wide range of Vocational Qualifications (VQs) are accredited. These Qualifications range from broad-based VQs to specialist qualifications designed for a particular sector. In partnership with the Learning and Skill Council (LSC) and the Sector Skills Development Agency (SSDA), the Qualifications and Curriculum Authority (QCA) in England has a remit to extend the take-up of VQs. In line with the more flexible school curriculum, this included their use by more 14-19-year olds.

National Vocational Qualifications (NVQs) are work-related, competence-based Qualifications. They reflect the skills and knowledge needed to do a job effectively, and show that a candidate is competent in the area of work the NVQ represents. NVQs are based on national occupational standards, similar to the unit standards applied in South Africa.

In terms of NVQs, food processing and manufacturing technology forms part of the City and Guilds Food Manufacturing Qualifications (generic processing is one of the specialised routes),

which replace the former NVQ in Food and Drink Manufacturing Operations on Levels 1-3. The structure of the Qualifications is in the form of an award (1 unit), certificate (2 units) and diploma (3 units) for both Levels 2 and 3. This will mean that employers who may not want their working candidates in college for too long will be able to offer a VQ possibly as a short course (e.g. the certificate route) which underpins the NVQ.

On Level 2 the units for the Qualifications are as follows:

Mandatory:

- Principles of working in food manufacturing and workplace safety.

Optional (applicable to cereals, snacks, pasta and condiments manufacturing):

- Food processing in manufacture.
- Nutrition and food science.
- Retail operations in food manufacture.

On Level 3 the units for the Qualifications are as follows:

Mandatory:

- Principles of working in food manufacture and monitoring food safety

Optional (applicable to cereals, snacks, pasta and condiments manufacturing):

- Control of resources in food manufacture.
- Food science and technology in manufacture.
- Product design and technology in food manufacture.
- Quality assurance in food manufacture.

Although there are no specific units that cover the specific manufacturing of cereals, snacks, pasta or condiments, there are strong overlaps between the City and Guilds Qualifications and this South African Qualification, namely:

- Workplace safety.
- Monitoring food safety.
- Food science and technology in manufacture.
- Quality assurance in food manufacture.
- Product design and technology in food manufacture.

The City and Guilds Qualifications on both Levels 2 and 3 focus more or less on the same areas, although the Qualifications on Level 3 provides an extra focus on monitoring and control procedures, as well as on quality assurance. Although some overlap exists between the UK and South African Qualifications with regard to quality control and food product manufacturing, none of the mentioned NVQs provide access to training in the specific streams of cereals, snacks, pasta or condiments manufacturing.

The Scottish Vocational Qualifications (SVQs) provide two qualifications in Food and Drink Manufacture, namely one in Production Control Skills on Level 2 and one in Specialist Technical Skills on Level 3. It consists of mandatory and optional units.

Mandatory units include maintaining of workplace food safety standards, as well as health and safety in food manufacturing for the Level 2 Qualification and communication for the Level 3 Qualification.

Level 2:

Optional units related to food manufacturing include the following:

- Developing production specifications.
- Record keeping and reporting.
- Task hand-over and changeovers.
- Centralised product control.
- Planning production schedules.
- Size-reduction.
- Weighing, mixing and batching.
- Ingredient preparation.
- Heat treatment.
- Separation.
- Temperature control.
- Conversion control.
- Forming.
- Enrobing.
- Milling.
- Slicing.
- Packaging.
- Planning your activities.
- Team work.
- Quality control and quality assurance.
- Environmental safety.
- Maintenance.
- Materials handling (receiving, transfer, storing, stock control and supply, despatch).
- Manual cleaning and cleaning-in-place (CIP).
- Continuous improvement.
- Problem solving.
- Start-up and shut-down procedures.

Level 3:

Optional units related to food manufacturing include the following:

- Self-management.
- Monitoring food safety at critical control points.
- Monitoring health, safety and environmental systems.
- Monitoring product quality.
- Sampling for quality control.
- Testing for quality control.
- Monitor and control quality of work activities.
- Monitor and control throughput.
- Continuous improvement in food production and food safety.
- Quality audits.
- Evaluate and improve production.
- Raise health and food safety awareness.
- Environmental good practice.
- Maintenance of plant and equipment.
- Develop test samples.
- Develop product specifications.
- Develop and implement operational plans.
- Project management.
- Risk assessment.

The Level 2 Scottish qualification has definite overlap with this South African Qualification in terms of materials handling, certain production processes and quality assurance, but still does not focus on definite streams within the cereals, snacks, pasta or condiments manufacturing environment. Clearly the Level 3 Scottish Qualification with its focus on developmental and management disciplines has a total different aim than this South African Qualification.

The latter focuses in the Scottish Qualifications are reflected in the Level 5 South African National Certificate in Manufacturing Management (NLRD 49743).

The Australian Qualifications Framework (AQF) contains three qualifications (Certificate II, III and IV) in Food Processing, which consists of core, specialist and optional units. The core component focuses on mathematics, communication, food safety, occupational health and safety and quality assurance.

Food-related optional units include the following:

- Routine maintenance.
- Maintaining environmental standards.
- Implementing environmental policies and procedures.
- Implementing and maintaining sampling procedures and food safety programmes.
- Auditing.
- Continuous improvement.
- Reporting on workplace performance.
- Sensory analyses.
- Statistical process control.
- Team/group management.
- Supporting and mentoring individuals.

Food-related specialist units include the following:

- Cleaning and sanitising of equipment.
- Materials handling.
- Packaging.
- Preparation and mixing of raw materials.
- Inspection of raw materials and products.
- Raw materials/ingredient and process knowledge.
- Production skills:
 - Operation of processing equipment.
 - Monitoring process operation.
 - Coating.
 - Depositing.
 - Extruding extrusion.
 - Filtration.
 - Frying.
 - Heat treatment.
 - Mixing/blending and cooking.
 - Drying.
 - Pumping.
 - Reduction.
 - Separation.
 - Spreads production.
- Planning.
- Process improvement.

Although the core and specialist components of the above-mentioned Qualifications compare well with the fundamental, core and elective components of the South African Qualification, it does not focus specifically on manufacturing of cereals, snacks, pasts or condiments.

Optional and specialist units around quality, management, food safety practices, planning, process improvement and problem solving pitches at a level slightly higher than this South African Qualification. This type of management skills are found in the Level 4 Further Education and Training Certificate in Generic Management (NLRD 57712) and the Level 5 National Certificate in Manufacturing Management (NLRD 49743) of South Africa.

On the New Zealand Qualification Authority (NZQA), three Qualifications exist for food processing, namely:

- National Certificate in Food and Related Products Processing (Level 2).

This Qualification serves as an introductory Qualification for people employed in the processing of food, beverages and related products. As an introductory qualification, it covers entry-level skills and knowledge, preparing people to play productive operational, services and storage roles in the food and related products processing industry. It would typically be completed in the first year of employment. The Qualification contains compulsory, elective and optional sections.

The compulsory section covers:

- Food safety and hygiene.
- Food processing skills.
- Health and safety.
- Numeracy and communication skills relevant to food processing.
- Quality in food processing.

The elective section allows candidates to choose from a range of additional standards to suit the nature of their particular work and includes competitive manufacturing, core health, core skills, food and related products processing, food safety, manufacturing processes, materials management, numbers, occupational health and safety, and powered industrial lift trucks.

The optional standards allow additional communication skills to be included in the trainee's programme where this is needed in the context of their employment situation or to assist the achievement of the compulsory and elective standards.

- National Certificate in Food and Related Products Processing (Level 3).

This Qualification is the second in the series of Qualifications designed for people employed in the processing of food, beverages and related products. As an intermediate Qualification, it builds on the National Certificate in Food and Related Products Processing (Level 2), and is intended for experienced process workers. This Qualification would typically be achieved in the second or third year of employment.

The Qualification contains a compulsory section, and elective A and B section.

The compulsory section covers:

- Food safety programme.
- Food processing skills.
- Health and safety.
- Quality in food processing.
- Team communications skills relevant to food processing.

Elective A section caters for either machine operators or quality control personnel. Elective B section allows candidates to select from a range of additional standards to suit their particular work and enterprise.

- National Certificate in Food and Related Products Processing (Level 4).

This Qualification is the third in the series of Qualifications designed for people employed in the processing of food, beverages and related products. It builds on the National Certificate in Food and Related Products Processing (Level 2), and the National Certificate in Food and Related Products Processing (Level 3), and is intended for team leaders or supervisors. The Qualification would typically be achieved in the third or fourth year of employment.

The Qualification contains a compulsory section, and an elective section.

The compulsory section covers:

- Compliance and regulatory control.
- Food line production skills.
- Health and safety.
- Communication skills.
- Management skills.
- Quality management skills.

The elective section allows candidates to select from:

- Training and assessing in the workplace.
- Occupational health and safety.
- Additional standards to suit the work environment.

Although there are elements of the South African fundamental, core and elective components in all of the above-mentioned New Zealand Qualifications, there is still no single Qualification that focuses specifically on the manufacturing of cereals, snacks, pasta or condiments. Also, the level of managerial skills required is somewhat higher than those required in the South African Qualification.

Conclusion:

There are definite overlaps between the Qualifications that were studied from abroad and the fundamental, core and elective components of this South African Qualification. Also, the principles of outcomes based training and assessment overseas are very similar to the South African NQF-based training and assessment system. There was, however, no single Qualification found abroad with a specific focus on the manufacturing of cereals, snacks, pasta or condiments, which makes this South African Qualification rather unique and specialised in its nature.

ARTICULATION OPTIONS

This Qualification provides horizontal articulation (through Exit Level Outcome 1) with all other NQF Level 3 National Certificates in Food and Beverage Processing. Processing-specific horizontal articulation exists with the following Qualifications on NQF Level 3:

- ID 20658: National Certificate: Food and Beverage Processing: Plant Baking Processing, NQF Level 3.
- ID 20504: National Certificate: Food and Beverage Processing: Fruit and Vegetables Processing, NQF Level 3.
- ID 20198: National Certificate: Food and Beverage Processing: Oil and Fat Based Product Processing, NQF Level 3.

- ID 20200: National Certificate: Food and Beverage Processing: Oil Milling, NQF Level 3.

This Qualification articulates vertically with the Further Education and Training Certificate in Generic Management NQF Level 4 (ID 57712).

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor and moderator respectively with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA, or by another ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.
- Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards, Exit Level Outcomes and the integrated competence described in the Qualification.
- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the following are essential:

- Anyone assessing a learner against this qualification must be registered as an assessor with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- The applicant needs well-developed interpersonal skills, as well as subject matter and assessment experience.
- The applicant should have completed this Qualification or a similar Qualification than this one at NQF Level 3 or higher, with a minimum of 12 months field experience after.

NOTES

This Qualification replaces Qualification 20197, "National Certificate: Food and Beverages Processing: Cereals, Snacks, Pasta, Spices, Condiments and Culinary Processing", Level 3, 120 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	9010	Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Core	120403	Apply good manufacturing practices as part of a food safety system	Level 2	4
Core	120416	Apply personal safety practices in a food or sensitive consumer product environment	Level 2	5
Core	120242	Demonstrate an understanding of heating and cooling media in a food-manufacturing environment	Level 2	4
Core	120235	Demonstrate an understanding of the concept of microbiology in a food handling environment	Level 3	6
Core	8782	Grade and sort food raw materials	Level 3	6
Core	120239	Monitor critical control points (CCPs) as an integral part of a hazard analysis critical control point (HACCP) system	Level 3	6
Core	12316	Perform first line maintenance on manufacturing or packing equipment	Level 3	7
Core	119802	Perform quality control practices in a food or sensitive consumer product operation	Level 3	6
Core	9047	Receive food raw materials	Level 3	8
Core	8804	Store and route food raw materials and products	Level 3	8
Elective	120405	Clean and sanitise a fast moving consumer goods (FMCG) processing system using an automated cleaning-in-place (CIP) system	Level 2	5
Elective	9054	Coat or dip a food product using automated equipment	Level 2	6
Elective	12258	Identify computerised systems in a manufacturing or processing system	Level 2	7
Elective	336763	Mix or blend food raw materials for processing using automated equipment	Level 2	4
Elective	8783	Peel fruit and vegetables for further processing	Level 2	4
Elective	8765	Pre-batch food raw materials	Level 2	4
Elective	252435	Apply basic invoicing and accounting principles	Level 3	6
Elective	244574	Apply knowledge of HIV/AIDS to a specific business sector and a workplace	Level 3	4
Elective	244611	Apply problem-solving techniques to make a decision or solve a problem in a real life context	Level 3	2
Elective	9072	Cook food products using continuous processing equipment	Level 3	8
Elective	336780	Cool a food product during the manufacturing of cereals, snacks, pasta or condiments	Level 3	4
Elective	12315	Demonstrate an understanding of basic machine operations in a manufacturing and or packaging environment	Level 3	7
Elective	336759	Demonstrate an understanding of the origin, purpose and function of raw materials used in the manufacturing of pasta	Level 3	5
Elective	336761	Dry a food product during the manufacturing of cereals, snacks, pasta or condiments	Level 3	4
Elective	8808	Extrude food products using a continuous extruder	Level 3	10
Elective	8806	Fry food products using vacuum or atmospheric frying equipment	Level 3	20
Elective	8764	Fumigate food raw materials before further processing	Level 3	8
Elective	242814	Identify and explain the core and support functions of an organisation	Level 3	6
Elective	242812	Induct a member into a team	Level 3	4
Elective	14665	Interpret current affairs related to a specific business sector	Level 3	10
Elective	336779	Mill or grind a food product	Level 3	8
Elective	8823	Pasteurise a food product by means of a batch pasteuriser	Level 3	6
Elective	120234	Pasteurise, thermise or vaccreate a liquid food product by means of a plate or tubular heat exchanger	Level 3	12
Elective	336760	Pop maize kernels for manufacturing of popcorn	Level 3	3
Elective	9074	Puff a food product using a pressure chamber	Level 3	9
Elective	8882	Roast beans or nuts	Level 3	8
Elective	120259	Separate liquids using a centrifugal separator	Level 3	8
Elective	8784	Shape fruit and vegetables for further processing	Level 3	10

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Elective	336762	Steep maize for manufacturing of corn snacks or starch	Level 3	4
Elective	9070	Toast a food product in an oven toaster	Level 3	8
Elective	116942	Use a GUI-based word processor to create merged documents	Level 3	3
Elective	116940	Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6
Elective	9046	Determine the quality of food products using sensory evaluation	Level 4	10
Elective	242821	Identify responsibilities of a team leader in ensuring that organisational standards are met	Level 4	6
Elective	123355	Manufacture a dry food product by means of a roller dryer	Level 4	30
Elective	9068	Prepare and process an aqueous and oil emulsion	Level 4	15

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION**None**



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of the origin, purpose and function of raw materials used in the manufacturing of pasta

SAQA US ID		UNIT STANDARD TITLE	
336759		Demonstrate an understanding of the origin, purpose and function of raw materials used in the manufacturing of pasta	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	5

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate knowledge and understanding of the origin and manufacturing processes.

SPECIFIC OUTCOME 2

Demonstrate knowledge and understanding of the purpose, function, storage and use of raw materials.

SPECIFIC OUTCOME 3

Demonstrate knowledge and understanding of food safety practices and procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Pop maize kernels for manufacturing of popcorn***

SAQA US ID		UNIT STANDARD TITLE	
336760		Pop maize kernels for manufacturing of popcorn	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	3

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of popping maize kernels.

SPECIFIC OUTCOME 2

Prepare to pop maize kernels.

SPECIFIC OUTCOME 3

Pop maize kernels prior to further processing.

SPECIFIC OUTCOME 4

Perform activities after popping of maize kernels.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Dry a food product during the manufacturing of cereals, snacks, pasta or condiments

SAQA US ID		UNIT STANDARD TITLE	
336761		Dry a food product during the manufacturing of cereals, snacks, pasta or condiments	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of drying of food products.

SPECIFIC OUTCOME 2

Prepare to dry a food product.

SPECIFIC OUTCOME 3

Dry a food product.

SPECIFIC OUTCOME 4

Perform activities after drying.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Steep maize for manufacturing of corn snacks or starch

SAQA US ID	UNIT STANDARD TITLE		
336762	Steep maize for manufacturing of corn snacks or starch		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of maize steeping.

SPECIFIC OUTCOME 2

Prepare to steep maize.

SPECIFIC OUTCOME 3

Steep maize prior to further processing.

SPECIFIC OUTCOME 4

Perform activities after maize steeping.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Mix or blend food raw materials for processing using automated equipment

SAQA US ID	UNIT STANDARD TITLE		
336763	Mix or blend food raw materials for processing using automated equipment		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Fabrication and Extraction		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of the role of mixing or blending in product formulation.

SPECIFIC OUTCOME 2

Prepare for mixing or blending of food raw materials.

SPECIFIC OUTCOME 3

Mix or blend food raw materials.

SPECIFIC OUTCOME 4

Perform end-of-mixing or blending procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Mill or grind a food product***

SAQA US ID	UNIT STANDARD TITLE			
336779	Mill or grind a food product			
ORIGINATOR		PROVIDER		
SGB Manufacturing and Assembly Processes				
FIELD	SUBFIELD			
6 - Manufacturing, Engineering and Technology				Manufacturing and Assembly
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS	
Undefined	Regular	Level 3	8	

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of on the milling or grinding of food products.

SPECIFIC OUTCOME 2

Prepare for milling or grinding of a food product.

SPECIFIC OUTCOME 3

Mill or grind a food product.

SPECIFIC OUTCOME 4

Perform end of milling or grinding procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Cool a food product during the manufacturing of cereals, snacks, pasta or condiments

SAQA US ID		UNIT STANDARD TITLE	
336780		Cool a food product during the manufacturing of cereals, snacks, pasta or condiments	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of cooling of food products.

SPECIFIC OUTCOME 2

Prepare to cool a food product.

SPECIFIC OUTCOME 3

Cool a food product.

SPECIFIC OUTCOME 4

Perform activities after cooling.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74189	National Certificate: Cereals, Snacks, Pasta and Condiments manufacturing	Level 3

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Food

registered by Organising Field 06 – Manufacturing, Engineering and Technology, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at www.saqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and **no later than 26 October 2009**. All correspondence should be marked **Standards Setting – SGB for Food** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. E. Brown
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 431-5144
e-mail: ebrown@saqa.org.za

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Milk and Cream Handling and Storing

SAQA QUAL ID	QUALIFICATION TITLE		
74229	National Certificate: Milk and Cream Handling and Storing		
ORIGINATOR	PROVIDER		
SGB Food			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	125	Level 2	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
50083	National Certificate: Milk and Cream Handling and Storing	Level 2	120	Will occur as soon as 74229 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION**Purpose:**

The purpose of this qualification is to ensure that the person who receives bulk milk or cream at a dairy reception facility can monitor the acceptability of bulk raw milk or cream and receive it into the processing system, thereby contributing to the quality assurance of dairy products. Bulk raw milk or cream is the main raw material for all dairy products. It is therefore of the utmost importance that this bulk milk or cream is of good quality to ensure that final products are also of good quality and are safe for human consumption. This qualification provides the backbone to any career opportunities within the dairy manufacturing environment.

A person acquiring this qualification will be able to take samples of bulk milk or cream at a dairy reception facility and determine the quality of the raw milk or cream. By evaluating the results of the determinations, he/she will be able to determine whether the milk or cream is suitable for intake. On acceptance, he/she will be able to receive, store and maintain the raw milk or cream for processing and manufacturing of dairy or dairy containing products. Portable competencies such as cleaning and sanitising of the reception system will also be obtained. The person will be able to apply all relevant personal safety and food safety practices during the performance of his/her tasks.

This qualification will allow a person to have access to education, training and career paths within the dairy industry, ensuring learning mobility and progression on the framework through articulation with other qualifications. This qualification will enhance the social, economic and personal development of the learner, as well as the sustainability and productivity of the dairy industry. The qualification will accelerate the redress of past unfair discrimination in education, training and employment opportunities.

Rationale:

This qualification reflects the workplace-based needs of the dairy industry that is expressed by employers and employees, both now and for the future. Typical learners will be new entrants to the dairy manufacturing industry, or persons who are currently working in a raw milk or cream handling and storing environment who have not received any formal recognition for their skills and knowledge.

This qualification is a reviewed and updated version of the similar qualification developed by the dairy industry in 1990 as a result of the demand in the dairy industry for national recognition for milk or cream reception personnel, being the backbone of the dairy industry. This former qualification in milk reception was registered with Department of Labour from 1990-1998, where after it was registered on the NQF as an integral part of the interim registered dairy qualifications on Level 4. The first version of the unit standards based National Certificate in Milk and Cream Handling and Storing NQF Level 2 was registered on the NQF in 2001 and this qualification serves as the revised version thereof.

This qualification aims at providing formal recognition for competencies already obtained and will continue to do so by providing recognition for workers in the dairy industry, specifically milk or cream reception. In addition, this qualification provides the new entrant with the opportunity to obtain competencies in milk and cream reception within the workplace. In this way, value is added to workers' employability and competence and the sustainability of the dairy industry is improved.

This qualification provides the learner with competencies to be employed within the dairy industry, but also gives the learner the flexibility to pursue different careers in the dairy sector, as well as in other food industries. The range of electives will allow the individual to pursue a career within a milk reception, laboratory, quality assurance and dairy manufacturing environment. Skilled workers are one of the key players in better manufacturing standards and productivity, which may increase business prosperity. This qualification will assist in social and economic transformation.

The secondary focus of the qualification is on food safety and personal safety and therefore this qualification will contribute to the establishment of workplace competencies that will ensure safe working practices and food products that are healthy and safe for human consumption.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

- Communication, Physical Science and Mathematical Literacy at NQF Level 1.

Recognition of Prior Learning:

This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience.

Access to the Qualification:

Open access.

QUALIFICATION RULES

- All fundamental unit standards are compulsory; 36 credits.
- All core unit standards are compulsory; 64 credits.
- A minimum of 25 credits should be chosen from the elective component.
- A total of 125 is required to obtain this qualification.

EXIT LEVEL OUTCOMES

Qualifying learners can:

1. Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
2. Receive and store raw milk or cream in a silo at a milk reception facility.
3. Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Critical Cross-Field Outcomes:

Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:

- Problem solving during milk or cream reception and laboratory analysis.

Evident in the following Exit Level Outcomes:

- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Work effectively with others as a member of a team, group, organisation or community by:

- Applying team-work during cleaning and sanitising, milk or cream reception and laboratory analysis.
- Co-ordinating one's work with that of others in the direct surrounding area.

Evident in the following Exit Level Outcomes:

- Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Organise and manage oneself and one's activities responsibly and effectively by:

- Planning one's activities.

Evident in the following Exit Level Outcomes:

- Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Collect, analyse, organise and critically evaluate information by:

- Taking samples.
- Keeping records of milk or cream reception and sample analysis.
- Analysing samples and evaluating the results.

Evident in the following Exit Level Outcomes:

- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:

- Keeping records and noting results.

Evident in the following Exit Level Outcomes:

- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:

- Working according to health and safety regulations.

Evident in Exit Level Outcomes:

- Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation by:

- Problem solving during milk or cream reception and laboratory analysis.

Evident in the following Exit Level Outcomes:

- Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

Contribute to the full personal development of each learner and the social and economic development of the society at large by:

- Applying good manufacturing practices during raw milk or cream reception.
- Receiving and storing raw milk or cream.
- Analysing raw milk or cream.

Evident in the following Exit Level Outcomes:

- Maintain and apply good manufacturing practices in a raw milk or cream handling and storing environment.
- Receive and store raw milk or cream in a silo at a milk reception facility.
- Analyse and evaluate the quality of raw milk or cream for intake at milk reception.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- Knowledge and comprehension regarding personal safety practices in a raw milk and cream handling and storing environment are applied according to standard operating procedures and safety requirements.

- Personal health, hygiene and presentation in a dairy processing environment are maintained according to the Occupational Health and Safety Act.
- Knowledge and comprehension of the effect of micro-organisms on personal health, hygiene and dairy product safety are applied according to standard dairy microbiology principles.
- Milk or cream reception equipment and surfaces are cleaned and sanitised manually and according to standard operating procedures.
- An understanding of the application of good manufacturing practices in a food safety system is demonstrated according to standard food safety principles.

Associated Assessment Criteria for Exit Level Outcome 2:

- Knowledge and comprehension of dairy terminology, equipment and systems are applied according to standard dairy principles.
- Knowledge and comprehension of heating and cooling media in a milk reception facility are applied according to standard dairy principles.
- Knowledge and comprehension of the nature of milk and its transformation into commercial dairy products are applied according to standard dairy principles.
- Raw milk or cream is received and stored in a silo at a milk reception facility according to standard operating procedures.
- A dairy reception facility is cleaned and sanitised using an automated cleaning in-place system and according to standard operating procedures.

Associated Assessment Criteria for Exit Level Outcome 3:

- A milk or cream sample is taken according to standard operating procedures.
- Food laboratory safety is maintained according to standard laboratory procedures.
- The quality of raw milk is analysed and evaluated in terms of its protein stability as indicated by the alizarol test.
- The quality of raw milk is analysed and evaluated in terms of its antibiotics content.
- The quality of a dairy product is analysed and evaluated in terms of its fat content, as indicated by the Gerber or Babcock fat determination method.
- The quality of a food product is analysed and evaluated in terms of its pH.
- The temperature of raw milk or cream is analysed and evaluated according to quality control procedures.

Integrated Assessment:

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a learner is able to evaluate the quality of raw milk or cream and receive, store and maintain raw milk or cream for processing and manufacturing of dairy or dairy containing products.

The identifying and solving of problems, team work, organising one-self, the using of applied science, the implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflexive competencies demonstrated. Assessment methods and tools must be designed to determine the whole person development and integration of applied knowledge and skills.

Applicable assessment tool(s) must be used to establish the foundational, reflexive and embedded knowledge applied to solve problems.

A detailed portfolio of evidence is required to prove the practical, applied and foundational competencies of the learner.

Assessors should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods and should assess combinations of

practical, applied, foundational and reflexive competencies. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

The receiving and storing of milk or cream, representative sample taking, cleaning and sanitising and quality assuring the raw milk or cream by means of laboratory tests can be assessed in one application.

Unit standards in the qualification must be used to assess specific and Critical Cross-Field Outcomes.

INTERNATIONAL COMPARABILITY

The following leading dairy producing countries all support and implement vocational training and education, but not on a structured qualifications framework as found in South Africa:

- Germany.
- France.
- Netherlands.
- Switzerland.
- Denmark.
- Sweden.
- United States of America.

With regards to vocational training and education, most of these countries implement decentralised and market-orientated programmes, both in technical and commercial training.

In Europe in general, the Society of Dairy Technology (SDT) in the United Kingdom in conjunction with the European Dairy Technology Diploma Holders Association (AEDIL) and the Dairy Industry Association (DIAL) worked together to formulate a pan-European initiative to issue Vocational Education Passports giving details of the holder's qualifications and experience in the dairy field. This was designed to assist both employers and employees. In Europe, it facilitates the movement of labour from one country to another, which is of increasing importance as dairy companies consolidate.

In Germany, for instance, although no information could be found about specific vocational training towards milk and cream handling and storing similar to this South African qualification, a very pertinent vocational training system is implemented. When leaving schools, 70% of German students take a course of vocational training, mostly within their so-called "dual system". This system combines practical, on-the-job training with theoretical instruction at a part-time vocational school. Through their close cooperation, private business, industry and the public sector are sharing responsibility: Training regulations are drawn at federal level, while the states oversee the vocational schools. There are three types of vocational schools in Germany:

Part-time vocational schools (Berufsschulen):

- In the dual system, the vocational schools complement the training received in a company. Trainees attend a part-time vocational school one or two days a week for three years. The schools teach general subjects and theories that are easier understood in the classroom than at work. Usually about 40% of the school work is in basic academic subjects such as languages, mathematics and sciences and about 60% in subjects directly related to the chosen profession. Performance is assessed in an exam and documented by a certificate issued mostly by the chamber of industry and commerce.

The full-time vocational school (Berufsfachschule):

- This school offers courses lasting one to three years. These can be part of an apprenticeship or even replace an apprenticeship entirely.

The vocationally oriented upper secondary school (Fachoberschule):

- This school admits students with an intermediate school certificate. Courses cover theoretical instruction as well as training workshops and on-the-job training. They generally last two years and qualify participants for the specialised college (Fachhochschule).

On-the-job training (apprenticeships), last between two and three and a half years, depending on the complexity of the occupation. During this period, the apprentice earns a training allowance. The professional requirements that have to be learned during the vocational training are spelled out in training regulations. Based on proposals from the business associations and trade unions, these regulations are regularly revised and updated. The training concludes with an examination conducted by a board of examiners, generally organised by the local chamber of industry and commerce. On the board of examiners are representatives of employers as well as vocational school teachers.

Although no company is obliged to provide training, over 500 000 firms in all branches of the economy, including the independent professions and the public service, provide vocational training. Larger enterprises have their own training workshops, but smaller firms train their apprentices right on the job. Very specialised firms pool their resources and send their apprentices to inter-company training centres in order to broaden their vocational skills.

The above system therefore compares well with the NQF based education and training system of our country.

Higher education towards Dairy Technology in Germany is presented at state of the art universities, for instance the Technical University of Munich. These courses, however, focus mainly on high level food process engineering and dairy research and development, other than the focus of this South African qualification.

The West part of France, with 50% of the national milk collection and 10% of the European milk production is the first French dairy area and one of the largest in Europe. The European Centre for Dairy Research and Training (ECDaiRT or CEREL) is a stakeholder that plays a major role in training in development in the dairy sector of France. It was established in 2001 and is a network of public research teams consisting of research staff and technical staff. By integrating and structuring the research sector, the extension services, the industry, the education and the public information in a multidisciplinary approach (from the herds and the farms to the dairy processing industries and the consumers), CEREL has the following emphasising aims:

- Developing new strategies of milk production and milk processing.
- Knowledge and scientific support.
- Education and training programmes tailored to disseminate knowledge and expertise towards milk producers and processing industries.

CEREL brings together all the actors involved in the milk and dairy chain of the West of France, namely:

- Institute of National Research in Agriculture (INRA).
- Ecole Nationale Supérieure Agronomique de Rennes (ENSAR).
- Ecole Nationale Supérieure Agronomique de Toulouse (ENSAT).
- Centre National du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts (CEMAGREF).
- Institut de l'Elevage.
- ITG Ouest.

- University of Renne, specialising in Ultrafiltration and Nanofiltration training.
- Centre National Interprofessionnel de l'Economie Laitière (CNIEL).
- Regional Chamber of Agriculture in Britain.
- British Biotechnology Alumni (BBA).

No specific dairy training programmes in France could be found at the time when this international comparability study was conducted.

In the Netherlands, dairy training courses from PTCplus were found. PTCplus is an international training centre in Netherlands which focuses on high-quality training in the field of agriculture, dairy technology and dairy production. Only the third one of the following four courses compared well with this South African qualification, although not unit standards based:

Module on Production of Dairy Products:

- A two week short course for managers, production managers, staff, consultants, trainers government officials involved in small-to medium-scale dairy enterprises. The course covers the production of liquid milk products such as pasteurised milk, yoghurts, whey drinks, yoghurt drinks, as well as butter, fresh-, soft-, medium-hard and hard-cheese. It does not include the manufacturing of evaporated milk, sweetened condensed milk and milk powders, but this can be arranged on request.

International Diploma in Dairy Husbandry and Milk Processing:

- A 26 week course for persons who contribute through teaching, training, extension and/or management activities directly or indirectly to the development of the dairy sector. The course covers training and extension, dairy farm management and small-scale milk processing.

International Training Programme on Milk Processing:

- A two, four or six week course, depending on the modules chosen. This course is intended for managers, staff of training institutes, staff of advisory services and future staff of new dairy enterprises. It covers milk procurement, production of dairy products and business administration, marketing and quality management. Each module can be attended as a "stand-alone". This course compares well with the South African Dairy qualifications, since it covers the following:
 - Milk Procurement (Composition and characteristics of milk, milking systems and storage of milk on the farm, milk collection, transport and reception, storage of raw milk at the plant, quality control tests on raw milk, payment of raw milk, cleaning and sanitising, yoghurt production).
 - Production of Dairy Products (Pasteurised milk, yoghurts, whey drinks, yoghurt drinks, butter and cheese). It does not include the manufacturing of evaporated milk, sweetened condensed milk and milk powders, but this can be arranged on request. The programme may be adapted to the specific needs of the participants.
 - Business Administration, Marketing and Quality Management (Financial administration of a dairy plant, marketing plans, quality management systems, food safety and hygiene audits, HACCP).

Module on Business Administration, Marketing and Quality Assurance:

- A two week short course for managers, quality assurance managers, marketing managers, quality assurance staff, business administration and marketing staff, consultants, trainers and lecturers active in the dairy sector. Topics cover financial administration of a dairy plant, marketing plans, quality management systems and food safety and hygiene audits.

In Switzerland, the Dairy Processing Technology Department of the Swiss College of Agriculture in Zollikofen, in collaboration with the Swiss Federal Dairy Research Station and the University

of Applied Sciences in Bern provides the following two courses, however not relating well with this South African qualification:

Food Technology, specialising in Dairy Processing:

- This course covers dairy and food processing technology, as well as dairy business and management that will prepare candidates for challenging positions in the executive level in the dairy and food industry. In applied research and development, projects are carried out in collaboration with the dairy industry and other partners such as the Swiss Federal Dairy Research Station. Post-formation courses allow professionals to keep up to date evolving knowledge.

Cheesemaking Technology:

- A three week course in the theory and practice of cheese manufacturing, including experience sharing with the Swiss cheese industry. Topics include: quality cultures, coagulation, cheesemaking process, brining/salting, ripening, storage, cheese types (fresh, quark, cottage, Pasta Filata, Feta, soft, Cheddar, processed, Ricotta, analogues, cheese made from milk of other animals), UHT, ultrafiltration, microfiltration and nanofiltration. Trained cheesemaking experts facilitate the training.

Denmark offers a long line of dairy-related educations. These multi-level educations are made available by the Danish Dairy Board, Dalum Education Centre, the Royal Danish Veterinary and Agricultural University and the Technical University of Denmark.

In Denmark great importance is attached to providing vocational training with an international perspective. Therefore, young Danish students are urged and supported to carry out a trainee period abroad.

Vocational training in Denmark is organised so that practical training and theoretical training alternate. This combination of theoretical training at a vocational school and work experience in a company apply for all vocational educations in Denmark.

Skilled Dairyman and Dairy Operator:

The practical part of the education may partly take place in companies outside Denmark (EU and Norway, Iceland, Switzerland and Liechtenstein). The content and structure of the dairy educations are laid down by the professional committee in accordance with Danish legislation.

The dairy education takes 3 years-normally with 50 weeks of theoretical training and 106 weeks of practical training. It is possible to complete an education as a qualified dairy operator after 1½ years. The dairy operator education consists of 30 weeks of theoretical training and 48 weeks of practical training.

The student can be credited for any relevant education or previous occupation essentially identical to the goals of the educations as dairyman or dairy operator.

It is the aim of the dairy educations that the skilled dairyman can undertake tasks of a technical nature within the dairy field such as:

- Carry out manual and automated operative functions according to current rules and regulations.
- Carry out the work in accordance with the quality control and other control systems of the company.
- Show insight and understanding related to the environmental conditions of the working area.
- Be able to work closely together with other professions.

- Obtain qualifications to develop skills through work and in-service training.

For the skilled dairyman the aim is furthermore to combine knowledge of the technical, the microbiological, physical and chemical conditions of dairy products with planning, documentation and quality evaluation of the tasks connected to the manufacturing of dairy products.

Theoretical training:

The theoretical training consists of:

- Basics (first aid, hygiene, information technology, environmental studies, health, economy, English, physics, chemistry and mathematics)-a total of 16 weeks.
- Area studies (knowledge of the trade, dairy production, company organisation and quality consciousness, quality of production and equipment)-a total of 19 weeks.
- Special subjects (dairy technology, processing and optional special subjects)-a total of 9 weeks.
- Optional subjects-a total of 6 weeks.

Practical training:

The practical training covers the following work areas and functions:

- Reception of raw material, pasteurisation and standardisation of milk.
- Preparation of production machinery for operation.
- Operation and regulation of production equipment.
- Production and quality control.
- Working with single processes in the production-mainly tasks of handling, cleaning and transport.
- Laboratory work and administrative tasks supplementing the work in the production.

The Danish dairy company is responsible for the practical part of the education and also for the period abroad in order to make the international work experience an integrated part of the whole education.

At the end of the trainee period the mentor will be asked to fill out a summary of the work functions which the apprentice has carried out during his/her stay.

Depending on the length of the trainee period it may be necessary for the apprentice to attend a school period at Dalum Education Centre, College of Food and Technology in Denmark. During such periods the apprentice will receive his/her wages from the Danish company.

Although broader in nature, this Danish course covers most of the topics that are addressed in this South African qualification.

Danish Dairy Training Programme:

The Danish Dairy Training Programme is an offer from the Danish Dairy Board to young dairy industry employees. The training is based on a period of work in a dairy outside Denmark for 3-12 months. The training period is designed to offer experience and insight into dairy production in dairy companies outside Denmark, personal development and improved language skills. These are all valuable qualifications for a young graduate who is applying for work in Denmark or abroad.

Courses in Denmark on Higher Education level include the following:

- Dairy Engineering-Presented by the Technical University of Denmark.

- Master of Science in Dairy Technology-A two-year academic programme offered in collaboration between the Royal Veterinary and Agricultural University and the Technical University (Denmark) and Lund University (Sweden).
- Processing Technologist (Dairy Technology)-A two-year education to become a processing technologist, available from Dalum Education Centre.

A lot of the dairy training offered by Sweden is done in collaboration with Denmark. Up till 2004, Sweden did not have any programmes specifically targeting the dairy sector. A number of Swedish dairy manufacturing industries have recognised the need for training their employees, and have since started to formalise specific dairy training programmes. None of these could, however, be found at the time when this international comparability study was conducted.

Also, no specific dairy training programmes in the United States of America could be found at the time when this international comparability study was conducted.

With regards to Africa, South Africa is by far the leading dairy producing country. Evidence was found of in-house dairy training courses presented in countries like Botswana, Mozambique, Namibia, Kenya, Lesotho and Swaziland, however, these are mostly initiated and funded by South African dairy manufacturing organisations and research facilities, as well as by international stakeholders like the Food and Agriculture Organisation of the United Nations (FAO). Independent African comparable courses could not be found.

Training programmes and best practices in dairy processing and manufacturing were compared for the following leading countries, which all implement a qualifications framework system:

- New Zealand.
- Australia.
- England, Wales and Northern Ireland.
- Scotland.

At the New Zealand Qualification Authority (NZQA), one qualification exists at Level 2 for dairy processing, namely:

National Certificate in Dairy Manufacturing (Process Skills):

This is an entry-level qualification intended for new employees working under close supervision. It recognises the ability to apply on-the-job skills within defined areas of responsibility. The qualification is structured on compulsory industry generics, a limited elective selection for enterprise specifics, and a set of broader electives covering operations, service and storage roles as well as foundation knowledge in food safety and good manufacturing practices. The design is modelled on the Certificate I in Food Processing from the Australian Qualifications Framework.

Compulsory standards include the following:

- Mathematics.
- Communication.
- People skills (team work).
- Food safety and quality assurance.
- Health and safety.

Two elective strands (A or B) are possible:

Elective strand A:

- Manual packaging.

- Automated packaging.
- Mixing and blending.
- In-house distribution.

Elective strand B:

- Occupational health and safety.
- Product safety programmes.
- Manual and automated cleaning and sanitising.
- Dairy supply chain.
- Routine maintenance.

Thus, part of the New Zealand qualification compares well with this South African qualification, although the South African qualification has a much stronger focus on milk reception and product analytical skills. On the other hand, the New Zealand qualification has a stronger focus on packaging, supply chain and maintenance skills than its South African counterpart.

Other New Zealand qualifications where elements of milk reception were found include the following:

- National Certificate in Dairy Manufacturing (Process Skills) Level 3, with strands in Processing and Supply Chain (and with optional strands in Performance Improvement and Product Safety).
- National Certificate in Dairy Manufacturing (Technology) Level 3, with an optional strand in Process Improvement.

It therefore seems as if most of the New Zealand qualifications have combined the skills of milk reception, dairy primary processing, dairy laboratory analysis and dairy product manufacturing into a single qualification with the aim at specific job descriptions. On the other hand, the South African model allows for four different, much more detailed and custom-made qualifications, which focus on the required skills, rather than on the job-description.

The Australian Qualifications Framework (AQF) contains a qualification (Certificate II) in Food Processing, which consists of core, specialist and optional units. The core component focuses on mathematics, communication, food safety, occupational health and safety and quality assurance.

Dairy-related specialist units include the following:

- Cleaning and sanitising.
- Materials handling.
- Packaging.
- Preparation and mixing.
- Production and process control.
- Retail.
- Coating/Enrobing.
- Evaporation.
- Filtration.
- Heat treatment.
- Drying.
- Homogenising.
- Retorting.
- Pumping.
- Pre-processing of raw materials.
- Separation.
- Production of spreads.
- Butter churning

- Continuous freezing.
- Processing of butter oil.
- Curd production and cutting.
- Cooling and hardening.
- Cheese pressing and moulding.
- Fermentation.
- Holding and storage
- Membrane processes.
- Deodorising (butter).
- Neutralisation (butter).

The Australian Certificate III in Food Processing offers three units relating to milk reception, namely:

- Bulk liquid transfer.
- Loading and unloading tankers.
- Working with temperature controlled stock.

Clearly the above-mentioned qualifications do not focus entirely on milk and cream reception and storage, but provides a broader option on Level 2 and 3. Optional units around quality, good manufacturing practices and problem solving compares well with this South African qualification.

On the National Qualifications Framework (NQF) of England, Wales and Northern Ireland, a wide range of vocational qualifications (VQs) are accredited. These qualifications range from broad-based VQs to specialist qualifications designed for a particular sector. In partnership with the Learning and Skill Council (LSC) and the Sector Skills Development Agency (SSDA), the Qualifications and Curriculum Authority (QCA) in England has a remit to extend the take-up of VQs. In line with the more flexible school curriculum, this included their use by more 14 to 19-year olds.

National vocational qualifications (NVQs) are work-related, competence-based qualifications. They reflect the skills and knowledge needed to do a job effectively, and show that a candidate is competent in the area of work the NVQ represents. NVQs are based on national occupational standards, similar to the unit standards applied in South Africa.

In terms of NVQs, dairy processing and manufacturing technology forms part of the City and Guilds Food Manufacturing Qualifications (dairy manufacturing is one of the specialised routes), which replace the former NVQ in Food and Drink Manufacturing Operations on Levels 1-3. The structure of the qualifications will be in the form of an award (1 unit), certificate (2 units) and diploma (3 units) for both Levels 2 and 3. This will mean that employers who may not want their working candidates in college for too long will be able to offer a VQ possibly as a short course (e.g. the certificate route) which underpins the NVQ.

On Level 2 the units for the qualifications are as follows:

Mandatory:

- Principles of working in food manufacturing and workplace safety.

Optional (applicable to dairy):

- Cheese and butter production.
- Dairy science and technology.
- Fermented dairy products and ice-cream production.
- Liquid milk and dried products production.
- Food processing in manufacture.

- Nutrition and food science.
- Retail operations in food manufacture.

On Level 3 the units for the qualifications are as follows:

Mandatory:

- Principles of working in food manufacturing and monitoring food safety.

Optional (applicable to dairy):

- Cheese and butter production.
- Control of resource in food manufacture.
- Dairy science and technology.
- Fermented dairy products and ice-cream production.
- Food science and technology in manufacture.
- Liquid milk and dried products production.
- Product design and technology in food manufacture.
- Quality assurance in food manufacture.

The City and Guilds qualifications on both Levels 2 and 3 focus more or less on the same areas, although the qualifications on Level 3 provides an extra focus on monitoring and control procedures, as well as on quality assurance. Although some overlap exists between the United Kingdom and South African qualifications with regard to quality control, none of the mentioned NVQs provide access to training in milk and cream handling and storing.

The Scottish Vocational Qualifications (SVQs) provide a qualification in Food Manufacture (Production Control Skills) on Level 2. It consists of mandatory units around food safety and occupational health and safety, as well as optional units.

Dairy-related optional units include the following:

- Production specifications.
- Reporting and recording.
- Task hand-over and changeovers.
- Product control.
- Weighing, mixing and batching.
- Heat treatment.
- Separation.
- Temperature control.
- Packaging.
- Planning your activities.
- Team work.
- Quality control and quality assurance.
- Maintenance.
- Materials handling.
- Manual cleaning and cleaning-in-place (CIP).
- Continuous improvement.
- Problem solving.
- Start-up and shut-down procedures.

Clearly the Scottish qualification has a major different focus than this South African qualification.

Summary:

While focusing specifically on bulk milk and/or cream handling and storage, this South African qualification covers the generic food handling and processing competencies contained in the qualifications listed above. All mentioned countries, with their strong agricultural and dairy farming sectors can be regarded as leaders in the field. This means therefore that this qualification, because of its similarity to those mentioned above, can be regarded as of good standard, comparable with the best provided elsewhere.

ARTICULATION OPTIONS

This qualification articulates vertically with the following qualifications:

- ID 50024: National Certificate: Dairy Primary Processing, NQF Level 3.
- ID 50305: National Certificate: Food Laboratory Analysis, NQF Level 3.

The first Exit Level Outcome of this qualification provides possible horizontal articulation into other NQF Level 2 Food qualifications.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor and moderator respectively with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA, or by another ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.
- Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes and the integrated competence described in the qualification.
- Anyone wishing to be assessed against this qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the following are essential:

- Anyone assessing a learner against this qualification must be registered as an assessor with the relevant ETQA, or with another ETQA that has a Memorandum of Understanding with the relevant ETQA.
- The applicant should have a similar qualification to this one at NQF Level 3 or higher, with a minimum of 12 months field experience.

NOTES

This qualification replaces qualification 50083, "National Certificate: Milk and Cream Handling and Storing", Level 2, 120 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119463	Access and use information from texts	Level 2	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	9009	Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	Level 2	3
Fundamental	7480	Demonstrate understanding of rational and irrational numbers and number systems	Level 2	3
Fundamental	9008	Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	3
Fundamental	119454	Maintain and adapt oral/signed communication	Level 2	5
Fundamental	119460	Use language and communication in occupational learning programmes	Level 2	5
Fundamental	7469	Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2
Fundamental	9007	Work with a range of patterns and functions and solve problems	Level 2	5
Fundamental	119456	Write/present for a defined context	Level 2	5
Core	120410	Clean and sanitise food manufacturing equipment and surfaces manually	Level 1	4
Core	120412	Demonstrate an understanding of dairy terminology, equipment and systems	Level 1	4
Core	120404	Maintain personal hygiene, health and presentation in a food handling environment	Level 1	4
Core	120398	Measure the temperature of food products and evaluate the readings	Level 1	2
Core	120401	Take a representative food sample	Level 1	4
Core	120416	Apply personal safety practices in a food or sensitive consumer product environment	Level 2	5
Core	120405	Clean and sanitise a fast moving consumer goods (FMCG) processing system using an automated cleaning-in-place (CIP) system	Level 2	5
Core	120402	Demonstrate an understanding of introductory principles of chemistry and physics	Level 2	5
Core	120418	Evaluate the quality of milk in terms of its protein stability, as indicated by the alizarol test	Level 2	3
Core	120407	Evaluate the quality of raw milk in terms of its antibiotics content	Level 2	5
Core	120413	Receive and store raw milk or cream in a silo at a milk reception facility	Level 2	8
Core	120245	Demonstrate an understanding of the nature of milk and its transformation into commercial dairy products	Level 3	6
Core	120241	Evaluate the quality of a dairy product in terms of its fat content, as determined by the Gerber or Babcock fat determination method	Level 3	5
Core	120411	Evaluate the quality of a food product in terms of its pH	Level 3	4
Elective	116932	Operate a personal computer system	Level 1	3
Elective	117902	Use generic functions in a Graphical User Interface (GUI)-environment	Level 1	4
Elective	120403	Apply good manufacturing practices as part of a food safety system	Level 2	4
Elective	336839	Collate and shrink-wrap packaged products using automated wrapping equipment	Level 2	6
Elective	336819	Collect bulk milk from a farm by means of a milk tanker	Level 2	8
Elective	336799	Demonstrate an understanding of heating and cooling media in a food manufacturing environment	Level 2	4
Elective	120397	Evaluate the quality of a food product in terms of its titratable acidity	Level 2	4
Elective	120417	Understand the control of pests and waste materials as part of a food safety system	Level 2	3
Elective	120237	Evaluate the composition of raw milk as determined by an infra red analyser	Level 3	6
Elective	120408	Evaluate the quality of milk in terms of its freezing point	Level 3	4
Elective	120400	Evaluate the quality of milk in terms of its solids-non-fat content	Level 3	4
Elective	120395	Evaluate the quality of raw milk in terms of its microbial load, as indicated by the resazurin test	Level 3	5

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION**None**



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of heating and cooling media in a food manufacturing environment

SAQA US ID	UNIT STANDARD TITLE		
336799	Demonstrate an understanding of heating and cooling media in a food manufacturing environment		
ORIGINATOR		PROVIDER	
SGB Food			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	4

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
120242	Demonstrate an understanding of heating and cooling media in a food-manufacturing environment	Level 2	4	Will occur as soon as 336799 is registered

SPECIFIC OUTCOME 1

Demonstrate an understanding of the concept of energy.

SPECIFIC OUTCOME 2

Demonstrate an understanding of the generation and application of steam as a heating medium.

SPECIFIC OUTCOME 3

Demonstrate an understanding of the application of water and gases as cooling media.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the generation and application of electricity as an energy source for heating and cooling purposes.

SPECIFIC OUTCOME 5

Demonstrate an understanding of the safe handling of heating and cooling media, as well as electricity.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Elective 74229	National Certificate: Milk and Cream Handling and Storing	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Collect bulk milk from a farm by means of a milk tanker***

SAQA US ID	UNIT STANDARD TITLE		
336819	Collect bulk milk from a farm by means of a milk tanker		
ORIGINATOR		PROVIDER	
SGB Food			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
120396	Collect bulk milk from the farm by means of a milk tanker	Level 2	8	Will occur as soon as 336819 is registered

SPECIFIC OUTCOME 1

Demonstrate an understanding of bulk milk collection from a farm.

SPECIFIC OUTCOME 2

Prepare for bulk milk collection.

SPECIFIC OUTCOME 3

Transfer bulk milk from a tank to a milk tanker.

SPECIFIC OUTCOME 4

Perform end of collection duties.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74229	National Certificate: Milk and Cream Handling and Storing	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Collate and shrink-wrap packaged products using automated wrapping equipment

SAQA US ID	UNIT STANDARD TITLE		
336839	Collate and shrink-wrap packaged products using automated wrapping equipment		
ORIGINATOR		PROVIDER	
SGB Food			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
120238	Collate and shrink-wrap packaged products using automated wrapping equipment	Level 2	6	Will occur as soon as 336839 is registered

SPECIFIC OUTCOME 1

Demonstrate an understanding of collating and shrink-wrapping.

SPECIFIC OUTCOME 2

Prepare to collate and shrink-wrap packaged products.

SPECIFIC OUTCOME 3

Collate and shrink-wrap packaged products.

SPECIFIC OUTCOME 4

Perform end of shrink-wrapping procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	74229	National Certificate: Milk and Cream Handling and Storing	Level 2

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Task Team for

Radiography and Clinical Technology

registered by Organising Field 09 – Health Sciences and Social Services, publishes the following Qualification for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification. The full Qualification can be accessed via the SAQA web-site at www.saqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification should reach SAQA at the address below and **no later than 26 October 2009**. All correspondence should be marked **Standards Setting – Task Team for Radiography and Clinical Technology** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. E. Brown

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D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Bachelor of Radiography: Radiation Laboratory Technology

SAQA QUAL ID	QUALIFICATION TITLE		
74349	Bachelor of Radiography: Radiation Laboratory Technology		
ORIGINATOR	PROVIDER		
TT - Radiography and Clinical Technology			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National First Degree	9 - Health Sciences and Social Services	Curative Health	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	480	Level 7	Regular-ELOAC

New NQF Level: NQF Level 08

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This Qualification serves to ensure competent, innovative technologists who will enhance the efficacy of Radiation Oncology, thereby forming an essential part of the radiation oncology team which provides a holistic healthcare service in both the public and the private sectors.

This Qualification will enable the successful learner to competently apply theoretical knowledge, skills and practical experience in radiation laboratory procedures and assist with invasive brachytherapy techniques.

The role of the radiation laboratory technologist includes the preparation of patients prior to radiation therapy, viz., treatment localisation and planning, manufacturing of immobilisation and beam modifying aids, ensuring quality assurance of the radiation laboratory as an entity of the radiation oncology process, and participating in education as part of the radiation oncology team.

The learner will be able to competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills to the solution of well-defined and abstract problems in the selected field of Radiation Oncology working in the radiation laboratory. This will be achieved by meeting the following outcomes:

- Applying ethical and human rights principles and health and safety regulations in the pursuance of promoting and sustaining development of radiation treatment delivery.
- Applying specialised academic knowledge and technical skills to ensure optimum standards of patient treatment and care.
- Demonstrating appropriate skills in management and research allowing the holder of this Qualification to work independently and in a supervisory capacity within the health care team.

Learners who successfully complete this Qualification will be eligible for registration with the relevant Health Professional Council as an independent practitioner.

Rationale:

The technological advancements seen in Radiation Oncology radiation treatment planning and radiation treatment delivery (in the fields of both external beam radiation therapy (EBRT) and brachytherapy), demonstrate the need for innovative, sophisticated, individualised treatment and accessory construction in order to ensure that precision dose planning and treatment delivery is effective. The radiation laboratory plays a key supportive role in the interdisciplinary team in Radiation Oncology through promoting and sustaining the technological advances in this field. Radiation Laboratory Technology is dependent on interdisciplinary fields such as physics, human biology and computer sciences to extract that information.

The role of the radiation laboratory technologist is described by the National Department of Health as the manufacturing of immobilisation and shielding devices. These immobilisation devices are used to make sure that the patient is treated in exactly the same position each day. It is for this reason that, even though these professionals are trained in mechanical, dental and laboratory principles, their work with patients necessitates additional skills in radiation safety, patient care and ethics.

The Qualification and curriculum required for the practice of radiation laboratory technology has grown from informal, hospital-based training to a formal Qualification offered by selective Higher Education institutions in partnership with academic hospitals where Radiation Oncology services are offered.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED IN PLACE

- Communication at NQF Level 4.
- Mathematics at NQF Level 4.
- Biology at NQF Level 4.
- Computer Literacy at NQF Level 3 is strongly recommended.

Recognition of Prior Learning:

This Qualification may be achieved in part through the recognition of relevant prior learning and/or through prior experience as a practitioner in another field such as radiotherapy or radiography.

Assessment may be based on certified portfolios of evidence submitted by the learner, as well as proven competence against any of the given Exit Level Outcomes. Recognition of Prior Learning will be applied on an individual basis and will be conducted in accordance with the institution's accredited Recognition of Prior Learning policy. Such procedures and the assessment of individual cases are subject to moderation by independent assessors.

This Qualification may be achieved in part through Recognition of Prior Learning, in accordance with the policies and procedures of the individual institutions and in agreement with the relevant ETQA, on presenting relevant evidence that meets the outcomes stated in the Qualification document.

Access to the Qualification:

Learners accessing this Qualification will be expected to be in possession of a National Senior Certificate with matriculation exemption, a relevant Further Education and Training Certificate or equivalent NQF Level 4 Qualification and comply with the selection policy of the relevant provider in agreement with the relevant ETQA.

QUALIFICATION RULES

- All Exit Level Outcomes must be achieved for the learner to be awarded the Qualification.
- This Qualification is competency based. In order to achieve clinical competency, notional hours will include theoretical and clinical components obtained at an accredited institution.
- The selection of Elective subjects offered to learners is at the discretion of the provider.

EXIT LEVEL OUTCOMES

1. Perform laboratory techniques appropriate to the clinical presentation or request and produce immobilisation and positioning devices for external beam radiotherapy and brachytherapy according to specified guidelines and patient treatment plans.

2. Select and assess the materials used for the production and manufacture of quality immobilisation, positioning and beam modifying devices according to specifications and patient treatment plans.

3. Evaluate request forms, radiographic and clinical notes to ensure that appropriate immobilisation devices are prepared in accordance with pattern recognition techniques and quality assurance.

4. Demonstrate responsible and effective patient care skills in terms of the principles of human rights and medical law.

5. Apply relevant, current legislation, ethical principles, guidelines and codes of practice in the performance of radiation laboratory technology to ensure personal and public safety.

6. Manage the radiation laboratory activities within the context of a radiation oncology department.

7. Apply specialised academic knowledge and technical skills pertaining to radiation laboratory services to ensure optimum standards of care.

8. Conduct research and foster a research climate in the radiation laboratory within the context of radiation oncology, through the use and application of information technology.

9. Apply the principles, specific knowledge, skills and values related to the chosen elective subject.

Range of possible electives:

- Introduction to specialised maxillo-facial, dental orthotics or similar technologies.
- Clinical engineering in radiotherapy.
- Educational training.
- Diagnostic radiography.
- Radiotherapy.
- Advanced radiotherapy treatment techniques.
- Nuclear medicine.
- Small and medium business enterprises.

Critical Cross-Field Outcomes:

The Qualification promotes the Critical Cross-Field Outcomes in the following manner:

- Identifying and solving problems is demonstrated through the application of specialised academic knowledge and technical skills in terms of radiation laboratory technology.
- Working effectively with other members of the oncology team is demonstrated in the confident performance of professional duties.
- Organising and managing self is demonstrated in the provision of specialised moulds and other materials/tools to aid in the provision of successful oncological treatment of patients.

- Collating data is indicated in the selection and assessment of materials used to identify health problems in the context of radiation laboratory technology and implement a plan of action through the application of knowledge of anatomy, pathology, radiobiology and physics.
- Communicating effectively is demonstrated through the utilisation of effective procedures, techniques and resources available to ensure that the radiation laboratory technology department functions effectively.
- Utilising science and technology critically and effectively is demonstrated in the core work of the radiation laboratory technologist.
- Demonstrating and understanding the world of related systems is demonstrated through the capability to perform laboratory techniques appropriate to the clinical setting and produce quality immobilisation and positioning devices which meet the specific needs required.

ASSOCIATED ASSESSMENT CRITERIA**Associated Assessment Criteria for Exit-Level Outcomes 1:**

- 1.1 Appropriate routine radiation laboratory techniques are performed with and without patients.
- 1.2 The selection of techniques is based on integrated, applied knowledge of anatomy, physiology, pathology, radiobiology, physics and radiation physics.
- 1.3 Patient is appropriately positioned and immobilised and the beam is modified accordingly.
- 1.4 Knowledge of aids required for the various treatment modalities used is demonstrated.
- 1.5 Devices are evaluated for quality, information recorded and documentation kept according to departmental standards.
- 1.6 Knowledge of laboratory tools and apparatus and dexterity in utilisation is demonstrated and applied.
- 1.7 Radiation protection and safety measures conforming to the ALARA (as low as reasonably achievable) principles are correctly applied to techniques involving sealed and unsealed radioactive materials.

Associated Assessment Criteria for Exit-Level Outcomes 2:

- 2.1 Integrated knowledge of applied anatomy, physiology, pathology, radiobiology and physics is applied in the selection of materials used for immobilisation and beam modification.
- 2.2 Occupational health and safety regulations are applied during the production of immobilisation and beam modifying devices.
- 2.3 The structure and properties of impressions, castings, thermoplastic and plaster materials are described and appropriately selected for a specific patient.
- 2.4 The physical and chemical conditions that affect dental waxes, polyurethanes, alginates, bases, catalysts, resins and metals are described and applied to the production of beam modifying devices.
- 2.5 The radiological properties of the materials used are identified and their selection justified.
- 2.6 Hazardous substances routinely used in the radiation laboratory are identified and the relevant safety measures taken to protect patients, staff and public are explained.

Associated Assessment Criteria for Exit-Level Outcomes 3:

- 3.1 The Radiation Laboratory Technology request form is interrogated to ensure that appropriate devices are made.
- 3.2 A patient is assessed against the clinical request form and appropriate measurements are interpreted and applied.
- 3.3 Beam modifying and patient immobilisation devices are evaluated to ensure compliance with quality standards.
- 3.4 Devices are developed that conform to standards of practice and medico-legal requirements.
- 3.5 Normal and abnormal devices are recognised and differentiated where applicable.

Associated Assessment Criteria for Exit-Level Outcomes 4:

- 4.1 Patient is assessed relevant to presenting clinical condition and appropriate care is given.
- 4.2 Verbal and non-verbal communication skills are used in dealing with diversity in patients.
 - Range of diversity includes but is not limited to: Race, culture, religion, ethnicity, language, sexual orientation, political orientation, age, differential abilities, social-economic status.
- 4.3 Patient preparation procedures are carefully explained to the patient and patient understanding is ensured by eliciting patient response.
- 4.4 Medical emergencies are dealt with by applying appropriate First Aid measures and sending for professional assistance, if necessary.
- 4.5 Patients with special needs are catered for in a manner that advocates human dignity.

Associated Assessment Criteria for Exit-Level Outcomes 5:

- 5.1 Occupational health, safety and radiation control regulations are explained and applied during all activities within the radiation technology milieu.
- 5.2 Sectional rules and standing instructions are explained and applied at all times within the radiation laboratory and its surrounds.
- 5.3 The principles of ethics in clinical practice and governance are explained and practically applied in all interactions with colleagues, patients and other clients.
- 5.4 The principles of the Human Rights Bill and the Patient Charter are explained and applied.
- 5.5 Infection control measures are explained and stringently applied within the radiation oncology laboratory and clinical environments.

Associated Assessment Criteria for Exit-Level Outcomes 6:

- 6.1 Management principles and procedures are conducted and implemented to ensure effective integration within the radiation laboratory.
- 6.2 Management skills within the multidisciplinary team are applied to ensure effective and optimal patient treatment and flow.
- 6.3 Appropriate information technology is used to record, retrieve and communicate patient data.
- 6.4 Departmental policies and standard operating procedures are interrogated, implemented and adhered to for effective management of the radiotherapy laboratory.

Associated Assessment Criteria for Exit-Level Outcomes 7:

- 7.1 Principles, concepts, applications and procedures of maxillo-facial and other complementary healthcare technologies are explained and applied in the development of appropriate immobilisation devices.
- 7.2. Specialised knowledge and skills are applied in the development and improvement of radiation laboratory technology procedures.
- 7.3 The role of diagnostic imaging procedures are explained and integrated in radiation laboratory technology.
- 7.4 Specialised immobilisation aids are produced to match different categories of patients and their clinical conditions.
- 7.5 The relevance of new and specialised developments in treatment of oncology patients is explained in terms of their use and relevance in a radiation laboratory.

Associated Assessment Criteria for Exit-Level Outcomes 8:

- 8.1 An ongoing knowledge of appropriate information technology is maintained to keep abreast of continuing and new developments within the radiotherapy laboratory technology field.
- 8.2 Research needs within the field of radiotherapy laboratory technology are identified and an appropriate area for research is selected.
- 8.3 Quantitative and qualitative research methods are explained and discussed as possible solutions to own research needs.

8.4 A professional research proposal within the field of radiotherapy laboratory technology is developed, motivated and presented.

8.5 Research principles and methodology in the field of radiotherapy research are applied in order to complete a mini research project.

8.6 Research is conducted ethically according to established research methodology and practice.

8.7 Research findings and conclusions are prepared and presented in a research report according to the required research practice.

Associated Assessment Criteria for Exit-Level Outcomes 9:

9.1 Apply and integrate the principles and/or philosophy of the subject into related activities.

9.2 Apply specialised techniques required to achieve the contextual objective.

9.3 Apply quality assurance principles to ensure optimal results within the context of the subject.

Integrated Assessment:

Integrated assessment strategies are applied throughout the course of learning for this Qualification, in both formative and summative assessments.

Integrated assessment takes the form of a variety of appropriate assessment methods, which include:

- Written assignments.
- Practical assessments.
- Literature reviews.
- Field reports and/or workbooks.
- Informal tests.
- Case studies.
- Class presentations.
- Peer evaluation.
- Simulations in structured learning environments.

Formative Assessment:

- Learning and assessment are integrated.
- The scheme of work includes tests and assignments, practical work and competency evaluation of practical skills.
- The process is continuous and focuses on smaller sections of the work in limited number of outcomes.

Summative Assessment:

- Summative assessments evaluate the learners' abilities to manage and integrate larger bodies of knowledge and to achieve the stated outcomes.
- Summative assessments also focus on the learners' ability to integrate knowledge and skills in the particular area of specialisation.
- Summative assessments include theoretical and practical assessments.

INTERNATIONAL COMPARABILITY

The primary objective of designing this Qualification was to meet the needs of the South African community as identified by the National Department of Health and also to be comparable with international best practice. In trying to compare this Qualification with those internationally, it was noted that most of the institutions which offer education and training that is similar to radiation laboratory technology refer to these practitioners as mould room technologists or technicians.

Canada:

The British Columbia Institute of Technology (BCIT) offers a four year Radiation Therapy course and a three year full-time diploma for Tool and Die Technicians. Both courses have some aspects of mould making incorporated in the programme. For both these courses, learners are introduced to the environment which also provides familiarity with treatment planning terminology, patient contouring and immobilisation, and treatment field blocking methods, as well as simulator and CT simulator technology requires construction of a customised immobilisation device using accepted procedure.

The Tool and Die Technician programme offered by the BCIT has been designed to provide learners with tool making and plastic mould-making skills. It includes on the job training to support institutional instruction. The course as a whole is made of three parts, namely: Machinist Core programme, Co-opted work term in industry and the last part focuses on Tool and Die Specialisation which is devoted to the design and making of jigs and fixtures, the making of forming dies and punches, and the designing and building of plastic moulds.

The Canadian Association of Medical Radiation Technologists has included as module C of the competency profile for the radiation therapists, the ability to construct and fit an immobilisation devices to ensure patient comfort during radiation therapy procedures.

United Kingdom:

The training programme in the United Kingdom is very similar to the British Colombian one. Both have some training in the mould room in the radiation therapy scope. According to the Society of Radiographers in the United Kingdom, Mould Room Technologists are radiographers who plan treatment and prepare immobilisation devices for patients. The contents, skills required and job opportunities are also available to radiographers. The same principle is applied to radiographers who are offered extensive education and training in dosimetry. There is no formal course for dosimetry and mould room technicians.

The United Kingdom is developing a Voluntary Register of Clinical Technologists and has drafted a Scope of Practice. Generically clinical technologists are considered as healthcare scientists who "perform invasive procedures on patients or make clinical interventions or exercise judgement that can substantially impact on patient health or welfare". The practice is divided into Clinical Physics and Clinical Engineering. Under Clinical Physics the discipline of Radiation Physics is practised by the Radiation Physics Technologists, who perform specialised tasks in mould room, dose planning, virtual simulation, brachytherapy, quality control of radiotherapy systems and dose measurements. The mould room tasks include:

- Taking appropriate impressions of patients.
- Manufacturing custom made beam direction, modifying and shielding devices.
- Monitoring and reacting to changing needs of patients in the mould room or undergoing brachytherapy.
- Providing advice and point of contact for patients throughout the mould room process.
- Operating a broad range of mould room equipment including vacuum forming and computerised block cutting equipment.
- Managing and controlling mould room stocks.

United States of America:

The United States of America includes mould room training in the scope of the Radiation Therapist. However the construction and preparation of the immobilisation and beam directional/modification devices is performed under the supervision and recommendation of a

Medical Dosimetrist. Although both disciplines have contact with patients, neither is equivalent to radiotherapy or radiation laboratory technology in the South African context.

Malaysia:

At the Sains University Hospital in Malaysia, a mould room technologist makes a personalised mould to fix to that specific part of body bearing the tumour. The mould room technologist works in a workshop and uses a variety of equipment to design individualised moulds and treatment aids. This means that they do not have contact with patients. Training is offered by the Sains University as part of the Radiation Therapy programme.

India:

The course for the Radiology Technician (Radio Diagnosis and Radiotherapy) was designed in 2005 to meet the needs of the society in India for diagnostic radiography and radiation therapy. The course is offered under the Craftsmanship Training Scheme over a period of two years. Major sections of the course focus on diagnostic radiography and radiation therapy. Mould room technology is only offered close to the end of the training programme. Radiotherapy is offered during weeks 91 to 100 and mould room education forms only part of radio-therapeutic practices which cover the very last part of the course.

To be accepted into the radiology technician course, the learner must have passed 12th Class examinations with Physics, Chemistry and Biology. These entrance requirements compare fairly with those proposed for this Qualification. The South African requirement which is different from that in India is the emphasis on radiotherapy physics. In India, this subject is taught at an elementary level and principles and practical applications are then emphasised throughout.

Conclusion:

In comparing the courses that incorporate education and training of mould room technicians in other parts of the world, it is clear that not all countries have registration requirements for those people working in positions similar to the South African radiation laboratory technologists. Where there are no registration requirements, the safety of the patients is ensured through the fact that professionals with direct patient contact are already registered with other relevant health councils.

It is evident that this Qualification contains additional and more advanced learning than its international counterparts, because the Radiation Laboratory Technologist in South Africa is required to perform a greater variety of competencies and assume more hands-on treatment responsibilities. This Qualification compares favourably with similar qualifications in other countries, is likely to be classified as the best in developing countries and is among the best in the developed world.

ARTICULATION OPTIONS

This Qualification articulates:

- Horizontally with the Bachelor of Radiation Therapy.
- Vertically with a Masters degree in Radiation Laboratory Technology or any other Master in the field of Radiography or Radiation.

MODERATION OPTIONS

- Providers offering learning towards this qualification must be accredited by the relevant ETQA, in agreement with the relevant Health Professional Council.
- Moderation of assessment will be overseen by the appropriate ETQA according to moderation principles and procedures.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

- Assessors must be registered in terms of the requirements of the relevant ETQA.
- Assessors and moderators must be used in a manner that fits into the quality management system of the provider and in accordance with the institutional tuition and assessment policies. This must also apply to the appointment of outside assessors and/or moderators.
- Assessors and moderators are expected to be in possession of a relevant Qualification above the NQF Level of this Qualification, as well as relevant clinical expertise and current experience. Such Qualifications include: National Diploma or Bachelor of Technology, M. Tech, D. Tech/PhD degree in Radiation Laboratory Technology or Radiation Therapy, Bachelor in Radiography: Radiotherapy, Bachelor Radiography (Hons), M. Radiography and PhD Radiography.

NOTES

Registration with the relevant Health Professional Council as a Learner is a statutory requirement when learners engage in providing services to individuals, groups and/or communities.

Following completion of this Qualification, the successful learner may be expected to complete a period of community service in terms of current legislative requirements before full registration as a professional with the relevant Health Professional Council can be obtained.

UNIT STANDARDS

This qualification is not based on Unit Standards.

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION

None
