No. 1184 **20 September 2002**

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 NSB 06, Manufacturing, Engineering and Technology, publishes the following qualifications 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 upon which qualifications are based. 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, 659 Pienaar street, Brooklyn, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 21 October 2002.*** All correspondence should be marked **Standards Setting – SGB for Food** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. D Mphuthing
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 482 0907

pp **SAMUEL B.A. ISAACS**
EXECUTIVE OFFICER

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

National Certificate in Food and Beverage Laboratory Practices: Food and Beverage Laboratory Analysis NQF 3

Field: Manufacturing, Engineering and Technology - NSB 06

Sub-field: Manufacturing and Assembly

Level: 3

Credit: 120

Issue date:

Review date:

Rationale of the qualification

This qualification reflects the workplace-based need of the food and beverage manufacturing industry regarding laboratory practices, specifically towards assistant analyst skills. This need is expressed by employers and employees, both now and for the future. This qualification provides the learner with accessibility to be employed within the food and beverage manufacturing industry and provides the flexibility to pursue a quality control and assurance career with broad articulation within the different areas of the food and beverage industry.

The level of flexibility within the range of electives will allow the individual to pursue a career as a quality control and assurance analyst within the food and beverage analytical, microbiological and biochemical laboratory environment leading to articulation within the laboratory supervision environment.

Purpose of the qualification

This qualification is aimed at the learner who wants to obtain the skills in food and beverage laboratory analysis, or who already has the skills, but wants to obtain national recognition for these skills through a process of RPL.
A person acquiring this qualification will be able to perform the core functions that support the operations in a food and beverage analytical laboratory. In addition, and depending on the electives chosen, the learner will be able to perform quality evaluation techniques and procedures to establish the physical, chemical, sensory, compositional and microbiological quality of food and beverage products.
This qualification will allow a person to advance to a food and beverage quality control and assurance practices or supervision qualification at NQF level 4. The qualification will also enhance the social status and productivity within the food and beverage industry.

Access to the qualification

Open access.

Credits assigned to the qualification

In the fundamental component of the qualification, a learner must achieve or demonstrate his/her competence in the 20 credits in the field of Communication Studies and Language and 16 credits in the field of Physical, Mathematical, Computer and Life Sciences. Six additional credits are assigned to knowledge of chemistry principles, which forms an integrated part of the fundamental knowledge needed for food and beverage laboratory analysis.

The unit standards in the core and elective component of the qualification reflect the skills and competencies needed in order to be transportable in the food or beverage laboratory and quality control environment.

In the core component of the qualification a learner must achieve or demonstrate his/her competence in the 62 credits within the core group of unit standards.

The elective component of the qualification enables the person to pursue a learning path with interests of his/her own that can contribute to other learning pathways, such as microbiological analysis, chemical and compositional analysis, and sensory and physical analysis of food and beverage products.

A minimum of 16 credits must be chosen from the electives in order to achieve the 120 credits of the qualification. From the total of 120 credits of the qualification, the fundamental and core unit standards contribute to a minimum of 92 credits on level 3 and higher.

An average learner is currently taking 780 hours in order to achieve the learning outcomes as described within the core and elective group of unit standards, and 1200 hours to achieve the total credits of the whole qualification.

Learning assumed to be in place

A knowledge, comprehension and application of language, mathematics, natural science and technology principles at NQF levels 1 and 2.

Exit level outcomes

Qualifying learners can:

Exit level 1: Maintain and apply safety practices in a food and beverage quality assurance laboratory.

Associated assessment criteria

- Maintain safety aspects regarding housekeeping, handling and storing of equipment and reagents in a food and beverage laboratory according to standard operating procedures and safety principles.
- Demonstrate knowledge of food safety practices and procedures in a food and beverage environment.
- Monitor and control quality assurance practices in a food and beverage laboratory according to standard operating procedures.

Exit level 2: Perform core functions in a food and beverage quality assurance laboratory.

Associated assessment criteria
- Prepare glassware and media for determination procedures in a food and beverage laboratory according to standard operating procedures.
- Demonstrating knowledge of heating and cooling procedures.
- Demonstrate knowledge of fundamental chemical and physical reactions and fundamental biochemistry principles.
- Measure the temperature of food or beverage products according to standard operating procedures and evaluate the results.
- Take representative samples of food or beverage products according to standard operating procedures for analysis in a laboratory.
- Perform elementary acid-base titrations to prepare chemical solution with specific concentrations.

Exit level 3: Determine the microbiological quality of food or beverage products.

Associated assessment criteria
- Demonstrate knowledge of and apply microbiological principles in a food and beverage environment.
- Demonstrate an understanding of the connection between micro-organisms and food spoilage and how this will affect microbiological analysis of food and beverage products.
- Evaluate the microbiological quality of food or beverage products by means of pour plate methods according to standard operating procedures.
- Demonstrate knowledge of the nature and composition of food.

Exit level 4: Determine the chemical and compositional quality of food or beverage products.

Associated assessment criteria
- Evaluate the quality of a food or beverage product in terms of its pH according standard operating procedures.
- Evaluate the quality of a food or beverage product in terms of its moisture content (oven drying method) according to standard operating procedures.
- Demonstrate knowledge of the nature and composition of food.

Exit level 5: Determine the physical and sensory quality of food or beverage products.

Associated assessment criteria
- Evaluate the quality of a food or beverage product in terms of its viscosity according to standard operating procedures.
- Evaluate the quality of a food or beverage product by performing sensory evaluation according to standard operating procedures.
- Demonstrate knowledge of the nature and composition of food.

Critical cross-field outcomes

Critical cross-field outcomes have been addressed by the exit level outcomes as follows:

Critical cross-field outcomes	**Evident in exit level outcome**
While performing laboratory analyst tasks, qualifying learners can:	
1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:	
• Applying knowledge and comprehension of health and safety practices,	1
• Monitoring and controlling quality assurance practices,	1

• Identifying and solving problems while performing laboratory analyst tasks.	2, 3, 4, 5
2. Work effectively with others as a member of a team, group, organisation or community by:	
• Applying team-work to monitor and control quality assurance practices,	1
• Co-ordinating one's work with that of others in the direct surrounding area.	2, 3, 4, 5
3. Organise and manage oneself and one's activities responsibly and effectively by:	
• Planning one's activities.	2, 3, 4, 5
4. Collect, analyse, organise and critically evaluate information by:	
• Monitoring and controlling quality assurance practices,	1
• Taking samples, analysing it and evaluating the results in order to determine whether products conform to specifications.	2, 3, 4, 5
5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:	
• Keeping records and noting results.	2, 3, 4, 5
6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:	
• Working according to health and safety regulations,	1, 2, 3, 4, 5
• Working with technologically advanced laboratory equipment according to SOP.	2, 3, 4, 5
7. Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation by:	
• Monitoring and controlling quality assurance practices,	1
• Identifying and solving problems during laboratory analyses of food and beverage samples.	2, 3, 4, 5
8. Contribute to the full personal development of each learner and the social and economic development of the society at large by:	
• Maintaining and applying safety practices in a food and beverage quality assurance laboratory,	1
• Performing core functions in a food and beverage quality assurance laboratory,	2
• Determining the microbiological quality of food or beverage products.	3
• Determining the chemical and compositional quality of food or beverage products.	4
• Determining the physical and sensory quality of food or beverage products.	5

International comparability

Benchmarking was done against the NVQ from Britain, SVQ from Scotland as well as Australian, New Zealand and German qualifications. Similar qualifications, though not always unit standards based, were found. Qualifications resembling comparability was found on the New Zealand qualification framework at level 4. These qualifications (food and dairy manufacturing laboratory technology certificates on level 4) focuses on development of learners towards laboratory management and advanced scientific and technological development of laboratory methods, which are clearly qualifications with a different focus.

Integrated assessment

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if the learner is able to perform core laboratory functions, as well as some quality evaluation techniques and procedures to establish one or more of the physical, chemical, sensory, compositional and microbiological quality of a range of food and beverage 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

assessment methods and tools 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 to problem solving and application of the world as a set of related systems within the processing environment.
A detailed portfolio of evidence is required to proof the practical, applied and foundational competencies of the learner.
Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. 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.
Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflexive competencies.

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.

Articulation possibilities

This qualification will enable the qualifying learner to progress to learning for the national certificate in food and beverages quality control and assurance practices or quality control supervision qualification at NQF level 4.

Moderation options

- Anyone assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor 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.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- 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 as well as 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 registration of assessors

For an applicant to register as an assessor, the following are essential:
- The applicant needs well-developed interpersonal skills, as well as subject matter and assessment experience.
- The assessor needs to be competent in the planning and conducting of assessment of learning outcomes as described in the unit standard "Plan and conduct assessment of learning outcomes" at NQF level 5. The subject matter experience must be well developed within the field of food and beverage laboratory practices, procedures and quality assurance tests.
- The applicant should have a similar qualification than this one, with a minimum of 12 months field experience after he/she has completed the qualification or,

- A food science and technology qualification on NQF level 6 or higher, with a minimum of 12 months field experience after he/she has completed the qualification.
- The subject matter experience of the assessor can be established by recognition of prior learning.
- The assessors need to be registered with the Food and Beverage Education and Training Quality Assurance Body.
- Detailed documentary proof of educational qualification, practical training undergone, and experience gained by the applicant must be provided (portfolio of evidence).

National Certificate in Food and Beverage Laboratory Practices: Food and Beverage Laboratory Analysis NQF 3 120 credits

Fundamental			
TITLE	**CREDITS**	**LEVEL**	**NLRD**
Accommodate audience and context needs in oral communication.	3	5	
Interpret and use information from texts.	3	5	
Write texts for a range of communicative context.	3	5	8964
Use language and communication in an occupational learning programmes.	3	5	8973
Field of Physical, Mathematical, Computer and Life Sciences			
Demonstrate understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations.	3	2	
Use mathematics to investigate and monitor the financial aspects of personal and business issues.	3	5	8983
Investigate life and work related problems using data and probabilities.	3	5	
Measure, estimate and calculate physical quantities and explore, describe and represent, interpret and justify geometrical relationships in two and three-dimensional space relevant to the life or workplace of the community.	3	4	9008
Demonstrate knowledge of chemistry principles.	3	6	
Total fundamental			**42**
Core			
TITLE	**CREDITS**	**LEVEL**	**NLRD**
Prepare glassware and media for determination procedures in a food laboratory.	1	4	
Measure the temperature of food or beverage products and evaluate the readings.	1	1	
Take a representative food or beverage sample.	1	3	
Maintain food laboratory safety.	2	4	9114
Demonstrate knowledge of the nature and composition of food.	3	6	
Demonstrate knowledge of fundamental principles of biochemistry.	3	7	
Monitor and control quality assurance practices in a food or beverage-manufacturing environment.	3	4	8902
Demonstrate knowledge of fundamental chemical and physical reactions.	3	8	
Apply microbiological principles in a food or beverage environment.	3	6	9147

Demonstrate an understanding of food or beverage safety practices and procedures in a food or beverage-manufacturing environment.	3	7	9042
Demonstrate an understanding of heating and cooling procedures.	3	4	9113
Demonstrate an understanding of the relationship between micro-organisms and food spoilage.	4	8	8870
Total Core		**62**	62
Electives (Choose a minimum of 16 credits)	**CREDITS**	**LEVEL**	**NLRD**
Perform elementary acid-base titrations and interpret the results.	6	3	
Evaluate the quality of a food or beverage product in terms of its viscosity.	3	3	9163
Evaluate the microbiological quality of a food or beverage product by means of pour plate methods.	12	3	9164
Evaluate the quality of a food or beverage product in terms of its pH.	4	3	9138
Evaluate the quality of a food product in terms of its moisture content using the oven drying method.	3	3	9154
Produce and use spreadsheets for business.	5	3	
Produce word processing documents for business.	5	3	
Determine the quality of food products using sensory evaluation.	10	4	

UNIT STANDARDS IN NATIONAL CERTIFICATE IN FOOD AND BEVERAGE LABORATORY PRACTICES: FOOD AND BEVERAGE LABORATORY ANALYSIS NQF 3

UNIT STANDARDS ON NQF LEVEL 1

Title 1: Prepare glassware and media for determination procedures in a food laboratory (Registered, Dairy SGB).
Title 2: Measure the temperature of food or beverage products and evaluate the readings (Registered, Dairy SGB).
Title 3: Take a representative food or beverage sample (Registered, Dairy SGB).

UNIT STANDARDS ON NQF LEVEL 2

Title 1: Maintain food laboratory safety (Registered, Dairy SGB).

UNIT STANDARDS AT NQF LEVEL 3

Title 1: Demonstrate knowledge of the nature and composition of food (To be registered).
Title 2: Demonstrate knowledge of fundamental principles of biochemistry (To be registered).
Title 3: Monitor and control quality assurance practices in a food or beverage manufacturing environment (Registered, Food SGB).
Title 4: Demonstrate knowledge of fundamental chemical and physical reactions (To be registered).
Title 5: Apply microbiological principles in a food or beverage environment (Registered, Dairy SGB).
Title 6: Demonstrate an understanding of food or beverage safety practices and procedures in a food or beverage manufacturing environment (Registered, Food SGB).
Title 7: Demonstrate an understanding of heating and cooling procedures (Registered, Food SGB).
Title 8: Perform elementary acid-base titrations and interpret the results (To be registered).
Title 9: Evaluate the quality of a food or beverage product in terms of its viscosity (Registered, Dairy SGB).
Title 10: Evaluate the microbiological quality of a food or beverage product by means of pour plate methods (Registered, Dairy SGB).
Title 11: Evaluate the quality of a food or beverage product in terms of its pH (Registered, Dairy SGB).
Title 12: Evaluate the quality of a food product in terms of its moisture content using the oven drying method (Registered, Dairy SGB).
Title 13: Produce and use spreadsheets for business (Registered, NSB 10).
Title 14: Produce word processing documents for business (Registered, NSB 10).
Title 15: Accommodate audience and context needs in oral communication (Registered, NSB 04).
Title 16: Interpret and use information from texts (Registered, NSB 04).
Title 17: Write texts for a range of communicative context (Registered, NSB 04).
Title 18: Use language and communication in an occupational learning programmes (Registered, NSB 04).
Title 19: Demonstrate understanding of the use of different numbers bases and measurement units and an awareness of error in the context of relevant calculations (Registered, NSB 10).
Title 20: Use mathematics to investigate and monitor the financial aspects of personal and business issues (Registered, NSB 10).
Title 21: Investigate life and work related problems using data and probabilities (Registered, NSB 10).

Title 22: Measure, estimate and calculate physical quantities and explore, describe and represent, interpret and justify geometrical relationships in two and three-dimensional space relevant to the life or workplace of the community (Registered, NSB 10).
Title 23: Demonstrate knowledge of chemistry principles (To be sourced from NSB 10).

UNIT STANDARDS AT NQF LEVEL 4

Title 1: Demonstrate an understanding of the relationship between micro-organisms and food spoilage (Registered, Food SGB).
Title 2: Determine the quality of food products using sensory evaluation (Registered, Food SGB).

UNIT STANDARDS AND SPECIFIC OUTCOMES IN NATIONAL CERTIFICATE IN FOOD AND BEVERAGE LABORATORY PRACTICES: FOOD AND BEVERAGE LABORATORY ANALYSIS NQF 3

UNIT STANDARDS AT NQF LEVEL 3

1. TITLE: **Demonstrate knowledge of the nature and composition of food.**
Specific outcome 1.1: Demonstrate knowledge of the components of food products and its nutritional importance.
Specific outcome 1.2: Demonstrate knowledge of the functional properties of food.
Specific outcome 1.3: Demonstrate knowledge of the effects of processing on food components.
Specific outcome 1.4: Demonstrate knowledge of methods of food preservation.

2. TITLE: **Demonstrate knowledge of fundamental principles of biochemistry.**
Specific outcome 2.1: Demonstrate knowledge of cells in living organisms.
Specific outcome 2.2: Demonstrate knowledge of vital processes and systems in living organisms.
Specific outcome 2.3: Demonstrate knowledge of enzymes in living organisms.
Specific outcome 2.4: Demonstrate knowledge of hormones in living organisms.

3. TITLE: **Demonstrate knowledge of fundamental chemical and physical reactions.**
Specific outcome 3.1: Demonstrate knowledge of fundamental physical reactions.
Specific outcome 3.2: Demonstrate knowledge of the reactions of light.
Specific outcome 3.3: Demonstrate knowledge of fundamental chemical reactions.
Specific outcome 3.4: Demonstrate knowledge of the rate and mechanism of chemical reactions.

4. TITLE: **Perform elementary acid-base titrations and interpret the results.**
Specific outcome 4.1: Demonstrate knowledge of elementary acid-base titrations.
Specific outcome 4.2: Prepare for elementary acid-base titrations in an analytical laboratory.
Specific outcome 4.3: Perform elementary acid-base titrations in an analytical laboratory.
Specific outcome 4.4: Report on the results of the acid-base titrations.