

**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 Standard for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standard. The full Qualification and Unit Standard can be accessed via the SAQA web-site at [www.saq.org.za](http://www.saq.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 Standard should reach SAQA at the address below and **no later than 13 August 2007**. All correspondence should be marked **Standards Setting – Manufacturing and Assembly Processes** and addressed to

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

**QUALIFICATION:****National Certificate: Production Technology**

SAQA QUAL ID		QUALIFICATION TITLE	
58781		National Certificate: Production Technology	
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	125	Level 2	Regular-Unit Stds Based

**PURPOSE OF THE QUALIFICATION****Purpose:**

The combination of learning outcomes that comprise this qualification will provide the qualifying learner with vocational knowledge and skills appropriate to the context of production technology.

This qualification provides learners with the range of learning and skills required to be able to perform a series of activities to support manufacturing, engineering and technology processes. Learners will acquire a range of skills in the identification of production parameters in manufacturing, engineering and technology industries and basic strategies to achieve them.

The qualifying learner will be able to:

- Communicate production and manufacturing related operational information to a variety of end users.
- Contribute to achieving production specifications through optimising organisational structures, functions and processes.
- Contribute to workgroup efforts and support the maintenance of a safe and healthy work environment.
- Demonstrate an understanding of production technology practices, terminology and systems as applied in manufacturing, engineering and technology.
- Contribute to efficient and effective production by applying quality standards and procedures.

This qualification is the first qualification in a pathway of three (3) qualifications for learners in the production technology environment.

**Rationale:**

As a result of an increased need for efficient and quality production processes in the manufacturing, engineering and technology field, the demand for production technology competencies has become more evident.

This qualification contributes to the industries in manufacturing and related fields which will allow learners who achieve the qualification to contribute and function in areas such as production processes, systems and maintenance, quality and occupational health and safety. Learners who will typically embark on this qualification are individuals who have an interest in a career in production technology. The production technology competencies incorporated in this

qualification can also be offered as support skills programmes to incumbents in any other manufacturing, engineering and technology field qualifications.

This qualification will add value to a specific manufacturing, engineering and technology context by complementing contexts specific qualifications within these sectors. The supportive relationship between occupational qualifications and this suite of qualifications is embedded in the inclusion of production technology competencies that have previously not been included in mainstream production, manufacturing and technological qualifications in order to address these identified gaps.

The qualifications available in production technology are either provider-based qualifications or national qualifications at NQF Level 5. There are no lower level qualifications that allow a learner access into this specific discipline. These qualifications have therefore been designed in such a way to firstly, facilitate the building of a pool of people that can choose a career in a production, engineering, manufacturing field and secondly, to allow any of the manufacturing and related qualifications to utilise the production technology qualifications as entry qualifications in these industries, since they would include the production technology competencies that these industries require; Thirdly, the qualifying learner will also gain access to further learning as a supervisor or in a managerial position within this specific production environment; and lastly, therefore have a learning pathway to access higher education programmes in this discipline.

This qualification will facilitate the formalising, recognition and strengthening of a historically neglected discipline that will be able to contribute towards efficient, effective, healthy, safe and productive manufacturing, engineering and technology environments, through encompassing applied knowledge, skills, attitudes and values.

#### **RECOGNIZE PREVIOUS LEARNING?**

Y

#### **LEARNING ASSUMED IN PLACE**

- Communication at Level 1.
- Mathematical literacy NQF Level 1.

Recognition of Prior Learning:

The qualification may be obtained in whole or in part through the process of Recognition of Prior Learning. Learners who may meet the requirements of any unit standard in this qualification may apply for recognition of prior learning to the relevant ETQA, and will be assessed against the assessment criteria of the exit level outcomes of this qualification and specific outcomes for the relevant unit standard/s.

Anyone wishing to be assessed against this qualification may apply to be assessed by any assessment agency, assessor or provider institution, which is accredited by the relevant ETQA.

Access to Qualification:

- Open access.

#### **QUALIFICATION RULES**

- All fundamental units standards to the value of 36 credits must be completed.
- All core unit standards to the value of 69 credits must be completed.
- Learners must complete unit standards to the value specialisation, of at least 20 credits from the specialisation, sector or general elective unit standards.

**EXIT LEVEL OUTCOMES**

1. Communicate production and manufacturing related operational information to a variety of end users.
  - Range: End users include but are not limited to supervisor, serviceman, peers, co-workers.
2. Contribute to achieving production specifications through optimising organisational structures, functions and processes.
3. Contribute to workgroup efforts and support the maintenance of a safe and healthy work environment.
4. Demonstrate an understanding of production technology practices, terminology and systems as applied in manufacturing, engineering and technology.
5. Contribute to efficient and effective production by applying quality standards and procedures.

**ASSOCIATED ASSESSMENT CRITERIA**

Associated Assessment Criteria for Exit Level Outcome 1:

- 1.1 Oral communication accommodates audience and context needs.
  - Range: Audience can include internal organisation customers such as supervisor, serviceman, peers, co-workers and suppliers and communication can be about materials or product characteristics and quality).
- 1.2 Interpretation of information from texts is justified in terms of literal and implicit content of text.
  - Range: Text includes production plans, job instructions, and work procedures, policies.
- 1.3 Use of information from texts is relevant for specific contexts.
- 1.4 Written texts are relevant for specified communicative contexts.
  - Range: Written text pertains to routine maintenance, safety, quality, and production documentation, production data, and process control parameters that are recorded.
- 1.5 Use of language and communication in occupational learning programmes meet specified requirements.

Associated Assessment Criteria for Exit Level Outcome 2:

- 2.1 The organisational structure and functions is explained to reflect the inter-relationship between the production process and the broader organisation.
- 2.2 The systems and processes related to the workplace is identified and applied to reflect an understanding of organisational operations.
- 2.3 The role of the individual is identified and explained in order to impact on the achievement of production specifications and targets.
- 2.4 The role of individuals and their impact is identified and explained in order to reflect the achievement of quality specifications and targets.

Associated Assessment Criteria for Exit Level Outcome 3:

- 3.1 Factors that constitute safe workplace practices are demonstrated to ensure safe work conditions for production.
- 3.2 Factors that pose a risk are identified and reported to address the specific risk.
- 3.3 The impact of maintenance on safe machine operations is explained to contribute to a safe and healthy work environment.
- 3.4 Routine maintenance is conducted and records are kept to meet safety requirements.
- 3.5 The way in which an individual contributes to health, safety and environmental practices is demonstrated through personal hygiene and adherence to policies and procedures.

**Associated Assessment Criteria for Exit Level Outcome 4:**

- 4.1 Production technology practices, terminology and systems are explained in terms of its relationship to production.
- 4.2 Production in-put, process and output variables and its influence are identified and explained to optimise resource utilisation and the production process.
- 4.3 Production targets are explained in terms of production requirements and contribution to organisational goals.
  - Range: Production requirements include given time, cost, quality, quantity, value-add and customer specifications.
- 4.4 Safety, health and environmental policies, procedures and legislation are complied with during the production process.

**Associated Assessment Criteria for Exit Level Outcome 5:**

- 5.1 Quality control principles and practices are interpreted and applied to meet quality specifications in production.
- 5.2 An understanding of the importance of continuous quality checks are demonstrated to reflect its impact on production.
- 5.3 Quality problems are solved by comparing and interpreting quality data in the workplace.
- 5.4 Basic monitoring of production is undertaken to ensure that the product stays within the limits of quality specifications.
  - Range: Basic monitoring: sensory, simple measurement, defect charts, samples.

**Integrated Assessment:**

Formative assessments conducted during the learning process will consist of written assessments, simulation in a practical environment and a number of self-assessments.

Summative assessment consists of written assessments, assignments and simulation in a practical environment, integrating the assessment of all unit standards and embedded knowledge. Summative assessments is only conducted once the learner has demonstrated proficiency during formative assessment.

In particular assessors should check that the learner is able to demonstrate the ability to consider a range of options and make decisions about:

- The quality of the observed practical performance as well as the theory and embedded knowledge behind it.
- The different methods that can be used by the learner to display thinking and decision making in the demonstration of practical performance.
- Reflexive competencies.

**INTERNATIONAL COMPARABILITY**

An extensive and comprehensive internet search was conducted to compare and benchmark the proposed qualifications with any similar qualifications in the developing and developed world nations.

The search focussed on a number of specific geographical regions which included Africa, the Americas, Western Europe, Asia and the countries south of the southern tip of Africa including New Zealand and Australia.

The search was conducted using key words or phrases which included production technologist, production technology, production qualifications, qualifications manufacturing, engineering, production and assembly, as well as search within the various aspects of each qualification.

No comparisons could be found which indicates that South Africa is leading the field in this particular line of study. Factors featured in the qualifications were evident in some cases but not in the encompassing format that is being proposed. The factors detected were restricted to part of:

- Operations Management.
- Logistics.
- Quality.
- Productivity.
- Safety.

Based on the above it is thus evident that it will be impossible to provide an extensive list of relational material and what follows is a comprehensive and encompassing list of search conducted.

The following qualification authorities were searched:

- Scottish Qualifications Authority.
- New Zealand Qualifications Authority.
- United Kingdom Qualifications and Curriculum Authority.
- National Qualifications Authority of Ireland.
- Victorian Qualifications Authority (Australia).
- Tasmanian Qualifications Authority.
- Mauritius Qualifications Authority\*.
- Australian Qualifications Framework.
- Botswana Training Authority\*.
- National Training Agency Trinidad and Tobago.

Other sites:

- Kenya Education Network\*.
- Department of Education Philippines (Technical Skills Development).
- Department of Technical Education India.
- Ministry of Education Egypt\*.
- Ministry of Education Ethiopia\*.
- Ministry of Education Zimbabwe\*.
- Ministry of Education Israel.
- Ministry of Education France.
- Ministry of Education Peru.
- Ministry of Education Sri Lanka.
- Ministry of Education Taiwan.

\* Indicates Africa.

The following qualifications were found which have reference to the proposed interventions:

Institution; Qualification; Related NQF Level; Finding:

- New Zealand Qualifications Authority; National Certificate Manufacturing and Engineering; Level 2; Expired, only relative to safety aspects.
- New Zealand Qualifications Authority; National Certificate Manufacturing and Engineering; Level 3; Expired, only focuses on machinery.
- United Kingdom Qualifications and Curriculum Authority (Wales); Certificate Production Line Control; Level 4; Focuses only on Production Technology.

- Tasmanian Qualifications Authority; Manufacturing Studies; Level 3/4; Focuses on materials process, methodologies and statistical process control.
- Australian Qualifications Framework; Certificate iv (Pre apprenticeship); Level 4; Workplace Technology.

The following unit standards were sourced which resemble components of the proposed qualifications:

Level 2:

- PRSS0101A/01; Follow workplace safety procedures; Australia.
- ZWAWSM32A/05; Follow workplace quality procedures; Australia.
- AUR61510A/02; Implement procedures to improve productivity; Australia.

Level 3:

- ARU39508A; Carry out Warehousing Procedures; Australia.
- MEAC06A; Apply quality standards to manufacturing process; Australia.
- RUAAG5300CTA; Implement and maintain quality assurance procedures; Australia.
- BSBFFLM506A; Manage workplace information system; Australia.
- ICS1A; Contribute to workplace improvements; Australia.
- ZWAGEN305A; Solve workplace problems; Australia.
- MEM14.2BA; Basic process planning; Australia.
- D/103/0746; Configure and set processing systems to meet production requirements; United Kingdom.
- Y/101/1063; Production planning and scheduling; United Kingdom.
- Y/101/1063; Production planning and scheduling; United Kingdom.

Level 3:

- ARU39508A; Carry out Warehousing Procedures; Australia.
- MEAC06A; Apply quality standards to manufacturing process; Australia.
- RUAAG5300CTA; Implement and maintain quality assurance procedures; Australia.
- BSBFFLM506A; Manage workplace information system; Australia.
- ICS1A; Contribute to workplace improvements; Australia.
- ZWAGEN305A; Solve workplace problems; Australia.
- MEM14.2BA; Basic process planning; Australia.
- D/103/0746; Configure and set processing systems to meet production requirements; United Kingdom.
- Y/101/1063; Production planning and scheduling; United Kingdom.
- Y/101/1063; Production planning and scheduling; United Kingdom.

Level 4:

- Plan and Organise Production; AUM3401A; Australia.
- Compile a production schedule; CUFPOP03B; Australia.
- Control Production; ICPSU56EA; Australia.
- Contribute to production control tasks; 137; Australia.
- Compile a production schedule; CUFPOP03B; Australia.
- Contribute to production planning; LMTPRGN06A; Australia.
- Plan production; LMTPRGN07A; Australia.
- Prepare a simple production schedule; MEM 30; Australia.
- Participate in improving workplace productivity; AUR61447A; Australia.
- FDFOPTSPC2A; Apply principals of Statistical Process Control; Australia.

- MNC.045.A; Apply and Monitor environmental Management policies, plans and procedures; Australia.
- MCMT452A; Apply statistics to processes in Manufacturing; Australia.
- Coordinate improvement of workplace productivity; AUR61510A; Australia.

### **ARTICULATION OPTIONS**

This qualification has been developed as the first qualification in Production Technology and is intended to provide a career in its own right, as well as to facilitate progression to other manufacturing and assembly qualifications. Learners can move horizontally or vertically between related qualifications, although in most cases, some standards will be required horizontally before moving to another qualification vertically.

This qualification articulates horizontally with any NQF Level 2 qualification in the broad manufacturing, engineering and technology related sectors such as:

- Metal.
- Tyre.
- Auto.
- Motor.
- Plastics.
- Foodbev.
- Mining.
- Chemical.

This qualification articulates vertically with any NQF Level 3 qualification in the broad manufacturing, engineering and technology related sectors such as:

- Metal.
- Tyre.
- Auto.
- Motor.
- Plastics.
- Foodbev.
- Mining.
- Chemical.

### **MODERATION OPTIONS**

● Moderation of learner achievements takes place at providers accredited by the applicable ETQA for the provision of programmes that result in the outcomes specified for the Further Education and Training Certificate: Production Technology NQF Level 4.

● Anyone moderating the assessment of a learner against this Qualification must be registered as a moderator 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.

● 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 as well as the integrated competence described in the Qualification.

### **CRITERIA FOR THE REGISTRATION OF ASSESSORS**

For an applicant to register as an assessor, the applicant needs:

- A minimum of two years relevant occupational experience.
- Proven interpersonal skills, subject matter and assessment experience.
- Proven subject matter expertise within production technology.



- Competent in manufacturing, engineering and technology sector occupational qualifications at NQF Level 3.
- To be a registered assessor with the relevant 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). Assessment competencies and subject matter experience of the assessor can be established by recognition of prior learning.

**NOTES**

N/A

**UNIT STANDARDS**

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	14445	Frame and implement an individual action plan to improve productivity within an organisational unit	Level 1	3
Core	13162	Identify and describe inputs, outputs, stages and quality indicators of the manufacturing, assembly or engineering process	Level 1	10
Core	13167	Identify potential hazards and critical safety issues in the workplace	Level 1	2
Core	9964	Apply health and safety to a work area	Level 2	3
Core	114891	Count stock for a stock-take	Level 2	5
Core	13220	Keep the work area safe and productive	Level 2	8
Core	119139	Monitor the quality of the input materials and the manufactured plastic product	Level 2	12
Core	12036	Orientate self in the workplace	Level 2	6
Core	13221	Perform routine maintenance	Level 2	8
Core	12667	Supply raw and processed material to production line	Level 2	3
Core	12463	Understand and deal with HIV/AIDS	Level 2	3
Core	12456	Explain and use organisational procedures	Level 3	6
Elective	14444	Demonstrate an understanding of a general business plan and adapt it to a selected business idea	Level 1	7
Elective	110076	Prepare for freight storage	Level 1	2
Elective	9877	Assemble components	Level 2	12
Elective	9878	Complete post-production and finishing operations	Level 2	12
Elective	7106	Conduct minor routine and breakdown maintenance on equipment and machines	Level 2	6
Elective	13222	Deal with safety, health and environmental emergencies in the workplace	Level 2	4
Elective	12465	Develop a learning plan and a portfolio for assessment	Level 2	6
Elective	119074	Erect and dismantle scaffolding	Level 2	4
Elective	9881	Mark off basic regular engineering shapes	Level 2	6
Elective	117898	Move, pack and maintain stock in a distribution centre/warehouse	Level 2	12
Elective	12484	Perform basic fire fighting	Level 2	4
Elective	12483	Perform basic first aid	Level 2	4
Elective	119753	Perform basic welding/joining of metals	Level 2	8
Elective	9882	Read and interpret basic engineering drawings	Level 2	8
Elective	119744	Select, use and care for engineering hand tools	Level 2	8
Elective	12476	Select, use and care for engineering measuring equipment	Level 2	4
Elective	12481	Sling loads	Level 2	4
Elective	9879	Use and care for tools and equipment	Level 2	10
Elective	244504	Describe and explain the principles of logistics support in a specific context	Level 3	6
Elective	117897	Maintain stock balances in a distribution centre	Level 3	8
Elective	117901	Receive stock in a DC/Warehouse	Level 3	15
Fundamental	119463	Access and use information from texts	Level 2	5
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	119454	Maintain and adapt oral/signed communication	Level 2	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	12444	Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in 2-dimensions in different life or workplace contexts	Level 2	3
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