

**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.saqqa.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		
58785	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	120	Level 3	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:

- Perform production maintenance activities and report irregularities within organisational structures.
- Apply the fundamental concepts, theories and techniques of production systems.
- Apply the fundamental concepts relating to production planning, scheduling and control.
- Apply quality control and quality assurance practices for efficient and effective production processes.
- Communicate effectively as a member of a team.

This qualification is the second 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 planning and control, 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 an efficient, effective, healthy, safe and productive manufacturing, engineering and technology environments, through encompassing applied knowledge, skills, attitudes and values.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED IN PLACE

- Communication at NQF Level 2.
- Mathematical literacy NQF Level 2.
- Contribute to achieving production specifications through optimising organisational structures, functions and processes NQF Level 2.
- Demonstrate an understanding of production technology practices, terminology and systems as applied in manufacturing, engineering and technology NQF Level 2.
- Contribute to efficient and effective production by applying quality standards and procedures NQF Level 2.

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 the Qualification:

Open access. The severity of a disability may cause a learner difficulty in the completion of this qualification in a specific context.

QUALIFICATION RULES

- All fundamental units standards to the value of 36 credits must be completed.
- All core unit standards to the value of 58 credits must be completed.

- Learners must complete unit standards to the value specialisation, of at least 26 credits from the specialisation, sector or general elective unit standards.

EXIT LEVEL OUTCOMES

1. Perform production maintenance activities and report irregularities within organisational structures.
2. Apply the fundamental concepts, theories and techniques of production systems.
 - Range: Include, but not limited to, Just in Time (JIT), cycle times, process flow, division of labour, lead times, transport systems, supply chain, value chain, Total Quality Management (TQM), process control, inventory control, batch sizes, capacity, productivity, lean manufacturing, waste management.
3. Apply the fundamental concepts relating to production planning, scheduling and control.
4. Apply quality control and quality assurance practices for efficient and effective production processes.
5. Communicate effectively as a member of a team.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- 1.1 Machine/equipment variables are monitored against specified maintenance checklists and appropriate action taken in accordance with maintenance schedules or procedures to prevent production delays.
 - Range: Maintenance will include cleaning, replacing components, inspection and adjustments, lubrication.
- 1.2 Machine/equipment non-conformances are identified and corrective action taken according to machine/equipment specifications and/or company procedures to ensure continuous production.
- 1.3 Preventative maintenance is performed according to work instructions to minimise production delays.
- 1.4 Maintenance reports are completed at specified occasions according to company requirements to maintain accurate records.
manufacturing, waste management.

Associated Assessment Criteria for Exit Level Outcome 2:

- 2.1 Basic production concepts and theories are explained in order to contribute to production efficiencies.
- 2.2 Basic production techniques are explained and applied according to prescribed company specifications.
- 2.3 Production/process resources are utilised optimally in the application of prescribed company specifications.

Associated Assessment Criteria for Exit Level Outcome 3:

- 3.1 Production planning, scheduling and control techniques are explained and applied according to prescribed procedures to achieve production targets.
- 3.2 Factors influencing planning, scheduling and control are explained and considered to interpret production plans and schedule resources.
- 3.3 Production plans are interpreted and resources scheduled to meet prescribed objectives.

Associated Assessment Criteria for Exit Level Outcome 4:

- 4.1 Company quality management systems are explained and applied according to company policies and customer specifications.
- 4.2 Product deviations and non-conformances are identified and responded to according to company procedures in order to meet quality specifications.
- 4.3 Company environmental management system is explained and applied according to company policies and legislation.
- 4.4 Quality inspection and sampling is performed to prevent deviations and non-conformances according to company procedures.

Associated Assessment Criteria for Exit Level Outcome 5:

- 5.1 Information and data is interpreted to ensure simple reports are produced for record keeping purposes.
- 5.2 Communication processes are engaged in to inform peers and supervisors of production processes and challenges.
- 5.3 Manufacturing materials tools are listed and stored for the purpose of production to standard specifications.
- 5.4 Relationships with peers, supervisory and management levels are established and functioning to promote communication within the workplace.
- 5.5 Issues related to own role and purpose in the organisation are discussed to reflect an understanding of individual contribution to the manufacturing process.
- 5.6 Problems are identified in a timely manner, reported and discussed and the agreed corrective action is implemented.

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 4:

- Plan and Organise Production; AUM3401A; Australia.
- Compile a production schedule; CUF0P03B; Australia.
- Control Production; ICPSU56EA; Australia.
- Contribute to production control tasks; 137; Australia.
- Compile a production schedule; CUF0P03B; 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 second 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 3 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 Level 4 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 4.
- 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	13234	Apply quality procedures	Level 3	8
Core	13223	Apply safety, health and environmental protection procedures	Level 3	6
Core	244504	Describe and explain the principles of logistics support in	Level 3	6

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
		a specific context		
Core	116218	Explain the planning and scheduling of tasks in a production environment	Level 3	3
Core	242814	Identify and explain the core and support functions of an organisation	Level 3	6
Core	9913	Perform first line maintenance	Level 3	14
Core	120379	Work as a project team member	Level 4	8
Core	10631	Demonstrate an understanding of manufacturing, principles, methodologies and processes	Level 5	7
Elective	12483	Perform basic first aid	Level 2	4
Elective	113840	Apply basic road transport managerial principles	Level 3	11
Elective	13915	Demonstrate knowledge and understanding of HIV/AIDS in a workplace, and its effects on a business sub-sector, own organisation and a specific workplace	Level 3	4
Elective	9914	Handle and care for materials	Level 3	12
Elective	9530	Manage work time effectively	Level 3	3
Elective	113829	Operate within a logistics environment	Level 3	10
Elective	12455	Perform the role of a safety, health and environmental protection representative	Level 3	4
Elective	116720	Show understanding of diversity in the workplace	Level 3	3
Elective	116280	Demonstrate understanding of warehouse manufacturing and inventory assembly	Level 4	20
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	119466	Interpret a variety of literary texts	Level 3	5
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
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5