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**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

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

**Manufacturing, Engineering and Technology**

publishes the following unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification. The qualification can be accessed via the SAQA web site at [www.saga.org.za](http://www.saga.org.za). Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 15 Aug 2005***. All correspondence should be marked **Standards Setting – SGB Manufacturing and Assembly Processes** and addressed to

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### *National Diploma: Rubber Technology*

SAQA QUAL ID	QUALIFICATION TITLE		
22774	National Diploma: Rubber Technology		
SGB NAME	NSB 06	PROVIDER NAME	
SGB Manufacturing and Assembly Processes	Manufacturing, Engineering and Technology		
QUAL TYPE	FIELD	SUBFIELD	
National Diploma	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	240	Level 5	Regular-Unit Stds Based

#### PURPOSE AND RATIONALE OF THE QUALIFICATION

##### Purpose:

The purpose of the qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively as rubber technologists within the rubber manufacturing and assembly environment and meet the challenges of such an environment.

The chief skills that are recognised in this qualification are the ability to test and analyse rubber materials, components and products, determine requirements for rubber applications, perform auditing activities and manage projects. These skills require an in-depth understanding of rubber manufacturing and assembly processes and applicable rubber chemistry, rubber physics, organic chemistry and mathematical concepts.

Qualified learners will also understand:

- > How to maintain and influence relationships in a complex production environment.
- > How to achieve change.
- > How to maintain quality specifications to optimise the quality assurance process.
- > How to work with a range of information sources to optimise performance.

Qualifying learners will also be able to support the various policies and procedures related to the safety, health and environmental systems that govern their workplace.

##### Rationale:

The rubber manufacturing industry is characterized by a sophisticated manufacturing and assembly process within a competitive and challenging environment. The rubber products produced must meet a wide variety of exacting safety, quality, customer and consumer specifications. The industry has to respond to quality issues and increasing competition in export and domestic markets and ensure the on-going development of new products required by changing customer needs. Within the rubber manufacturing and assembly industry, the rubber technology skills area is concerned with ensuring that all inputs to the manufacturing and assembly process deliver the required quality and quantity of product. People working as rubber technologists require specialized technical skills and knowledge in order to assure that material specifications critical to the manufacturing process are met, quality assurance practices are adhered to during the rubber manufacturing and assembly process, and processes are in place to adapt to and meet the requirements of the constantly changing products that must be manufactured.

This is one of a series of qualifications for learners who want to follow a career in any industry in which rubber (elastomeric) materials are used.

For those who have been in the workplace for a long time, this qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of formal education or training.

The qualification also forms the basis for further development within rubber technology, materials technology and management in the higher education and training band.

### **RECOGNIZE PREVIOUS LEARNING?**

Y

### **LEARNING ASSUMED TO BE IN PLACE**

This qualification assumes that learners have an FETC in Industrial Rubber or equivalent. If the learner does not already have such a qualification, it is assumed that learners are competent in:

- > Communication and Mathematical Literacy at NQF Level 4.
- > Understand rubber materials, components and products and their functions.
- > Understand rubber manufacturing process.
- > Concepts of influencing small levels of changes in quality assurance practices.
- > Dealing with change in relation to procedures that support workplace relationships, procedures, roles and responsibilities.

Recognition of prior learning:

This qualification may be obtained through a process of RPL. The learner should be thoroughly briefed prior to the assessment and support provided and guidance should be provided to assist in the process of developing a portfolio. While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes.

Care should be taken that the process used provides the learner with an opportunity to demonstrate competence and is not too demanding as to prevent learners from taking up the RPL option towards gaining the qualification.

### **ACCESS TO THE QUALIFICATION**

This qualification is designed for learners who:

- > Are new-entry workers to a rubber and material technology environment.
- > Have attended courses and then apply the knowledge gained to activities in the workplace.
- > Are already workers and have acquired the skills and knowledge without attending formal courses.
- > Are part of a learnership programme, which integrates structured learning, and work experience.

Access for learners with physical disabilities is dependent on the:

- > Type and severity of disability.
- > Nature of the manufacturing process and the requirements of equipment operation.

### **QUALIFICATION RULES**

In order to be awarded this qualification, learners have to be declared competent in:

- > All listed unit standards in the Fundamental (42 credits) and Core category (167 credits) of the qualification.
- > A minimum of 31 credits from the list specified under the elective category.

The learner may also choose additional elective unit standards in excess of the minimum required.

### **EXIT LEVEL OUTCOMES**

1. Demonstrate an understanding of rubber compounding and processing and an ability to conduct investigations for verification purposes, to explain product non-conformances, for product modifications and for new product development.
2. Demonstrate an ability to determine the requirements for common commercial rubber applications.
3. Demonstrate an ability to implement new projects in a rubber manufacturing and assembly process.

4. Demonstrate an ability to audit materials, components, process performance and final product for compliance with specifications, e.g. policies and procedures, company performance criteria.
5. Demonstrate an ability to coordinate work activities and plan, schedule and arrange work.
6. Demonstrate an understanding of options for further learning in this or a related field of learning and preparation requirements for such learning.

#### **ASSOCIATED ASSESSMENT CRITERIA**

- 1.1 Experimental design is determined based on evaluation of presented task.
- 1.2 Tests are conducted and reliability of test results confirmed.
- 1.3 Report on findings is generated.
- 1.4 Can respond to and discuss issues related to rubber compounding and physics as they apply to the testing and analysis of rubber materials, components and products.
- 2.1 Predictions are formulated.
- 2.2 Relevant and appropriate information is collected.
- 2.3 Recommendations are made based on customer requirements.
- 2.4 Customer is satisfied with performance criteria of product in use, recommendations made and cost/quality relationship.
- 2.5 Report is compiled.
- 2.6 Recommendations made are justified with reference to rubber chemistry and physics.
- 3.1 Project plan is formulated with performance indicators.
- 3.2 Project is completed.
- 3.3 Feasibility of implementing project results is determined.
- 3.4 Report is generated and applicable persons briefed.
- 3.5 Can respond to and discuss issues related to project management.
- 4.1 Audit plan is produced.
- 4.2 Affected stakeholders are informed of audit plan.
- 4.3 Audit data is collected and recorded.
- 4.4 Findings are evaluated for conformance / non-conformance to legislation, company policy and procedures.
- 4.5 Findings report is compiled, processed and circulated to affected parties.
- 4.6 Audit findings and suitable recommendations are discussed with affected parties.
- 4.7 Corrective action(s) / improvements made are evaluated, recorded and processed.
- 4.8 Can respond to and discuss issues related to auditing activities.
- 5.1 Work schedules are met.
- 5.2 Work activities are planned.
- 5.3 Goals set are specific, measurable and achievable and aligned to customer and business needs.
- 5.4 Schedules are developed in consultation with relevant parties and any scheduling conflicts are resolved.
- 6.1 Options are explained.
- 6.2 Preparation requirements are explained.
- 6.3 Learning plan is developed.

#### **Integrated assessment:**

Integrated assessment at the level of the qualification provides an opportunity for learners to show they are able to integrate concepts, actions and ideas achieved across a range of unit standards and contexts.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance, and must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

- > Observing the learner at work (both in the primary activity as well as other interactions).
- > Asking questions and initiating short discussions to test understanding.
- > Looking at records and reports in the portfolio and reviewing previous assessments.

In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

It is necessary to ensure that the fundamental part of the qualification is also targeted to ensure that while the competence may have been achieved in a particular context, learners are able to apply it in a range of other contexts and for further learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes. The assessment process should cover both the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities associated with the tube and pipe manufacturing process.

### **INTERNATIONAL COMPARABILITY**

This qualification has been designed in response to a need from the rubber manufacturing and assembly industry for persons at NQF level 5 with a particular set of skills. No direct international comparisons were found for this qualification at the equivalent of NQF level 5. However, this qualification articulates into further learning within the higher education band in materials and polymer technology. Such higher level qualifications are found in many countries such as Australia, New Zealand, United Kingdom, the United States and Canada.

### **ARTICULATION OPTIONS**

The qualification has been designed and structured so that qualifying learners can move both horizontally from one area of specialisation to another, and vertically, further specialising in a particular skills area.

> Vertical articulation can occur with the National Diploma in Rubber Technology: NQF Level 6 (NLRD ID 1655) and horizontally with the National Certificate in Industrial Rubber Level 5 (NLRD ID 23260).

Employers or institutions should be able to evaluate the outcomes of these qualifications against the needs of their context and structure top-up learning appropriately. Equally, holders of other qualifications may be evaluated against this qualification for the purpose of RPL.

### **MODERATION OPTIONS**

> Anyone assessing a learner or moderating the assessment of a learner against this unit standard must be registered as an assessor with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this unit standard must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant Education, Training, Quality, Assurance (ETQA) Body, or by an 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, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in the Unit Standard.

Anyone wishing to be assessed against this unit standard 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**

Assessors should be in possession of:

- > Appropriate qualification at one level above the level of the qualification and a minimum of three years experience in a rubber manufacturing and assembly environment. The subject matter experience of the assessor can be established by recognition of prior learning.
- > Registered as an assessor with the relevant ETQA.

### **NOTES**

N/A

**UNIT STANDARDS***(Note: A blank space after this line means that the qualification is not based on Unit Standards.)*

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	9406 Manage a team	Level 5	4	Registered
Core	12669 Implement new projects in a rubber manufacturing and assembly process	Level 5	30	Registered
Core	12670 Test and analyse rubber materials, components and products	Level 5	45	Registered
Core	12671 Determine requirements for rubber applications	Level 5	60	Registered
Core	12674 Perform auditing activities	Level 5	12	Registered
Core	13237 Optimise the quality assurance system	Level 5	6	Registered
Core	13256 Maintain business processes	Level 5	10	Registered
Elective	13301 Produce complex engineering drawings	Level 4	6	Registered
Elective	13942 Demonstrate a basic understanding of the role of a business strategy in managing a small business or a business unit	Level 4	5	Registered
Elective	13949 Apply technical knowledge and skill to align business unit performance to business goals	Level 4	5	Registered
Elective	14473 Develop and produce computer aided drawings	Level 4	4	Registered
Elective	14539 Demonstrate an understanding and apply physical science and chemistry in construction materials testing	Level 4	8	Registered
Elective	114210 Use drawing equipment and apply drawing techniques to produce detail drawings of basic structural steelwork assemblies and arrangement drawings	Level 4	28	Registered
Elective	114585 Plan strategically to improve business performance	Level 4	4	Registered
Elective	113810 Interpret the principles contained in basic South African law as entrenched in the constitution and the Bill of Rights	Level 5	6	Registered
Elective	114204 Use advanced 3D computer modelling techniques in the production of detail drawings and other data leading to the fabrication of commercial and industrial structural steel buildings	Level 5	28	Registered
Elective	115824 Appraise the SMME business owner and or manager	Level 5	5	Registered
Elective	116793 Determine the viability of a business and monitor its performance	Level 5	10	Registered
Fundamental	12433 Use communication techniques effectively	Level 5	8	Registered
Fundamental	12675 Use mathematical and statistical techniques effectively as a rubber technologist	Level 5	34	Registered