No. 608

13 July 2007



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 <u>www.saqa.org.za</u>. 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 13 August 2007.* All correspondence should be marked **Standards Setting – Manufacturing and Assembly Processes** 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 – 431-5144 e-mail: dmphuthing@saqa.org.za

S/AHIKH

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION: National Certificate: Electro-Mechanical Winding

SAQA QUAL ID	QUALIFICATION TITLE			
58862	National Certificate: Electro-Mechanical Winding			
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	130	Level 3	Regular-Unit Stds Based	

PURPOSE OF THE QUALIFICATION

Purpose:

The purpose of the qualification is to provide learners with the standards and range of learning required to wind and re-wind complex electro-mechanical components and to use and care for the relevant equipment in a responsible manner.

This is the second qualification in a series for learners who would like to follow a career in electro-mechanical winding and focuses on specialising skills on more complex components. This qualification builds on the learning undertaken in the National Certificate in electro-mechanical winding at NQF Level 2, and it is assumed that learners entering into a learning programme towards this qualification are already competent in the core skills outlined in the NQF Level 2 qualification.

With this additional learning, learners will be able to participate in more complex winding activities. What learners achieve in this qualification will also serve as a basis for further learning where they will engage in more complex activities in testing electro-mechanical components at NQF Level 4.

On completion of this qualification, the learner will be given recognition for the following exit level outcomes:

- Interpret work requirements and apply these to a job.
- Wind and re-wind complex electro-mechanical components.
- Monitor and maintain the quality of wound components.
- Protect components from damage.

Learners will generally carry out their role within the context of:

- A fully equipped engineering workshop.
- Set maintenance and works procedures.
- Given inspection and testing procedures.
- Given Quality Assurance policies, procedures and processes.

÷

Rationale:

This qualification in electro-mechanical winding NQF Level 3 is the second qualification in a series for learners who want to follow a career in the field of manufacturing and assembly processing. This qualification focuses on developing skills and knowledge necessary to advance such a career and provides specific learning towards winding complex electro-mechanical components.

There is a need for this qualification in the industry because many people who are able to wind basic electro-mechanical components would like to advance their skills onto more complex components. They will also benefit from applying fundamental life skills to their job in interpreting requirements and being held responsible for the results of what they do.

People who have achieved the skills and knowledge outlined in this qualification are normally employed in the following positions:

- Winder.
- Quality controller.
- Store personnel.
- Senior Staff.
- Dismantler.
- Assembler.

Learners may advance from these positions to achieve the qualification in electro-mechanical winding at NQF Level 4 where they will be required to test and rectify electro-mechanical components as necessary.

There are currently approximately 5000 people employed in the industry that are required to perform complex winding operations as would be learnt through this qualification. This implies that many learners will be able to be given Recognition of Prior Learning (RPL) for one or more unit standards making up this qualification, and that the qualification is required by industry.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

This qualification assumes learners have attained the outcomes described in the National Certificate in electro-mechanical winding at NQF Level 2.

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 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 to ensure that the process used provides the learner with the opportunity to demonstrate competence and is not too demanding as to prevent the learner from implementing the RPL option towards gaining the qualification.

Access to the Qualification:

This qualification recognises the skills, knowledge and values relevant in the workplace and will cater for learners who:

 Have attended courses and need to apply the knowledge gained to activities in the workplace. Source: National Learners' Records Database
Qualification 58862
04/07/2007
Pa

Page 2

- Are already workers and have acquired skills and knowledge without having attended formal training.
- Are part of a learnership program which integrates structured learning and operational experience.

Candidates applying for this qualification need to demonstrate physical competence in operating equipment and should therefore be physically able to contend with the circumstances required in the workshop environment. Access for learners with physical disabilities is dependent on the following:

- Type and severity of disability.
- The nature of the process and requirements of equipment operation.

QUALIFICATION RULES

This qualification consists of a minimum of 130 credits made up as follows:

- Candidates are required to achieve all 20 credits for communication from the available fundamental unit standards.
- Candidates are required to achieve all 16 credits for mathematical literacy within the context of electro-mechanical winding operations.
- Candidates must achieve all 78 credits from the core unit standards.
- Candidates may select additional unit standards from any of the elective unit standards to achieve a minimum of 16 credits.

Note:

• The elective credits should be chosen in accordance with the requirements of the selected context and the interests of the learner.

EXIT LEVEL OUTCOMES

1. Interpret work requirements and apply these to a job.

- 2. Wind and re-wind complex electro-mechanical components.
- 3. Monitor and maintain the quality of wound components.
- 4. Protect components from damage.

Critical Cross-Field Outcomes:

This qualification addresses the following generic outcomes in an integrated manner through the application of various unit standards:

- Work effectively with others as a member of a team/group.
- Organise and manage oneself and one's activities.
- Communicate using visual, mathematical and/or language skills in modes of oral and/or written presentation.
- Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made.
- Collect, analyse, organise and critically evaluate information.
- Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
- Understand the world as a set of related systems.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

Source: National Learners' Records Database

Qualification 58862

1.1 Information related to work tasks is accessed and interpreted from a range of written and oral sources to ensure that work requirements are understood.

1.2 Components to be wound are confirmed with relevant personnel according to given work instructions.

1.3 Standard operating procedures are identified and applied to specific tasks to meet the requirements of the work instruction.

1.4 Ranges and tolerances allowed in the winding operation are identified and described in terms of how they will be adhered to.

1.5 Consequences of not adhering to work instructions are explained in terms of customer satisfaction and payment for work done.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Winding of complex components is conducted in accordance with agreed time schedules.

• Range: Winding activities include winding, rewinding, dismantling, cleaning, measuring, repairing, assembling and testing.

2.2 Winding functions are completed in accordance with agreed timeframes.

2.3 Components are wound to manufacturer specifications within acceptable tolerances.

2.4 Materials are used economically with a minimum of wastage.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Quality requirements are identified and interpreted in terms of specific measurements and allowable defects.

3.2 Winding is within allowable tolerances as specified in the work instructions.

3.3 Wound components are checked against quality requirements and reported on in accordance with workplace requirements.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Types of damage to components and materials are identified in terms of their causes and prevention.

4.2 Actions required to prevent or minimise damage to components are identified and adhered to as applicable for specific components and conditions.

4.3 Consequences of not preventing damage to components are described in terms of customer satisfaction and costs.

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the qualification. Assessment must take place according to the detailed specifications indicated in the unit standards associated with each exit level outcome.

Over and above the achievement of the specified unit standards, evidence of integration will be required within the context of an active learning environment. Assessors should note that the evidence of integration could well be presented by candidates when being assessed against the unit standards, thus there should not necessarily be separate assessments for each unit standard and then further assessment for integration. Well designed assessments should make it possible to gain evidence against each unit standard while at the same time gain evidence of integration.

INTERNATIONAL COMPARABILITY

As a starting point, this series of qualifications in electro-mechanical winding was compared to other, similar outcomes-based qualifications, certifications or skills standards in English

Source: National Learners' Records Database Qualification 58862 04/07/2007 Page 4

speaking countries of the world. There were no unit standards based qualifications found to be **comparable** to this qualification, but the training courses and qualifications used formed the **basis** of comparison for this qualification.

The major roleplayers in South Africa all have international standing and conduct work in other African countries as well as in Europe. Work is conducted in accordance with international best practice, and these practices were used as the starting point in determining the requirements of the unit standards for this qualification.

This qualification was compared to the following countries as follows:

UK, Germany and USA:

Allocation of work is fragmented and learners specialise in one particular aspect of the trade. Learning is modular and there is no qualification for an electro-mechanical winder. The complete aspect of electro-mechanical winding will be conducted through a number of people performing specific tasks. South African qualified electro-mechanical winders are in great demand due to their broad knowledge and skills.

New Zealand and Australia:

There is no NQF Level 2 qualification for electro-mechanical winding. A learner may undergo a generic certificate in electrical engineering, and then progress to a NQF Level 4 qualification in motor rewinding and repair through a three-year apprenticeship programme.

Switzerland:

There is currently no standard training program for winder education. Years ago there used to be an apprenticeship possibility for "Electrical Machines Winder". This apprenticeship was a 4 year educational programme. Currently it is quite difficult to get skilled winders in Switzerland (and also in Central Europe). Companies that require these skills employ qualified winders who in turn train other workers on the specific skills requirements on the job.

Africa:

Countries such as Kenya, Kuwait, Nigeria, Tanzania, Zambia and Zimbabwe have contracts with South African companies (which may be based in the local country as well) to maintain their electro-mechanical components. Training of employees in these countries is conducted according to company standards, which are the same as what was used for determining these unit standards.

It is anticipated that this qualification will be welcomed in these countries and may form the basis for similar local qualifications.

ARTICULATION OPTIONS

This qualification has been designed and structured as part of a progressive route in the manufacturing and assembly processes industry so that qualifying learners can move from one level to the next.

The use of generic unit standards in this qualification opens new avenues for the learner to progress from one qualification to another in related fields of study beyond electro-mechanical winding. Employers or institutions should be able to evaluate the outcomes of this qualification against the needs of their context and structure top-up learning appropriately.

1

Qualification 58862

This qualification builds on the National certificate in electro-mechanical winding at NQF Level 2 and leads to the National Certificate in electro-mechanical winding at NQF Level 4. Learners may also decide to further their career in one of the following fields:

- Electrical engineering.
- Mechanical engineering.
- Storekeeping.
- Technical sales.

Learners who have achieved this qualification have achieved generic skills that would enable them to follow a career in electrical or mechanical engineering. This qualification articulates with the following qualifications:

- ID 48475: National Certificate: Electrical Engineering, NQF Level 3.
- ID 58720: National Certificate: Engineering Fabrication, NQF Level 3.
- ID 23274: National Certificate: Mechanical Engineering: Fitting Level, NQF 3.
- ID 50062: National Certificate: Occupational Hygiene and Safety, NQF Level 3.

MODERATION OPTIONS

• Anyone assessing a learner against this qualification must be registered as an assessor with the relevant SETA ETQA.

• Any institution or learning provider offering learning towards the achievement of this qualification should be accredited as a provider with the relevant SETA ETQA.

• Moderation of assessment should be overseen by the relevant SETA ETQA according to the moderation guidelines provided for in this qualification as well as the agreed ETQA procedures.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

• Appropriate qualification and a minimum of 3 years experience in the field of manufacturing or a similar environment. The subject matter experience of the assessor can be established by recognition of prior learning.

- Appropriate experience and understanding of assessment theory, processes and practices.
- Good interpersonal skills and the ability to balance the conflicting requirements of:
- Maintaining national standards.
- The interests of the learner.
- \circ The need for transformation and redressing the legacies of the past.
- o The cultural background and language of the learner.
- Registration as an assessor with the relevant SETA ETQA.
- Any other criteria required by the relevant SETA ETQA.

NOTES

Learners will be assessed against this qualification in a work context appropriate to their needs. This may mean that only certain equipment is available in their workplace, but the requirements of the unit standards must then be matched to that type of equipment where possible. Where specific requirements cannot be met due to unavailability of equipment, the learner will have to undergo training in a different workplace to be exposed to the required equipment prior to assessment.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	13234	Apply quality procedures	Level 3	8
Core	9887	Coat material and components	Level 3	4

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	9924	Dismantle complex assemblies	Level 3	20
Core	12456	Explain and use organisational procedures	Level 3	6
Core	12392	Perform winding/rewinding of complex electro-mechanical components	Level 3	40
Elective	115091	Monitor compliance to safety, health and environmental requirements in a workplace	Level 2	2
Elective	13205	Operate and monitor a lathe to produce simple components	Level 2	12
Elective	13204	Operate and monitor a milling machine to produce simple components	Level 2	12
Elective	244611	Apply problem-solving techniques to make a decision or solve a problem in a real life context	Level 3	2
Elective	113899	Demonstrate an understanding of basic programmable logic controllers	Level 3	6
Elective	12457	Develop learning strategies and techniques	Level 3	3
Elective	116218	Explain the planning and scheduling of tasks in a production environment	Level 3	3
Elective	9914	Handle and care for materials	Level 3	12
Elective	9530	Manage work time effectively	Level 3	3
Elective	7786	Operate a Computer	Level 3	8
Elective	8039	Operating cranes	Level 3	10
Elective	8038	Operating lift trucks	Level 3	6
Elective	12455	Perform the role of a safety, health and environmental protection representative	Level 3	4
Elective	120383	Provide assistance in implementing and assuring project work meets quality requirements	Level 3	6
Elective	9885	Read and interpret engineering drawings	Level 3	12
Elective	9888	Select, use and care for marking off/out equipment: routine shapes	Level 3	8
Elective	116720	Show understanding of diversity in the workplace	Level 3	3
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
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

{