No. 607 **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 **www.saqa.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 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

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Electro-Mechanical Winding

SAQA QUAL ID	*QUALIFICATION TITLE*		
58860	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	120	Level 2	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 work effectively in the manufacturing industry, making use of the relevant skills to wind and rewind basic electro-mechanical components.

This qualification is the starting point for a person wanting to follow a career in electro-mechanical winding. The primary skill that is recognised in this qualification is the ability to apply the relevant skills to wind and rewind, dismantle, repair and assemble basic electro-mechanical components and to use and care for the relevant equipment in a responsible manner.

This qualification incorporates an understanding of basic operational procedures and how to read and interpret workshop manuals, workshop procedures, task instructions and job cards, as well as knowledge of workshop equipment.

With this understanding learners will be able to participate in operational activities. What learners achieve in this qualification will also serve as a basis for further learning where they will engage in more complex winding activities in the field of manufacturing and assembly processing.

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

- Communicate with peers and supervisors in a manufacturing work context.
- Select appropriate tools and equipment for basic winding operations.
- Dismantle and reassemble electro-mechanical components.
- Wind and rewind basic electro-mechanical components.
- Work as part of a team when winding components.

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 2 is the first 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 begin such a career and provides specific learning in winding electro-mechanical components.

There is a need for this qualification in the industry because many people enter into jobs where they are required to wind electro-mechanical components. They will also benefit from learning the fundamental aspects of working as a team and communicating information when winding components, as this forms an integral part of the job.

This qualification typically forms the starting point in a career in electro-mechanical winding and people who hold this qualification may be employed in the following key positions:

- Engineering assistant.
- Small component winder.
- Winding team member.

Learners may advance from these positions to achieve the qualification in electro-mechanical winding at NQF Level 3 where they will be required wind and rewind electro-mechanical components.

There are currently approximately 5000 people employed in the industry that are required to perform basic 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 manufacturing, engineering and related activities at NQF Level 1.

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 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.
- 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 dependant 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 120 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 65 credits from the core unit standards.
- Candidates may select additional unit standards from any of the elective unit standards to achieve a minimum of 19 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. Communicate with peers and supervisors in a manufacturing work context.

2. Select appropriate tools and equipment for basic winding operations.
- Range: Tools and equipment include multimeters, clamp on meter, megger, mallets, spanners and any form of winding tool that may be of assistance during electromechanical winding.

3. Dismantle and reassemble electro-mechanical components.

4. Wind and rewind basic electro-mechanical components.

5. Work as part of a team when winding components.

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:

1.1 Oral communication is maintained and adapted as required to promote effective interaction in a work context.
1.2 Terminology used is appropriate to the situation and in accordance with normal workplace usage.
1.3 Information related to work tasks is accessed and interpreted from a range of written and oral sources to ensure that work requirements are understood.
1.4 Communication is clear and unambiguous and at an appropriate level for designated target audiences.
1.5 Information communicated is accurate and conveyed in accordance with acceptable timeframes.
1.6 Communication is effective, regular and ongoing.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 The scope of work to be performed is determined from given instructions and standard operating procedures.
2.2 Tools and equipment required for the scope of work are sourced from available supplies.
2.3 Tools and equipment are checked for condition prior to use. Faulty tools are identified and replaced or repaired as appropriate.
2.4 Tools and equipment are used according to manufacturer operating guidelines.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Components to be dismantled or reassembled are identified from work instructions.
3.2 Components are stripped and cleaned according to workplace operational requirements.
3.3 Waste is discarded in accordance with relevant legislative and workplace requirements.
3.4 Component parts are marked and stored in a manner that minimises confusion of different parts for similar components.
3.5 Components are assembled according to manufacturer specifications.
3.6 Components are checked for functionality before being signed off as complete.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Components to be wound are confirmed with relevant personnel according to given work instructions.
4.2 Winding functions are completed in accordance with agreed timeframes.
4.3 Components are wound to manufacturer specifications within acceptable tolerances.
4.4 Materials are used economically with a minimum of wastage.

Associated Assessment Criteria for Exit Level Outcome 5:

5.1 Safety procedures are adhered to during the winding process.
5.2 Winding is completed without risk of injury to self or work colleagues.
5.3 Work outputs facilitate effective achievement of group goals.
5.4 Personal relations are developed to maximise team output.
5.5 Responsibilities of different team members and the impact of poor workmanship in any area are explained in terms of the team output.

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 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 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 leads to the National certificate in electro-mechanical winding at NQF Level 3.

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:

- National Certificate: Engineering and Related Design, NQF Level 2.
- ID 48473: National Certificate: Electrical Engineering, NQF Level 2.
- ID 58722: National Certificate: Engineering Fabrication, NQF Level 2.
- ID 23273: National Certificate: Mechanical Engineering: Fitting, NQF Level 2.
- ID 48804: National Certificate: Occupational Safety, Hygiene and Environment, NQF Level 2.

MODERATION OPTIONS

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

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

- Moderation of assessment should be overseen by the relevant 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.
  - The need for transformation and redressing the legacies of the past.
  - The cultural background and language of the learner.
- Registration as an assessor with the relevant ETQA.
- Any other criteria required by the relevant 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	9877	Assemble components	Level 2	12
Core	14051	Collect and record data	Level 2	3
Core	244664	Dismantle basic components and sub-assemblies	Level 2	3
Core	13220	Keep the work area safe and productive	Level 2	8
Core	13258	Participate in work group activities	Level 2	4
Core	9921	Perform basic winding/rewinding of electro-mechanical components	Level 2	19
Core	10237	Select, use and care for electrical measuring instruments	Level 2	4
Core	119744	Select, use and care for engineering hand tools	Level 2	8
Core	12476	Select, use and care for engineering measuring	Level 2	4

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
		equipment		
Elective	14445	Frame and implement an individual action plan to improve productivity within an organisational unit	Level 1	3
Elective	243189	Manage personal finances	Level 1	8
Elective	13202	Apply study and learning techniques	Level 2	3
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	12466	Explain the individual`s role within business	Level 2	4
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	9919	Prepare metal surfaces	Level 2	6
Elective	12463	Understand and deal with HIV/AIDS	Level 2	3
Elective	116241	Work Safely and use safety equipment when carrying out mechanical or electrical work on air conditioning, refrigeration and ventilation installations	Level 2	7
Elective	9322	Work in a team	Level 2	3
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	9008	Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	3
Fundamental	119454	Maintain and adapt oral/signed communication	Level 2	5
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