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AIDS HELPLINE: 0800-0123-22 Prevention is the cure

GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 1178 **20 September 2002**

Established in terms of Act 58 of 1995

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

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following qualifications 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 upon which qualifications are based. 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, 659 Pienaar street, Brooklyn, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 21 October 2002.*** All correspondence should be marked **Standards Setting – SGB for Manufacturing and Assembly** 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 – 482 0907

pp **SAMUEL B.A. ISAACS**
EXECUTIVE OFFICER

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

National Certificate in Engineering Fabrication: NQF Level 2

Field: Manufacturing, engineering and technology - NSB 06

Sub-field: Manufacturing & assembly

Level: 2
Credit: 159
Issue date:
Review date:

Rationale of the qualification:

This is the first qualification in a series for learners who want to follow a career in the field of engineering fabrication, which includes boiler making, sheet metal working, welding and vehicle body building. This qualification focuses on developing skills and knowledge necessary to begin such a career.

It enables learners who have gained relevant experience in the workplace to gain credits through the RPL process. The qualification also forms the basis for further learning in the field of engineering fabrication where the learner will be able to specialise in one of the following skill areas: Light / Heavy Fabrication or Welding.

Purpose:

The purpose of this qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively in various industries making use of engineering fabrication skills and to meet the challenges of such an environment.

The chief skill that is recognised in this qualification is the ability to produce simple components using a variety of fabrication methods. This capability requires an understanding of basic fabrication theory; machinery functioning, operation and maintenance; engineering materials and tools; concepts of measurement; basic engineering drawing and development of components and simple methods of cutting and joining metals.

Hand skills play a vital role in this qualification.

Qualified learners will also understand:

- The basics of how a business functions
- Their role in the business, i.e. in fabrication and related activities
- How they are affected by legislation, regulations, agreements and policies related to their particular work environment

With this understanding, learners will be able to participate in workplace activities

Access to the Qualification:

Open Access

This qualification series recognises skills, knowledge and values relevant to a workplace. It is designed for learners who:

- 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.

Learning assumed to be in place:

This qualification assumes learners have a General Education and Training Certificate at NQF Level 1, or alternatively, ABET qualifications.

If the learner does not already have such a qualification, learning in preparation for this qualification would also have to include:

- Literacy and numeracy
- Basic concepts of science and technology

Exit Level Outcomes and Assessment Criteria:

Exit level outcome 1

Demonstrate an understanding of fabrication methods and an ability to produce simple components that meet quality and output requirements, working safely and in an environmentally aware manner.

Associated Assessment Criteria

- Output and quality requirements are met
- Safe working practices are adhered to
- Can respond to questions and discuss issues related to the theoretical principles of fabrication, the various fabrication methods and the functioning of machinery

Exit level outcome 2

Identify engineering materials used in the fabrication process and describe their characteristics and applications.

Associated Assessment Criteria

- Fabrication materials are identified and their properties described
- Can respond to questions and discuss issues related to the common applications and methods of fabricating using engineering materials

Exit level outcome 3

Demonstrate an ability to read, interpret and produce basic engineering drawings and sketches.

Associated Assessment Criteria

- Components to be fabricated are identified and requirements interpreted from engineering drawing or sketch
- Engineering drawing or sketch is produced to meet job requirements

- Can respond to questions and discuss issues related to engineering drawing concepts and material lists

Exit level outcome 4

Demonstrate an ability to select, use and care for fabrication machinery.

Associated Assessment Criteria

- Machinery is used in accordance with manufacturer's specifications
- Lubricating agents are applied consistently and systematically
- Can respond to questions and discuss issues related to the use and maintenance of machinery

Exit level outcome 5

Work effectively with others, understand own role in the organisation and understand the purpose of the organisation in the economy of the country.

Associated Assessment Criteria

- Receive and act on information or decisions
- Report or pass on relevant information
- Respond to questions and discuss issues at the level of the qualification related to own role and the purpose of the organisation

Exit level outcome 6

Demonstrate the ability to communicate with peers and members of supervisory / management levels by summarising information and expressing opinions on given information in spoken form.

Associated Assessment Criteria

- Communication is effective, regular and ongoing
- Information is clear and accurate and conveyed in a timely manner
- Relationships with peers and supervisory / management levels are established and functioning

Exit level outcome 7

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

- Options are explained
- Preparation requirements are explained

International comparability

Other, similar outcomes-based qualifications, certificates or skills standards in New Zealand and the United Kingdom have been used extensively to inform this qualification and its associated standards, and it compares favourably with them.

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.

Some assessment aspects will demand practical demonstration while others may not. In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

Since this is a foundational qualification, 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 crossfield outcomes have been achieved.

Recognition of prior learning:

This qualification may be obtained through RPL. The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a qualification.

Articulation possibilities:

The qualification has been designed and structured so that qualifying learners can move from one context to another. 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. Equally, holders of other qualifications may be evaluated against this qualification for the purpose of RPL.

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 guidelines

Criteria for registration of assessors

The following criteria should be applied by the relevant ETQA:

1. Appropriate qualification in the field of engineering fabrication and a minimum of two years' experience in an engineering fabrication environment. The subject matter experience of the assessor can be established by recognition of prior learning
2. Appropriate experience and understanding of assessment theory, processes and practices
3. Good inter-personal 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
4. Registration as an assessor with the MERS ETQA or any other relevant ETQA
5. Any other criteria required by the MERS ETQA or any other relevant ETQA

NATIONAL CERTIFICATE IN ENGINEERING FABRICATION – NQF LEVEL 2

Level 2 Fundamental	NLRD ID		Level 2 Core	NLRD ID		Level 2 Elective Choice of:	NLRD ID	
Communication			**Fabrication (Light / Heavy)**			**Directly related to the core**		
Maintain and adapt oral communication	8962	5	Select, use and care for engineering hand tools	12216	8	Join metals using the resistance welding process	12482	4
Access and use information from texts	8963	5	Select, use and care for engineering measuring equipment	12476	4	**Indirectly related to the core**		
Write for a defined context	8964	5	Select, use and care for engineering power tools	12219	6	Perform basic first aid	12483	4
Communicate at work	8964	5	Identify engineering materials, their characteristics and applications and common metal tests used in engineering	12477	4	Perform basic fire fighting	12484	4
Maths			Draw and interpret simple engineering drawings	12478	10	Manage personal finance	12464	6
Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in two dimensions in different life or workplace contexts	12444	3	Mechanically cut, drill and punch fabrication materials	12239	10	Operate a personal computer system	12485	6
Demonstrate understanding of rational and irrational numbers, and number systems, within the context of relevant calculations	12472	3	Form and shape sheet metal using hand or power operated machines	12240	8	Use a personal computer system	12486	3
Use mathematics to investigate and monitor the	7469	2	Weld work pieces with the shielded metal arc welding process in the down hand	12479	20	Other standards or additional learning related to the purpose	12487	

financial aspects of personal and community life			position			of the qualification		
Apply basic knowledge of statistics in order to investigate life and work related problems	12443	3	Weld workpieces with the oxy-acetylene gas welding process in the down hand position	12480	10	**Minimum elective credits required for qualification**		**12**
Work with a range of patterns and basic functions to solve related problems	9007	5	Cut materials using the oxy-fuel gas cutting process (manual cutting)	12243	10			
			Sling loads	12481	4			
			Safety, Health, Environment and Quality Assurance					
Understand and deal with HIV/Aids personally and in the workplace	12474	3	Work safely and use safety equipment	9443	4			
Develop a personal learning plan and prepare for assessment reflecting the outcomes stated below	12475	6	**Business relations**					
			Explain the individual's role within business	12466	4			
			Develop a learning plan and a portfolio for assessment	12465	6			
			Understand and deal with HIV/AIDS	12463	3			
Total Fundamental		**45**	**Total Core**		**11 1**	**Total Elective**		**12**
Total for qualification		**16 8**						

NATIONAL CERTIFICATE IN ENGINEERING FABRICATION – NQF LEVEL 2

Unit standards developed for this qualification:

UNIT STANDARDS ON NQF LEVEL 2

CORE

Title 1: Draw and interpret simple engineering drawings

Title 2: Mechanically cut, drill and punch fabrication materials

Title 3: Form and shape sheetmetal using hand or power operated machines

Title 4: Weld workpieces with the shielded metal arc welding process in the downhand position

Title 5: Weld workpieces with the oxy-acetylene gas welding process in the downhand position

Title 6: Cut metals using the oxy-fuel gas cutting process (manual cutting)

ELECTIVE

Title 7: Join metals using the resistance welding process

UNIT STANDARDS AND SPECIFIC OUTCOMES IN NATIONAL CERTIFICATE IN ENGINEERING FABRICATION – NQF LEVEL 2

Title 1: Draw and interpret simple engineering drawings

Specific outcome 1.1: Interpret engineering drawings

- Identify components and assemblies
- Recognise and interpret material requirements
- Identify dimensions and detailed instructions
- Identify and interpret symbols and conventions

Specific outcome 1.2: Produce drawings

Specific outcome 1.3: Check drawings for compliance with job requirements

Specific outcome 1.4: Recognise problems and report to appropriate personnel

Title 2: Mechanically cut, drill and punch fabrication materials

Specific outcome 2.1: Prepare for work activity

- Interpret job instructions and determine sequence of operations
- Select equipment and lubricants
- Prepare equipment for operation, including routine maintenance and pre-operational checks
    - Select and fit correct tooling
    - Replace worn tooling, if required

- Verify material properties with supervisor
- Prepare material for cutting, drilling and punching operations
- Identify potential hazards and take preventative action

Specific outcome 2.2: Cut, drill and punch metals

- Confirm blade clearances, drill speeds and feeds
- Cut, drill and punch materials to specifications
- Dispose of waste materials
- Store reusable material
- Clean and restore work area

Specific outcome 2.3: Apply quality checks on cut, drilled and punched material

- Inspect and measure cut materials
- Identify and report non-conformances

Specific outcome 2.4: Recognise and report problems

Specific outcome 2.5: Report outcomes of work done

Specific outcome 2.6: Apply safe working practices and discuss issues related to safety of self, fellow workers, machines, equipment, materials and the environment

Title 3: Form and shape sheetmetal using hand or power operated machines

Specific outcome 3.1: Prepare for forming and shaping material

- Interpret job instructions and determine sequence of operations
- Select and prepare equipment for operation including routine maintenance and pre-operational checks
- Check that equipment and materials required are at the workstation
- Evaluate limitations of materials
- Perform calculations
- Mark off workpiece according to job requirements
- Identify potential hazards and take preventative action

Specific outcome 3.2: Form and shape materials

- Adjust machine settings
- Carry out forming and shaping operations
- Dispose of waste material
- Store reusable materials

Specific outcome 3.3: Visually inspect and measure fabricated items for conformance

Specific outcome 3.4: Identify and report non-conformances to appropriate personnel

Specific outcome 3.5: Report outcomes of work done

Specific outcome 3.6: Apply safe working practices and discuss issues related to safety of self, fellow workers, machines, equipment, materials and the environment

Title 4: **Weld workpieces with the shielded metal arc welding process in the downhand position**

Specific outcome 4.1: Describe and explain the gas metal arc welding process

Specific outcome 4.2: Select, assemble and conduct pre operational checks of gas metal arc welding equipment

Specific outcome 4.3: Prepare work pieces prior to welding

Specific outcome 4.4: Weld workpieces

Specific outcome 4.5: Inspect welded work piece for defects

Specific outcome 4.6: Care and store welding consumables and equipment

Title 5: Weld workpieces with the oxy-acetylene gas welding process in the downhand position

Specific outcome 5.1: Describe and explain the oxyacetylene gas welding process

Specific outcome 5.2: Select, assemble and conduct pre operational checks of oxyacetylene gas welding equipment

Specific outcome 5.3: Prepare work pieces prior to welding

Specific outcome 5.4: Weld metals with oxyacetylene gas welding process

Specific outcome 5.5: Inspect welded work piece for defects

Specific outcome 5.6: Care and store welding consumables and equipment

Title 6: Cut metals using the oxy-fuel gas cutting process (manual cutting)

Specific outcome 6.1: Describe the oxy-fuel cutting process

Specific outcome 6.2: Prepare for the oxy fuel cutting operation

Specific outcome 6.3: Cut material

Specific outcome 6.4: Care and storage of cutting equipment, tools, and materials

Title 7: Join metals using the resistance welding process

Specific outcome 7.1: Prepare for work activity

- Interpret job instructions and determine sequence of operations
- Find relevant worksite procedure and determine operational requirements
- Select and prepare equipment for operation including routine maintenance and pre-operational checks

- Implement maintenance procedures for copper electrodes
- Adjust settings and assemble equipment
- Check that consumables required are at the workstation
- Prepare materials for welding
- Identify hazards and take preventative action

Specific outcome 7.2: Join metals using the resistance welding process

- Set up workpiece
- Establish welding parameters
- Weld materials
- Dispose of waste materials
- Store reusable material

Specific outcome 7.3: Apply quality checks on welded metals

- Identify and correct welding defects
- Clean welds after welding
- Check completed weld using visual examination

Specific outcome 7.4: Recognise and report problems of quality, operation, output, safety

Specific outcome 7.5: Report outcomes of work done

Specific outcome 7.6: Apply safe working practices and discuss issues related to safety of self, fellow workers, machines, equipment, materials and the environment