No. 1545 **24 October 2003**

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

Plastics Manufacturing

Registered by NSB 06, 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 unit standard. The unit standard 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, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address *below and no later than* ***16 November 2003.*** All correspondence should be marked **Standards Setting – SGB for Plastics manufacturing** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Polymer Composite Fabrication

SAQA QUAL ID	*QUALIFICATION TITLE*	
36153	National Certificate: Polymer Composite Fabrication	
SGB NAME	SGB Plastics Manufacturing	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-4-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
154	Level 4	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

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 the polymer composite fabrication industry and to meet the challenges of such an environment.

This qualification recognises the skills, knowledge and values acquired by learners involved in polymer composite fabrication. The chief skill that is recognised in this qualification is the ability to plan and co-ordinate fabrication activities to produce specialised fabricated composite components and complex assemblies. Successful learners described in this qualification manufacture or repair the following types of product:

1. Aircraft parts, including structural components such as helicopter blades, control surfaces, radomes, tail assemblies

2. Automotive assemblies including canopies, vehicle bodies (commercial as well as motor sport), motor cycle rims, tanker bodies

3. Chemical plant including tanks, pressure vessels, reactor bodies, material handling, pipes, valves and flow control

4. Sports and other water craft, including boats, yachts and ships

5. Building assemblies such as decorative panels, roof sheets and structures

6. Electrical and engineering parts such as distribution boxes, busbars, machine parts and covers

7. Composite moulds to fabricate the above products

This capability requires an understanding of needs analysis, planning and sequencing activities, the monitoring and maintenance of quality and the verification of the conformance of completed components and assemblies. Interpersonal skills play a role in this qualification.

Qualifying learners will be able to relate what they are doing to scientific principles and concepts. They will also be able to contribute to the implementation and maintenance of the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace. Qualifying learners will also be able to contribute to the implementation and maintenance of business processes.

What learners achieve in this qualification will also serve as a basis for further learning where they will further develop their skills and knowledge to include optimising fabrication processes, maintaining fabrication efficiencies, scheduling and arranging maintenance and managing inventory to meet production requirements.

This qualification can be obtained in the following contexts:

> Spray lay-ups
> Vacuum processes
> Resin transfer moulding
> Autoclaving
> A combination of vacuum processes and autoclaving
> Aircraft composite components manufacture
> Aircraft composite components repair

Rationale for the qualification:

This is the third qualification in a series for learners who want to follow a career in polymer composite fabrication processes. This qualification focuses on developing skills and knowledge necessary to progress in such a career.

The polymer composite fabrication industry operates in a competitive and challenging environment. The finished fabrications have to respond to a wide variety of exacting customer and consumer requirements. In addition, the industry has to respond to international competition, on-going development of new products as the result of changing customer needs, and environmental issues.

The fabrication of composites requires the combination of two or more different materials to form a product. What makes composites unique is that a composite material is formed at the same time as the structure itself is being fabricated. This means that the person who is making the structure is creating the properties of the resultant composite material, and so the manufacturing processes that are used have an unusually critical part to play in determining the performance of the resultant structure. Composites are not like metals, where a sheet might be made in one factory and shaped into a car roof in another. With composites it all happens at once. The products are often subjected to considerable or sometimes extreme stress when in operation and the manufacturing process needs to be consistent and accurate.

There were previously no qualifications for general industry. There were, however, two designated trades for specialist areas in the industry: transport and aerospace. This series of qualifications will replace those trades to ensure uniformity across all industries. The general industry consists of many micro and small enterprises and very few people have any sort of formal qualification. Industry has low barriers to entry and invests little in developing people's skills. This, together with the ignorance of clients, has led to widely differing standards. Many products and services are safety critical in nature and there is a need to create skills standards to alleviate this problem. The qualifications have been designed in a contextual way so that a learner is accredited for applying a generic set of skills in a specific context. This means it is not necessary to write unit standards for every variation of process or material.

This qualification forms part of a series at different levels to create opportunities for development, a career path and greater security of employment within the polymer composite fabrication industry.

This qualification enables learners who have gained relevant experience in the workplace to obtain credits through the RPL process. This qualification also forms the basis for further development in polymer composite fabrication in particular and the plastics manufacturing industry in general.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes learners have a National Certificate in Polymer composite fabrication (NQF Level 3). If the learner does not already have such a qualification, learning in preparation for this qualification would also have to include:

> Language and maths related to organising and controlling their environment

> An ability to fabricate polymer composite components and assemblies of some complexity using a variety of methods

> An ability to set up and assemble equipment and perform routine maintenance on equipment and tools

> Concepts of organising factors in labour, business and the economy

> Role and purpose of procedures related to workplace relationships, roles and responsibilities.

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.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

1. Demonstrate the ability to produce specialised components and complex assemblies using a variety of fabrication methods and operations, setting up equipment, meeting output requirements and working safely with due care for fellow workers and the environment.

2. Demonstrate the ability to read, interpret and produce detailed engineering drawings and to plan fabrication sequences, processes and work instructions.

3. Demonstrate an understanding of quality specifications and an ability to interpret these and evaluate fabricated components to determine compliance with specifications.

4. Maintain and support procedures to solve a variety of problems, both familiar and unfamiliar, within a polymeric composite context and operate within both familiar and new situations, taking responsibility and making decisions.

5. Co-ordinate work team activities, ensure a safe and efficient workplace, and develop the skills and performance of workgroup members.

6. Interact, liaise and communicate with peers, the work group, members of supervisory / management levels and end-users.

7. Gather, summarise and analyse information from a range of sources in order to identify problems, determine trends and produce documentation for a variety of purposes.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Output and quality requirements are met
> Fabrication time limits are adhered to
> Safe working practices are adhered to
> Issues related to the theoretical principles of fabrication and the various fabrication methods and their respective operations at this level are discussed and an understanding is demonstrated by responding to questions.

2.
> Components and assemblies to be fabricated are identified and requirements are interpreted from drawing
> Drawing is produced to meet project requirements and appropriate drawing standards

> Fabrication sequence, fabrication processes and material lists are compiled and detailed work instructions are developed.

3.
> Quality specifications are interpreted and applied to fabricated components and compliance is determined and reported
> Issues related to quality specifications and the principles underpinning such methods are discussed and an understanding is demonstrated by responding to questions.

4.
> Solutions to polymeric composite -related problems are based on a clear analysis of information gathered through diagnostic procedures
> Procedures are modified to respond to unfamiliar problems where appropriate
> All actions related to problem solving are accurately recorded for future reference
> Issues related to familiar problems in the fabrication of components and assemblies are discussed and an understanding is demonstrated by responding to questions.

5.
> Production schedules and assignments are met
> Production workflow is managed efficiently
> Workgroup goals are met
> Provide leadership in workgroup discussions, in workgroup problem solving activities, and in the implementation of solutions
> Relevant information is received, processed and passed on
> Workgroup members are supported, coached and influenced to work effectively, efficiently and safely.

6.
> Conditions, evidence and incidences are reported accurately in a timely manner and discussed with peers and management
> Information is clearly presented in a timely manner in the required format to appropriate parties
> Relationships with peers and supervisory / management levels are established and functioning.

7.
> Information is gathered from a range of sources and accurately summarised
> Data gathered through diagnostic procedures is examined systematically and analysis is repeated until problem is solved (see Exit Level Outcome 4)
> Records are available for scrutiny and future reference.

Integrated Assessment:

The purpose of assessment for this qualification is not to re-assess the outcomes of unit standards but to assess the evidence in terms of the exit level outcomes. The exit level outcomes represent an integration of the various unit standards.

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.

The assessor will collect evidence of the learner's competence by:

> Observing the learner at work (in primary activities as well as in other work-related interactions) or by relevant simulations
> Asking questions and initiating short discussions to test understanding
> Looking at records, reports, the portfolio and assessment reports for individual unit standards

The learner may choose in which official 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 on the approach being taken.

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 the critical cross-field outcomes have been achieved.

INTERNATIONAL COMPARABILITY

This series of qualifications (NQF level 2 - 4) was compared to:

1. The Certificate in Polymer Processing from the Casey Institute of Technical and Further Education in Australia, which consists of 14 modules making up 432 hours. These modules cover only the technical areas that this series of qualifications covers from Level 2 to Level 4.

2. National Certificate in Composites (Level 4) registered on the National Qualifications framework in New Zealand. This qualification covers a range of specific skill sets related to composites as well as generic engineering skills. The qualification also allows for 33 credits to be selected from anywhere on the New Zealand NQF

A comparison is made difficult because:

1. In both the Australian and New Zealand cases, neither the fundamental learning elements nor some of the generic core elements are specified.

2. In both the Australian and New Zealand cases, the learning required crosses several levels.

3. The Certificate in Polymer Processing does not require time to be spent producing portfolios.

4. While both qualifications require the learner to master a wider range of polymer composites techniques than the South African qualifications do, they do not specify the level of complexity that has to be achieved. The applied competence in the South African qualifications focuses on achieving a specific level of competence required by a person working in a real-world fabrication context in which a degree of specialisation, experience and problem-solving ability is required.

ARTICULATION OPTIONS

The qualification has been designed and structured so that qualifying learners can move from one context to another, within the composite fabrication environment. Learners may need to receive structured top up learning when moving to a thermoplastics or Industrial rubber environment.

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 THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

1. Appropriate qualification in the field of plastics fabrication at NQF Level 5 and a minimum of 2 years' experience in a polymer composite fabrication environment. The subject matter experience of the assessor can be established by recognition of prior learning. Until there is a sufficient body of competent people, interim arrangements may have to be adopted.

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.

NOTES

* Notes on unit standards

Gen: Titles are Generic Standards submitted to NSB 06 - currently in SAQA registration process
Eng: Titles are Mechanical Engineering standards - now registered, but still need to find out NLRD numbers. Not available on current consolidated list from NSB 06
TPW: Contextualise Thermoplastics Fabrication unit standard - submitted to NSB 06 in January 2003 for registration
AMO: Draft unit standards from the Aircraft Maintenance and Overhaul SGB.

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	13298 Produce detailed engineering drawings	Level 3	6	Public Comment
Core	13254 Contribute to the implementation and maintenance of business processes	Level 4	10	Public Comment
Core	14710 Manage and develop the performance of work group members in fabrication activities	Level 4	6	Public Comment
Core	110276 Maintain the quality of fabricated polymer composite products	Level 4	24	Public Comment
Core	110283 Fabricate specialised polymer composite parts ad complex assemblies	Level 4	28	Public Comment
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	9528 Communicate with clients	Level 3	3	Registered
Fundamental	9529 Compile feasibility and commissioning reports	Level 3	3	Registered
Fundamental	12429 Develop a personal financial plan	Level 3	2	Public Comment
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Registered
Fundamental	8975 Read, analyse and respond to a variety of texts	Level 4	5	Registered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	9502 Write a technical report	Level 4	4	Registered
Fundamental	9506 Communicate in an assertive manner with clients and fellow workers	Level 4	4	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Polymer Composite Fabrication

SAQA QUAL ID	*QUALIFICATION TITLE*	
36155	National Certificate: Polymer Composite Fabrication	
SGB NAME	SGB Plastics Manufacturing	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-3-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
130	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

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 the polymer composite fabrication industry and to meet the challenges of such an environment.

This qualification recognises the skills, knowledge and values acquired by learners involved in polymer composite fabrication. The chief skill that is recognised in this qualification is the ability to produce composite components of some complexity using more demanding resin, reinforcement and impregnation techniques. This capability requires an understanding of the laying out and marking off of shapes; the setting up and use fabrication equipment; development and fabrication from drawings and sketches, the cutting and joining of components, the manufacture of simple moulds and room temperature cure repairs. Hand skills play a role in this qualification.

Qualifying learners will be able to relate what they are doing to scientific principles and concepts.They will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace. Qualified learners will also understand diversity and how to resolve conflict in the workplace, the basics of business finance and how to manage their own work time effectively.

What learners achieve in this qualification will also serve as a basis for further learning where they will further develop their skills and knowledge to include safety critical products, fabrication processes requiring elevated temperature cure, setting up equipment with more complex control systems, manufacturing of moulds and tooling, and developing products from drawings.

This qualification can be obtained in the following contexts:

> Spray lay-ups
> Vacuum processes
> Resin transfer moulding
> Autoclaving
> A combination of vacuum processes and autoclaving
> Aircraft composite components manufacture
> Aircraft composite components repair

Rationale for the qualification:

This is the second qualification in a series for learners who want to follow a career in polymer composite fabrication processes. This qualification focuses on developing skills and knowledge necessary to progress in such a career.

The polymer composite fabrication industry operates in a competitive and challenging environment. The finished fabrications have to respond to a wide variety of exacting customer and consumer requirements. In addition, the industry has to respond to international competition, on-going development of new products as the result of changing customer needs, and environmental issues.

The fabrication of composites requires the combination of two or more different materials to form a product. What makes composites unique is that a composite material is formed at the same time as the structure itself is being fabricated. This means that the person who is making the structure is creating the properties of the resultant composite material, and so the manufacturing processes that are used have an unusually critical part to play in determining the performance of the resultant structure. Composites are not like metals, where a sheet might be made in one factory and shaped into a car roof in another. With composites it all happens at once. The products are often subjected to considerable or sometimes extreme stress when in operation and the manufacturing process needs to be consistent and accurate.

There were previously no qualifications for general industry. There were, however, two designated trades for specialist areas in the industry: transport and aerospace. This series of qualifications will replace those trades to ensure uniformity across all industries. The general industry has low barriers to entry and invests little in developing people's skills. This, together with the ignorance of clients, has led to widely differing standards. Many products and services are safety critical in nature and there is a need to create skills standards to alleviate this problem. The qualifications have been designed in a contextual way so that a learner is accredited for applying a generic set of skills in a specific context. This means it is not necessary to write unit standards for every variation of process or material.

This qualification forms part of a series at different levels to create opportunities for development, a career path and greater security of employment within the polymer composite fabrication industry.

This qualification enables learners who have gained relevant experience in the workplace to obtain credits through the RPL process. This qualification also forms the basis for further development in polymer composite fabrication in particular and the plastics manufacturing industry in general.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes learners have a National Certificate in Polymer composite Fabrication (Level 2). If the learner does not already have such a qualification, learning in preparation for this qualification would also have to include:

> Language and maths beyond basic literacy and numeracy
> Basic concepts of science and technology related to composite fabrication methods, composite materials, tools and equipment used in the fabrication process
> An ability to produce simple components using contact moulds excluding spray processes
> Concepts of organising factors in labour, business and the economy
> Role and purpose of procedures related to workplace relationships, roles and responsibilities.

Recognition of prior learning:

This qualification may be obtained through a process of 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.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

1. Demonstrate the ability to produce components and assemblies of some complexity, including the manufacture of simple moulds, the commissioning and repairing of tooling using a variety of fabrication methods and operations, resins, reinforcements, core material and impregnation techniques.

2. Demonstrate the ability to read drawings, plan composite fabrication processes, develop work instructions, lay out, mark off and cut reinforcing and core materials.

3. Demonstrate the ability to select and apply appropriate quality checks to determine whether components and assemblies comply with specifications.

4. Select procedures to solve familiar problems within a composite fabrication environment and operate within clearly defined contexts, with some scope for personal decision-making and responsibility.

5. Contribute to workgroup efforts and support the maintenance of a safe, effective and efficient workplace.

6. Demonstrate the ability to communicate with peers and members of supervisory / management levels and to use information which has been gathered and summarised from a range of sources to produce simple written reports.

ASSOCIATED ASSESSMENT CRITERIA

1.

1.1 Ratios of materials are calculated, measured and mixed correctly and with due allowance for changing environmental conditions

1.2 Fabrication processes are completed consistently well and within standard times

1.3 Fabrication processes are performed safely with due care for self, fellow workers and the environment

1.4 Fabricated products made from the manufactured, repaired or newly commissioned tooling meet specifications

1.5 Repair options are discussed and the various steps or stages are demonstrated

1.6 Steps in commissioning of tooling are discussed and explained

1.7 Issues related to the theoretical principles of composite fabrication and the various fabrication methods and their respective operations at this level are discussed and understanding is demonstrated by responding to questions.

2.

2.1 Requirements for resins and re-inforcing and core materials are interpreted from drawings and reinforcing and core materials to be used are selected

2.2 Material lists are compiled

2.3 Work instructions are clear, logical and comprehensive

2.4 Re-inforcing and core materials are cut to shape and according to required orientation

2.5 The ability to plan fabrication processes for a variety of different situations and projects is demonstrated.

3.

3.1 A range of common quality checks is demonstrated

3.2 Checks are appropriate to the quality and the needs of the fabricated product and its end use

3.3 Specifications are explained

3.4 Can respond appropriately to questions and discuss issues related to various quality checks and procedures and the principles underpinning such quality checks.

4.

4.1 Appropriate procedures are selected to solve problems

4.2 Problems are solved in an efficient and effective manner

4.3 Corrective actions include steps to minimise the future occurrence of the problems experienced

4.4 Unfamiliar problems are accurately reported to appropriate personnel

4.5 Can respond appropriately to questions and discuss issues related to familiar problems in the composite fabrication of components and assemblies.

5.

5.1 Production schedules and assignments are met

5.2 Production workflow is managed efficiently

5.3 Safe working practices are adhered to

5.4 Workgroup goals are met

5.5 Assistance and support is provided where required

5.6 Active participation in workgroup discussions, in workgroup problem solving activities and in the implementation of solutions occurs

5.7 Relevant information is received and passed on.

6.

6.1 Information is gathered from a range of sources and accurately summarised

6.2 Information is presented clearly, in a timely manner and in the required format to appropriate parties

6.3 Relationships with peers and supervisory / management levels are established and functioning.

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.

The assessor will collect evidence of the learner's competence by:

> Observing the learner at work (both in primary activities as well as other interactions) or by relevant simulations
> Asking questions and initiating short discussions to test understanding
> Looking at records and reports

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 on the approach being taken.

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 the critical cross-field outcomes have been achieved.

INTERNATIONAL COMPARABILITY

This series of qualifications (NQF level 2 - 4) was compared to:

1. The Certificate in Polymer Processing from the Casey Institute of Technical and Further Education in Australia, which consists of 14 modules making up 432 hours. These modules cover only the technical areas that this series of qualifications covers from Level 2 to Level 4.

2. National Certificate in Composites (Level 4) registered on the National Qualifications framework in New Zealand. This qualification covers a range of specific skill sets related to composites as well as generic engineering skills. The qualification also allows for 33 credits to be selected from anywhere on the New Zealand NQF

A comparison is made difficult because:

1. In both the Australian and New Zealand cases, neither the fundamental learning elements nor some of the generic core elements are specified.

2. In both the Australian and New Zealand cases, the learning required crosses several levels.

3. The Certificate in Polymer Processing does not require time to be spent producing portfolios.

4. While both qualifications require the learner to master a wider range of polymer composite techniques than the South African qualifications do, they do not specify the level of complexity that has to be achieved. The applied competence in the South African qualifications focuses on achieving a specific level of competence required by a person working in a real-world fabrication context in which a degree of specialisation, experience and problem-solving ability is required.

A broad comparison can, however, be made and is summarised as follows:

Australia

Scope
Broad in scope

Approach
Course-based

Level
Not specified

Context
De-contextualised

Assessment
Institution-based

Essential embedded knowledge
Theory specified

Credits
Nominally 43

Fundamental learning
Not formally specified

Business relations
Not formally specified

Working with and developing others
Not covered

Life skills
Not covered

New Zealand

Scope
Nominal competence in a wide range of fabrication methods

Approach
Task based

Level
Level 4

Context
Partly contextualised

Assessment
Institution or work-based

Essential embedded knowledge
Not clear

Credits
212

Fundamental learning
Not formally specified

Business relations
Not formally specified

Working with and developing others
Not formally specified

Life skills
Not formally specified

South Africa

Scope
Mastery of specific fabrication methods in context

Approach
Skills development-based

Level
Level 2, 3 and 4

Context
Contextual

Assessment
Work-based and portfolio-based

Essential embedded knowledge
Specified

Credits
360

Fundamental learning
Specified

Business relations
Specified

Working with and developing others
Specified

Life skills
Specified

In summary, there are considerable similarities in the technical competence required but the approach of the South African series of qualifications looks at whole-person development in not only technological, but also in team- and business-related skills and makes explicit assumptions related to level of schooling and life skills.

ARTICULATION OPTIONS

The qualification has been designed and structured so that qualifying learners can move from one context to another, within the composite fabrication environment. Learners may need to receive structured top up learning when moving to a thermoplastics or industrial rubber environment.

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 THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

1. Appropriate qualification in the field of polymer composite fabrication at NQF level 4 and a minimum of 2 years' experience in a polymer composite fabrication environment. The subject matter experience of the assessor can be established by recognition of prior learning. Until there is a sufficient body of competent people, interim arrangements may have to be adopted.

2. Appropriate experience and understanding of assessment theory, processes and practices.

3. 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

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

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	9526 Manage basic business finance	Level 3	6	Registered
Core	9530 Manage work time effectively	Level 3	3	Registered
Core	9531 Show understanding of diversity in the workplace	Level 3	3	Registered
Core	9533 Use communication skills to handle and resolve conflict in the workplace	Level 3	3	Registered
Core	12457 Develop learning strategies and techniques	Level 3	3	Registered
Core	14688 Develop work instructions for thermoplastic fabrication using drawings	Level 3	10	Public Comment
Core	14700 Lay out and mark off regular and irregular shapes for thermoplastic fabrication	Level 3	25	Public Comment
Core	110280 Produce complex polymer composite products	Level 3	28	Public Comment
Elective	10567 Transport personnel, material and equipment using Light Delivery Vehicle	Level 1	4	Registered
Elective	12483 Perform basic first aid	Level 2	4	Registered
Elective	12484 Perform basic fire fighting	Level 2	4	Public Comment
Elective	13204 Operate and monitor a milling machine to produce simple components	Level 2	12	Public Comment
Elective	13205 Operate and monitor a lathe to produce simple components	Level 2	12	Public Comment
Elective	13214 Operate and monitor a drilling machine to produce simple components	Level 2	6	Public Comment
Elective	7567 Produce and use spreadsheets for business	Level 3	5	Registered
Elective	7570 Produce word processing documents for business	Level 3	5	Registered
Elective	8038 Operating lift trucks	Level 3	6	Registered
Elective	8039 Operating cranes	Level 3	10	Registered
Elective	14720 Adapt to working in a client's work environment	Level 3	3	Public Comment
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
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	Registered
Fundamental	9011 Use mathematics to investigate and monitor the financial aspects of personal and business issues	Level 3	5	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9528 Communicate with clients	Level 3	3	Registered
Fundamental	9529 Compile feasibility and commissioning reports	Level 3	3	Registered
Fundamental	14108 Measure, estimate, calculate physical quantities, explore, describe and represent, interpret, justify geometrical relationships in 2 & 3-dimensional space relevant to the life or workplace of the comm	Level 3	4	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Polymer Composite Fabrication

SAQA QUAL ID	*QUALIFICATION TITLE*	
36154	National Certificate: Polymer Composite Fabrication	
SGB NAME	SGB Plastics Manufacturing	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-2-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
132	Level 2	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

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 the polymer composite fabrication industry and to meet the challenges of such an environment.

This qualification recognises the skills, knowledge and values acquired by learners involved in polymer composite fabrication. The chief skill that is recognised in this qualification is the ability to combine polymer resins and reinforcement materials to create a product, using a variety of fabrication methods. This capability requires an understanding of basic composites fabrication theory; engineering tools; concepts of measurement; basic engineering drawing, properties of polymeric composite materials and methods of fabricating them. Hand skills play a role in this qualification.

This qualification requires that learners qualify in basic contact moulding techniques. Contact moulding takes place in an open mould but excludes spray processes.

Qualified learners will also understand:
> The basics of how a business functions
> Their role in the business, i.e. in polymer composite 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.

What learners achieve in this qualification will also serve as a basis for further learning where they will further develop their skills and knowledge to include more complex composites fabrication processes and techniques, laying out and marking off of regular and irregular shapes and developing work instructions from drawings.

Rationale for the qualification

This is the first qualification in a series for learners who want to follow a career in polymer composite fabrication processes. This qualification focuses on developing skills and knowledge necessary to begin such a career.

The polymer composite fabrication industry operates in a competitive and challenging environment. The finished fabrications have to respond to a wide variety of exacting customer and consumer requirements. In

addition, the industry has to respond to international competition, on-going development of new products as the result of changing customer needs, and environmental issues.

The fabrication of composites requires the combination of two or more different materials to form a product. What makes composites unique is that a composite material is formed at the same time as the structure itself is being fabricated. This means that the person who is making the structure is creating the properties of the resultant composite material, and so the manufacturing processes they use have an unusually critical part to play in determining the performance of the resultant structure. Composites are not like metals, where a sheet might be made in one factory and shaped into a car roof in another. With composites it all happens at once. The products are often subjected to considerable or sometimes extreme stress when in operation and the manufacturing process needs to be consistent and accurate.

There were previously no qualifications for general industry. There were, however, two designated trades for specialist areas in the industry: transport and aerospace. This series of qualifications will replace those trades to ensure uniformity across all industries. The general industry has low barriers to entry and invests little in developing people's skills. This, together with the ignorance of clients, has led to widely differing standards. Many products and services are safety critical in nature and there is a need to create skills standards to alleviate this problem. The qualifications have been designed in a contextual way so that a learner is accredited for applying a generic set of skills in a specific context. This means it is not necessary to write unit standards for every variation of process or material.

This qualification forms part of a series at different levels to create opportunities for development, a career path and greater security of employment within the polymer composite fabrication industry.

This qualification enables learners who have gained relevant experience in the workplace to obtain credits through the RPL process. This qualification also forms the basis for further development in polymer composite fabrication in particular and the plastics manufacturing industry in general.

RECOGNIZE PREVIOUS LEARNING?

Y

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:
> Communication and numeracy
> Basic concepts of science and technology

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.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

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

2. Identify composites materials used in the fabrication process, describe their characteristics and applications and relate them to the fabrication process and end use.

3. Demonstrate an ability to read and interpret basic engineering drawings and sketches as used in polymer composite fabrication.

4. Demonstrate an ability to select, use and care for hand tools, measuring and composite fabrication equipment and consumables.

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

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

1.
> Output and quality requirements are met
> Safe working practices are adhered to
> Can respond appropriately to questions and discuss issues related to the theoretical principles of composite fabrication, the various fabrication methods and the functioning of equipment/machinery
> Ratios of materials are calculated, measured and mixed correctly
> Adjustments or responses are made according to an assessment of the changes in the working environment
2.
> Correct terminology is understood and used
> All key materials are identified
> Properties of the materials are described in relation to their function and purpose
> Can respond appropriately to questions and discuss issues related to the common applications and methods of fabricating using composite materials
3.
> Components to be fabricated are identified
> Material and construction requirements and the fabrication sequence is determined from the engineering drawing or sketch
> Common symbols are understood and explained
> Can respond appropriately to questions and discuss issues related to engineering drawing concepts and material lists for polymer composite fabrication
4.
> Equipment is used in accordance with manufacturer's specifications
> Tools and equipment appropriate to the purpose are chosen
> Can respond appropriately to questions and discuss issues related to the use and maintenance of equipment
5.
> Received information or decisions are acted on
> Relevant information is reported or passed on
> Work activities and efforts do not disrupt or spoil work group efforts
> Can respond appropriately to questions and discuss issues at the level of the qualification related to own role and the purpose of the organisation
6.
> 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

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 values 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.
Assessors will collect evidence of the learner's competence by:
> Observing the learner at work (both in primary activities as well as other interactions) or by relevant simulations

> Asking questions and initiating short discussions to test understanding
> Looking at records and reports

The learner may choose in which official 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.

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 the critical cross-field outcomes have been achieved.

INTERNATIONAL COMPARABILITY

This series of qualifications (NQF level 2 - 4) was compared to:
1. The Certificate in Polymer Processing from the Casey Institute of Technical and Further Education in Australia, which consists of 14 modules making up 432 hours. These modules cover only the technical areas that this series of qualifications covers from Level 2 to Level 4.
2. National Certificate in Composites (Level 4) registered on the National Qualifications Framework in New Zealand. This qualification covers a range of specific skill sets related to composites as well as generic engineering skills. The qualification also allows for 33 credits to be selected from anywhere on the New Zealand NQF

A comparison is made difficult because:

1. In both the Australian and New Zealand cases, neither the fundamental learning elements nor some of the generic core elements are specified.
2. In both the Australian and New Zealand cases, the learning required crosses several levels.
3. The Certificate in Polymer Processing does not require time to be spent producing portfolios.
4. While both qualifications require the learner to master a wider range of polymer composites techniques than the South African qualifications do, they do not specify the level of complexity that has to be achieved. The applied competence in the South African qualifications focuses on achieving a specific level of competence required by a person working in a real-world fabrication context in which a degree of specialisation, experience and problem-solving ability is required.

ARTICULATION OPTIONS

The qualification has been designed and structured so that qualifying learners can move from one context to another, within the composite fabrication environment. Learners may need to receive structured top learning when moving to a thermoplastics or Industrial rubber environment.

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 THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:
1. Appropriate qualification in the field of polymer composite fabrication at NQF level 3 and a minimum of 2 years' experience in a polymer composite fabrication environment. The subject matter experience of the assessor can be established by recognition of prior learning. Until there is a sufficient body of competent people, interim arrangements may have to be adopted.

1. Appropriate experience and understanding of assessment theory, processes and practices
2. 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
3. Registration as an assessor with the MERS ETQA or any other relevant ETQA
4. Any other criteria required by the MERS ETQA or any other 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	9882 Read and interpret basic engineering drawings	Level 2	8	Registered
Core	12216 Select, use and care for engineering hand tools	Level 2	8	Registered
Core	12219 Select, use and care for engineering power tools	Level 2	6	Registered
Core	12466 Explain the individual's role within business	Level 2	4	Registered
Core	12476 Select, use and care for engineering measuring equipment	Level 2	4	Registered
Core	13220 Keep the work area safe and productive	Level 2	8	Registered
Core	13258 Participate in work group activities	Level 2	4	Registered
Core	110279 Prepare mould for polymer composite fabrication	Level 2	8	Public Comment
Core	110281 Fabricate a polymer composite product	Level 2	9	Public Comment
Core	110285 Demould a polymer composite product	Level 2	5	Public Comment
Core	110289 Identify and work with material as required for polymer composite fabrication	Level 2	8	Public Comment
Elective	7547 Operate a personal computer system	Level 2	6	Registered
Elective	12481 Sling loads	Level 2	4	Public Comment
Elective	12483 Perform basic first aid	Level 2	4	Registered
Elective	12484 Perform basic fire fighting	Level 2	4	Public Comment
Elective	13222 Deal with safety, health and environmental emergencies in the workplace	Level 2	4	Registered
Elective	110278 Prepare damaged polymer composite product for repairs	Level 2	6	Public Comment
Elective	110288 Apply gel coat in patterns	Level 2	6	Public Comment
Elective	110290 Assemble moulded components and attach fittings	Level 2	6	Public Comment
Fundamental	7469 Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2	Registered
Fundamental	8962 Maintain and adapt oral communication	Level 2	5	Registered
Fundamental	8963 Access and use information from texts	Level 2	5	Registered
Fundamental	8964 Write for a defined context	Level 2	5	Registered
Fundamental	8982 Demonstrate understanding of rational and irrational numbers and number systems within the context of relevant calculations	Level 2	3	Registered
Fundamental	9007 Work with a range of patterns and functions and solve problems	Level 2	5	Registered
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	Registered
Fundamental	9268 Manage basic personal finance	Level 2	6	Registered
Fundamental	12444 Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in 2-dimensions in different life or workplace contexts	Level 2	3	Registered
Fundamental	12461 Communicate at work	Level 2	5	Registered
Fundamental	12463 Understand and deal with HIV/AIDS	Level 2	3	Registered
Fundamental	12465 Develop a learning plan and a portfolio for assessment	Level 2	6	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Prepare mould for polymer composite fabrication

SAQA US ID	*UNIT STANDARD TITLE*
110279	Prepare mould for polymer composite fabrication

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Locate, identify, transport and mount the correct mould for the required product.

SPECIFIC OUTCOME 2

Identify, locate and correct common defects and deformities on mould.

SPECIFIC OUTCOME 3

Clean and assemble mould, and apply release agent.

SPECIFIC OUTCOME 4

Record and report all identified problems and faults.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Fabricate a polymer composite product

SAQA US ID	*UNIT STANDARD TITLE*
110281	Fabricate a polymer composite product

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	9

Specific Outcomes:

SPECIFIC OUTCOME 1

Apply surface coating.

SPECIFIC OUTCOME 2

Apply body of resin and reinforcement materials, and consolidate into a laminate.

SPECIFIC OUTCOME 3

Apply surface coatings to back of laminates.

SPECIFIC OUTCOME 4

Prepare edges, align components and apply resin and reinforcements to join composite parts.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Demould a polymer composite product

SAQA US ID	*UNIT STANDARD TITLE*
110285	Demould a polymer composite product

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Demould a composite product.

SPECIFIC OUTCOME 2

Trim product as and when required.

SPECIFIC OUTCOME 3

Inspect, clean a demoulded product, and identify and report defects.

SPECIFIC OUTCOME 4

Prepare and finish a demoulded product for downstream use.

SPECIFIC OUTCOME 5

Faults and problems are reported and issues relating to the finishing processes are discussed.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Identify and work with material as required for polymer composite fabrication

SAQA US ID	*UNIT STANDARD TITLE*
110289	Identify and work with material as required for polymer composite fabrication

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify and discuss the role and properties of materials used in the manufacturing of.

SPECIFIC OUTCOME 2

Determine ratio, measure and mix materials for composite production in contact moulding.

SPECIFIC OUTCOME 3

Transport and store materials.

SPECIFIC OUTCOME 4

Report problems, discuss issues and record data.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Produce complex polymer composite products

SAQA US ID	*UNIT STANDARD TITLE*
110280	Produce complex polymer composite products

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 3	28

Specific Outcomes:

SPECIFIC OUTCOME 1

Discuss the role and purpose of various materials in combination.

SPECIFIC OUTCOME 2

Store, transport, select and prepare materials for complex composite products.

SPECIFIC OUTCOME 3

Prepare mould, set up equipment, fabricate product, assemble and join composites.

SPECIFIC OUTCOME 4

Manufacture simple composite moulds and commission new moulds or tooling.

SPECIFIC OUTCOME 5

Apply release agents, prepare surfaces for repair, complete and finish repair.

SPECIFIC OUTCOME 6

Record data; recognise and report variances.

SPECIFIC OUTCOME 7

Complete quality checks, recognise problems and take corrective action.

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UNIT STANDARD: 6

Produce detailed engineering drawings

SAQA US ID	*UNIT STANDARD TITLE*
13298	Produce detailed engineering drawings

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine drawing requirements.

SPECIFIC OUTCOME 2

Perform calculations to produce drawing.

SPECIFIC OUTCOME 3

Produce drawings.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Maintain the quality of fabricated polymer composite products

SAQA US ID	*UNIT STANDARD TITLE*
110276	Maintain the quality of fabricated polymer composite products

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 4	24

Specific Outcomes:

SPECIFIC OUTCOME 1

Plan the fabrication sequence and verify the control documentation.

SPECIFIC OUTCOME 2

Inspect laminates, check dimensions, determine acceptability and identify problems.

SPECIFIC OUTCOME 3

Monitor materials preparation, fabrication activities and finishing operations and make adjustments.

SPECIFIC OUTCOME 4

Inspect fabrications, fittings and finishing operations, determine acceptability and identify.

SPECIFIC OUTCOME 5

Record and report inspection findings and make recommendations.

SPECIFIC OUTCOME 6

Liaise with parties involved and monitor the rectification of problems.

SPECIFIC OUTCOME 7

Request and witness all required tests or test procedures.

SPECIFIC OUTCOME 8

Conduct internal audits and send measuring instruments for calibration.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 8

Fabricate specialised polymer composite parts ad complex assemblies

SAQA US ID	*UNIT STANDARD TITLE*
110283	Fabricate specialised polymer composite parts ad complex assemblies

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 4	28

Specific Outcomes:

SPECIFIC OUTCOME 1

Verify materials specified against the drawing or works instruction.

SPECIFIC OUTCOME 2

Draw, check and prepare materials for the fabrication process.

SPECIFIC OUTCOME 3

Prepare moulds and tooling, apply release agents and surface finish materials.

SPECIFIC OUTCOME 4

Establish set-up conditions, set up, operate, shut down and maintain processing machinery.

SPECIFIC OUTCOME 5

Prepare joints, align and bond parts and sections.

SPECIFIC OUTCOME 6

Demould and post-treat products.

SPECIFIC OUTCOME 7

Identify and rectify fabrication faults and complete records.

SPECIFIC OUTCOME 8

Verify conformance, test and hand over the final product.

SPECIFIC OUTCOME 9

Interact with work group members and clients.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 9

Prepare damaged polymer composite product for repairs

SAQA US ID	*UNIT STANDARD TITLE*
110278	Prepare damaged polymer composite product for repairs

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Clarify what needs to be done.

SPECIFIC OUTCOME 2

Collect tools, equipment and consumable items.

SPECIFIC OUTCOME 3

Prepare damaged areas and clean.

SPECIFIC OUTCOME 4

Test and check final surface preparation.

SPECIFIC OUTCOME 5

Clean and store equipment, clean workplace.

SPECIFIC OUTCOME 6

Faults and problems are reported and issues relating to the preparation process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 10

Apply gel coat in patterns

SAQA US ID	*UNIT STANDARD TITLE*
110288	Apply gel coat in patterns

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine position of pattern and apply tape.

SPECIFIC OUTCOME 2

Select and formulate gel coat.

SPECIFIC OUTCOME 3

Apply first gel coat, remove tape, apply subsequent colours in sequence.

SPECIFIC OUTCOME 4

Clean equipment and discard tapes.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 11

Assemble moulded components and attach fittings

SAQA US ID	*UNIT STANDARD TITLE*
110290	Assemble moulded components and attach fittings

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Plastics Manufacturing	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB MAP	Regular	Level 2	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Determine what needs to be done.

SPECIFIC OUTCOME 2

Collect components.

SPECIFIC OUTCOME 3

Prepare joints and fixing points.

SPECIFIC OUTCOME 4

Position and join components.

SPECIFIC OUTCOME 5

Test and check final assembly.

SPECIFIC OUTCOME 6

Clean and store equipment, clean workplace.

SPECIFIC OUTCOME 7

Faults and problems are reported and issues relating to the fitting process are discussed.