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GOVERNMENT NOTICE

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 327 **30 April 2010**

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 Process

registered by Organising Field 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 Qualifications and Unit Standards. The full Qualifications and Unit Standards can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate for Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualifications and Unit Standards should reach SAQA at the address below and ***no later than 31 May 2010 .*** All correspondence should be marked **Standards Setting – SGB for Manufacturing and Assembly Process** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. E. Brown
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 431-5144
e-mail: ebrown@saqa.org.za

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Yacht and Boat Building

SAQA QUAL ID	***QUALIFICATION TITLE***		
77003	National Certificate: Yacht and Boat Building		
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	136	Level 2	Regular-Unit Stds Based

New NQF Level: NQF Level 02

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
50542	National Certificate: Small Craft Construction	Level 2	156	Will occur as soon as 77003 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of this qualification is to prepare qualifying learners for a career in yacht and boatbuilding, to provide an opportunity for people currently employed in the industry to achieve formal recognition for their accumulated knowledge and skills and to enable them to advance in a structured career and learning path, and to facilitate the economic growth and development of the South African boatbuilding industry.

Qualifying learners will have developed basic boatbuilding skills, knowledge and understanding, which include:

- An understanding of the boatbuilding environment, including a broad understanding of different boatbuilding techniques and their applicability to the different materials commonly used for boatbuilding.
- A practical understanding of workshop safety.
- Selecting and safely operating the appropriate basic hand and power tools commonly used in boatbuilding.
- Operating basic power machinery used in woodworking applications in boatbuilding.
- A basic understanding of laminating materials with specific reference to boatbuilding applications.
- Basic laminating skills.

Learners acquiring this qualification will have an improved understanding of their role, and acquire the applied competencies to consistently and effectively execute their duties by contributing to the manufacturing process, and adhering to quality and safety requirements.

Rationale:

The boat building industry is a complex and specialised sector supplying a vast range of quality boats to customers. The emergence of South Africa as a cost effective supplier to international markets has created a demand for people with the skills to build yachts and boats as well as to perform support functions in a boat building process. These processes include laminating, marine joinery, boat design and construction, metalwork, complying with international boat building standards, installing and maintaining marine electrical systems and inflatable boat technology.

This is the first in a series of qualifications in yacht and boat building starting at NQF Level 2 and progressing to NQF Level 4. This series of qualifications will enable learners to:

- Develop their existing skill level and progress vertically in a selected career path within the yacht and boat building industry.
- Receive recognition for experience gained in the work place through an RPL process.
- Obtain skills and knowledge that are portable within similar manufacturing industries.
- Gain access to higher levels of learning and learning provision.
- Access opportunities to progress in their personal life and career and add value to the operations in which they function.
- Contribute to the growth of the South African economy and society.

This learning pathway addresses the full skills requirements of the boatbuilding sector and will prepare qualifying learners for the broad range of activities that must be undertaken by the competent boatbuilder, whilst at the same time providing a sound base for further learning.

People working in the yacht and boat building sector require validation of their skills and experience through access to formal qualifications and standards. The qualification affirms the experiences of boat builders through the recognition of prior learning, credit accumulation and achievement of competencies. It also provides learners with opportunities for professional development and career advancement within the broader manufacturing environment.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

- Communication and Mathematical Literacy at NQF Level 1 or equivalent.

Recognition of Prior Learning:

The structure of this unit standards-based qualification makes the Recognition of Prior Learning possible. This qualification may therefore be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. 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 Recognition of Prior Learning option towards gaining a qualification.

If the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this qualification the appropriate credits should be assigned to the learner. Recognition of Prior Learning will be done by means of Integrated Assessment as mentioned above.

This Recognition of prior learning may allow:

- Accelerated access to further learning at this or higher levels on the NQF.
- Gaining of credits towards a unit standard.
- Obtaining of this Qualification in part or in whole.

Access to the Qualification:

- This qualification is open for learners whose mobility on a standard boat would not be restricted due to any disabilities.

QUALIFICATION RULES

The Qualification is made up of Fundamental, Core, and Elective unit standards and a minimum of 136 Credits are required to complete the Qualification.

In this Qualification the credits are allocated as follows:

- Fundamental: 36 Credits.
- Core: 90 Credits.
- Electives: 10 Credits (minimum).

Total: 136 Credits.

The Fundamental Component:

The Fundamental Component consists of Unit standards to the value of 20 Credits in Communication in a South African language at NQF Level 2 and Unit standards in Mathematical Literacy at NQF Level 2 to the value of 16 Credits. All the Fundamental unit standards are compulsory.

The Core Component:

Yacht and Boat Building, can be differentiated from most other trades by the extremely wide range of core competencies that are required by the technically competent practitioner. A high level of skill and understanding are necessary in activities as diverse as joinery, metalwork, fibreglass fabrication, and electrical, mechanical and plumbing installation for the professional boatbuilder.

This Core component covers competencies related to boat building practices, health, safety and environmental issues, tools and equipment, manufacturing processes and materials. The unit standards provide the knowledge, values and skills that all learners require in order to engage in boat building practices.

All the Unit standards to the value of 90 credits in the Core Component are compulsory.

Elective Component:

Learners are to choose elective unit standards to the value of at least 10 Credits to complete the qualification.

EXIT LEVEL OUTCOMES

1. Demonstrate an understanding of the boatbuilding environment, including a broad understanding of different boatbuilding techniques and their applicability to the different materials commonly used for boatbuilding.

2. Demonstrate a practical understanding of workshop safety.

3. Demonstrate a basic understanding of composite materials with specific reference to boatbuilding applications.

4. Use basic laminating techniques.

Critical Cross-Field Outcomes:

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:

- Identification of materials.
- Identification of hull forms and features.
- Identification of causes of problems.
- Identification of different problems resulting from inappropriate material or tool selection and potential solutions.

2. Work effectively with others as a member of a team, group, organisation or community by:

- Liaising with team members and supervisor.

3. Organise and manage oneself and ones' activities responsibly and effectively by:

- Plan sequence of operations based on job specification.

4. Collect, analyse, organise and evaluate information by:

- Examine finished product for non-conformances.

5. Communicate well orally or in writing:

- Record information on work performed.
- Report outcome of work to supervisors.

6. Demonstrate an understanding of the world as a set of related systems:

- Explain the consequences of inappropriate hull type selection.
- Explain the consequences of inappropriate material or production process selection.

7. Use science and technology effectively and critically by:

- Understanding of material properties.
- Understanding of construction processes.
- Understand measuring and drawing techniques.
- Understand fairing techniques.
- Understand measuring and mixing equipment and techniques.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- Different types of small craft and their specific distinguishing characteristics are identified and described.
- The main parts of a boat are identified and their basic functionality described.
- Different boatbuilding techniques are described and their applicability to the major boatbuilding materials explained.

Associated Assessment Criteria for Exit Level Outcome 2:

- The work area is kept in a safe and productive state through the application of health and safety standards.
- Personal protective equipment is used according to health and safety standards.

Associated Assessment Criteria for Exit Level Outcome 3:

- Different types of reinforcement material are described and identified, and their main properties and uses explained.
- Different types of matrix material are described and identified and their main properties and uses discussed.
- Different types of core material are described and identified and their main properties and uses discussed.

Associated Assessment Criteria for Exit Level Outcome 4:

- Resins are measured and mixed according to specifications.
- Reinforcements are selected, prepared and positioned according to specifications.
- Basic hand-laminating techniques are applied.

Integrated Assessment:

- Assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, so that an integrated approach to assessment is incorporated into the qualification.
- Learning, teaching and assessment are inextricably interwoven. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the unit standards should be integrated.
- Assessment of Communication and Mathematical Literacy should be integrated as far as possible with other aspects and should use practical administration contexts wherever possible. A variety of methods must be used in assessment and tools and activities must be appropriate to the context in which the learner is working or will work. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.
- The term `Integrated Assessment` implies that theoretical and practical components should be assessed together. During integrated assessments, the assessor should make use of a range of formative and summative assessment tool methods and assess combinations of practical, applied, foundational and reflective competencies.
- Assessors must assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
- Assessment should ensure that all specific outcomes, embedded knowledge and critical cross-field outcomes are evaluated in an integrated manner.

INTERNATIONAL COMPARABILITY

The South African boatbuilding qualifications have been developed to fit into the NQF system where a series of qualifications is developed at successive NQF Levels, each of which can be awarded to learners on completion, while full competence as a boatbuilder is only attained on completion of all the qualifications in the series. International practice, on the other hand, is that there is one large qualification encompassing the full range of competencies, skills and knowledge, which has to be completed for the person to be equipped as a competent boatbuilder. Learners internationally only receive the comprehensive qualification and not smaller, step-by step qualifications. This makes it difficult to compare the qualifications on a level by level basis with other qualifications from around the world.

While the qualified South African boat builder may ultimately have very similar skills, and a comparable level of knowledge to boatbuilders in different countries, the process of developing these is quite distinct in South Africa.

This qualification was compared with training offered in countries that are acknowledged leaders in the small boat-building industry i.e. countries whose industry supplies small craft to other countries. These countries are:

- USA.
- Malaysia.
- Turkey.
- Australia.
- New Zealand.
- UK.

The United Kingdom:

The United Kingdom is renowned for their boat building expertise and there are several national registered qualifications, however, it seems that many training providers still present their own traditional learning programs based on the learner's years of experience and specific manufacturer's needs. The UK is the only country that offers qualifications on consecutive 'levels' in a similar way to South Africa, but only does so at two levels, namely level 2 and level 3. In the UK there are very well established boatbuilding schools which offer the full range of training in a specialist practical environment. May of the programmes include theoretical examinations which students do online, while they have to demonstrate competence through a series of assignments managed and assessed at their boat building yard. The South African boat building qualifications are much more comprehensive.

New Zealand:

New Zealand offers qualifications at level 3 and level 4, but the qualifications are distinct and do not follow on from one another. By far the majority of the qualifications are at level 4, and the prospective boatbuilder would spend between three and five years accumulating the necessary credits, skills and experience to attain the level 4 qualification without first acquiring a level 2 or level 3 qualification along the way. In New Zealand there is a very well developed tradition of practical training being done in boatyards, and learners develop all their skill and experience in the workplace and attend polytechnics or universities for the theoretical content only.

In general the contents of the South African boat building qualifications, taking the level 2, 3 and 4 qualifications as a whole, compare well with the New Zealand boat building qualifications.

United States of America:

The American Boat and Yacht Council (ABYC) have a well developed professional certification process which covers the majority of the core boatbuilding skills. This series of South African boatbuilding qualifications (levels 2, 3 and 4) focuses on the same core knowledge and skills, and the successful learner should be well prepared for ABYC certification on completion of all three qualifications.

Turkey:

The boating industry in Turkey is well developed. A technical high school, Kurucasile, on the Black Sea Coast of Turkey, is devoted to boat building only. This school, in addition to modern techniques, teaches its students, elements and principles of traditional craftsmanship. A number of other schools and academic institutions also run diploma courses in boatbuilding, which include practical components being learned at large yards. All these diplomas are valid

nationwide. These programmes and courses consist of all the skills and knowledge required by a boatbuilder and are not shorter certificate courses given to successful learners who have mastered only some of the skills and knowledge required. Diplomas issued by large universities (such as the naval architect diplomas issued by most technical universities) are internationally recognised.

Australia:

Australia has a well-established boat-building industry supported by well-defined units of study to be offered by training providers. Their learning programs in boat building do not seem to follow levels of complexity. It is very difficult to compare the South African individual boat building qualifications with those in Australia. However, it seems that once South African learners have completed the Further Education and Training Certificate: Boatbuilding and the preceding two qualifications at Level 2 and 3, they will be adequately equipped to compete with their Australian counterparts.

Malaysia:

Malaysia is an emerging boat building country. To date they have not developed a formal national qualification. They have however identified future training objectives and are in the process of developing learning programmes for the manufacture of fibreglass boats.

Africa in General:

Although many countries in Africa have displayed the capability to build boats of many shapes and sizes it still lacks the capability to build modern boats. No evidence was found of any boat building training being presented in sub-Saharan Africa. The South African qualifications could help to fill that gap on the continent by making these qualifications available to all those countries that might show an interest in these qualifications.

Conclusion:

Other countries all have a certain assumed level of basic education and do not attempt to combine teaching of Mathematics and Communication Fundamentals with the qualifications in the same way as the NQF in South Africa. While this is in response to a particular South African need, it further contributes to the local qualification being quite different in nature from any of its international counterparts.

The cumulative content of the South African qualifications (Levels 2, 3 and 4) is broader than would be required in Australia, Canada, New Zealand and the UK, but very similar to the recently developed ABYC qualifications in the USA. In the other countries, while the full scope of skills and knowledge are available as qualifications, students tend to specialise in more specific areas and so achieve a boat building qualification with a particular area of focus.

The South African qualifications offer learners a number of sequential shorter qualifications, while the other countries offer qualifications at the end of a longer, but possibly more narrowly focused period of learning.

Level 2:

In Level 2, learners receive an introduction to the working environment, workplace health and safety training, and entry level skills and boat building knowledge very similar to what they would receive in all the other countries, with the primary difference being that they receive a Level 2 qualification at the end of it. The South African qualification includes Fundamentals in Mathematical Literacy and Communication which the others do not.

Level 3:

In Level 3, students build on the knowledge and skills acquired at Level 2 in a very similar fashion to the other countries studied, with the main difference again being the awarding of a level 3 qualification upon completion, and the inclusion of further Mathematical Literacy and Communication Fundamentals.

In terms of levels, the level 3 falls between the UK Level 2 and Level 3, and is similar to the New Zealand Level 3, although in New Zealand no interim qualification is awarded.

Level 4:

At Level 4 the learner hones his/her skills, and refines his/her knowledge of boatbuilding, and upon completion, the successful learner will have achieved an almost identical level of theoretical knowledge to his counterpart following the ABYC syllabus in the USA, but will achieve the qualification with slightly less experience. Likewise, the New Zealand, Australian and Canadian students will have more workplace experience and a slightly narrower theoretical basis, while the UK student will have less experience and a slightly narrower knowledge base, but much more intensive practical training.

As stated in the beginning, it is very difficult to compare unlike levels and systems across countries, and each system will naturally have its own benefits and drawbacks. The content of the South African qualification is as comprehensive as any other and broader than most, but the way of delivering the training and the assessment thereof are quite different.

ARTICULATION OPTIONS
This Qualification articulates with the following Qualifications:

Horizontal articulation:

- ID 49091: National Certificate: Furniture Making: Wood, NQF Level 2.

Vertical articulation:

- ID 49105: National Certificate: Furniture Making: Wood, NQF Level 3.

MODERATION OPTIONS
- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with an appropriate Education and Training Quality Assurance Body (ETQA) or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

- Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA`s policies and guidelines for assessment and moderation.

- Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

- To be registered as an assessor with the relevant Education and Training Quality Assurance Body.
- A relevant qualification at one level higher than the level of the qualification and 12 months experience in the relevant field.
- Well-developed subject matter expertise within boat building.

NOTES

This qualification replaces qualification 50542, "National Certificate: Small Craft Construction", Level 2, 156 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119463	Access and use information from texts	Level 2	5
Fundamental	12461	Communicate at work	Level 2	5
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	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
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
Core	365146	Apply a range of boat design and construction principles	Level 2	20
Core	365159	Demonstrate a practical understanding of marine joinery	Level 2	30
Core	365145	Demonstrate an understanding of corrosion and basic metalwork in a marine environment	Level 2	10
Core	365143	Demonstrate an understanding of inflatable boat technology	Level 2	5
Core	110281	Fabricate a polymer composite product	Level 2	9
Core	110289	Identify and work with material as required for polymer composite fabrication	Level 2	8
Core	13220	Keep the work area safe and productive	Level 2	8
Elective	123600	Demonstrate seamanship for the safe crewing of a small craft	Level 2	10
Elective	12465	Develop a learning plan and a portfolio for assessment	Level 2	6
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	12481	Sling loads	Level 2	4

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of inflatable boat technology

SAQA US ID	*UNIT STANDARD TITLE*		
365143	Demonstrate an understanding of inflatable boat technology		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 2	5

New NQF Level: NQF Level 02

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of rigid inflatable boats.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the properties of materials and adhesives used in the construction of inflatable boats.

SPECIFIC OUTCOME 3
Demonstrate an understanding of materials and adhesives used in inflatable boat construction.

SPECIFIC OUTCOME 4
Demonstrate the methods of joining rigid and inflatable parts.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77003	National Certificate: Yacht and Boat Building	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of corrosion and basic metalwork in a marine environment

SAQA US ID	*UNIT STANDARD TITLE*		
365145	Demonstrate an understanding of corrosion and basic metalwork in a marine environment		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 2	10

New NQF Level: NQF Level 02

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of basic corrosion processes.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the 'galvanic series' of metals in sea water.

SPECIFIC OUTCOME 3
Demonstrate an understanding of the installation of corrosion protection and prevention equipment on a boat.

SPECIFIC OUTCOME 4
Manufacture metal components.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77003	National Certificate: Yacht and Boat Building	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply a range of boat design and construction principles

SAQA US ID	***UNIT STANDARD TITLE***		
365146	Apply a range of boat design and construction principles		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 2	20

New NQF Level: NQF Level 02

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of the terminology associated with boat design and construction.

SPECIFIC OUTCOME 2
Describe the materials and methods used in boat building and discuss their applications and limitations.

SPECIFIC OUTCOME 3
Identify and discuss hull forms.

SPECIFIC OUTCOME 4
Demonstrate an understanding of the features of a lines plan and the process of its development.

SPECIFIC OUTCOME 5
Construct a scale model from a lines plan.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77003	National Certificate: Yacht and Boat Building	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate a practical understanding of marine joinery

SAQA US ID	*UNIT STANDARD TITLE*		
365159	Demonstrate a practical understanding of marine joinery		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 2	30

New NQF Level: NQF Level 02

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of the properties and uses of wood, plywood and other manufactured boards used in boatbuilding.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the properties and uses of the different adhesives used in boatbuilding.

SPECIFIC OUTCOME 3
Demonstrate an understanding of the use of the wide range of fasteners used in boatbuilding.

SPECIFIC OUTCOME 4
Use measuring and marking equipment in a marine environment.

SPECIFIC OUTCOME 5
Use basic hand and power tools in boatbuilding applications.

SPECIFIC OUTCOME 6
Make basic woodworking joints.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77003	National Certificate: Yacht and Boat Building	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Yacht and Boat Building

SAQA QUAL ID	*QUALIFICATION TITLE*		
78863	National Certificate: Yacht and Boat Building		
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	136	Level 3	Regular-Unit Stds Based

New NQF Level: NQF Level 03

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
50543	National Certificate: Small Craft Construction	Level 3	122	Will occur as soon as 78863 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of this qualification is, to prepare qualifying learners for a career in boatbuilding, to provide an opportunity for people currently employed in the industry to achieve formal recognition for their accumulated knowledge and skills and to enable them to develop a structured career path, as well as to facilitate the economic growth and development of the South African boatbuilding industry.

Qualifying learners will have developed core boatbuilding skills, knowledge and understanding, which include:

- An understanding of the lines drawing and standards and techniques.
- A practical understanding of the safe operation and maintenance of woodworking tools and machinery encountered in boatbuilding applications.
- An understanding of the main on-board systems relevant to boatbuilding and identify their major components.
- An understanding of the properties of resin, reinforcement and core materials, and their practical application in the construction and repair of composite components.

Learners acquiring this qualification will have an improved understanding of their role, and acquire the applied competencies to consistently and effectively execute their duties by contributing to the manufacturing process, and adhering to quality and safety requirements.

This qualification reflects the need and demand within the small craft construction sector for skilled employees. Successful learners will be able to manufacture world-class products, improve professionalism and enhance the general quality of service delivery in the industry,

thereby contributing positively to investor confidence and the international competitiveness of the South African small craft construction sector.

Rationale:

The boat building industry is a complex and specialized sector supplying a vast range of quality boats to customers. The emergence of South Africa as a cost effective supplier to international markets has created a demand for people with the skills to build yachts and boats as well as function within the support processes of a building process. These processes include but not limited to: boat design and construction techniques, installation and maintenance of marine systems, manufacture and installation of marine joinery components, construct and repair composite marine components and understand marine inboard engines.

This is the second in a series of qualifications in yacht and boat building starting at NQF Level 2 and progressing to NQF Level 4. This series of qualifications will enable learners to:

- Develop their existing skill level and progress vertically in a selected career path within the yacht and boat building industry.
- Receive recognition for experience gained in the work place through Recognition of Prior Learning process.
- Obtain skills and knowledge portable within similar manufacturing industries.
- Gain access to higher levels of learning and learning provision.
- Access opportunities to progress in their personal life and career, and add value to the operations in which they function.
- Contribute to the growth of the South African economy and society.

This learning pathway addresses the full skills requirements of the boatbuilding sector and will prepare qualifying learners for the broad range of activities that must be undertaken by the competent boat builder, whilst at the same time providing a sound base for further learning.

People working in the yacht and boat building sector require validation of their skills and experience through access to formal qualifications and standards. The qualification affirms the experiences of boat builders through the recognition of prior learning, credit accumulation and achievement of competencies. It also provides learners with opportunities for professional development and career advancement within the broader manufacturing environment.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

- Communication and Mathematical Literacy at NQF Level 2.

Recognition of Prior Learning:

The structure of this unit standards-based qualification makes the Recognition of Prior Learning possible. This qualification may therefore be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. 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 Recognition of Prior Learning option towards gaining a qualification.

If the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this qualification the appropriate credits should be assigned to the learner. Recognition of Prior Learning will be done by means of Integrated Assessment as mentioned above.

This Recognition of Prior Learning may allow:

- Accelerated access to further learning at this or higher levels on the NQF.
- Gaining of credits towards a unit standard.
- Obtaining of this Qualification in part or in whole.

Access to the Qualification:

There is open for learners whose mobility on a boat will not be restricted due to any disabilities. It is preferable that learners first complete the National Certificate: Yacht and Boat Building, NQF Level 2 before accessing this qualification.

QUALIFICATION RULES

The Qualification is made up of Fundamental, Core, and Elective unit standards and a minimum of 136credits are required to complete the Qualification.

In this Qualification the credits are allocated as follows:

- Fundamental: 36 credits.
- Core: 85 credits.
- Electives: 15 credits (minimum).
- Total: 136 credits.

The Fundamental Component:

The Fundamental Component consists of Unit standards to the value of 20 credits in Communication in a South African language at Level 2 and Unit standards in Mathematical Literacy at NQF Level 2 to the value of 16 credits. All the Fundamental unit standards are compulsory.

The Core Component:

Yacht and Boat Building, can be differentiated from most other trades by the extremely wide range of core competencies that are required by the technically competent practitioner. A high level of skill and understanding are necessary in activities as diverse as joinery, metalwork, fibreglass fabrication, and electrical, mechanical and plumbing installation for the professional boatbuilder.

This Core component covers competencies related to boat building practices, health, safety and environmental issues, tools and equipment, manufacturing processes and materials. The unit standards provide the knowledge, values and skills that all learners require in order to engage in boat building practices.

All the Unit standards to the value of 85 credits in the Core Component are compulsory.

Elective Component:

Learners are to choose elective unit standards to the value of at least 15 credits to complete the qualification.

EXIT LEVEL OUTCOMES

Qualifying learners are able to:

1. Demonstrate an understanding of lines drawing standards and techniques.

2. Understand the safe operation and maintenance of the full range of woodworking tools and machinery commonly encountered in boatbuilding applications and use them accordingly.

3. Install the main on-board systems relevant to boatbuilding and identify their major components.

4. Understand the properties of resin, reinforcement and core materials, and use them in the construction and repair of composite components.

Critical Cross-Field Outcomes:

Identify and solve problems:

- Identification of different design features. Evident in Exit Level Outcome 1.
- Identification of causes of problems. Evident in Exit Level Outcome 1, 3 and 4.
- Identification of different problems resulting from inappropriate material, tool or finish selection and potential solutions. Evident in Exit Level Outcome 2.
- Identification of different materials. Evident in Exit Level Outcome 3.
- Identification of different components. Evident in Exit Level Outcome 4.

Work effectively with others in teams:

- Liaising with team members and supervisor. Evident in all Exit Level Outcomes.

Organise oneself effectively:

- Plan sequence of operations based on job specification. Evident in Exit Level Outcome 1, 3 and 4.

Collect, analyse, organise and evaluate information:

- Examine finished product for non-conformances. Evident in Exit Level Outcome 1, 3 and 4.

Communicate well orally or in writing:

- Record information on work performed. Evident in all Exit Level Outcomes.
- Report outcome of work to supervisor. Evident in all Exit Level Outcomes.

Use science and technology responsibly:

- Understanding of three dimensional shapes and their properties. Evident in Exit Level Outcome 1.
- Understanding of materials. Evident in Exit Level Outcome 2.
- Understand measuring and calculating techniques. Evident in Exit Level Outcome 1.
- Understanding of material properties. Evident in Exit Level Outcome 3 and 4.
- Understand measuring and mixing equipment and techniques. Evident in Exit Level Outcome 3.
- Understand tension, stress, flow rate and pressure. Evident in Exit Level Outcome 4.

Understand that the world is a set of related systems:

• Explain the consequences of incorrect calculation of areas, volumes and their centroids. Evident in Exit Level Outcome 1.
• Explain the consequences of inappropriately selecting the main features involved in rudder design. Evident in Exit Level Outcome 1.
• Explain the consequences of inappropriate component selection or incorrect installation and the resulting effects on the installed system. Evident in Exit Level Outcome 4.
• Explain the consequences of inappropriate material or finish selection and the impact that this may have on related systems. Evident in Exit Level Outcome 2 and 3.

ASSOCIATED ASSESSMENT CRITERIA
Associated Assessment Criteria for Exit Level Outcome: 1

• The design of yachts and boats is identified and explained according to main features and principles.
• The lines plan features are identified and their inter-relationships explained according to specifications.

Associated Assessment Criteria for Exit Level Outcome: 2

• The full range of hand and power tools are correctly used and maintained.
• The full range of woodworking machinery used in boatbuilding applications is used and maintained.
• Marine-specific joinery projects are undertaken and finished products comply with specifications and standards.

Associated Assessment Criteria for Exit Level Outcome: 3

• Marine systems are identified and their major components described and discussed.
• Marine systems are installed according to specification and relevant standards.

Associated Assessment Criteria for Exit Level Outcome: 4

• The properties of different types of resin, reinforcement and core materials are described with particular reference to their suitability for different applications.
• Repairs are successfully carried out on damaged composite parts.
• New composite parts are fabricated that comply with initial specifications and relevant standards requirements.

Integrated Assessment:

• Assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, so that an integrated approach to assessment is incorporated into the qualification.
• Learning, teaching and assessment are inextricably interwoven. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the unit standards should be integrated.
• Assessment of Communication and Mathematical Literacy should be integrated as far as possible with other aspects and should use practical administration contexts wherever possible. A variety of methods must be used in assessment and tools and activities must be appropriate to the context in which the learner is working or will work. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.
• The term `Integrated Assessment` implies that theoretical and practical components should be assessed together. During integrated assessments, the assessor should make use of a range of formative and summative assessment tool methods and assess combinations of practical, applied, foundational and reflective competencies.

• Assessors must assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
• Assessment should ensure that all specific outcomes, embedded knowledge and critical cross-field outcomes are evaluated in an integrated manner.

INTERNATIONAL COMPARABILITY

This qualification was compared with training offered in countries that are acknowledged leaders in the small boat-building industry; countries whose industry supplies small craft to others. These countries are:

• USA.
• Malaysia.
• Turkey.
• Australia.
• New Zealand.
• UK.

United States of America:

The American Boat and Yacht Council (ABYC) have a well developed professional certification process for the majority of core boatbuilding skills. This qualification focuses on the same core knowledge and skills, and the successful student should be well prepared for ABYC certification.

Malaysia:

Malaysia is an emerging boat building country. To date they have not developed a formal national qualification. They have however identified future training objectives and are in the process of developing learning programmes for fibreglass boats.

Turkey:

The boating industry in Turkey is well developed. A technical high school, Kurucasile, on the Black Sea Coast of Turkey, is devoted to boat building only. This school, in addition to modern techniques, teaches its students, elements and principles of traditional craftsmanship. All the schools and academic institutions, issue diplomas to students who have attended the necessary courses and fulfilled all conditions, including tests and exams. In addition, people attending and successfully finishing the training courses held at various places, such as large yards, and other institutions, are given certificates declaring that the holder has completed a certain program. All these diplomas and certificates are valid nationwide. Diplomas issued by large universities (such as the naval architect diplomas issued by most technical universities) are internationally recognized.

Australia:

Australia has a well-established boat-building industry supported by well-defined units of study to be applied by training providers. Their learning programs in boat building do not seem to follow levels of complexity but rather that of completeness. It is very difficult to compare the South African individual boat building qualifications with those in Australia. However, it seems that once South African learners had completed the Further Education and Training Certificate in Boat Building, they will be adequately equipped to compete with their Australian counterparts.

New Zealand:

The New Zealand authorities compiled a range of national certificates that can be applied in the boat building industry. Most of these certificates are at level 4 with the exception of one that is

registered at level 3. In general the contents of the South African boat building qualifications compares well with the New Zealand boat building qualifications.

United Kingdom:

The United Kingdom is renowned for their boat building expertise and similarly displays a well-thought-out capability to train towards that expertise. The UK has several national registered qualifications, however, it does seem as though many training providers still present their own traditional learning programs based on years of experience and specific community needs. It is thought that the South African boat building qualifications are much more comprehensive.

Africa in General:

Although many countries in Africa have displayed across the continent the capability to build boats of many shapes and sizes it still lacks the capability to build modern boats. No evidence was found of any boat building training being presented in sub-Saharan Africa. The South African qualifications could help to fill that gap on the continent by making these qualifications available to all those countries that might show an interest in these qualifications.

ARTICULATION OPTIONS

This Qualification articulates with the following proposed and registered Qualifications:

Horizontal Articulation:

- ID: 36155: National Certificate in Polymer Composite Fabrication, NQF Level 3.
- ID: 49105: Further Education and Training Certificate: Furniture Making: Wood, NQF Level 3.

Vertical Articulation:

- ID: 50560: Further Education and Training Certificate: Small Craft Construction, NQF Level 4.
- ID: 36153: Further Education and Training Certificate: Polymer Composite Fabrication, NQF Level 4.
- ID: 49092: Further Education and Training Certificate: Furniture Making: Wood, NQF Level 4.

MODERATION OPTIONS

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

- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

- Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA`s policies and guidelines for assessment and moderation.

- Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

• To be registered as an assessor with the relevant Education and Training Quality Assurance Body.
• A relevant qualification at one level higher than the level of the qualification and 12 months experience in the relevant field.
• Well-developed subject matter expertise within small craft construction.

NOTES

This qualification replaces qualification 50543, "National Certificate: Small Craft Construction", Level 3, 122 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	9010	Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Core	376541	Apply a range of boat design and construction techniques	Level 3	15
Core	376560	Construct and Repair composite marine components	Level 3	15
Core	376542	Install and maintain a range of marine systems	Level 3	25
Core	376544	Manufacture and install marine joinery components	Level 3	30
Elective	376543	Demonstrate an understanding of inboard engine systems and maintenance	Level 3	15
Elective	10783	Join of aluminium by means of arc welding	Level 3	5
Elective	116714	Lead a team, plan, allocate and assess their work	Level 3	4
Elective	117877	Perform one-to-one training on the job	Level 3	4
Elective	116720	Show understanding of diversity in the workplace	Level 3	3

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply a range of boat design and construction techniques

SAQA US ID	*UNIT STANDARD TITLE*		
376541	Apply a range of boat design and construction techniques		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

New NQF Level: NQF Level 03

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate a practical understanding of boat design.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the process of lofting shapes from a lines plan.

SPECIFIC OUTCOME 3
Calculate areas and volumes in boat design.

SPECIFIC OUTCOME 4
Explain the rudder design in yachts and boats.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78863	National Certificate: Yacht and Boat Building	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Install and maintain a range of marine systems

SAQA US ID	***UNIT STANDARD TITLE***		
376542	Install and maintain a range of marine systems		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 3	25

New NQF Level: NQF Level 03

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of an on-board fuel system.

SPECIFIC OUTCOME 2
Demonstrate an understanding of marine hydraulic systems.

SPECIFIC OUTCOME 3
Demonstrate an understanding of marine plumbing systems.

SPECIFIC OUTCOME 4
Demonstrate an understanding of compressed gas for cooking and heating.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78863	National Certificate: Yacht and Boat Building	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of inboard engine systems and maintenance

SAQA US ID	***UNIT STANDARD TITLE***		
376543	Demonstrate an understanding of inboard engine systems and maintenance		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 3	15

New NQF Level: NQF Level 03

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of basic engine systems.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the maintenance and servicing requirements of the different engine systems.

SPECIFIC OUTCOME 3
Demonstrate an understanding of the correct procedure for identifying problems in engine systems.

SPECIFIC OUTCOME 4
Demonstrate an understanding of the principles and operation of marine propulsion systems.

SPECIFIC OUTCOME 5
Engine systems are serviced and maintained.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	78863	National Certificate: Yacht and Boat Building	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Manufacture and install marine joinery components

SAQA US ID	***UNIT STANDARD TITLE***		
376544	Manufacture and install marine joinery components		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 3	30

New NQF Level: NQF Level 03

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Manufacture joinery components.

SPECIFIC OUTCOME 2
Install marine joinery components.

SPECIFIC OUTCOME 3
Demonstrate the finishing of typical marine joinery components.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78863	National Certificate: Yacht and Boat Building	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Construct and Repair composite marine components

SAQA US ID	*UNIT STANDARD TITLE*		
376560	Construct and Repair composite marine components		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	15

New NQF Level: NQF Level 03

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of composites in a marine environment.

SPECIFIC OUTCOME 2
Apply resin, fabric and core materials in both a new construction and repair situation.

SPECIFIC OUTCOME 3
Demonstrate an understanding of composite boat structures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78863	National Certificate: Yacht and Boat Building	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Yacht and Boat Building

SAQA QUAL ID	*QUALIFICATION TITLE*		
78864	Further Education and Training Certificate: Yacht and Boat Building		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
Further Ed and Training Cert	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	146	Level 4	Regular-Unit Stds Based

New NQF Level: NQF Level 04

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
50560	Further Education and Training Certificate: Small Craft Construction	Level 4	169	Will occur as soon as 78864 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of this qualification is, to prepare qualifying learners for a career in boatbuilding, to provide an opportunity for people currently employed in the industry to achieve formal recognition for their accumulated knowledge and skills, and to enable them to develop a structured career path, as well as to facilitate the economic growth and development of the South African boat building industry.

Qualifying learners will have developed advanced boat building skills, knowledge and understanding, which include but are not limited to:

- Demonstrating an understanding of the basic principles of boat and yacht design.
- Demonstrating a practical understanding of the installation of marine systems.
- Demonstrating a thorough understanding of composite materials technology and advanced composite fabrication processes relevant to boat building.
- Discussing and describing the need for standards in boat building.
- Applying relevant standards to the different aspects of small craft construction and systems specification and installation.

Learners acquiring this qualification will have a thorough understanding of their role, and acquire the applied competencies to consistently and effectively execute their duties by contributing to the manufacturing process, and adhering to quality and safety requirements. The skills, knowledge and understanding demonstrated within this qualification are essential for social, economic and cultural transformation, and contribute to upliftment and economic growth within the manufacturing environment.

Rationale:

South Africa has a well-developed, albeit relatively small, boat building industry, which competes very favourably with the boat building sectors in other countries. South African built boats are highly regarded for their quality by both South African and foreign boat owners. Thus is testimony to the high degree of knowledge and skill prevalent in the South African boat building sector. These skills need to be formally transmitted to an increasing number of workers in the sector so that South Africa can remain at the forefront of world small craft construction and continue to attract foreign and local buyers.

An extensive review was undertaken of education and training programmes and qualifications in the boat building sector and this which resulted in the determination of a learning pathway for the sector. This qualification is the third in the pathway that addresses the full skills requirements of the boat building sector and will prepare qualifying learners for the broad range of activities that must be undertaken by the competent boat builder, whilst at the same time providing a sound base for further learning.

This qualification reflects the need and demand within the small craft construction sector for skilled employees. The qualification will enable learners to manufacture world-class products; it will improve professionalism in the sector and enhance the general quality of service delivery in the industry, thereby contributing positively to investor confidence and the international competitiveness of the South African small craft construction sector.

The qualification can be used to give recognition to experienced, but unqualified boat builders for the skills and knowledge they have acquired through the recognition of prior learning and credit accumulation. It also provides learners with opportunities for professional development and career advancement within the broader manufacturing environment.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

- Communication and Mathematical Literacy at NQF Level 3.

Recognition of Prior Learning:

The structure of this unit standards-based qualification makes the Recognition of Prior Learning possible. This qualification may therefore be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. 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 Recognition of Prior Learning option towards gaining a qualification.

If the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this qualification the appropriate credits should be assigned to the learner. Recognition of Prior Learning will be done by means of Integrated Assessment as mentioned above.

This Recognition of Prior Learning may allow:

- Accelerated access to further learning at this or higher levels on the NQF.
- Gaining of credits towards a unit standard.
- Obtaining of this Qualification in part or in whole.

Access to the Qualification:

There is open access to the qualification for learners whose mobility on a boat will not be restricted due to any disabilities, as most training will take place on and in a small craft. However, it is preferable that learners first complete the National Certificate: Yacht and Boat Building, NQF Level 3 before accessing this qualification.

QUALIFICATION RULES
The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 156 credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards in:

- Mathematical Literacy at NQF Level 4 to the value of 16 credits.
- Communication at NQF Level 4 in a First South African Language to the value of 20 credits.
- Communication in a Second South African Language at NQF Level 3 to the value of 20 credits.

It is compulsory therefore for learners to do Communication in two different South African languages, one at NQF Level 4 and the other at NQF Level 3.

All Unit Standards in the Fundamental Component are compulsory.

Core Component:

This Core component covers competencies related to small craft construction practices, health, safety and environmental issues, tools and equipment, manufacturing processes and materials and standards. The unit standards provide the knowledge, values and skills that all learners require in order to engage in small craft construction practices. A high level of skill and understanding are necessary in activities as diverse as joinery, metalwork, composites fabrication, and electrical, mechanical and plumbing installation for the professional boat builder.

The Core Component consists of Unit Standards to the value of 75 credits all of which are compulsory.

Elective Component:

Learners are to choose unit standards from the Elective Component to the value of at least 15 credits to complete the qualification.

EXIT LEVEL OUTCOMES
Qualifying learners are able to:

1. Demonstrate an understanding of and apply the basic principles of boat and yacht design.

2. Demonstrate a practical understanding of the installation of marine electrical systems.

3. Demonstrate a thorough understanding and application of composite materials technology and advanced composite fabrication processes relevant to boat building.

4. Discuss and describe the need for standards in boat building.

5. Apply relevant standards to the different aspects of small craft construction and systems specification and installation.

Critical Cross-Field Outcomes:

The Critical Cross-Field Outcomes form an important part of the competencies required of a competent boat builder and are therefore integrated in a meaningful way into the unit standards making up the qualification. Details of how may be addressed are given in each unit standard.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- Displacement and stability calculations are undertaken during small craft design.
- Different sailing rig types are described and discussed in terms of their advantages and disadvantages and use.
- A general arrangement and interior layout drawing for a small craft is produced.

Associated Assessment Criteria for Exit Level Outcome 2:

- Guidelines for the installation of marine systems are followed.
- Maintenance activities are outlined and undertaken on marine systems.

Associated Assessment Criteria for Exit Level Outcome 3:

- A thorough understanding of composite materials and their interaction to form composite structures is demonstrated.
- Components are produced used advanced and specialised composite production processes.
- Hardware items are installed on composite panels according to recognised standards and industry best practice.

Associated Assessment Criteria for Exit Level Outcome 4:

- The role of international and local standards in boat design, construction and maintenance is described and discussed.
- Marine systems and structures are checked for compliance with relevant international and local standards.

Associated Assessment Criteria for Exit Level Outcome 5:

- Relevant national and international standards are applied to all design, production and maintenance activities undertaken.
- Implications of non-compliance with standards are discussed, for different aspects of yacht and boat building, and for the business of the boatyard.

Integrated Assessment:

- Assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, so that an integrated approach to assessment is incorporated into the qualification.
- Learning, teaching and assessment are inextricably interwoven. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the unit standards should be integrated.
- Assessment of Communication and Mathematical Literacy should be integrated as far as possible with other aspects and should use practical administration contexts wherever possible.

A variety of methods must be used in assessment and tools and activities must be appropriate to the context in which the learner is working or will work. Where it is not possible to assess the

learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.
• The term `Integrated Assessment` implies that theoretical and practical components should be assessed together. During integrated assessments, the assessor should make use of a range of formative and summative assessment tool methods and assess combinations of practical, applied, foundational and reflective competencies.
• Assessors must assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
• Assessment should ensure that all specific outcomes, embedded knowledge and critical cross-field outcomes are evaluated in an integrated manner.

INTERNATIONAL COMPARABILITY
The South African boatbuilding qualifications have been developed to fit into the NQF system where a series of qualifications is developed at successive NQF Levels, each of which can be awarded to learners on completion, while full competence as a boatbuilder is only attained on completion of all the qualifications in the series. International practice, on the other hand, is that there is one large qualification encompassing the full range of competencies, skills and knowledge, which has to be completed for the person to be equipped as a competent boatbuilder. Learners internationally only receive the comprehensive qualification and not smaller, step-by step qualifications. This makes it difficult to compare the qualifications on a level by level basis with other qualifications from around the world.

While the qualified South African boat builder may ultimately have very similar skills, and a comparable level of knowledge to boatbuilders in different countries, the process of developing these is quite distinct in South Africa.

This qualification was compared with training offered in countries that are acknowledged leaders in the small boat-building industry i.e. countries whose industry supplies small craft to other countries. These countries are:

• USA.
• Malaysia.
• Turkey.
• Australia.
• New Zealand.
• UK.

The UK:

The United Kingdom is renowned for their boat building expertise and there are several national registered qualifications, however, it seems that many training providers still present their own traditional learning programs based on the learner's years of experience and specific manufacturer's needs. The UK is the only country that offers qualifications on consecutive 'levels' in a similar way to South Africa, but only does so at two levels, namely level 2 and level 3. In the UK there are very well established boatbuilding schools which offer the full range of training in a specialist practical environment. May of the programmes include theoretical examinations which students do online, while they have to demonstrate competence through a series of assignments managed and assessed at their boat building yard. The South African boat building qualifications are much more comprehensive.

New Zealand:

New Zealand offers qualifications at level 3 and level 4, but the qualifications are distinct and do not follow on from one another. By far the majority of the qualifications are at level 4, and the prospective boatbuilder would spend between three and five years accumulating the necessary credits, skills and experience to attain the level 4 qualification without first acquiring a level 2 or

level 3 qualification along the way. In New Zealand there is a very well developed tradition of practical training being done in boatyards, and learners develop all their skill and experience in the workplace and attend polytechnics or universities for the theoretical content only.

In general the contents of the South African boat building qualifications, taking the level 2, 3 and 4 qualifications as a whole, compare well with the New Zealand boat building qualifications.

United States of America:

The American Boat and Yacht Council (ABYC) have a well developed professional certification process which covers the majority of the core boatbuilding skills. This series of South African boatbuilding qualifications (levels 2, 3 and 4) focuses on the same core knowledge and skills, and the successful learner should be well prepared for ABYC certification on completion of all three qualifications.

Turkey:

The boating industry in Turkey is well developed. A technical high school, Kurucasile, on the Black Sea Coast of Turkey, is devoted to boat building only. This school, in addition to modern techniques, teaches its students, elements and principles of traditional craftsmanship. A number of other schools and academic institutions also run diploma courses in boatbuilding, which include practical components being learned at large yards. All these diplomas are valid nationwide. These programmes and courses consist of all the skills and knowledge required by a boatbuilder and are not shorter certificate courses given to successful learners who have mastered only some of the skills and knowledge required. Diplomas issued by large universities (such as the naval architect diplomas issued by most technical universities) are internationally recognised.

Australia:

Australia has a well-established boat-building industry supported by well-defined units of study to be offered by training providers. Their learning programs in boat building do not seem to follow levels of complexity. It is very difficult to compare the South African individual boat building qualifications with those in Australia. However, it seems that once South African learners have completed the Further Education and Training Certificate: Boatbuilding and the preceding two qualifications at NQF Level 2 and NQF Level 3, they will be adequately equipped to compete with their Australian counterparts.

Malaysia:

Malaysia is an emerging boat building country. To date they have not developed a formal national qualification. They have however identified future training objectives and are in the process of developing learning programmes for the manufacture of fibreglass boats.

Africa in General:

Although many countries in Africa have displayed the capability to build boats of many shapes and sizes it still lacks the capability to build modern boats. No evidence was found of any boat building training being presented in sub-Saharan Africa. The South African qualifications could help to fill that gap on the continent by making these qualifications available to all those countries that might show an interest in these qualifications.

Conclusion:

Other countries all have a certain assumed level of basic education and do not attempt to combine teaching of Mathematics and Communication Fundamentals with the qualifications in

the same way as the NQF in South Africa. While this is in response to a particular South African need, it further contributes to the local qualification being quite different in nature from any of its international counterparts.

The cumulative content of the South African qualifications (Levels 2, 3 and 4) is broader than would be required in Australia, Canada, New Zealand and the UK, but very similar to the recently developed ABYC qualifications in the USA. In the other countries, while the full scope of skills and knowledge are available as qualifications, students tend to specialise in more specific areas and so achieve a boat building qualification with a particular area of focus.

The South African qualifications offer learners a number of sequential shorter qualifications, while the other countries offer qualifications at the end of a longer, but possibly more narrowly focused period of learning.

Level 2:

In Level 2, learners receive an introduction to the working environment, workplace health and safety training, and entry level skills and boat building knowledge very similar to what they would receive in all the other countries, with the primary difference being that they receive a level 2 qualification at the end of it. The South African qualification includes Fundamentals in Mathematical Literacy and Communication which the others do not.

Level 3:

In Level 3, students build on the knowledge and skills acquired at level 2 in a very similar fashion to the other countries studied, with the main difference again being the awarding of a level 3 qualification upon completion, and the inclusion of further Mathematical Literacy and Communication Fundamentals.

In terms of levels, the level 3 falls between the UK level 2 and level 3, and is similar to the New Zealand level 3, although in New Zealand no interim qualification is awarded.

Level 4:

At level 4 the learner hones his/her skills, and refines his/her knowledge of boatbuilding, and upon completion, the successful learner will have achieved an almost identical level of theoretical knowledge to his counterpart following the ABYC syllabus in the USA, but will achieve the qualification with slightly less experience. Likewise, the New Zealand, Australian and Canadian students will have more workplace experience and a slightly narrower theoretical basis, while the UK student will have less experience and a slightly narrower knowledge base, but much more intensive practical training.

As stated in the beginning, it is very difficult to compare unlike levels and systems across countries, and each system will naturally have its own benefits and drawbacks. The content of the South African qualification is as comprehensive as any other and broader than most, but the way of delivering the training and the assessment thereof are quite different.

ARTICULATION OPTIONS
Articulation:

This Qualification articulates with the following Qualifications:

Horizontal articulation:

• ID:36153; Further Education and Training Certificate: Polymer Composite Fabrication; NQF Level 4.

• ID:49092; Further Education and Training Certificate: Furniture Making: Wood; NQF Level 4.

Vertical articulation:

• ID: 22433; National Certificate: Manufacturing and Assembly; NQF Level 5.

MODERATION OPTIONS

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

• Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

• Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

• Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Criteria for the Registration of Assessors:

For an applicant to register as an assessor, the applicant needs:

• To be registered as an assessor with the relevant Education and Training Quality Assurance Body.
• A relevant tertiary qualification at one level higher than the level of the qualification and 12 months experience in the relevant field.
• Well-developed subject matter expertise within small craft construction.

NOTES

This qualification replaces qualification 50560, "Further Education and Training Certificate: Small Craft Construction", Level 4, 169 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6
Fundamental	119462	Engage in sustained oral/signed communication and evaluate spoken/signed texts	Level 4	5
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	5
Fundamental	9016	Represent analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 4	4

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119471	Use language and communication in occupational learning programmes	Level 4	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	5
Core	376540	Demonstrate an understanding of boat design	Level 4	15
Core	376580	Demonstrate an understanding of boatbuilding standards	Level 4	20
Core	376582	Demonstrate an understanding of structural composites	Level 4	20
Core	376581	Install marine electrical systems	Level 4	20
Elective	376545	Apply marine fairing and painting techniques	Level 4	15
Elective	263024	Plan and produce two dimensional (2D) Computer Aided Drawings (CAD)	Level 4	15
Elective	117166	Use CNC machinery in the furniture production process	Level 4	10

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of boat design

SAQA US ID	***UNIT STANDARD TITLE***		
376540	Demonstrate an understanding of boat design		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	15

New NQF Level: NQF Level 04

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Calculate displacement and explain its importance in boat building.

SPECIFIC OUTCOME 2
Demonstrate an understanding of stability and methods of calculation in boat design.

SPECIFIC OUTCOME 3
Demonstrate an understanding of rig design.

SPECIFIC OUTCOME 4
Identify and describe the main features of interior boat and yacht layout.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78864	Further Education and Training Certificate: Yacht and Boat Building	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply marine fairing and painting techniques

SAQA US ID	***UNIT STANDARD TITLE***		
376545	Apply marine fairing and painting techniques		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	15

New NQF Level: NQF Level 04

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Identify and describe the personal health and safety factors to be considered when working with marine paint and fairing compounds.

SPECIFIC OUTCOME 2
Prepare boat surfaces for fairing and painting.

SPECIFIC OUTCOME 3
Demonstrate an understanding of yacht and boat fairing techniques.

SPECIFIC OUTCOME 4
Demonstrate an understanding of yacht and boat painting techniques and marine coating systems.

SPECIFIC OUTCOME 5
Troubleshoot common failures in marine coating systems.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	78864	Further Education and Training Certificate: Yacht and Boat Building	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of boatbuilding standards

SAQA US ID	***UNIT STANDARD TITLE***		
376580	Demonstrate an understanding of boatbuilding standards		
ORIGINATOR		***PROVIDER***	
SGB Manufacturing and Assembly Processes			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	20

New NQF Level: NQF Level 04

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of industry standards in the specification and installation of bilge pumps.

SPECIFIC OUTCOME 2
Demonstrate an understanding of industry standards in the specification and installation of Marine Electrical Systems.

SPECIFIC OUTCOME 3
Demonstrate an understanding of industry standards in the installation of Engine Exhaust systems.

SPECIFIC OUTCOME 4
Demonstrate an understanding of industry standards in the specification and installation of handrails and re-boarding systems.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78864	Further Education and Training Certificate: Yacht and Boat Building	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Install marine electrical systems

SAQA US ID	*UNIT STANDARD TITLE*		
376581	Install marine electrical systems		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Engineering and Related Design	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	20

New NQF Level: NQF Level 04

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of the theory of marine electrical installations.

SPECIFIC OUTCOME 2
Demonstrate an understanding of the installation of a marine electrical system.

SPECIFIC OUTCOME 3
Demonstrate an understanding of the principles and operation of onboard electrical systems.

SPECIFIC OUTCOME 4
Install and maintain a simple marine electrical system

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78864	Further Education and Training Certificate: Yacht and Boat Building	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate an understanding of structural composites

SAQA US ID	*UNIT STANDARD TITLE*		
376582	Demonstrate an understanding of structural composites		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	20

New NQF Level: NQF Level 04

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate an understanding of plug and mould manufacturing in boat building.

SPECIFIC OUTCOME 2
Demonstrate an understanding of vacuum bagging, infusion and prepreg.

SPECIFIC OUTCOME 3
Demonstrate an understanding of composite structural details.

SPECIFIC OUTCOME 4
Demonstrate an understanding of quality assurance systems in composite construction.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	78864	Further Education and Training Certificate: Yacht and Boat Building	Level 4