No. 43 **5 February 2010**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with Regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Task Team for

SOVEREIGNTY OF THE STATE

registered by Organising Field 08 – Law, Military Science and Security, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and ***no later than 5 March 2010.*** All correspondence should be marked **Standards Setting – Task Team for Sovereignty of the State** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Engineering Watchkeeping

SAQA QUAL ID	*QUALIFICATION TITLE*		
77983	Further Education and Training Certificate: Engineering Watchkeeping		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
Further Ed and Training Cert	8 - Law, Military Science and Security	Sovereignty of the State	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	122	Level 4	Regular-Unit Stds Based

New NQF Level: NQF Level 04

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

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

This qualification is aimed at persons who work or intend to work in the Navy or Maritime sector as an Engineering Watchkeeper, and who require essential skills in maritime engineering supervision and watchkeeping. Learners may progress from this qualification to become a Marine Engineering Officer (Navy), a Weapons Engineering Officer (Navy), or Chief Engineer in the commercial maritime sector. This qualification follows on from SAN training in Engineering Assistance at NQF Level 3 and leads to the National Certificate: Marine Engineering at NQF Level 5.

The qualification will provide professional status to persons who practise within the discipline. Learners in possession of this qualification will be able to:

- Carry out specified scheduled maintenance activities on board a ship.
- Carry out watch keeping duties in the engine room as chief of the watch.
- Combat fire and flood while on watch.
- Conduct engineering trials on a vessel.
- Conduct fabrication and repair operations on ships.
- Conduct personnel management functions for a team.
- Dismantle, repair and assemble shipboard plant.
- Ensure compliance with maritime pollution prevention requirements.
- Implement safe work procedures for engineering work on a naval vessel.
- Operate equipment to provide electrical power to a vessel.
- Operate propulsion machinery and associated control systems.
- Operate pumping and associated control systems.

Engineering Watchkeepers will generally carry out their role within the context of:

- A marine environment.
- Adequately equipped and serviceable vessels.

• Coherent and interdependent relationships.

Rationale:

The South African Navy (SAN) wishes to provide for the recognition of key clusters of supervisory, management and technical competence which coincide with SAN licensing requirements.

The majority of the candidates for this qualification are likely to have completed the introductory courses to maritime engineering, and wish to progress to engineering watchkeeping within a naval context. This qualification will give them the opportunity to develop and balance their practical skills with the essential knowledge needed to earn a formal qualification in Engineering Watchkeeping, without formal education becoming an impassable barrier.

There is a critical need in the SAN to identify people from different demographic and gender backgrounds who have a sound foundation in basic engineering skills, and who have completed learning and been recognised as competent as an engineering rating. This qualification will provide for them the opportunity to develop the specific skills demanded of those who supervise engineering watchkeeping within a safety conscious and highly regulated sector.

A decision has also been made that the SAN must comply with, or exceed, international marine engineering standards. Traditionally, SAN training has been of a high standard in defined areas, but has not always produced people who meet international maritime licensing requirements such as the International Maritime Organisation (IMO) Standards of Training, Certification and Watchkeeping (STCW), and SAMSA (South African Maritime Safety Association) Codes and conventions. The qualification recognises and makes provision for these additional requirements.

In addition, the policy of the Defence Force, as part of a broader skills development process in South Africa, is to provide Defence Force members with skills, knowledge and competencies that are transferable to sectors outside the Defence Force so as to enable members to obtained employment when they leave the SANDF. This qualification will not only provide the learner with the competencies required to operate effectively within the SAN, but also provide him/her with skills that are usable in the merchant marine as well as in other commercial sectors.

In summary, the purpose of the qualification and its unit standards is to:

• Describe the standard required for competent performance in the SAN and the international arena as a naval engineering watchkeeper.
• Provide a framework of learning and competencies for that would allow for Recognition of Prior Learning (RPL).
• Provide access and progression via a coherent learning pathway for engineering personnel wishing to follow a career in marine engineering.
• Provide access to candidates formerly denied opportunities for a career in maritime defence, which in turn promotes personal (and thus national) skills development.

The maritime industry, and in particular the South African Navy, have a need to keep watch over engineering activities.
The majority of the candidates for this qualification are likely to be working in the South African Navy, with the knowledge gained in this qualification being directly applicable to a naval engineering watchkeeper. Experienced engineering ratings and/or watchkeepers are also in general demand in the commercial maritime industry, and career opportunities include container vessels and fishing.

This occupation is highly regulated through international organisations and agreements and thus has a major influence on the construct of this qualification.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
- Mathematics at NQF Level 3.
- Communication at NQF Level 3.

Recognition of Prior Learning:

This qualification can be achieved wholly or in part through recognition of prior learning in terms of the defined exit level outcomes and/or individual unit standards.

Evidence can be presented in various ways, including international and/or previous local qualifications, products, reports, testimonials mentioning functions performed, work records, portfolios, videos of practice and performance records.

All such evidence will be judged in accordance with the general principles of assessment described in this document and the requirements for integrated assessment.

Access to the Qualification:

Learners applying to enrol for this qualification need to comply with given medical requirements in order to perform the activities and functions of a watchkeeper on board a ship. Learners who do not comply with these medical requirements may find difficulty in achieving many of the unit standards associated with this qualification.

QUALIFICATION RULES
This Qualification consists of a minimum of 122 Credits made up as follows:

Fundamental:

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 122 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.

Mathematical Literacy is defined as the ability to apply basic mathematics within a variety of real life contexts.
All Unit Standards in the Fundamental Component are compulsory.

Core Component:

- The Core Component consists of Unit Standards to the value of 56 Credits all of which are compulsory.

Elective Component:

• Learners must select additional Unit Standards from the Elective component to achieve a minimum of 10 Credits.

EXIT LEVEL OUTCOMES

1. Execute watchkeeping duties.

2. Use tools effectively for maintenance and repair.

3. Operate shipboard machinery and equipment.

4. Carry out planned and corrective maintenance.

5. Respond to emergencies as an engineering watchkeeper.

Critical Cross-Field Outcomes:

This qualification addresses the following Critical Cross-Field Outcomes, as detailed in the unit standards:

• Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made:
o The function requires critical thought, problem-solving and responsible decision making across a wide range of technical and personnel situations and contexts. The function requires identifying deviations from the norm, identification of the cause, and selection of appropriate responses to solve problems.

• Working effectively with others as a member of a team, group, organisation or community:
o The operator is part of an engineering team as well as a damage control team. As watchkeeper, the operator directs the activities of others and achieves aims and objectives by these means. The operator is also part of the broader picture of the ship's company and plays a part within that greater whole.

• Organising and managing oneself and one's activities responsibly and effectively:
o Naval vessels are complex entities and there are a variety of service and maintenance functions scheduled on a daily, weekly and monthly basis. It is essential that the operator is well organised and able to execute the tasks efficiently and effectively as planned to promote the safety of personnel and vessel.

• Collecting, analysing, organising and critically evaluating information:
o It is essential that an accurate picture of the condition of the vessel is maintained at all times so that it is ready and fit-for-purpose as required by the command aim. Information must be gathered and reported consistently to form and maintain this picture.

• Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion:
o Communication in a technical environment frequently makes use of diagrams. Instructions and requirements must be effectively communicated and feedback and input accurately interpreted and evaluated for the function to operate as intended.

• Using science and technology effectively and critically, showing responsibility towards the environment and health of others:
o The entire function revolves around the critical and responsible use of technology, both in the operation of the plant as well as the detection of faults, and fabrication, maintenance and repair

operations. All of this must be carried out to minimise spillage and detrimental impact on the environment.

• Demonstrating and understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation:
o A critical competence-the operator is also part of the broader picture of the ship's company and plays a part within that greater whole.

• Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of society at large, by making individuals aware of the importance of:
o Reflecting on and exploring a variety of strategies to learn more effectively.
o Participating as responsible citizens in the life of local, national and global communities.
o Being culturally and aesthetically sensitive across a range of social contexts.
o Exploring education and career opportunities.
o Developing entrepreneurial opportunities.

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

1.1. Handover and/or relief of an engineering watch is performed while meeting international and national safety organisation safety requirements, and complying with South African Navy protocols and procedures.
Range:
• Safety organisations include: international maritime organisation (IMO); South African Maritime Safety Organisation (SAMSA).
1.2. Routine duties of the chief of the watch are managed and performed in compliance with safety and emergency procedures.
1.3. Precautions to prevent pollution to the marine environment during all evolutions are taken to comply with International Convention for the Prevention of Pollution from Ships (MARPOL) requirements.
1.4. Actions taken in the event of a pollution emergency meet the requirements of shipboard oil pollution plan (SOPEP) as specified in the Shipboard Marine Pollution Emergency Plans.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Tools for a range of fabrication and/or repair operations on marine machinery and equipment are selected appropriately for the particular operation and are used in accordance with their design and purpose.
2.2 Shipboard plant, marine machinery and other equipment is dismantled according to engineering procedures as required for repair work.
2.3 Parts are fabricated within the tolerance limits as stipulated by machine and equipment manufacturers.
2.4 Marine machinery and equipment is repaired and reassembled in accordance with naval operating procedures and manufacturer requirements, so as to deliver the performance as per manufacturer's specifications.
2.5 Housekeeping is done according to safe engineering practice requirements and naval standards.
2.6 Reports are completed and submitted to authorised personnel on time in the required format.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Start up, operation and shut down of propulsion machinery and associated control systems is performed consistent with operating principles and procedures, and manufacturer's specifications.

3.2 Operation of propulsion machinery and associated control systems is executed in a manner that optimises output according to specified requirements, within operational constraints.
3.3 Start up, operation and shut down of pumps and associated control systems is performed consistent with operating principles and procedures, and manufacturer's specifications.
3.4 Preventative maintenance and servicing of pumps is carried out in accordance with the schedule and standard operating procedures.
3.5 Electrical generation equipment is operated in accordance with operating principles and procedures.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Safe work procedures are identified, developed, communicated and/or confirmed for critical areas of engineering operation, in line with accepted policy and procedures, to promote safe working practices in the engineering environment.
4.2 Planning for maintenance is done in compliance with the naval maintenance documentation system and requirements.
4.3 Planned maintenance is executed, evaluated and reported according to specified requirements.
4.4 Installations are inspected and equipment set to design specifications in preparation for harbour and sea trials, as specified in established procedures.
4.5 Harbour and sea trials are executed in accordance with their purpose, and planned and/or corrective maintenance and/or repair work confirmed to be at required standards.

Associated Assessment Criteria for Exit Level Outcome 5:

5.1 Hazards which enhance the likelihood of fire or flood are identified, and precautions taken are consistent with good practice and naval operating procedures.
5.2 All engineering work is done in conformance with the requirements of safe work practices, and limits the opportunity for fire and/or flood damage.
5.3 Responses to fire and/or flood are made appropriate to the nature of the emergency, the threat to vessel and personnel and in line with onboard emergency plans.

Integrated Assessment:

Assessment should be carried out at regular intervals as well as at the end of the periods of study and should be offered in an integrated way. It is envisaged that learners will work at more than one unit standard at a time.

Assessment should focus on the learners' ability to apply theoretical knowledge and understanding to practical application. Assessors should use a range of strategies to allow learners to demonstrate applied competence. Assessment strategies and procedures should be in alignment with the purpose and exit level outcomes of the qualification. These should primarily consist of practical assessments supported by written assignments, tests and/or examinations, case studies, problem solving assignments, portfolios of learning and projects.

Learners must demonstrate the ability to engage in the operations selected in an integrative way, dealing with divergent and "random" demands related to these work operations, effectively. Evidence is required that the learner is able to achieve the purpose of the qualification as a whole at the time of the award of the qualification. Integration of skills will be demonstrated through the achievement of the core operational standards.

Assessors should note that evidence of integration could well be presented by learners when being assessed against the individual unit standards. Thus, there should not necessarily be separate assessments for each unit standard and then further assessment for integration. Well designed assessments should make it possible to gain evidence against each unit standard while at the same time gaining evidence of integration.

INTERNATIONAL COMPARABILITY
The qualifications from the following countries have been examined for comparison:

- United Kingdom (Royal Navy).
- Canada.
- Australia.
- India.

In addition, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and South African Maritime Safety Authority (SAMSA) codes have informed the development of this qualification.

The rationale for the choice is as follows: The Royal Navy is the leader, and their practices are widely copied throughout the world. All other Navies and maritime Organisations comply with the STCW codes, leading to a substantial degree of uniformity in a highly regulated environment [This qualification was developed with the STCW codes in mind]. Canada has a long history of outcomes based approaches, and their qualifications represent a useful variation on the Royal Navy. The Australian qualifications are amongst the best standards based approaches to navy engineering qualifications. The Indian examples provide insight into approaches from the sub-continent. Finally, the South African Maritime Safety Authority (SAMSA) is the regulatory body for South Africa, and the SA Navy has made every attempt to meet their requirements, in the interests of compliance, portability and articulation.

Standards of Training, Certification and Watchkeeping (STCW):

The STCW codes Chapter III, Section A-III/1 specify the competency requirements for engineering watchkeepers as follows:

- Use appropriate tools for fabrication and repair operations typically performed on ships.
- Use hand tools and measuring equipment for dismantling, maintenance, repair and re-assembly of shipboard plant and equipment.
- Use hand tools, electrical and electronic measuring and test equipment for fault-finding, maintenance and repair operations.
- Maintain a safe engineering watch.
- Use English in written and oral form.
- Operate main and auxiliary machinery and associated control systems.
- Operate pumping systems and associated control systems.
- Operate alternators, generators and control systems.
- Maintain marine engineering systems, including control systems.
- Ensure compliance with pollution-prevention requirements.
- Maintain seaworthiness of the ship.
- Prevent, control and fight fires on board.
- Operate life-saving devices.
- Apply medical first aid on board ship.
- Monitor compliance with legislative requirements.

South African Maritime Safety Authority-Marine Notice No. 15 of 2005:

Engineer Officer:

A candidate for the certificate of competency as engineer officer must be at least 18 years of age and must have:

(a) Completed at least 6 months approved sea service as assistant engineer officer on ships of 750 kW propulsion power or more under the supervision of an engineer officer.

(b) Passed a theoretical examination at an accredited institution and have successfully completed approved training consisting either:

(i) Of an approved cadetship, of at least 30 months, consisting of:
(aa) Practical workshop training.
(bb) Theoretical education.
(cc) At least six months approved sea service.
or
(ii) Of an approved trade as an artisan in an engineering discipline.

(c) Been assessed at Level 1, 2 and 3.

Interpretation:

To avoid doubt, the following terms and expressions are explained:

Approved sea service means service on a ship, other than one that navigates exclusively in inland waters or in a port operations area, that is engaged in ordinary trading (i.e. commercial operations). Sea service in non-trading ships must satisfy regulation 56 of the Merchant Shipping (Training and Certification) Regulations, 1999, and may be approved at the discretion of the senior examiner.
Approved training means training at a SAMSA accredited training institution, or training consisting either of a cadetship or a trade as an artisan in an engineering discipline, approved at the discretion of the senior engineer examiner.

Exemptions:

Eligibility requirements for engineer officer (engineer cadet):

A candidate for the certificate of competency as engineer officer may be exempted from having to complete an approved cadetship or approved trade as an artisan in an engineering discipline, if:

- The candidate is at least 18 years of age.
- The candidate has completed at least 18 months approved sea service, of which at least 6 months must have been served as assistant engineer officer on ships of 750 kW propulsion power or more under the supervision of an engineer officer.
- The candidate has completed the ISF on-board training record book for engineer cadets, has passed the approved theoretical education in accordance with the Code and has completed approved practical workshop training.
- The candidate has completed the ancillary courses as laid down by the Merchant Shipping (Training and Certification) Regulations, 1999.
- The candidate has passed an approved simulator training course on engine room watchkeeping.
- The candidate has been assessed at Level 2 and 3.

Eligibility requirements for engineer officer (marine motorman higher grade):

A candidate who is the holder of a marine motorman higher grade certificate of competency may be granted an engineer officer certificate of competency if:

- The candidate has passed approved theoretical education in accordance with the Code.
- The candidate has successfully completed the ancillary courses required by the Merchant Shipping (Training and Certification) Regulations, 1999.

• The candidate has completed at least 3 months approved sea service as an assistant engineer officer on vessels of 750 kW propulsion power or more, other than fishing and port operations vessels, under the supervision of an engineer officer.
• The candidate has been assessed at level 2 and 3.

United Kingdom:

Job description-Engineering Watchkeeper:

The Royal Navy uses highly sophisticated, modern warships which can operate in the harshest conditions imaginable. The Engineering Watchkeeper is part of the team that looks after everything from the fuel, power and propulsion systems that keep the ship going, to the water purification and air-conditioning equipment critical to the wellbeing of the crew.

Responsibilities:

• Carrying out routine maintenance on all different kinds of equipment on board ship, such as the engines, the emergency steering and the ventilation system.
• Investigating faults, and then making repairs so that the vessel can carry out its mission.
• Operating machinery like the pumps, steering gear and engines, and helping with the refueling of the ship while at sea.
• Looking after the fuel and electricity for aircraft and managing the lifts on board aircraft carriers.
• Being part of a damage control and fire fighting team so that, in case of emergency, the Engineering Watchkeeper will know how to cope.

Training:

When ratings have completed a course of training approved by the Department, they may proceed to sea as uncertified engineering officers and perform the sea service as indicated below. To progress, they need qualifying sea service while in possession of the MNTB Motorman Certificate, and must be nominated assistant to engineering officer in charge of the watch. They also require a 4-day fire-fighting course and 1st aid at sea. The progression route is outlined below:

Class 4 Certificate of Competency after sea service on a vessel not less than 350 Kilowatt. Conditions for each of the certificates are:

• Motor Certificate: requires 6 months at sea, 4 of which must include watchkeeping on main propelling machinery for motor ships.
• Steam Certificate: requires 6 months at sea, 4 of which must include watchkeeping on boilers and main propulsion.
• Combined Certificate: 8 months at sea, 4 of which must include watchkeeping on motor engines, and 4 on steam.

Class 3 Certificate of Competency: 12 months/8 of which must include watchkeeping on main propelling machinery, motor ships; and the balance on main propulsion, steam, or day work. Service endorsement: 12 months with Class 3 Cert of competency; sea service on motor ships.

Class 2 Certificate of Competency: sea service on a vessel not less than 750 Kilowatt.
• Motor Certificate: 18 months at sea/9 of which must include watchkeeping on main propelling machinery, motor ships; the balance include watchkeeping on main, steam, or day work.
• Steam Cert: 18 months/9 of which must include watchkeeping on boilers/main propulsion; the balance on main, steam, or day work.
• Combined: 18 months/must include 9 months watchkeeping on each.
• Service endorsement: 12 months with Class 2 Cert.

For class 1-sea service on a vessel not less than 1500 Kilowatt:

- Motor Certificate: 18 months/9 of which must include watchkeeping on a vessel not less than 3000 kW, with a Class 2 Certificate.
- Steam Certificate: 18 months/9 of which must include watchkeeping on boilers/main propulsion; the balance on main propulsion, steam, or day work.
- Combined Certificate: 18 months 9 of which must include watchkeeping on a vessel not less than 3000 kW, with Class 2 Certificate.
- Service endorsement 12 months with Class 2 Certificate.

Royal Australian Navy:

Australia Education/Training:

To become an Engineer Trainee a candidate must complete an engineering trade approved by the Australian Maritime Safety Authority. An Engineer Trainee can become a marine engineer through completion of a certificate in pre-sea training, followed by an at-sea service training course sponsored by a shipping company. This training course consists of a Diploma of Marine Engineering (Watchkeeping). On completion of the diploma, and if qualifying sea service or workshop experience is satisfactory, trainees will be examined by the Australian Maritime Safety Authority for an Engineer Watchkeeping Certificate of Competency. The trainees may then undertake a diploma, advanced diploma or degree in marine engineering. To become an Engineer Cadet they must complete year 12 and complete an Engineer Cadetship approved by the Australian Maritime Safety Authority. This requires the same training as an Engineer Trainee, plus a minimum of 36 weeks approved trade training.

Entry to the certificate course usually requires completion of at least Year 12 with passes in mathematics, sciences and English. Entry to the diploma of marine engineering courses below usually requires TCE with English and mathematics and/or significant progress towards or completion of a Diploma of Marine Engineering (Watchkeeper) or an Engineer Watchkeeping Certificate of Competency. The advanced diploma and degree courses usually require completion of TCE with English, mathematics and physics.

The following suggests a progression of qualifications leading to the Level 4 qualification which equates well with the proposed National Certificate: Engineering Watchkeeping-Level 4.

TDM 202 01 Certificate II in Transport and Distribution (Marine Engine Driving)
Characteristics of the Qualification.

Title: Certificate II in Transport and Distribution (Marine Engine Driving).

Rationale:

Successful completion will require competency in units that relate to work defined as aligned at AQF Level 2.
"Performance of a prescribed range of functions involving known routines and procedures and some accountability for the quality of outcomes. Applications may include some complex or non-routine activities involving individual responsibility or autonomy and/or collaboration with others as part of a group or team."

Qualification Contents:

- B Equipment Checking, and Maintenance:
  - TDM MB36 01A Prepare a small vessel's machinery for sea.
  - TDM MB19 01A Carry out basic hull maintenance.

- E Communications:
  - TDM ME1 01A Understand orders and be understood in relation to shipboard duties*.

- F Operational Quality and Safety:
  - TDM MF7 01A Observe safe working practices*.
  - TDM MF8 01A Comply with emergency procedures*.
  - TDM MF9 01A Fight and extinguish fires*.
  - TDM MF10 01A Provide first aid*.
  - TDM MF11 01A Survive at sea in the event of vessel abandonment*.
  - TDM MF12 01A Minimise the risk of fire and maintain a state of readiness to respond to emergency situations involving fire*.
  - TDM MF39 01A Maintain running log including fuel calculations and written reports.

- L Human Resources:
  - TDM ML2 01A Contribute to effective human relationships on board a vessel*.

- R Carry Out Operations on Equipment and Systems:
  - TDM MR18 01A Operate deck machinery installed on a small vessel.
  - TDM MR19 01A Safely handle and stow explosive and flammable materials.
  - TDM MR30 01A Operate and carry out basic service checks on small vessel marine propulsion systems.
  - TDM MR31 01A Operate and carry out basic servicing on auxiliary systems.
  - TDM MR32 01A Operate and carry out basic routine servicing of marine extra low and low voltage electrical systems.

- U Environment:
  - TDM MU4 01A Ensure compliance with pollution prevention measures.

Requirements for completion of the Qualification:

A successful assessment outcome of 8 pre sea entry level units (identified by asterisks above) and 9 units chosen from above and/or relevant cross industry units listed in the rear of this Training Package. When packaged together these units need to provide a coherent qualification, inclusive of the competencies necessary to fulfill occupational and regulatory requirements. Where certification through a marine authority is also to be sought, the selection should include all of the units related to certification requirements.

This includes the mandatory pre-sea unit requirements shown by an asterisk in the table above.

TDM 302 01 Certificate III in Transport and Distribution.
(Marine Engine Driving).
Characteristics of the Qualification.

Title: Certificate III in Transport and Distribution (Marine Engine Driving).

Rationale:

A qualification for the Maritime sector of the Transport and Distribution. Successful completion will require competency in units that relate to work defined as aligned at AQF Level 3.
"Performance of a defined range of skilled operations, usually within a range of broader related activities involving known routines, methods and procedures, where some discretion and judgement is required in the selection of equipment, services or contingency measures and within known time constraints. Applications may involve some responsibility for others. Participation in teams including group or team coordination may be involved."

Qualification Contents:

- B Equipment Checking and Maintenance:
  - TDM MB29 01A Recognise and correct deteriorated fittings and machinery.

- E Communications:
  - TDM ME1 01A Understand orders and be understood in relation to shipboard duties*.

- F Operational Quality and Safety:
  - TDT MF7 01A Observe safe working practices *.
  - TDM MF8 01A Comply with emergency procedures*.
  - TDM MF9 01A Fight and extinguish fires*.
  - TDM MF10 01A Provide first aid*.
  - TDM MF11 01A Survive at sea in the event of vessel abandonment*.
  - TDM MF12 01A Minimise the risk of fire and maintain a state of readiness to respond to emergency situations involving fire*.
  - TDM MF27 01A Prevent, control and fight fires on board a small vessel.
  - TDM MF40 01A Carry out basic operational engineering calculations.
  - BSXFMI409A Implement and monitor continuous improvement systems and processes.
  - BSXFMI306A Manage workplace information.

- L Human Resources:
  - TDM ML2 01A Contribute to effective human relationships on board a vessel*.
  - TDM ML3 01A Establish and maintain a harmonious workplace environment.
  - BSXFMI304A Participate in, lead and facilitate work teams.

- R Carry Out Operations on Equipment and Systems.
  - TDM MR19 01A Safely handle and stow explosive and flammable materials.
  - TDM MR27 01A Operate and maintain marine internal combustion engines on vessels of 750 kW propulsion power or less.
  - TDM MR28 01A Operate and maintain auxiliary systems on vessels up to 750 kW propulsion power.
  - TDM MR29 01A Operate and maintain marine low and medium voltage electrical systems.

- U Environment :
  - TDM MU4 01A Ensure compliance with pollution prevention measures.

Requirements for completion of the Qualification:

A successful assessment outcome of 8 pre sea entry level units (identified by asterisks above) and 13 units chosen from above and/or relevant cross industry units listed in the rear of this Training Package. When packaged together these units need to provide a coherent qualification, inclusive of the competencies necessary to fulfill occupational and regulatory requirements. Where certification through AMSA or another marine authority is also to be sought, the selection should include all of the units related to certification requirements. This includes the mandatory pre-sea unit requirements shown by an asterisk in the table above.

TDM 402 01 Certificate IV in Transport and Distribution (Marine Engineering).
Characteristics of the Qualification.

Title: Certificate IV in Transport and Distribution (Marine Engineering).

Rationale:

A management qualification for the Maritime sector of the Transport and Distribution Industry. Successful completion will require competency in units that relate to work defined as aligned at AQF Level 4. "Performance of a broad range of skilled applications including requirements to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills. Applications involve responsibility for, and limited organisation of, others." Qualification Contents:

- B Equipment Checking and Maintenance:
  - TDM MB31 01A Organise maintenance and repairs on a small vessel.
  - TDM MB35 01A Employ Damage Control techniques for hull damage.
  - TDM MB37 01A Fabricate simple shipboard components.
  - TDM MB38 01A Dismantle, inspect, repair and reassemble vessel machinery.

- E Communications:
  - TDM ME1 01A Understand orders and be understood in relation to shipboard duties*.

- F Operational Quality and Safety:
  - TDM MF4 01A Maintain the operational condition of life-saving, fire-fighting and other safety systems.
  - TDM MF5 01A Develop emergency and damage control plans and handle emergency situations.
  - TDM MF7 01A Observe safe working practices*.
  - TDM MF8 01A Comply with emergency procedures*.
  - TDM MF9 01A Fight and extinguish fires*.
  - TDM MF10 01A Provide first aid*.
  - TDM MF11 01A Survive at sea in the event of vessel abandonment*.
  - TDM MF12 01A Minimise the risk of fire and maintain a state of readiness to respond to emergency situations involving fire*.
  - TDM MF13 01A Manage fire fighting and prevention activities.
  - TDM MF18 01A Apply medical first aid on board a vessel.
  - TDM MF19 01A Operate lifesaving appliances.
  - TDM MF27 01A Prevent, control and fight fires on board a small vessel.
  - TDM MF38 01A Establish engine room watchkeeping procedures on vessels of less than 3,000 propulsion power.
  - TDM MF41 01A Carry out engineering calculations related to maintenance and operations.
  - BSXFMI405A Manage operations to achieve planned outcomes.
  - BSXFMI406A Manage workplace information.
  - BSXFMI409A Implement and monitor continuous improvement systems and processes.
  - BSXFMI410A Facilitate and capitalise on change and innovation.

- L Human Resources:
  - TDM ML2 01A Contribute to effective human relationships on board a vessel*.
  - BSXFMI404A Participate in, lead and facilitate work teams.
  - BSXFMI403A Establish and manage effective workplace relationships.

- N Assessment:
  - BSZ402A Conduct assessment:

- R Carry Out Operations on Equipment and Systems:
  - TDM MR19 01A Safely handle and stow explosive and flammable materials.
  - TDM MR21 01A Operate and maintain engines, machinery and auxiliary power sources on vessels of less than 3,000 propulsion power.
  - TDM MR22 01A Operate and maintain boiler systems.

o TDM MR23 01A Operate and maintain batteries, starter motors and power distribution systems.
o TDM MR24 01A Operate and marine internal combustion engines and propulsion transmission systems.
o TDM MR25 01A Operate and maintain auxiliary machinery systems, including steering gear and refrigeration systems.
o TDM MR26 01A Test, maintain and operate marine electrical and control equipment.
o MEM 18.1 A Use hand tools.
o MEM 18.2 A Use power tools/hand held operations.
o MEM 5.1 A Manual soldering/desoldering electrical. electronic components.
o MEM 5.4 A Perform routine oxyacetylene welding (fuel gas welding).
o MEM 5.6 A Perform brazing and/or silver soldering.
o MEM 5.7 A Manual heating thermal cutting and gouging.
o MEM 5.15 A Weld using manual metal arc welding process.
o MEM 7.5 A Perform general machining.

Requirements for completion of the Qualification:

A successful assessment outcome of 8 pre sea entry level units (identified by asterisks above) and 17 units chosen from above and/or relevant cross industry units listed in the rear of this Training Package. When packaged together these units need to provide a coherent qualification, inclusive of the competencies necessary to fulfill occupational and regulatory requirements. Where certification through AMSA or another marine authority is also to be sought, the selection should include all of the units related to certification requirements. This includes the mandatory pre-sea unit requirements shown by an asterisk in the table above.

TDM 502 01 Diploma of Transport and Distribution (Marine Engineering).
Characteristics of the Qualification.

Title: Diploma of Transport and Distribution (Marine Engineering):

Rationale:

An operational qualification for the Maritime sector of the Transport and Distribution Industry. Successful completion will require competency in units that relate to work defined as aligned at AQF Level 5.
"The self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others. Applications involve participation in development of strategic initiatives, as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned with planning and evaluation functions. Group or team coordination and management may be involved.

Qualification Contents:

• A Handling Cargo and Vessel Stability:
o TDM MA10 01A Control trim, stability and stress

• B Equipment Checking and Maintenance:
o TDM MB4 01A Maintain seaworthiness of vessel.
o TDM MB12 01A Fault-find, dismantle, maintain and repair shipboard plant and equipment.
o TDM MB13 01A Carry out shipboard fabrication and repair operations.
o TDM MB15 01A Detect and identify the cause of machinery malfunctions and repair faults on vessels over 750 kW of propulsion power.

o TDM MB16 01A Organize safe maintenance and repair procedures on vessels over 750 kW of propulsion power.
o TDM MB17 01A Test, detect faults and maintain and restore electrical/electronic control equipment to operating condition on vessels over 750 kW of propulsion power.

• E Communications:
o TDM ME1 01A Understand orders and be understood in relation to shipboard duties*.
o TDM ME7 01A Use English in written and oral form to perform engineering duties.

• F Operational Quality and Safety:
o TDM MF3 01A Monitor compliance with legislative requirements and measures to ensure safety of life at sea.
o TDM MF4 01A Maintain the operational condition of life-saving, fire-fighting and other safety systems.
o TDM MF5 01A Develop emergency and damage control plans and handle emergency situations.
o TDT MF7 01A Observe safe working practices*.
o TDM MF8 01A Comply with emergency procedures*.
o TDM MF9 01A Fight and extinguish fires*.
o TDM MF10 01A Provide first aid*.
o TDM MF11 01A Survive at sea in the event of vessel abandonment*.
o TDM MF12 01A Minimise the risk of fire and maintain a state of readiness to respond to emergency situations involving fire*.
o TDM MF 13 01A Manage marine fire-fighting and prevention activities.
o TDM MF 14 01A Plan and implement special safety, maintenance and emergency procedures for liquefied gas tankers.
o TDM MF 15 01A Plan and implement special safety, maintenance and emergency procedures for chemical tankers.
o TDM MF 16 01A Plan and implement special safety, maintenance and emergency procedures for oil tankers.
o TDM MF18 01A Apply medical first aid on board a vessel.
o TDM MF19 01A Operate lifesaving appliances.
o TDM MF20 01A Prevent, control and fight fires on board a vessel.
o TDM MF22 01A Maintain safety of engine equipment, systems and services on vessels of unlimited propulsion power.
o TDM MF24 01A Maintain safety of engine equipment, systems and services on vessels over 750 kW of propulsion power.
o TDM MF25 01A Ensure safe working practices.
o TDM MF26 01A Establish watch keeping arrangements and procedures.
o TDM MF31 01A Maintain a safe engineering watch.
o TDM MF37 01A Manage vessel operations.
o BSXFMI505A Manage operations to achieve planned outcomes.
o BSXFMI506A Manage workplace information.
o BSXFMI509A Implement and monitor continuous improvement systems and processes.
o BSXFMI510A Facilitate and capitalise on change and innovation.

• L Human Resources:
o TDM ML1 01A Organise and manage the crew.
o TDM ML2 01A Contribute to effective human relationships on board a vessel*.
o BSXFMI504A Participate in, lead and facilitate work teams.
o BSXFMI503A Establish and manage effective workplace relationships.

• N Assessment:
o BSZ503A Design and establish the assessment system.
o BSZ402A Conduct assessment.

• R Carry Out Operations on Equipment and Systems:
○ TDM MR9 01A Operate alternators, generators and control systems to supply shipboard electrical power.
○ TDM MR10 01A Operate pumping systems and associated control systems.
○ TDM MR11 01A Operate main and auxiliary machinery and associated control systems.
○ TDM MR13 01A Operate electrical/electronic control equipment on vessels over 750 kW of propulsion power.
○ TDM MR14 01A Manage fuel and ballast operations on vessels over 750 kW of propulsion power.
○ TDM MR15 01A Operate, monitor and evaluate engine performance on vessels over 750 kW of propulsion power.
○ TDM MR16 01A Plan and schedule operations on vessels over 750 kW of propulsion power.
○ TDM MR17 01A Start up and shut down main propulsion and auxiliary machinery and associated systems on vessels over 750 kW of propulsion power.
○ MEM 18.1 A Use hand tools.
○ MEM 18.2 A Use power tools/hand held operations.
○ MEM 5.1 A Manual soldering/desoldering electrical, electronic components.
○ MEM 5.4 A Perform routine oxyacetylene welding (fuel gas welding).
○ MEM 5.6 A Perform brazing and/or silver soldering.
○ MEM 5.7 A Manual heating thermal cutting and gouging.
○ MEM 5.15 A Weld using manual metal arc welding process.
○ MEM 7.5 A Perform general machining.

• U Environment:
○ TDM MU1 01A Monitor compliance with legislative requirements and measures to ensure protection of the marine environment.
○ TDM MU4 01A Ensure compliance with pollution prevention measures.

Requirements for completion of the Qualification:

A successful assessment outcome of 8 pre sea entry level units (identified by asterisks above) and 20 units chosen from above and/or relevant cross industry units listed in the rear of this Training Package. When packaged together these units need to provide a coherent qualification, inclusive of the competencies necessary to fulfill occupational and regulatory requirements.

Where certification through AMSA is also to be sought, the selection should include all of the units related to certification requirements. This includes the mandatory pre-sea unit requirements shown by an asterisk in the table above.

BSZ503A Design and Establish the Assessment System can only be undertaken if the BSZ40198 Certificate IV in Assessment and Workplace Training or equivalent has been completed.

Canada:

Marine Engineering Mechanic:

Marine Engineering Mechanics operate and monitor the correct operation of a ship's mechanical equipment. The mechanical systems for which they are responsible are diverse and complex. Under supervision, they inspect, test, maintain, repair, modify and install equipment associated with the trade. The ability to perform as a member of a tactical team, to understand directions, to react quickly, and to cope with unfamiliar situations is essential. Initiative and dependability are necessary attributes, as is the willingness to work for extended periods to complete a given job.

Marine Engineering Mechanics monitor correct operation and assist with maintenance of:

- Main and auxiliary high-pressure boilers.
- Diesel and gas turbine propulsion engines.
- Hydraulic, mechanical and electrical control systems used in monitors, alarms, helicopter haul-down and replenishment-at-sea equipment.
- Refrigeration and air conditioning equipment.
- Ship's steering equipment.
- The systems that produce the ship's domestic and boiler feed water.
- Filling and transfer systems for water, fuels and lubricants.
- Complete departmental records and maintenance reports.
- Complete administration required for obtaining, storing and disposing of supplies and hazardous materials used by the trade.

Training:

Training begins with a Basic Military Qualification (BMQ) which provides the basic core skills and knowledge common to all trades. Apart from Canadian Navy specific input, the course covers the following topics:

- Basic safety.
- First aid.
- Personal survival in nuclear, biological and chemical conditions.
- Handling and firing personal weapons.
- Cross-country navigation, and
- Personal survival in field conditions.

On completion of the BMQ, Marine Engineering Mechanics attend Naval Environmental Training which includes:

- Naval history and organization.
- Shipboard fire-fighting and damage control.
- Watchkeeping duties.
- Seamanship.

The second portion of the training includes the following:

- Common engineering practices and publications.
- Liquid contamination detection.
- Safe working attitudes and practices.
- Machinery lubrication.
- Use of hand tools.
- Maintenance of valves and gaskets.
- Systems familiarization.

Training is continued through on-the-job training onboard ship.

Advanced and Specialty Training:

Personnel who demonstrate the desire and possess the prerequisite qualifications may be selected for advanced specialty training as they progress in their careers. Below are examples of training related to this Military Occupational Training.
- Journeyman Occupation Training Courses.
- Preventive and Corrective Maintenance Techniques.
- Auxiliary and Propulsion Machinery Operator Certification.
- Specialty Training Courses.

- Submarines.
- Ship's Diver.
- Instructional Techniques.
- Gas Turbine Heavy Maintenance.
- Heavy Diesel Maintenance-specific to shipboard models.
- Integrated Machinery Control System Technician Training (IMCS).
- Diesel Inspector.
- Non-destructive Testing Techniques.
- Helicopter Haul-down and Fuelling Training.
- Machinist Specialist.
- Career Development.

Marine Engineering Mechanics have opportunity for career progression and advanced training courses. At various stages throughout their career, they must obtain Marine Engineering operating certificates, which reflect and assure a competent level of watchkeeping and technical ability.

Indian Navy:

The Indian Navy allows for a stepped progression through the engineering ranks as described below:

Direct Entry Engineering Mechanic Course:
Aim of Course:

- Ab-initio course.
- To train matriculate sailors as engineering mechanics.

Pre Course Requirement:

- Should have qualified on the entry exam.
- Should be matriculate with 55% aggregate marks or more.

Duration:

- 28 weeks.

Post Course Recommendations:

- Be employed on board ships for watch keeping on Auxiliary machinery such as shafting, steering gear etc. and also be an able mate for Engineering Rating.

Leading Engineering Mechanic Course:
Aim of Course:

- Promotion for Leading Engineering Mechanic rank.

Pre Course Requirement:

- Should have qualified Auxiliary watchkeeping certificate.

Duration:

- 11 weeks.

Post Course Recommendations:

• Be employed on board ships for performing independent watchkeeping on Auxiliary machinery.

Mechanician IV Class Course:

Aim of Course:

• Ab-initio course for mechanicians.
• To train engineering mechanic for artificers cadre.

Pre Course Requirement

• Should have scored 70% marks or above in previous courses.

Duration:

• 110 weeks.

Post Course Recommendations:

• Be employed on board ships for operation, maintenance and defect rectification on all main/auxiliary machinery.

Chief Engineering Mechanic Course:

Aim of Course:

• As a pre requisite for promotion for the rank of Chief Engineering Mechanic.
• As a refresher course to update knowledge on main propulsion machinery, auxiliaries, NBCD, technical administration and ship control systems etc. Also to give fresh inputs on latest development in the field of marine engineering.

Duration:

• 6 weeks.

Post Course Recommendations:

• Be employed for carrying out duties as chief regulator.
• Be employed for performing independent watch keeping of all machinery onboard.

Conclusion:

This qualification meets the STCW Code requirements, as well as the SAMSA requirements for qualification. The additional competences meet other requirements specific to the Navy rather than civilian needs. Overall, the qualification is consistent with training provided for commercial engineering watchkeepers and Navy watchkeepers internationally.

ARTICULATION OPTIONS
Possibilities for articulation outside of marine engineering include qualifications in the following areas:

Horizontal Articulation:

• ID 58270: Further Education and Training Certificate: Electro-Mechanics, NQF Level 4, 171 Credits.
• ID 58721: Further Education and Training Certificate: Engineering Fabrication, NQF Level 4, 141 Credits.
• ID 59709: Further Education and Training Certificate: Mechanical Engineering: Fitting NQF Level 4, 120 Credits.

Vertical Articulation:

• ID 58883: National Certificate: Fluid Power, NQF Level 5, 129 Credits.

MODERATION OPTIONS
• Providers offering learning towards achievement of any of the unit standards that make up this qualification must be accredited through the relevant ETQA. Accredited providers must establish moderation procedures and systems in line with the requirements of the ETQA.

• Internal moderation of assessment must take place at the point of assessment with external moderation or verification being provided by the relevant ETQA. External moderators should provide reports not only on the fairness and consistency of assessment, but also on the validity of the assessment design in terms of the specified outcomes.

CRITERIA FOR THE REGISTRATION OF ASSESSORS
Anyone assessing learners against this qualification must be registered as an assessor with the relevant ETQA. The following criteria are specified for assessors of this qualification:

• Be registered as an assessor with the relevant ETQA.
• Be in possession of a similar qualification at NQF Level 5 or higher.
• Have a minimum of 3 years experience in the field of marine engineering.

NOTES
Where SAMSA accreditation is required, the following particular issues should be taken into consideration:

SAMSA Assessment procedure:

• Every candidate for the issue of a certificate of competency as deck or engineer officer must be assessed at one or more of the following levels:
o Level 1; this assessment is carried out during qualifying service on a ship and involves the practical demonstration that the required level of competency has been reached or during training at an accredited institution, and must be carried out aboard ship by one or more designated ship's officers and ashore by one or more assessors.
o Level 2; this assessment is carried out during qualifying service on a ship or during training at an accredited training institution, and must be carried out by an assessor.
o Level 3; this assessment is carried out by an examiner and an assessor when a candidate presents himself or herself for oral examination.
• All units of competency that are to be assessed at Level 1 or 2 must be indicated in the training record book issued to the candidate.
• Only an assessor may sign off a unit of competency in the candidate's training record book when the candidate is considered to be ready for the next level of assessment (if any) and has successfully demonstrated competency in the unit as specified in the Code for South African Maritime Qualifications (the Code).

Assessors:

Every person who, whether on or off a ship, conducts in-service assessment of a candidate for the purposes of certification must:

- Have an appropriate level of knowledge and understanding of the competency to be assessed.
- Have proof of being qualified in the activities for which the assessment is being made.
- Have proof of having received appropriate guidance in assessment methods and practices.
- Have gained appropriate experience.

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
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	12153	Use the writing process to compose texts required in the business environment	Level 4	5
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	5
Core	376240	Carry out Class C scheduled maintenance activities on board a SA navy vessel	Level 4	4
Core	376261	Carry out chief of the watch duties in the engine room of a SA navy vessel	Level 4	10
Core	376243	Combat fire and flood while on watch	Level 4	4
Core	376242	Conduct engineering trials on a vessel	Level 4	4
Core	376241	Conduct fabrication and repair operations on ships	Level 4	6
Core	376263	Conduct personnel management functions for a team on a SA Navy vessel	Level 4	4
Core	376264	Dismantle, repair and assemble shipboard plant	Level 4	4
Core	376262	Ensure compliance with maritime pollution prevention requirements	Level 4	4
Core	376260	Implement safe work procedures for engineering work on a vessel	Level 4	4
Core	376246	Operate equipments to provide electrical power to seal a vessel	Level 4	4
Core	376265	Operate propulsion machinery and associated control systems.	Level 4	4
Core	376244	Operate pumping and associated control systems	Level 4	4
Elective	335856	Change and set tooling	Level 4	15
Elective	335863	Identify and solve problems pertaining to production machines	Level 4	15
Elective	335875	Implement and maintain business processes	Level 4	8

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Carry out Class C scheduled maintenance activities on board a SA navy vessel

SAQA US ID	*UNIT STANDARD TITLE*		
376240	Carry out Class C scheduled maintenance activities on board a SA navy vessel		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 knowledge of the naval maintenance documentation system.

SPECIFIC OUTCOME 2
Plan maintenance for South African Navy Vessels.

SPECIFIC OUTCOME 3
Conduct planned maintenance.

SPECIFIC OUTCOME 4
Evaluate and report on maintenance activities.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Conduct fabrication and repair operations on ships

SAQA US ID	*UNIT STANDARD TITLE*		
376241	Conduct fabrication and repair operations on ships		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	6

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 knowledge of operations that can be performed on board.

SPECIFIC OUTCOME 2
Demonstrate knowledge of special tools required for marine machinery and equipment.

SPECIFIC OUTCOME 3
Fabricate parts required to repair marine machinery and equipment.

SPECIFIC OUTCOME 4
Repair marine machinery and equipment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Conduct engineering trials on a vessel

SAQA US ID	*UNIT STANDARD TITLE*		
376242	Conduct engineering trials on a vessel		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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
Conduct installation inspections.

SPECIFIC OUTCOME 2
Set equipment to design specifications.

SPECIFIC OUTCOME 3
Conduct harbour acceptance trials.

SPECIFIC OUTCOME 4
Conduct sea acceptance trials.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Combat fire and flood while on watch

SAQA US ID	*UNIT STANDARD TITLE*		
376243	Combat fire and flood while on watch		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 fire hazards.

SPECIFIC OUTCOME 2
Identify and use precautions against flooding.

SPECIFIC OUTCOME 3
Conduct safe engineering practices to reduce the risk of fire and flood.

SPECIFIC OUTCOME 4
React to emergencies.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Operate pumping and associated control systems

SAQA US ID	*UNIT STANDARD TITLE*		
376244	Operate pumping and associated control systems		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 knowledge of the working principles of pumping and control systems.

SPECIFIC OUTCOME 2
Start and shut down pump and control systems.

SPECIFIC OUTCOME 3
Operate pump and control systems.

SPECIFIC OUTCOME 4
Conduct preventative maintenance and servicing of pumps.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Operate equipments to provide electrical power to seal a vessel

SAQA US ID	*UNIT STANDARD TITLE*		
376246	Operate equipments to provide electrical power to seal a vessel		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 knowledge of electrical power generation on a vessel.

SPECIFIC OUTCOME 2
Prepare to operate electrical generation equipment.

SPECIFIC OUTCOME 3
Operate electrical generation equipment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Implement safe work procedures for engineering work on a vessel

SAQA US ID	*UNIT STANDARD TITLE*		
376260	Implement safe work procedures for engineering work on a vessel		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 knowledge of safe work procedures.

SPECIFIC OUTCOME 2
Develop safe working procedures.

SPECIFIC OUTCOME 3
Communicate safe work procedures.

SPECIFIC OUTCOME 4
Confirm safe work procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Carry out chief of the watch duties in the engine room of a SA navy vessel

SAQA US ID	*UNIT STANDARD TITLE*		
376261	Carry out chief of the watch duties in the engine room of a SA navy vessel		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	10

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
Relieve and handover an engineering watch.

SPECIFIC OUTCOME 2
Perform the duties of the chief of the watch.

SPECIFIC OUTCOME 3
Carry out routine duties required during a watch.

SPECIFIC OUTCOME 4
Manage and perform safety and emergency procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Ensure compliance with maritime pollution prevention requirements

SAQA US ID	*UNIT STANDARD TITLE*		
376262	Ensure compliance with maritime pollution prevention requirements		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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
Describe precautions to take in order to prevent pollution to the marine environment.

SPECIFIC OUTCOME 2
Take effective action in the event of a pollution emergency.

SPECIFIC OUTCOME 3
Implement pollution prevention measures during bunkering operations.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Conduct personnel management functions for a team on a SA Navy vessel

SAQA US ID	***UNIT STANDARD TITLE***		
376263	Conduct personnel management functions for a team on a SA Navy vessel		
ORIGINATOR		***PROVIDER***	
TT - Sovereignty of the State			
FIELD		***SUBFIELD***	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	4

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
Conduct induction of new employees to the workplace.

SPECIFIC OUTCOME 2
Administer leave benefits.

SPECIFIC OUTCOME 3
Administer personnel requests and statements.

SPECIFIC OUTCOME 4
Manage grievances in the workplace.

SPECIFIC OUTCOME 5
Provide assistance on social welfare issues.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Dismantle, repair and assemble shipboard plant

SAQA US ID	*UNIT STANDARD TITLE*		
376264	Dismantle, repair and assemble shipboard plant		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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
Dismantle shipboard plant.

SPECIFIC OUTCOME 2
Repair components.

SPECIFIC OUTCOME 3
Assemble shipboard plant.

SPECIFIC OUTCOME 4
Complete the process and report results.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Operate propulsion machinery and associated control systems.

SAQA US ID	*UNIT STANDARD TITLE*		
376265	Operate propulsion machinery and associated control systems.		
ORIGINATOR		*PROVIDER*	
TT - Sovereignty of the State			
FIELD		*SUBFIELD*	
8 - Law, Military Science and Security		Sovereignty of the State	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	4

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 knowledge of the working principles of main propulsion and auxiliary machinery.

SPECIFIC OUTCOME 2
Start and shut down main and auxiliary machinery and systems.

SPECIFIC OUTCOME 3
Operate main and auxiliary propulsion machinery.

SPECIFIC OUTCOME 4
Optimise output of propulsion machinery.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	77983	Further Education and Training Certificate: Engineering Watchkeeping	Level 4