National Unit Specification: general information

UNIT Small Boat Engineering (SCQF level 5)

CODE F8KR 11

SUMMARY

This Unit is a mandatory Unit in the SCQF level 5 Maritime Skills Course and has been designed to be taken as part of that Course. The Unit may be offered as a free-standing Unit.

It is intended for candidates who wish to develop generic employability skills which are valued by all employers and vocational skills relevant to a career in the Maritime sector. This Unit introduces candidates to the basic engineering involved in small boats, for example: the construction of boats, the boat's method of propulsion, the steering of the boat, the types of engine, the differences between diesel fuel oil and petrol fuel oil, the uses and differences of hydraulic oil and lubricating oil and the routine care and maintenance of engine and auxiliaries on a boat. This Unit has been designed for candidates in S3 or above but may also be suitable for other candidate groups.

OUTCOMES

1 Investigate basic engineering and maintenance involved in small boats.
2 Present information on the basic engineering involved in small boats to a given brief.
3 Perform a routine maintenance task for the engine of a small boat.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

CREDIT VALUE

0.5 credit at SCQF level 5 (3 SCQF credit points at SCQF level 5*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Administrative Information

Superclass: FK

Publication date: February 2010

Source: Scottish Qualifications Authority

Version: 01

National Unit Specification: general information (cont)

UNIT Small Boat Engineering (SCQF level 5)

CORE SKILLS

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit Specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

National Unit Specification: statement of standards

UNIT Small Boat Engineering (SCQF level 5)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME 1

Investigate basic engineering and maintenance involved in small boats.

Performance Criteria

(a) Gather information on different methods and materials for the construction of small boats.
(b) Gather information on steering systems and pumping equipment in small boats.
(c) Gather information on the means of propulsion and the working cycles of engines used in small boats.
(d) Gather information on the maintenance of engines in small boats.

OUTCOME 2

Present information on the basic engineering involved in small boats to a given brief.

Performance Criteria

(a) Plan the presentation in line with the given brief.
(b) Select appropriate information as detailed in the plan.
(c) Present the information in accordance with the plan.
(d) Complete the presentation within deadlines set out in the brief.

OUTCOME 3

Perform a routine maintenance task for the engine of a small boat.

Performance Criteria

(a) Check the oil level in a small boat engine.
(b) Select the correct fluid to top up the engine.
(c) Top up the oil to the correct level.
(d) Follow all the Health and Safety guidelines throughout the maintenance task.

National Unit Specification: statement of standards (cont)

UNIT Small Boat Engineering (SCQF level 5)

EVIDENCE REQUIREMENTS FOR THIS UNIT

Performance evidence and written/oral evidence is required to show that all Outcomes and Performance Criteria have been achieved.

Performance and product evidence will be supported by assessor checklists. The performance evidence will be generated from practical activities carried out under supervised conditions at the required safety standards.

The evidence may be gathered at different points throughout the Unit.

Outcomes 1 and 2 — Folio

Candidates will investigate independently, to a given brief, the basic engineering and maintenance involved in small boats in supervised conditions. Resources may be shared but candidates must gather information individually. The information gathered will be contained in a folio and progress discussed with the teacher/lecturer at an appropriate point during the investigation to ensure the folio is the candidate's own work. A record of the discussion should be retained.

Candidates will be given a clear investigation brief informing them that the evidence for the folio must cover:

- two materials used for constructing a boat from: wood, steel, glass reinforced plastic and moulded rubber boat.
- two basic methods of joining and fabricating different construction materials from welding for steel, riveting where two different metals are used, wooden wedges or carvel built wooden boats, mould fabrication for GRP and inflatable rubber boats.
- basic steering systems and their maintenance — the basic outboard steering and one plunger hydraulic system.
- The importance of keeping a vessel free of water and means of removal from the vessel.
- the means of propulsion of two different small boats.
- identification of the parts of engine and propulsion system. The basic parts to include piston, connecting rod, crank shaft, cylinder head, oil sump, exhaust and air inlet. This could be on, for example, a drawing or labelled picture.
- the basic differences between diesel and petrol engine with regard to principle of working.
- the working cycle of a two stroke and a four stroke engine. This could be, for example, in the form of block diagrams.
- the importance of and reason for lubricating and cooling the engine.
- the purpose of filtering of air and oil in the system.

Using the information gathered candidates will plan a presentation, select information and present the information in accordance with the plan. Candidates will be given a clear presentation brief with given timescales informing them that the evidence for the Outcome must include:

- a written plan of how they will present the information.
- written and/or oral presentation on one of the following topics:
  - the construction of a small boat
  - the steering systems and pumping equipment in small boats
  - the means of propulsion and the working cycles of engines used in small boats.

Candidates should be provided with a template to aid the planning process. The evidence may be in the form of, for example, a written and/or oral report, an information leaflet, poster or audio-visual / electronic presentation.

Outcome 3 — Performance evidence

Candidates will be required to demonstrate by practical activity on a minimum of one occasion that they are able to:

- select the correct fluid for a given engine from: diesel oil, petrol, hydraulic oil and lubricating oil.
- check the oil level in an engine and top it up to the correct level.
- follow the correct safety procedures before attempting to fill/top up oil/water for cooling system and throughout the activity.

An assessor observation checklist must be retained to provide evidence of performance for Outcome 3.

The National Assessment Bank (NAB) pack provided for this Unit illustrates the standard that should be applied. It includes an example Folio brief, presentation brief, an assessor checklist and an observation checklist. Centres wishing to design and develop their own assessments for this Unit, they should be of a comparable standard, and should refer to the NAB for verification prior to use. It is recommended that these are submitted to SQA for approval.

National Unit Specification: support notes

UNIT Small Boat Engineering (SCQF level 5)

This part of the Unit Specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit introduces candidates to the basic engineering involved in small boats, for example: the construction of small boats, the boat's method of propulsion, the steering of the boat, the types of engine, the differences between diesel fuel oil and petrol fuel oil, the uses and differences of hydraulic oil and lubricating oil and the routine care and maintenance of engine and auxiliaries on a boat. For the purpose of this Unit, a small boat is classified as, for example a small fishing or ferry boat, a rubber inflatable boat (RIB), a yacht.

During this Unit, in addition to the specific vocational skills developed and assessed, candidates will be given an opportunity to develop the following employability skills:

- positive attitude and willingness to learn*
- maintaining good timekeeping and attendance
- communication skills *
- ability to follow instructions*
- working cooperatively with others
- working to agreed deadlines*
- showing respect and consideration for others
- flexibility and adaptability
- safe and appropriate handling of equipment*
- awareness of health and safety *
- understanding of personal survival techniques
- fire safety awareness
- confidence to seek feedback
- reflecting on own performance
- review and self-evaluation skills
- understanding of the workplace*

Development in a number of these employability skills (those marked with an asterisk *) will be clearly identified as a result of evidence generated through the assessment activities for this Unit. There are opportunities in the Unit to develop the remaining skills.

National Unit Specification: support notes (cont)

UNIT Small Boat Engineering (SCQF level 5)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The content of the Unit may be illustrated with drawings, diagrams and pictures of different parts of engines and boat construction, however the use of actual engines and boat models to explain the different methods and materials for construction of a boat, the parts of an engine, steering systems and pumping arrangements and the means of propulsion would enhance the delivery of the Unit. The use of various software based animated programmes to demonstrate the working of different types of engines would aid an understanding for Outcome 3. Videos may also be used to introduce the requirements for maintenance of an engine however candidates are required to be able to check oil levels in an engine and to demonstrate the correct safety procedures before attempting to maintain a cooling system. Candidates should be able to distinguish between petrol, diesel oil, hydraulic oil and lubricating oil for the purposes of maintenance of an engine.

Small boat visits could be arranged for a physical demonstration of propulsion and steering system, which may include a small manoeuvre if practicable safely. Both manual and battery powered self starting procedures of the engine should be explained and demonstrated.

Visits to boat building yards and/or the video demonstration of construction of a boat will aid the understanding of Outcome 1.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

During the production of the folio of evidence there may be opportunities to develop aspects of the Core Skill of *Communication*. While completing the practical activity for Outcome 3 there may be opportunities to develop aspects of the Core Skill of *Problem Solving*.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Evidence that covers all the Outcomes and Performance Criteria is required. This should take the form of written and/or oral recorded evidence and performance evidence.

Evidence Requirements are fully expressed in the mandatory section of this Unit Specification.

Outcomes 1 and 2 — Folio

Candidates must be given a clear brief with time scales for completion to ensure that all the Evidence Requirements are understood by the candidate. The folio must cover all the Evidence Requirements specified. A template for the plan of the presentation should be given to the candidates to ensure all aspects of planning are covered. The candidate's presentation may take the form of a written and/or oral report, an information leaflet, a poster or Audio-visual / electronic presentation. Oral evidence must be supported by an assessor checklist.

Outcome 3 — Performance evidence

The practical activity used must enable a candidate to demonstrate that they can check the oil level in an engine, select the correct fluid by distinguishing between diesel oil, petrol, hydraulic oil and lubricating oil and employ the correct safety procedures when attempting to fill/top up oil/water for a cooling system in an engine. A checklist must be used and retained by the assessor to record the observation of performance of the candidate.

The Candidate Review for Outcome 3 of *Employability Skills and Careers in the Maritime Sector* (SCQF level 5) could be integrated with the assessment of this Unit, if candidates are taking it as part of the Maritime Skills (SCQF level 5) Course.

Written and/or recorded oral evidence, assessor checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

The National Assessment Bank (NAB) pack provided for this Unit illustrates the standard that should be applied. It includes a folio brief, an assessor checklist and an observation checklist. Centres wishing to design and develop their own assessments for this Unit, they should be of a comparable standard, and should refer to the NAB for verification prior to use. It is recommended that these are submitted to SQA for approval.

DISABLED CANDIDATES AND/OR THOSE WITH ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**