



Higher National Unit specification: general information

Unit title: Marine Engineering: Auxiliary Systems

Unit code: FT29 34

Superclass: XQ

Publication date: August 2011

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to provide the under-pinning knowledge to enable candidates to acquire the standards of competency for officers in charge of an engineering watch under the Standards of Training, Certification and Watchkeeping 95 Convention.

On completion of the Unit the candidate should be able to:

- 1 Explain marine auxiliary equipment.
- 2 Explain the operational procedures, operational problems and maintenance of marine auxiliary equipment.

Recommended prior knowledge and skills

Candidates should have completed the NQ Unit Marine Engineering Practice: An Introduction (F9K6 12) at SCQF level 6. Candidates could also have had some relevant industrial experience within a marine environment.

Credit points and level

- 1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**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.*

Higher National Unit specification: general information (cont)

Unit title: Marine Engineering: Auxiliary Systems

Core Skills

There are opportunities to develop the Core Skills of *Communication*, *Problem Solving* and *Working with Others* at *SCQF level 6* in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment

The assessment for Outcome 1 could be a single question paper of six questions which will be answered under supervised closed-book conditions in 1hour.

Outcome 2 could be a single question paper of six questions which will be answered under supervised closed-book conditions in 1hour.

Higher National Unit specification: statement of standards

Unit title: Marine Engineering: Auxiliary Systems

Unit code: FT29 34

Assessment should be conducted under supervised and controlled conditions.

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain marine auxiliary equipment.

Knowledge and/or Skills

- ◆ Types of marine auxiliary equipment
- ◆ Layout of marine auxiliary equipment
- ◆ Operating principles of marine auxiliary equipment
- ◆ Construction of marine auxiliary equipment

Evidence Requirements

Candidates will need to provide evidence to demonstrate knowledge and/or skills for marine auxiliary equipment (air conditioning and refrigeration systems, sewage systems, electrical generation systems, freshwater generation systems, steering gear, deck and cargo handling equipment, firefighting and safety equipment, and pumps and pumping systems).

Candidates should with reference to auxiliary equipment:

- ◆ draw the layout of one type of auxiliary system
- ◆ explain the operation of one type of auxiliary system
- ◆ explain with the aid of a sketch the construction of one type of auxiliary system
- ◆ explain knowledge of fire fighting and fire detection equipment
- ◆ explain knowledge of electrical generation and distribution systems
- ◆ explain knowledge of deck and cargo handling equipment

Evidence should be generated under controlled conditions.

Assessment Guidelines

Evidence could be assessed using an assessment instrument composed of six structured questions. This assessment may last for 1 hour.

Higher National Unit specification: statement of standards (cont)

Unit title: Marine Engineering: Auxiliary Systems

Outcome 2

Explain the operational procedures, operational problems and maintenance of marine auxiliary equipment.

Knowledge and/or Skills

- ◆ Types of marine auxiliary equipment
- ◆ Operational procedures and safety regulations
- ◆ Maintenance procedures
- ◆ Pollution prevention regulations and procedures
- ◆ Testing of fire safety equipment and steering gear
- ◆ Paralleling of electrical generation plant

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills for a type of marine propulsion plant (air conditioning and refrigeration systems, sewage systems, electrical generation systems, freshwater generation systems, steering gear, deck and cargo handling equipment, fire fighting and safety equipment, and pumps and pumping systems).

Candidates should for marine auxiliary equipment:

- ◆ explain the operational procedures for one type of equipment
- ◆ explain the maintenance for one type of plant
- ◆ explain the procedures for the paralleling of electrical generating plant
- ◆ explain the testing of fire safety equipment
- ◆ explain pollution prevention procedures
- ◆ explain knowledge of pollution and safety regulations

Evidence should be generated under controlled conditions.

Assessment Guidelines

The assessment could be a single question paper consisting of six structured questions. The assessment of this Outcome may last for 1 hour.

Higher National Unit specification: support notes

Unit title: Marine Engineering: Auxiliary Systems

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 40 hours.

Guidance on the content and context for this Unit

The content of this Unit is designed to give the candidate the knowledge of the various types of propulsion plant they may come across whilst at sea.

Outcome 1 examines the construction of the different types of propulsion plant and the principles of operation. Outcome 1 also looks at the various auxiliary machinery that are required for the operation of the propulsion plant. The layout of this machinery and its interconnection with the propulsion plant will be explained.

Outcome 2 examines the procedures employed in the starting and shutdown of the various types of propulsion plant. They will also be tutored in the diagnosis of common operational faults and machinery failures and the procedures to be adopted in order to rectify the problem.

Guidance on the delivery and assessment of this Unit

Outcome 1 could consist of a single paper of six structured questions which will be assessed under closed-book supervised conditions of 1 hour duration. The questions will cover the one type of propulsion plant and will cover the construction, operation and system layout of the plant.

The question paper for Outcome 2 could consist of six questions which will be assessed under closed-book supervised conditions of 1 hour duration. The questions must cover different types of auxiliary equipment and could include procedures for paralleling, fire safety, pollution prevention demonstrate knowledge of international and national pollution and safety regulations.

Open learning

This Unit could be delivered by distance learning. However it would require planning by the centre to ensure the sufficiency and authenticity of candidate evidence. Arrangements would have to be made to ensure that assessment for the Outcomes are under controlled conditions

Higher National Unit specification: support notes (cont)

Unit title: Marine Engineering: Auxiliary Systems

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 Communication 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)*.

Opportunities for developing Core Skills

In the answering of assessment work candidates may have the opportunity to develop 'Written Communication' of the core skill Communication at SCQF level 6. The specific core skills that the candidate may have to complete are 'Present all essential ideas/information and supporting detail in a logical and effective order' and 'Use conventions which are effective in achieving the purpose of the piece and adapted as necessary for the target audience'.

In preparing for assessment work candidates may have the opportunity to develop 'Written Communication (reading)' of the core skill Communication at SCQF level 6. Candidates may have the opportunity to obtain manufacturers brochures on auxiliary equipment and this will assist develop the specific core skills 'Identify and summarise all significant information, ideas and supporting details in a complex written document'.

The presentation of problems in assessments which candidates require to interpret and work through will also develop the Critical Thinking component of Problem Solving, at SCQF level 6. This will allow candidates to develop the specific core skills 'Assess the relevance of these factors to the situation or issue' and 'Develop and justify an approach to deal with the situation or issue'.

When candidates are completing this Unit there are opportunities to reinforce theories through marine workshop sessions. Candidates may have the opportunity to develop the component 'Planning and Organising' of the core skill Problem Solving at SCQF level 6. Candidates may complete a complex task in the workshop and may have the opportunity to complete the specific core skills 'Develop a plan', 'Identify and obtain resources to carry out the plan' and 'Carry out the task'. In addition this laboratory work may allow candidates to develop the core skill of Working with Others at SCQF level 6. Candidates tasks in the workshop may assist developing the specific core skills 'Negotiate working methods' and 'Promote co-operative working with others, progress towards shared goals'.

Higher National Unit specification: support notes (cont)

Unit title: Marine Engineering: Auxiliary Systems

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

History of changes to Unit

Version	Description of change	Date

© Scottish Qualifications Authority 2011

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

General information for candidates

Unit title: Marine Engineering: Auxiliary Systems

On completion of this Unit you will have acquired knowledge of the different types of propulsion plant and their systems to be found on ships at sea.

You will have appreciation of the myriad of different arrangements of the systems that are required to support propulsion plant. You will learn the main features of these systems.

You will gain knowledge of the typical procedures required to start the different types of propulsion plant and also how to shut them down. You will study the different common operational faults and mechanical failures that can occur with the different types of plant, and how to rectify them.

Outcome 1 could consist of a single assessment consisting of six questions covering the construction, operation and systems pertaining to the different types of plant. The assessment may be of 1 hour duration and will be sat under supervised closed-book conditions.

Outcome 2 can be assessed by a paper consisting of six questions covering the starting, shutdown and maintenance procedures of the different types of propulsion plant. The assessment could be of 1 hour duration under supervised closed-book conditions.

There are two Outcomes of study in this Unit:

- 1 Explain marine auxiliary equipment.
- 2 Explain the operational procedures, operational problems and maintenance of marine auxiliary equipment.