

End-point assessment plan for Marine Electrician integrated apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0808	3	Yes

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Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the Marine Electrician apprenticeship standard. It explains how EPA for this apprenticeship must operate.

This document provides the EPA design requirements for end-point assessment organisations (EPAOs) for this apprenticeship standard. It will also be useful for apprentices undertaking this apprenticeship, their employers and training providers.

EPA must be conducted by an EPAO approved to deliver EPA for this apprenticeship standard. Each employer should select an approved EPAO from the Education & Skills Funding Agency's Register of end-point assessment organisations (RoEPAO).

Full time apprentices will typically spend 48 months on-programme (before the gateway) working towards the occupational standard. All apprentices must spend a minimum of 12 months on-programme. All apprentices must spend a minimum of 20% of on-programme time undertaking off-the-job training.

This EPA is integrated with the City & Guilds Level 3 Diploma in Marine Electrical Engineering (Advanced). Therefore, when designing the EPA, the EPAO must consult with and obtain approval from the awarding organisation that the practical assessment meets their requirements.

Before starting EPA, an apprentice must meet the gateway requirements. For this apprenticeship they are:

- the employer must be content that the apprentice is working at or above the occupational standard
- the apprentice must achieve the following:
 - Level 2 English and mathematics¹
 - Very High Frequency (VHF) Licence Level 2
 - Marine Electronics Installer (MEI) Level 2
 - British Marine Electrical Technician (BMET) Level 2
 - City & Guilds Level 2 Diploma in Marine Electrical Engineering (Foundation) all units
 - City & Guilds Level 3 Diploma in Marine Electrical Engineering (Advanced) – all marine electrician units with the exception of unit 312 learning outcome 5, which is integrated into the EPA

¹For those with an education, health and care plan or a legacy statement, the apprenticeship's English and Mathematics minimum requirement is Entry Level 3. British Sign Language (BSL) qualifications are an alternative to English qualifications for those who have BSL as their primary language.

The EPAO must confirm that all required gateway evidence has been provided and accepted as meeting the gateway requirements. The EPAO is responsible for confirming gateway eligibility. Once this has been confirmed, the EPA period starts.

This EPA should then be completed within an EPA period lasting typically for 6 months, after the EPA gateway.

The EPA consists of 3 discrete assessment methods.

It will be possible to achieve the following grades in each end-point assessment method:

Assessment method 1: Structured interview underpinned by a portfolio of evidence

- Fail
- Pass
- Distinction

Assessment method 2: Multiple-choice test

- Fail
- Pass

Assessment method 3: Practical assessment

- Fail
- Pass

Performance in the EPA will determine the overall apprenticeship standard grade of:

- Fail
- Pass
- Distinction

EPA summary table

On-programme (typically 48 months)	<p>Training to develop the knowledge, skills and behaviours (KSBs) of the occupational standard.</p> <p>Training towards English and mathematics Level 2, if required.</p> <p>Training towards achieving the qualifications specific to this occupation as outlined below.</p> <p>Compiling a portfolio of evidence.</p>
End-point assessment gateway	<p>The employer must be content that the apprentice is working at, or above, the level of the occupational standard. Apprentices must have achieved all gateway qualifications mandated in the occupational standard. The qualifications required are:</p> <ul style="list-style-type: none"> • English and mathematics Level 2 • Very High Frequency (VHF) Licence Level 2 • Marine Electronics Installer (MEI) Level 2 • British Marine Electrical Technician (BMET) Level 2 • City & Guilds Level 2 Diploma in Marine Electrical Engineering (Foundation) – all marine electrician units • City & Guilds Level 3 Diploma in Marine Electrical Engineering (Advanced) – all marine electrician units with the exception of unit 312 learning outcome 5, which is integrated into the EPA <p>Apprentices must submit:</p> <ul style="list-style-type: none"> • a portfolio of evidence compiled during the on-programme period of the apprenticeship, containing sufficient evidence to demonstrate the knowledge, skills and behaviours (KSBs) that will be assessed by the structured interview.
End-point assessment (which will typically take 6 months)	<p>Assessment method 1: Structured interview underpinned by a portfolio of evidence</p> <p>With the following grades:</p> <ul style="list-style-type: none"> • Fail • Pass

	<ul style="list-style-type: none"> · Distinction <p>Assessment method 2: Multiple-choice test</p> <p>With the following grades:</p> <ul style="list-style-type: none"> · Fail · Pass <p>Assessment method 3: Practical assessment</p> <p>With the following grades:</p> <ul style="list-style-type: none"> · Fail · Pass <p>Overall EPA/apprenticeship graded:</p> <ul style="list-style-type: none"> · Fail · Pass · Distinction
<p>Professional recognition</p>	<p>Aligns with recognition by:</p> <ul style="list-style-type: none"> • The Institute of Marine Engineering, Science and Technology (Level - Engineering Technician, MarEngTech)

Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically 6 months, starting when the EPAO has confirmed that all gateway requirements have been met.

Any supporting material which underpins an EPA assessment method should be submitted at the gateway.

The EPA period must last for a minimum of one week.

Order of assessment methods

The structured interview and multiple-choice test may be administered in any order but both elements must be passed before undertaking the practical assessment. The practical assessment must be administered last, and only once the other 2 elements have been passed as verified by the EPAO.

Gateway

The apprentice should only enter the gateway once the employer is content that the apprentice is working at or above the level of the occupational standard. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

The EPAO determines when all other gateway requirements have been met, and the EPA period will only commence once the EPAO has confirmed this.

In addition to the employer's confirmation that the apprentice is working at or above the level of the occupational standard, the apprentice must have achieved the following gateway requirements prior to starting EPA:

- English and mathematics at level 2. (For those with an education, health and care plan or a legacy statement the apprenticeships English and mathematics minimum requirement is Entry Level 3 and British Sign Language qualification are an alternative to English qualifications for whom this is their primary language.)
- Very High Frequency (VHF) Licence Level 2
- Marine Electronics Installer (MEI) qualification Level 2
- British Marine Electrical Technician (BMET) qualification Level 2
- City & Guilds Level 2 Diploma in Marine Electrical Engineering (Foundation) – all units
- City & Guilds Level 3 Diploma in Marine Electrical Engineering (Advanced) – all marine electrician units with the exception of unit 312 learning outcome 5, which is integrated into the EPA

For the structured interview underpinned by portfolio of evidence, the requirements are:

- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
- it must contain evidence related to the KSBs that will be assessed by the structured interview
- the portfolio of evidence will typically contain 10-15 discrete pieces of evidence
- evidence must be mapped against the KSBs
- evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested
- evidence sources may include:
 - workplace documentation/records, for example workplace policies/procedures, records
 - witness statements
 - annotated photographs
 - video clips (maximum total duration 10 minutes); the apprentice must be in view and identifiable
 - work products, such as work reports, instructions and safety documentation.

This is not a definitive list; other evidence sources are possible.
- it should not include reflective accounts or any methods of self-assessment
- any employer contributions should focus on direct observation of performance (for example witness statements) rather than opinions
- the evidence provided must be valid and attributable to the apprentice; the portfolio of evidence must contain a statement from the employer and apprentice confirming this
- the portfolio of evidence must be submitted to the EPAO at the gateway

The portfolio of evidence is not directly assessed. It underpins the structured interview and, therefore, should not be marked by the EPAO. EPAOs should review the portfolio of evidence in preparation for the structured interview, but are not required to provide feedback after this review of the portfolio.

The EPAO must ensure they have copies of the workplace policies and procedures required to carry out this assessment method.

For the multiple-choice test:

- no specific requirements

For the practical assessment:

- no specific requirements

End-point assessment methods

The apprentice will be assessed against the KSBs assigned to the assessment methods outlined below, as shown in the mapping section of this EPA plan.

Assessment method 1: Structured interview underpinned by a portfolio of evidence (This assessment method has 1 component.)

Overview

This assessment will take the form of a structured interview which must be appropriately structured to draw out the best of the apprentice's competence and excellence and cover the KSBs assigned to this assessment method. The independent assessor's role is restricted to asking questions, and it is not a two-way discussion. The independent assessor leads this process to obtain information from the apprentice to enable structured assessment decision-making to occur. Questioning should assess the KSBs assigned to this assessment method and the apprentice may use their portfolio to support their responses.

The rationale for this assessment method is:

- It allows the apprentice to be assessed against KSBs which may not naturally occur during the practical assessment.
- It is underpinned by a portfolio of evidence, enabling the apprentice to demonstrate the application of skills and behaviours as well as knowledge.
- It allows for testing of responses where there are a number of potential answers that couldn't be tested through a multiple-choice test.
- It is cost effective, as apart from a venue it does not require additional resources.

Delivery

The independent assessors will conduct and assess the structured interview.

The structured interview must last for 60 minutes. The independent assessor has the discretion to increase the time of the structured interview by up to 10% to allow the apprentice to complete their last answer.

The structured interview will be conducted as set out here:

An independent assessor will conduct the structured interview with the apprentice in the presence of an employer expert who must not have been involved in the learning or training of the apprentice. The employer expert's role is to provide technical support, advice and guidance such as confirming company policies, procedures, processes, providing context on technical information or on emerging technologies. They must not provide information on behalf of the apprentice, ask the apprentice questions or influence the apprentice in any way. The employer expert must not amplify or clarify points made by the apprentice. Any information provided by the employer expert must only be at the request of the independent assessor, who has the final say over the assessment and grade awarded.

Apprentices must be assessed against the KSBs assigned to this assessment method as shown in the mapping of KSBs. Apprentices are expected to understand and use relevant occupational language that would be typical of a level 3 competent person in this occupation.

During this method, the independent assessor must combine questions from the EPAO's question bank and those generated by themselves having reviewed the portfolio in advance. The independent assessor must have at least 2 weeks to review the portfolio after the gateway and prepare for the structured interview. The apprentice can use the portfolio of evidence as an aide memoire and to support answers being given.

The independent assessor must ask a minimum of 10 open questions that adequately cover the KSBs mapped to this assessment method. The independent assessor can ask follow-up questions for clarification.

The themes for the questions are:

- industry awareness
- health and safety
- environment
- communication
- work operations and customer service
- sourcing components
- quality and continuous improvement
- installation and fit out
- servicing
- testing

KSBs met and answers to questions, must be recorded by the independent assessor.

The independent assessor must use the assessment tools and procedures that are set by the EPAO to record the structured interview.

The independent assessor will make all grading decisions.

Venue

The structured interview should take place in a quiet room, free from distractions and influence.

The structured interview can take place in any of the following:

- employer's premises
- a suitable venue selected by the EPAO (for example a training provider's premises).

Where a face to face structured interview is not possible it is acceptable to conduct the structured interview remotely. Video conferencing can be used, but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided in some way for example, by using a 360-degree camera.

Question and resource development

A question bank must be developed by EPAOs. The question bank must be of sufficient size to prevent predictability and the EPAO must review it regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs. Independent assessors must use the question bank as a source for questions and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for asking suitable questions in line with the EPAO's training and standardisation process.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

Independent assessors must be developed and trained by the EPAO in the conduct of structured interviews and reaching consistent judgement.

Support Material

EPAOs will produce the following material to support this assessment method:

- structured interview specification
- question bank
- marking materials
- recording documentation
- independent assessor training materials
- grading guidance
- outline of the assessment method's requirements

Assessment method 2: Multiple-choice test (This assessment method has 1 component.)

A multiple-choice test is a controlled assessment which consists of a series of questions in which apprentices are asked to provide a response.

Overview

The rationale for this assessment method is:

- it allows for the efficient testing of knowledge and skills where there is a right or wrong answer
- it does not require independent assessor time, reducing cost
- it allows for flexibility in terms of when, where and how it is taken

Delivery

Test format

The test can be:

- computer based
- paper based

It will consist of 40 questions.

These questions will consist of:

- closed response questions (e.g. multiple-choice questions)

Test administration

Apprentices must have 120 minutes to complete the test.

The test is closed book which means that the apprentice cannot refer to reference books or materials.

Apprentices must take the test in a suitably controlled environment that is a quiet space, free of distractions and influence, in the presence of an invigilator. The invigilator may be the independent assessor, or another external person employed by the EPAO or specialised (proctor) software, if the test can be taken on-line. The EPAO is required to have an invigilation policy that will set out how the test is to be carried out. This will include specifying the most appropriate ratio of apprentices to invigilators to best take into account the setting and security required in administering the test.

The EPAO is responsible for ensuring the security of testing they administer to ensure the test remains valid and reliable (this includes any arrangements made using online tools). The EPAO is responsible for verifying the validity of the identity of the person taking the test.

This assessment method will be carried out as follows:

This is a multiple-choice test. There will be 4 responses, one of which will be the only correct answer.

There will be 40 questions in total. There must be 10 scenario-based questions and 30 non scenario-based questions in the test. The scenario-based questions will assess all of the skills assigned to this assessment method and the non-scenario based questions will assess all of the knowledge elements assigned to this assessment method.

The EPAO must verify the suitability of the venue for taking the test.

Marking

Tests must be marked by an independent assessor or markers employed by the EPAO following a marking guide produced by the EPAO. Alternatively, marking by computer is permissible where questions types allow this, to improve marking reliability.

Correct answers will be awarded one mark.

Any incorrect or missing answers must be assigned 0 marks.

Question and resources development

Questions will be written by EPAOs. They must be relevant to the occupation and assess KSBs mapped to this assessment method. It is recommended that this be done in consultation with employers of this occupation. EPAOs should also maintain the security and confidentiality of their questions when consulting employers. EPAOs must develop a test specification and “question banks” of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the questions they contain, are fit for purpose. The test questions must be varied yet assess the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

Required supporting material

EPAOs will produce the following material to support this assessment method:

- a question bank
- a test specification
- sample tests and mark schemes
- live tests and mark schemes
- analysis reports which show areas of weakness for completed tests/exams and an invigilation policy
- assessment recording documentation

Assessment method 3: Practical assessment (This assessment method has 2 components.)

This assessment method incorporates the assessment from Unit 312 of the Level 3 Diploma in Marine Electrical Engineering (Advanced) – learning outcome 5. It has two components, which must be developed and administered by the EPAO in line with the requirements set out by City & Guilds and in line with the requirements set out in this plan. It must be taken in the following order:

- a practical task
- a short answer test

The following activities must be observed during the practical assessment. These activities must be designed to provide the apprentice with the opportunity to demonstrate occupational competence in the KSBs assigned to this assessment method:

- practical task to complete a circuit diagram to a given specification, then build and test the circuit diagram including the demonstration of fault-finding and problem solving skills
- short answer test to demonstrate the underpinning knowledge required for successful completion of the practical task to specification

The EPAO must determine a practical assessment that is reflective of the apprentice's duties and provides coverage of the KSBs assigned to this assessment method.

Overview

This assessment method is integrated with the City & Guilds Level 3 Diploma in Marine Electrical Engineering (Advanced) – unit 312, learning outcome 5. Therefore, when designing the method, the EPAO must consult with and obtain approval from the awarding organisation that it meets their requirements.

Apprentices must be observed by an independent assessor completing a practical assessment in which they will demonstrate the KSBs assigned to this assessment method. The end-point assessment organisation will arrange for the practical assessment to take place, in

consultation with the employer. The practical assessment must be carried out over a total assessment time of 5 hours. The overall indicative times expected are as follows:

1. practical task – 4 hours
2. short answer test – 1 hour

The assessment may be split into discrete sections held over 2 consecutive working days, with the short answer test taking place the following day. A typical working day is considered to be 7.5 hours. The independent assessor has the discretion to increase the time of each component by up to 10%. The independent assessor can conduct and observe up to six apprentices during component 1. Component 2 may be conducted remotely, in an employer, training provider or EPAO's premises, but the EPAO must verify the identity of the apprentice and have processes in place to ensure that the apprentice is not being assisted in any way.

The simulated environment must closely relate to the apprentice's natural working environment. EPAOs must ensure that specifications for the practical assessments are comparable in terms of complexity (i.e. that all apprentices are provided with tools and equipment with a similar number of faults).

The rationale for this assessment method is:

- This occupation involves practical tasks best assessed through observation on-the-job, however the opportunity to demonstrate the transferable skills required may be limited in a real work context due to scheduling issues.
- A practical assessment has been selected as this enables all apprentices to have the same opportunity to demonstrate their ability to work on different types of equipment.
- The apprentice will be assessed in a suitable venue selected by the EPAO (e.g. a training provider's premises or another employer's premises).

Component 1: Practical task

The practical task gives the apprentice opportunity to demonstrate their practical and problem solving skills. The apprentice will be given a pack containing an incomplete circuit diagram and a specification. They must then complete the circuit diagram, ensuring it meets the specification provided. The apprentice will build the circuit from the diagram. This will involve them preparing their work area and using the tools and equipment that is typical in this occupation. They will be supplied with a selection of parts, some of which will be faulty, meaning the apprentice will be fault-finding and problem solving. The apprentice will also have access to a selection of non-faulty parts to correct any faults. The number of faulty/non-faulty parts must ensure that the practical task is of equal demand across apprentices allowing any fault diagnoses and problem solving to occur within the time constraints.

Delivery

The practical task is conducted over 4 hours and invigilated by the independent assessor.

Apprentices must be provided with information on the tasks they must complete, including the timescales they will be working to, before the start of the practical assessment. The time to give this information is exclusive of the assessment time.

The following activities must be included in the practical task, as a practical task without these activities would seriously hamper the opportunity for the apprentice to demonstrate occupational competence against the KSBs assigned to this assessment method:

- preparing their work area
- selecting the correct tools, equipment and parts
- fault-finding
- problem solving
- testing
- restoring their work area

Component 2: Short answer test

This short answer test gives the apprentice the opportunity to demonstrate that they have the underpinning theoretical knowledge required to carry out a range of practical tasks. It will involve them answering a number of short answer questions. The short answer test must include questions relating to K10, K12, K17 and K23 as they also include knowledge that may not be covered in the practical task.

Delivery

Apprentices must have 60 minutes +/- 10% to complete the test.

This will be a 10-question short answer test.

The questions must be varied to avoid the test becoming too predictable yet allow assessment of the relevant KSBs. Questions must be developed to ensure sufficient scope to cover the breadth of knowledge specific to the task.

These questions will consist of:

- 10 open-response questions where the response is the result of a calculation or a short paragraph

The test is closed book which means that the apprentice cannot refer to reference books or materials. Formulae required for calculations are to be supplied by the EPAO. Use of a calculator is allowed.

The test may be conducted in an employer's/training provider's/EPAO's premises and can be invigilated "remotely" using video conferencing software, but the EPAO must put steps in place to verify the identity of the apprentice and ensure that the apprentice cannot be assisted in any way.

Apprentices must be provided with both written and verbal instructions on all components of the practical assessment, including the timescales they are working to; this briefing is exclusive of the assessment time.

The independent assessor is responsible for ensuring that the apprentice is assessed under controlled conditions and must manage the administration and invigilation of apprentices including during breaks, in order to maintain security of the assessment in-line with the EPAO's malpractice policy.

Evidence of KSBs must be documented by the independent assessor, using documentation issued by the EPAO. All components will be assessed holistically, the independent assessor will make all grading decisions.

Venue

Practical assessments must be conducted in one of the following locations:

- a suitable venue selected by the EPAO (e.g. a training provider's premises or another employer's premises.)
- remotely (component two only)

For component 1, the venue must include:

- an individual desk (where multiple apprentices are being assessed at the same time this must ensure privacy so they are not overlooked or distracted).

Each apprentice will be provided with a number of parts, some of which will be faulty. The suggested parts list is as follows:

<u>Item</u>	<u>Suggested parts per apprentice</u>	<u>Quantity</u>
MDF board	600 x 400 x 18 MDF board with the following equipment mounted:	1
12v DC power supply	base tech BT-305 0-30v or similar 12V supply	1
DIN rail	200mm length of standard DIN rail	
fuse holder	furneaux riddall (FH435) inline fuse holder for automotive fuse	1
fuse	furneaux riddall (FB-KIT) selection box of automotive fuses	1
momentary switch	furneaux riddall (6JF-001-571-041) momentary push button switch	2
on/off switch	RS (314-4995) on-off rocker switch panel mount	1
12v DC motor	RS (420-647) PRO, 12 V DC brushed & geared motor	1
green 12v LED	RS (195-0262) green panel mount indicator, 8mm, 12V DC	1
amber 12v LED	RS (195-0263) amber panel mount indicator, 8mm, 12V DC	1
red 12v LED	RS (195-0264) red panel mount indicator, 8mm, 12V DC	1
12v DC DPDT relay	RS (180-3038) wago 788 series 12V DC DPDT relay clamp terminal	2

12v DC DPDT relay	RS (180-3056) wago replacement plug in relay for above (faulty)	2
connector	RS (323-5877) wago, 281, 600 V standard din rail mount terminal	10
jumper	RS (180-9252) wago, 281 PCB jumper for terminal block	4
1mm ² wire red	furneaux riddall (CM1.0 50M red) 1.0mm/17 AWG oceanflex tinned single core thin wall cable	As Required
1mm ² wire black	furneaux riddall (CM1.0 50M black) 1.0mm/17 AWG oceanflex tinned single core thin wall cable	As Required
spade terminal red	furneaux riddall (PRR1541) fully insulated 6.3mm female spade terminal (red)	As Required

Each apprentice will be provided with the following tools:

<u>Item</u>	<u>Suggested tools (or similar) per apprentice</u>	<u>Quantity</u>
wire cutters	RS (732-836) PRO 150 mm diagonal cutters	1
wire strippers	RS (613-044) PRO 170 mm wire stripper	1
wago driver (med)	RS (753-0690) wago, 210 screwdriver for terminal block	1
crimpers	RS (533-279) PRO plier crimping tool for terminal	1
multimeter	RS (123-1938) PRO RS14 handheld digital multimeter	1

Where practical assessment takes place off-site, the EPAO is responsible for ensuring the apprentice has the appropriate tools and equipment to complete the task. The EPAO may liaise with the employer or training provider to provide these.

Resources development

The EPAO will produce specifications to outline in detail how the practical assessment will operate, what it will cover and how the KSBs assigned to the practical assessment will be assessed. It is recommended that this be done in consultation with employers. The EPAO must put in place measures and procedures to maintain the security and confidentiality of their specifications if employers are consulted. Specifications must be standardised by the EPAO.

The EPAO will create and set open short answer questions to assess the knowledge theory elements.

The EPAO must develop 'practical assessment specifications' and 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure the practical tasks and questions, are fit for purpose. The short answer questions relating to the knowledge elements must be varied yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different practical assessment and short answer questions in the case of re-sits/re-takes.

EPAOs should produce the following materials to support this assessment method:

- independent assessor training materials
- assessment specifications (verified by City & Guilds)
- grading guidance
- mark schemes
- a bank of practical tasks
- a bank of short answer questions
- assessment recording documentation
- analysis reports which show areas of weakness for completed tests and an invigilation policy
- guidance materials for the apprentice

Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments to the assessment methods for the EPA for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustment and what reasonable adjustments will be made. The adjustments must maintain the validity, reliability and integrity of the assessment methods outlined in this EPA plan.

Overall EPA Grading

All assessment methods are weighted equally in their contribution to the overall EPA grade. Performance in the EPA will determine the apprenticeship grade of fail, pass, or distinction. Independent assessors must individually grade the structured interview and practical assessment, according to the requirements set out in this plan.

Grading

For assessment methods 1 and 3, see mapping and grading tables later on within this document.

Assessment method 2: Multiple-choice test

KSBs
K7, K13, K15, K16, K18, K19, K20, K22, S4, S16ii, S17

The following grade boundaries apply to the test:

Grade	Minimum score (marks out of 40)	Maximum score (marks out of 40)
Pass	30	40
Fail	0	29

Overall EPA grading

All EPA methods must be passed for the EPA to be passed overall.

Apprentices must gain a pass in all three assessment methods in order to achieve an overall pass. Apprentices must gain a distinction in assessment method 1 in order to gain an overall distinction.

Grades from individual assessment methods should be combined in the following way to determine the grade of the EPA as a whole:

Structured interview Assessment method 1	Multiple-choice test Assessment method 2	Practical assessment Assessment method 3	Overall grading
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Distinction

Any grade = fail, pass, or distinction

Re-sits and re-takes

Apprentices who fail one or more assessment methods will be offered the opportunity to take a re-sit or a re-take at the employer's discretion. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

A re-sit does not require further learning, whereas a re-take does.

Apprentices should have a supportive action plan to prepare for a re-sit or a re-take.

The timescale for a re-sit/re-take is agreed between the employer and EPAO. A re-sit is typically taken within 3 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 4 months of the EPA outcome notification.

All assessment methods must be taken within a 6-month period, otherwise the entire EPA will need to be re-sat/re-taken.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to a higher grade.

Where any assessment method has to be re-sat or re-taken, the apprentice will be awarded a maximum EPA grade of pass, unless the EPAO determines there are exceptional circumstances requiring a re-sit or re-take.

Roles and responsibilities

Role	Responsibility
Apprentice	<p>As a minimum, apprentices should:</p> <ul style="list-style-type: none"> • participate in and complete on-programme training to meet the KSBs as outlined in the occupational standard for a minimum of 12 months • undertake 20% off-the-job training as arranged by the employer and training provider • understand the purpose and importance of EPA
Employer	<p>As a minimum, employers should:</p> <ul style="list-style-type: none"> • select the EPAO and training provider • work with the training provider (where applicable) to support the apprentice in the workplace and to provide the opportunities for the apprentice to develop the KSBs • work with the training provider to brief the apprentice on the mandated certificates/licenses including when they should be achieved and how the integration with the EPA works • arrange and support a minimum of 20% off-the-job training to be undertaken by the apprentice • decide when the apprentice is working at or above the occupational standard and so is ready for EPA • ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan • remain independent from the delivery of the EPA • confirm arrangements with the EPAO for the EPA (who, when, where) in a timely manner (including providing access to any employer-specific documentation as required, for example company policies) • ensure that the EPA is scheduled with the EPAO for a date and time which allow appropriate opportunity for the KSBs to be met • ensure the apprentice is well prepared for the EPA • ensure the apprentice is given sufficient time away from regular duties to prepare for and complete all post-gateway elements of the EPA, and that any required supervision during this time (as stated within this EPA plan) is in place

	<ul style="list-style-type: none"> • where the apprentice is assessed in the workplace, ensure that the apprentice has access to the resources used on a daily basis • provide an employer expert for the structured interview in-line with the requirements set out in this plan • determine if a resit or retake is appropriate, should the apprentice fail
EPAO	<p>As a minimum, EPAOs should:</p> <ul style="list-style-type: none"> • conform to the requirements of this EPA plan and deliver its requirements in a timely manner • conform to the requirements of the Register of End-Point Assessment Organisations (RoEPAO) • conform to the requirements of the external quality assurance provider (EQAP) for this apprenticeship standard • understand the occupational standard • make all necessary contractual arrangements, including agreeing the price of the EPA • develop and produce assessment materials including specifications and marking materials (for example mark schemes, practice materials, training material) • appoint suitably qualified and competent independent assessors • appoint administrators (and invigilators where required) to administer the EPA as appropriate • provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading • provide adequate information, advice and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA, including explaining the certificates/licences required as part of this apprenticeship and outlining how the integrated qualification works. • arrange for the EPA to take place, in consultation with the employer • where the apprentice is not assessed in the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary • develop and provide appropriate assessment recording documentation to ensure a clear and auditable process is

	<p>in place for providing assessment decisions and feedback to all relevant stakeholders</p> <ul style="list-style-type: none"> • have no direct connection with the apprentice, their employer or training provider. In all instances, including when the EPAO is the training provider (i.e. HEI), there must be no conflict of interest • have policies and procedures for internal quality assurance (IQA), and maintain records of regular and robust IQA activity and moderation for external quality assurance (EQA) purposes • deliver induction training for independent assessors, and for invigilators and/or markers (where used) • undertake standardisation activity on this apprenticeship standard for all independent assessors before they • conduct independent assessor training for an EPA for the first time, if the EPA is updated and periodically as appropriate (a minimum of annually) • manage invigilation of apprentices in order to maintain security of the assessment in line with the EPAO's malpractice policy • verify the identity of the apprentice being assessed • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard • provide details of the independent assessor's name and contact details to the employer • have and apply appropriately an EPA appeals process • request certification via the Apprenticeship Service upon successful achievement of the EPA • liaise with City & Guilds to ensure any additional requirements for the practical assessment are satisfied • communicate the outcomes of the practical assessment to City & Guilds in a timely manner
Independent assessor	<p>As a minimum, independent assessors should:</p> <ul style="list-style-type: none"> • have the competence to assess the apprentice at this level and hold any required qualifications and experience in line with the requirements of the independent assessor as detailed in the IQA section of this EPA plan • understand the occupational standard and the requirements of this EPA • have, maintain and be able to evidence up-to-date knowledge and expertise of the subject matter • deliver the end-point assessment in-line with the EPA plan

	<ul style="list-style-type: none"> • comply with the IQA requirements of the EPAO • have no direct connection or conflict of interest with the apprentice, their employer or training provider; in all instances, including when the EPAO is the training provider (i.e. HEI) • attend induction training • attend standardisation events when they begin working for the EPAO, before they conduct an EPA for the first time and a minimum of annually for this apprenticeship standard • assess each assessment method, as determined by the EPA plan, and without extending the EPA unnecessarily • assess against the KSBs assigned to each assessment method, as shown in the mapping of assessment methods and as determined by the EPAO, and without extending the EPA unnecessarily • make all grading decisions • record and report all assessment outcome decisions, for each apprentice, following instructions and using assessment recording documentation provided by the EPAO, in a timely manner • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard • mark open (constructed) test answers accurately according to the EPAO's mark scheme and procedures
Training provider	<p>As a minimum, training providers should:</p> <ul style="list-style-type: none"> • work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the knowledge, skills and behaviours as listed in the occupational standard • work with the employer to ensure the apprentice understands the mandated certificates/licenses including when they should be achieved and how the integration with the EPA works • conduct training covering any knowledge, skill or behaviour requirement agreed as part of the Commitment Statement (often known as the Individual Learning Plan). • monitor the apprentice's progress during any training provider led on-programme learning • advise the employer, upon request, on the apprentice's readiness for EPA

	<ul style="list-style-type: none"> • remain independent from delivery of the EPA. Where the training provider is the EPA (i.e. a HEI) there must be procedures in place to mitigate against any conflict of interest
Marker	<p>As a minimum, markers should:</p> <ul style="list-style-type: none"> • attend induction training and standardisation training where appropriate • have no direct connection or conflict of interest with the apprentice, their employer or training provider in all instances including when the EPAO is the training provider (i.e. HEI) • mark multiple-choice test answers accurately according to the EPAO's mark scheme and procedures
Employer expert	<p>As a minimum, technical experts should:</p> <ul style="list-style-type: none"> • have no direct connection or conflict of interest with the apprentice, their employer or training provider • provide technical support, advice and guidance such as confirming company policies, procedures, processes, providing context on technical information or on emerging technologies • provide information only at the request of the independent assessor • not provide information on behalf of the apprentice, ask the apprentice questions or influence the apprentice or the assessment judgement in any way • not amplify or clarify points made by the apprentice
Invigilator	<p>As a minimum, the invigilator should:</p> <ul style="list-style-type: none"> • attend induction training and standardisation training • have no direct connection or conflict of interest with the apprentice, their employer or training provider; in all instances, including when the EPAO is the training provider (i.e. HEI) • invigilate and supervise apprentices during tests and in breaks during assessment methods to prevent malpractice
Awarding organisation for the Level 3 Diploma in Marine Electrical Engineering (Advanced)	<p>For the practical assessment, the awarding organisation should, as a minimum:</p> <ul style="list-style-type: none"> • agree to the requirements of the practical assessment in this EPA plan • ensure any additional requirements do not conflict with the requirements set out in this plan

	<ul style="list-style-type: none"> • advise the ESFA of the integrated qualification, should they apply to the Register of End-Point Assessment Organisations (RoEPAO) so that conflicts of interest can be managed • understand the occupational standard • have no direct connection with the apprentice, their employer or training provider • remain independent of the delivery of the EPA
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Internal Quality Assurance (IQA)

Internal quality assurance refers to the strategies, policies and procedures that EPAOs must have in place to ensure valid, consistent and reliable end-point assessment decisions. EPAOs for this EPA must adhere to all requirements within the Roles and Responsibilities section and:

- have effective and rigorous quality assurance systems and procedures that ensure fair, reliable and consistent assessment across employers, places, times and independent assessors
- appoint independent assessors who have knowledge of the leisure marine and small commercial marine industries
- appoint independent assessors who have recent relevant experience of the occupation/sector at the same level as the apprentice gained in the last three years or significant experience of the occupation/sector
- appoint independent assessors who are competent to deliver the end-point assessment
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- operate induction training for independent assessors when they begin working for the EPAO on this occupational standard and before they deliver an updated assessment method for the first time
- ensure independent assessors attend standardisation events on an ongoing basis and at least once per year
- undertake standardisation activity on this apprenticeship standard for all independent assessors:
 - before they conduct an EPA for the first time
 - if the EPA is updated
 - periodically as appropriate (a minimum of annually)
- conduct effective moderation of assessment decisions and grades
- conduct appeals where required, according to the EPAO's appeals procedure, reviewing and making final decisions on assessment decisions and grades

Value for money

Affordability of the EPA will be aided by using at least some of the following practice:

- using an employer's or training provider's premises
- assessing multiple apprentices simultaneously in the multiple-choice test and practical assessment
- using technology – for example video conferencing where applicable

Professional body recognition

This apprenticeship is designed to prepare successful apprentices to meet the requirements for registration as an Engineering Technician with The Institute of Marine Engineering, Science and Technology.

Mapping of knowledge, skills and behaviours (KSBs)

Assessment method 1: Structured interview underpinned by a portfolio

Knowledge
K1: Characteristics and features of the national and international marine industry and marine electrician's role and placement within the industry, and who marine electricians interact with in order to perform their work operations.
K2: Effective communication techniques and methods, their role and features, along with the advantages and disadvantages of each when communicating with different customers and stakeholders (internal and external). Organisational processes and procedures regarding communication channels, methods and techniques, and how communications and their outcomes are recorded and documented.
K3: Uses of information technology in the marine industry and when performing marine electrical and electronic work operations. Marine electrical and electronic and other general marine terminology and their meanings.
K5: Sourcing of components, costing, pricing and budgeting principles and reporting discrepancies and quality issues.
K8: Ways of ensuring quality of marine electrical and electronic processes and work products, including continuous business improvement techniques and how they are integrated into marine electrical and electronic work processes and procedures.
K9: The different sources of information and guidance that directs marine electrical and electronic work operations, typically including marine electrical drawings and technical specifications, where this information and guidance can be found and when and where it should be used.
K14: Principles, process, approved methods and techniques and organisational policy and procedures that need to be followed when undertaking different marine electrical and electronic work operations.
K24: Importance of customer service and effective customer service principles and techniques.

Skills
S1 Prepare for and contribute to meetings and hold discussions. Use appropriate communication and interpersonal techniques and marine terminology to aid effective interactions with colleagues, customers, contractors, suppliers and others, to achieve required marine electrical and electronic task outcomes.
S2 Make recommendations to customers and other interested parties to ensure optimal compliance and performance of marine electrical and electronic equipment and systems, that meet customer requirements. Apply appropriate customer service principles and techniques. Meet customer needs (internal and external) and deliver required customer service in accordance with organisational policy and processes when undertaking a marine electrical and electronic work role.

S3 Maintain the safety of self along with others by following safe systems of work when conducting marine electrical and electronic work operations. Identify and comply with all relevant legislation, regulations, codes of practice and other relevant information and guidance when planning and performing marine electrical and electronic work operations.
S8 Follow quality improvement principles, techniques, and methods and identify any areas for improvement.
S9 Use various wiring support mechanisms and systems to route and secure cables in accordance with regulations and best practice and install cables using appropriate segregation and separation methods, in accordance with required specifications in relation to positioning bulkhead penetration.
S12 Complete relevant records and documentation relevant to marine electrical and electronic systems, in accordance with organisational documentation and any other relevant information and guidance.
S13 Install, position and secure marine electrical and electronic equipment and components (propulsion, navigational, safety, domestic, operational, generation, communication, audio visual and IT, protection and ancillary systems) in accordance with design specification and following all required steps and checks for the approved work operation process and operational standards.
S14 Support commission and system tests in accordance with the manufacturer's design specification, company best practice and processes and perform basic crew roles.
S15 Check, test, and diagnose marine electrical and electronic equipment and components in boats to company and marine standards, using appropriate company and marine standards and other relevant documentation.
S19 Fit required new marine electrical and electronic equipment adhering to best practice.
S20 Perform routine servicing in the specified sequence using appropriate techniques and procedures.
S21 Deal with any problems that may present themselves within their own area of responsibility.
S22 Check, test, and diagnose battery condition and alternating current (ac) power systems and record results.

Behaviours
B1: Embrace a safety culture and situational awareness including being hazard and risk aware when working, being on or near water and when working aloft or at height. Challenge any unsafe practices.
B2: Embrace an environmentally sustainable working culture, taking responsibility for the appropriate use of resources and own actions.
B3: Demonstrate commitment to quality, commercial awareness and continuous improvement.
B4: Focus on the requirements of the customer (internal and external), seeking to provide outstanding customer service, meeting customer requirements.
B5: Work individually and as part of a team, communicating effectively at different levels to achieve positive work results.
B6: Consistently treat everyone with respect and courtesy, valuing diversity.
B7: Motivated, meticulous, proactive and adaptable, with a focus on continuous personal development.

B8ii: Effectively schedule and manage stakeholder expectations.
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Assessment method 2: Multiple-choice test

Knowledge
K7: Relevant legislation, regulations, relevant industry guidance, and organisational policies, practices and procedures that direct health and safety and environmental sustainability at work and the importance of complying with control of substances hazardous to health (COSHH), the waste electrical and electronic equipment (WEEE), and work at height regulations and work on or near water requirements. The hazards and risks when undertaking marine electrical and electronic work operations and how these can be minimised. Personal protective equipment (PPE) that should be used when undertaking marine electrical and electronic work operations, the selection of the PPE and how to use the different PPE. How to deal with emergencies and responsibilities in responding to these within their own area of responsibility.
K10: The mathematical techniques, formulae, and calculations that underpin marine electrical and electronic work.
K13: Vessel design and construction and complex shapes and the relationship between systems and efficient use of space.
K15: Importance of accurate completion and maintenance of marine electrical and electronic information, documentation and the records and information that needs to be recorded and where, during different stages of marine electrical and electronic work operations.
K16: Importance of restoring the work area to a tidy and safe state on completion of marine electrical and electronic work operation and what this entails.
K18: Operation principles of different electrical and electronic systems.
K19: Importance of isolation procedures for marine electrical and electronic operations. Ways of minimising electrostatic discharge.
K20: Basic operational principles of marine electrical and electronic equipment and components being serviced and their servicing requirements.
K22: Means of powering down and correctly operating locking out systems.
Skills
S4 Consider sustainability and environmental impacts and apply environmental best practice when planning and performing marine electrical and electronic work operations.
S16ii Lockout and tagout electrical and electronic equipment, circuits and cables.
S17 Dispose of waste materials, in accordance with safe working and environmental practices and approved procedures.

Assessment method 3: Practical assessment

Knowledge
K4: Different diagnostic and problem solving techniques and methods used to resolve marine electrical and electronic problems relevant to their area of responsibility.
K6: Organisational process and procedures for the design, planning and set up, and installation of marine electrical and electronic systems including assemblies and sub-assemblies.
K10: The mathematical techniques, formulae, and calculations that underpin marine electrical and electronic work.
K11: Range of tools, materials, equipment and components used when performing marine electrical and electronic operations, their characteristics, features and their safe use, movement and operation.
K12: Purpose and operation of different marine electrical and electronic equipment and systems and their characteristics and features.
K17: Necessary checks, tests and diagnostics and inspections undertaken when performing different marine electrical and electronic work operations and how these are undertaken for the different types of marine electrical and electronic work operation.
K21: Methods for checking that marine electrical and electronic components are fit for purpose and actions that need to be taken if they are not.
K23: How to check, test, and diagnose the condition of different marine electrical and electronic systems.
Skills
S5 Follow approved industry guidance and techniques, and operational work methods, practices, processes, principles, and procedures when undertaking the different marine electrical and electronic work operations, within required time frames.
S6 Select, use, maintain, and store appropriate resources safely and correctly (tools, equipment, machinery and consumables).
S7 Design, plan and set up to produce and install marine electrical and electronic systems including assemblies and sub-assemblies from marine electrical engineering drawings, electrical formulae and technical specifications in the correct manner (This will typically include design of electrical panels, power distribution requirements and best use of available space), ensuring the necessary resources are selected.
S10 Conduct required tests and checks when performing work operations on different marine electrical and electronic systems.
S11 Restore work area to a safe and tidy condition in accordance with organisational policy and procedures.
S16i Power down, remove, repair and reuse or replace electrical and electronic equipment, circuits and cables.
S18 Carry out required modifications and rewiring using approved materials and techniques, adhering to required specifications and instructions.

Behaviours

B8i: Manage own time efficiently to complete work operations within the confines of job responsibility

Appendix A: Grading descriptors

Assessment method 1: Structured interview underpinned by a portfolio of evidence

KSBs	Pass – All pass criteria must be met	Distinction – All pass and all distinction criteria must be met
<p>Industry Awareness K1</p>	<p>Describes the characteristics and features of the national and international marine industry.</p> <p>Describes the marine electrician's role within the industry and the stakeholders with which they interact. (K1)</p>	<p>Describes how their employer fits within the industry.</p> <p>Describes current wider issues affecting the industry and the impact on their employer.</p>
<p>Health and Safety S3, S21, B1</p>	<p>Describes how the hazards and risks vary according to the surroundings, i.e. near water or on water and when working aloft or at height. Describes how they mitigate those risks. (B1, S21)</p> <p>Describes how they complete a risk assessment. (B1, S21)</p>	<p>Explains how they educate others on health and safety requirements and describes the impact of that on the individual and the business.</p> <p>Explains the consequences of unsafe practices on the individual and the business for a given example. (B1, S21)</p>

	<p>Describes how they challenge unsafe practices and follow safe systems of work when conducting marine electrical and electronic work operations. (B1, S3, S21)</p> <p>Describes how they identify and comply with relevant legislation, regulations, codes of practice and other relevant information and guidance when planning and performing marine electrical and electronic work operations. (S3)</p>	
<p>Environment B2</p>	<p>Explains how their choices for engineering processes, materials and resources improves environmental sustainability. (B2)</p> <p>Explains how they responsibly dispose of waste. (B2)</p>	<p>Explains how poor choices can impact on the environment and on the business. (B2)</p> <p>Explains how future technology in the industry will impact on their choices and environmental sustainability. (B2)</p>
<p>Communication K2, K3, S1, S12, B5</p>	<p>Describes how they prepare, contribute to meetings and hold discussions.</p> <p>Describes how they apply different communication techniques and methods with internal and external customers and within</p>	<p>Explains the importance and benefits of keeping records of communications. (K2)</p> <p>Explains how they have communicated sensitive information or managed difficult conversations. (S1)</p>

	<p>teams and justify their choices. Explains the impact of their choices. (K2, S1, B5)</p> <p>Describes the processes and procedures they follow to communicate internally and externally using appropriate terminology. (K2, K3)</p> <p>Describes the records and documentation and records of communication that must be recorded and how this is stored in their organisations. (K3, S12)</p>	<p>Explains how they lead discussions. (S1, B5)</p>
<p>Work Operations and Customer Service K9, K14, K24, S2, B4, B6, B8ii</p>	<p>Describes how they meet the needs of internal customers. (S2, B4)</p> <p>Describes the principles, methods, techniques company policies and processes they follow to undertake marine electrical and electronic work operations. (K14)</p> <p>Describes how they have made recommendations to customers that ensures optimal compliance and performance of marine electrical and electronic equipment</p>	<p>Describes how they exceeded customer expectations through excellent working practices and effective communication. (S2, B4)</p>

	<p>and systems and meets customer requirements. (K24, S2, B8ii, K9)</p> <p>Explains the type of information they use in their role and how it is used to make informed decisions. (K9)</p> <p>Explains how they treat others with courtesy and respect and how they value diversity. (B6)</p>	
<p>Sourcing Components K5, B3</p>	<p>Describes the process for sourcing components. (K5)</p> <p>Describes how they ensure value for money. (K5, B3)</p> <p>Describes how they ensure the minimum quality requirements are met. (K5)</p>	<p>Explains the actions they have taken when reporting quality issues to help to prevent the same issues occurring in the future. (K5)</p> <p>Explains how they manage difficulty with sourcing components or supplies. (K5)</p>
<p>Quality and Continuous Improvement K8, S8, S21, B3, B7</p>	<p>Describes how they ensure quality of marine electrical and electronic processes and work products, including how they have proactively used continuous business improvement techniques to do so. (K8, S8, B3)</p> <p>Describes how they have contributed to continuous improvement projects and how their ideas made a difference to</p>	<p>Describes how continuous improvements helps keep a business competitive. (S8)</p> <p>Describes the impact of continuous improvements on the commercial aspects of the business. (S8)</p>

	<p>the business. (S8, B3, B7, S21)</p> <p>Explains how this has aided their own development. (B7)</p> <p>Explains when they have been adaptable to meeting the needs of the business. (B7)</p>	
<p>Installation and Fit out S9, S13, S19</p>	<p>Describes how they have fitted new marine electrical and electronic equipment adhering to best practice. (S19)</p> <p>Describes how they have used a variety of wiring support mechanisms and systems to route and secure cables in accordance with regulations and best practice and install cables using appropriate segregation and separation methods, in accordance with required specifications in relation to positioning bulkhead penetration. (S9)</p> <p>Describes how they have installed, positioned and secured marine electrical and electronic equipment and components (propulsion, navigational, safety, domestic, operational,</p>	<p>Describes how they maximise efficiency and minimise use of resources. (S19)</p> <p>Describes how they position, install and secure marine electrical and electronic equipment in more challenging situations, e.g. having to take regards to galvanic compatibility and separation. (S13)</p>

	<p>generation, communication, audio visual and IT, protection and ancillary systems) in accordance with design specification and following all required steps and checks for the approved work operation process and operational standards. (S13)</p>	
<p>Servicing S20</p>	<p>Describes the techniques and procedures they have used in order to perform routine servicing within the specified sequence. (S20)</p>	<p>Explains the consequences of not maintaining the correct regular service intervals. (S20) Explains the consequences of not completing the correct servicing documentation (S20)</p>
<p>Testing S14, S15, S22</p>	<p>Describes how they have supported commissioned and performed system tests in accordance with the manufacturer's design specification, company best practice and processes and performed a basic crew role. (S14) Describes how they have checked, tested, and diagnosed marine electrical and electronic equipment and components in</p>	

	<p>boats to company and marine standards. (S15, S22)</p> <p>Describes the documentation required to complete those tasks. (S15)</p> <p>Describes how they have checked, tested and diagnosed battery condition and alternating current and where and how they record these results. (S22)</p>	
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Assessment method 3: Practical assessment

KSBs	Pass – All pass criteria must be met
<p>Diagnosing and Solving Problems K4, S7</p>	<p>Applies different diagnostic and problem-solving techniques and methods to resolve marine electrical and electronic problems relevant to their area of responsibility. (K4, S7)</p>
<p>Checking and Testing K17, K21, K23, S10, S16i</p>	<p>Undertakes checks, tests and inspections when performing electrical and electronic work operations to ensure products and components are fit for purpose. Explains how different checks and tests are undertaken for operations. (K17, K21, K23, S10)</p> <p>Powers down equipment and removes, repairs, reuses/replaces electrical and electronic equipment, circuits and cables. (S16i)</p>
<p>Working to standard K6, S5, B8i</p>	<p>Follows approved industry guidance, techniques, and operational work methods, practices, processes, principles, and procedures when planning, setting up, installing and undertaking marine electrical and electronic work operations. (K6, S5, B8i)</p> <p>Completes the task within given timescales. (S5, B8i)</p>

<p>Use, Maintenance and Storage of Resources K11, K12, S6, S11</p>	<p>Selects, uses, maintains and stores a range of resources safely and correctly. Explains their characteristics, features and safe use. (K11, K12, S6)</p> <p>Restores work area to a safe and tidy condition in accordance with policy and procedures. (S11)</p>
<p>Design, Plan and Set Up K10, S7</p>	<p>Produces and installs marine electrical and electronic systems including assemblies and sub-assemblies from marine electrical engineering drawings, electrical formulae and technical specifications in the correct manner. (K10, S7)</p>
<p>Modifications S18</p>	<p>Carries out required modifications and rewiring using approved materials and techniques, adhering to required specifications and instructions. (S18)</p>