



ENERGY &
ENVIRONMENT
AWARDS

Skills for a greener world

EEA Level 3 End-point Assessment for Low Carbon
Heating Technician

Specification

QAN 610/6011/2
ST1020 V1.1

Specification for

EEA Level 3 End-point Assessment for Low Carbon Heating Technician

QAN 610/6011/2

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Updates to this specification

Since the first publication of Energy & Environment Awards Low Carbon Heating Technician Specification (LCHT), the following updates have been made.

Version	Date first published	Section updated	Page(s)
v2.0	August 2025	Rebranded	All
v1.0	December 2024	First published	All

Section 1: At a Glance EPA Summary

Qualification name	EEA Level 3 End-point Assessment for Low Carbon Heating Technician
Ofqual qualification number	610/6011/2
Standard reference	ST1020
Assessment plan	V1.1
Standard title	Low Carbon Heating Technician
Level	3
On-programme duration	Typically 36 months
Gateway readiness	<p>Mandatory requirements:</p> <ul style="list-style-type: none"> • Employer or training provider must confirm the apprentice is ready to take the EPA • Apprentice must achieve English and mathematics qualifications in line with the apprenticeship funding rules • Compile and submit an EPA portfolio, which the interview will be based <p>To confirm the Apprentice has met all Gateway pre-requisites, employer must complete, sign and submit the Gateway Eligibility Form (GER) form to Energy & Environment Awards. See Appendix B, Low Carbon Heating Technician Supporting Documents 'Gateway Eligibility Form.'</p>
End-point assessment duration	Typically 4 months after the Gateway
End-point assessment methods and their order	The assessment components can be delivered in any order. The result of one assessment method

	<p>does not need to be known before starting the next:</p> <ul style="list-style-type: none"> • Practical assessment with questions • Professional interview (based on an EPA portfolio) • Multiple-choice test
End-point assessment methods and component grading	<p>Practical assessment with questions: Fail; Pass; or Distinction</p> <p>Professional interview based on an EPA portfolio: Fail; Pass; or Distinction</p> <p>Multiple-choice test: Fail; Pass; or Distinction</p>
Overall Grading	Fail; Pass; Merit or Distinction
Certification	Energy & Environment Awards request Apprenticeship completion certificates from the ESFA
Glossary of Terms	Appendix A, Low Carbon Heating Technician Supporting Documents

Objective

The purpose of the Low Carbon Heating Technician (LCHT) end-point assessment (EPA) is to confirm that an apprentice is fully capable of doing their job before they receive their apprenticeship certificate. It also helps to demonstrate that what an apprentice has learned can be applied in the real world.

Once the apprentice has completed the LCHT end-point assessment requirements successfully and has been certified they could take on the following job role:

- Skilled heat pump installer/technician/engineer
- Renewable heating installer/technician/engineer
- Solar thermal installer/technician/engineer

Gateway Readiness

Gateway takes place before the EPA can start. The employer and training provider will review their apprentice's knowledge, skills and behaviours to see if they have met the minimum requirements of the apprenticeship set out in the apprenticeship standard and are ready to take the assessment. Only apprentices who complete gateway successfully can start the EPA. Gateway pre-requisites are listed in the summary table above. The Gateway Eligibility Form must be completed see LCHT Supporting Documents Appendix B.

Recognition of prior learning (RPL)

Energy & Environment Awards does not recognise any apprentice prior learning (RPL) or prior achievement (RPA) for the purpose of amending the assessment requirements of any end-point assessments.

Please refer to Energy & Environment Awards RPL and RPA policy at <https://energyenvironmentawards.co.uk/policies-and-fees/>

In order for Energy & Environment Awards to award an end-point assessment qualification, the apprentice must successfully complete all required assessment components with Energy & Environment Awards. This means that:

- each of the EPA components must be completed in full with Energy & Environment Awards
- where an apprentice transfers to Energy & Environment Awards from another EPAO they have to undertake the entire EPA with Energy & Environment Awards
- components of the EPA cannot be certificated in isolation
- evidence for the portfolio and interview must be produced while the apprentice is on-programme to demonstrate current practice

This does not affect the Gateway requirements which must be met in order for an apprentice to be eligible for end-point assessment.

This does not affect any reasonable adjustments that may be granted.

Section 2: End-point Assessment Components

Component 1: Practical assessment with questions

Overview

In the practical assessment with questions, an independent assessor, approved by Energy & Environment Awards, will observe the apprentice completing a set task or a series of set tasks in an environment agreed with Energy & Environment Awards. The environment must closely relate to their natural working environment. The apprentice will have the opportunity to demonstrate the application of the relevant knowledge, skills and behaviours (KSBs) mapped to the practical assessment with questions.

The independent assessor will ask questions before or during the assessment. To remain as unobtrusive as possible, the independent assessor will ask questions during natural breaks between tasks and after completion of work rather than disrupting the apprentice's flow. Energy & Environment Awards will give the apprentice at least **2 weeks notice** of the assessment.

The following table outlines the procedure for conducting a practical assessment with questions:

Assessors	1 Independent assessor, approved by Energy & Environment Awards.
Practical structure	<p>The total assessment time is 28 hours. A working day is typically considered to be 7.5 hours long. The assessor can increase the time by up to 2 hours and 48 minutes (10%) to allow the apprentice to complete a task or respond to a question if necessary.</p> <p>The assessment may be split into discrete sections held over different days but must be completed over 4 working day(s). If necessary, it may continue into 5 working days if the assessor increases the time by 10%.</p> <p>The independent assessor:</p> <ul style="list-style-type: none"> • may observe a maximum of four apprentices at the same time (subject to Energy & Environment Awards approval of the assessment environment) • Will ask questions to assess the level of competence against the grading descriptors. Questioning will take place during and after work completion

	<p>There may be breaks during the assessment to allow the apprentice to move from one location to another and for meal/comfort breaks. During these breaks, the clock will be stopped and then restarted to ensure that the assessment duration is not reduced. The breaks must be invigilated during the assessment, to maintain security of the EPA, in line with Energy & Environment Awards malpractice policy.</p>
Where will the assessment take place?	<p>The practical assessment with questions must take place in a simulated environment, selected by Energy & Environment Awards, which relates to the apprentice's natural work environment.</p> <p>When assessing more than one apprentice at the same time, the employer/training provider must provide evidence that the workshop layout allows this to happen.</p> <p>Questioning that occurs after the assessment should take place in a quiet location free from distractions and influence.</p>
What are the tasks that will be covered?	<p>The apprentice will be observed carrying out following 2 tasks (Component 1 and 2):</p> <ul style="list-style-type: none"> • Component 1 – Installation (Typically 23 hours) <p>The apprentice will be provided with a written brief detailing a customer's low carbon heating and hot water installation specification. This specification will include a low carbon heating and hot water system, which could include but is not limited to:</p> <ul style="list-style-type: none"> • ground source heat pump • air source heat pump • water source heat pump • solar thermal system <p>The apprentice will then carry out planning and installation practices, including the following:</p> <ul style="list-style-type: none"> • compliance with health and safety regulations • production of a work programme, risk assessment and method statement • planning, sizing and selecting the system • installing the system • testing and commissioning the system • conducting a customer handover

	<p>The independent assessor will play the role of the customer when the apprentice conducts the customer handover.</p> <ul style="list-style-type: none"> • Component 2 – Maintenance (Typically 5 hours) <p>The independent assessor will pre-install two commonly found faults on a low carbon heating and hot water installation that could include but is not limited to:</p> <ul style="list-style-type: none"> • ground source heat pump • air source heat pump • water source heat pump • solar thermal system <p>The apprentice will carry out maintenance practices on the low carbon heating and hot water installation, including the following:</p> <ul style="list-style-type: none"> • safe isolation of electrical supply • compliance with health and safety regulations • servicing the system • diagnosis of a minimum of two commonly found faults (for example, wrong pipe size, wrong type of insulation, etc.) • rectification of two commonly found faults <p>The practical will include completing some paper-based exercises based on the KSBs.</p> <p>These activities provide the apprentice with the opportunity to demonstrate the KSBs mapped to this assessment component.</p> <p>For further details refer to ‘Knowledge, Skills and Behaviours (KSBs) Coverage’ below pages [11 - 31].</p>
Who sets the task(s)?	<p>Energy & Environment Awards will review and discuss with the employer/training provider the various low carbon heating and hot water systems that the apprentice installs and services as part of their regular duties in the workplace. The centre must propose a task that encompasses all required elements, which Energy & Environment Awards will review and approve.</p> <p>See Appendix D, LCHT Supporting Documents ‘Level 3 Low Carbon Heating Technician Practical Assessment with Questions Planning and Approval Form.’</p>
What resources	<p>The employer/training provider will provide equipment and resources needed for the practical assessment with questions.</p>

can the apprentice use?	<p>Equipment and resources needed for the practical assessment with questions must be:</p> <ul style="list-style-type: none"> the tools, plant, machinery, equipment and PPE required for the job in good and safe working condition <p>Relevant work instructions/manuals must be available in hard copy or electronically.</p>
How many questions will the apprentice be asked?	<p>The independent assessor:</p> <ul style="list-style-type: none"> will ask a minimum of 5 questions may ask follow-up questions in order to seek clarification
What will the questions focus on?	<p>Underpinning knowledge and/or skills and behaviours where an opportunity to observe them has not occurred.</p>
Grading	<p>Fail, Pass or Distinction.</p>

Practical assessment with questions knowledge, skills and behaviours (KSBs) coverage

The practical assessment with questions covers:

Practical assessment with questions Theme KSBS – Health and Safety	Amplification and Guidance (where required)
<p>S1 Operate in a safe working manner by complying with health and safety legislation, approved codes of practice and guidance and applying safe working practices.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • follow essential health and safety guidelines while performing tasks • wear appropriate PPE for all tasks being performed <p>Key Points to Understand and Demonstrate for Safe Operation:</p> <ol style="list-style-type: none"> 1. Health and Safety Legislation: <ul style="list-style-type: none"> ○ Knowledge of Legislation: Understand and apply key health and safety laws relevant to the construction and building services industry, such as the Health and Safety at Work Act 1974 ○ Stay updated with any changes in legislation 2. Compliance with Approved Codes of Practice and Guidance: <ul style="list-style-type: none"> ○ Familiarity with Codes: Be familiar with industry-specific codes of practice and guidance documents ○ Application: Apply these codes and guidance from recognised bodies and authorities in daily work to ensure safe practices 3. Application of Safe Working Practices: <ul style="list-style-type: none"> ○ Use of PPE: Correctly use Personal Protective Equipment (PPE) such as gloves, safety glasses, and hard hats ○ Safe Handling: Demonstrate safe manual handling techniques to prevent injuries

Practical assessment with questions Theme KSBS – Health and Safety	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Emergency Procedures: Know and follow emergency procedures, including fire safety and first aid. Report and document any incidents or near misses promptly <p>4. Work Environment:</p> <ul style="list-style-type: none"> ○ Site Safety: Maintain a clean and organised worksite to minimise risks ○ Tool Safety: Use tools and equipment safely and ensure they are well-maintained
<p>B1 Takes personal responsibility for and promotes health and safety.</p>	<p>Apprentice must:</p> <ul style="list-style-type: none"> • always wear the appropriate PPE • be able to perform all tasks safely and logically, following health and safety guidelines and manufacturer's instructions <p>Key Points to Understand and Demonstrate when Taking Personal Responsibility for and Promoting Health and Safety:</p> <p>1. Adherence to Health and Safety Legislation:</p> <ul style="list-style-type: none"> ○ Legislation and Regulations: Follow all relevant health and safety laws, regulations, and codes of practice ○ Compliance: Stay updated on changes in health and safety legislation and apply them in the workplace <p>2. Safe Working Practices:</p> <ul style="list-style-type: none"> ○ Consistently use Personal Protective Equipment (PPE) ○ Ensure tools and equipment are in good working condition and used correctly <p>3. Emergency Procedures:</p>

Practical assessment with questions Theme KSBS – Health and Safety	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Be familiar with and be able to execute emergency procedures, including fire safety and first aid ○ Know the location of emergency exits, first aid kits and fire extinguishers <p>4. Promoting Health and Safety:</p> <ul style="list-style-type: none"> ○ Leading by Example: Set a positive example by consistently following health and safety practices ○ Encouraging Others: Encourage colleagues to adhere to health and safety protocols and report unsafe conditions <p>5. Continuous Improvement:</p> <ul style="list-style-type: none"> ○ Training and Development: Participate in ongoing health and safety training to stay updated with best practices ○ Feedback and Reflection: Reflect on health and safety practices and seek feedback to improve continuously
Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
<p>K21 Planning, sizing and selecting practices for low carbon heating and hot water systems and components.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • perform a full heat loss calculation of one room from the plans given by the assessor • use the information provided by the assessor, the apprentice is to select and size relevant heat emitters and appliances. All pipework and components to be sized correctly

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. System Planning: Understand the system design principles of planning low carbon heating (e.g. heat pumps, solar thermal systems) and hot water systems, including layout, design considerations, and integration with existing systems. 2. Sizing Calculations: Methods of calculating the appropriate size of heating and hot water systems based on building requirements 3. Component Selection: Criteria for selecting appropriate components based on system requirements, efficiency, and compatibility with other system elements. 4. Energy Efficiency: Techniques for maximising energy efficiency in system design and component selection. Understanding of thermal properties and how they affect system performance. 5. Component Compatibility: Knowledge of how different components interact within a system. Ensuring compatibility between various parts of the system to avoid issues during installation and operation. 6. Installation Practices: Best practices for installing low carbon heating and hot water systems. Safety procedures and risk assessments related to installation.
K24 Risk assessments, method statements and work programmes: production methods and requirements.	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> complete a written risk assessment for the proposed installation of a heating or hot water system complete a programme of works in a logical manner

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Risk Assessments: <ul style="list-style-type: none"> ○ Identification of Hazards: Recognise potential hazards associated with low carbon heating and hot water systems ○ Risk Evaluation: Assess the likelihood and severity of risks to determine appropriate control measures ○ Control Measures: Implement measures to mitigate identified risks, ensuring the safety of all personnel and the environment ○ Documentation: Accurately document risk assessments, including identified hazards, risk levels, and control measures 2. Method Statements: <ul style="list-style-type: none"> ○ Detailed Procedures: Develop detailed method statements outlining the steps required to safely and effectively complete tasks ○ Safety Protocols: Include safety protocols and procedures to be followed during the execution of tasks ○ Roles and Responsibilities: Clearly define the roles and responsibilities of all team members involved in the task ○ Compliance: Ensure method statements comply with relevant health and safety regulations and industry standards 3. Work Programmes: <ul style="list-style-type: none"> ○ Planning and Scheduling: Develop work programmes that outline the timeline and sequence of tasks required for the installation and maintenance of low carbon heating systems

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Resource Allocation: Efficiently allocate resources, including personnel, equipment, and materials, to ensure the smooth execution of the work programme ○ Monitoring and Adjustments: Continuously monitor the progress of the work programme and make necessary adjustments to address any issues or delays <p>4. Production Methods and Requirements:</p> <ul style="list-style-type: none"> ○ Installation Techniques: Be proficient in the various installation techniques for low carbon heating systems, including ground and air source heat pumps and solar thermal collectors ○ Testing and Commissioning: Understand the procedures for testing and commissioning systems to ensure they are operating correctly and efficiently ○ Maintenance and Fault Finding: Develop skills in routine maintenance, fault finding, and rectification to ensure the longevity and reliability of the systems
<p>S3 Produce work programmes for tasks within low carbon heating and hot water industry.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • complete a work programme for the installation of a low carbon heating appliance, heating system and hot water system in a domestic dwelling <p>Key Points to Understand and Demonstrate:</p> <p>1. Understand Project Requirements:</p> <ul style="list-style-type: none"> ○ Clearly identify the scope of the project, including specific tasks and objectives

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Gather and interpret relevant technical information and specifications <p>2. Resource Management:</p> <ul style="list-style-type: none"> ○ Identify and allocate necessary resources, including materials, tools, and personnel ○ Ensure that resources are available when needed to avoid delays <p>3. Time Management:</p> <ul style="list-style-type: none"> ○ Scheduling: Develop a detailed schedule that outlines the start and end times for each task ○ Milestones: Set clear milestones to track progress and ensure timely completion of the project <p>4. Coordination and Communication:</p> <ul style="list-style-type: none"> ○ Stakeholder Coordination: Coordinate with other trades and stakeholders to ensure seamless integration of activities ○ Communication Plan: Establish a communication plan to keep all involved informed of progress and any changes to the work programme <p>5. Risk Management and Mitigation:</p> <ul style="list-style-type: none"> ○ Identify Risks: Identify potential risks that could impact the work programme and develop mitigation strategies ○ Contingency Planning: Include contingency plans to address unforeseen issues that may arise during the project <p>6. Monitoring and Adjusting:</p> <ul style="list-style-type: none"> ○ Implement mechanisms to monitor progress against the work programme. ○ Make adjustments as necessary to address any issues or changes in project scope.

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<p>7. Documentation:</p> <ul style="list-style-type: none"> ○ Work Programme Documentation: Accurately document the work programme, including task lists, schedules, resource allocations, and risk management plans ○ Updates and Revisions: Keep the work programme updated with any changes and ensure all team members; stakeholders are informed on progress and deviations from the plan
<p>S4 Produce risk assessments and method statements for the low carbon heating and hot water systems work.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • produce a full risk assessment and method statement for one aspect of the proposed installation of a low carbon heating system. Note: this does not need to cover the entire installation <p>Key Points to Understand and Demonstrate:</p> <p>1. Risk Assessment Production:</p> <ul style="list-style-type: none"> ○ Identification of Hazards: Recognize potential hazards associated with low carbon heating and hot water systems ○ Risk Evaluation: Assess the likelihood and severity of risks to determine appropriate control measures ○ Control Measures: Implement measures to mitigate identified risks, ensuring the safety of all personnel and the environment ○ Documentation: Accurately document risk assessments, including identified hazards, risk levels, and control measures <p>2. Method Statement Creation:</p>

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Detailed Procedures: Develop detailed method statements outlining the steps required to safely and effectively complete tasks ○ Safety Protocols: Inclusion of safety precautions, tools and equipment required, and specific instructions for safe execution of tasks ○ Roles and Responsibilities: Clearly define the roles and responsibilities of all team members involved in the task ○ Compliance: Ensure method statements comply with relevant health and safety regulations and industry standards <p>3. Environmental and Sustainability Considerations:</p> <ul style="list-style-type: none"> ○ Incorporation of principles of sustainability and energy efficiency in risk assessments and method statements ○ Consideration of environmental impact and waste management practices <p>4. Communication Skills:</p> <ul style="list-style-type: none"> ○ Effective communication of risk assessments and method statements to colleagues and stakeholders ○ Ability to explain safety procedures and ensure understanding among team members <p>5. Compliance and Documentation:</p> <ul style="list-style-type: none"> ○ Ensuring all risk assessments and method statements comply with industry standards and regulatory requirements. ○ Keeping accurate records and documentation for audit and review purposes

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
S13 Plan, size and select low carbon heating and hot water systems.	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> perform a full room-by-room heat loss calculation from a plan drawing of one room in a property, by hand, using only a calculator use the assessor's documents to select the appropriate size of appliance, heat emitters, and components, and competently explain their choices and reasoning to the assessor <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> System Planning: <ul style="list-style-type: none"> Site Assessment: Conduct a thorough assessment of the installation site to understand the specific requirements and constraints Design Layout: Develop a detailed design layout that integrates the low carbon heating and hot water systems with the existing infrastructure Sizing Calculations: <ul style="list-style-type: none"> Heat Load Calculations: Perform accurate heat load calculations to determine the heating requirements of the building Component Sizing: Size components such as heat pumps, solar thermal systems, and hot water storage tanks to meet the calculated demands Component Selection: <ul style="list-style-type: none"> Efficiency and Compatibility: Select components based on their efficiency, compatibility with other system elements, and suitability for the specific application

Practical assessment with questions Theme KSBs – Planning for installation	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Sustainability Considerations: Incorporate sustainability principles by choosing components that minimise environmental impact and maximize energy efficiency <p>4. Regulatory Compliance:</p> <ul style="list-style-type: none"> ○ Industry Standards: Ensure all planning, sizing, and selection activities comply with relevant industry standards and regulations ○ Documentation: Maintain accurate records of all calculations, design choices, and justifications to demonstrate compliance <p>5. Environmental and Economic Considerations:</p> <ul style="list-style-type: none"> ○ Cost-Benefit Analysis: Perform a cost-benefit analysis to balance initial costs with long-term savings and environmental benefits ○ Renewable Energy Integration: Plan for the integration of renewable energy sources to enhance system sustainability

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
K11 Testing and commissioning practices and techniques applicable to low carbon heating and hot water systems.	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • competently set the heat curve on a heating appliance using the design temperatures provided • check the correct performance and operation of the heating and hot water systems and all the safety components installed • complete a benchmark/commissioning sheet including a verbal handover to the customer (assessor)

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
	<p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Pre-Commissioning Checks: Understand the importance of and how to perform pre-commissioning checks to ensure all components are correctly installed and ready for testing. 2. System Testing: Demonstrate the ability to conduct various tests on low carbon heating and hot water systems, including pressure tests, electrical safety tests, and performance tests. 3. Commissioning Procedures: Follow standard commissioning procedures to bring the system into operation, ensuring it meets design specifications and operates efficiently. 4. Documentation and Reporting: Accurately document all testing and commissioning activities, including test results, issues identified, and corrective actions taken. 5. Handover Process: Understand the process of handing over the system to the client, including providing operational advice and ensuring the client understands how to use and maintain the system. 6. Troubleshooting: Identify and resolve any issues that arise during testing and commissioning, ensuring the system operates correctly and safely. 7. Compliance with Standards: Ensure all testing and commissioning activities comply with relevant industry standards and regulations.
S5 Install, low carbon heating and hot water systems.	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> install a low carbon heating system. A suitable low carbon heating appliance, a high-gain unvented hot water cylinder, buffer tank, radiator, and basin will

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
	<p>already be in position. The apprentice is to install the pipework and safety components for the system</p> <ul style="list-style-type: none"> • install the pipework and safety components to an existing high-gain unvented hot water cylinder, basin and wastewater system <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Preparation and Planning: <ul style="list-style-type: none"> ○ Site Assessment: Conduct a thorough assessment of the installation site to identify any potential issues and ensure it is suitable for the system ○ Material and Equipment Preparation: Ensure all necessary materials and equipment are available and in good condition before starting the installation 2. Installation Procedures: <ul style="list-style-type: none"> ○ System Layout: Follow the design layout and manufacturer's guidelines to position and install components correctly ○ Component Installation: Install key components such as heat pumps, solar thermal systems, and hot water storage tanks according to specifications ○ Pipework and Connections: Install and connect pipework, ensuring all joints are secure and leak-free ○ Electrical Connections: Safely install and connect electrical components, adhering to relevant electrical standards and regulations

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
	<p>3. Safety Practices:</p> <ul style="list-style-type: none"> ○ Health and Safety Compliance: Follow all health and safety regulations, including the use of Personal Protective Equipment (PPE) and safe working practices ○ Safe Handling: Use safe manual handling techniques to prevent injuries during the installation process
<p>S6 Test, commission and handover low carbon heating and hot water systems, including providing operational advice.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • perform the relevant testing and commissioning tasks to ensure their newly installed low carbon heating appliance and hot water system operates in a safe and efficient manner • articulate verbal advice to the customer (the assessor will take on the role of a customer) regarding the safe and efficient operation of a new low carbon and low temperature heating system <p>Key Points to Understand and Demonstrate:</p> <p>1. System Testing:</p> <ul style="list-style-type: none"> ○ Pre-Commissioning Checks: Conduct pre-commissioning checks to ensure all components are correctly installed and ready for testing ○ Functional Testing: Perform functional tests to verify that the system operates as intended, including pressure tests, electrical safety tests, and performance tests ○ Troubleshooting: Identify and resolve any issues that arise during testing to ensure the system operates correctly and safely <p>2. Commissioning Procedures:</p>

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Standard Procedures: Follow standard commissioning procedures to bring the system into operation, ensuring it meets design specifications and operates efficiently ○ Calibration and Adjustment: Calibrate and adjust system settings to optimise performance and efficiency ○ Documentation: Accurately document all commissioning activities, including test results, issues identified, and corrective actions taken <p>3. Documentation and Handover Process:</p> <ul style="list-style-type: none"> ○ Client Communication: Provide clear and comprehensive operational advice to the client, ensuring they understand how to use and maintain the system ○ Installation Records: Accurately document the installation process, including any issues encountered and how they were resolved ○ Client Handover: <ul style="list-style-type: none"> ▪ Supply the client with all necessary documentation, including user manuals, maintenance schedules, and warranty information ▪ Conduct a demonstration of the system's operation, highlighting key features and safety procedures <p>4. Safety Practices:</p> <ul style="list-style-type: none"> ○ Health and Safety Compliance: Follow all health and safety regulations, including the use of Personal Protective Equipment (PPE) and safe working practices ○ Safe Isolation: Ensure safe isolation of electrical supplies during testing and commissioning to prevent accidents

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
B4 Takes responsibility for completing work.	<p>Apprentice must work independently and complete all parts of the assessment tasks on their own, without seeking advice or guidance from anyone else present.</p> <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Accountability: <ul style="list-style-type: none"> ○ Ownership of Tasks: Take full responsibility for the tasks assigned to you, ensuring they are completed to a high standard ○ Problem-Solving: Address any issues that arise during the completion of tasks, finding solutions independently or seeking help when necessary 2. Time Management: <ul style="list-style-type: none"> ○ Meeting Deadlines: Ensure all tasks are completed within the agreed times ○ Prioritisation: Prioritise tasks effectively to manage workload and meet deadlines 3. Quality of Work: <ul style="list-style-type: none"> ○ Attention to Detail: Pay close attention to detail to ensure the quality and accuracy of work ○ Continuous Improvement: Seek feedback and continuously look for ways to improve work practices 4. Professionalism: <ul style="list-style-type: none"> ○ Reliability: Be reliable and dependable, consistently delivering work on time and to the required standard. ○ Ethical Conduct: Maintain high ethical standards in all work activities

Practical assessment with questions Theme KSBs – Installation and testing	Amplification and Guidance (where required)
	<p>5. Communication:</p> <ul style="list-style-type: none"> ○ Progress Updates: Keep supervisors and colleagues informed of progress and any potential delays ○ Clear Documentation: Document work clearly and accurately, ensuring it can be understood by others
Practical assessment with questions Theme KSBs – Service and maintenance	Amplification and Guidance (where required)
<p>K16 Routine service and maintenance practices and techniques applicable to low carbon heating and hot water systems.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • follow a logical approach to perform a routine service and maintenance on the heating appliance following the manufacturer's instructions and guidance • perform a service and maintenance on an unvented hot water system • follow all health and safety guidance, and maintain clear communication with the customer (the assessor will take on this role) throughout <p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Routine Maintenance Procedures: Understand the standard procedures for routine maintenance of low carbon heating and hot water systems, including cleaning, inspection, and testing. 2. Service Intervals: Know the recommended service intervals for different types of low carbon heating systems and components.

Practical assessment with questions Theme KSBs – Service and maintenance	Amplification and Guidance (where required)
	<p>3. Safety Practices: Demonstrate safe working practices, including the safe isolation of electrical supplies and adherence to health and safety regulations.</p> <p>4. Diagnostic Techniques: Use diagnostic techniques to identify and troubleshoot common issues in low carbon heating systems.</p> <p>5. Component Checks: Perform checks on key components such as heat pumps, solar thermal systems, and unvented hot water systems to ensure they are functioning correctly.</p> <p>6. Documentation: Accurately document all maintenance activities, including any issues found and actions taken.</p> <p>7. Client Communication: Effectively communicate with clients about the maintenance performed, any issues identified, and recommendations for future maintenance.</p>
<p>K19 Fault finding, diagnosis and rectification practices and techniques applicable to low carbon heating and hot water systems.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • perform key safety tasks such as safe isolation before attempting the fault diagnosis on a heating or hot water system. • utilise manufacturers data and perform a logical step-by-step fault finding diagnosis and this diagnosis must be proven with relevant test equipment, if applicable • explain how they would then rectify the fault <p>Key Points to Know:</p> <p>1. Fault Finding Techniques:</p>

Practical assessment with questions Theme KSBs – Service and maintenance	Amplification and Guidance (where required)
	<ul style="list-style-type: none"> ○ Identifying common faults in low carbon heating and hot water systems ○ Understanding the symptoms of various faults and their potential causes <p>2. Diagnosis Practices:</p> <ul style="list-style-type: none"> ○ Systematic approach to diagnosing faults, including visual inspections and testing ○ Use of diagnostic software and tools to pinpoint issues ○ Interpreting data from system controls and sensors to identify problems <p>3. Rectification Techniques:</p> <ul style="list-style-type: none"> ○ Methods for rectifying identified faults, including replacing faulty components and making necessary adjustments ○ Ensuring repairs comply with relevant standards and regulations ○ Testing the system post-repair to confirm the fault has been rectified and the system is operating efficiently
<p>S9 Service, maintain, diagnose faults and rectify low carbon heating and hot water systems, including safe isolation of supply.</p>	<p>Apprentice must be able to:</p> <ul style="list-style-type: none"> • safely electrically isolate the system before performing any perform any maintenance task • competently utilise the correct tools and documents available to successfully diagnose a fault in a low carbon heating or hot water system • explain their diagnosis process clearly and precisely

Practical assessment with questions Theme KSBs – Service and maintenance	Amplification and Guidance (where required)
	<p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Servicing and Maintenance: <ul style="list-style-type: none"> ○ Scheduled Maintenance: Perform regular maintenance tasks such as cleaning, inspecting, and testing components to ensure optimal performance ○ Component Check: Check key components like heat pumps, solar thermal systems, and hot water storage tanks for wear and tear or potential issues 2. Fault Diagnosis: <ul style="list-style-type: none"> ○ Diagnostic Techniques: Use appropriate diagnostic tools and techniques to accurately identify faults in the system ○ Systematic Approach: Apply a systematic approach to fault finding, ensuring all potential causes are considered and tested 3. Fault Rectification: <ul style="list-style-type: none"> ○ Repair Techniques: Implement effective repair techniques to rectify identified faults, ensuring the system is restored to full functionality ○ Replacement of Components: Replace faulty components with appropriate parts, ensuring compatibility and performance 4. Safe Isolation of Supply: <ul style="list-style-type: none"> ○ Electrical Isolation: Safely isolate electrical supplies before performing any maintenance or repair work to prevent accidents ○ Compliance with Safety Standards: Follow all relevant health and safety regulations and standards during isolation procedures

Practical assessment with questions Theme KSBs – Service and maintenance	Amplification and Guidance (where required)
	<p>5. Documentation:</p> <ul style="list-style-type: none"> ○ Service Records: Accurately document all service and maintenance activities, including any issues found and actions taken ○ Fault Logs: Maintain detailed logs of faults identified and rectified, showing the diagnostic process and solutions implemented <p>6. Client Communication:</p> <ul style="list-style-type: none"> ○ Operational Advice: Provide clients with clear and comprehensive advice on system operation and maintenance. ○ Service Reports: Supply clients with detailed service reports, including recommendations for future maintenance

Practical assessment with questions roles and responsibilities

Role	Responsibility
Independent Assessor	<p>Explain, to the apprentice, the format and timescales of the practical assessment with questions before it starts.</p> <p>Give the apprentice a written brief detailing a customer's low carbon heating and hot water installation specification.</p> <p>Conduct and assess the practical assessment with questions.</p> <p>Use language in the delivery of the EPA that is appropriate to level 3.</p> <p>Invigilate and supervise the apprentice during the practical assessment with questions, including moving between tasks and breaks, to prevent malpractice in line with Energy & Environment Awards invigilation procedures.</p> <p>Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by Energy & Environment Awards.</p>
Employer/Training Provider	<p>The training provider must liaise effectively with the employer to ensure the apprentice is prepared for the practical assessment with questions.</p> <p>Ensure that the apprentice is given sufficient time away from regular duties to prepare for, and complete the EPA</p> <p>Provide the venue for the practical assessment with questions which must be suitably equipped to allow the apprentice to attempt all aspects of the practical assessment with questions.</p> <p>Provide all necessary tools and equipment for the apprentice.</p> <p>Ensure the apprentice has access to the resources used on a daily basis.</p> <p>Provide Energy & Environment Awards with access to any employer-specific documentation as required for example, company policies</p> <p>Use Energy & Environment Awards Practical assessment review service to review and discuss the fitness for purpose of the assessment task.</p>

Role	Responsibility
	<p>Ensure that any required supervision during the EPA period, as stated within this EPA Plan and this Specification, is in place.</p> <p>Employer/training provider must remain independent from the delivery of the EPA.</p>
Energy & Environment Awards	<p>Energy & Environment Awards will review:</p> <ul style="list-style-type: none"> the arrangements for the practical assessment with questions planned by the employer/training provider with the employer/training provider the various types of low carbon heating and hot water systems that the apprentice installs and services as part of their regular duties in the workplace <p>Energy & Environment Awards will use the above information to choose a suitable assessment task from a selection of tasks. The tasks will be developed in collaboration with employers.</p> <p>Arrange for the practical assessment with questions to take place, in consultation with the employer/training provider and independent assessor</p>

Component 2: Professional Interview based on an EPA portfolio

Overview

The professional interview is based on the apprentice's EPA Portfolio and focuses on holistic evidence covering the KSBs relating to the professional interview. The apprentices may refer to their EPA portfolio to help answer interview questions.

The EPA portfolio is **not assessed**. The EPA Portfolio Template is designed to assist the apprentice during their professional interview. The apprentice should use the EPA Portfolio Template to collate evidence in preparation for their professional interview. It should only contain evidence compiled throughout the apprenticeship. The EPA Portfolio Template will be issued to employers/training providers by their Energy & Environment Awards Service Delivery Coordinator and must be completed and submitted to Energy & Environment Awards at Gateway.

The apprentice will be given at least **2 weeks notice** of the professional interview.

The following table outlines the procedure for conducting a professional interview based on an EPA portfolio:

Assessors	1 independent assessor approved by Energy & Environment Awards will conduct the interview.
Professional Interview structure based on an EPA portfolio	<p>The apprentice's Manager/Mentor must support the completion of the EPA Portfolio Template tasks in accordance with company policy and procedures.</p> <p>Types and number of questions:</p> <ul style="list-style-type: none"> • The independent assessor must ask at least 8 questions • Standardised open questions which will be based on the contents of the evidence in the EPA portfolio to ensure the apprentice's level of knowledge, skills and behaviours • Additional follow up questions are allowed, to seek clarification <p>Location: Employer's premises or a suitable venue for example a training provider's premises.</p> <p>Time:</p> <ul style="list-style-type: none"> • The interview must last 75 minutes (1 hour 15 minutes) • The independent assessor has the discretion to increase the time of the professional interview by up to 7.5 minutes (10%) to allow the apprentice to complete their last answer

	<p>The professional interview will be:</p> <ul style="list-style-type: none"> • conducted by 1 independent assessor • face to face or remote, as agreed • recorded in writing using the professional interview record template provided by Energy & Environment Awards • video recorded using relevant technology such as Microsoft Teams or an audio recording device • conducted under examination conditions <p>The apprentice must have access to their EPA portfolio throughout the professional interview.</p> <p>Although questioning will cover ALL the elements of the LCHT standard (listed below in this section of the Specification), the independent assessor will prioritise areas according to what they see in the EPA portfolio.</p> <p>For further guidance on the EPA portfolio refer to Section 5 Practical Guidance on an EPA Portfolio.</p>
What topics will be covered?	<p>For further details refer to ‘Knowledge, Skills and Behaviours (KSBs) Coverage below pages [36 - 71].</p>
When will the EPA portfolio be referred to?	<p>The EPA portfolio:</p> <ul style="list-style-type: none"> • will be reviewed by the independent assessor before the interview • can be referred to by the apprentice to illustrate their answers <p>Note: the EPA portfolio is not directly assessed.</p>
Grading	<p>Fail, Pass or Distinction</p>

Professional interview based on an EPA portfolio knowledge, skills and behaviours (KSBs) coverage

The professional interview based on an EPA portfolio covers the following (Task references relate to Tasks specified in the EPA Portfolio template):

Task 1: Environment and sustainability	Amplification and guidance (where required)
<p>K2 Principles of sustainability, energy efficiency, reuse of materials and recycling. Principles of control and management of emissions and waste. Efficient use of resources and legislation.</p>	<p>Apprentice should be able to:</p> <ul style="list-style-type: none"> • compare and contrast traditional, non-renewable energy sources with renewable energy sources. Describing how each energy source generates heat, the scientific principles behind and the limitations of Energy produced • know about the measures and practices used to increase Energy efficiency of UK property's, heating and hot water systems and appliances • be aware of the measures that can be taken to reduce emissions and waste and refer to the legislation that provides guidance <p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Principles of Sustainability: <ul style="list-style-type: none"> ○ Understanding Sustainability: Evidence of knowledge about sustainability principles and their importance in the context of low carbon heating systems. ○ Sustainable Practices: Examples of implementing sustainable practices in daily work, such as using renewable energy sources and eco-friendly materials. 2. Energy Efficiency:

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Energy Efficiency Measures: Documentation of measures taken to improve energy efficiency in heating and hot water systems. ○ Energy Audits: Records of conducting energy audits and implementing recommendations to enhance system efficiency. ○ Performance Metrics: Data showing improvements in energy performance and reductions in energy consumption. <p>3. Reuse of Materials and Recycling:</p> <ul style="list-style-type: none"> ○ Material Reuse: Examples of reusing materials in installations and maintenance to minimise waste. ○ Recycling Practices: Documentation of recycling practices, including segregating waste and ensuring proper disposal of recyclable materials. ○ Waste Reduction Initiatives: Reports or logs showing efforts to reduce waste generation through reuse and recycling. <p>4. Control and Management of Emissions and Waste:</p> <ul style="list-style-type: none"> ○ Emissions Control: Evidence of practices to control and reduce emissions from heating systems. ○ Waste Management: Procedures for managing waste, including hazardous waste, in compliance with environmental regulations. ○ Environmental Impact Assessments: Records of conducting environmental impact assessments and implementing mitigation measures.

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<p>5. Efficient Use of Resources:</p> <ul style="list-style-type: none"> ○ Resource Management: Documentation of efficient use of resources, such as water, fuel, and materials ○ Resource Optimisation: Examples of optimising resource use to minimise environmental impact ○ Sustainable Sourcing: Evidence of sourcing materials and components from sustainable suppliers <p>6. Legislation and Compliance:</p> <ul style="list-style-type: none"> ○ Regulatory Knowledge: Evidence of understanding relevant environmental legislation and regulations ○ Compliance Records: Documentation of compliance with environmental laws and standards ○ Training and Certification: Certificates or records of training on environmental regulations and sustainability practices
<p>S2 Apply environmental and sustainability principles.</p>	<p>Apprentices should be able to demonstrate and explain how their daily working practices, waste management, and material selections contribute to environmental protection and support sustainable practices.</p> <p>Key Points to Understand and Demonstrate:</p> <p>1. Understanding Environmental and Sustainability Principles:</p> <ul style="list-style-type: none"> ○ Application of Principles: Evidence of understanding key environmental and sustainability principles relevant to low carbon heating systems

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Regulatory Compliance: Documentation of compliance with environmental regulations and guidelines 2. Sustainable Practices in Daily Work: <ul style="list-style-type: none"> ○ Eco-Friendly Materials: Examples of using eco-friendly materials and methods in installations and maintenance ○ Energy Efficiency Measures: Implementation of energy-saving measures, such as using energy-efficient tools and equipment ○ Waste Reduction: Documentation of efforts to reduce waste and promote recycling on-site 3. Resource Management: <ul style="list-style-type: none"> ○ Efficient Resource Use: Records of efficient use of resources, such as fuel, water, and materials ○ Sustainable Sourcing: Evidence of sourcing materials and components from sustainable suppliers ○ Carbon Footprint Reduction: Initiatives to reduce carbon footprint, such as optimising route planning to minimise travel distances 4. Waste Management: <ul style="list-style-type: none"> ○ Proper Disposal: Procedures for proper disposal of waste materials in accordance with environmental standards ○ Recycling Practices: Evidence of segregating waste for recycling and safe disposal of hazardous materials ○ Waste Reduction Reports: Reports or logs showing reduced waste generation through reuse and recycling practices

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<p>5. Innovative Solutions:</p> <ul style="list-style-type: none"> ○ Sustainable Technologies: Examples of innovative approaches to heating and hot water systems that enhance environmental sustainability ○ Case Studies: Case studies or project reports highlighting the use of sustainable technologies or methods ○ Stakeholder Feedback: Feedback or testimonials from stakeholders on the positive environmental impact of implemented solutions <p>6. Monitoring and Reporting:</p> <ul style="list-style-type: none"> ○ Performance Monitoring: Regular monitoring of environmental performance and sustainability metrics ○ Compliance Reports: Reports or audits showing compliance with environmental standards and continuous improvement ○ Corrective Actions: Documentation of corrective actions taken to address any environmental issues
<p>B2 Considers the environment and sustainability.</p>	<p>Apprentices must be able to explain how their job role and their actions in that job role directly affect the environment.</p> <p>Key Points to Understand and Demonstrate:</p> <ul style="list-style-type: none"> ● Environmental Awareness: <ul style="list-style-type: none"> ○ Clearly articulate understanding of environmental legislation and regulations relevant to low carbon heating systems

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Discuss strategies for identifying and mitigating environmental risks associated with installation and maintenance activities • Sustainable Practices: <ul style="list-style-type: none"> ○ Explain how they implement energy-efficient practices and use sustainable materials in their work ○ Describe how they promote and practice the principles of reduce, reuse, and recycle in all work activities • Efficient Resource Use: <ul style="list-style-type: none"> ○ Provide examples of how they optimise the use of resources, such as water and energy, to minimise waste ○ Discuss the selection and use of tools and equipment that have a lower environmental impact • Waste Management: <ul style="list-style-type: none"> ○ Explain their approach to managing and disposing of waste materials in accordance with environmental regulations ○ Describe how they segregate waste for recycling and ensure hazardous materials are handled safely • Energy Efficiency: <ul style="list-style-type: none"> ○ Discuss their experience with installing and maintaining systems that enhance energy efficiency, such as heat pumps and solar thermal systems ○ Provide examples of conducting energy audits and recommending improvements for energy efficiency in heating systems

Task 1: Environment and sustainability	Amplification and guidance (where required)
	<ul style="list-style-type: none"> • Continuous Improvement: <ul style="list-style-type: none"> ○ Highlight their commitment to staying updated with the latest advancements in low carbon technologies and sustainable practices ○ Discuss their engagement in continuous learning and professional development to enhance their environmental and sustainability knowledge
Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
<p>K12 Installation practices and techniques of electrical and electronic control systems applicable to low carbon heating and hot water systems.</p>	<p>Apprentices should know the basic fundamental safe working practices to safely isolate, install or replace an electrical control to a heating or hot water system whilst working within the limits of their own competence.</p> <p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Understanding of Installation Practices: <ul style="list-style-type: none"> ○ Components and Systems: Evidence of knowledge about the components and systems involved in low carbon heating and hot water systems ○ Installation Standards: Documentation of relevant standards and regulations governing the installation of these systems 2. Installation Procedures: <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for installing electrical and electronic control systems

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Compliance with Standards: Examples of compliance with industry standards and manufacturers' guidelines during installation ○ Annotated Diagrams: Annotated diagrams or schematics showing the correct installation of control systems <p>3. Technical Skills and Techniques:</p> <ul style="list-style-type: none"> ○ Wiring and Connections: Demonstration of wiring and connection techniques specific to low carbon systems ○ Use of Tools and Equipment: Use of appropriate tools and equipment for installation tasks, with calibration records ○ Configuration and Programming: Evidence of configuring and programming control systems to ensure proper operation <p>4. Safety and Compliance:</p> <ul style="list-style-type: none"> ○ Health and Safety Adherence: Records of adherence to health and safety guidelines during installation ○ Safety Checks: Documentation of safety checks performed before, during, and after installation ○ Training Records: Certificates or training records related to electrical safety and low carbon technologies <p>5. Sustainability Practices:</p> <ul style="list-style-type: none"> ○ Eco-Friendly Practices: Examples of sustainable practices followed during installation, such as minimising waste and using eco-friendly materials ○ Environmental Impact: Evidence of efforts to reduce the environmental impact of installation activities

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<p>6. Quality Assurance:</p> <ul style="list-style-type: none"> ○ Testing and Commissioning: Procedures for testing and commissioning installed systems to ensure they operate correctly and efficiently ○ Quality Checks: Documentation of quality checks and performance testing results ○ Client Feedback: Feedback from clients or supervisors on the quality of installations
<p>K13 Testing and commissioning practices and techniques of electrical and electronic control systems applicable to low carbon heating and hot water systems.</p>	<p>Apprentices should be able to logically test an electrical control and provide guidance to customers during handover.</p> <p>The apprentice must be able to explain the function and operations of both weather compensation and load compensation controls.</p> <p>Key Points to Know:</p> <p>1. Understanding of Testing and Commissioning:</p> <ul style="list-style-type: none"> ○ Principles and Importance: Evidence of knowledge about the principles and importance of testing and commissioning low carbon heating and hot water systems ○ Standards and Regulations: Documentation of the standards and regulations governing these practices <p>2. Testing Procedures:</p> <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for conducting various tests, such as continuity tests, insulation resistance tests, and functional tests

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Use of Testing Equipment: Examples of using appropriate testing equipment, such as multimeters, oscilloscopes, and thermal imaging cameras ○ Systematic Approaches: Records of systematic approaches to testing, including test plans and checklists <p>3. Commissioning Techniques:</p> <ul style="list-style-type: none"> ○ Calibration and Configuration: Detailed procedures for commissioning control systems, including system calibration and configuration ○ Performance Verification: Documentation of system performance verification and optimisation ○ Adjustments Records: Records of adjustments made to ensure systems operate efficiently and effectively
<p>K18 Routine service and maintenance practices and techniques of electrical and electronic control systems applicable to low carbon heating and hot water systems.</p>	<p>Apprentices should be aware of key safety principles and regulations that refer to electrical installations, and the limits of their own competence to rectify any faults.</p> <p>Key Points to Know:</p> <p>1. Understanding of Maintenance Requirements:</p> <ul style="list-style-type: none"> ○ Knowledge of Systems: Evidence of understanding the routine service and maintenance needs of low carbon heating and hot water systems. ○ Benefits of Maintenance: Documentation of the benefits of regular maintenance for system efficiency and longevity <p>2. Service and Maintenance Procedures:</p>

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for performing routine service tasks, such as cleaning, inspecting, and replacing components ○ Specific Maintenance Activities: Examples of specific maintenance activities, like checking electrical connections, testing sensors, and calibrating control systems ○ Tools and Equipment: Use of appropriate tools and equipment for maintenance tasks, with calibration records <p>3. Technical Skills and Techniques:</p> <ul style="list-style-type: none"> ○ Diagnosing Issues: Demonstration of skills in diagnosing and troubleshooting common issues in low carbon systems ○ Preventive Maintenance: Evidence of performing preventive maintenance to avoid system failures ○ Corrective Actions: Records of corrective maintenance actions taken to resolve identified issues <p>4. Safety and Compliance:</p> <ul style="list-style-type: none"> ○ Health and Safety Adherence: Evidence of adherence to health and safety guidelines during maintenance activities ○ Risk Assessments: Risk assessments and safety checks performed before, during, and after maintenance ○ Training Records: Certificates or training records related to electrical safety and low carbon technologies <p>5. Sustainability Practices:</p> <ul style="list-style-type: none"> ○ Eco-Friendly Practices: Examples of sustainable practices followed during maintenance, such as using eco-friendly cleaning agents and minimising waste

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Energy Efficiency: Evidence of efforts to ensure systems are maintained for optimal energy efficiency and environmental performance
<p>K20 Fault finding, diagnosis and rectification practices and techniques of electrical and electronic control systems applicable to low carbon heating and hot water systems including safe isolation procedures.</p>	<p>Apprentices should be able to:</p> <ul style="list-style-type: none"> • follow a logical and systematic approach to fault finding • understand the sequence of operation of the electrical controls in a heating and hot water system • follow the safe isolation procedure and utilise the correct tools and equipment for this task <p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Understanding Fault Finding and Diagnosis: <ul style="list-style-type: none"> ○ Common Faults: Evidence of knowledge about common faults in low carbon heating and hot water systems ○ Diagnostic Procedures: Documentation of diagnostic procedures and tools used to identify faults 2. Fault Finding Techniques: <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for identifying faults in electrical and electronic control systems ○ Diagnostic Equipment: Examples of using diagnostic equipment, such as multimeters, oscilloscopes, and thermal imaging cameras ○ Systematic Approaches: Records of systematic approaches to troubleshooting, including flowcharts or decision trees 3. Diagnosis Practices:

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Root Cause Analysis: Detailed documentation of the diagnosis process, including symptom identification and root cause analysis ○ Diagnostic Tools: Use of diagnostic software or tools specific to low carbon systems ○ Data Interpretation: Examples of interpreting diagnostic data and making informed decisions based on findings <p>4. Rectification Techniques:</p> <ul style="list-style-type: none"> ○ Repair Procedures: Procedures for repairing or replacing faulty components in control systems ○ Tools and Techniques: Evidence of using appropriate tools and techniques for rectification tasks ○ Performance Data: Records of successful rectification of faults, including before-and-after performance data <p>5. Safe Isolation Procedures:</p> <ul style="list-style-type: none"> ○ Isolation Procedures: Documentation of safe isolation procedures to ensure systems are de-energized before maintenance ○ LOTO Procedures: Evidence of adherence to lockout/tagout (LOTO) procedures and use of isolation equipment ○ Safety Checks: Records of safety checks performed before, during, and after isolation

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
<p>K22 Processes and procedures of electrical supply and control systems applicable to low carbon heating and hot water systems and work including limits to operative competence.</p>	<p>Apprentices should have a clear understanding of how electrical controls function in a heating and hot water system and the most energy efficient ways of using these controls.</p> <p>Key Points to Know:</p> <ol style="list-style-type: none"> 1. Understanding Electrical Supply and Control Systems: <ul style="list-style-type: none"> ○ Components and Operation: Evidence of knowledge about the components and operation of electrical supply and control systems used in low carbon heating and hot water systems ○ Principles of Electrical Supply: Documentation of the principles of electrical supply, including voltage, current, and power distribution 2. Installation and Configuration Procedures: <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for installing and configuring electrical supply and control systems ○ Compliance with Standards: Examples of compliance with relevant standards and regulations during installation ○ Annotated Diagrams: Annotated diagrams or schematics showing the correct setup of control systems 3. Operational Procedures: <ul style="list-style-type: none"> ○ Routine Operational Checks: Step-by-step procedures for operating electrical supply and control systems ○ System Monitoring: Documentation of routine operational checks and system monitoring ○ Performance Optimisation: Records of system performance optimisation and energy efficiency measures

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<p>4. Maintenance and Troubleshooting:</p> <ul style="list-style-type: none"> ○ Routine Maintenance: Procedures for routine maintenance and troubleshooting of electrical supply and control systems ○ Diagnostic Techniques: Examples of diagnosing and rectifying common issues ○ Use of Tools: Use of appropriate tools and techniques for maintenance tasks <p>5. Limits to Operative Competence:</p> <ul style="list-style-type: none"> ○ Scope of Work: Documentation of the scope of work that the operative is competent to perform ○ Escalation Procedures: Evidence of understanding when to escalate issues to more qualified personnel ○ Training and Qualifications: Records of training and qualifications that define the operative's competence limits
<p>S7 Install electrical and electronic control systems applicable to low carbon heating and hot water systems.</p>	<p>Apprentices should be able to:</p> <ul style="list-style-type: none"> • select the correct and most efficient control systems and then safely install these controls in a heating or hot water system • correctly use a multi-meter to test resistances of components <p>Key Points to Understand and Demonstrate:</p> <p>1. Preparation and Planning:</p> <ul style="list-style-type: none"> ○ Review of Specifications: Evidence of reviewing design specifications and technical drawings before installation ○ Planning Documentation: Documentation of planning activities, including resource allocation and scheduling

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Risk Assessments: Risk assessments and method statements prepared for the installation process <p>2. Installation Procedures:</p> <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for installing electrical and electronic control systems ○ Compliance with Standards: Examples of compliance with relevant standards and regulations during installation ○ Annotated Diagrams: Annotated diagrams or schematics showing the correct installation of control systems <p>3. Technical Skills and Techniques:</p> <ul style="list-style-type: none"> ○ Wiring and Connections: Demonstration of wiring and connection techniques specific to low carbon systems ○ Use of Tools and Equipment: Use of appropriate tools and equipment for installation tasks, with calibration records ○ Configuration and Programming: Evidence of configuring and programming control systems to ensure proper operation
<p>S8 Test and commission electrical and electronic control systems applicable to low carbon heating and hot water systems.</p>	<p>Apprentices should be able to:</p> <ul style="list-style-type: none"> • apply a logical approach to following manufacturers guidance on commissioning electronic control systems and advising the customer on their correct usage during handover • set a heat curve in a heating compensation control <p>Key Points to Understand and Demonstrate:</p> <p>1. Preparation for Testing and Commissioning:</p>

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Review of Specifications: Evidence of reviewing design specifications and technical drawings before testing ○ Planning Documentation: Documentation of planning activities, including resource allocation and scheduling ○ Risk Assessments: Risk assessments and method statements prepared for the testing and commissioning process <p>2. Testing Procedures:</p> <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for conducting various tests, such as continuity tests, insulation resistance tests, and functional tests ○ Use of Testing Equipment: Examples of using appropriate testing equipment, such as multimeters, oscilloscopes, and thermal imaging cameras ○ Systematic Approaches: Records of systematic approaches to testing, including test plans and checklists <p>3. Commissioning Techniques:</p> <ul style="list-style-type: none"> ○ Calibration and Configuration: Detailed procedures for commissioning control systems, including system calibration and configuration ○ Performance Verification: Documentation of system performance verification and optimisation ○ Adjustments Records: Records of adjustments made to ensure systems operate efficiently and effectively

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
<p>S10 Perform routine service, maintenance, fault diagnosis and rectification procedures and techniques on electrical and electrical control systems applicable to low carbon heating and hot water systems including carrying out safe isolation procedures.</p>	<p>Apprentices must be able to:</p> <ul style="list-style-type: none"> • follow key electrical safety procedures and guidance when servicing and fault finding on electrical systems • select the correct tools and equipment, utilise and handle them correctly for each electrical task performed <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Routine Service and Maintenance Procedures: <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for performing routine service tasks, such as cleaning, inspecting, and replacing components ○ Specific Maintenance Activities: Examples of specific maintenance activities, like checking electrical connections, testing sensors, and calibrating control systems ○ Tools and Equipment: Use of appropriate tools and equipment for maintenance tasks, with calibration records 2. Fault Diagnosis Techniques: <ul style="list-style-type: none"> ○ Identifying Faults: Detailed procedures for identifying faults in electrical and electronic control systems ○ Diagnostic Equipment: Examples of using diagnostic equipment, such as multimeters, oscilloscopes, and thermal imaging cameras ○ Systematic Approaches: Records of systematic approaches to troubleshooting, including flowcharts or decision trees 3. Rectification Procedures:

Task 2: Electrical and electronic control systems	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Repair Procedures: Procedures for repairing or replacing faulty components in control systems ○ Tools and Techniques: Evidence of using appropriate tools and techniques for rectification tasks ○ Performance Data: Records of successful rectification of faults, including before-and-after performance data <p>4. Safe Isolation Procedures:</p> <ul style="list-style-type: none"> ○ Isolation Procedures: Isolation Techniques: Explain and demonstrate safe isolation procedures to ensure electrical systems are safely de-energized before maintenance or repair work ○ Compliance with Regulations: Show understanding of and compliance with relevant health and safety regulations during isolation procedures

Task 3: Decommissioning	Amplification and guidance (where required)
<p>K14 Decommissioning practices applicable to heating and hot water systems including limitations to operative competence with regard to other fuel systems supply, components and appliances.</p>	<p>Apprentices must understand:</p> <ul style="list-style-type: none"> • the step-by-step process to safely drain a heating system • the step-by-step process to safely drain a hot water system • their limitations in isolating a fuel source and the competence/qualifications required for this area of work <p>Key Points to Understand and Demonstrate:</p> <p>1. Understanding Decommissioning Practices:</p>

Task 3: Decommissioning	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Principles and Procedures: Evidence of knowledge about the principles and procedures for decommissioning heating and hot water systems ○ Regulatory Compliance: Documentation of compliance with relevant standards and regulations during decommissioning <p>2. Decommissioning Procedures:</p> <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for safely decommissioning heating and hot water systems ○ System Draining and Isolation: Examples of draining systems and isolating components to ensure safe decommissioning ○ Disposal of Components: Procedures for the safe disposal of decommissioned components and materials <p>3. Limitations to Operative Competence:</p> <ul style="list-style-type: none"> ○ Scope of Work: Documentation of the scope of work that the technician is competent to perform ○ Recognising Limits: Evidence of understanding the limitations of their competence, particularly with regard to other fuel systems (e.g., gas, oil) ○ Escalation Procedures: Procedures for escalating tasks beyond their competence to more qualified personnel
<p>K15 Decommissioning practices of electrical and electronic control systems applicable to heating and hot water systems.</p>	<p>Apprentices must understand:</p> <ul style="list-style-type: none"> • how to identify the electrical controls for all heating and hot water systems • safe isolation procedure

Task 3: Decommissioning	Amplification and guidance (where required)
	<ul style="list-style-type: none"> • limitations of their competence with electrical works <p>Key Points to Understand and Demonstrate:</p> <p>1. Understanding Decommissioning Practices:</p> <ul style="list-style-type: none"> ○ Principles and Procedures: Evidence of knowledge about the principles and procedures for decommissioning electrical and electronic control systems ○ System Knowledge: Describe the layout, features, and working principles of the electrical and electronic control systems used in heating and hot water systems <p>2. Decommissioning Procedures:</p> <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for safely decommissioning electrical and electronic control systems ○ System Draining and Isolation: Examples of draining systems and isolating components to ensure safe decommissioning ○ Disposal of Components: Procedures for the safe disposal of decommissioned components and materials
S11 Decommission heating and hot water systems.	<p>Apprentices must:</p> <ul style="list-style-type: none"> • choose the correct tools to decommission a heating or hot water system • state where they can safely deposit any fluid from a heating or hot water circuit

Task 3: Decommissioning	Amplification and guidance (where required)
	<ul style="list-style-type: none"> show their understanding of how a heating and hot water system layout is configured in relation to decommissioning a system in the most economical way <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> Decommissioning Procedures: <ul style="list-style-type: none"> Step-by-Step Procedures: Detailed procedures for safely decommissioning heating and hot water systems System Draining and Isolation: Examples of draining systems and isolating components to ensure safe decommissioning Disposal of Components: Procedures for the safe disposal of decommissioned components and materials Limitations to Operative Competence: <ul style="list-style-type: none"> Scope of Work: Documentation of the scope of work that the technician is competent to perform Recognising Limits: Evidence of understanding the limitations of their competence, particularly with regard to other fuel systems (e.g., gas, oil) Escalation Procedures: Procedures for escalating tasks beyond their competence to more qualified personnel
S12 Decommission electrical and electrical control systems applicable to heating and hot water systems.	<p>Apprentice must:</p> <ul style="list-style-type: none"> perform safe isolation on a heating and hot water system choose the correct tools to perform the task safely

Task 3: Decommissioning	Amplification and guidance (where required)
	<ul style="list-style-type: none"> • know the limits of their competence in relation to electrical concepts in heating systems <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Decommissioning Procedures: <ul style="list-style-type: none"> ○ Step-by-Step Procedures: Detailed procedures for safely decommissioning electrical and electronic control systems ○ System Isolation: Examples of isolating systems and components to ensure safe decommissioning ○ Disposal of Components: Procedures for the safe disposal of decommissioned components and materials 2. Limitations to Operative Competence: <ul style="list-style-type: none"> ○ Scope of Work: Documentation of the scope of work that the technician is competent to perform ○ Recognising Limits: Evidence of understanding the limitations of their competence, particularly with regard to other fuel systems (e.g., gas, oil) ○ Escalation Procedures: Procedures for escalating tasks beyond their competence to more qualified personnel
Task 4: Communication and collaboration	Amplification and guidance (where required)
K7 Communication techniques used with different audiences.	<p>The apprentice must be able to:</p> <ul style="list-style-type: none"> • articulate advice to a customer in a structured and clear manner, using language that a customer with limited knowledge would understand

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Active Listening: Paying full attention to the speaker, acknowledging their message, and responding thoughtfully. 2. Body Language: Using gestures, facial expressions, and posture to reinforce verbal messages. 3. Feedback: Providing constructive responses to ensure the message has been understood correctly. 4. Questioning: Asking open-ended or clarifying questions to gather more information or confirm understanding. 5. Paraphrasing: Restating the speaker's message in own words to show understanding and retention. 6. Understanding Audience Needs: <ul style="list-style-type: none"> ○ Identify Communication Needs: Explain how to assess the communication needs of different audiences, such as clients, colleagues, and stakeholders ○ Tailoring Communication: Discuss the importance of adapting communication styles to suit the audience's level of technical knowledge and understanding 7. Effective Communication Techniques: <ul style="list-style-type: none"> ○ Verbal Communication: Describe techniques for effective verbal communication, including active listening, clear articulation, and appropriate tone ○ Non-Verbal Communication: Explain the role of body language, facial expressions, and gestures in reinforcing verbal messages

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Written Communication: Discuss the principles of clear and concise writing, including the use of proper grammar, structure, and technical terminology 8. Customer Service Skills: <ul style="list-style-type: none"> ○ Active Listening: Explain the importance of listening to customer concerns and responding appropriately ○ Empathy and Responsiveness: Discuss how to show empathy and provide timely responses to customer queries and complaints 9. Technical Documentation: <ul style="list-style-type: none"> ○ Types of Documentation: Describe the types of technical documentation used in the industry, such as reports, manuals, and diagrams ○ Clarity and Accuracy: Explain the importance of accuracy and clarity in technical documentation to ensure it is understandable by different audiences 10. Collaboration and Teamwork: <ul style="list-style-type: none"> ○ Effective Team Communication: Discuss the importance of clear communication within a team setting. ○ Tools and Techniques: Explain how to use communication tools and techniques to facilitate collaboration and ensure all team members are informed and engaged 11. Presentation Skills: <ul style="list-style-type: none"> ○ Preparing Presentations: Describe how to prepare and deliver presentations to different audiences, including clients and colleagues

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Use of Visual Aids: Explain the use of visual aids and other tools to enhance understanding and engagement during presentations
<p>K25 Collaborative and ethical working, relationship management with clients and stakeholders and mutual problem-solving techniques.</p>	<p>The apprentice must be able to:</p> <ul style="list-style-type: none"> • explain how differing construction trades work in unison on projects most efficiently • explain how equality, diversity and inclusion principles relate to their role. This includes working with other stakeholders and customers <p>Key Points to Understand and Demonstrate:</p> <p>1. Collaborative Working:</p> <ul style="list-style-type: none"> ○ Teamwork Examples: Evidence of working effectively within a team, including collaboration with colleagues, supervisors, and other trades ○ Project Involvement: Documentation of involvement in team projects, highlighting contributions and collaborative efforts ○ Communication Skills: Examples of clear and effective communication within a team setting, including giving and receiving feedback <p>2. Ethical Working:</p> <ul style="list-style-type: none"> ○ Ethical Practices: Evidence of adhering to ethical standards and practices in all work activities

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Integrity and Honesty: Documentation of situations where integrity and honesty were demonstrated, such as reporting issues or mistakes ○ Compliance with Codes of Conduct: Examples of compliance with industry codes of conduct and ethical guidelines <p>3. Relationship Management with Clients and Stakeholders:</p> <ul style="list-style-type: none"> ○ Client Interactions: Evidence of building and maintaining positive relationships with clients, including examples of effective communication and customer service ○ Stakeholder Engagement: Documentation of interactions with various stakeholders, such as suppliers, regulatory bodies, and community members ○ Feedback and Testimonials: Client and stakeholder feedback or testimonials highlighting the technician's relationship management skills <p>4. Mutual Problem-Solving Techniques:</p> <ul style="list-style-type: none"> ○ Problem-Solving Examples: Evidence of using mutual problem-solving techniques to address and resolve issues collaboratively ○ Conflict Resolution: Examples of resolving conflicts or disagreements through effective communication and negotiation ○ Innovative Solutions: Documentation of innovative solutions developed through collaborative problem-solving efforts

Task 4: Communication and collaboration	Amplification and guidance (where required)
<p>S14 Communicate with others verbally and in writing.</p>	<p>The apprentice:</p> <ul style="list-style-type: none"> • should be capable of verbally explaining detailed plans, sequence of works and schematics to a range of interested parties • must be able to produce a schematic diagram of a heating system layout • must complete a hand written handover checklist for the customer • must be able to verbally explain how to handover a system to a customer effectively <p>Key Points to Understand and Demonstrate:</p> <p>1. Verbal Communication:</p> <ul style="list-style-type: none"> ○ Clarity and Articulation: Demonstrate the ability to convey information clearly and concisely. This includes using appropriate technical terminology and ensuring the listener understands the message ○ Active Listening: Show skills in active listening, which involves paying full attention to the speaker, acknowledging their message, and responding thoughtfully ○ Adaptability: Adjust communication style to suit different audiences, such as clients, colleagues, and stakeholders, ensuring that technical information is accessible to non-experts <p>2. Written Communication:</p> <ul style="list-style-type: none"> ○ Technical Documentation: Produce clear and accurate technical documents, such as reports, manuals, and emails.

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<p>This includes using proper grammar, structure, and technical terminology</p> <ul style="list-style-type: none"> ○ Conciseness and Precision: Write in a concise and precise manner, ensuring that all necessary information is included without unnecessary detail ○ Professional Tone: Maintain a professional tone in all written communications, appropriate to the context and audience <p>3. Customer Interaction:</p> <ul style="list-style-type: none"> ○ Customer Service: Communicate effectively with clients, addressing their concerns and queries in a professional and courteous manner ○ Feedback Handling: Respond to customer feedback, both positive and negative, in a constructive way that fosters good relationships <p>4. Team Collaboration:</p> <ul style="list-style-type: none"> ○ Team Meetings: Participate actively in team meetings, contributing ideas and feedback clearly and constructively ○ Collaboration Tools: Use collaboration tools (e.g., email, messaging apps, project management software) effectively to communicate with team members
<p>S15 Works collaboratively with clients or stakeholders to solve problems.</p>	<p>The apprentice must be able to clearly explain their opinion on the best way to use a specific heating and hot water system, and support their view with accurate data and a logical explanation.</p>

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Understanding Collaborative Problem-Solving: <ul style="list-style-type: none"> ○ Principles of Collaboration: Evidence of understanding the principles of collaborative problem-solving and its importance in the context of low carbon heating systems ○ Stakeholder Identification: Documentation of identifying key stakeholders involved in the problem-solving process 2. Effective Communication: <ul style="list-style-type: none"> ○ Client Interactions: Examples of clear and effective communication with clients to understand their needs and concerns ○ Team Communication: Evidence of effective communication within a team, including sharing information and coordinating efforts ○ Documentation: Records of meetings, discussions, and communications with clients and stakeholders 3. Problem Identification and Analysis: <ul style="list-style-type: none"> ○ Problem-Solving Techniques: Documentation of techniques used to identify and analyse problems, such as root cause analysis ○ Data Collection: Evidence of collecting relevant data and information to understand the problem fully ○ Stakeholder Input: Examples of involving clients and stakeholders in the problem identification and analysis process 4. Developing Solutions:

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Collaborative Mind mapping: Evidence of collaborative brainstorming sessions to generate potential solutions ○ Evaluation of Options: Documentation of evaluating different solutions based on criteria such as feasibility, cost, and impact ○ Client and Stakeholder Feedback: Examples of seeking and incorporating feedback from clients and stakeholders in the solution development process <p>5. Implementation of Solutions:</p> <ul style="list-style-type: none"> ○ Action Plans: Detailed action plans for implementing chosen solutions, including roles and responsibilities ○ Coordination and Execution: Evidence of coordinating with clients and stakeholders to execute the solution effectively ○ Monitoring and Adjustments: Documentation of monitoring the implementation process and making necessary adjustments based on feedback <p>6. Review and Reflection:</p> <ul style="list-style-type: none"> ○ Outcome Evaluation: Records of evaluating the outcomes of implemented solutions to determine their effectiveness ○ Lessons Learned: Documentation of lessons learned from the problem-solving process and how they will be applied to future projects ○ Client and Stakeholder Testimonials: Feedback or testimonials from clients and stakeholders on the effectiveness of the collaborative problem-solving efforts

Task 4: Communication and collaboration	Amplification and guidance (where required)
B3 Collaborates and promotes teamwork.	<p>The apprentice must be able to explain how to work well with others and how to assign roles and responsibilities effectively in tasks.</p> <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Understanding Teamwork Principles: <ul style="list-style-type: none"> ○ Team Dynamics: Evidence of understanding the principles of effective teamwork and the dynamics of working within a team ○ Roles and Responsibilities: Documentation of understanding different roles and responsibilities within a team setting 2. Effective Communication: <ul style="list-style-type: none"> ○ Team Meetings: Examples of participation in team meetings, including contributing ideas and listening to others ○ Clear Instructions: Evidence of giving and receiving clear instructions within a team ○ Conflict Resolution: Examples of resolving conflicts or misunderstandings through effective communication 3. Collaboration in Projects: <ul style="list-style-type: none"> ○ Project Involvement: Documentation of involvement in team projects, highlighting collaborative efforts and contributions ○ Shared Goals: Evidence of working towards shared goals and objectives with team members ○ Coordination and Cooperation: Examples of coordinating tasks and cooperating with colleagues to achieve project outcomes 4. Leadership and Support:

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<ul style="list-style-type: none"> ○ Leadership Roles: Evidence of taking on leadership roles within a team, such as leading a project or task ○ Supporting Colleagues: Examples of supporting and mentoring colleagues, including providing guidance and assistance ○ Encouraging Teamwork: Documentation of efforts to encourage and promote teamwork among colleagues <p>5. Feedback and Improvement:</p> <ul style="list-style-type: none"> ○ Seeking Feedback: Evidence of seeking feedback from team members and supervisors to improve teamwork skills ○ Providing Feedback: Examples of providing constructive feedback to colleagues to enhance team performance ○ Continuous Improvement: Documentation of actions taken to improve teamwork and collaboration based on feedback received
B5 Supports an inclusive culture.	<p>The apprentice must be able to provide evidence to show examples of times when they have worked inclusively in their job role.</p> <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Respect for Diversity: Show how you respect and value differences in others, including cultural, gender, age, and ability differences. 2. Inclusive Communication: Use language and communication styles that are inclusive and considerate of all team members. 3. Team Collaboration: Actively include and engage all team members in discussions and decision-making processes.

Task 4: Communication and collaboration	Amplification and guidance (where required)
	<p>4. Supportive Environment: Create and maintain a work environment where everyone feels safe, respected, and valued.</p> <p>5. Conflict Resolution: Address and resolve conflicts in a manner that respects all parties involved and promotes harmony.</p> <p>6. Continuous Learning: Demonstrate a commitment to learning about and promoting inclusivity and diversity.</p>
<p>B7 Act ethically.</p>	<p>The apprentice must be able to show examples of how they acted ethically with a customer or fellow technician/coworker during their career.</p> <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Integrity: Show honesty and transparency in all professional dealings. 2. Accountability: Take responsibility for their actions and their outcomes. 3. Professionalism: Maintain high standards of work and conduct. 4. Fairness: Treat all colleagues, clients, and stakeholders with fairness and respect. 5. Compliance: Adhere to laws, regulations, and industry standards. 6. Confidentiality: Protect sensitive information and respect privacy.

Task 5 Continuous Professional Development (CPD) and well-being	Amplification and guidance (where required)
<p>K23 Well-being: mental and physical health considerations in self and others and how to access support. Impact of mental health on the construction industry.</p>	<p>The apprentice must be able to explain how good physical health can help in career as a low carbon heating technician.</p> <p>The apprentice should be able to explain why people in the construction industry find it hard to talk about mental issues.</p> <p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Understanding Mental and Physical Health: Show knowledge of common mental and physical health issues and their signs. 2. Accessing Support: Demonstrate awareness of how to access support for mental and physical health issues. 3. Impact on the Industry: Understand and explain the impact of mental health on productivity, safety, and overall well-being in the construction industry. 4. Promoting Well-being: Show how they promote a healthy work environment for themselves and their colleagues.
<p>B6 Committed to continued professional development (CPD).</p>	<p>The apprentice must be able to:</p> <ul style="list-style-type: none"> • give examples of future professional development they want to achieve in their career • explain why continuing professional development (CPD) is especially important for a low carbon heating technician

Task 5 Continuous Professional Development (CPD) and well-being	Amplification and guidance (where required)
	<p>Key Points to Understand and Demonstrate:</p> <ol style="list-style-type: none"> 1. Proactive Learning: Show initiative in seeking out learning opportunities and staying updated with industry developments. 2. Skill Enhancement: Continuously improve and expand their technical and professional skills. 3. Reflective Practice: Regularly reflect on their performance and identify areas for improvement. 4. Engagement in Training: Actively participate in training sessions, workshops, and other professional development activities. 5. Knowledge Sharing: Share knowledge and skills with colleagues to contribute to their development.

Professional interview based on an EPA portfolio roles and responsibilities

Role	Responsibility
Independent Assessor	Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by Energy & Environment Awards.
Employer/Training Provider	<p>The professional interview must be scheduled with Energy & Environment Awards for a date and time which allow the apprentice to be well prepared.</p> <p>Ensure the apprentice has access to their portfolio before and on the day of the professional interview.</p>
Energy & Environment Awards	<p>Arrange for the professional interview to take place, in consultation with the employer/training provider and independent assessor.</p> <p>Develop and produce an assessment specification, question bank and assessment materials in line with the EPA plan.</p>

Component 3: Multiple-choice Test

Overview

The multiple-choice test is a computer-based test which consists of 40 multiple-choice questions. Paper-based tests are available on request.

Apprentices have 60 minutes to complete the test. It consists of 40 multiple-choice questions.

The multiple-choice questions will have four possible answers of which one will be correct.

The Pass mark is 28 correct answers.

The Distinction mark is 35 correct answers.

For this paper:

- a (scientific) calculator is allowed
- access to the internet or intranet is NOT allowed
- apprentices cannot refer to any reference books or materials

Apprentices must take the test in a quiet space, free from distractions and influence, in the presence of an invigilator.

Apprentices must be given at least **2 weeks notice** of the date and time of the multiple-choice test.

Multiple-choice Test Coverage

The multiple-choice test consists of 40 core knowledge questions.

The table below lists each of the knowledge elements, assessed in the knowledge assessment. Amplification and Guidance can be found in the table above.

Number of Questions	Knowledge	Amplification and Guidance
1 - 3	K1: Health and safety legislation, approved codes of practice and guidance and safe working practices applicable to work in the building services and wider construction industry.	<p>1.1 Health and safety legislation</p> <p>1.2 Health and safety approved codes of practice and guidance including:</p> <ul style="list-style-type: none"> ○ Reporting of injuries, Diseases and Dangerous Regulations (RIDDOR) ○ Health and Safety at Work Act 1974 ○ Electrical Safety ○ Control of Substances Hazardous to Health (COSHH) ○ Fluorinated Gas (F gas) handling <p>1.3 Safe working practices applicable to work in the building services and wider construction industry including:</p> <ul style="list-style-type: none"> ○ knowing safety critical signage ○ correct use of PPE
4 - 6	K3: Common installation practices and techniques used in the installation and maintenance of low carbon heating and hot water systems (air source, water source	<p>3.1 Common installation practices and techniques used in the installation of Air Source Heat Pump Systems including:</p>

Number of Questions	Knowledge	Amplification and Guidance
	and ground source heat pumps, solar thermal systems, unvented hot water systems, connections to cold water systems, lower temperature wet central heating).	<ul style="list-style-type: none"> ○ the common components installed on air source pump systems <p>3.2 Common installation practices and techniques used in the installation of Ground Source Heat Pump Systems including:</p> <ul style="list-style-type: none"> ○ the various types of ground source heat pump collector circuits <p>3.3 Common installation practices and techniques used in the installation of Unvented Hot Water Systems including:</p> <ul style="list-style-type: none"> ○ installation requirements ○ regulations that must be adhered to when installing an unvented hot water cylinder <p>3.4 Common installation practices and techniques used in the installation of Solar Thermal Systems including:</p> <ul style="list-style-type: none"> ○ key installation requirements of solar thermal hot water systems <p>3.5 Common installation practices and techniques used in the installation of Low Temperature wet central heating systems including:</p> <ul style="list-style-type: none"> ○ controls utilised in low temperature heating systems

Number of Questions	Knowledge	Amplification and Guidance
4 - 5	K4: Scientific and mechanical principles applicable to how low carbon heating, cooling and hot water systems work, including coefficient of performance (COP) and seasonal performance factor (SPF).	<p>4.1 Scientific principles applicable to how low carbon heating systems work including:</p> <ul style="list-style-type: none"> ○ refrigeration cycle ○ Ideal Gas Law <p>4.2 Mechanical principles applicable to how low carbon heating systems work including components in a heat pump</p> <p>4.3 Scientific and mechanical principles applicable to how low carbon heating, cooling and hot water systems work, including:</p> <ul style="list-style-type: none"> ○ coefficient of performance (COP) ○ factors effecting the coefficient of performance of a heat pump system ○ <p>4.4 Scientific and mechanical principles applicable to how low carbon heating, cooling and hot water systems work, including seasonal performance factor (SPF).</p> <p>4.5 Mechanical principles applicable to how low carbon cooling including key components of the refrigeration cycle</p>

Number of Questions	Knowledge	Amplification and Guidance
2 - 3	K5 Roles and responsibilities of persons within the low carbon heating and hot water systems industry and related trades.	<p>5.1 Roles of persons within the low carbon heating industry:</p> <ul style="list-style-type: none"> ○ Heat pump installer ○ Solar thermal installer ○ Certification bodies <p>5.2 Responsibilities of persons within the low carbon heating industry:</p> <ul style="list-style-type: none"> ○ Heat pump installer ○ Solar thermal installer ○ Certification bodies
2 - 4	K6 Legislative requirements and sources of information applicable to low carbon heating and hot water system installation, service and repair.	<p>6.1 Legislative requirements applicable to low carbon hot water system installations.</p> <p>6.2 Sources of information applicable to low carbon hot water system installations including relevant building regulations for hot water systems.</p> <p>6.3 Legislative requirements applicable to low carbon heating installations including:</p> <ul style="list-style-type: none"> ○ governing bodies ○ planning permissions

Number of Questions	Knowledge	Amplification and Guidance
1 - 2	K8: Layout features, working principles and legislative requirements of cold water systems connected to low carbon heating and hot water systems.	<p>8.1 Layout features of cold water systems connected to low carbon heating systems</p> <p>8.2 Working principles of cold water systems connected to low carbon heating and hot water systems including:</p> <ul style="list-style-type: none"> ○ basic layouts ○ components of direct and indirect cold water systems
3 - 5	K9: Layout features and working principles of low carbon heating and hot water systems.	<p>9.1 Layout features and working principles of low carbon heating systems</p> <p>9.2 Working principles of low carbon heating hot water systems for example types and components used in hot water systems</p> <p>9.3 Working principles of low carbon heating systems for example types, layouts and components used in carbon heating systems</p>
2 - 4	K10: Sustainability: sources of renewable and non-renewable energy, current energy efficiency advice and guidance, UN Sustainability Development Goals, decarbonisation.	<p>10.1 Sources of renewable and non-renewable energy including where electricity is generated</p> <p>10.2 UN sustainability development goals, decarbonisation including net zero</p> <p>10.3 Current energy efficiency advice and guidance including:</p> <ul style="list-style-type: none"> ○ EPC ratings ○ Current building regulations

Number of Questions	Knowledge	Amplification and Guidance
3 - 4	K17: F-Gas regulations: purpose and application	17.1 Fluorinated gas (F gas) regulations and purpose 17.2 Gas regulation application
3 - 4	K26: Electrical safety: working with electricals in low carbon heating and hot water systems. Understanding limits of competence, what not to do, and when to engage a competent electrician, as well as other trades	26.1 Electrical working with electricals in low carbon heating and hot water systems including: <ul style="list-style-type: none"> ○ installing electrical components in heating systems ○ calculating voltage, amps and resistance of a system ○ electrical fault finding 26.2 Understanding limits of competence

Multiple-choice Test Roles and Responsibilities

Role	Responsibility
Invigilator	<p>Is typically provided by the employer or training provider.</p> <p>Attend induction training as directed by Energy & Environment Awards.</p> <p>Not invigilate an assessment, solely, if they have delivered the assessed content to the apprentice.</p> <p>Invigilate and supervise the apprentice during tests and in breaks during assessment methods to prevent malpractice in line with Energy & Environment Awards invigilation procedures.</p>
Employer/Training Provider	<p>Ensure that the multiple-choice test is scheduled with Energy & Environment Awards for a date and time which allow the apprentice to be well prepared.</p> <p>Follow Energy & Environment Awards guidance in setting up and confirming IT provision for the on-screen test.</p>
Energy & Environment Awards	<p>Arrange for the multiple-choice test to take place, in consultation with the employer/training provider.</p> <p>Mark multiple-choice test answers accurately according to the mark scheme and procedures.</p>

Section 3: Grading and Grading Descriptors

Component 1: Practical assessment with questions

The apprentice must demonstrate core KSBs in an integrated way.

A Fail will be awarded if an apprentice has not achieved **all** the Pass descriptors..

To gain a Pass, an apprentice must successfully achieve **all** the descriptors for each KSB, as shown below.

To achieve a Distinction an apprentice must successfully achieve **all** the Pass descriptors and **all** of the descriptors from each of the Distinction boxes.

Pass descriptors for the practical assessment with questions

Practical assessment with questions - Themed KSBs	To achieve a Pass the apprentice must achieve ALL of the following:
Health and safety S1 and B1	Prioritises and promotes health and safety by applying safe working practices and complying with health and safety regulations and approved codes of practice throughout the practical tasks, ensuring the working environment is safe for themselves and others. (S1 and B1)
Planning for installation K12; K24; S3; S4 and S13	Produces a work programme in line with the installation specification, manufacturer instructions and installation time. Produces a method statement and risk assessment reflective of the installation specification, manufacturers guidance and recommended control measures. (K24; S3 and S4)

Practical assessment with questions - Themed KSBs	To achieve a Pass the apprentice must achieve ALL of the following:
	Plans, sizes and selects a suitable carbon heating and hot water system in line with the installation specification, manufacturer guidance and legislative requirements. (K21 and S13)
Installation and testing K11; S5; S6 and B4	Applies techniques to install, test and commission the selected low carbon heating and hot water system in line with manufacturer guidance, legislative requirements and the programme of work. Hands over the installation and provides operational advice in line with manufacturer operational instructions. (K11; S5; S6 and B4)
Service and maintenance K16; K19 and S9	Applies techniques to perform routine servicing, maintenance, fault diagnosis, and fault rectification on a low carbon heating and hot water system. Ensures the safe isolation of the electrical supply and the work is carried out in line with manufacturer guidance and legislative requirements. (K16; K19 and S9)

Distinction descriptors for the practical assessment with questions

Practical assessment with questions - Themed KSBs	To achieve a Distinction the apprentice must achieve ALL of the Pass descriptors and ALL of the Distinction descriptors
Health and safety S1	Explains the benefits for individuals and the business of compliance with health and safety regulations and procedures and the consequences of non-compliance. (S1)
Planning for Installation S4	Justifies the control measures chosen to minimise hazards and risks during the work programme. (S4)
Installation and testing K11; S5 and S6	Justifies the use of installation, testing and commissioning techniques to ensure the system is operating at maximum efficiency. (K11; S5 and S6)
Service and maintenance K19 and S9	Justifies the diagnostic methods they use in the identification and resolution of faults. (K19 and S9)

Component 2: Professional interview based on an EPA portfolio

The apprentice must demonstrate core KSBs in an integrated way.

To gain a Pass, an apprentice must successfully achieve **all** the assessment descriptors for each KSB, as shown below.

To achieve a Distinction, an apprentice must successfully achieve **all** the Pass assessment descriptors and **all** descriptors from each of the Distinction boxes.

Professional discussion (based on an EPA portfolio)	To achieve a Pass the apprentice must achieve ALL of the following:
Task 1: Environment and sustainability K2; S2 and B2	Describes how they consider and apply environmental and sustainability principles in their work. Explains how they apply the principles in line with organisational procedures, regulations and standards on energy efficiency, material reuse, recycling, and management of emissions and waste. (K2; S2 and B2)
Task 2: Electrical and electronic control systems K12; K13; K18; K20; K22; S7; S8 and S10	Describes how they follow processes and apply techniques to install, test and commission electrical and electronic control systems applicable to low carbon heating and hot water systems, whilst working within the limits of their own competence. Explains how they carry out the work in line with manufacturer guidance and legislative requirements. (K12; K13; K22; S7 and S8) Describes how they apply techniques to carry out routine servicing, fault diagnosis, fault rectification and maintenance, on electrical and electronic control systems applicable to low carbon heating and hot water systems. Explains how they safely isolate the supply and carry out the work in line with manufacturer guidance and legislative requirements. (K18; K20 and S10)

Professional discussion (based on an EPA portfolio)	To achieve a Pass the apprentice must achieve ALL of the following:
Task 3: Decommissioning K14; K15; S11 and S12	<p>Describes how they apply techniques to decommission low carbon heating and hot water systems, in line with legislative requirements. Explains the limitations of their competence when decommissioning alternative fuel systems, components and appliances. (K14 and S11)</p> <p>Describes how they apply techniques to decommission electrical and electronic control systems applicable to low carbon heating and hot water systems in line with legislative requirements. (K15 and S12)</p>
Task 4: Communication and collaboration K7; K25; S14; S15; B3; B5 and B7	<p>Describes how they communicate with others using verbal and written techniques suitable for the context and how they adapt their style of communication to suit the audience. (K7 and S14)</p> <p>Describes how they work ethically, collaboratively and promote teamwork with stakeholders or clients to solve problems. Explains how they are supportive of the needs and concerns of others, especially where this relates to diversity and inclusion. (K25; S15; B3; B5 and B7)</p>
Task 5: CPD and well-being K23 and B6	<p>Explains the learning they have completed and recorded to support competence in their role, showing a commitment to future CPD. (B6)</p> <p>Explains the mental and physical health considerations in self and others and how to access support. Explains how mental health can impact the construction industry. (K23)</p>

Distinction descriptors for the professional interview based on an EPA portfolio

Professional interview (based on an EPA portfolio)	To achieve a Distinction the apprentice must achieve ALL of the Pass descriptors and ALL of the Distinction Descriptors:
Task 1: Environment and sustainability K2 and S2	Justifies the need to apply environmental and sustainability principles to the industry and their work. (K2 and S2)
Task 2: Electrical and electronic control systems	NA
Task 3: Decommissioning K14 and S11	Justifies the importance of following legislative requirements when decommissioning low carbon heating and hot water systems, and the consequences of not doing so. (K14 and S11)
Task 4: Communication and collaboration K25 and S15	Justifies the use of collaborative, relationship management and problem-solving techniques when managing client or stakeholder contact and describes the impact this can have on the organisation. (K25 and S15)
Task 5: CPD and well-being	NA

Component 3: Multiple-choice Test

The following grade boundaries apply to the multiple-choice test assessment:

Grade	Minimum mark	Maximum mark
Fail	0	27
Pass	28	34
Distinction	35	40

Overall grading

The apprenticeship will be graded fail, pass, merit or distinction. The final grade will be determined by collective performance in the three assessment components.

In order to gain a pass, an apprentice must achieve at minimum of a pass in each EPA component. A pass represents full competence against the standard. To achieve a merit grade, an apprentice must achieve a distinction in the practical assessment with questions and one other assessment component, as well a pass in the remaining assessment component. To achieve an overall distinction the apprentice must achieve a distinction in each EPA component.

The practical assessment with questions, interview based on an EPA portfolio and multiple-choice test are all marked separately and awarded a fail, pass, or distinction.

The multiple-choice test is based on the percentage score achieved. The grade and mark for the practical assessment with questions and interview is based on the number and level of descriptors achieved.

The overall grade for the LCHT Standard is based on the grades in individual components as follows:

Practical assessment with questions	Professional interview based on an EPA portfolio	Multiple-choice Test	Overall grading
Distinction	Distinction	Distinction	Distinction
Distinction	Distinction	Pass	Merit
Distinction	Pass	Distinction	Merit
Pass	Distinction	Distinction	Pass
Distinction	Pass	Pass	Pass
Pass	Distinction	Pass	Pass
Pass	Pass	Distinction	Pass
Pass	Pass	Pass	Pass
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail

The grading descriptors that will be applied for each assessment descriptors along with additional details can be found in Section 3 of this Specification.

Section 4: Resits and retakes

Apprentices who fail one or more EPA components can re-sit or re-take the failed component at the employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, but a re-take does. Apprentices should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and Energy & Environment Awards should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 4 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.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

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

The apprentice will get a maximum EPA grade of a pass if they need to re-sit or re-take one or more assessment methods, unless Energy & Environment Awards determines there are exceptional circumstances.

Energy & Environment Awards resit and re-take policy can be found at:
<https://energyenvironmentawards.co.uk/policies-and-fees/>

Section 5: Practical Guidance

L3 LCHT Practical Assessment with Questions Planning and Approval Form

Purpose

Energy & Environment Awards must approve employer's practical assessments with questions assessment. The purpose of the approval is to provide Energy & Environment Awards with assurance that the practical assessment will be conducted in line with the LTMO assessment plan. The approval must take place before the first practical assessment with questions assessment is carried out. To access the service, see Appendix D, LCHT Supporting Documents 'Level 3 LCHT Practical Assessment with Questions Planning and Approval Form.'

Submitting the form to Energy & Environment Awards

To obtain approval, employers must complete the Level 3 LCHT Practical assessment with Questions Planning and Approval Form'. This must be submitted to Energy & Environment Awards Service Delivery Team for approval at least 2 months before Gateway.

Energy & Environment Awards Approval Process

Once the Practical Assessment with Questions Planning and Approval Form has been received the approval process will be conducted by Energy & Environment Awards. The outcomes will be shared with the employer/training provider no later than 5 working days following the review.

The employer/training provider must ensure:

- the task(s) being observed is suitable and sufficient and is to be carried out at a suitable premises. Site access for the assessor and any specific requirements must be advised in advance
- all equipment and resources are suitable for the task, in good safe working condition and certification where applicable

Please be aware:

- Practical assessment with questions approval does not guarantee the apprentice will pass the assessment

- No health and safety risk assessment has been carried out by Energy & Environment Awards
- Energy & Environment Awards approval does not remove any of the training provider obligations to ensure full coverage of the standard, and full compliance with relevant legislation
- Energy & Environment Awards approval is based only on information supplied and is not a guarantee that the practical assessment tasks/briefs, selected plant/machinery/equipment on the day of the practical assessment will be sufficient for the practical assessment with questions
- The information provided in the Level 3 LCHT Practical Assessment with Questions Planning and Approval Form must not be shared with the apprentice

Preparing for the Practical assessment with questions

Where possible, the employer/training provider should provide the apprentice with the opportunity to carry out a practice practical assessment with questions as close to the real assessment described in Section 2 of the specification (Component 1).

The employer/training provider should prepare a practical task similar to (but not identical to) the tasks being used for the live assessment. A suitable person should be chosen to play the part of the assessor.

A template is provided to help ensure that the activities assessed during the practical assessment will give complete coverage of the standard. See Appendix E, LCHT Supporting Documents 'Practice Practical Assessment with questions Template.'

Preparing for the Professional Interview based on an EPA portfolio

A Professional Interview based on an EPA portfolio should take place between the apprentice and the person acting the role of an assessor. The apprentice should draw on evidence from their EPA portfolio during the discussion.

Guidance on an EPA Portfolio

Throughout the on-programme part of their apprenticeship, the apprentice must compile an EPA portfolio to support them in the professional interview. The Professional interview will draw on the evidence contained in the EPA portfolio.

The EPA portfolio should reflect their individual experiences and the activities carried out during this period and meet the requirements outlined in the assessment plan.

A completed EPA portfolio is one of the Gateway requirements.

The EPA portfolio is **not assessed**. It serves the following purposes:

- It provides the opportunity for each apprentice to provide examples of the knowledge, skills and behaviours that will be assessed in the professional interview
- A carefully prepared EPA portfolio will support the apprentice during the professional interview
- It allows the assessor to review the EPA portfolio before the professional interview to help focus and contextualise the questions the apprentice will be asked

The EPA portfolio is a record of how each apprentice demonstrated the knowledge, skills and behaviours that are assessed in the professional interview. Apprentices will have access to their EPA portfolio during the professional interview. When the employer/training provider registers their apprentices with Energy & Environment Awards they will have access to the EPA Portfolio Template.

The role of the employer/training provider

Employer/training providers are expected to support the apprentice in preparing their portfolio by:

- providing clear instruction and deadlines to allow the apprentice to plan and compile their portfolio in preparation for the Gateway meeting
- advising on which pieces of evidence to select
- authenticating evidence as valid
- signing off the EPA portfolio
- submitting the portfolio to Energy & Environment Awards as part of Gateway requirements.

What to expect in the practice professional interview?

The practice professional interview will be based on the EPA portfolio which will provide the apprentice with the opportunity to practice discussing their KSBs gained throughout their on-programme and by referring to the evidence from their portfolio

using their responses to the tasks and associated evidence. A suitable person should be chosen to play the part of the assessor.

A practice professional interview template is provided to help prepare the appropriate questions to ask and to record the apprentices' performance. See Appendix F, LCHT Supporting Documents 'Practice Professional Interview based on an EPA Portfolio Form.'

As part of the practice exercise, apprentices should have access to their EPA portfolio to support their responses.

Preparing for the multiple-choice test

While on-programme, the employer and/or training provider should brief the apprentice on the areas to be assessed by the multiple-choice test, as detailed in Section 2 in this specification. It is good practice to identify the areas within the learning programme where the relevant knowledge is delivered, ensuring that apprentices are aware that elements of these might come up in the test.

The multiple-choice test is aligned to the standard rather than a specific job role that the apprentice may be doing. The questions have been written to reflect the Lead Traffic Management Operative role as a whole and not focussed on specific plant, machinery, or employer-specific processes.

In readiness for end-point assessment, the apprentice should complete a practice multiple-choice test. This should be undertaken in advance of the live multiple-choice test, with enough time to mark the test, and provide feedback to the apprentices. A practice multiple-choice test is available as a printable copy – See Appendix C, LCHT Supporting Documents 'Practice Multiple-choice Test.'

For maximum effect, ensure the test is taken in exam conditions similar to those that will be experienced in a live test.

Section 6: Authenticity and security of apprentice work

The apprentices must be advised by their training provider and employer that copying of any work (whether it is from another apprentice or from internal, external documents or source) and presenting it as their own will be deemed as malpractice and will lead to their work being disqualified. Apprentices must not share their work or allow any person to copy their work as this is not allowed and would also be deemed as malpractice.

In signing off the portfolio, training providers and employers must be satisfied that the evidence in the portfolio is:

- **adequate:** evidence must cover all relevant KSBs within the assessment plan. Adequate does not mean a large quantity of evidence. The evidence should focus on quality rather than quantity
- **authentic:** apprentices must be able to confirm and talk about the evidence that they submit with the independent assessor, appointed by Energy & Environment Awards. It is vitally important apprentices only submit evidence relating to them
- **appropriate:** all evidence must be relevant to the KSBs assessed during the professional interview based on an EPA portfolio
- **recent and up to date:** all evidence must be linked to the tasks in the EPA portfolio template. The evidence must be recent and current which demonstrate the apprentice's competence. The independent assessors, appointed by Energy & Environment Awards, will assess current competencies. Apprentices must gather evidence during their on-programme training

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