ENERGY & ENVIRONMENT AWARDS

EEA Level 3 End-point Assessment for Heat Network Maintenance Technician
(Distribution; Residential)

Specification

QAN 610/6335/6
ST1308 V1.0

Specification for

EEA Level 3 End-point Assessment for Heat Network Maintenance Technician

QAN 610/6335/6

Updates to this specification

Since the first publication of Energy & Environment Awards (EEA) Heat Network Maintenance Technician Specification (HNMT), the following updates have been made.

Version	Date first published	Section updated	Page(s)
v1.0	January 2026	First published	All

Section 1: At a Glance EPA Summary

Qualification name	EEA Level 3 End-point Assessment for Heat Network Maintenance Technician
Ofqual qualification number	610/6335/6
Standard reference	ST1308
Assessment plan	V1.0
Standard title	Heat Network Maintenance Technician
Specialist options	Distribution Residential
Level	3
Entry requirements	Learners must be 16 years of age or above
On-programme duration	Typically 36 months Must spend a minimum of 8 months on the program and complete the required off-the-job training according to the apprenticeship funding rules
Gateway readiness	Mandatory requirements: • 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 To confirm the apprentice has met all Gateway pre-requisites, employer must complete, sign and submit the Gateway Eligibility Form (GER) form to

	EEA. See Appendix B, Heat Network Maintenance Technician Supporting Documents 'Gateway Eligibility Form.'
End-point assessment duration	Typically, 3 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 does not need to be known before starting the next: • Multiple-choice test • Practical assessment with questions • Interview based on an EPA portfolio
End-point assessment methods and component grading	Multiple-choice test: Fail; Pass; or Distinction Practical assessment with questions: Fail; or Pass Interview based on an EPA portfolio: Fail; Pass; or Distinction
Overall Grading	Fail; Pass or Distinction
Certification	EEA request Apprenticeship completion certificates from DfE
Glossary of Terms	Appendix A, Heat Network Maintenance Technician Supporting Documents

Objective

The purpose of the Heat Network Maintenance Technician (HNMT) end-point assessment (EPA) is to reflect compliance with all Ofqual requirements, the requirements of the relevant assessment plan and 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 HNMT end-point assessment requirements successfully and has been certified they could take on the following job role:

- District heat network maintenance technician
- Plant maintenance engineer
- Residential engineer

Professional recognition

The apprenticeship standard aligns with the Institute of Mechanical Engineers (IMechE) for Engineering Technician (Eng Tech).

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 HNMT Supporting Documents Appendix B.

Recognition of prior learning (RPL)

Energy & Environment Awards (EEA) 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 EEA. This means that:

- each of the EPA components must be completed in full with EEA
- where an apprentice transfers to EEA from another EPAO they have to undertake the entire EPA with EEA
- 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: 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 80 minutes to complete the test.

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 34 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 below.

Number of Questions	Knowledge	Amplification and Guidance
2 - 4	**K1:** Heat network systems: heat sources, materials and technology, scale and scope of networks, sustainability, efficiency and cost-effectiveness.	1.1 Heat Sources: Combined heat and power (CHP), boilers, heat pumps, and waste heat recovery 1.2 Materials and Technology: pipes, pumps, valves, heat interface units (HIUs), and control systems 1.3 Scale and scope of networks: pipe sizing, insulation materials, pressure and temperature ratings, and geographic coverage 1.4 Sustainability, efficiency and cost-effectiveness
1 - 3	**K2:** Types of heat networks: local, district and city-wide.	2.1 Identify the different types of heat networks, e.g. local (communal), district, and city-wide
2 - 4	**K3:** Awareness of legislative, regulatory frameworks and regulators: Department for Energy Security and Net Zero, The Association for Decentralised Energy (ADE), Office of Gas and Electricity Markets (OFGEM), Energy Ombudsman, Heat Networks (Scotland) Act, Heat Networks (Metering and Billing) Regulations.	3.1 Department for Energy Security and Net Zero 3.2 The Association for Decentralised Energy (ADE) 3.3 Office of Gas and Electricity Markets (OFGEM) 3.4 Energy Ombudsman 3.5 Heat Networks (Scotland) Act 2021 3.6 Heat Networks (Metering and Billing) Regulations 2014

Number of Questions	Knowledge	Amplification and Guidance
2 - 4	**K4:** Awareness of codes of conduct and technical standards: The Heat Trust, Chartered Institution of Building Services Engineers (CIBSE) CP1.2, Building Services Research and Information Association (BSRIA), Building Engineering Services Association (BESA), Manufacturers of Equipment for Heat Networks Association.	4.1 The Heat Trust 4.2 Chartered Institution of Building Services Engineers (CIBSE) CP1.2 4.3 Building Services Research and Information Association (BSRIA) 4.4 Building Engineering Services Association (BESA) 4.5 Manufacturers of Equipment for Heat Networks Association
4 - 6	**K6:** Awareness of health and safety regulations and the impact on role: Health and Safety at Work Act, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), Personal Protective Equipment (PPE) at Work Regulations, Control of Substances Hazardous to Health (COSHH) Regulations, Electrical regulations, Manual Handling Operations Regulations (MHOR), Construction Design Management Regulations (CDM), working at height, confined spaces and lone working.	6.1 Health and Safety at Work Act 1974 6.2 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013 6.3 Personal Protective Equipment (PPE) at Work Regulations 2022 6.4 Control of Substances Hazardous to Health (COSHH) Regulations 2002 6.5 Electrical Regulations such as Electricity at work Regulations 1989, and BS 7671:2018 – IET Wiring Regulations 6.6 Manual Handling Operations Regulations (MHOR) 1992 6.7 Construction Design and Management Regulations (CDM) 2015 6.8 Working at Height Regulations 2005 6.9 Confined Spaces Regulations 1997 6.10 Lone working policies and procedures

Number of Questions	Knowledge	Amplification and Guidance
2 - 4	**K7:** Awareness of environmental and sustainability regulations and requirements: Environmental Protection Act, Pollution Prevention and Control Act, Clean Air Act, Radioactive Substances Act, Controlled Waste Regulations, Controls on Dangerous Substances and Preparations Regulations. Efficient use of resources. Recycling, reuse and safe disposal of waste.	7.1 Environmental Protection Act 1990 7.2 Pollution Prevention and Control Act 1999 7.3 Clean Air Act 1993 7.4 Radioactive Substances Act 1993 7.5 Controlled Waste Regulations 2012 7.6 Controls on Dangerous Substances and Preparations Regulations 2006 7.7 How efficient use of resources helps to reduce waste and environmental impact 7.8 Recycling, reuse and safe disposal of waste: segregate materials, identify recyclable components, safe handling of hazardous substances, and authorised disposal
1 - 3	**K9:** Environmental management and environmental management systems: ISO 14000, ISO 14004, ISO 14001.	9.1 Principles and application of environmental management systems: • ISO 14000 – Environmental Management Standards Framework • ISO 14004 – General Guidelines on Principles, Systems and Support Techniques • ISO 14001 – Requirements for Environmental Management Systems (EMS)
1 - 2	**K11:** Awareness of principles of climate change, including causes and environmental impact and contribution of	11.1 Causes and environmental impact of climate change: greenhouse gas emissions, global warming, biodiversity loss

Number of Questions	Knowledge	Amplification and Guidance
	heat network industry to achieving carbon budgets and net zero.	11.2 Contribution of the heat network industry to achieving carbon budgets and net zero.
2 - 4	**K13:** Principles of asset management, maintenance systems and asset tagging.	13.1 Asset Management Principles (e.g. ISO 55000): lifecycle management, risk-based decision-making, performance monitoring and regulatory compliance 13.2 Maintenance systems and types: Computerised Maintenance Management Systems (CMMS), Planned Preventive Maintenance (PPM), Reactive Maintenance, Condition-Based Maintenance (CBM), Predictive Maintenance 13.3 Asset Tagging
2 - 4	**K14**: Thermodynamics in heat networks: units of measurement, formulae including Q = mcΔT, properties of materials, relationship between energy, heat and power.	14.1 How the first and second laws of thermodynamics apply to heat transfer, energy conservation, and efficiency in heat networks 14.2 Units of measurement used in thermodynamics 14.3 Thermodynamic formulae; including Heat Energy Transfer (Q = mcΔT) 14.4 Knowledge of how the properties of materials affect heat transfer and system efficiency, such as thermal conductivity, density, and specific heat capacity 14.5 Relationship between energy, heat and power
2 - 4	**K15:** Principles of fluid dynamics in heat networks: units of measurement, formulae including Q = V/t and p=ρgh and hydrodynamics, and how they impact	15.1 Units of measurement used in hydrodynamics 15.2 Application of hydrodynamic formulae to calculate fluid movement and pressure such as Flow rate (Q = V/t), Hydrostatic Pressure (p=ρgh)

Number of Questions	Knowledge	Amplification and Guidance
	pressure, operational pressures, differential pressure and heat network efficiency issues.	15.3 Relationship between velocity, friction losses, and pressure drop and the impact on pressure 15.4 Typical operational pressure ranges in heat networks 15.5 Differential pressure across pumps, valves and HMI's 15.6 Heat network efficiency issues
2 - 4	**K19:** Industrial plant and process control systems: characteristics, modes of control, tuning methods, hierarchical and advanced process control systems.	19.1 Characteristics: reliability, responsiveness, stability, scalability 19.2 Modes of control: manual, automatic, supervisory 19.3 Tuning methods: Ziegler-Nichols, Trial and Error, Software-based tuning 19.4 Hierarchical and advanced process control systems
2 - 4	**K20:** Water quality: the impact of poor water quality on heat networks, scale, corrosion, fouling and microbiology. Open and closed systems, chemical and chemical free systems, industry body and standard.	20.1 Impact of poor water quality on heat networks: scale, corrosion, fouling and microbiology 20.2 Open and closed systems: characteristics, advantages, disadvantages, and common water quality issues 20.3 Chemical dosing methods such as, corrosion inhibitors, scale inhibitors and biocides 20.4 Chemical free treatment options such as filtration, magnetic conditioning, UV sterilization 20.5 Industry bodies and standards
2 - 4	**K22:** Pipe work: types and pipework common issues, riser and lateral pipework, stainless steel, carbon steel, barrel, plastic and copper pipe.	22.1 Common materials and their uses: stainless steel, carbon steel, barrel, plastic and copper pipe 22.2 Pipe jointing methods: threaded, welded, soldered, push-fit and compression 22.3 Pipework layout: riser (vertical) and lateral (horizontal)

Number of Questions	Knowledge	Amplification and Guidance
		22.4 Common pipework issues: corrosion, leaks at joints, thermal expansion and blockages
1 - 2	**S7:** Conduct thermodynamic calculations.	S7.1 Conduct thermodynamic calculations
1 – 2	**S8:** Complete calculations for cold fill pressure of building and differential pressure across pump.	S8.1 Complete cold fill pressure of building and differential pressure across pump calculations

Multiple-choice Test Roles and Responsibilities

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

Component 2: Practical assessment with questions

Overview

In the practical assessment with questions, an independent assessor, approved by Energy & Environment Awards, will observe the apprentice completing set tasks in a simulated environment. The simulated environment must closely relate to the apprentice's 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 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 EEA.
Practical structure	The total assessment time is 6 hours. The independent assessor can increase the time by up to 36 minutes (10%) to allow the apprentice to complete a task or respond to a question if necessary. The independent assessor: • may observe only one apprentice at any one time, to ensure quality and rigour. • will ask questions to assess the level of competence against the grading descriptors. Questioning will take place during the practical assessment The practical assessment may not be split other than for comfort breaks or to allow apprentices to move from one location to another. 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 EEA malpractice policy.
Where will the assessment take place?	The practical assessment with questions must take place in a simulated environment, approved by EEA, which relates to the apprentice's natural work environment.
What are the tasks that will be covered?	The apprentice must be observed carrying out two tasks specific to their specialist option: **<u>Distribution</u>** • **Task 1: Distribution system planned service** The apprentice must carry out planned servicing tasks on a distribution system. • **Task 2: Distribution system unplanned maintenance** The apprentice must visually inspect, fault find and carry out unplanned maintenance on a distribution system. The system must have faults pre-installed by the EPAO. The range of maintenance tasks must include: • the taking of flow, pressure and temperature measurements using portable instrumentation • remote operation of distribution plant equipment through BMS (Building Management System) • local operation of distribution equipment through the control panel • operation of E-Stop and safety circuits **<u>Residential</u>** • **Task 1: HIU (Heat Interface Unit) and tertiary system (hot water and radiator or underfloor heating) commissioning and subsequent service.** The apprentice must commission and service the following: • an electrical or mechanical HIU • a space heating circuit • **Task 2: Residential system unplanned maintenance** The apprentice must visually inspect, fault find and carry out unplanned maintenance on a residential system. The system must have faults pre-installed by EEA. The range of maintenance tasks must include:

	• flow and balancing related faults • conducting HIU energy balance and efficient operations calculations • the taking of flow, pressure and temperature measurements using portable instrumentation These activities provide the apprentice with the opportunity to demonstrate the KSBs mapped to this assessment component. **For further details refer to 'Knowledge, Skills and Behaviours (KSBs) Coverage' below pages [19 - 46].**
Who sets the task(s)?	EEA must review the employer/training provider planned tasks which are based on the requirements listed above. See Appendix D, HNMT Supporting Documents 'Level 3 Heat Network Maintenance Technician Practical Assessment with Questions Planning and Approval Form.'
What resources can the apprentice use?	The employer/training provider will provide equipment and resources needed for the practical assessment with questions. Equipment and resources needed for the practical assessment with questions must be: • the tools, plant, machinery, equipment and PPE required for the job • in good and safe working condition Relevant work instructions/manuals must be available in hard copy or electronically.
How many questions will the apprentice be asked?	The independent assessor: • will ask a minimum of 3 questions • may ask follow-up questions in order to seek clarification
What will the questions focus on?	Underpinning knowledge and/or skills and behaviours where an opportunity to observe them has not occurred.
Grading	Fail or Pass

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

The practical assessment with questions covers core and specialist option KSBs

Practical assessment with questions Theme: Health and safety (Core)	Amplification and Guidance
S2: Comply with health and safety regulations and guidance.	Complies with health and safety regulations and guidance such as: • Health and Safety at Work Act 1974 (HASWA) • Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013 • Personal Protective Equipment (PPE) at Work Regulations 2022 • Control of Substances Hazardous to Health (COSHH) Regulations 2002 • Electrical regulations, e.g. BS7671, applicable to their role such as safe working practices, and an understanding of the role and responsibilities of a qualified competent person • Manual Handling Operations Regulations (MHOR) 1992 • Construction Design Management Regulations (CDM) 2015 • Working at Height Regulations 2005 • Confined spaces Regulations 1997 • company lone working policies and procedures
B1: Prioritise health and safety.	Demonstrates how they: • consistently follow health and safety policies, procedures and guidance • take personal responsibility for their own and others health, safety and security

Practical assessment with questions Theme: Engineering representations (Core)	Amplification and Guidance

K18: Engineering representations: design principles, piping and instrumentation diagrams, single-line electrical diagrams, control panel schematics, circuit and network diagrams.
 	
S12: Interpret and use engineering representations.
	Applies an understanding of:
	• design principles of engineering systems:
	  ○ operating parameters such as pressure, temperature, volume, voltage, current, and power demands of pumps and other equipment
	  ○ relationship between pipe size, pump rating, flow rate and appliance capacity
	• Piping and Instrumentation Diagrams (P&ID)
	  ○ common symbols
	  ○ annotated leader lines for pipe size, flow rate, pressure drop & velocity
	• data plates: displays key specifications of equipment such as manufacturer, model, operating limits, and compliance information:
	  ○ interpret information, e.g. nominal pressure, maximum operating temperature, safety valve ratings and extract key data from manufacturer's manuals or datasheets
	• single-line electrical diagrams, recognise and understand symbols for transformers, relays, circuit breakers, PLC controllers and other control panel components
	• the difference between PLC input and output types, including:
	  ○ digital (on/off) and analogue (voltage, current, resistance)
	  ○ common signals such as 0–10 V, 4–20 mA
	  ○ temperature sensors (10k, PT100, PT500, PT1000)

Practical assessment with questions Theme: Engineering representations (Core)	Amplification and Guidance
	Demonstrates how they: • interpret relevant technical documentation, including wiring diagrams, piping and instrumentation diagrams, manufacturer manuals, calibration certificates, and maintenance records • trace, analyse and apply diagrams across mechanical, electrical and control systems to ensure safe, efficient, and compliant operation of heat network assets

Practical assessment with questions Theme: Task and work area organization (Core)	Amplification and Guidance
K5: Planning, organising and time management techniques. **S1:** Plan and organise tasks including the selection and organisation of resources.	Demonstrate an understanding of how they: • plan and organise tasks, ensuring all required parts, materials, tools and PPE are available before work begins • identify the need for risk assessments and method statements (RAMS) • confirm the correct permits to work are in place, e.g. hot works, confined space, working at height • assess whether the task requires one or two technicians, specialist lifting equipment, or additional resources to complete safely and efficiently • allow for system considerations, such as isolating fire alarms, notifying building users of potential disruption, switching off heat sources or pumps, and confirming if duty/standby plant is available for changeover

Practical assessment with questions Theme: Task and work area organization (Core)	Amplification and Guidance
	• accurately estimate the time needed to complete the job, factoring in potential complications, site access restrictions, or safety checks • communicate the plan clearly to all team members, contractors, and stakeholders
K10: Site management: work area preparation and maintenance techniques. **S5**: Prepare and maintain the work area.	Demonstrate how they: • ensure the work area is properly set up before starting, such as segregation of the work zone, use of barriers, signage, and ensuring safe access/egress routes are maintained • place all tools, materials and equipment in the work area in an organised manner to avoid hazards, minimise downtime, and maintain good housekeeping standards • implement control measures such as spill kits, dust sheets or drip trays to protect the environment and surrounding plant/equipment from contamination or damage • comply with site-specific requirements such as permits to work, RAMS and inductions, ensuring all site rules and procedures are followed • monitor and maintain the work area throughout the task, keeping it tidy, hazard-free and safe for themselves and others working nearby • manage waste disposal appropriately, including separation of general waste, recyclables, and hazardous materials, in line with environmental and statutory requirements

Practical assessment with questions Theme: Task and work area organization (Core)	Amplification and Guidance
	• restore the site on completion, ensuring the area is left clean, safe and fully operational, with all tools and equipment removed, permits closed, and stakeholders notified

Practical assessment with questions Theme: Tools and equipment (Core)	Amplification and Guidance

K34: Tools and equipment used in district heat system maintenance. Requirements for cleaning, storage, care, and operational checks.
 	
S25: Check tools and equipment including calibration. Use and store tools and equipment.
	Demonstrate an understanding of the purpose and suitability of:
	• Tools and equipment such as:
	  ○ Hand and power tools: spanners, screwdrivers, grips, pliers, steel saws, insulated screwdrivers, wire cutters and impact wrenches
	  ○ test equipment: multimeters and clamp meters
	  ○ digital devices: laptops, Personal Digital Assistants (PDA) or mobile apps (e.g. Grundfos GO) for diagnostics, commissioning and digital paperwork
	  ○ gas safety equipment: personal gas detectors (clip-on units)
	• specialist instruments such as:
	  ○ manometers: for ventilation and gas systems & gas work
	  ○ temperature probes and infrared (IR) thermometers
	  ○ refractometers: for glycol concentration
	• safety and access equipment such as harnesses, lifting aids, gantry cranes, and bearing pullers for heavier primary-side maintenance tasks

Practical assessment with questions Theme: Tools and equipment (Core)	Amplification and Guidance

	• tools for refrigeration work such as nitrogen bottles, OFN regulators, high-pressure hoses, leak detectors and refrigerant gas scales, including associated health and safety risks
	• the importance of correctly checking, calibrating, using, and storing tools to maintain accuracy, efficiency, reliability, safety and compliance
	
	This should include how they:
	• check tools and equipment before use, ensuring they are in safe working order, clean, and free from visible damage
	• select and use the correct tool or piece of equipment for the task, following manufacturer's instructions and organisational procedures to ensure safe and effective operation
	• follow calibration processes, including:
	  ○ follow manufacturer's guidelines for correct calibration intervals and procedures
	  ○ check calibration certificates to confirm tools or equipment are within their valid calibration period
	  ○ ensure calibration labels are present and match the tool's or equipment's serial number
	• follow correct procedures for inspecting, cleaning, storing, and maintaining tools and instrumentation devices including reporting or replacing damaged tools promptly

Practical assessment with questions Theme: Core maintenance and fault finding (Core)	Amplification and Guidance
K16: Flow, pressure and temperature measurement techniques, portable measurement instruments, static pressure and differential pressure reading. **S9:** Conduct flow, pressure and temperature measurements using portable instrumentation, including static pressure and differential pressure reading.	Demonstrate an understanding of: • portable measuring equipment used in the commissioning and fault finding of heat networks • safe pressure readings technique, making use of Binder and Schrader test points • accurate temperature measurement on pipes and surfaces, using different sensor types • indirect flow and temperature measurement methods • recording readings in standard formats and comparing to previous data for both manual and electronic recording methods • calibration checks for sensor equipment This should include how they perform: • direct measurements on equipment and pipework, including temperature, static pressure, and differential pressure • indirect measurements, calculating flow rates from temperature sensor data in combination with heat meter data
K35: Visual inspection techniques. **S26:** Conduct visual inspection.	Demonstrate how they: • conduct visual checks of pipework, insulation, joints, and equipment to identify signs of wear, corrosion, leaks, or overheating • recognise abnormal system behaviour, e.g. vibration, noise, discoloration • use inspection tools, e.g. thermal imaging, borescopes, where appropriate

Practical assessment with questions Theme: Core maintenance and fault finding (Core)	Amplification and Guidance
	• follow inspection intervals in line with company procedures and manufacturer's guidelines • record findings accurately and reports defects in line with company procedures
K36: Fault finding techniques. **S28:** Apply fault finding techniques.	Demonstrate how they apply: • fault finding techniques such as visual inspection, manual testing, signal verification, flow and pressure analysis, and manufacturer diagnostics • problem solving methods such as, root cause analysis, collaborating with colleagues This should include how they: • identify common faults found in heat networks using fault finding techniques, technical documentation, and manufacturers' fault finding guides • identify the root causes of problems using fault finding processes and by performing measurements • document the fault-finding process, rectification steps, and justify the techniques used

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

K38: Planned and unplanned maintenance techniques: servicing, repair and replacement.	Demonstrate an understanding of the different types and frequency of maintenance carried out in the workplace:
	• Planned maintenance practices:
	  ○ scheduled inspections and servicing in line with manufacturer instructions, company procedures, and industry standards such as SFG20
	  ○ replacement of components before failure to maintain reliability
	  ○ cleaning, lubrication, and flushing of systems to optimise performance
	  ○ reducing unplanned downtime and improving system efficiency
	• Unplanned maintenance practices:
	  ○ repairing components after equipment has failed to restore operation
	  ○ replacing failed parts when repair is not viable or cost-effective
	  ○ temporary repairs to maintain service until full corrective work can be scheduled

K39: Distribution plant equipment: pumps, inverters, motors, fans, strainers, thermal stores, expansion and vibration bellows and plant heat exchangers.	Apply an understanding of distribution plant equipment by:
	• performing maintenance on pumps:
	  ○ check seals, bearings and couplings
	  ○ monitor vibration and noise
	  ○ clean strainers
	  ○ verify duty/standby operation
	  ○ ensure correct alignment and lubrication
	• carrying out inverter (VSD) checks:
	  ○ confirm correct operation

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	○ inspect cooling fans and filters ○ check parameter settings against manufacturer requirements ○ record fault codes where applicable • inspecting and maintaining motors: ○ including terminal connections, insulation resistance testing, and bearing condition checks ○ ensure cooling paths are clear and free from dust or debris • maintaining fans: ○ check bearings, balancing, cleaning blades and housings ○ ensure guards and mountings are secure to prevent vibration issues • inspecting and cleaning strainers ○ remove debris to maintain flow and system efficiency ○ check for signs of corrosion or damage to baskets and gaskets • maintaining thermal stores: ○ check insulation condition ○ monitor stratification ○ verify temperature sensors ○ inspect safety devices such as pressure relief valves • inspecting and testing expansion vessels and vibration bellows: ○ check pre-charge pressures, diaphragms and fixing points ○ look for leaks, cracks or perishing ○ ensure correct system pressure compensation • maintaining heat exchangers: ○ including visual inspection, leak checks, cleaning plates or tubes

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	○ check flow and temperature differential ○ ensure gaskets and seals are intact This should include how they: • demonstrate safe working practices such as isolating equipment correctly, using the right tools, and checking drain points • ensure systems are restored to service without leaks or faults • prove correct operation of systems via BMS testing signals such as enable, running, fault & modulation
K40: Pressurisation plant equipment: pressurisation unit, expansion vessel, fill and spill unit, break tank and Automatic Air Vents (AAVs).	Demonstrate an understanding of pressurisation plant equipment and how it is maintained: • pressurisation units servicing and inspection: ○ check pump operation, pressure sensors, switches, and control settings ○ verify that the system maintains designed operating pressure and responds correctly to pressure fluctuations • expansion vessels: check for correct pre-charge pressure using a calibrated gauge: ○ inspect the diaphragm or bladder for integrity ○ ensure there are no leaks, corrosion or damage ○ verify correct vessel sizing and installation position • fill and spill units: maintain by ensuring: ○ correct water levels, float switch operation, and make-up valve function ○ overflow and discharge points are unobstructed and labelled correctly

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

	• inspect and clean break tanks:
	  ○ check for correct air gaps, secure lids, and cleanliness to prevent contamination
	  ○ ensure ball valves and level controls operate freely and reliably
	• service Automatic Air Vents (AAVs):
	  ○ check for leaks, blockages, or contamination
	  ○ confirm vent caps and seals are intact and operational
	  ○ ensure trapped air can be safely and efficiently released from the system
	
	This should include how they:
	• verify all pressure relief valves, gauges and isolation valves associated with pressurisation equipment are in good condition and operate correctly
	• ensure all work is conducted safely:
	  ○ isolate systems where necessary
	  ○ follow correct drain and refill procedures
	  ○ restore pressure in line with operating parameters before returning the plant to service
	• maintain accurate records of pressure readings, pre-charge levels, and component condition, to support compliance, traceability and quality assurance

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

K41: Water treatment plant equipment: de-gasser, chemical dosing pot, chemical auto dosing equipment, dirt air separator and water softener.	Demonstrate an understanding of water treatment plant equipment and how it is maintained:
	• de-gasser:
	  ○ confirm correct operation of vacuum or venturi systems
	  ○ check seals, valves, and air removal performance
	• chemical dosing pots:
	  ○ ensure integrity of lids, sight glasses, valves, and flushing connections
	  ○ confirm correct dosing quantities and safe handling in line with COSHH
	• chemical automatic dosing systems:
	  ○ verify sensors, pumps, and controls are clean, calibrated, and operating accurately
	• dirt and air separator:
	  ○ inspect chambers for sludge or debris
	  ○ check vents for blockages
	  ○ confirm air release mechanisms function correctly
	• water softener:
	  ○ inspect brine levels, resin condition, regeneration cycles, and valve operation
	• system water parameters
	  ○ check pH, conductivity, hardness, inhibitor levels
	  ○ record results and report anomalies in accordance with water treatment schedules

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	This should include how they: • follow safe chemical handling practices e.g. PPE, COSHH data sheets, and isolate/depressurise dosing systems before maintenance • rectify issues such as incorrect dosing, air ingress, or scale formation • maintain accurate records of dosing levels, test readings, and component condition to comply with company water hygiene plans and statutory standards

K42: Valves and associated actuators: including Pressure Independent Control Valve (PICV), Differential Pressure Control Valve (DPCV), Non-Return Valve (NRV) temperature and pressure release valve (PRV), three port valves and isolation valves.	Demonstrate an understanding of valves and associated actuators, including how they are maintained:
	• Pressure Independent Control Valves (PICVs):
	  ○ check for free movement of the actuator stem
	  ○ verify set-point pressures
	  ○ clean strainers or filters
	  ○ ensure correct balancing and control response as per commissioning data
	• Differential Pressure Control Valves (DPCVs):
	  ○ inspect the diaphragm and capillary tubes for leaks or damage
	  ○ verify differential pressure settings using calibrated gauges
	  ○ clean valve bodies to prevent debris build-up that could affect system stability
	• Non-Return Valves (NRVs):
	  ○ test to ensure correct flow direction and closure
	  ○ inspect internal springs and seals for wear

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	○ replace components where backflow prevention is compromised • Pressure Relief Valves (PRVs) and temperature/pressure safety valves: ○ inspect to ensure correct lift pressure ○ check for corrosion, leaks or scaling that could prevent reseating ○ confirm discharge routes are unobstructed and correctly labelled • three-port valves: ○ test actuator operation is smooth ○ check control signals correspond to correct valve movement ○ verify flow paths for correct sequencing, e.g. mixing or diverting • isolation valves: ○ inspect for smooth operation, leak-free seating, and handle integrity ○ exercise valves periodically to prevent seizure ○ confirm correct labelling and orientation • actuators: ○ check for correct electrical or control signal operation ○ verify power supply, position feedback, and linkage alignment ○ replace or recalibrate as needed This should include how they: • isolate and depressurise pipework before maintenance, using appropriate tools • follow lock-off/tag-out procedures • record all maintenance findings, including valve set-points, actuator responses, and test results, ensuring compliance with manufacturer

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	specifications, system design parameters, and organisational quality standards

S29: Perform maintenance on distribution plant equipment.	Demonstrates how they:
	• follow manufacturer's instructions, site procedures, and task-specific requirements to ensure safe, efficient and reliable operation of the system
	• review technical documentation, confirming isolation points, gathering required tools, parts and permits, and communicating with site management before starting work
	• ensure all work is completed safely:
	  ○ follow isolation procedures and lock-off/tag-out systems
	  ○ verify systems are depressurised and cool before maintenance begins
	• conduct thorough visual and functional inspections, removing covers or insulation where necessary to check for hidden issues such as small leaks, crystallisation, corrosion, or loose connections
	• identify and correctly use drain points on pipework, understanding that incorrect us can lead to unsafe or incomplete draining
	• safely remove covers, e.g. HIU panels, strainer caps, lagging jackets, to gain proper visual access, recognising when removal is unsafe, such as never removing live electrical motor terminal covers
	• use the correct tools and test equipment, ensuring they are calibrated, fit for purpose and used in accordance with manufacturer's guidance

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	• conduct planned preventative maintenance (PPM) tasks such as cleaning, lubricating, tightening connections, testing safety devices, and inspecting for wear, leaks or corrosion • apply reactive maintenance techniques when faults are identified, diagnosing root causes • carry out repairs or replacements promptly to minimise downtime and disruption • verify correct operation of plant components such as pumps, valves, strainers, heat exchangers, expansion vessels and pressurisation units, ensuring all are performing within design parameters • clean, reinstate and test the system following maintenance, checking for leaks, correct pressure, flow and temperature before returning to service • document all maintenance activities accurately, such as readings, observations, corrective actions, and parts replaced in accordance with organisational quality assurance and reporting procedures • maintain good housekeeping, adhering to health, safety and environmental requirements, and leaving the work area safe and tidy upon completion
K43: Building Management System (BMS) remote plant operation techniques: fault reset, heat generation asset commercial gas boilers, pumps, valves and pressurisation units.	Demonstrates an understanding of: • safe access and operation of Building Management System (BMS) in line with site procedures and manufacturer's guidance, including secure login, system navigation and user access levels • how BMS monitors, controls and adjusts plant operation for pumps, boilers, valves, Combined Heat and Power (CHP) units and pressurisation systems

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

	• interpretation of BMS feedback signals such as pump speed, flow and return temperatures, pressures, differential pressure (DP) switch status, boiler modulation levels, and system load indicators
	• fault feedback logic and how to recognise whether alarms originate from equipment, sensors, or control signals
	• modes of operation e.g. Auto, Override, and Emergency Override, and when each should be applied
	• importance of KPIs monitored by the BMS, such as network flow and return temperatures, CHP uptime, and energy efficiency:
	  ○ how they impact network performance and customer satisfaction
	• use of BMS trending tools to analyse performance, identify flatlined (stale) signals, and export data for reporting
	• meaning of system colour indicators on BMS interfaces, e.g. Trend IQ Vision, and what they signify, e.g. stale or inactive data, and overridden points
	• function of the Hand–Off–Auto (HOA) switch and implications of each position:
	  ○ Off: removes the enable signal, preventing automatic operation
	  ○ Hand (Manual): forces continuous running, overriding BMS or PLC control signals, while respecting hardwired safety interlocks such as fire alarms, emergency stops, or pressure switches
	  ○ Auto: allows automatic operation based on BMS or PLC control logic and system demand
	• difference between:
	  ○ hardwired interlocks: safety-critical physical circuits that will always stop the equipment, such as fire alarms or emergency stops

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance
	○ soft interlocks: software-based control logic within the BMS • operational and safety risks of manual mode and why systems must be returned to Auto after work is completed
S30: Operate plant equipment remotely through BMS using remote plant operation techniques, including switch duty of a duty standby pump, change lead heat source and valve operation.	Demonstrate how they: • check and reset alarms or faults through the BMS, verifying the root cause before re-enabling equipment and logging actions • confirm the correct operation of emergency stops (E-stops) and safety circuits before, during and after local operation to ensure plant shutdown functions correctly in an emergency • perform duty/standby changeovers of pumps and other equipment through the BMS, without causing pressure, flow or temperature disturbances across the network • change lead heat sources, e.g. switching boilers or CHP engines, safely to maintain system stability and preventing loss of service to connected clients • perform local operation while monitoring system conditions to avoid overheating, overpressure, or loss of flow • safely use BMS, ensuring no actions are taken that could cause a detrimental effect on the heat network or breach operational safety parameters • record and report all local operations, including the purpose of manual running, duration, readings observed and confirmation that equipment was safely returned to automatic control on completion

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

K44: Plant equipment control panels and local operation techniques: pumps and heat source.
 	
S31: Operate plant equipment locally from control panel, including pump and heat source.
	Applies an understanding of:
	• safe isolation procedures before starting work, in line with manufacturer instructions and site protocols
	• use of control panels, inverter panels, or commissioning tools (e.g. Grundfos GO) to:
	  ○ test pumps, adjust pump speed, and verify motor direction safely
	  ○ confirm correct pressure, flow, and temperature readings
	  ○ monitor for abnormal noise, vibration, or overheating
	• locally operating boilers or other heat sources:
	  ○ confirm safe conditions for firing e.g. adequate pressure, ventilation, and water flow
	  ○ observe start-up and shutdown sequences in line with manufacturer procedures
	• correct use of the Hand–Off–Auto (HOA) switch, selecting Off, Hand, and Auto as required, returning to Auto mode after local operation to restore normal BMS or PLC control
	
	Demonstrates how they:
	• coordinate local operations with the BMS or site control room to prevent conflicts between remote and local commands
	• appropriately document and report all actions taken during local operation, including purpose, duration, and any faults identified, in compliance with safety and quality standards

Practical assessment with questions Theme: Distribution systems maintenance (Distribution)	Amplification and Guidance

K45: E-Stops and safety circuits: operation and return to normal service techniques.
 	
S32: Operate e-stop and safety circuits on equipment and return plant to normal service, including fire alarm re-activation.
	Demonstrate an understanding of:
	• E-stops: manual emergency shut down of equipment to prevent harm or damage
	• safety circuits: isolate power, stop plant operations, and prevent restart when unsafe conditions are detected
	• fire alarm systems: how they interact with plant controls, including automatic shutdowns and lockouts
	• return to normal operations:
	  ○ correct procedures for reactivating systems after an emergency stop or fire alarm.
	  ○ verify components are functioning correctly before restoring normal operations
	
	Demonstrates how they:
	• safely activate an E-Stop in line with company procedures
	• reset safety circuits and return plant to normal service, ensuring all safety conditions are met
	• reactivate fire alarms, liaising with building safety teams and external contractors where applicable
	• conduct checks to confirm safety systems are ready for future use
	• document E-Stop activations, resets, and fire alarm reactivations and communicates with all stakeholders to maintain safety

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance

K46: Planned and unplanned maintenance techniques: servicing, repair and replacement.	Demonstrate an understanding of the different types and frequency of maintenance carried out in the workplace:
	• Planned maintenance practices:
	  ○ scheduled inspections and servicing in line with manufacturer instructions, company procedures, and industry standards such as SFG20
	  ○ replacement of components before failure to maintain reliability
	  ○ cleaning, lubrication, and flushing of systems to optimise performance
	  ○ reducing unplanned downtime and improving system efficiency
	• Unplanned maintenance practices:
	  ○ repairing components after equipment has failed to restore operation
	  ○ replacing failed parts when repair is not viable or cost-effective
	  ○ temporary repairs to maintain service until full corrective work can be scheduled

K47: Heat Interface Unit (HIU): single plate (direct or indirect heating system), twin Plate, electrical and mechanical. Cooling Interface Unit (CIU), Hot Water Cylinders and Fan Coil Units (FCU).	Demonstrates an understanding of: • different types of HIU such as single plate (direct or indirect), twin plate, electrical, and mechanical and their functions for Domestic Hot Water (DHW), central heating and cooling • methods of control used in HIUs, including mechanical and electronic systems • commissioning of the configurable functions in HIUs and CIUs, such as setpoints, keep warm, boost flow, return temperature limits, load limits, hot water priority, and Legionella prevention functions

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance

	• advantages and disadvantages of hot water cylinders, and where they should be deployed
	• main methods of connecting potable (unvented) hot water cylinders to HIUs and communal heating networks, including:
	  ○ indirect coils and plate heat exchanger recover via an HIU
	  ○ applicable unvented regulations and the role of a competent person for systems over 15 litres
	• control of heating and cooling within properties in order to minimise costs and maximise comfort levels
	• techniques to replace components in HIUs & CIUs, including valves, pumps, and sensors

K48: Tertiary system assets: radiator, Thermostatic Radiator Valves (TRVs), heating control units, under floor heating systems, automatic air valves, lock shield, dynamic balancing valve, Direct Hot Water (DWH) systems and trace heating.	Demonstrates an understanding of: • different types of heat emitters, e.g. radiators, fan coil units, and underfloor heating, including how they are connected and controlled • types of Thermostatic Radiator Valves (TRVs) and Return Limiting Valves, including correct setup procedures • functions of underfloor heating components e.g. manifolds, temperature control valves, injection systems, pumps, and safety cut-out thermostats • methods for removing air from systems using manual and automatic air vents, air separators, and bleeding radiators. • purpose and operation of trace heating systems, including diagnosing common faults such as damaged heating cables, faulty thermostats, or insulation failures

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance
	• types of Domestic Hot Water (DHW) outlet, e.g. taps, showers and baths, and associated safety and commissioning requirements

K49: Tertiary system wiring, controls and metering: pre and post pay systems, 2 and 3 port (S and Y plan), valves, programmers, thermostats, heating circuit pumps, heating circuit and zone control.	Demonstrates an understanding of:
	• differences between pre-pay and post-pay metering systems, including how they operate and are wired
	• purpose and placement of heating circuit pumps in tertiary systems
	• types and configuration requirements of user controls for time and temperature regulation, such as room thermostats and programmers
	• methods for zoning heating systems, including central heating and domestic hot water:
	  ○ configuration requirements and control layouts such as Y-Plan and S-Plan circuits
	• identification and rectification of faults, e.g. replace and rewire, in tertiary components such as thermostats, programmers, pumps and motorised valves
	• basic wiring principles:
	  ○ safe isolation and wiring standards for tertiary systems
	  ○ common wiring faults and fault finding methods

S33: Perform maintenance on residential heat network systems.	Demonstrate how they: • follow manufacturer's instructions, and task-specific requirements to ensure safe, efficient and reliable operation of the system • review technical documentation to confirm isolation points • conduct thorough visual and functional inspections to identify hidden issues such as leaks, corrosion, or loose connections

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance

	• use the correct tools and test equipment, ensuring they are calibrated, fit for purpose and used in accordance with manufacturer's guidance
	• test water quality and system condition:
	  ○ check and clean strainers
	  ○ flush and fill systems
	• conduct full performance test on HIUs and tertiary systems as part of regular maintenance and fault identification, including:
	  ○ cleaning, lubricating, tightening connections, testing safety devices
	  ○ inspecting for wear, leaks or corrosion
	• apply reactive maintenance techniques when faults are identified, diagnosing root causes
	• carry out repairs or replacements promptly to minimise downtime and disruption
	• reinstate and test the system following maintenance, checking for leaks, correct pressure, flow and temperature before returning to service
	• test static and differential pressures to confirm correct operation of circulating pumps
	• document all maintenance activities accurately, such as readings, observations, corrective actions, and parts replaced in accordance with manufacturer's requirements
	• maintain good housekeeping, adhering to health, safety and environmental requirements, and leaving the work area safe and tidy upon completion

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance
K50: Applied calculation techniques: HIU energy balance and efficient operation. **S34:** Conduct HIU energy balance and efficient operations calculations.	Applies an understanding of: • HIU operating modes and how they affect efficiency, e.g. Domestic Hot Water (DHW) priority, space heating, combined (heating and DHW), standby and summer modes • functions of heat (and cooling) meters for energy measurement, accurate customer billing and performance monitor system performance • the heat energy equation Q = mcΔT to calculate energy transfer, flow rate and temperature difference Demonstrates how they: • read and interpret power, flow and temperatures from heat (and cooling) meters • use meter data to identify excess energy use, or overlap between heating and cooling • perform power, flow and temperatures calculations on a working HIU system

K51: Balancing and flow optimisation techniques: radiators and underfloor heating.
 	
S35: Apply balancing and flow optimisation techniques.
	Demonstrates an understanding of:
	• how to commission:
	  ○ flow rates and temperature drops across radiators for system balancing
	  ○ flow rates on underfloor heating circuits
	• Pressure and Thermostatic Radiator Valves (PTRVs): correct flow and temperature control
	• use of thermal imaging to identify faults in underfloor heating, e.g. cold spots or uneven heat

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance
	Demonstrates how they: • commission and optimise a full heating system to achieve design loads and temperature drops • measure and adjust flow rates and temperature drops across radiators for balanced heating • set correct flow rates on underfloor heating manifolds according to design specifications • use thermal imaging equipment to diagnose underfloor heating issues • check and adjust PTRVs for optimal performance and system efficiency • record all adjustments, confirming system performance meets design parameters
K53: Electrical, mechanical Heat Interface Unit (HIU) and space heating circuit commissioning techniques. **S37:** Perform commissioning of electrical HIU and mechanical HIU and a space heating circuit.	Demonstrates an understanding of: • different HIU settings and functions e.g. DHW priority, temperature limits, flow control and how they impact central heating performance • how to use differential temperature measurements across heat emitters to verify correct operation • commissioning principles for mechanical and electronic HIUs, including setting design parameters • maintain efficiency and protect system components by setting limits on an HIU, e.g. return temperature and peak flow rates Demonstrates how they:

Practical assessment with questions Theme: Residential systems maintenance (Residential)	Amplification and Guidance
	• commission and optimise a range of HIUs (mechanical and electronic) to achieve design setpoints, loads, and temperature drops across heating circuits • measure differential temperatures across heat emitters • set and verify HIU limits e.g. return temperature, peak flow rate, according to manufacturer's guidelines • check correct operation of electrical and mechanical components during commissioning • restore the system to normal operation in compliance with safety protocols and manufacturer instructions • document all commissioning results accurately

Practical assessment with questions roles and responsibilities

Role	Responsibility
Independent Assessor	Explain, to the apprentice, the format and timescales of the practical assessment with questions before it starts. Conduct and assess the practical assessment with questions. Use language in the delivery of the EPA that is appropriate to level 3. Invigilate and supervise the apprentice during the practical assessment with questions, including moving between tasks and breaks, to prevent malpractice in line with EEA invigilation procedures. Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EEA.
Employer/Training Provider	The training provider must liaise effectively with the employer to ensure the apprentice is prepared for the practical assessment with questions. 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. Provide all necessary tools and equipment for the apprentice. Ensure the apprentice has access to the resources used on a daily basis. Provide EEA with access to any employer-specific documentation as required for example, company policies. Use EEA practical assessment review service to review and discuss the fitness for purpose of the assessment task. Ensure that any required supervision during the EPA period, as stated in this Specification, is in place. Employer/training provider must remain independent from the delivery of the EPA.

Role	Responsibility
Energy & Environment Awards	EEA will review the arrangements for the practical assessment with questions planned by the employer/training provider. Arrange for the practical assessment with questions to take place, in consultation with the employer/training provider and independent assessor

Component 3: Interview based on an EPA portfolio

Overview

The interview is based on the apprentice's EPA Portfolio and focuses on holistic evidence covering the KSBs relating to the 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 interview. The apprentice should use the EPA Portfolio Template to collate evidence in preparation for their 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 EEA at Gateway.

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

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

Assessors	1 independent assessor approved by EEA will conduct the interview.
Interview structure based on an EPA portfolio	The apprentice's Manager/Mentor must support the completion of the EPA Portfolio Template tasks in accordance with company policy and procedures. **Types and number of questions:** • The independent assessor must ask at least 6 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 **Location:** Employer's premises or a suitable venue for example a training provider's premises. **Time:** • The interview must last 75 minutes (1 hour 15 minutes) • The independent assessor has the discretion to increase the time of the Interview by up to 7.5 minutes (10%) to allow the apprentice to complete their last answer **The Interview will be:**

	• conducted by 1 independent assessor • face to face or remote, as agreed • recorded in writing using the interview record template provided by EEA • video recorded using relevant technology such as Microsoft Teams or an audio recording device • conducted under examination conditions The apprentice must have access to their EPA portfolio throughout the interview. Although questioning will cover ALL the elements of the HNMT standard (listed below in this section of the Specification), the independent assessor will prioritise areas according to what they see in the EPA portfolio. **For further guidance on the EPA portfolio refer to Section 5 Practical Guidance on an EPA Portfolio.**
What topics will be covered?	**For further details refer to 'Knowledge, Skills and Behaviours (KSBs) Coverage below pages [51 - 75].**
When will the EPA portfolio be referred to?	The EPA portfolio: • will be reviewed by the independent assessor before the interview • can be referred to by the apprentice to illustrate their answers **Note**: the EPA portfolio is **not** directly assessed.
Grading	Fail, Pass or Distinction

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

The Interview based on an EPA portfolio covers the following:

Interview based on an EPA portfolio Theme: Environment and sustainability (Core)	Amplification and guidance
S3: Comply with environmental and sustainability regulations and requirements, including safe disposal of waste, re-cycling or re-use of materials, and efficient use of resources. **B2:** Consider the impact on the environment when using resources and carrying out work.	Describes how they: • follow procedures for disposing of hazardous and non-hazardous waste in line with company and legal requirements, e.g. glycol fluids, insulation materials, metal components • hold or check for a valid waste carrier licence when transporting waste • separate recyclable materials from general waste and reuse components where safe and appropriate, e.g. copper piping, aluminium heat exchangers • manage contaminated water from system flushing in compliance with trade effluent regulations and discharge permits • reduce energy and water usage during maintenance tasks, e.g. using low-energy tools, minimising water discharge during flushing • consider the environmental impact of their work and takes steps to mitigate it, e.g. emissions from flushing systems, noise pollution or heat loss from inefficient systems

Interview based on an EPA portfolio Theme: Health and safety (Core)	Amplification and guidance
K8: Hazard identification techniques, control measures, risk assessment method statements (RAMs), risk management and the recording and reporting of incidents and accidents. **S4:** Identify and document hazards and risks in the workplace and apply control measures.	Demonstrates an understanding of: • hazard identification techniques: visual inspections, reviewing safety data sheets and manufacturer's instructions, dynamic risk assessments • control measures: mitigate identified risks, ensuring the safety of all personnel and the environment • risk assessment method statements (RAMS): outline the scope of work and identify specific hazards, risks and control measures in place • risk management: monitoring controls, reviewing incidents, and updating procedures • procedures for recording and reporting of incidents and accidents: incident reports, near miss reporting, accident books, escalation protocol This should include how they: • conduct risk assessments in a safe and controlled manner, identifying hazards and evaluating any risks and implementing appropriate control measures • document their findings in a clear and appropriate manner in line with company procedures and requirements • monitor and maintain site safety conditions and adjust their risk assessment control measures if site conditions change

Interview based on an EPA portfolio Theme: Health and safety (Core)	Amplification and guidance
	• record and report incidents and accidents in a clear and appropriate manner. Following company procedures and requirements and escalating when necessary • ensure the control measures they select are effective in minimising risk and hazards

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance
Communication and documentation	
K24: Documentation: methods and requirements - electronic and paper.	Demonstrates an understanding of the: • use of digital platforms to record service history, test results, and maintenance actions such as asset management systems (e.g. Maximo, SAP), handheld devices, or BMS (building management systems) logs • relevant documentation to be completed in line with company procedures and ask requirements, such as job sheets, risk assessments, permits, handover documents, and inspection checklists • company protocols for version control, approvals, and distribution • importance of maintaining audit trials and following GDPR, cyber security and data protection policies

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance
S15: Record or enter information - paper based or electronic. For example, energy usage, job sheets and task list, risk assessments, equipment service records, test results, handover documents and manufacturer's documentation, asset management records, work sheets, checklists and waste environmental records.	Describe how they: • select appropriate documentation for job sheets, risk assessments, service records, and permits • save and organise electronic files, ensuring documents are stored and in secure systems • draft and review risk assessments, updating where required to clearly identify hazards, controls, and residual risks • accurately complete all documentation, using correct terminology and recording all relevant details, such as dates, times, asset ID's, test results, actions taken • prepare handover documents, outlining completed work, and outstanding issues • update electronic asset management records with relevant details, i.e. maintenance history, component replacements, calibration dates • complete waste transfer notes, hazardous waste logs, and environmental records • submit any legal or statutory documents, to relevant authorities or internal compliance teams
K31: Written communication techniques. Plain English principles. Engineering terminology. Report writing.	Describes how they use written communication in their role to: • accurately record information, selecting the most appropriate method e.g. email, updating electronic systems used within the workplace, group chat or messaging platforms

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance
S21: Communicate in writing. For example, with colleagues and stakeholders.	• produce clear and accurate reports, written in a concise and precise manner, considering tone and clarity • share information with colleagues and stakeholders, using appropriate style, i.e. plain English or engineering terminology as appropriate for the intended audience
K33: Verbal communication techniques. Giving and receiving information. Matching style to audience. **S22:** Communicate with others verbally, for example, colleagues and stakeholders.	Demonstrates how they use verbal communication techniques to: • deliver concise and accurate spoken instructions, especially in noisy, time-sensitive or safety-critical environments • use appropriate tone, pace and volume to ensure messages are understood across diverse teams and settings • provide support and updates to all stakeholders, adapting language and technical terminology for the audience • communicate clearly and concisely, ensuring understanding and transparency
Information Technology	
K37: Information technology: Management Information Systems (MIS), spreadsheets, presentation, word processing, email, virtual communication and learning platforms. General Data Protection Regulation (GDPR). Cyber security.	Describes how they: • accurately update Management Information Systems (MIS) to record jobs, maintenance activities, schedule maintenance and track asset performance • use spreadsheets for data analysis such as tracking service intervals, analysing water quality trends, and calculating efficiency

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance

S23: Use information and digital technology. Comply with GDPR and cyber security regulations and policies.	• prepare clear reports and presentations to communicate findings and support decision-making in line with company standard
	• communicate professionally, using email and virtual platforms for updates, handovers, and coordination with stakeholders
	• apply GDPR principles, handling personal data securely, sharing only with authorised individuals, and following reporting timeframes
	• follow company client & site security protocols:
	  ○ authorised access, sign in/out procedures, restricted zones, and emergency exit procedures
	  ○ prevent disruption or damage, especially in high-risk environments such as plant areas
	• comply with company IT and cyber security policies:
	  ○ use strong passwords, keep devices updated, identify suspicious activity, and safeguard data on mobile or remote connections
	  ○ prevent breaches when accessing systems such as MIS and Building Management System (BMS)
	
	This should include:
	• why GDPR and cyber security are essential for protecting organisational and customer data in everyday IT use
	• how assurance and monitoring processes, including Automatic Meter Reading (AMR) systems and Building Management Systems (BMS),

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance
	are used to collect and report performance data securely and consistently
Team working, ethical practices and equity, diversity and inclusion	
K29: Team working principles. **S19:** Apply team working principles.	Demonstrates an understanding of working as a team: • team building: morale; trust and respect • goal setting: flexibility • roles and responsibilities: accountability • good communication: collaboration; being a team player • effective leadership: motivation This should include how they: • apply teamworking principles in line with organisational policy to achieve goals safely and effectively • contribute to wider team and company results, including how being focused on teamwork supports others to achieve their goals
K30: Equity, diversity and inclusion requirements in the workplace. **B6:** Support an equitable, diverse and inclusive culture.	Understands the requirements of equality, diversity and inclusion in the workplace: • equality: fair treatment, access and opportunity for all regardless of age, race, gender, cultural background, beliefs, sexual orientation • diversity: recognise and value differences in backgrounds, cultures and perspectives

Interview based on an EPA portfolio Theme: Communication and working with others (Core)	Amplification and guidance
	• inclusion: foster a culture where all employees feel values and are able to contribute fully Supports a positive workplace culture by: • showing respect to others • modelling respectful behaviour • creating and maintaining productive working relationships • challenging discriminatory language or behaviour
S20: Apply ethical principles. **B5:** Act ethically.	Describes how they apply ethical principles in their daily activities: • communicates with honesty and transparency • treats others fairly, avoiding discrimination • takes responsibility for decisions and actions • challenges unethical behaviour in the workplace

Interview based on an EPA portfolio Theme: Quality assurance, continual professional development and continuous improvement (Core)	Amplification and guidance
Quality Assurance	
K26: Quality assurance requirements and monitoring processes. **S16:** Apply quality assurance procedures and monitoring processes.	Describes how they: • follow organisational Quality Assurance (QA) procedures to ensure work meets required standards • conduct internal checks before reporting externally, using methods such as spot checks, photographic evidence, and service report reviews • monitor equipment downtime and response times to maintain KPI compliance • cooperate with external QA audits and understand the consequences of discrepancies e.g. escalation, disciplinary action • produce accurate, timely reports and risk assessments to support compliance and maintain accreditations, e.g. ISO • apply industry-specific QA requirements for heat networks, including service levels, metering and reporting obligations and understand the consequences of non-compliance KPI failure, clients reputation with end users, GSS payments and contract termination • track and interpret KPIs for system performance and customer service, adjusting processes to meet targets

Interview based on an EPA portfolio Theme: Quality assurance, continual professional development and continuous improvement (Core)	Amplification and guidance
	• develop or contribute to a QA schedule or plan to ensure appropriate monitoring and continuous improvement
B3: Take responsibility for the quality of their own work.	Describes how they take responsibility of their own work by: • completing works to a high standard, resolving issues where possible and knowing when to escalate problems • maintaining good housekeeping at all times • showing commitment by seeing tasks through to completion, even when plans change or delays occur • conducting routine tasks diligently, such as meter readings and inspections, ensuring data is recorded accurately to avoid downstream errors • accurately recording and reporting service and maintenance tasks, ensuring compliance with statutory and regulatory frameworks as well as company procedures
Continual professional development and continuous improvement	
K28: Continuous improvement techniques: lean, 6-sigma, KAIZEN, 5 S (Sort, set, shine, standardise and sustain).	Demonstrates an understanding of: • LEAN: principles focused on maximising value and minimising waste in processes

Interview based on an EPA portfolio Theme: Quality assurance, continual professional development and continuous improvement (Core)	Amplification and guidance
S18: Apply continuous improvement techniques. Devise suggestions for improvement.	• Six Sigma: data driven methodology for reducing defects and improving quality • Kaizen: continuous incremental improvement through small, ongoing positive changes • 5S (Sort, Set, Shine, Standardise and Sustain): used to organise and maintain efficient workspaces • other continuous improvement techniques relevant to their organisation or sector Explains how they have used continuous improvement techniques in their work. This should include: • a suggestion they have made for an improvement to an issue or process • how they recorded or presented the idea • explanation of how the improvement has contributed to the process or business
S24: Carry out and record planned and unplanned learning and development activities.	Outlines the learning and development activities they have completed to support their competence, such as: • maintaining a CPD log or record of learning • participation in additional trade or technical courses

Interview based on an EPA portfolio Theme: Quality assurance, continual professional development and continuous improvement (Core)	Amplification and guidance
	• engagement with industry-related articles or publications • completion of additional academic, technical, or professional qualifications • involvement in off-the-job training activities • learning gained through on-the-job training experience
B7: Committed to continued professional development (CPD) to maintain and enhance competence in their own area of practice.	Shows a commitment to maintaining and enhancing competence through Continued Professional Development, e.g. • keeps up to date with industry developments • willingly participates in training to maintain or enhance current knowledge • maintains a record of progress • attempts to improve performance following constructive feedback

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
Core maintenance techniques	
K32: End to end process through a heat network upon a customer demanding heat (hot water or heating) within a property with indirect HIU (Heat Interface Unit).	Demonstrate an understanding of: • initial demand stage: how demand for heating and hot water activates the HIU and influences system flow and temperature • HIU operation: role of internal pumps, heat exchangers, and primary control valves, e.g. Pressure Independent Control Valve (PICV), in maintaining secondary circuit and hot water service temperatures • system interaction: how changes at the HIU affect primary network flow and temperature, and how district heating substations respond to maintain stability • sensors and controls: function of sensors, differential pressure monitoring, and BMS inputs in regulating pump speed and plant output • sensors and controls: function of sensors, differential pressure monitoring, and BMS inputs in regulating pump speed and plant output This should include explaining:

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	• the causes of differential pressure across pumps/risers to change when PICVs open or close, and how the BMS responds by ramping pumps up or down to restore setpoint • how increased demand leads to higher flow and plant response, e.g. pump ramp-up, boiler modulation, or use of thermal stores, and how reduced demand closes the HIU valves, backs off pumps, and stabilises the system • why correct sensor placement, commissioning, and control settings are critical, and how missing or misconfigured components can disrupt operation • how to establish the correct differential pressure control point by testing the index run HIU flow rate furthest from pump

K12: Maintenance practices: planned, preventative, predictive and reactive methods. Maintenance techniques and standards, statutory inspection and industry standard SFG20.
 	
S6: Apply maintenance practices and standards.
	Demonstrate an understanding of:
	• maintenance practices such as:
	  ○ planned: scheduled tasks in line with planned preventative maintenance (PPM) and SFG20, e.g. cleaning a strainer twice a year
	  ○ preventative: lubricating moving parts or tightening connections to reduce breakdowns and extend equipment life
	  ○ predictive: using monitoring data, such as flow, pressure, vibration, water chemistry, to adjust intervals and prevent faults

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	○ reactive methods: acting immediately when faults occur. e.g. cleaning a strainer if HIU flow is poor, and recognising frequent issues as signs of deeper problems • SFG20 guidance: to identify correct maintenance frequency, either mandatory or recommended, and standards for different building services systems • difference between intrusive and passive maintenance, e.g.: ○ intrusive: opening and cleaning a strainer ○ passive: measuring the differential pressure across the strainer to identify a blockage Describes how they: • follow company maintenance packs and schedules in line with statutory inspection requirements and industry standard SFG20
B8: Respond and adapt to work demands and situations.	Describes how they: • adapt their approach to real site conditions, such as responding to unexpected breakdowns, by moving from planned schedules to reactive repairs • apply standards consistently while adapting to changing work demands, ensuring safety, compliance and operational continuity • in practice, e.g. if an unexpected breakdown occurs that requires moving from a planned schedule to a reactive repair

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	• adjust their maintenance plan in response to predictive data, either bringing work forward or extending intervals • plan for contingencies by ensuring spare parts or alternatives are available before starting work
K27: Remote diagnostic techniques and supply system crossover impact: monitoring and test equipment, use and interpretation of results of fixed monitoring equipment for on and offline monitoring including continuous and semi-continuous data recording, flow rates, temperatures and distribution system. **S17:** Perform remote performance diagnostics.	Demonstrates how they apply their understanding of: • systems responsible for monitoring equipment, including BMS systems, ARMS systems, and manufacturer systems • interpreting data from fixed and portable monitoring equipment for on/offline analysis such as flow rates, temperatures, pressure, and distribution performance • functions of local and remote head-end system, including graphics, trend analysis and data export • technical layers in monitoring, e.g. data transport, ingress, and storage and how frequency affects accuracy and storage • KPIs used to measure performance and identify faults • how to identify crossover in supply systems, including where it occurs and its impact This should include how they: • access and navigate BMS head end systems, and monitoring and visualisation platforms, e.g. cloud based Grafana • generate graphs and reports for system performance and diagnostics

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	• follow manufacturers' fault finding processes and diagnostic techniques to identify and report common heat networks and energy centres problems

K21: Water network system maintenance techniques: cleaning of strainer baskets and water sampling.
 	
S13: Maintain water network systems, for example cleaning of strainer baskets and heat network water sampling ready for analysis.
	Demonstrates how they apply an understanding of:
	• correct procedure for cleaning a Heat Interface Unit (HIU) strainer basket:
	  ○ prepare for maintenance by isolating and draining the HIU
	  ○ use appropriate tools to remove strainer cap and basket before cleaning to remove debris
	  ○ reassemble carefully, check for leaks before returning the system to service
	• purpose of strainer cleaning:
	  ○ ensure free flow to protect components from blockages and maintain system efficiency
	• water sampling on a HIU:
	  ○ qualified technicians follow company procedures to collect representative, uncontaminated samples, using appropriate sampling bottles, pumps or taps
	• key parameters tested during water analysis, including:
	  ○ oxygen levels, alkalinity, pH: indicates water chemistry and corrosion risk
	  ○ dissolved metals such as ferrous ions: indicates corrosion, scaling, or water treatment issues

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	○ inhibitor levels: confirm correct dosing to protect against corrosion and scaling • why water sampling is critical: diagnose corrosion, detect contamination, maintain efficiency, and protect HIU and network longevity • importance of monitoring water make-up on primary and secondary systems: identify leaks and prevent water quality degradation This should include how they: • identify what will and will not cause a system interruption, identify and correctly bring into service any by-pass lines or standby equipment to avoid disruption • follow correct authorisation procedures for service interruption or medium/high risk activities, relevant to system type and scale, e.g. district/primary, secondary, tertiary/HIU • comply with safety and statutory standards during strainer maintenance and water sampling • ensure water is in circulation and not stagnant before sampling, flushing sampling point before filling bottle • minimise the release of system water to prevent contamination during maintenance activities

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance

K23: Pipe working techniques: repair and replacement, safe isolation, drain down and refill.
 	
S14: Repair or replace pipework.
	Demonstrates how they apply their understanding of:
	• select and perform pipework repair and replacement techniques, including:
	  ○ cutting and jointing methods such as compression, push-fit, crimp, screwed/socketed, solder/braze, weld, and flanged
	  ○ reinstatement procedures to restore system integrity after repair or replacement
	• tool and material selection: appropriate tools and correct fittings for pipe type, e.g. copper, steel, plastic
	• interpret DN/PN denominations and how different flange types do/do not marry up with each other
	• safe isolation and proving:
	  ○ obtain authorisation e.g. permit-to-work (PTW)/ Detailed Electrical Operating Procedure (DEOP)
	  ○ identify isolation points and verify zero energy/pressure on both sides
	  ○ apply additional controls where necessary, e.g. double block-and-bleed, air gap, for high-risk systems
	• drain down procedures: selecting suitable drain points, controlling discharge and complying with environmental requirements, e.g. discharge licence for large volumes or chemically treated water
	• refill and venting process:

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	○ use filling loops/quick-fill valves to refill system with softened water and adding inhibitors or other water treatment where necessary ○ prevent backflow/contamination by using non-return/check valves, and capped filling loops ○ safely vent air to maintain wider system operation where possible • **r**ead and interpret pressures/differentials: ○ manage risks when opening valves under imbalance ○ identify faulty instruments, e.g. gauges stuck at zero, impossible temperature readings • handle large primary components: plan lift-and-shift for heavy strainers/valves, using appropriate lifting equipment and following manual handling and safety procedures • safety, compliance, and environmental considerations throughout pipework isolation, draining and refilling, ensuring work is completed to statutory and industry standards • plan tasks considering time-restricted works, making sensible estimates for fill and vent times based on system size and method
K17: Electrical installation techniques and principles: circuit theory, capacitance in DC circuits, magnetism, single-phase alternating current (AC) theory, 3 phase wiring, hazards of	Demonstrates an understanding of electrical installation techniques and principles: • circuit theory: relationship between current, voltage and resistance and how they interact in series and parallel circuits

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
electricity, safe isolation of circuits, testing for live or dead and minor works certification.	• capacitance in DC circuits: ability of a component to store and release electrical energy and the role of capacitance in DC circuits, i.e. filtering and smoothing • magnetism: electromagnetic principles relevant to motors and pumps such as Flemmings Left Hand Rule, forces of nature to move a liquid • single-phase AC theory: single alternating current waveform often used to supply electrical power in domestic or small commercial systems. • three-phase wiring: method of electrical distribution that uses three alternating currents to deliver consistent and efficient power. • hazards of electricity: recognises risks such as electric shock, arc flash, and fire, and applying control measures • safe isolation of circuits: procedures to safety isolate, lockout and tagout equipment before conducting work. • testing for live or dead: Use of approved voltage indicators and proving units to verify isolation • Minor Works Certification: documentation verifying compliance with BS 7671 (IET Wiring Regulations), PUWER (Provision & Use of Work Equipment Regulations).
S10: Test electrical system for live and dead.	Describe how they: • use wiring diagrams to identify components in the circuit or equipment to be tested

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	• follow company procedures for verifying safe conditions before work begin • carry out safe isolation in line with the company procedure • use appropriate and calibrated test equipment • confirm the system is dead/safe to test before commencing work
S11: Install and certify electrical wiring to three phase pump.	Describe how they: • refer to wiring diagrams and manufacturer's guidelines • select appropriate cable types for the task • follow safe working practices, including isolation and risk assessments • use correct tools and methods for terminating, routing and securing • carry out functional tests, insulation resistance testing, and earth continuity verification
Problem solving	
K25: Problem solving techniques: diagnostics, root cause analysis, DMAIC (Define, Measure, Analyse, Improve, Control), PDCA (Plan Do Check Act), 5 Whys', Fishbone and Ishikawa. **S27**: Apply problem solving techniques.	Demonstrate an understanding of: • diagnostics techniques, such as checking system data (e.g. pressures, temperatures, flow rates), reviewing maintenance records and using tools such as BMS readouts or meter readings to identify symptoms of faults

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance

	• when they would apply **root cause analysis to** identify the underlying cause, e.g. repeatedly blocked strainers indicate a wider water quality problem
	• structured problem-solving models such as:
	  ○ DMAIC (Define, Measure, Analyse, Improve, Control): defining the issue, measuring system performance, analysing causes, implementing improvements and putting controls in place to prevent reoccurrence
	  ○ PDCA (Plan, Do, Check, Act): planning the solution, carrying out the work, checking the results against expectations, and acting on findings to make permanent improvements
	• questioning methods such as:
	  ○ 5 Whys to drill down into why a problem occurred, continuing until the root cause is identified
	• visual tools such as: Fishbone or Ishikawa diagrams to map out potential causes under categories such as Methods, Materials, Machines, and Manpower, supporting systematic problem-solving
	• different resources available when fault finding larger complex systems, such as mechanical P&ID's, control panel schematics, O&M manuals, online resources such as engineering calculators and when to seek help from senior engineers, management or specialist contractors

Interview based on an EPA portfolio Theme: Core maintenance techniques and problem solving (Core)	Amplification and guidance
	This should include how they: • perform diagnostics by gathering information, checking system data (e.g. pressures, temperatures, flow rates), reviewing maintenance records and using tools such as BMS readouts or meter readings to identify symptoms of faults • select the correct diagnostic and analytical techniques to deliver a safe, efficient and compliant solution in line with organisational and industry standards • use and interpret simple mechanical & electrical schematics, comparing drawings to components to ensure they are correct and complaint with the system requirements
B4: Act professionally.	Describe how they: • take personal accountability in their work, follows instructions, meets deadlines, owns mistakes and corrective actions • follows company policies (permits, data protection, environmental controls), does not cut corners, records truthfully • models professional behaviour, clean work area, neat documentation, appropriate language and behaviour on site

Interview based on an EPA portfolio Theme: Residential systems: Heat meters and network communications (Residential)	Amplification and guidance (where required)
K52: Residential heat meters: removal and installation techniques, network communication and configuration. **S36:** Apply techniques to remove, install, configure and set network communications for residential heat meters.	Demonstrate an understanding of: • functions of heat (and cooling) meters, including how they measure energy consumption and flow • safe removal and installation techniques, including isolation, sealing, correct orientation, and avoiding sensor damage • various communications protocols used by meters, including pulse, M-Bus, Wireless M-Bus, Modbus and LoRaWAN and their typical applications • the range of communications modules available with common heat meters, and how they are fitted or replaced • requirements for setting up heat meters and adjusting configuration settings, including units, and device address • how heat meters integrate with wider systems such as BMS or AMR platforms for data collection and billing • verification steps after installation, e.g. checking readings, communication status, and error codes • compliance and security considerations, including GDPR for data handling and cyber security practices for wireless communication This should include how they: • isolate, drain and remove, heat meters safely, refilling and venting systems to restore operation • install heat meters correctly, maintaining sealing integrity and orientation to avoid sensor damage

Interview based on an EPA portfolio Theme: Residential systems: Heat meters and network communications (Residential)	Amplification and guidance (where required)
	• fit and configure communication modules/cards into meters • wire up M-Bus systems and connect meters to network communication systems • adjust configuration settings on meters, including units and device address, and verify correct setup • record meter identification and operational data accurately in line with company procedures • confirm correct operation of meters after installation and configuration • check data is communicating correctly across the network and troubleshoot common faults or errors

Interview based on an EPA portfolio roles and responsibilities

Role	Responsibility
Independent Assessor	Review the apprentice's EPA portfolio prior to the interview. Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EEA.
Employer/Training Provider	The interview must be scheduled with EEA for a date and time which allow the apprentice to be well prepared. Ensure the apprentice has access to their portfolio before and on the day of the Interview.
Energy & Environment Awards	Arrange for the interview to take place, in consultation with the employer/training provider and independent assessor.

Section 3: Grading and Grading Descriptors

Component 1: 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

Component 2: Practical assessment with questions

The apprentice must demonstrate 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.

Practical assessment with questions - Themed KSBs	To achieve a Pass the apprentice must achieve **ALL** of the following:
Core - Health and Safety S2 B1	Prioritises health and safety and works in compliance with health and safety regulations and guidance. (S2, B1)
Core - Engineering representations K18 S12	Interprets and uses engineering representations in line with task requirements. (K18, S12)
Core – Task and work area organisation K5 K10 S1 S5	Applies site management techniques to prepare and maintain the work area in line with task requirements. (K10, S5) Plans and organises tasks including the selection and organisation of resources in line with task requirements. (K5, S1)
Core - Tools and Equipment K34 S25	Checks tools and equipment including calibration prior to use, and uses and then stores tools and equipment, in line with task requirements and operating or manufacturer's instructions. (K34, S25)
Core - Core maintenance and fault finding K16 K35 K36 S9 S26 S28	Conducts flow, pressure and temperature measurements using portable instrumentation including static and differential pressure readings in line with task requirements. (K16, S9)

Practical assessment with questions - Themed KSBs	To achieve a Pass the apprentice must achieve **ALL** of the following:
	Conducts visual inspections and applies fault finding techniques in line with task requirements. (K35, K36, S26, S28)
Heat network distribution specialist – Distribution systems maintenance K38 K39 K40 K41 K42 K43 K44 K45 S29 S30 S31 S32	Performs maintenance on distribution plant equipment in line with manufacturer's or operating instructions and task requirements. (K38, K39, K40, K41, K42, S29) Operates plant equipment remotely through BMS, including switch duty of a duty standby pump, changing lead heat source and valve operation in line with task requirements. (K43, S30) Operates plant equipment locally through the control panel including pump and heat sources in line with task requirements. (K44, S31) Operates E-Stop and safety circuits including returning plant to normal service and fire alarm re-activation in line with task requirements. (K45, S32)
Heat network residential specialist – Residential systems maintenance K46 K47 K48 K49 K50 K51 K53 S33 S34 S35 S37	Performs maintenance on residential heat network systems in line with manufacturer's or operating instructions and task requirements. (K46, K47, K48, K49, S33) Performs HIU energy balance and efficient operation calculations and applies flow and balancing optimisation techniques in line with task requirements. (K50, K51, S34, S35) Performs commissioning of an electrical or mechanical HIU and a space heating circuit in line with task requirements. (K53, S37)

Component 2: Interview based on an EPA portfolio

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 assessment descriptors for each KSB, as shown below.

To achieve a Distinction, an apprentice must successfully achieve **all** the Pass assessment descriptors and **all** distinction descriptors.

Professional discussion (based on an EPA portfolio)	To achieve a Pass the apprentice must achieve **ALL** of the following:
Core - Environment and sustainability S3 B2	Describes how they consider the impact on the environment and comply with environmental and sustainability regulations including, when disposing of waste, re-cycling or re-using materials, and using resources efficiently. (S3, B2)
Core - Health and safety K8 S4	Describes how they identify and document hazards and risks in the workplace and how they apply control measures in line with organisational procedures. Explains the procedure for the recording and reporting of incidents in the workplace. (K8, S4)
Core - Core maintenance techniques K12 K17 K21 K23 K27 K32 S6 S10 S11 S13 S14 S17 B8	Explains the end to end process through a heat network upon a customer demanding heat (hot water or heating) within a property with indirect HIU. (K32) Describes how they apply maintenance practices and standards in line with statutory inspection requirements and industry standard SFG20, adapting to work demands and situations. (K12, S6, B8)

Professional discussion (based on an EPA portfolio)	To achieve a Pass the apprentice must achieve **ALL** of the following:
	Describes how they perform remote diagnostics considering the supply system crossover impact, in line with manufacturer's or operating instructions and task requirements. (K27, S17) Describes how they apply techniques to maintain the water network system and repair or replace pipework in line with organisational procedures and task requirements. (K21, K23, S13, S14) Describes how they apply principles and techniques to install and certify electrical wiring to a three phase pump, including testing for live and dead, in line with regulatory standards and guidance and task requirements. (K17, S10, S11)
Core - Quality assurance K26 S16 B3	Describes how they take responsibility for the quality of their work by applying quality assurance procedures and monitoring processes in line with organisational procedures. (K26, S16, B3)
Core - Problem solving K25 S27 B4	Describes how they act professionally and apply problem solving techniques when solving problems in line with task requirements. (K25, S27, B4)
Core - Information Technology K37 S23	Describes how they use information technology and information systems and comply with GDPR and cyber security to support work tasks. (K37, S23)
Core – Team working, ethical practices and equity, diversity and inclusion	Explains how they apply ethical principles and support an equitable, diverse and inclusive culture in the workplace. (K30, S20, B5, B6)

Professional discussion (based on an EPA portfolio)	To achieve a Pass the apprentice must achieve **ALL** of the following:
K29 K30 S19 S20 B5 B6	Describes how they apply team working principles to meet their team's work goals. (K29, S19)
Core – Communication and documentation K24 K31 K33 S15 S21 S22	Describes how they record or enter information for work tasks in line with organisational procedures: paper-based or electronic. (K24, S15) Describes how they communicate in written form in the workplace using techniques suitable for the context. (K31, S21) Describes how they use verbal communication techniques suitable for the context, adapting style to suit the audience. (K33, S22)
Core – Continual professional development and continuous improvement K28 S18 S24 B7	Explains how they have applied continuous improvement techniques to provide a suggestion for improvement to an issue or process in their own work. (K28, S18) Outlines planned and unplanned learning they have completed and recorded to support competence in their role, showing a commitment to future CPD. (S24, B7)
Heat network residential systems specialist – Residential Systems: Heat meters and network communications K52 S36	Describes how they remove, install and configure residential heat meters, including the setting of network communications in line with manufacturer's or operating instructions and task requirements. (K52, S36)

Distinction descriptors for the Interview based on an EPA portfolio

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:
Core - Environment and sustainability S3 B2	Justifies the actions they have taken to comply with environmental and sustainability regulations. (S3)
Core - Health and safety K8 S4	Explains how chosen control measures have the potential to minimise risks or hazards. (K8, S4)
Core - Core maintenance techniques K12 K17 K21 K23 K27 K32 S6 S10 S11 S13 S14 S17 B8	
Core - Quality assurance K26 S16 B3	Describes the importance of quality assurance procedures and monitoring processes to the task outcome and the business. (K26, S16)
Core - Problem solving K25 S27 B4	
Core - Information Technology K37 S23	
Core – Team working, ethical practices and equity, diversity and inclusion K29 K30 S19 S20 B5 B6	Explains how their team focus supports wider teams to meet their goals. (K29, S19)

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:
Core – Communication and documentation K24 K31 K33 S15 S21 S22	
Core – Continual professional development and continuous improvement K28 S18 S24 B7	Explains how continuous improvement suggestions they have devised have contributed to the business or the process. (K28, S18)
Heat network residential systems specialist – Residential Systems: Heat meters and network communications K52 S36	

Overall grading

The apprenticeship will be graded fail, pass 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 an overall distinction the apprentice must achieve a distinction in the multiple-choice test and the interview based on an EPA portfolio along with a pass in the practical assessment with questions.

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

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 HNMT Standard is based on the grades in individual components as follows:

Multiple-choice Test	Practical assessment with questions	Interview based on an EPA portfolio	Overall grading
Fail in any component			Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Pass
Pass	Pass	Distinction	Pass
Distinction	Pass	Distinction	Distinction

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

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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 3 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 4 months of the EPA outcome notification.

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 HNMT 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 HNMT 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, HNMT Supporting Documents 'Level 3 HNMT practical assessment with questions planning and approval form.'

Submitting the form to Energy & Environment Awards

To obtain approval, employers must complete the Level 3 HNMT 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 EEA
- EEA approval does not remove any of the training provider obligations to ensure full coverage of the standard, and full compliance with relevant legislation
- EEA 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 HNMT 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 this specification (Component 2).

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, HNMT Supporting Documents 'Practice practical assessment with questions template.'

Preparing for the Interview based on an EPA portfolio

An 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 Interview. The 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 interview
- A carefully prepared EPA portfolio will support the apprentice during the Interview
- It allows the assessor to review the EPA portfolio before the 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 interview. Apprentices will have access to their EPA portfolio during the 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 EEA as part of Gateway requirements.

What to expect in the practice interview?

The practice 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 interview template is provided to help prepare the appropriate questions to ask and to record the apprentices' performance. See Appendix F, HNMT Supporting Documents 'Practice 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 Heat Network Maintenance Technician 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, HNMT 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 EEA. It is vitally important apprentices only submit evidence relating to them
- **appropriate**: all evidence must be relevant to the KSBs assessed during the 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 EEA, will assess current competencies. Apprentices must gather evidence during their on-programme training