Contents

Hide menu

Standard in development
L3: District heat network maintenance technician

Title of occupation

District heat network maintenance technician

UOS reference number

ST1308

Core and options

Yes

This standard has options. Display the standard for:

All Distribution Systems Specialist Residential Systems Specialist

Option title/s

Distribution Systems Specialist

Residential Systems Specialist

Level of occupation

Level 3

Occupational maps data

Route: Engineering and manufacturing
Pathway: Maintenance, Installation & Repair
Cluster: Service, repair and or or overhaul operative or technician

Typical duration of apprenticeship

36 months

Target date for approval

01/01/0001

Resubmission

No

Would your proposed apprenticeship standard replace an existing framework?

No

Does professional recognition exist for the occupation?

No

Occupation summary

This occupation is found in the engineering sector and is core to the operation and maintenance of district heat networks. A district heat network is a system which generates and supplies low carbon heat generated in a centralised location through a system of insulated pipes to residential and commercial heat customers.

Technicians will be responsible for the operation, planned maintenance and reactive repair of all equipment relevant to the network. This will involve attending customer properties - both residential and commercial, as well as distribution substations and energy centres, generating heat and often electricity. The role can involve working under pressure and to tight time constraints, such as when responding to energy outages where hundreds of people may be temporarily without heat supply. Technicians may also be required to support project improvement and specialist works, for example, acting as the company representative on the ground, controlling and supporting subcontractors.

Technicians will typically specialise in one of two roles with different technologies specific to each:

Customer supply systems specialist - working in customers' homes to service, maintain and attend breakdowns of the customer heat interface unit, which provides the end customer with their heating and hot water supply.

Distribution systems specialist – working in distribution substations and energy centres to service, maintain and attend breakdowns of the distribution plant

responsible for pumping hot water around the network. Typical equipment would typically include pumps, strainers, heat exchangers, expansion vessels, pressurisation units and control valves.

In their daily work, a technician interacts with a wide variety of people. Externally, this includes customers living in their homes and professionals in the commercial spaces supplied with low carbon heat from the network. Local management and concierge teams will also often be present on the various sites, requiring regular communication of major works being undertaken. When in contact with customers district heat technicians represent their company and company values at all times. Internally, they work with, and have support from, fellow technicians in their own and the wider teams within the company. Day to day, when out on site, they often work alone.

Technicians are responsible for completing all operation and maintenance tasks to a high standard, whether planned, corrective or reactive. An accurate, clear and concise record of all works will be required. Technicians typically report directly to a site manager, operations manager or maintenance manager. They are often required to be fully mobile with a vehicle provided by the company.

Typical job titles

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

Are there any statutory/regulatory or other typical entry requirements?

No

Core occupation duties

DUTY	KSBS
Duty 1 Inspect, clean and maintain district heating plant equipment	K1 K2 K4 K5 K6 K7 K8 K9 K12 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K34 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S16 S17 S18 S24 S25 S29 S30 S31 S3 B1 B2 B3 B4 B5 B7
Duty 2 Follow maintenance resource schedules to ensure that all routine tasks are completed	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K12 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S21 S23 S24 S26 S2 B1 B2 B3 B4 B5 B7
Duty 3 Keep	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K12 K13 K15 K16 K17 K18 K19 K20 K21 K22 K23

DUTY	KSBS
maintenance systems records up to date with detailed, concise records	S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S18 S19 S20 S21 S22 S23 S29 S B1 B2 B3 B4 B5 B7
Duty 4 Raise issues and problems with defective or poorly functioning plant equipment, including scoping failed components	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K12 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 S2 S3 S4 S5 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 S23 S29 B1 B2 B3 B4 B5 B6 B7
Duty 5 Conduct a root cause analysis for plant failures reported by clients or colleagues and develop a scope of works for plant remediation	K1 K2 K4 K5 K6 K7 K8 K9 K10 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K25 S2 S4 S5 S7 S8 S9 S10 S11 S12 S13 S14 S16 S17 S18 S29 S30 S31 S32 S33 S34 S35 S3 B1 B2 B3 B4 B5 B7
Duty 6 Complete breakdown repairs on plant equipment, to restore heat to the customer and or network	K1 K2 K4 K5 K6 K7 K8 K9 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K32 K34 K38 S1 S2 S3 S4 S5 S7 S8 S9 S10 S11 S12 S13 S14 S16 S18 S25 S29 S30 S31 S32 S33 S34 S B1 B2 B3 B4 B5 B7
Duty 7 Undertake regular inspection and upkeep of vehicles, tools and	K1 K2 K4 K5 K6 K7 K8 K9 K10 K12 K13 K14 K15 K16 K17 K21 K26 K27 K32 K34 K38 S1 S2 S3 S4 S5 S6 S9 S10 S11 S12 S13 S16 S17 S18 S25 S29 S30 S31 S32 S33 S34 S35 B1 B2 B3 B4 B5 B7

DUTY	KSBS
equipment required to perform the role effectively	
Duty 8 Manage site-based project work including the management of approved subcontractors	K1 K2 K3 K4 K5 K6 K8 K9 K10 K13 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K25 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S16 S17 S18 S19 S20 S21 S22 S23 S2 B1 B2 B3 B4 B5 B6 B7
Duty 15 Maintain the work area following safety, environmental and risk management systems. Ensure waste is separated, segregated, and handled in accordance with environmental standards	K8 K9 K10 K11 K12 K13 K29 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 S1 S2 S3 S4 S5 S10 S11 S13 S20 S22 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37 B1 B2 B3 B5

Option duties

Distribution Systems Specialist duties

DUTY	KSBS
Duty 9 Service and maintain customer heat interface units	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37
Duty 10 Diagnose, fault find and repair breakdowns	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37

DUTY	KSBS
on customer heat interface units	
Duty 11 Undertake basic maintenance activities on tertiary heating systems (radiators, underfloor systems)	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37
Duty 12 Service and maintain customer cooling interface units	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37

Residential Systems Specialist duties

DUTY	KSBS
Duty 13 Complete planned preventative maintenance of distribution systems in energy centres and substations	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37
Duty 14 Diagnose, fault find and repair breakdowns on distribution system plant equipment	K32 K34 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 S2 S25 S29 S30 S31 S32 S33 S34 S35 S36 S37

KSBs

Knowledge

K1: Core: Heat network systems: heat sources, materials and technology, scale and scope of networks, sustainability, efficiency and cost-effectiveness.
K2: Core: Types of heat networks: local, district and city-wide.
K3: Core: 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.
K4: Core: 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.
K5: Core: Planning, organising and time management techniques.
K6: Core: 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.
K7: Core: 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.
K8: Core: Hazard identification techniques, control measures, risk assessment method statements (RAMs), risk management and the recording and reporting of incidents and accidents.
K9: Core: Environmental management and environmental management systems: ISO 14000, ISO 14004, ISO 14001.
K10: Core: Site management: work area preparation and maintenance techniques.
K11: Core: Awareness of principles of climate change, including causes and environmental impact and contribution of heat network industry to achieving carbon budgets and net zero.
K12: Core: Maintenance practices: planned, preventative, predictive and reactive methods. Maintenance planning techniques and standards, statutory inspection and industry standard SFG20.
K13: Core: Principles of asset management, maintenance systems and asset tagging.
K14: Core: Thermodynamics in heat networks: units of measurement, formulae including Q = m c P d, properties of materials, relationship between energy, heat and power.
K15: Core: Principles of fluid dynamics in heat networks: units of measurement, formulae including Q = V/t and p=ρgh and hydrodynamics, and how they impact pressure, operational pressures, differential pressure and heat network efficiency issues.
K16: Core: Flow, pressure and temperature measurement techniques, portable measurement instruments, static pressure and differential pressure reading.

K17: Core: Electrical installation techniques and principles: circuit theory, capacitance in DC circuits, magnetism, single-phase alternating current (AC) theory, 3 phase wiring, hazards of electricity, safe isolation of circuits, testing for live or dead and minor works certification.
K18: Core: Engineering representations: design principles, piping and instrumentation diagrams, single-line electrical diagrams, control panel schematics, circuit and network diagrams.
K19: Core: Industrial plant and process control systems: characteristics, modes of control, tuning methods, hierarchical and advanced process control systems.
K20: Core: 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.
K21: Core: Water network system maintenance techniques: cleaning of strainer baskets and water sampling.
K22: Core: Pipe work: types and pipework common issues, riser and lateral pipework, stainless steel, carbon steel, barrel, plastic and copper pipe.
K23: Core: Pipe working techniques: repair and replacement, safe isolation, drain down and refill.
K24: Core: Documentation: methods and requirements - electronic and paper.
K25: Core: Problem solving techniques: diagnostics, root cause analysis, DMAIC (Define, Measure, Analyse, Improve, Control), PDCA (Plan Do Check Act), 5 Whys', Fishbone and Ishikawa.
K26: Core: Quality assurance requirements and monitoring processes.
K27: Core: Remote diagnostic techniques and supply system cross over 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.
K28: Core: Continuous improvement techniques: lean, 6-sigma, KAIZEN, 5 S (Sort, set, shine, standardise and sustain).
K29: Core: Team working principles.
K30: Core: Equity, diversity and inclusion requirements in the workplace.
K31: Core: Written communication techniques. Plain English principles. Engineering terminology. Report writing.
K32: Core: 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).
K33: Core: Verbal communication techniques. Giving and receiving information. Matching style to audience.
K34: Core: Tools and equipment used in district heat system maintenance. Requirements for cleaning, storage, care, and operational checks.
K35: Core: Visual inspection techniques.
K36: Core: Fault finding techniques.
K37: Core: Information technology: Management Information Systems (MIS), spreadsheets, presentation, word processing, email, virtual communication and learning platforms. General Data Protection Regulation (GDPR). Cyber security.
K38: Distribution systems specialist: Planned and unplanned maintenance techniques: servicing, repair and replacement.
K39: Distribution systems specialist: Distribution plant equipment: pumps, inverters, motors, fans, strainers, thermal stores, expansion and vibration bellows and plant heat exchangers.

K40: Distribution systems specialist: Pressurisation plant equipment: pressurisation unit, expansion vessel, fill and spill unit, break tank and Automatic Air Vents (AAVs).
K41: Distribution systems specialist: Water treatment plant equipment: de-gasser, chemical dosing pot, chemical auto dosing equipment, dirt air separator and water softener.
K42: Distribution systems specialist: Valves and associated actuators: including Pressure Independent Control Valve (PICV), Differential Pressure Control Valve (DPCV), Non-Return Valve (NRV) temperature and pressure release valves and pressure release valve (PRV), three port valves and isolation valves.
K43: Distribution systems specialist: Building Management System (BMS) remote plant operation techniques: fault reset, heat generation asset commercial gas boilers, pumps, valves and pressurisation units.
K44: Distribution systems specialist: Plant equipment control panels and local operation techniques: pumps and heat source.
K45: Distribution systems specialist: E-stops and safety circuits: operation and return to normal service techniques.
K46: Residential systems specialist: Planned and unplanned maintenance techniques: servicing, repair and replacement.
K47: Residential systems specialist: 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).
K48: Residential systems specialist: Tertiary system assets: radiator TRVs, heating control units, under floor heating systems, automatic air valves, lock shield, dynamic balancing valve, Direct Hot Water (DWH) systems and Trace Heating.
K49: Residential systems specialist: 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.
K50: Residential systems specialist: Applied calculation techniques: HIU energy balance and efficient operation.
K51: Residential systems specialist: Balancing and flow optimisation techniques: radiators and underfloor heating.
K52: Residential systems specialist: Residential heat meters: removal and installation techniques, network communication and configuration.
K53: Residential systems specialist: Electrical, mechanical Heat Interface Unit (HIU) and space heating circuit commissioning techniques.

Skills

S1: Core: Plan and organise tasks including the selection and organisation of resources.
S2: Core: Comply with health and safety regulations and guidance.
S3: Core: 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.
S4: Core: Identify and document hazards and risks in the workplace and apply control measures.
S5: Core: Prepare and maintain the work area.
S6: Core: Apply maintenance practices and standards.
S7: Core: Conduct thermodynamic calculations.
S8: Core: Complete calculations for cold fill pressure of building and differential pressure across pump.

S9: Core: Conduct flow, pressure and temperature measurements using portable instrumentation, including static pressure and differential pressure reading.
S10: Core: Test electrical system for live and dead.
S11: Core: Install and certify electrical wiring to three phase pump.
S12: Core: Interpret and use engineering representations.
S13: Core: Maintain water network systems, for example cleaning of strainer baskets and heat network water sampling ready for analysis.
S14: Core: Repair or replace pipework.
S15: Core: 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 manufacturers' documentation, asset management records, work sheets, checklists and waste environmental records.
S16: Core: Apply quality assurance procedures and monitoring processes.
S17: Core: Perform remote performance diagnostics.
S18: Core: Apply continuous improvement techniques. Devise suggestions for improvement.
S19: Core: Apply team working principles.
S20: Core: Apply ethical principles.
S21: Core: Communicate in writing. For example, with colleagues and stakeholders.
S22: Core: Communicate with others verbally, for example, colleagues and stakeholders.
S23: Core: Use information and digital technology. Comply with GDPR and cyber security regulations and policies.
S24: Core: Carry out and record planned and unplanned learning and development activities.
S25: Core: Check tools and equipment including calibration. Use and store tools and equipment.
S26: Core: Conduct visual inspection.
S27: Core: Apply problem solving techniques.
S28: Core: Apply fault finding techniques.
S29: Distribution systems specialist: Perform maintenance on distribution plant equipment.
S30: Distribution systems specialist: 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.
S31: Distribution systems specialist: Operate plant equipment locally from control panel, including pump and heat source.
S32: Distribution systems specialist: Operate e-stop and safety circuits on equipment and return plant to normal service, including fire alarm re-activation.
S33: Residential systems specialist: Perform maintenance on residential heat network systems.
S34: Residential systems specialist: Conduct HIU energy balance and efficient operations calculations.
S35: Residential systems specialist: Apply balancing and flow optimisation techniques.
S36: Residential systems specialist: Apply techniques to remove, install, configure and set network communications for residential heat meters.
S37: Residential systems specialist: Perform commissioning of electrical HIU or mechanical (HIU) and a space heating circuit.

Behaviours

B1: Core: Prioritise health and safety.
B2: Core: Consider the impact on the environment when using resources and carrying out work.
B3: Core: Take responsibility for the quality of their own work.
B4: Core: Act professionally.
B5: Core: Act ethically.
B6: Core: Support an equitable, diverse and inclusive culture.
B7: Core: Committed to continued professional development (CPD) to maintain and enhance competence in their own area of practice.

Qualifications

English and Maths

Apprentices without level 2 English and maths will need to achieve this level prior to taking the End-Point Assessment. For those with an education, health and care plan or a legacy statement, the apprenticeship's English and maths minimum requirement is Entry Level 3. A British Sign Language (BSL) qualification is an alternative to the English qualification for those whose primary language is BSL.

Does the apprenticeship need to include any mandated qualifications in addition to the above-mentioned English and maths qualifications?

No

Consultation

TBC

Progression Routes

Supporting uploads

Mandatory qualification uploads
Mandated degree evidence uploads
Professional body confirmation uploads

Involved employers

Subject sector area

4.1 Engineering