

Refrigeration Air Conditioning and Heat Pump Engineering Technician (Level 3)
**Standard for Knowledge, Skills and Behaviours –
Proposed Changes from Steering Group Review 2021**

1. Typical job titles include

Refrigeration Technician/Engineer, Air Conditioning Technician/Engineering, Heat pump Technician/Engineer, Service Technician/Engineer, Maintenance Technician/Engineer, Commissioning Engineer.

NOTE ON PROPOSED AMENDMENTS:

Text highlighted in yellow is addition or amendment.

Text highlighted in blue is original text to which changes are proposed

2. Occupational summary

The Refrigeration Air Conditioning and Heat Pump (RACHP) Engineering Technician is a specialist occupation involved in planning, preparing and safely carrying out work activities in process, product and space cooling. Knowledge must be transferrable between any of the core activities of refrigeration, air conditioning or heat pumping.

The work is carried out in a variety of applications essential for key UK business activities such as food production, product distribution, retail storage and display, transport and office climate control, manufacturing processes (eg petrochemical, pharmaceutical), IT/Datacentres and medical/healthcare services temperature and environmental control.

Key activities are: (*remove: design*), installation, routine maintenance, reactive service, commissioning and de-commissioning of Refrigeration, Air Conditioning and Heat Pump systems. Technicians require a thorough competency in their understanding of the engineering principles of thermodynamics and the vapour compression cycle in order to perform operations. A fully competent technician works without immediate supervision, and liaises effectively with other trades and with end users.

Environmental, legislation and technology changes mean that the requirements for technicians in this sector are constantly evolving. European and UK Safety and Environmental legislation are key drivers in rapid technology changes in the sector which is responsible for an estimated 10% of UK greenhouse gas emissions and 16% of electricity use. RACHP Engineering Technicians have important responsibilities for the safety of themselves, work colleagues and the general public as well as minimising the environmental impact of cooling systems.

Occupation duties (complete new section added as required)

Duty	KSB
1. Plans tasks, taking into account technical diagrams, product manuals and refrigerant selection in accordance with standards, legislation and codes	K1, K2, K3, K4, K5, K6, K7, K7, K9, B1, B4
2. Carries out site specific risk assessment and prepares for tasks ensuring selection of appropriate tools, equipment, PPE.	K1, K2, K4, S1, B1, B5, B7
3. Carries out installation tasks with due regard to safety of those in the vicinity and the environment including pipework, jointing, component fixing and connection.	K1, K4, K5, K7, K8, K9, S1, S2, S5, S6, S7, B4
4. Charges system with refrigerant minimising leakage and completes system records	K1, K5, K8, S3, B1
5. Commissioning activities to ensure efficient functioning including system testing (pressure testing and tightness testing) and performance recording.	K1, K4, K5, K6, K8, S5, S7, S8, B2, B3, B4
6. Completes system equipment documentation and handover to customer	K1, K5, S9, B4, B6
7. Carries out planned service, maintenance, regular leak checks and recording as well as reactive fault finding and repair of existing systems	K1, K4, K5, K6, K7, K8, S8, S9, S10, B6
8. Decommissioning activities including safe recovery, recycling or disposal of refrigerant and other waste products.	K1, K4, K5, K8, S4, B1
9. Works with other trades or equipment operators on sites and communicates relevant information about appropriate use and interaction with other services	K5, K4, K9, S7, B6

Requirements: Knowledge, Skills and Behaviours –

Knowledge	What is required
Legislation, Regulations and Standards	K1 - Understanding of relevant UK and international standards, technical and environmental legislation including health & safety, environmental protection, working with pressure systems, electrical circuits and flammable substances. K2 - Understanding content and role of industry Codes of Practice and other sources of up to date information and advice on technical safety and legislative aspects of their work.
Underpinning principles	K3 - Sound understanding of principles of thermodynamics, gas laws, psychrometrics, fluid flow, <i>New text added</i> K4 - Understanding of how to work with electricity safely and principles of electrical fault finding K5 - understands the properties of the full range of refrigerant fluids and lubricants and their suitability for use in different applications, environmental impact and safety considerations

Data analysis	K6 - Ability to understand relevant diagrams, calculations, tools, charts, tables and formulae and apply them as appropriate.
System fundamentals	K7 - Understanding of the function and operation of system components and how they interact in a range of different systems and applications.
Sustainability	K8 - Understanding of environmental impact of refrigerants, maximising efficient system performance and mitigation of direct and indirect carbon emissions. K9 - Understanding of environmental technologies employed in the sector such as heat recovery, low GWP refrigerants, and other equipment which can be used to reduce heat gain, cooling load or energy use.
Skills	What is required
Safe working practices	S1- Installation, commissioning, testing, fault diagnostics, rectification of systems, component/refrigerant suitability and selection S2 - Working with pressure systems and electrical circuits and systems S3 - Evaluating and mitigating risks of refrigerants including toxicity, flammability and other potential risks or hazards to self and the general public. S4 - Decommissioning, safe recovery and disposal of equipment and hazardous waste transfer
Control circuit application	S5 - Electrical and electronic control systems setting, testing and fault finding; and their integration with system-associated communication networks.
Mechanical operations	S6 - Positioning, fixing, jointing and testing of pipework, electrical circuits and water circuits where relevant.
Application of mathematical principles	S7 -Determining heating and cooling loads and selecting and balancing appropriate components and systems for maximum performance and efficiency.
Sustainable system operation	S8 - Using system operating parameters for efficient performance to achieve measurable and sustained reductions in carbon emissions. S9 - Routine and reactive service and maintenance, testing, fault finding, reporting and rectification. S10 - Retrofitting and refilling of existing equipment to lower GWP refrigerants including safety, reliability and environmental considerations.
Behaviours	What is required (linked to EngC professional Engineering Technician grade)
Safety approach	B1 - Disciplined approach to assessing, managing, mitigating and avoiding risk in a variety of situations to themselves, colleagues, the public and the environment.
Strong work ethic	B2 - Positive ethical attitude and behaviours including reliability, willingness to take responsibility. Commitment to completing tasks and ability to work as part of a multi disciplined team.

Logical problem solver	B3 -Employs logical analytical thinking, and determined attitude to problem solving and technical challenges.
Focus on quality	B4 - Attention to detail, following procedures, planning and preparation, verifying compliance.
Personal responsibility	B5 -Takes responsibility for work and interactions with colleagues, customers, suppliers or subcontractors.
Communicates well	B6 - Uses a range of communications methods effectively, positively and in timely fashion manner
Adaptable	B7 - Able to adapt to changes in conditions, technologies, situations and a wide variety of different working environments.
Self motivated	B8 - Willingness to learn and commitment to professional development and to applying principles of sound engineering and sustainability of engineering systems.

4. Duration – typically 36 months would be required to gather sufficient practical experience.

5. Mandatory Qualifications

All apprentices must achieve a “Level 2 Certificate in F Gas and ODS Regulations Category 1” as this is a legal requirement under the EU F Gas Regulation 517/2014 to work on equipment containing Fluorinated Refrigerants.

New text added

All apprentices must achieve a Level 3 Qualification in RACHP engineering as regulated by OFQUAL as part of this apprenticeship as this is a requirement specified by employers

Employers who recruit candidates without English or Maths at Level 2 or above must ensure that the apprentice achieves this standard prior to the completion of the Apprenticeship.

6. Link to professional registration

This standard is designed to meet the professional standards of the Engineering Council for registration as an Engineering Technician (EngTech) in partnership with the Institute of Refrigeration and CIBSE.

7. Level – Level 3 is the appropriate level for Engineering Technicians who need to work without supervision and have a high level of responsibility.

8. To be reviewed – after three years