

# 6090 Refrigeration Air Conditioning and Heat Pump Engineering Technician

April 2021 v2.1

**Apprentice Development Journal**

Version and date	Change detail	Section
V1.0 September 2018	Initial input of data	Document.
V2.0 April 2021	Restructured document and updated recording forms.	Document.
V2.1 April 2021	Clarified wording to remove contradiction re: time of Synopsis submission ( <b>post-gateway, 4-weeks</b> prior to booked EPA date)	Section 1 (page 4) Section 3 (page 10)

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# 1 Introduction

## What is the Apprentice Development Journal?

The Apprentice Development Journal is a collection of evidence that demonstrates the development of the apprentice's knowledge, skills and behaviours whilst on the job, across the duration of the 'on-programme' segment of the apprenticeship.

Centres/Employers must ensure that any evidence collected is valid and appropriate in relation to industry standards. They must ensure the evidence is an authentic account of the work the apprentice has carried out in the workplace, consistent with their typical performance and accurately reflecting their capability.

Centres/Employers may wish to use the journal to inform performance reviews that are carried out throughout the apprenticeship. The evidence within an apprentice's journal can also be used when considering if an apprentice is ready to progress through the gateway onto end-point assessment.

In addition, the Apprentice Development Journal has been designed to support an application to the Engineering Council for registration as an Engineering Technician (EngTech). Registration with the Engineering Council distinguishes individuals as professional technicians with a commitment to engineering standards and their continued professional development.

The development journal is **not** formally assessed. However, a synopsis of the journal is required to be submitted post-gateway, 4 weeks prior to the EPA booking. The apprentice will use this synopsis as a reference document during the Professional Interview element of the EPA. Guidance on collating and submitting the synopsis, and its requirements, can be found in **Section 3** of this document.

# 2 General Guidance

## Requirements of the Apprentice Development Journal

The development journal should contain evidence which covers the full range of tasks given below:

1. Jointing and System Testing
2. Evacuation and Dehydration - Commission and Charge (Critical and/or Non-critical Charge)
3. Reactive Maintenance
4. Breakdown Investigation
5. Rectification (Electrical)
6. Routine Maintenance
7. Refrigerant Recovery and Disposal

To build up a sufficient journal, it is recommended that apprentices should carry out each task **at least** once a year, totalling at least **three** examples of each, over the course of the apprenticeship.

Evidence should be presented in the form of job sheets, which the apprentice can use to write up jobs they have completed, and associated evidence items, such as observations, work products, witness testimonies and reflective accounts. A job may have multiple evidence items associated with it covering several tasks. Job sheets and Evidence header sheets are provided in the **Recording Forms** section of this document.

## Types of Evidence

### Job Sheets

These should be used by the apprentice to record written accounts of jobs they have carried out, providing context to the associated evidence.

These should include:

- what was involved in the job (including which tasks are covered);
- details of the date, job location and the client serviced;
- who the apprentice worked with;
- how the apprentice planned the works;
- reference materials used;
- the quality of work produced;
- relevant legislative documentation used

A Job Sheet form is provided in the **Recording Forms** section of this document.

### Evidence items

Job sheets should be accompanied by the relevant evidence generated during the job. Evidence can be presented through various means, for example:

- observations - carried out by personnel from the employer, such as a supervisor, or by a centre representative. The apprentice will be observed in the workplace carrying out a naturally occurring activity. This observation will be a statement of what has been seen and can be written or recorded. Confidentiality and data protection requirements must be adhered to.

- work products – for example; copies of commissioning test records, handover documents, photo/video evidence etc.
- witness testimony - can be in many forms. It can be in writing or a recording; again confidentiality and data protection requirements must be adhered to. A witness will provide an account of what the apprentice has done in their job role. The witness may also confirm the authenticity of other items of evidence presented by the apprentice. A witness can range from an employer representative to a customer; it is recommended that expert witnesses are used. Expert witnesses are individuals who are qualified/experienced to a minimum of a Level 3.
- reflective accounts - allow the apprentice to consider what they have carried out in the workplace and how well they have done it. The apprentice can reflect on the tasks they have carried out, including how and why they approached a piece of work as they did.

### **Recognition of Prior Learning (RPL)**

RPL cannot be used as evidence as part of the journal. Only evidence that has been generated during the period of the apprenticeship can be included.

### **Simulation of Evidence**

It is a requirement that all the evidence is reflective of the work the apprentice has carried out in the workplace. Evidence must be from on-site, real working environments with authentication. Simulated activities will not be accepted.

### **Health and safety / Codes of practice**

The importance of safe working practices, the demands of the Health and Safety at Work Act and the Codes of Practice associated with the industry must always be adhered to.

The requirement to follow safe working practices is an integral part of all City & Guilds products, and it is the responsibility of the centre/employer to ensure that all relevant health and safety requirements are in place before the apprentice begins any practical tasks.

### **Working towards competence**

It is recommended that apprentices, employers and/or centres should meet on a regular basis throughout the apprenticeship to review progress so far and ensure the apprentice is being given adequate opportunities to carry out all of the seven tasks defined within this document. An Apprentice progress review form is included in **Appendix 4** of this document.

Apprentices, employers and/or centres should work together to identify and plan which upcoming jobs will provide appropriate evidence to add to the journal.

## Guidance on Tasks

The development journal should contain a variety of evidence covering the following tasks. Further detail on each task is provided below. It is recommended that apprentices should carry out each task at least once a year, totalling at least three examples of each, over the course of the apprenticeship.

### Task 1 – Jointing and System Testing

#### What is this?

- Installation of pipework and/or components into systems.
- Jointing or fabrication of materials for various systems.
- Testing of systems.

#### Journal should consist of a variety of:

Pipework materials (copper, steel, brass, plastic, aluminium) and insulation.

Joining of electrical cables, refrigerant pipework, and water pipework.

- Pipework: similar and dissimilar materials covering permanent/non-permanent mechanical joints, adhesive joints and brazed joints
- Cables: soldering, crimp terminals, category 5 and category 6 data cables, junction boxes, terminal strips, power and control

#### Testing

- Refrigeration Circuit: BS EN 378(2016), strength test, tightness test.
- Electrical: Continuity, polarity, insulation resistance.

#### Systems

- New installation.
- Repair work.
- Modification to existing systems.

### Task 2.1 – Evacuation and Dehydration/Commission and Charge (Critical Charge)

#### What is this?

The preparation of new installations through evacuation, dehydration, refrigerant charging and commissioning any type of system. Any system which requires a specific refrigerant weight (capillary line, orifice plate, high side float) with evacuation to BS EN 378 standard or similar.

#### The journal should consist of evidence of the apprentice:

- completing the relevant commissioning data in addition to other supporting evidence.

#### and/or

### Task 2.2 – Evacuation and Dehydration/Commission and Charge (Non-critical Charge)

#### What is this?

The preparation of new installations through evacuation, dehydration, refrigerant charging and commissioning any type of system. Any system that does not have a specified charge weight (liquid receiver) with evacuation to BS EN 378 standard or similar.

#### The journal should consist of evidence of the apprentice:

- completing the relevant commissioning data in addition to other supporting evidence.

### **Task 3 – Reactive Maintenance**

#### **What is this?**

Repairs carried out following breakdown, restoring a system to its usual operation.

#### **Journal should consist of a variety of:**

- replacing refrigerants;
- repairing leakages;
- replacing components;
- cleaning heat exchangers;
- calibrating controls.

#### **The journal should consist of evidence of the apprentice:**

- completing the relevant statutory documentation in addition to other supporting evidence.

### **Task 4 – Breakdown Investigation**

#### **What is this?**

An investigation into faulty systems and/or components. This must include the fault diagnostics and rectification procedure for any RACHP system.

#### **Journal should consist of evidence of the apprentice:**

- using the correct diagnostic tools and equipment to correctly identify faults and rectification, in addition to other supporting evidence.

### **Task 5 – Fault Finding and Rectification (Electrical)**

#### **What is this?**

A safe investigation into faulty systems and/or components and correcting identified faults. This includes single and three phase electrical motors and single phase control circuits.

#### **Journal should consist of evidence of the apprentice:**

- using the correct diagnostic tools and equipment to correctly identify faults;
- applying safe working practices, specifically safe isolation methods;
- using correct rectification procedures to correctly identify faults.

### **Task 6 – Routine Maintenance**

#### **What is this?**

Planned preventative maintenance activities and adherence to maintenance checklists.

#### **Journal should consist of evidence of the apprentice:**

- recording relevant information in appropriate formats such as checklists: manufacturers, industry, client.

### **Task 7 – Refrigerant Recovery and Disposal**

#### **What is this?**

Removal of refrigerant for either permanent or temporary purposes. This must also include the disposal of refrigerant and procedures for decommissioning a system.

#### **Journal should consist of evidence of the apprentice:**



- using the correct tools and equipment to recover refrigerant;
- removing refrigerant from site for reclamation or disposal;
- completing statutory documentation.

### **Additional conditions of use**

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- (where the City & Guilds Assessment Materials are dated examinations), the JCQ Instructions for Conducting Examinations.

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  - They must provide access, on request, to City & Guilds to the system(s) on which the Assessment Materials appear.

### **Using an e-portfolio**

It is strongly encouraged that apprentices collate this evidence electronically, especially as the synopsis will need to be submitted to City & Guilds electronically prior to end-point assessment. This is to allow the Independent End-point Assessor to review the evidence and prepare for the Professional Interview.

City & Guilds provide an e-portfolio solution called Learning Assistant. If you wish to consider using Learning Assistant to support the collation of this Journal please contact [learningassistantsupport@cityandguilds.com](mailto:learningassistantsupport@cityandguilds.com)

# 3 Guidance on submitting a Synopsis of evidence from the journal

## What is the Synopsis?

Following the EPA Gateway, apprentices will collate a synopsis of their development journal for discussion as part of the Professional Interview within the end-point assessment. Tutors/employers should work with the apprentice to ensure the synopsis meets the requirements in this document. The completed synopsis **must** be submitted to City & Guilds at least **4 weeks** prior to the EPA taking place.

The synopsis is **not** directly assessed. It is a collection of evidence selected from the apprentice's development journal that supports the Professional Interview. As the Professional Interview is graded, it is still important that, as well as showing that they have met the requirements, the apprentice selects their best work.

The synopsis will contain a variety of evidence to support the apprentice's responses within the interview, assisting them to demonstrate that they have met the pass criteria, and possibly the distinction. The professional interview contains questions on themes covering 12 of the Knowledge/Skills/Behaviours from the apprenticeship standard.

When assembling the synopsis, apprentices should select three job sheets from their development journal, and associated evidence items to cover all 7 tasks, and all 12 KSBs covered in the Professional Interview (an evidence item may cover multiple tasks/KSBs). This is to ensure that the apprentice will have evidence they can refer to when answering all of the questions within the Professional Interview.

The submitted Synopsis must meet the following requirements:

1. A maximum of **three** jobs can be included.
2. From these three jobs, the apprentice must have **at least** one piece of evidence covering **each** of the seven tasks.
3. A maximum of 21 pieces of evidence (in total) can be submitted.
4. All evidence items must be referenced to the Tasks (1-7) and the Knowledge/Skills/Behaviours (KSBs) they are being submitted against.

Mapping forms are provided in the **Recording Forms** section of this document to assist apprentices/tutors in referencing evidence to the tasks and KSBs.

## Selecting evidence

Before selecting the evidence to form the synopsis, the apprentice should review the requirements of the Professional Interview set out in this pack. This includes the knowledge, skills and behaviours being assessed, the tasks that must be completed and the grading criteria they will be assessed against.

To assemble their synopsis, the apprentice should consider all the evidence they have available that shows they have met the requirements being assessed. From this, they should select the evidence that best meets those requirements.

There are two questions that an apprentice should consider when selecting work to form their synopsis:

1. Does the work show that I have met all of the requirements of the task?
2. Is this the best evidence I have showing that I have met all of the requirements?

### Selecting best evidence

To inform their selection, the apprentice should review the grade descriptors for the professional interview, and choose the evidence which will best assist them when giving answers, to achieve the higher grades. Where an apprentice has multiple pieces of evidence available covering the same criteria, the apprentice should consider these and select their best piece of evidence for inclusion in the synopsis.

It is expected that most, if not all, evidence collated for a synopsis will be sourced from the final part of the apprenticeship. Altogether, the evidence selected for the synopsis should cover all of the relevant criteria.

### Preparing evidence for submission

The synopsis can be produced in paper and/or electronic form but is required to be submitted electronically to City & Guilds for the end-point assessment. The synopsis must be submitted a minimum of **four weeks** prior to the Professional Interview.

Forms have been provided by City & Guilds to assist centres in preparing the **Apprentice Development Journal Synopsis** for the Professional Interview. Copies of all forms can be found in the **Recording Forms** section of this document.

The following list is an example of what should be submitted:

- **Apprentice Development Journal Cover Sheet**
- **Declaration of Authenticity** form.
- **Evidence mapped to professional interview (by task)** form.
- **Evidence mapped to professional interview (by KSB)** form.
- **Expert Witness Sample Signatures** form if applicable (only where expert witness testimony is included in evidence).
- Job Sheet 1 – a completed **RACHP Apprenticeship Job Sheet** form
  - Related pieces of evidence (presented with a completed **Evidence Header Sheet** for each piece of evidence).
- Job Sheet 2 – a completed **RACHP Apprenticeship Job Sheet** form
  - Related pieces evidence (presented with a completed **Evidence Header Sheet** for each piece of evidence).
- Job Sheet 3 – a completed **RACHP Apprenticeship Job Sheet** form
  - Related pieces of evidence (presented with a completed **Evidence Header Sheet** for each piece of evidence).

It is not mandatory that all City & Guilds materials are used; if centres or employers have suitable alternatives they are permitted to use these, however they must ensure they are able to clearly map evidence towards the Professional Interview.

# Recording Forms

The recording forms in this chapter have been developed to support apprentices, employers and centres in the collation of evidence within this Journal.

The below documents have been provided by City & Guilds to assist in producing the Apprentice Development Journal:

**1. Apprentice Development Journal Cover Sheet**

**2. Declaration of Authenticity**

**3. Witness and Expert Witness Sample Signatures**

Use where expert witness testimony is being included as evidence.

**4. RACHP Apprenticeship Journal Job Sheets**

Apprentices should use this form to record details of jobs included in the journal. (a separate Job Sheet should be used for each job).

**5. Evidence Header Sheet**

Apprentices should use this form as a header for each item of evidence to aid referencing (a separate header sheet should be used for each item).

The following forms are provided to assist in producing the Synopsis:

**6. Synopsis checklist**

Apprentices/tutors/employers should use this checklist to ensure all required documentation is included in the synopsis.

**7. Evidence mapped to Professional Interview by Task**

Use this form when collating evidence for the Synopsis, to reference the selected evidence to each of the seven tasks.

**8. Evidence mapped to Professional Interview by KSB**

Use this form when collating evidence for the Synopsis, to reference the selected evidence to each of the twelve KSB's assessed in the professional interview.

It is not mandatory that all City & Guilds materials are used; if centres or employers have suitable alternatives they are permitted to use these, however they must ensure they are able to clearly map evidence towards the Professional Interview.

## Apprentice Development Journal Cover Sheet

### Apprentice Details

Surname:  Forename(s):

Address:

County:  Postcode:

Home Tel:  City & Guilds Enrolment No:

### Awarding Details

Programme Title:

C&G Scheme/Complex No:     Level:

### Centre Details

Name:  Centre No:

Address:

County:  Postcode:

Telephone:  Centre Contact:

### Employer Details

Name:  Work Based Mentor:

Address:

County:  Postcode:

Telephone:  Contact Name:

## Declaration of authenticity

<b>Apprentice name</b>	Apprentice Name	<b>Enrolment number</b>	
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### Apprentice declaration:

I confirm that all work submitted is my own, and that I have acknowledged any sources I have used.

<b>Apprentice</b>	Signature	<b>Date</b>	DD/MM/YY
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### Employer declaration:

I confirm that all work was conducted under conditions designed to assure the authenticity of the apprentice's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the apprentice.

<b>Tutor/Assessor</b>	Signature	<b>Date</b>	DD/MM/YY
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## Expert Witness Sample Signatures

Witnesses should read the statements below and sign their agreement.

I am suitably experienced and/or technically qualified as a Level 3 RACHP engineer and am able to provide evidence in the form of 'expert witness testimony' as evidence of this apprentice's competence.

I acknowledge that I will only countersign documentation/journal entries requested by the apprentice where to my knowledge only the apprentice has completed the work, and on the understanding that the work has been carried out to a commercially acceptable standard.

Name (Print)	Sample Signature	Phone No.	Date

## RACHP Apprenticeship Journal Job Sheet

Duplicate as required.

Job Sheet Number		Date		Time Job Completed	
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Tasks this job relates to:

Note one job may provide sufficient evidence against multiple tasks.

Task 1		Task 3		Task 5		Task 7	
Task 2		Task 4		Task 6			

Site Details (Location, Client)	
Colleagues	
Job Details	<p><i>May include: What was involved in the job; reference materials used; relevant legislative documentation used; commissioning test records, handover documents etc.</i></p>
Work Plans	



What went well?	
What could be better next time?	
Photos:	<i>Insert any photos here / attach on extra sheets as required.</i>
Name	
Signature	

## Evidence Header Sheet

Duplicate as required.

Apprentice name:		Signature:	
Task(s) this evidence relates to:	<i>Circle/delete as appropriate:</i> 1, 2, 3, 4, 5, 6, 7.	KSB(s) this evidence relates to:	<i>eg. B1.1, S1.1</i>

Evidence reference:	Job sheet this evidence relates to:	Date the evidence was created/generated/recorded:
		<i>DD/MM/YYYY</i>

## Synopsis checklist

Apprentices/tutors/employers should use this checklist to ensure all required documentation is included in the synopsis.

Requirement	Y/N
Has a completed <b>Apprentice Development Journal Cover Sheet</b> been included?	
Has a completed <b>Declaration of Authenticity</b> form been included?	
Is any Expert Witness Testimony included within the evidence and if so, has a completed <b>Expert Witness Sample Signatures form</b> been included?	
Have <b>three</b> completed <b>Job Sheets</b> from the development journal been included?	
Have all associated evidence items been included, with a completed <b>Evidence header sheet</b> attached to <b>each</b> piece of evidence? (maximum 21 pieces of evidence across 3 jobs)	
Has a completed <b>Evidence mapped to professional interview (by task) form</b> been included, showing that all seven tasks are covered by the evidence included in the synopsis?	
Has a completed <b>Evidence mapped to professional interview (by KSB) form</b> been included, showing that all KSBs are covered by the evidence included in the synopsis?	

## Evidence mapped to Professional Interview (by Task)

Task	Evidence Ref	Ref to KSB from Professional Interview
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Task 1: Jointing and system testing

Task 2: Evacuation and dehydration/commission and charge (Critical and/or Non-Critical)

Task 3: Reactive maintenance

Task 4: Breakdown investigation

Task 5: Fault finding and rectification (Electrical)

Task 6: Routine maintenance

Task 7: Refrigerant recovery and disposal

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## Evidence mapped to Professional Interview (by KSB)

Interview Theme	KSB	Ref	Evidence Ref
Theme 1	B1 Safety approach	B1.1	
Theme 2	S1 Safe working practices	S1.1	
		S1.2	
		S1.3	
		S1.4	
Theme 3	S5 Sustainable system operation	S5.1	
		S5.2	
		S5.3	
Theme 4	K7 Sustainability	K7.1	
		K7.2	
Theme 5	K4 Underpinning principles	K4.1	
Theme 8	B2 Strong work ethic	B2.1	
Theme 9	B3 Logical problem solver	B3.1	
Theme 7	B4 Focus on quality	B4.1	
Theme 11	B5 Personal responsibility	B5.1	
Theme 6	B6 Communicates well	B6.1	
Theme 10	B7 Adaptable	B7.1	
Theme 12	B8 Self-motivated	B8.1	

# Appendix 1 - Knowledge, Skills and Behaviours covered in Professional Interview

Within the professional interview the apprentice will need to discuss and evidence, through their synopsis, that they are competent in the criteria below, which are set out in the standard.

Ref	KSB	Ref	Description
K4	Underpinning Principles	K4.1	Sound understanding of principles of thermodynamics, gas laws, psychrometrics, fluid flow, electricity, properties of refrigerant fluids and lubricants.
K7	Sustainability	K7.1	Understanding of environmental impact of refrigerants, maximising efficient system performance and mitigation of direct and indirect carbon emissions.
		K7.2	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.
S1	Safe working practices	S1.1	Installation, commissioning, testing, fault diagnostics, rectification of systems, component/refrigerant suitability and selection
		S1.2	Working with pressure systems and electrical circuits and systems
		S1.3	Evaluating and mitigating risks of refrigerants including toxicity, flammability and other potential risks or hazards to self and the general public.
		S1.4	Decommissioning, safe recovery and disposal of equipment and hazardous waste transfer
S5	Sustainable system operation	S5.1	Using system operating parameters for efficient performance to achieve measurable and sustained reductions in carbon emissions.
		S5.2	Routine and reactive service and maintenance, testing, fault finding, reporting and rectification.
		S5.3	Retrofitting and refilling of existing equipment to lower GWP refrigerants including safety, reliability and environmental considerations.
B1	Safety approach	B1.1	Disciplined approach to assessing, managing, mitigating and avoiding risk in a variety of situations to themselves, colleagues, the public and the environment.
B2	Strong work ethic	B2.1	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.
B3	Logical problem solver	B3.1	Employs logical thinking, and determined attitude to problem solving and technical challenges.

B4	Focus on quality	B4.1	Attention to detail, following procedures, planning and preparation, verifying compliance.
B5	Personal responsibility	B5.1	Takes responsibility for work and interactions with colleagues, customers, suppliers or subcontractors.
B6	Communicates well	B6.1	Uses a range of communications methods effectively, positively and in timely fashion.
B7	Adaptable	B7.1	Able to adapt to changes in conditions, technologies, situations and a wide variety of different working environments.
B8	Self-motivated	B8.1	Willingness to learn and commitment to professional development and to applying principles of sound engineering and sustainability of engineering systems.

## Appendix 2 - Tasks mapped to RACHP Standard

The below mapping has been developed to support apprentices in mapping their evidence back to the apprenticeship standard and the professional interview. This mapping is not definitive and some apprentices may complete tasks which provide evidence of competence in other knowledge, skills and behaviours (KSBs) than those listed below.

Task		Area in Standard
Task 1: Jointing and system testing	Skills	<ul style="list-style-type: none"> <li>• Mechanical Operations</li> <li>• Safe Working Practices</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>
Task 2: Evacuation and dehydration/commission and charge (Critical and Non-Critical)	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Sustainable System Operation</li> <li>• Control Circuit Application</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>
Task 3: Reactive maintenance	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Control Circuit Application</li> <li>• Mechanical Operation</li> <li>• Sustainable System Operation</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>
Task 4: Breakdown investigation	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Control Circuit Application</li> <li>• Mechanical Operation</li> <li>• Sustainable System Operation</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>



Task		Area in Standard
Task 5: Fault finding and rectification (Electrical)	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Control Circuit Application</li> <li>• Mechanical Operation</li> <li>• Sustainable System Operation</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>
Task 6: Routine maintenance	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Control Circuit Application</li> <li>• Mechanical Operation</li> <li>• Sustainable System Operation</li> <li>• Application of Mathematical Principles</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• Underpinning Principles</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>
Task 7: Refrigerant Recovery and Disposal	Skills	<ul style="list-style-type: none"> <li>• Safe Working Practices</li> <li>• Sustainable System Operation</li> </ul>
	Knowledge	<ul style="list-style-type: none"> <li>• Legislation, Regulations and Standards</li> <li>• System Fundamentals</li> <li>• Sustainability</li> </ul>
	Behaviours	<ul style="list-style-type: none"> <li>• All</li> </ul>

## Appendix 3 – Professional interview grading criteria

<p><b>Theme 1 – Safety Approach</b></p> <p>Apprentice solves technical problems, explains their role and how they select the appropriate techniques, procedures and/or methods.</p>	<p><b>Pass Criteria</b></p> <ul style="list-style-type: none"> <li>Follows safe working practice behaviours related to the tasks carried out</li> </ul>	<p><b>Distinction Criteria</b> Achieve the pass criteria and in addition</p> <ul style="list-style-type: none"> <li>Achieves the pass criteria and in addition:</li> <li>Applies safety behaviours proactively and flexibly to a range of work environments, demonstrating ability to respond to changing circumstances</li> <li>Influences safety policy for example by bringing to the attention of others changes required related to a task or project or in their employers' policies.</li> </ul>
<p><b>Theme 2 – Safe working practices</b></p> <p>Apprentice has taken action to prevent harm to people, equipment or data.</p>	<p><b>Pass Criteria</b></p> <ul style="list-style-type: none"> <li>Develops and works to risk assessments and safe working procedures</li> </ul>	<p><b>Distinction Criteria</b> Achieve the pass criteria and in addition</p> <ul style="list-style-type: none"> <li>Achieves the pass criteria and in addition:</li> <li>Continually reassesses, monitors and communicates to others risks throughout the job being carried out and is able to contribute to the management of others in the work environment in order to mitigate risk and ensure the safe working practices of a variety of roles and tasks in a variety of work situations</li> </ul>

<b>Theme 3 – Sustainable System Operations</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
<p>Apprentice has taken action to evaluate and minimise environmental impacts.</p>	<ul style="list-style-type: none"> <li>• Uses data to ascertain system performance and implement modifications to reduce direct and indirect system emissions and takes into account overall environment impact</li> </ul>	<ul style="list-style-type: none"> <li>• Achieving the pass criteria and in addition:</li> <li>• Works to reduce environmental impact across a range of new and existing systems consistently.</li> <li>• Evaluates the potential to implement sustainable technology changes into existing systems, contributes to developing new ways to apply such technologies and influences the behaviour of others.</li> <li>• Regularly applies a range of sustainable technologies</li> </ul>
<b>Theme 4 – Sustainability</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
<p>Apprentice can explain potential impact of systems on the environment, direct and indirect emissions.</p>	<ul style="list-style-type: none"> <li>• Has awareness and understanding of sustainability issues for the RACHP sector and their personal responsibility for the environmental impact of systems they work with.</li> </ul>	<ul style="list-style-type: none"> <li>• Can justify the use of a more sustainable technology and understands what actions they should be taking in the workplace to reduce environmental impact of systems.</li> <li>• Understands how to evaluate the impact of different technologies to achieve more sustainable systems and improve the sustainability of existing systems.</li> <li>• Provides a documented argument to justify adopting new more sustainable technologies to others</li> </ul>

<b>Theme 5 – Underpinning Principles</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
<p>Apprentice can explain what equipment is used, why, how data is gathered and analysed and how they initiated the project to produce the desired outcome. Apprentice uses scientific, technical or engineering principles to complete their project.</p>	<ul style="list-style-type: none"> <li>• Can discuss knowledge of underpinning principles relevant to their job role</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrates a greater depth of knowledge of a wider range of underpinning principles beyond their own job role</li> <li>• Explains to advanced principles, and proactively seeks to deepen their knowledge of those principles</li> </ul>
<b>Theme 6 – Communicates Well</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
<p>Apprentice uses data to make reports and support recommendations on work they have carried out to their employer or other people involved such as clients or suppliers.</p>	<ul style="list-style-type: none"> <li>• Gives examples of a wide range of communication methods used to communicate with peers and customers, e.g. verbal communication, written communication in the form of diagrams/charts etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepares their own communications to explain complex information effectively.</li> <li>• Persuades and influences stakeholders involved in projects by selecting and using the most suitable method of communication</li> </ul>
<b>Theme 7 - Focus on Quality</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
<p>Apprentice identifies, plans, and organises the resources needed to effectively complete a project, explaining how they took into consideration cost, quality, safety and environmental impact.</p>	<ul style="list-style-type: none"> <li>• Follows instructions to support the importance of getting it right first time and assesses the potential implications if attention to detail is lacking</li> <li>• Attention to detail in planning, documenting, preparing and checking</li> </ul>	<ul style="list-style-type: none"> <li>• Takes responsibility for ensuring a quality assurance system across a range of projects, for both their own work but also their team / project members</li> </ul>

<b>Theme 8 – Strong Work Ethic</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
Apprentice can demonstrate their role and commitment to successful completion of a project	<ul style="list-style-type: none"> <li>• Takes responsibility for completion of own projects, taking ownership for own actions and identifying and working with appropriate team members</li> </ul>	<ul style="list-style-type: none"> <li>• Considers and adopts multiple solutions to challenges they are responsible for</li> <li>• Consistently takes leadership in completion of projects by working proactively with all those involved in the project (team members management and clients) to provide range of solutions responding to problems which arise in a variety of situations</li> </ul>
<b>Theme 9 – Logical problem solving</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
Apprentice exercises logical problem solving in a working environment relation to completion of a project	<ul style="list-style-type: none"> <li>• Uses of logical problem solving and solution analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipates and avoids potential problems for themselves and others in a range of projects or technical challenges</li> </ul>
<b>Theme 10 – Adaptability</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
Apprentice exercises adaptability in a working environment in relation to completion of a project	<ul style="list-style-type: none"> <li>• Responds and adapts to changes to working practices within projects</li> </ul>	<ul style="list-style-type: none"> <li>• Proactively implements changes to own working practice within projects</li> <li>• Influences others to implement changes in a variety of projects</li> </ul>

<b>Theme 11 – Personal Responsibility</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
Apprentice complies with professional engineering Institutions' Code of Conduct and Ethics	<ul style="list-style-type: none"> <li>• Acts professionally at all times</li> <li>• Maintains an awareness of impact of their own behaviour on their personal reputation and that of their employer, their customers and the engineering profession</li> </ul>	<ul style="list-style-type: none"> <li>• Takes the initiative to influence the behaviour and professional standards of others in work situations</li> </ul>
<b>Theme 12 – Self Motivated</b>	<b>Pass Criteria</b>	<b>Distinction Criteria</b> <b>Achieve the pass criteria and in addition</b>
Apprentice ensures they keep up to date with developments in their technical area and continues to develop their professional competence	<ul style="list-style-type: none"> <li>• Is aware of factors that can influence performance.</li> <li>• Recognises how their own working style and team dynamics impact on a project's success</li> </ul>	<ul style="list-style-type: none"> <li>• Plans own learning and identifies appropriate learning resources related to projects</li> </ul>

# Appendix 4 – Apprentice progress review form

Centres may use this form to periodically review progress with the apprentice/employer during the on-programme phase of the apprenticeship.

Date		Review Number	
	Name and Position	Signature	
Apprentice			
Employer Representative			
Centre Representative	If applicable	If applicable	
Last review date			
Actions carried forward from last review			
Evidence reviewed			
Evidence mapped to Professional Interview reviewed?	Y/N		
What is going well?			
Areas of development going forward			

Next Steps/Actions	
Employer representative comments	
Centre representative comments	
Apprentice comments	