



HM Government

T-LEVELS

T Level Technical Qualification in **Building Services Engineering for Construction**

Refrigeration Engineering Candidate Pack

Version 1.1

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Version History

Version	Author	Date	Change Description
1.0	JW	12/05/25	First introduction
1.1	JR	30/01/26	Updated grade descriptors and assessment wording to remove undefined references to improve clarity.

SPECIMEN

**T Level Technical
Qualification in Building
Services Engineering for
Construction**

Refrigeration Engineering

Candidate Pack

**Practical Assessment:
2025 – Specimen**

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1. Assessment

This candidate assessment pack is for candidates completing the Refrigeration Engineering occupational specialism component of the Technical Qualification.

Within this pack, you will find:

- information which tells you about things that you must and must not do when you are completing the assessment
- assessment brief
- a detailed breakdown of each task, the evidence requirements, and the conditions (controls) under which the task is to be completed
- any stimulus materials and templates required.

You must not discuss or share any details of the brief until after TBC.

2. Candidate guidance

General guidance

This is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of the work you produce. It is therefore important that you carry your work out to the highest standard you can.

Plagiarism

Plagiarism is the failure to acknowledge sources properly and/or the submission of another person's work as if it were your own. Plagiarism is not allowed in this assessment.

This is an assessment of your abilities, so the work must be all your own and carried out under the conditions stated. You will be asked to sign a declaration that you have not had any help with the assessment.

Your assessor is allowed to give you some help understanding the instructions, if necessary, but they will record any other guidance you need, and this will be taken into account during marking.

Where research is allowed, your assessor must be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge the sources used and clearly reference any information taken from them (e.g. providing as a minimum a list of web addresses / books / articles etc. used).

Timings and planning

You are advised to study the details of the assessment before starting.

You should check with your assessor that you have all the relevant materials, equipment and information/data sources that you need before starting the assessment.

You should take care when planning to make sure you have divided the time available between the activities in the assessment tasks appropriately. Timings for tasks are provided within this pack to support with planning and time allocation.

You will have 28 hours in total to complete this assessment.

You are permitted the following time for each task:

- 2 hours completing task 1
- 3 hours completing task 2
- 15 hours completing task 3
- 8 hours completing task 4.

Health and safety

You must always work safely, in particular while you are carrying out practical tasks.

You must always follow any relevant Health and Safety regulations, Risk Assessments and codes of practice in line with centre requirements.

If your assessor sees you working in a way that is unsafe for yourself or others, they will highlight the issue and ask you to stop the task immediately. Your assessor will not be able to reassess you until they are sure you are ready for assessment and can work safely.

Presentation of work

Presentation of work must be neat, legible and appropriate to the task and evidence required for submission.

You should make sure that each piece of evidence, including any forms, is clearly labelled with your name and the assessment reference.

All electronic files must be given a clear file name that allows your assessor to identify it as your work.

Written work may be word-processed or handwritten, unless stated otherwise.

All sketches and drawings should be neat and tidy and annotated.

Calculations should be set out clearly, with all working shown, as well as any assumptions made. You should use appropriate units at all times, consistent with the requirements of the assessment.

Instructions for this assessment

Ensure you read all the provided assessment information issued by the assessor.

You must work independently and not share your work with any other candidates in these supervised assessment sessions.

Your work will be kept secure during any supervised breaks that are taken.

Internet access is **not** allowed, unless otherwise stated in the task.

You must complete all tasks and present all evidence detailed in each task.

Within each task you will find the following:

- **An overview of each task** – This provides a short description of the purpose of each task.
- **Conditions of assessment** – This will tell you the duration and rules you must follow when completing the task.
- **Resources** – A list of the resources you will have access to when completing each task.
- **Task instructions** – This section gives the specific instructions that provide the requirements for each task.
- **What you must produce for marking** – This describes the evidence you must submit when the task is complete. Be aware failure to submit any evidence requested can adversely affect your overall mark for the assessment.

Assessment themes

You will be assessed against a number of assessment themes. These themes and the performance outcomes will be holistically assessed across the assessment tasks.

This assessment has a total of 90 marks spread across the assessment themes, as shown below:

Assessment theme	Performance outcomes			Marks
	Install refrigeration systems	Commission refrigeration systems	Maintain refrigeration systems	
Health and safety				12
Design and planning				24
Systems and components				15
Reports and information				9
Inspecting and testing of systems and components				12
Handover and communication				6
Working with faults				12
Total				90
Performance outcome weighting	37%	23%	40%	

The table below shows typical knowledge and skills required for pass level performance against each of the performance outcomes:

Performance outcome	Typical knowledge and skills
Install refrigeration systems	You display a breadth of knowledge and practical skills that enables you to complete the given installation tasks successfully. You have the technical skills to use tools and materials safely and in logical order in relation to a plan.
Commission refrigeration systems	You work in a safe manner, carrying out testing and interpreting test results, using tools, testing and diagnostic equipment. You work with documentation (manufacturer's instructions, building regulations), carrying out tasks in clear and logical sequence and carrying out clear record keeping of test results.
Maintain refrigeration systems	You apply knowledge and understanding through practical skills to solve a particular scenario or problem, justifying the decisions and approaches you take. You select materials and techniques appropriately and protect customers' property. You use materials effectively, considering costs and environmental impacts.

3. Assessment brief

You have been called to a property to:

- undertake the design of a refrigeration system to a pre-existing freezer room
- plan and install the refrigeration system.

Your supervisor has asked you to carry out a survey of the proposed installation.

The customer has identified the wall space that they want to locate the cooler on and the outdoor area to site the condensing unit.

The general layout of the installation is shown in Figure 1 and Figure 2.

The power supply will be taken from a local isolator provided by others.

Condensate drainage will be connected to the main drain line provided by others.

Whilst on site, the customer asked for an inspection of a faulty refrigeration system at the same property. After inspection, it has been identified that it requires a compressor change and a routine maintenance. You are required to discuss this with the customer and agree to carry out this work.

This assessment has a time allocation of **28 hours**. Plan your time accordingly to enable timely completion.

4. Tasks

Task 1

The purpose of this task is for you to demonstrate that you can extract information and data from a given source of information and apply calculations to determine the design criteria.

Conditions of assessment:

The time allocated for this task is 2 hours

You must carry out the task on your own, under controlled conditions

No software packages are permitted for use for this activity.

Resources

You will have access to the following resources to complete this task:

A copy of the Assessment brief

Access to Appendix 1: (Design specification)

Access to Appendix 2: (Refrigeration schematic component layout drawing (figure 1))

Access to Appendix 4: (Design answer sheet template)

Calculator (non-programmable)

Pen.

You are required to:

- Calculate the heat ingress for the cold store
- Determine the heat ingress
- Determine the product cooling load
- Determine any additional heat loads within the cold room.

You must show all workings on the answer sheet.

Calculations should be within $\pm 6.25\%$ tolerance.

What you must produce for marking:

- Completed calculations on the Design answer sheet template: Appendix 4.

Task 2

The purpose of this task is for you to demonstrate that you can correctly plan the installation and measure and mark out your work area.

Conditions of assessment:

- The time allocated for this task is 3 hours
- You **must** carry out the task on your own, under controlled conditions.

Resources

You will have access to the following resources to complete this task:

- Access to Assessment brief
- Access to Appendix 5 – Risk Assessment template
- Access to Appendix 6 – Method statement template
- Access to Appendix 7 – Materials list template
- Access to Appendix 8: (Refrigeration system installation layout drawing (figure 2))
- A range of drawing materials
- A range of tools and equipment as identified in your Materials list for Task 2B.

A) You are required to:

- Plan the installation of the refrigeration system in line with the requirements outlined within the brief and supporting drawings.
- Complete the risk assessment template, identifying any risks and hazards.
- Complete the method statement template, outlining the sequence of work.
- Complete the materials list including tools, equipment and personal protective equipment (PPE) requirements.
- Complete an annotated installation diagram including location dimensions of indoor and outdoor units and pipe route.

Your assessor will provide details of the assessment area to be used.

If you provide plans that are not fit for purpose it is expected that your assessor will intervene and provide necessary feedback and corrections to the plans prior to you carrying out the installation.

The installation diagram will be used by you to carry out the installation and will also be used by your assessor for checking the dimensional tolerances of the installed system and pipework.

B) You are required to:

- Prepare your work area for the installation of the refrigeration system, in line with the requirements identified in Task 2A.
- Measure and mark out your work area, as detailed in your approved, annotated installation drawing from Task 2A.

Marked components position and pipework should be within $\pm 2\text{mm} - 5\text{ mm}$.
You must complete this activity prior to carrying out the installation of the system.

What you must produce for marking:

- Completed Risk Assessment template: Appendix 5
- Completed Method Statement: Appendix 5
- Completed Materials list: Appendix 7
- Completed annotated installation drawing.

Task 3

The purpose of this task is for you to demonstrate that you can correctly install the refrigeration system, connect the electrical supply, commission it and handover the system to the customer.

Conditions of assessment:

- The time allocated for this task is 15 hours.
- You **must** carry out the task on your own, under controlled conditions.

Resources

You will have access to the following resources to complete this task:

- Access to Assessment brief
- Access to your completed documents from Task 2 (Risk assessment, Method Statement and Materials List)
- Access to a copy of your annotated installation drawing from Task 2A
- Access to Appendix 8 – Pressure test certificate template
- Access to Appendix 9 – Safe isolation report template
- Access to Appendix 10 – Commissioning checklist template
- Writing materials or access to computer (word processing software)
- A range of tools and equipment as identified in your Materials list from Task 2A.

A) You are required to:

- Install the refrigeration system in accordance with your annotated installation drawing (from Task 2A) and as agreed by your assessor.

Complete the installation to the following specification:

- All pipework is to be clipped directly to the wall surface (cable tray must NOT be used) with the pipe brackets at a maximum 300 mm spacing.
- Both pipes are installed at 50 mm centres.
- All pipe bends are carried out with the correct size pipe bending tool.
- Nitrogen purging is carried out during all brazing activities.
- Marking out and final measuring of installed components and pipework is within ± 2 mm – 5 mm.
- All internal pipework below the notional finished ceiling level is contained with suitable plastic trunking.
- Outlet pipe from condensate pump is terminated to a suitable wastewater drain line.
- Good housekeeping is maintained throughout the assessment.

B) You are required to:

- Test the pipework installation for strength and tightness, using recognised testing techniques and procedures.
- Carry out the correct strength and tightness test pressures in accordance with current F-Gas regulations and BS EN 378-2:2016.
- Hold the tightness test for a minimum of **one** hour.
- Complete the pressure test certificate.

All pipework is to be pressure tested (strength and tightness) under the direct observation of the assessor.

Leak checking will be conducted with either a soap solution or proprietary leak testing fluid.

C) You are required to:

- Isolate the electrical supply in accordance with safety procedures and legislative requirements.
- Connect the electrical supply and interconnecting wiring to the refrigeration system from a suitably supplied electrical isolator.
- Complete a written account of the safe isolation process using the supplied template.

Your assessor will observe you carrying out the isolation process.

All power, interconnecting and control wiring must be in accordance with manufacturer's requirements and meet current UK regulations, BS 7671:2018+A3:2024.

D) You are required to:

- Commission the system as per manufacturer's instructions
- Remove the gauges from the commissioned system, minimising the loss of refrigerant to the atmosphere
- Conduct a final leak check
- Handover the refrigeration system to the customer.

The handover to meet the following specification:

- Demonstration of its operation
- Explanation of the routine maintenance requirements
- Demonstration of how to remove and clean the air filters
- Confirmation that the customer is confident in operating the system.

Complete the commissioning checklist.

After pressure and leak testing, the system will be evacuated to 2 Torr minimum, with the final vacuum checked by your assessor using a vacuum gauge.

You will then weigh-in the correct refrigerant charge.

Leak checking will be conducted with either a soap solution or proprietary leak testing fluid.

The assessor will act as the customer during the handover.

You must produce the following for marking:

- Completed pressure test certificate: Appendix 8
- Completed written report of safe isolation: Appendix 9
- Completed commissioning checklist: Appendix 10.

Task 4

The purpose of this task is for you to demonstrate that you can correctly identify, diagnose and report faults, rectify the fault by servicing and performing maintenance activities so the system performs correctly.

Conditions of assessment:

- The time allocated for this task is 8 hours.
- You **must** carry out the task on your own, under controlled conditions.

Resources

You will have access to the following resources to complete this task:

- Access to Assessment brief
- Access to your completed documents from Task 2A (Risk assessment, Method Statement and Materials List)
- Access to Appendix 11 – Fault finding answer sheet template
- Access to Appendix 8 – Pressure test certificate template
- Access to Appendix 12 – F-Gas log sheet template
- Access to Appendix 10 – Commissioning checklist template
- Access to Appendix 13 – Maintenance report template
- Writing materials and/or access to computer (word processing software)
- A range of tools and equipment as identified in your Materials list from Task 2A.

A) You are required to:

- Use recognised techniques and procedures to diagnose the faults on each of the compressors.
- Record the fault for each of the compressors.

Complete the Fault finding answer sheet.

After diagnosing the faults, you should check with your assessor to ensure you have done this correctly. If you do not initially identify the correct fault, your assessor may prompt you. If you require any prompts or guidance for this activity, it will be reflected in the marking.

B) You are required to:

- Rectify a fault component on a refrigeration system. You must remove and refit a compressor from a designated system.
- Complete the installation to the following specification:
 - Recover the refrigerant to atmospheric pressure or below.
 - Un-braze the compressor and remove it from the condensing unit.
 - Refit and re-braze the compressor into the condensing unit.
 - Pressure test and observe for a minimum of one hour in accordance with F-Gas regulations and BS EN378-2:2016 and leak tested.
 - Evacuate system to 2 Torr minimum and charge with weighted amount of refrigerant according to manufacturer's requirements.
 - Complete the pressure test certificate
 - Complete the F-gas log sheet.

C) You are required to:

- Conduct routine maintenance on an operational refrigeration system.
- Complete the maintenance to the following specification:
 - Carry out safe electrical isolation procedure to shut the system down
 - Remove and clean air filter
 - Mix and spray clean the evaporator and condenser coils using a proprietary coil cleaning fluid
 - Perform a leak test on the entire system
 - Run and test the system
 - Record the readings.

There is no requirement to fit gauges.

D) You are required to:

- Write a detailed maintenance report for the customer and prepare documentation ready for a customer handover.
- Complete the report to the following specification:
 - Explanation given of the fault
 - Methods for repair and chosen method of repair
 - Justifications for what work has been carried out
 - How has the disposal of waste been managed
 - What documentation has been completed and will be handed over to the customer.
 - Complete maintenance report.
 - Complete documentation for handover.

You must produce the following for marking:

- Completed Fault finding answer sheet: Appendix 11
- Completed pressure test certificate: Appendix 8
- Completed F-Gas log sheet: Appendix 12
- Completed commissioning checklist: Appendix 10
- Completed maintenance report: Appendix 13.

End of Assessment

Appendix 1: Design specification

Design specification

External Dimensions:

5 m long x 3.5 m wide x 3.2 m high.

U Values:

- Wall: 0.19 W/m²K
- Roof: 0.15 W/m²K
- Floor: 0.25 W/m²K

Temperatures:

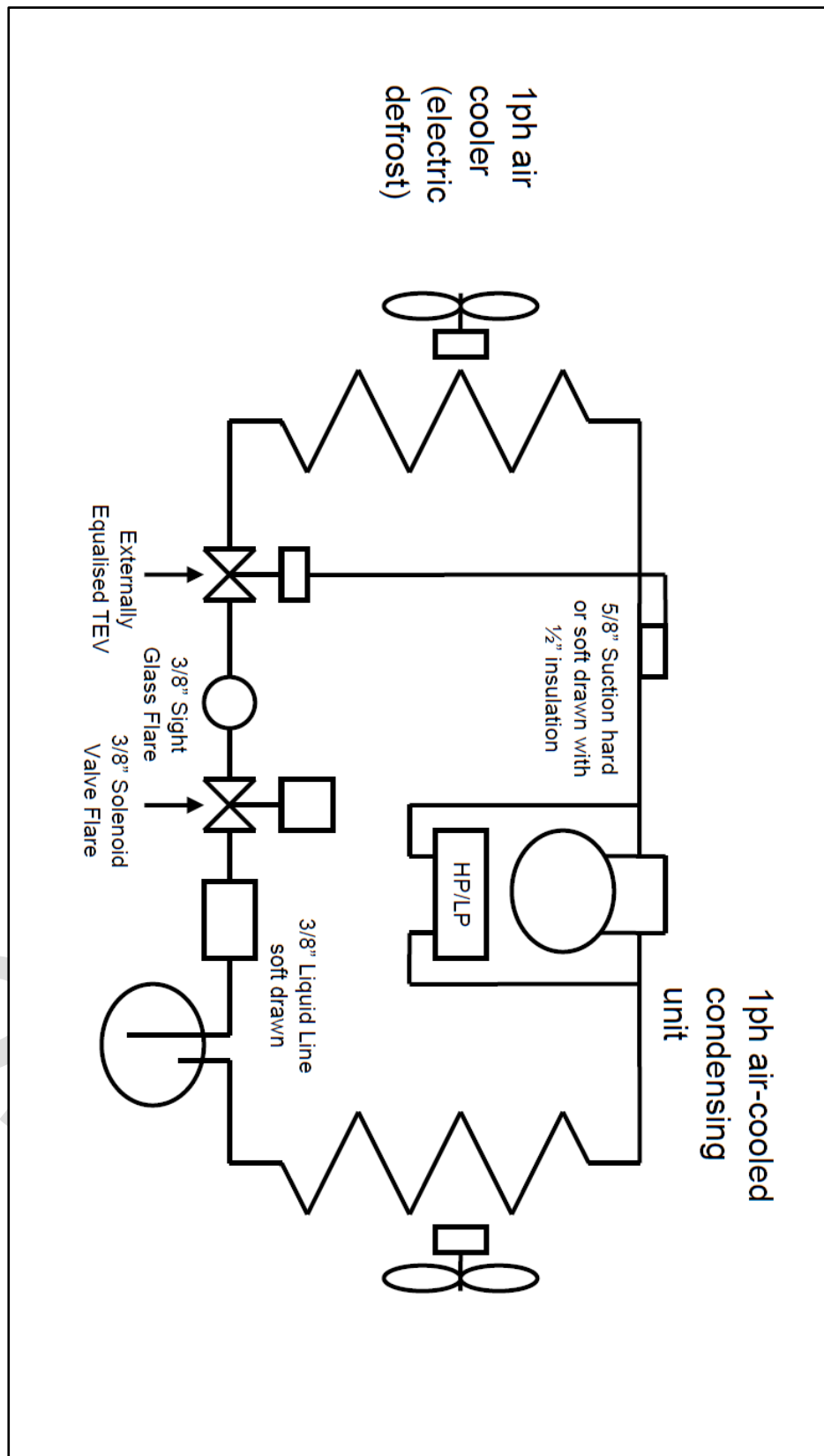
- Internal: -20°C
- External Ambient: 32°C
- Ground: 15°C

Ancillary items:

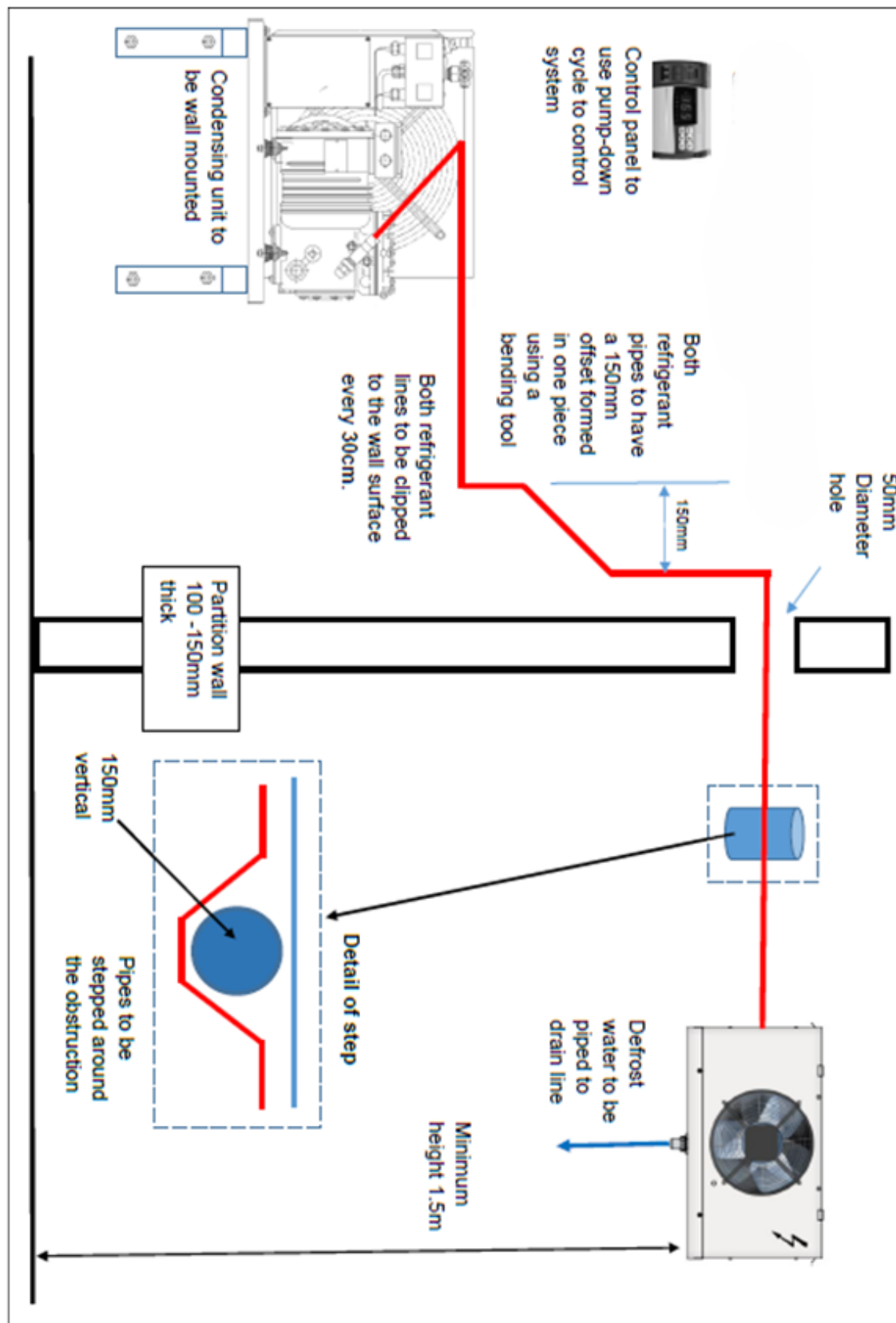
- Floor heater grid: 15W/m²
- Internal lighting: 300W for 8 hours per day
- Door seal heater tape: 50W
- Fan motors: 3 x 550W
- Occupancy: 2 workers for 4 hours per day
- Defrost heaters 5 kW (30 minutes twice per day)

In addition, the cold store must have the capability of cooling 500kg of beef from +5°C to -20°C in 8 hours.

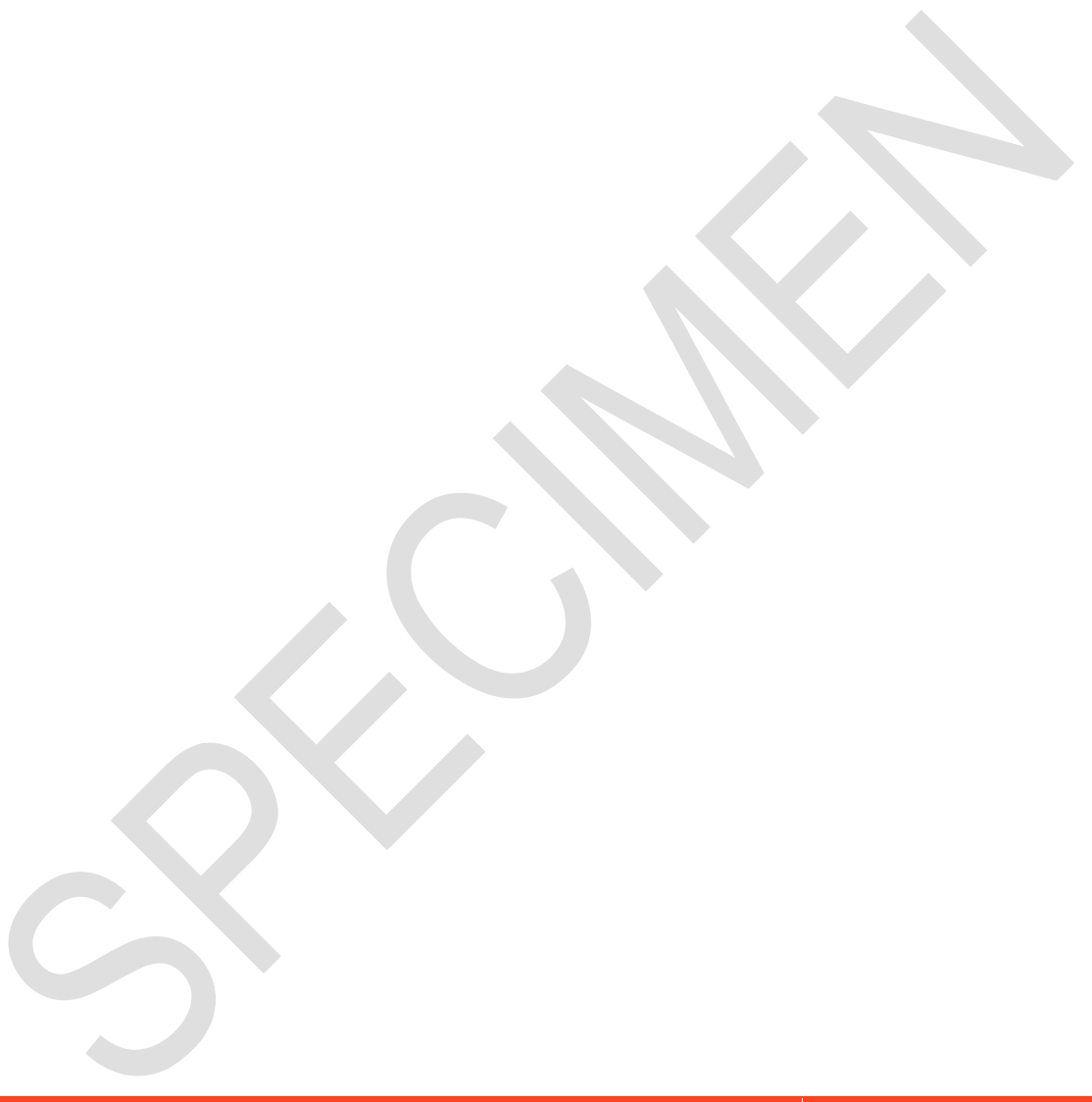
Appendix 2: Refrigeration schematic component layout drawing (figure 1)



Appendix 3: Refrigeration system installation layout drawing (figure 2)



Appendix 4: Design answer sheet template

Candidate name		
WJEC candidate number		
Candidates must show their workings:		
		
Candidate signature	Date	

Appendix 5: Risk assessment template

Candidate name		WJEC candidate number	
Activity		Location	

Severity (S): Degree of harm which may be caused (or number of persons affected)

1 – Minor injury 2 – Major injury 3 – Fatality

Likelihood (L): Probability that the event will occur

1 – Remote 2 – Possible 3 – Likely

Risk rating: Severity x Likelihood

Severity	3	3	6	9
	2	2	4	6
	1	1	2	3
	1	2	3	
Likelihood				

1-2 – Low

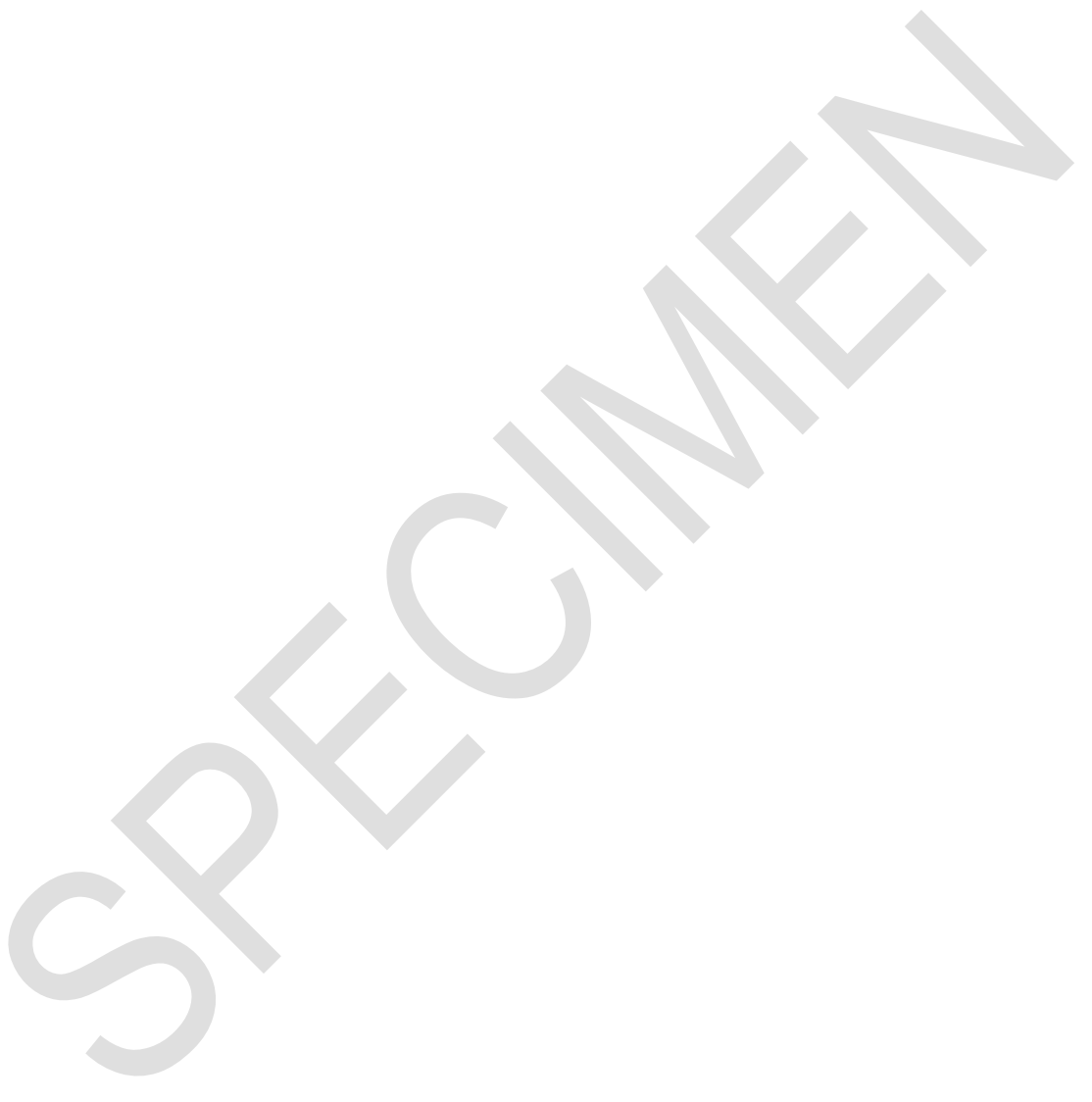
3-5 – Medium

6-9 – High

Item	Activity	Hazard	Persons at risk	Existing control measures	S: 1-3	L: 1-3	Risk rating	Are the risks controlled?

Candidate signature	Date

Appendix 6: Method statement template

Candidate name			
WJEC candidate number			
			
Candidate signature		Date	

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Appendix 7: Materials list template

Candidate name	
WJEC candidate number	

[illegible]

Candidate signature	Date

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Appendix 8: Pressure test certificate template

Candidate name						
WJEC candidate number						

CERTIFICATION OF PRESSURE TESTING (IN ACCORDANCE WITH BS EN 378)						
Name of client					Job No.	
Site address					Date of Test.	
Contact detail	Contact number.				Email.	
System/component under test						

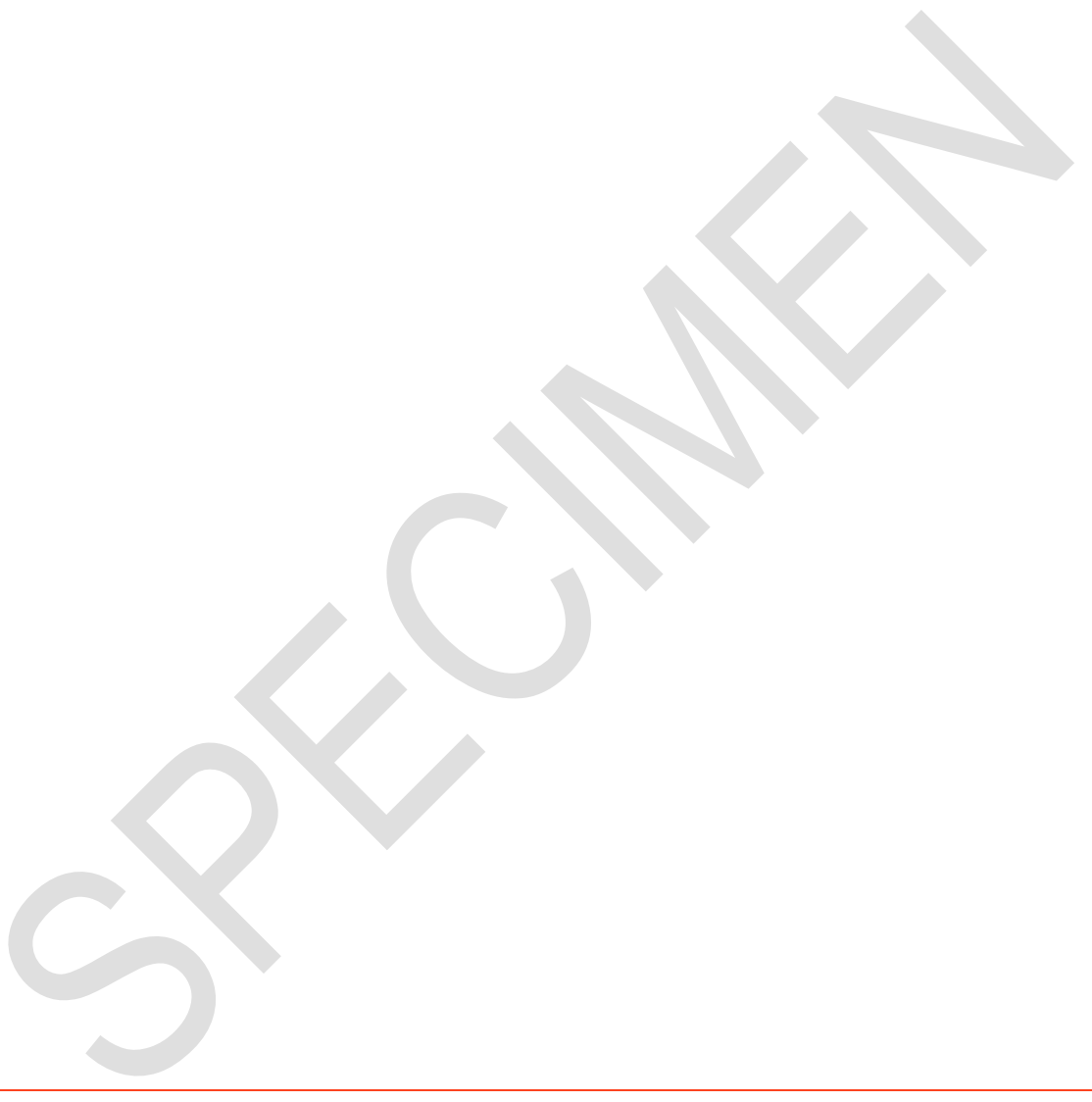
TEST DETAIL						
STRENGTH TEST Ps x	START PRESSURE	START TEMP	DURATION	FINAL PRESSURE	FINAL TEMP	RESULT
TIGHTNESS TEST Ps x	START PRESSURE	START TEMP	DURATION	FINAL PRESSURE	FINAL TEMP	RESULT

Details of person carrying out the test						
Name		Signature			Date	

Details of person who witnessed the above test			
Name	Status	Signature	Date

Candidate signature	Date

Appendix 9: Safe isolation report template

Candidate name		
WJEC candidate number		
		
Candidate signature	Date	

Appendix 10: Commissioning checklist template

Candidate name	
WJEC candidate number	

COMMISSIONING CHECKLIST			
General information			
Client name:			
Location/Address:			
System information			
Make			
Indoor model			
Indoor serial number			
Outdoor model			
Outdoor serial number			
Cooling/heating capacity			
Refrigerant			
System pressure tested to (BAR)		Pipe size	
System held on vacuum (HRS)		Suction (inch)	
System gas charge added (g)		Liquid (inch)	
Type of gas			
Pipe length			
Drain			
Gravity		Pumped	
Pipework insulation and condensate pumps and drains checked and operating			

Pressure and temperature settings				
			On	Off
Air				
Suction pressure				
Electrical				
Single phase		3 Phase		FL Amps
Control set points				
Notes (including recommendations)				
Candidate signature				Date

Appendix 11: Fault finding answer sheet template

Candidate name		
WJEC candidate number		
Compressor 1:		
Compressor 2:		
Compressor 3:		
Candidate signature	Date	

Appendix 12: F-Gas log sheet template

Candidate name	
WJEC candidate number	

F-GAS LOG SHEET			
General information			
Site/Plant name:			
Location:			
Site/Plant operator (contact details):			
Contact name:			
Cooling loads served:			
Refrigerant type		Refrigerant quantity (kg)	
Plant manufacturer		Year of installation	
Refrigeration additions			
Date	Technician	Amount added (kg)	Reason for addition
Refrigeration removals			
Date	Technician	Amount added (kg)	Reason for removal. What was done with recovered refrigerant?
Leak tests			
Date	Technician	Test result (including location and	Follow up actions required

		cause of any leaks identified)	
Follow-up actions			
Date	Technician	Related to test on	Action taken
Candidate signature			Date

Appendix 13: Maintenance report template

Candidate name	
WJEC candidate number	

Details of the fault:

The action(s) required to rectify the fault:

The action(s) taken to manage the disposal of waste:

Documentation completed for handover:

Candidate signature

Date

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Contact Us

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