

T Level Technical Qualification in Building Services Engineering for Construction – Plumbing Engineering

Centre Standardisation Materials

Version 1.1

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For external use

Contents

1. Introduction	2
2. Candidate A	4
2.1. Assessment details	4
2.2. Task Overview	4
2.3. Task 1 - Planning the installation	5
2.3.1. Candidate evidence	6
2.4. Task 2 – Installation, Commission and Decommission	19
2.4.1. Candidate evidence	21
2.5. Task 3 – Carry out maintenance	33
2.5.1. Candidate evidence	34
2.6. Guidance on the exemplar marking	40
2.7. Candidate Record Form (CRF) – Plumbing engineering (8710-356)	41
3. Candidate B	45
3.1. Assessment details	45
3.2. Task Overview	45
3.3. Task 1 - Planning the installation	46
3.3.1. Candidate evidence	47
3.4. Task 2 – Installation, Commission and Decommission	58
3.4.1. Candidate evidence	60
3.5. Task 3 – Carry out maintenance	73
3.5.1. Candidate evidence	74
3.6. Guidance on the exemplar marking	80
3.7. Candidate Record Form (CRF) – Plumbing engineering (8710-356)	81

Introduction

Plumbing engineering (8710-36) (356)

These standardisation materials have been produced to support centre assessors when marking the Occupational Specialism assessment.

The materials are produced to support staff in the process of marking, including how to effectively use marking grids to mark using assessment themes.

The Occupational Specialism assessments for the T Level in Building Services Engineering are externally set summative assessments which are internally marked by assessors. It is the centre's responsibility to ensure candidate's work is marked in a standard way across the centre, using the specified marking grids, in order to rank performance on a single mark scale.

The marking materials must be considered alongside the Technical Qualification Occupational Specialism assessment guide.

It is recommended that all assessors, including any unlikely to mark, are included in early discussions around the use of the marking grids, as all assessors should understand the basis of marking. This is because it could shape their teaching by helping candidates practise, bringing their skills and knowledge together to complete a problem, and helping them learn to explain and justify their choices in terms of subject knowledge in preparation for summative assessment.

Assessors must study the Technical Qualification Occupational Specialism assessment guide which provides detailed information about the assessment themes and the marking grids, to ensure they are clear about the different assessment themes and how they may show up in evidence across the range of tasks.

If there is more than one assessor carrying out marking at the centre, this process should be carried out as part of a group activity to ensure markers are clear and in agreement about what sorts of evidence are relevant for assessment and which assessment theme they fit into.

The following materials should form the basis for pre-standardisation and discussion could take place using evidence from trial runs/formative assessment activities. Standardisation should also take place using the evidence from the actual assignment set for that year, so along with utilising this tool, please ensure activities surrounding the live assignment also take place.

Thank you for accessing these support materials. Please note that the Practical Observation form has been updated since the publication of these materials. The Practical Observation form included in the live assessment materials is the version that must be used when assessing the Occupational Specialism.

Guide to marking the T Level Occupational Specialism Assessment – recording: [link](#)

Please review the accompanied recording to support standardisation activities.

Within this pack, you will find:

- Links to the assessment materials and relevant Guide Standard Exemplification Materials
- Links to the Sample Assessment Materials
- Exemplar candidate evidence from two candidates – Candidate A and Candidate B
- Guidance on the exemplar marking
- A partially completed candidate record form, reflecting marking of a number of the assessment themes within this assessment

Candidate A

Assessment details

This standardisation pack has been developed to reflect the requirements of the **Plumbing engineering – Sample** version. The assessment pack can be access on the City & Guilds website, [here](#).

The evidence used for the exemplar marking in this pack is based on the **Guide Standard Exemplification materials** for this occupational specialism that can be located, [here](#).

Task Overview

The Practical Assignment is based around a work-based scenario and is made up of three tasks:

Task 1 – Planning the installation

- a) Plan the installation of the cloakroom and the unvented hot water cylinder following the client brief.
- b) Measure and mark out proposed working area.

Task 2 – Installation, commissioning and decommissioning

- a) Install the cloakroom and unvented hot water cylinder in accordance with your drawing and as agreed by your assessor.
- b) Connect the electrical supply to the unvented cylinder from a suitably supplied fused spur connection following the safe isolation procedure
- c) Commission the system and handover to customer
- d) Decommission the system

Task 3 – Carrying out maintenance

- a) Discuss fault with customer, investigate and diagnose fault
- b) Produce a written report of the maintenance activity
- c) Repair and rectify fault

Task 1 - Planning the installation

(Assessment themes: Health and Safety, Design and planning, Systems and components)

For task 1 candidates need to produce the following pieces of evidence:

- Risk assessment
- Method statement with justifications
- Installation diagram (cloakroom and unvented hot water cylinder) with pipe layout, pipe sizes and associated components
- Materials list
- Assessor observation of measurements and marking out of space allocation/ work area checked against installation diagram

For illustration, the guided exemplification materials (GSEM) for Task 1 contain examples of candidate evidence for the following assessment requirements only:

- Risk assessment
- Method statement with justifications
- Installation diagram (unvented hot water cylinder) with pipe layout, pipe clips and associated components
- Materials list
- Assessor observation of measurements and marking out of space allocation/ work area checked against installation diagram

The following task 1 candidate assessment requirements have not been included as example candidate evidence for this version of the guided exemplification materials.

- Installation diagram (cloakroom)

Photographic evidence required:

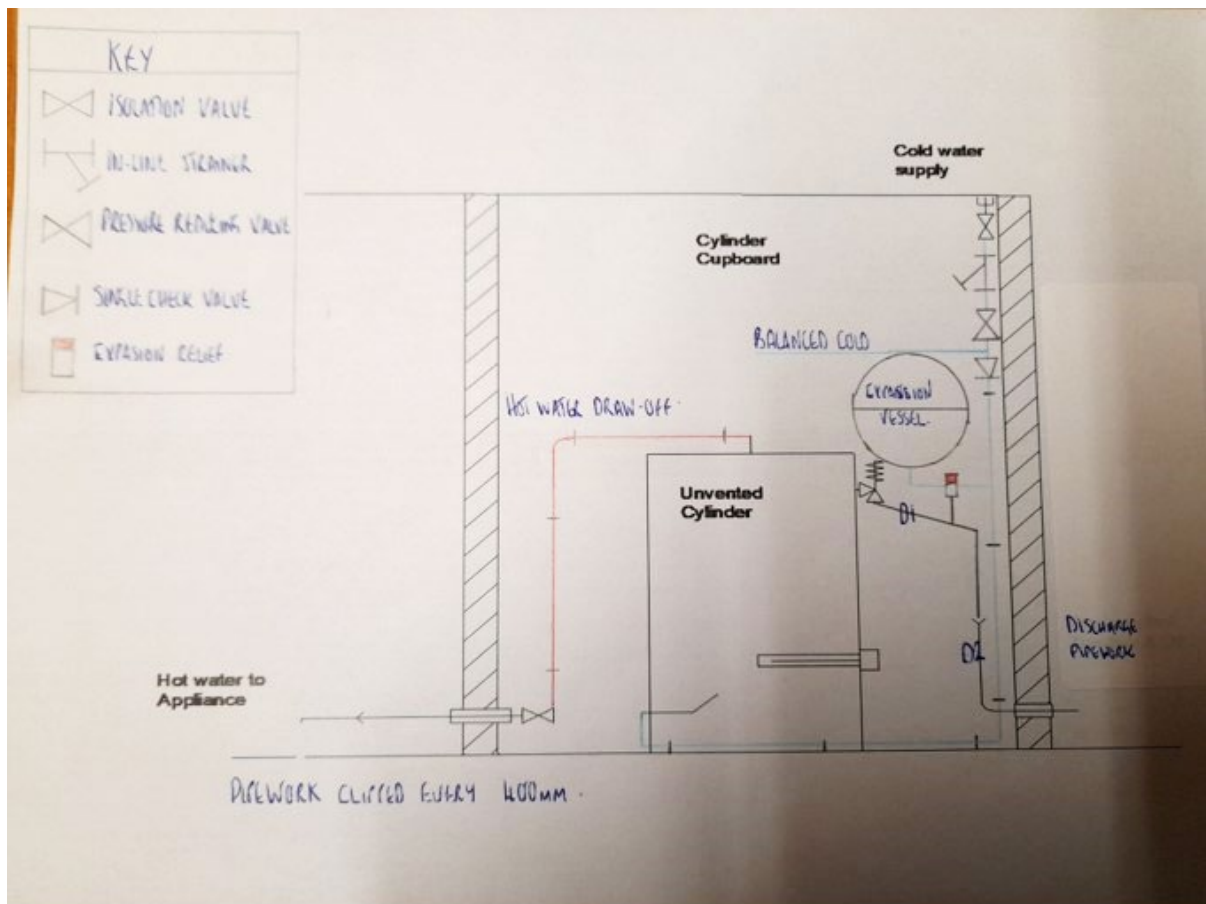
Measuring and marking out of proposed working area

Photographic evidence which shows:

- Appropriateness of method and equipment used to measure and mark out. Photos should show use of correct measuring equipment and correct marking out of pipework – **Photographs 1 and 2.**

Task 1 - Candidate evidence

1.1.1. Installation diagram



1.1.2. Practical Observation Form – Measuring and marking out of proposed working area



Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Systems and components (Installation)

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Measuring and marking out of proposed working area	The candidate has followed the correct and logical process for marking out. The candidate installed a datum line to work from and this enabled them to establish the correct level and falls for the installation. This resulted in all dimensions being taken and recorded accurately and free from errors.

1.1.3. Task 1 - Photographic evidence

Appropriateness of method and equipment used to measure and mark out. Photos should show use of correct measuring equipment and correct marking out of pipework.

Evidence description	Photo
<p>Photograph 1</p> <p>Candidate marking out a work area using a spirit level to provide a straight and vertical line on the first attempt.</p>	
<p>Photograph 2</p> <p>Work area shows accurate and clear marking out on work surface.</p>	

1.1.4. Risk assessment

Activity: Installation of pipework Location: Centre A		Date: xxxxxx Position: Candidate						
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High			
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely								
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	R R	Are the Risks Controlled?
1	Soldering	Burn/ fire/ damage to property/ damage to person	Self	Handle soldering equipment with care Use wet rag to cool hot pipework Water fire extinguisher	2	1	2	Yes
2	Electrical wiring	Death Shock	Self	Carry out safe isolation procedure under supervised conditions and ensure appliance is locked off	3	1	3	Yes
3	Spilt water	Slipping	Self Others	Keep working area clean and tidy clear away any spillages to reduce risk	2	1	2	Yes

4	Loose Cables	Tripping	Self Others	Stick all electrical cables down with cable guards or with tape where possible to reduce risk of tripping	1	2	2	Yes
5	Hazardous substances	Asphyxiation/ irritation/ contamination/ ingestion	Self	Correct use of PPE – wearing gloves. Correct ventilation Personal hygiene. Refer to material data sheet	2	1	2	Yes
6	Manual handling	Personal injury	Self	Correct kinetic lifting techniques. Awareness of maximum lifting weight. Suitable training	2	1	2	Yes

Activity: Decommissioning		Date: xxxxxx						
Location: Centre A		Position: Candidate						
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High			
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely								
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	R R	Are the Risks Controlled ?

1	Hazardous waste	Potential for foul waste and contaminated pipework from flux's or other waste materials	Self	Correct use of PPE including gloves Wash hands carefully and dispose of contaminated waste in suitable location to remove risk from contaminants	1	1	1	Yes
2	Wet surfaces	Slips and trips	Self Others	Ensure all installation pipework is adequately drained to minimise the volume of water that could escape onto floor surface Clear away any spilt liquids to reduce risk of slips/trips	2	1	2	Yes
3	Manual handling	Personal injury	Self	Correct kinetic lifting techniques. Awareness of maximum lifting weight. Suitable training	2	1	2	Yes

Activity: Decommissioning	Date: xxxxxx
Location: Centre A	Position: Candidate
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality	
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely	
RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High	

Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1- 3	L 1- 3	R R	Are the Risks Controlled ?
1	Hazardous waste	Potential for foul waste and contaminated pipework from flux's or other waste materials	Self	Correct use of PPE including gloves Wash hands carefully and dispose of contaminated waste in suitable location to remove risk from contaminants	1	1	1	Yes
2	Wet surfaces	Slips and trips	Self Others	Ensure all installation pipework is adequately drained to minimise the volume of water that could escape onto floor surface Clear away any spilt liquids to reduce risk of slips/trips	2	1	2	Yes
3	Manual handling	Personal injury	Self	Correct kinetic lifting techniques. Awareness of maximum lifting weight. Suitable training	2	1	2	Yes

1.1.5. Method statement

Cloakroom installation

Ensure you have the correct PPE which includes steel toe cap boots, boiler suit and heat proof hi visibility vest to ensure risk of personal injury is limited and in line with risk assessment.

I will then carry out a visual inspection to make sure my workspace is safe; I will move anything that is unwanted out of the way. I will also put a dust sheet down in my working area to keep it protected and tidy.

Indicate the component and pipework layout in pencil on the work surface to the correct measurements in line with drawing and ensuring the use of a datum line and spirit level to ensure all components and pipe-runs will be accurate. Fit the components to the correct height in line with specification and also meet the correct recommend installation heights for example the wash hand basin at 900mm.

Collect all pipework, fittings and necessary tools required to complete the installation in line with my materials list, also checking that all the fittings and materials are British standard kite marked. This is an imprint on each fitting and show that they are of the right quality for purpose. I will put them in a safe place in the working area where they are easily accessible but do not cause a trip hazard.

Measure from the centre line for the WC and the WHB brackets and erect the brackets and basin in according to the specification and install all the appropriate pipe clips at equal distancing to both provide support and ensure the installation is aesthetically pleasing. Carefully and accurately measure the pipe lengths and make allowance for any X dimensions to allow for pipe gain and then cut the copper pipe, then continue to pull any angles, kicks, or Passovers needed for the task.

Once all pipework is prefabricated Install the pipework and add the fittings tightening any compression joints to provide some stability. When happy with the fit of the installation pipework dismantle all joints and clean and apply flux to all the surfaces that are to be soldered, this will allow the solder to run smoothly once heat is applied and ensure that the installation is water tight and free from leaks. Solder all the copper joints ensuring all surfaces are protected from damage using a suitable heat mat or shield.

Using the clips already installed place the waste pipework into position and tighten all the mechanical joints to ensure the waste is all connected and free from leaks. Test all copper pipework for leaks with a hydraulic pressure tester to ensure the joints are free from leaks when pressurised and once completed turn on the water supplies.

Following on from this I would commission the system and complete the associated paperwork

Unvented hot water installation

Ensure you have the correct PPE which includes steel toe cap boots, boiler suit and heat proof hi visibility vest to ensure risk of personal injury is limited and in line with risk assessment.

I will then carry out a visual inspection to make sure my workspace is safe; I will move anything that is unwanted out of the way. I will also put a dust sheet down in my working area to keep it protected and tidy.

Indicate the component and pipework layout in pencil on the work surface to the correct measurements in line with drawing and ensuring the use of a spirit level to ensure all components and pipe-runs will be accurate.

Collect all pipework, fittings and necessary tools required to complete the installation in line with my materials list, also checking that all the fittings and materials are British standard kite marked. This is an imprint on each fitting and show that they are of the right quality for purpose. I will put them in a safe place in the working area where they are easily accessible but do not cause a trip hazard.

Measure and mark out for the required pipe clips and install all the appropriate pipe clips at equal distancing to both provide support and ensure the installation is aesthetically pleasing.

Carefully and accurately measure the pipe lengths and make allowance for any X dimensions to allow for pipe gain and then cut the copper pipe, then continue to pull any angles, kicks, or Passovers needed for the task.

Once all pipework is prefabricated Install the pipework and add the components tightening any compression joints to provide some stability. When happy with the fit of the installation pipework dismantle all joints and clean and apply flux to all the surfaces that are to be soldered, this will allow the solder to run smoothly once heat is applied and ensure that the installation is watertight and free from leaks. Solder all the copper joints ensuring all surfaces are protected from damage using a suitable heat mat or shield. Refit all the required components as per the installation diagram.

Complete the installation of the D1 pipework from all safety components to the tundish in line with current building regulations.

Test all copper pipework for leaks with a hydraulic pressure tester to ensure the joints are free from leaks when pressurised and one completed turn on the water supplies. Carry out the installation of the wiring of the cylinder after confirming with assessor it is okay to proceed making sure to follow the correct safe isolation process to a high degree of accuracy detailed in the isolation report.

Following on from this I would commission the system and complete the associated paperwork

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1.1.6. Material list (Cloakroom Installation)

Equipment/Materials	Quantity
Pencil	1
Spirit level	1
Tape measure	1
Dust sheets	1
Pipe slice	1
Pipe bending machine	1
Philips screwdriver	1
Adjustable spanners	2
Pipe	3 metres
Basin wrench	1
Wire Wool	1
Flux/flux brush	1
Heat proof mat	1
Blow torch	1
Waste pipe	2
Boss strap	1
Solder	1
Power drill	1
Flat file	1
Waste Clips	3
Screws	20

15mm clips	10
15mm pipe	6
WHB	1
WC	1
Taps and waste	1
Clean cloths	2
15mm End feed elbow	2
15mm End feed tee	1
22mm End feed elbow	5
15mm End feed tee	1
15mm Drain off valve	1
22mm x 15 mm reducer	1
<u>PPE</u>	
Boiler suit/protective clothing	
Gloves	
Steel toe capped boots	
Goggles	

1.1.7. Material list (Unvented cylinder Installation)

Equipment/Materials	Quantity
Pencil	1
Spirit level	1
Tape measure	1
Pipe slice	1
Pipe bending machine	1
Philips screwdriver	1
Adjustable spanners	2
Wire Wool	1
Flux/flux brush	1
Heat proof mat	1
Blow torch	1
Solder	1
Power drill	1
Flat file	1
Screws 1 ¼"	20
22mm clips	10
22mm pipe	6
15mm pipe	3
15mm clips	3
Cylinder (Unvented)	1
Control components	1

15mm End feed elbow	2
15mm End feed tee	1
22mm End feed elbow	5
15mm End feed tee	1
15mm Drain off valve	1
22mm x 15 mm reducer	1
Clean cloths	2
<u>PPE</u>	
Boiler suit/protective clothing	
Gloves	
Steel toe capped boots	
Goggles	

Task 2 – Installation, Commission and Decommission

(Assessment themes: Health and Safety, Systems and components, Reports and information, Inspecting and testing systems and components, Handover and communication)

For Task 2, candidates need to produce the following pieces of evidence:

- Commissioning checklist
- Assessor observations:
 - Installation of components
 - Safe isolation process
 - Commissioning
 - Handover to customer
 - Decommissioning

For illustration, the guided exemplification materials (GSEM) for Task 2 contain examples of candidate evidence for the following assessment requirements only:

- Assessor observations:
 - Installation of components
 - Safe isolation process
 - Commissioning
 - Handover to customer
 - Decommissioning

The following task 2 candidate assessment requirements have not been included as example candidate evidence for this version of the guided exemplification materials:

- Commissioning checklist

Photographic evidence required:

Installation of components

Photographic evidence which shows:

- Tolerances have been met for the measurement of pipework – **Photograph 3.**
- Two photos, one each of each installation showing finished pipework and component positioning which demonstrates the aesthetics of the completed installation – **Photograph 4, 5, 6 and 7.**
- Use of tools (bending and cutting equipment) and piping skills – **Photograph 8.**
- Results of tool usage – **Photograph 9.**
- Soldering/soldered fittings to show that heat mats have been used and no burn/scorch marks to the wall/or burn marks to the wall to support the assessors making of the jointing process – **Photograph 10.**
- Use/type of clips – **Photograph 11.**

Decommissioning

Photographic evidence which shows:

- The system being drained down safely and economically to the correct location – **Photograph 12.**
- Decommissioning of pipework and components for both system installations – **Photograph 13.**
- The finish of the working area after decommissioning following filling and repainting of surfaces – **Photograph 14.**

Task 2 - Candidate evidence

1.1.1. Practical Observation Form – Safe isolation

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Health and safety

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Safe isolation	<p>Candidate was confident in carrying out the industry safe isolation procedure,</p> <p>Candidate correctly selected all the equipment required, including voltage indicator, lock off kit and correct signage.</p> <p>The candidate correctly checked the testing equipment and confirmed operation before continuing with tests to prove supply was DEAD. The safe isolation process was carried out safely and in the correct sequence.</p> <p>Candidate correctly identified signage and placed notices to advise the system was isolated and tested.</p>

1.1.2. Practical Observation Form – Installation of components and pipework

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	System and components

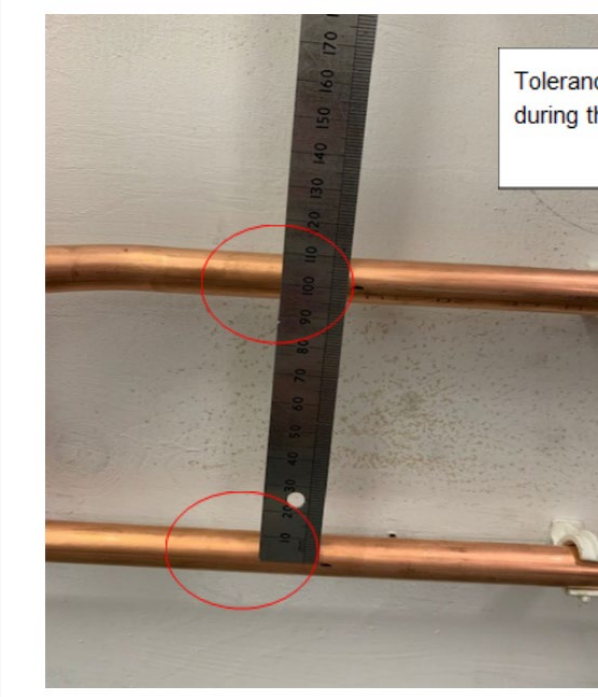
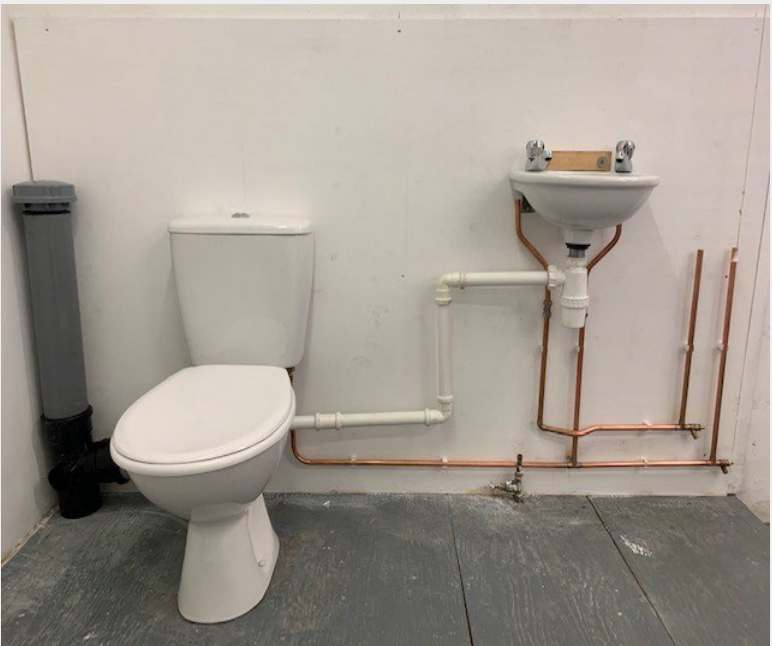
Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Installation of components	<p>Candidate prepared the work-space with consideration to health and safety and good housekeeping, by putting dust sheets on floor, collecting all the correct equipment and storing tools and materials in safe location. Candidate maintained workspace throughout and adhered to the risk assessment throughout the installation.</p> <p>Candidate details any pre-existing marks or damage to the wall prior to marking out for their installation.</p> <p>Candidate set about the task in a highly organized manor and prefabricated lengths of pipework including bends to ensure accuracy, consistency and efficiency.</p> <p>Cloakroom Installation</p> <p>Candidate prepared the work-space using accurate clipping distancing to support the installation of pipework. This was installed with 400mm spaces with attention to aesthetics and ensuring pipework is parallel and secured.</p> <p>WHB was installed at a suitable height for correct operation and was measured within a 2mm of tolerance.</p> <p>Candidate has effectively marked out and measured pipework to suitable lengths to carry out the installation, with no wastage of materials</p>

	<p>All tolerances met throughout the installation producing a piece of work that was aesthetically pleasing.</p> <p>Unvented cylinder installation</p> <p>Candidate prepared the workspace using accurate clipping distancing to support the installation of pipework with attention to aesthetics and ensuring pipework is parallel and secured.</p> <p>Unvented hot water cylinder and safety controls were installed as per manufacturer instructions and in line with their installation diagram. Pipework installation completed to within 2mm of tolerances.</p> <p>Candidate has effectively marked out and measured pipework to suitable lengths to carry out the installation, with no wastage of materials</p> <p>D1 pipework was installed as per the requirements detailed in Approved document Part G</p> <p>All tolerances met throughout the installation producing a piece of work that was aesthetically pleasing.</p> <p>Candidate demonstrates excellent skills throughout the installation.</p> <p>Candidate correctly selects and uses tools, resulting in no tooling marks to components. Pipework skills result in no wasted materials</p>
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1.1.3. Task 2 - Photographic evidence

Tolerances have been met for the measurement of pipework.

Evidence description	Photo
<p>Photograph 3</p> <p>Tolerance of (+/- 2mm) have been met during the installation of the pipework.</p>	
<p>Photograph 4</p> <p>Two photos, one each of each installation showing finished pipework and component positioning which demonstrates the aesthetics of the completed installation.</p> <p>Finished installation of the cloakroom including appliances and pipework to tolerances/standards.</p> <p>Overall aesthetics of the installation have been met.</p>	

Photograph 5

Copper pipework installation

Finished installation of the unvented hot water cylinder and associated pipework including the installation of both functional and safety controls.

Overall aesthetics of the installation have been met.



Photograph 6

Pipework installed to the required tolerance ($\pm 2\text{mm}$). Bends have been completed to a high standard with no signs of throating or rippling



Photograph 7

Pipework level

Pipework level and within tolerance (+/-2mm)



Photograph 8

Use of tools (bending and cutting equipment) and piping skills.

Fabricated Passover with appropriate clearance. no signs of throating or rippling



Photograph 9

Results of tool usage

Components fitted correctly with no signs of tool marks from installation.



Photograph 10

Soldering/soldered fittings to show that heat mats have been used and no burn/scorch marks to the wall/or burn marks to the wall to support the assessors making of the jointing process

Correct use of blow lamp, safe soldering, correct selection of solder, protection of customer property with heat mat centrally positioned. Removal of venerable heat sensitive components before soldering commences.



Photograph 11

Use/type of clips

Pipework level and adequately clipped with appropriate spacing. Pipework fabricated without use of additional fittings.



1.1.4. Practical Observation Form – Commissioning

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Inspecting and testing of system and components/ reports and information

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Commissioning	<p>Candidate follows correct process for commissioning tests using manufactures instruction for both the cloakroom installation and unvented hot water cylinder installation to ensure no aspects of the commissioning had been omitted.</p> <p>After completing the visual inspection, the candidate carried out operational checks on all the components including testing the flow rates at the outlets with a weir gauge ensuring they met the standards required.</p> <p>Candidate completed the commissioning with a performance test ensuring all of the installation was commissioned to industry standards before handing over to customer.</p> <p>Candidate completed commissioning records in line with industry requirements.</p>

1.1.5. Practical Observation Form – Handover to customer

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Handover & communication

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Handover to customer	<p>Candidate interacts well with customer using eye contact and open body language. Candidate gives information about location of hot water and cold water and explains the operating principles of the appliances.</p> <p>Candidate provides detail of maintenance and service requirements for both installations. Candidate makes reference to manufactures instructions at relevant stages of the task.</p>



1.1.6. Practical Observation Form – Decommissioning

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Systems and components

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Decommissioning	<p>For both installations the candidate follows a logical sequence for decommissioning.</p> <p>Candidate follows safe working practices throughout the duration of the task.</p> <p>Candidate removed sanitary appliances first to limit risk of damage to components and where appropriate returned them into original packaging.</p> <p>Candidate removed as much of the straight lengths of pipework that could be reused and securely stored them. Candidate cut out any fitting containing solder and disposed of these into a contaminate recycling and then continued to remove pipework that was not contaminated with solder but could not be reused as it contained bends and offsets and correctly disposed of these separately to the contaminated waste.</p> <p>Candidate made a good attempts to make good the working area with the use of appropriate fillers and sands back completely resulting in a good quality surface before applying a top coat of paint to restore the work are to pre-installation condition.</p>

1.1.7. Photographic evidence

Evidence description	Photo
<p>Photograph 12</p> <p>The system being drained down safely and economically to the correct location.</p> <p>Preparation for draining down: correct equipment and drain point used to drain down system pipework for decommissioning activities.</p> <p>Use of correct signage.</p>	
<p>Photograph 13</p> <p>Decommissioning of pipework and components for the system installation.</p> <p>Pipework decommissioned correctly with consideration of recycling and reuse.</p> <p>Separation of clean/dirty copper.</p>	

Photograph 14

The finish of the working area after decommissioning following filling and repainting of surfaces.

No holes and marks evident following decommissioning of pipework and surface preparation.



Task 3 – Carry out maintenance

(Assessment themes: Reports and information, Handover and communication, Working with faults)

For Task 3, candidates need to produce the following pieces of evidence:

- A written report of the maintenance activity
- Assessor observations
 - Fault diagnosis
 - Rectification of fault
 - Assessor feedback of discussion with customer

For illustration, the guided exemplification materials (GSEM) for Task 3 contain examples of candidate evidence for the following assessment requirements only:

- A written report of the maintenance activity
- Assessor observations
 - Fault diagnosis
 - Rectification of fault
 - Discussion with customer

Photographic evidence

Fault diagnosis and rectification of fault.

Photographic evidence which shows:

- Results of tool usage – **Photograph 15.**
- Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component – **Photograph 16, 17 and 18.**
- System on completion of all works – **Photograph 19.**

Task 3 - Candidate evidence

1.1.1. Writing a report of maintenance activity

Maintenance activity

FAULT No Central Heating

Description of fault diagnosis

I liaised with the customer asking suitable questions to check if the hot water was working at any other outlets as this would confirm that either the problem was at the point of use tap or an issue on the installation pipework and components. After discussion with my assessor and initial investigations with reference to manufacturer instructions I was able to confirm that there was a fault on the installation and traced this to a blocked line strainer. This would need to be cleared of the blockage.

Possible solutions

I decided the best solution to this problem was to isolate the water supply, drain some of the water from the cylinder drain off and clear the blocked line strainer once I was confident the water is out of the system, as I am confident in draining system installations and know the risk of water damage to the customer property has been reduced.

Actions taken to rectify fault

To repair the fault I carried out the following sequence

- Inform customer I was about to drain the system and chose a suitable route to drain the water via a hose from the drain off point at the bottom of the cylinder.
- Isolate the cold feed supply to the hot water cylinder.
- Open all hot water outlets and drain water from system to the suitable safe location.
- Remove line strainer and cleared the blockage.
- Ensure the valve compression connections are tight
- Close all outlets
- Refill system.
- Inform customer of completed repair

1.1.8. Practical Observation Form – Fault diagnosis and fault rectification



Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate A	CG12345
Centre name	Assessment theme
City & Guilds	Working with faults/ Handover & communication

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Fault diagnosis and customer discussions	<p>Candidate displays very good customer interaction with positive body language and asked questions with appropriate tone along with good use of eye contact that put the customer at ease</p> <p>The candidate asked various meaning questions to gain an insight into the fault and explained well to the customer that the responses to the questions were allowing an insight into the possible fault and diagnostic assessments of the issue.</p> <p>Through the asking of appropriate questions, including:</p> <ul style="list-style-type: none"> • Is the fault at a single outlet? • How frequent is the fault? • Have you had any work done on the installation recently? <p>By expanding on the customer responses allowed the candidate to make judgments and trace the fault to the appropriate component quickly and confidently reassuring the customer at all times.</p> <p>The candidate selected an appropriate repair method and was focused and methodical in their approach to the maintenance repair carrying out the task confidently explained the process that they would carry out in good time and no damage to customer property.</p>

Fault rectification	<p>Candidate implemented all the health and safety preparations required to take care of components and customer property, ensuring warning notices and barriers were in place as appropriate to eliminate any trips/slips or falls.</p> <p>Candidate follows a methodical and logical sequence, safely draining down the system and disposing of the waste water correctly, prior to selecting the correct tools to remove and repair the defective component.</p> <p>The candidate completed the repair efficiently without error and in good time, checking the completed repair.</p>
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1.1.8. Task 3 - Photographic evidence

Evidence description	Photo
<p>Photograph 15</p> <p>Results of tool usage.</p> <p>Component fitted correctly with no signs of tool marks from installation of the replacement component.</p>	 A close-up photograph of a copper pipe fitting. The fitting is a 90-degree elbow with a red cap on the top end. The copper pipe is connected to a wall. The background is a plain white wall.
<p>Photograph 16</p> <p>Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component.</p> <p>Loosening of faulty component.</p>	 A photograph of a plumber in a grey shirt and dark trousers working on a white water heater. The plumber is leaning over the water heater, which is surrounded by copper pipes. The plumber is using a tool to work on a component on the side of the water heater. The background shows a white wall and a doorway.

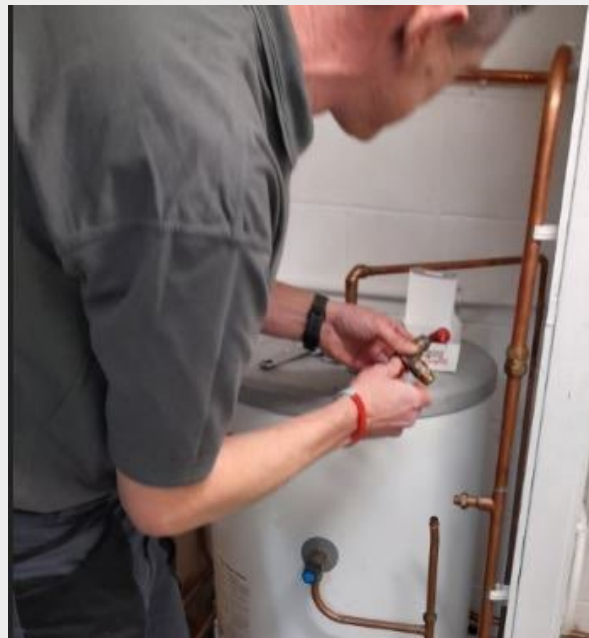
Photograph 17

Removal of faulty component.



Photograph 18

Replacement of component.



Photograph 19

System on completion of all works.

Repair completed and work area left tidy.



Guidance on the exemplar marking

Within this standardisation pack, a partially completed CRF form has been provided that outlines how an assessor has awarded marks against the candidate evidence for a number of the assessment themes.

For the purposes of these materials the Marking Grids used can be found in the Sample Assessment Materials [here](#).

For exemplification purposes, an explanation of how the marker has determined the mark to be awarded is provided, this exemplary document showing

- How the marker has first considered the marking bands available and determined within which band the evidence best fits
- Subsequently, consideration within the determined band and justification for the mark to be awarded within that band.

Candidate Record Form (CRF) – Plumbing engineering (8710-356)

Candidate name	Candidate number
Candidate A	CG12345
Centre name	Centre number
City & Guilds	123456

Marker Notes – Please always refer to the relevant marking grid for guidance on allocating marks and make notes which describe the quality of the evidence and justification of marks. Expand boxes as required

Health and safety												
	Band 1				Band 2				Band 3			
	1	2	3	4	5	6	7	8	9	10	11	12
Band 3	<p>Band justification</p> <p><i>The candidate has demonstrated that they have exceeded the requirements of the middle marking band:</i></p> <p><i>Risk assessment is detailed and clearly identifies all of the associated risk factors.</i></p> <p><i>Risk mitigation methods are detailed and have been clearly identified for all potential risks. Potential for harm and probability factors have been identified throughout. Health and safety is followed during preparation and throughout tasks and all work completed safely.</i></p> <p><i>Risks and hazards that occur during the tasks are correctly mitigated against as they arise.</i></p> <p><i>Therefore, the mark to be awarded sits within the upper marking band.</i></p>											
Mark 11	<p>Mark justification</p> <p><i>The candidate demonstrates a thorough knowledge and understanding of the different types of risk and hazards associate with plumbing activities. The candidate has identified all hazards and associated risks for each of the tasks. The candidate demonstrates excellent understanding of the mitigations that can be used to minimise the identified risks and hazards, and has identified and provided thorough detail for the identified control/s. The probability of each of the hazards/risks occurring has been identified for each of the hazards.</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be at the upper end of the highest marking band and a mark of 11 has been awarded.</i></p>											

Design and planning – Documents								
	Band 1			Band 2			Band 3	
	1	2	3	4	5	6	7	8
Band 3	<p>Band justification</p> <p><i>The candidate has demonstrated that they have exceeded the requirements of the middle marking band:</i></p> <p><i>Documents are thorough and demonstrates comprehensive technical knowledge, and the process is set out in a logical order. There is detail in how to perform tasks with clear reasoning that links to the assignment brief and tasks to justify choices made.</i></p> <p><i>All materials, quantities and PPE required to meet the brief have been identified with excellent consideration given to the aesthetics of the finished installation.</i></p> <p><i>Therefore, the mark to be awarded sits within the upper marking band.</i></p>							
Mark 8	<p>Mark justification</p> <p><i>The candidate demonstrates a comprehensive understanding of the sequencing of activities in relation to the given tasks, detailing all aspects of the install for example, marking out tasks, collecting materials and marking out dimensions for fittings on straight pipe runs clearly demonstrating excellent understanding of system installation processes. The methods given follow the logical and methodical stages of the installation, for example, dry fixing the installation for accuracy prior to soldering. The method statement is detailed and accurate, and reasoning has been provided to support the methods and process given, for example carrying out a visual inspection to make sure my workspace is safe and hydraulic pressure testing to ensure the joints are free from leaks.</i></p> <p><i>The candidate shows excellent knowledge and understanding of the different resources required to carry out the tasks and meet the requirements of the assignment brief. The quantities listed are accurate and relevant to the task. The candidate has selected all of the materials and equipment required to meet the requirements of the cloakroom and the unvented hot water system installations, consideration has been given to the finished aesthetics of the installations, with the inclusion of cleaning cloths to allow the fixing of the brassware to be carried out with no tooling damage. The candidate demonstrates a good understanding of health and safety and listed the PPE required to carry out the tasks safely, as well as including heat proof mats and dust sheets which demonstrates consideration to customer property. The candidate has considered aspects of health and safety and listed the PPE required to carry out the tasks safely. The candidate identifies individual fittings such as elbows and tees, as well as screw sizes, with quantities for each, showing an excellent knowledge and understanding of the different fixing methods, fitting types and jointing methods.</i></p>							

	<i>Due to the reasons outlined here –the response has been determined to be in the upper marking band and a mark of 8 has been awarded.</i>
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Design and planning – Drawings and diagrams

	Band 1			Band 2			Band 3		
	1	2	3	4	5	6	7	8	9

Band 3	<p>Band justification</p> <p><i>The candidate has demonstrated that they have exceeded the requirements of the middle marking band:</i></p> <p><i>Installation drawings is complete and accurate.</i></p> <p><i>Position of components is correct with consideration of aesthetics or performance.</i></p> <p><i>Therefore, the mark to be awarded sits within the upper marking band.</i></p>
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Mark 8	<p>Mark justification</p> <p><i>The candidate has completed the installation diagram considering all aspects required to meet the assignment brief. The candidate demonstrates excellent knowledge and understanding of plumbing components and has correctly identified all of the associated components and controls and positioned them in the correct order on the diagram. The pipe clips are clearly displayed and the distance between each clip has been noted. The installation diagram has been annotated to include accurate pipework layout and correct pipework connections to the system. The candidate demonstrates good knowledge of current building and water regulations by correctly identifying/ referencing D1 and D2 discharge pipework. The candidate shows an excellent understanding of the requirements of installation diagrams and the overall drawing is clear, detailed, well presented, with the use of a key. The candidate identifies the single check valve, demonstrating a thorough understanding of the water regulations.</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be in the upper marking band and a mark of 8 has been awarded.</i></p>
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Working with faults

	Band 1				Band 2				Band 3			
	1	2	3	4	5	6	7	8	9	10	11	12

Band 3	<p>Band justification</p> <p><i>The candidate has demonstrated that they have exceeded the requirements of the middle marking band:</i></p>
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	<p><i>Risk assessment is detailed and clearly identifies all of the associated risk factors.</i></p> <p><i>Risk mitigation methods are detailed and have been clearly identified for all potential risks. Potential for harm and probability factors have been identified throughout. Health and safety is followed during preparation and throughout tasks and all work completed safely.</i></p> <p><i>Risks and hazards that occur during the tasks are correctly mitigated against as they arise.</i></p> <p><i>Manufacturer's instructions were followed at all appropriate stages during the fault diagnosis.</i></p> <p><i>Therefore, the mark to be awarded sits within the upper marking band</i></p>
<p>Mark</p> <p>11</p>	<p>Mark justification</p> <p><i>The candidate demonstrates a thorough knowledge and understanding of the different types of risk and hazards associate with plumbing activities. The candidate has identified all hazards and associated risks for each of the tasks. The candidate demonstrates excellent understanding of the mitigations that can be used to minimise the identified risks and hazards, and has identified and provided thorough detail for the identified control/s. The probability of each of the hazards/ risks occurring has been identified for each of the hazards.</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be at the upper end of the highest marking band and a mark of 11 has been awarded.</i></p>

Internal assessor name	Date	Total mark
Internal assessor signature		* /90

* Please Note that the Total Mark (90) applies to the full assignment including all Assessment Themes

Candidate B

Assessment details

This standardisation pack has been developed to reflect the requirements of the **Plumbing engineering – Sample** version. The assessment pack can be access on the City & Guilds website, [here](#).

The evidence used for the exemplar marking in this pack is based on the **Guide Standard Exemplification materials** for this occupational specialism that can be located, [here](#).

Task Overview

The Practical Assignment is based around a work-based scenario and is made up of three tasks:

Task 1 – Planning the installation

- a) Plan the installation of the cloakroom and the unvented hot water cylinder following the client brief.
- b) Measure and mark out proposed working area.

Task 2 – Installation, commissioning and decommissioning

- a) Install the cloakroom and unvented hot water cylinder in accordance with your drawing and as agreed by your assessor.
- b) Connect the electrical supply to the unvented cylinder from a suitably supplied fused spur connection following the safe isolation procedure
- c) Commission the system and handover to customer
- d) Decommission the system

Task 3 – Carrying out maintenance

- a) Discuss fault with customer, investigate and diagnose fault
- b) Produce a written report of the maintenance activity
- c) Repair and rectify fault

Task 1 - Planning the installation

(Assessment themes: Health and Safety, Design and planning, Systems and components)

For task 1 candidates need to produce the following pieces of evidence:

- Risk assessment
- Method statement with justifications
- Installation diagram (cloakroom and unvented hot water cylinder) with pipe layout, pipe sizes and associated components
- Materials list
- Assessor observation of measurements and marking out of space allocation/ work area checked against installation diagram

For illustration, the guided exemplification materials (GSEM) for Task 1 contain examples of candidate evidence for the following assessment requirements only:

- Risk assessment
- Method statement with justifications
- Installation diagram (unvented hot water cylinder) with pipe layout, pipe clips and associated components
- Materials list
- Assessor observation of measurements and marking out of space allocation/ work area checked against installation diagram

The following task 1 candidate assessment requirements have not been included as example candidate evidence for this version of the guided exemplification materials.

- Installation diagram (cloakroom)

Photographic evidence required:

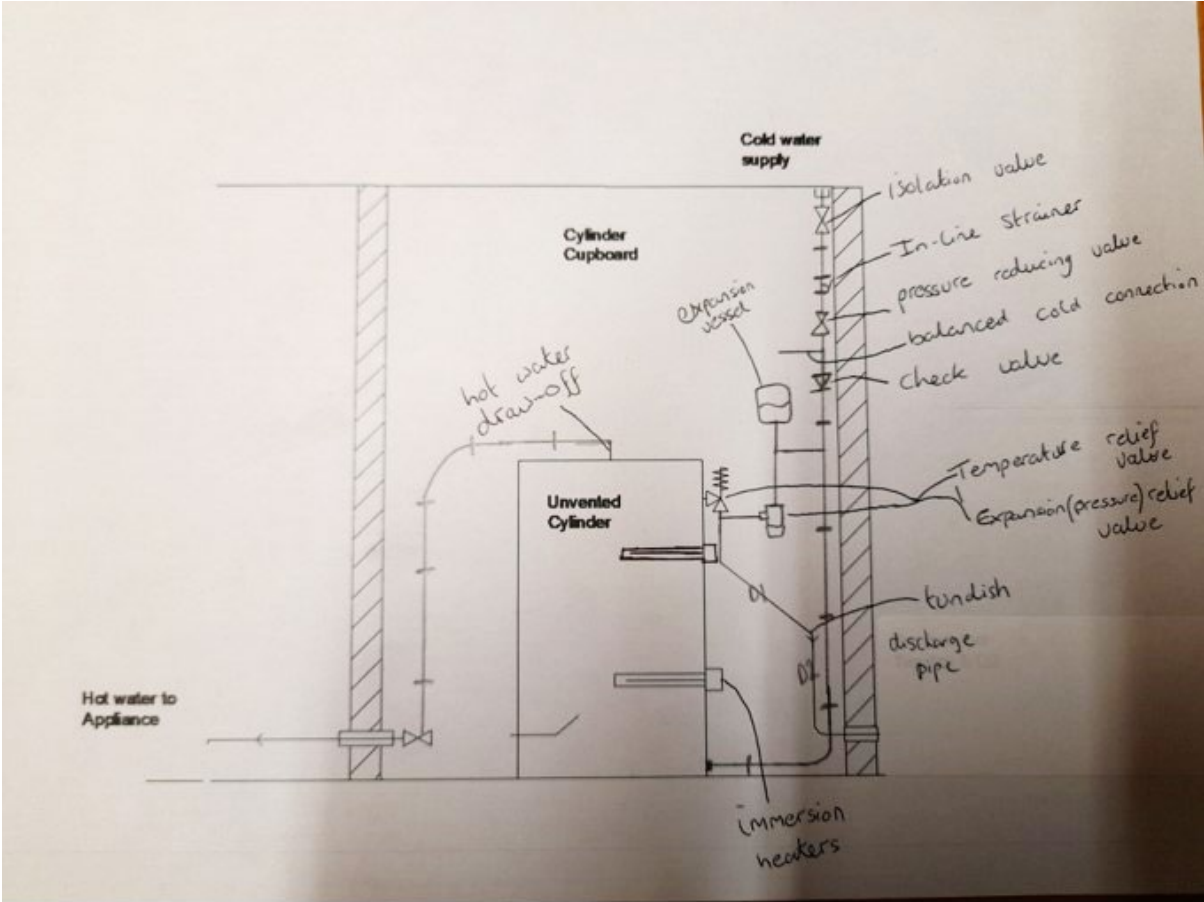
Measuring and marking out of proposed working area

Photographic evidence which shows:

- Appropriateness of method and equipment used to measure and mark out. Photos may show inaccuracies or multiple attempts at marking out – **Photograph 1 and 2.**

Task 1 - Candidate evidence

1.1.9. Installation diagram



1.1.10. Practical Observation Form – Measuring and marking out of proposed working area



Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Systems and components (Installation)

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Measuring and marking out of proposed working area	<p>Candidate used the edge of the wall to establish the correct level and falls for the installation. The measuring process had some minor inaccuracies which was caused by incorrect use of measuring equipment, the use of the edge of wall instead of a datum line or laser level.</p> <p>Candidate displayed some disorganisation in working from a set point and this resulted in them having to double check some dimensions from the position of pipework and components for the WHB and unvented hot water cylinder, which impacted on time. Overall key data was recorded and set out accurately.</p> <p>Candidate took several attempts to mark out resulting in lines left on wall.</p> <p>Candidate has marked out all pipe clips to industry standards and spacing is mostly accurate.</p>

1.1.11. Task 1 - Photographic evidence

Appropriateness of method and equipment used to measure and mark out. Photos may show inaccuracies or multiple attempts at marking out.

Evidence description	Photo
<p>Photograph 1</p> <p>Candidate marking out a work area using a straight edge that is not the approved method.</p>	
<p>Photograph 2</p> <p>Work area shows multiple marks on work surface from marking out due to initial inaccurate measuring and marking out.</p>	

1.1.12. Risk assessment

Activity: Installation of pipework Location: Centre A		Date: xxxxxx Position: Candidate						
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High			
LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely								
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	R R	Are the Risks Controlled?
1	Soldering	Burn/ fire	Self	Handle soldering equipment with care Use wet rag to cool hot pipework Fire extinguisher	2	1	2	Yes
2	Electrical wiring	Death Shock	Self	Carry out safe isolation procedure under supervised conditions and ensure appliance is locked off	3	1	3	Yes
3	Loose Cables	Tripping	Self Others	Stick all cables down	2	2	4	Yes
4	Hazardous substances	Irritation	Self	Correct use of PPE and ventilation	2	1	2	Yes
5	Manual handling	Personal injury	Self	Correct kinetic lifting techniques	2	1	2	Yes

Activity: Decommissioning		Date: xxxxxx						
Location: Centre A		Position: Candidate						
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High			
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	R R	Are the Risks Controlled?
1	Hazardous waste	Irritation	Self	Correct use of PPE	2	3	6	Yes
2	Wet surfaces	Slips and trips	Self Others	Clear away any spilt liquids to reduce risk of slips/trips	2	1	2	Yes
3	Manual handling	Personal injury	Self	Correct kinetic lifting techniques	2	1	2	Yes

Activity: Maintenance		Date: xxxxxx						
Location: Centre A		Position: Candidate						
SEVERITY (S): Degree of harm which may be caused (including numbers affected) 1 Minor Injury 2 Major Injury 3 Fatality LIKELIHOOD (L): Probability that event will occur 1 Remote 2 Possible 3 Likely					RISK RATING (RR): Severity x Likelihood 1-2 Low 3-5 Medium 6-9 High			
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	R R	Are the Risks Controlled?
1	Pipework	Cut	Self	Take care when handling and removing the valve as pipework exposed could be sharp	1	2	2	Yes

2	Wet surfaces	Slips and trips	Self Others	Watch out for any wet surfaces around the working area	2	1	2	Yes
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2.1.1. Method statement

Cloakroom installation

- 1) Ensure you have the correct PPE
- 2) Draw the component and pipework layout in pencil on the work surface to the correct measurements
- 3) Collect all pipework, fittings and necessary tools
- 4) Measure from the centre line for the WC and the WHB brackets and erect the brackets and basin in according to the specification
- 5) Fit pipe clips to the correct measurement's and according to the specification
- 6) Measure and cut the copper pipe, then continue to pull any angles, kicks, or Passovers needed for the task
- 7) Install the pipework and add the fittings
- 8) Tighten and double check fittings
- 9) Clean the pipework and apply flux, then solder pipework and fittings together
- 10) Pressure test your work.
- 11) Install waste connections as per the drawing

Unvented hot water installation

- 1) Ensure you have the correct PPE
- 2) Draw the component and pipework layout in pencil on the work surface to the correct measurements
- 3) Collect all pipework, fittings and necessary tools
- 5) Fit pipe clips to the correct measurement's and according to the specification
- 6) Measure and cut the copper pipe, then continue to pull any angles, kicks, or Passovers needed for the task
- 7) Install the pipework and add the fittings
- 8) Tighten and double check fittings
- 9) Clean the pipework and apply flux, then solder pipework and fittings together
- 10) Pressure test your work.
- 12) Carry out the installation of the wiring after confirming with assessor it is okay to proceed

2.1.2. Material list (Cloakroom Installation)

Equipment/Materials	Quantity
Pencil	1
Spirit level	1
Tape measure	1
Dust sheets	1
Pipe slice	1
Pipe bending machine	1
Philips screwdriver	1
Adjustable spanners	2
Pipe	3 metres
Fittings	20
Basin wrench	1
Heat proof mat	1
Blow torch	1
Power drill	1
Flat file	1
Waste Clips	3
Screws	20
15mm clips	10
15mm pipe	6
WHB and fixings	1
WC and fixings	1

Taps and waste	1
15mm fittings (elbows, tees and valves)	10
22mm fittings (elbows, tees and valves)	10
<u>PPE</u>	
Boiler suit/protective clothing	
Steel toe capped boots	
Gloves	
Goggles	

2.1.3. Material list (Unvented cylinder Installation)

Equipment/Materials	Quantity
Pencil	1
Spirit level	1
Tape measure	1
Dust sheets	1
Pipe slice	1
Pipe bending machine	1
Philips screwdriver	1
Adjustable spanners	2
Heat proof mat	1
Blow torch	1
Power drill	1
Flat file	1
Screws	20
22mm clips	10
22mm pipe	6
15mm pipe	3
15mm clips	3
Cylinder (Unvented)	1
Control components	1
15mm fittings (elbows, tees and valves)	10
22mm fittings (elbows, tees and valves)	10

<u>PPE</u>	
Boiler suit/protective clothing	
Steel toe capped boots	
Gloves	
Goggles	

Task 2 – Installation, Commission and Decommission

(Assessment themes: Health and Safety, Systems and components, Reports and information, Inspecting and testing systems and components, Handover and communication)

For Task 2, candidates need to produce the following pieces of evidence:

- Commissioning checklist
- Assessor observations:
 - Installation of components
 - Safe isolation process
 - Commissioning
 - Handover to customer
 - Decommissioning

For illustration, the guided exemplification materials (GSEM) for Task 2 contain examples of candidate evidence for the following assessment requirements only:

- Assessor observations:
 - Installation of components
 - Safe isolation process
 - Commissioning
 - Handover to customer
 - Decommissioning

The following task 2 candidate assessment requirements have not been included as example candidate evidence for this version of the guided exemplification materials:

- Commissioning checklist

Photographic evidence required:

Installation of components

Photographic evidence which shows:

- Tolerances have been met for the measurement of pipework. Photos may show any excess/ waste materials caused by inaccurate measurements – **Photograph 3**
- Two photos, one each of each installation showing finished pipework and component positioning which demonstrates the aesthetics of the completed installation. Visible signs of pipework damage that are not straight or horizontal/vertical and bends that are not properly formed. None of which stops the system operating correctly – **Photographs 4, 5, 6 and 7**
- Use of tools (bending and cutting equipment) and piping skills. Photos may show pipework cut offs – **Photograph 8**
- Results of tool usage. Photos may show tooling marks – **Photograph 9**
- Soldering/soldered fittings to show that heat mats have been used and no burn/scorch marks to the wall/or burn marks to the wall to support the assessors making of the jointing process – **Photograph 10**

- Use/type of clips. Photos may show clips that are not equally spaced or installed in line – **Photograph 11**

Decommissioning

Photographic evidence which shows:

- The system being drained down safely and economically to the correct location – **Photograph 12**
- Decommissioning of pipework and components for both system installations – **Photograph 13**
- The finish of the working area after decommissioning following filling and repainting of surfaces – **Photograph 14**

Task 2 - Candidate evidence

1.1.9. Practical Observation Form – Safe isolation

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Health and safety

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Safe isolation	<p>Candidate took some time starting the task and although was correct in performing the process, it was clear that there was a lack of awareness from the candidate about managing their time effectively throughout the process.</p> <p>Candidate correctly sourced all the equipment needed and gained permission to proceed from the assessor.</p> <p>The candidate correctly checked the testing equipment and confirmed operation and continued to isolate supply correctly.</p> <p>Tests to prove supply was DEAD had been carried out with accuracy and confirmed the installation was safe.</p> <p>Candidate correctly identified signage and placed notices to advise the system was isolated and tested.</p>

1.1.10. Practical Observation Form – Installation of components and pipework

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Systems and components (Installation)



Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Installation of components and pipework	<p>Candidate has ensured all H&S and site preparation works are in place before starting task by putting dust sheets on floor, storing tools and materials in safe location. However maintenance of work space during the task was minimal with some tools left out and not stored correctly after use.</p> <p>Candidate use of tools is mostly good however some tasks require more than one attempt. Candidate uses water pliers incorrectly on brass fittings, resulting in tooling marks to pipework/ components.</p> <p>Cloakroom Installation</p> <p>Candidate prepared the work space using a suitable clipping distancing to support the installation of pipework. This was installed with 400mm spaces with attention to aesthetics and ensuring pipework is parallel and secured.</p> <p>WHB was installed at a suitable height for correct operation however when measured was not completely accurate but within 5mm of tolerance.</p> <p>Candidate made some errors with the pulling of bends, these were correct but resulted in some wasted materials and inaccuracies from original design. Most tolerances met, but minor inaccuracies in the</p>

	<p>dimensions of the bends and offsets, at a tolerance of 5mm. Overall aesthetics of the installation has not been affected.</p> <p>Candidate has effectively marked out and measured pipework to suitable lengths to carry out the installation, with some wastage of materials. The forming of bends was carried out twice due to inaccuracy on first attempt which resulted in material wastage.</p> <p>Unvented cylinder installation</p> <p>Candidate prepared the work space using a suitable clipping distancing to support the installation of pipework. This was installed with 400mm spaces with attention to aesthetics and ensuring pipework is parallel and secured.</p> <p>Unvented hot water cylinder and safety controls were installed as per manufacturer instructions however when measured was not completely accurate but within 5mm of tolerance.</p> <p>Candidate made some errors with the pulling of bends, these were correct but resulted in some wasted materials and inaccuracies from original design. Most tolerances met, but minor inaccuracies in the dimensions of the bends and offsets, at a tolerance of 5mm. Overall aesthetics of the installation has not been affected.</p> <p>D1 pipework was installed as per the requirements detailed in Approved document Part G</p> <p>Candidate has effectively marked out and measured pipework to suitable lengths to carry out the installation, with some wastage of materials. The forming of bends was carried out twice due to inaccuracy on first attempt which resulted in material wastage</p>
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1.1.11. Task 2 - Photographic evidence

Tolerances have been met for the measurement of pipework. Photos may show any excess/waste materials caused by inaccurate measurements

Evidence description	Photo
<p>Photograph 3</p> <p>Tolerance of (+/- 5mm) have been met during the installation of the pipework.</p>	
<p>Photograph 4</p> <p>Two photos, one each of each installation showing finished pipework and component positioning which demonstrates the aesthetics of the completed installation. Visible signs of pipework damage that are not straight or horizontal/vertical and bends that are not properly formed. None of which stops the system operating correctly.</p> <p>Finished installation of the unvented hot water cylinder and associated pipework including the installation of</p>	

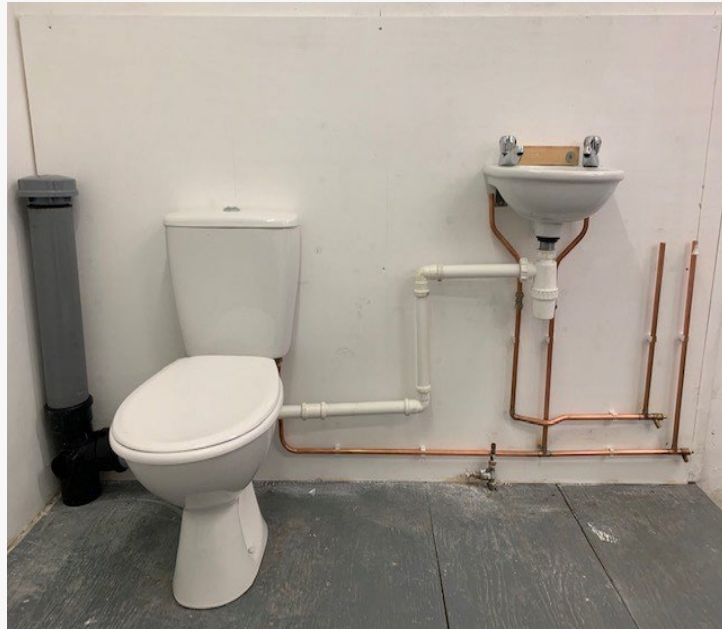
both functional and safety controls.

Overall aesthetics of the installation have been met.

Photograph 5

Finished installation of the cloakroom including appliances and pipework to tolerances/standards.

Overall aesthetics of the installation have been met.



Photograph 6

Pipework not level but within tolerance.



Photograph 7

Components correctly installed but not level



Photograph 8

Use of tools (bending and cutting equipment) and piping skills. Photos may show pipework cut offs.

The correct operation/use of pipe bend machine and pipe cutting tools.



Photograph 9

Results of tool usage

Soldering/soldered fittings to show that heat mats have been used and no burn/scorch marks to the wall/or burn marks to the wall to support the assessors making of the jointing process.

Component fitted correctly with signs of tool marks from installation.



Photograph 10

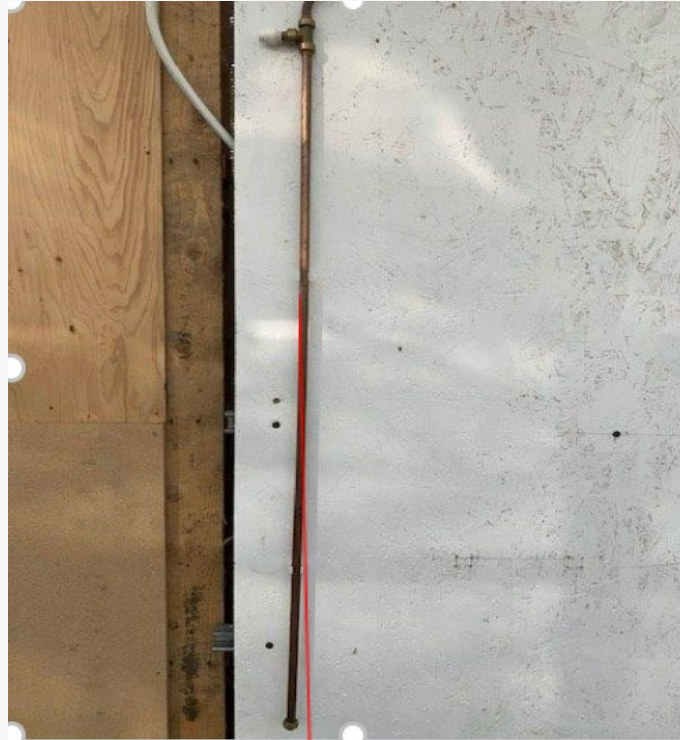
Correct use of blow lamp, safe soldering, correct selection of solder, protection of customer property although heat mat not correctly positioned.



Photograph 11

Use/type of clips. Photos may show clips that are not equally spaced or installed in line.

Incorrect clipped pipe not plumb



1.1.12. Practical Observation Form – Commissioning

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Inspecting and testing of system and components/ reports and information

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Commissioning	<p>Candidate did not follow correct process for commissioning tests.</p> <p>Visual inspection is not completed which results in a small leak from the tap washer. Candidate rectifies leak successfully.</p> <p>Commissioning checks and test are completed.</p> <ul style="list-style-type: none"> • fill system, and repair any leaks if required • pressure testing • commission hot and cold-water including confirmation of flow rates checked • operational checks

1.1.13. Practical Observation Form – Handover to customer

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Handover & communication

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – <i>detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.</i>
Handover to customer	<p>Candidate has arms folded and doesn't make eye contact.</p> <p>Candidate gives information about location of hot water and cold water and explains the operating principles of the unvented hot water cylinder.</p> <p>Candidate provides detail of maintenance requirements e.g. cleaning processes but misses information about limitations of the system e.g. servicing requirements</p> <p>Candidate makes reference to manufactures instructions at some stages of the task.</p>



1.1.14. Practical Observation Form – Decommissioning

Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Systems and components (Decommissioning)

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Decommissioning	<p>Candidate follows a logical sequence for decommissioning.</p> <p>Candidate follows safe working practices at most stages of the decommissioning.</p> <p>Candidate removed sanitary appliances first to limit risk of damage to components.</p> <p>Candidate correctly identified some of the components that could not be reused and disposed of them in the correct recycling bins.</p> <p>Candidate did miss opportunities to recycle plastic clips.</p> <p>Candidate attempts to make good the working area with the use of appropriate fillers but the area is not sanded back completely resulting in a poor quality finish.</p>

1.1.15. Photographic evidence

Evidence description	Photo
<p>Photograph 12</p> <p>The system being drained down safely and economically to the correct location.</p> <p>Preparation for draining down: correct equipment and drain point used to drain down system pipework for decommissioning activities.</p>	
<p>Photograph 13</p> <p>Decommissioning of pipework and components for the system installation.</p> <p>Pipework decommissioned correctly with minimal consideration of recycling.</p> <p>No separation of different materials.</p> <p>No separation of clean/dirty copper.</p>	

Photograph 14

Some holes and marks still evident from complete decommissioning of pipework.



Task 3 – Carry out maintenance

(Assessment themes: Reports and information, Handover and communication, Working with faults)

For Task 3, candidates need to produce the following pieces of evidence:

- A written report of the maintenance activity
- Assessor observations
 - Fault diagnosis
 - Rectification of fault
 - Discussion with customer

For illustration, the guided exemplification materials (GSEM) for Task 3 contain examples of candidate evidence for the following assessment requirements only:

- A written report of the maintenance activity
- Assessor observations
 - Fault diagnosis
 - Rectification of fault
 - Discussion with customer

Photographic evidence

Fault diagnosis and rectification of fault.

Photographic evidence which shows:

- Results of tool usage. Photos may show tooling marks – **Photograph 15**
- Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component – **Photograph 16, 17, 18, 19**
- System on completion of all works – **Photograph 20**

Task 3 - Candidate evidence

1.1.2. Writing a report of maintenance activity

Maintenance activity report

FAULT No Central Heating

Description of fault diagnosis

I checked if the hot water was working at any other outlets as this would confirm that either the problem was at the point of use tap or an issue on the installation, after investigation and discussion with my assessor I confirmed that there was a fault on the installation and traced this to a blocked strainer

Possible solutions

The solution to this problem is to drain all the water from the cylinder clean the strainer

Actions taken to rectify fault

To repair the fault I carried out the following sequence

- Isolate the cold feed supply to the hot water storage.
- Remove line strainer and cleared the blockage.
- Ensure the valve compression connections are tight
- Close all outlets
- Refill system.

2.1.4. Practical Observation Form – Fault diagnosis and fault rectification



Assessment ID	Qualification number
8710-356	8710-36
Candidate name	Candidate number
Candidate B	CG12345
Centre name	Assessment theme
City & Guilds	Working with faults/ Handover & communication

Complete the table below referring to the relevant marking grid, found in the assessment pack. **Do not** allocate marks at this stage.

Task	Notes – detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.
Fault diagnosis and customer discussions	<p>Candidate shows some nerves at the beginning of the customer discussion, with an initial lack of eye contact. Candidate has their arms folded and misses some opportunities to put the customer at ease.</p> <p>The candidate asked various questions to gain an insight into the fault and some of these were irrelevant to the task.</p> <p>Appropriate questions were eventually asked:</p> <ul style="list-style-type: none"> • Which outlets are effected? • Frequency of fault? • How long has the fault been happening? <p>This allowed candidate to make some judgments and trace the fault to the appropriate valve although this may have been guesswork/trial and error rather than systematic fault analysis.</p> <p>Candidate carries out a visual inspection of the system to identify the source of the fault.</p>

Fault rectification	<p>Candidate considers health and safety preparations, using dust sheets, removing customer property where required and creating a safe route for the hose pipe to remove the waste water from the property.</p> <p>Candidate follows a logical sequence, safely draining down the system and disposing of the waste water correctly, prior to selecting the correct tools to remove and replace the defective component.</p> <p>Candidate selected correct tools to remove the defective component without excessive tool damage to the compression joints. The use of adjustable spanners over water pump pliers ensured there was no marking to the brass compression fittings.</p> <p>The candidate completed the repair efficiently with only minor mistakes, strainer removed prematurely causing leak of water before installation had sufficiently drained. This did not impact the overall task.</p>
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1.1.16. Task 3 - Photographic evidence

Evidence description	Photo
<p>Photograph 15</p> <p>Results of tool usage.</p> <p>Component fitted correctly with signs of tool marks from installation of replacement component.</p>	 A close-up photograph of a brass pipe fitting. A red circle highlights the connection point between two pipes. The fitting shows signs of tool usage, such as scratches and marks.
<p>Photograph 16</p> <p>Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component.</p> <p>Loosening of faulty component.</p>	 A photograph of a plumber in a grey shirt and dark trousers working on a white water heater. He is using a tool to loosen a component on the copper piping. The background shows a white wall and a window.

Photograph 17

Removal of faulty component.



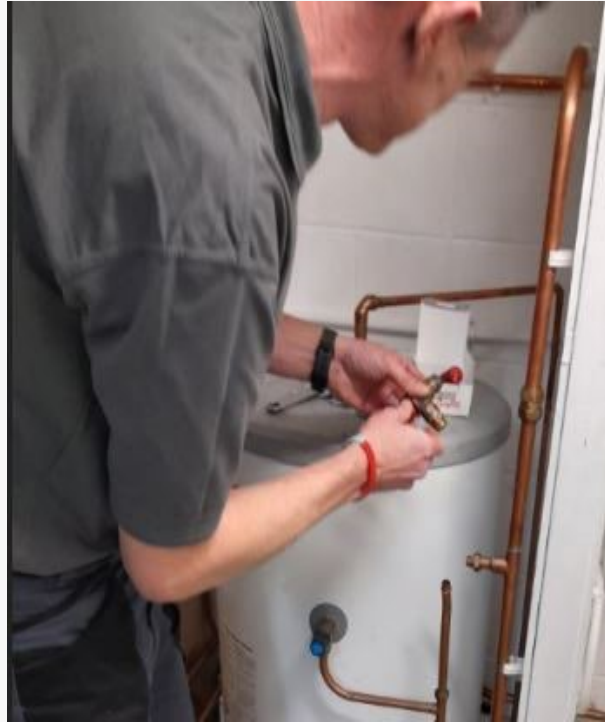
Photograph 18

Excess pipework removed during repair activity.



Photograph 19

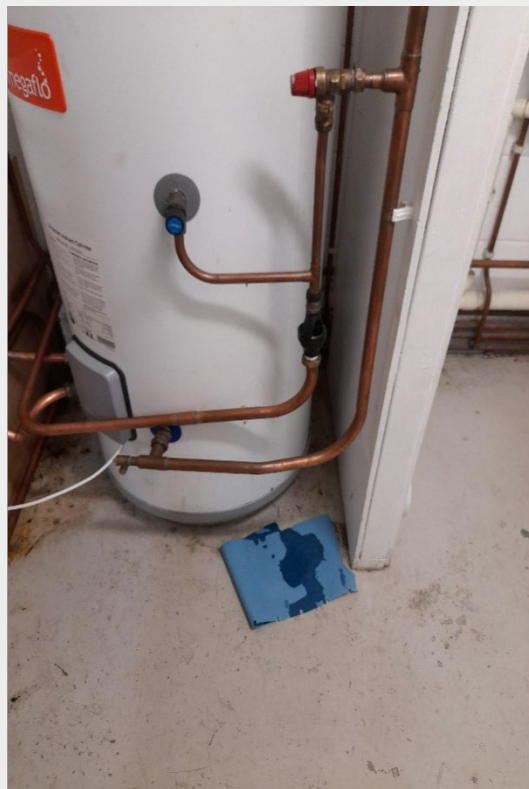
Replacement of component



Photograph 20

System on completion of all works.

Repair completed with signs of leaks which have been repaired.



Guidance on the exemplar marking

Within this standardisation pack, a partially completed CRF form has been provided that outlines how an assessor has awarded marks against the candidate evidence for a number of the assessment themes.

For the purposes of these materials the Marking Grids used can be found in the Sample Assessment Materials [here](#).

For exemplification purposes, an explanation of how the marker has determined the mark to be awarded is provided, this exemplary document showing

- How the marker has first considered the marking bands available and determined within which band the evidence best fits
- Subsequently, consideration within the determined band and justification for the mark to be awarded within that band.

Candidate Record Form (CRF) – Plumbing engineering (8710-356)

Candidate name	Candidate number
Candidate B	CG12345
Centre name	Centre number
City & Guilds	123456

Marker Notes – Please always refer to the relevant marking grid for guidance on allocating marks and make notes which describe the quality of the evidence and justification of marks. Expand boxes as required

Health and safety												
	Band 1				Band 2				Band 3			
	1	2	3	4	5	6	7	8	9	10	11	12
Band 2	<p>Band justification</p> <p><i>The candidate has demonstrated that they have exceeded the requirements of the lowest marking band.</i></p> <p><i>Risk assessment is complete and covers a good range of risk factors. Risk mitigation methods have been identified for some of the potential risks, but not all.</i></p> <p><i>Consideration is given to potential for harm and probability factors.</i></p> <p><i>Health and safety is followed during preparation and throughout tasks and all work completed safely.</i></p> <p><i>Therefore, the mark to be awarded sits within the middle marking band.</i></p>											
Mark 7	<p>Mark justification</p> <p><i>The candidate demonstrates a good knowledge and understanding of the different types of risk and hazards associated with plumbing activities. The candidate has identified the major hazards and associated risks for each of the tasks. The candidate demonstrates some understanding of the mitigations that can be used to minimise the identified risks and hazards and has attempted to identify controls, although these are somewhat brief, the candidate does demonstrate some understanding by making links to the correct use of PPE, and use of e.g. wet rag to cool hot pipework.</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be at the upper end of the middle marking band and a mark of 7 has been awarded.</i></p>											

Design and planning – Documents									
	Band 1			Band 2			Band 3		
	1	2	3	4	5	6	7	8	9
Band 1	<p>Band justification</p> <p><i>The candidate has demonstrated that they meet the requirements of the lowest marking band: Documents are brief but correct in process but with minor inaccuracies in technical knowledge and sequencing. No reasoning provided to justify choices made.</i></p> <p><i>Key materials, quantities and PPE required to meet the brief have been identified with some consideration given to the aesthetics of the finished installation.</i></p> <p><i>The evidence does not suggest that the candidate has demonstrated above the initial mark band, and therefore the mark to be awarded sits within the lower marking band.</i></p>								
Mark 3	<p>Mark justification</p> <p><i>The candidate demonstrates a good understanding of the sequencing of activities in relation to the given tasks, marking out tasks, collecting materials and installing components before clipping out. The methods given follow the logical stages of the installation; cutting and bending before soldering and pressure testing The methods statements identify all of the key steps, the steps are brief but accurate, however no reasoning or justification has been given to support the methods given. The candidate shows good knowledge and understanding of the different resources required to carry out the tasks and meet the requirements of the assignment brief. The candidate has selected the minimum materials and equipment required for the cloakroom layout and the unvented hot water system to allow successful installations in line with the assignment brief. The candidate has identified quantities that are accurate and relevant to the tasks,</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be at the upper end of the lower marking band, and a mark of 3 has been awarded.</i></p>								
Design and planning – Drawings and diagrams									
	Band 1			Band 2			Band 3		
	1	2	3	4	5	6	7	8	9
Band	<p>Band justification</p>								

Mark	Mark justification											
Working with faults												
	Band 1				Band 2				Band 3			
	1	2	3	4	5	6	7	8	9	10	11	12
Band 1	<p>Band justification</p> <p><i>The candidate has demonstrated that they meet the requirements of the lowest marking band: Fault-finding techniques were carried out with some success demonstrating knowledge of fault-finding techniques that was appropriate.</i></p> <p><i>Investigation and analysis of fault was clear and followed some logic</i></p> <p><i>Reference was made to manufacturer's instructions at some points during the fault diagnosis.</i></p> <p><i>Rectification of fault follows a logical process and is completed efficiently with only minor mistakes.</i></p> <p><i>Use of tools is basic, and requires more than one attempt, resulting in pipework installations that may be over soldered or with excessive tooling marks.</i></p> <p><i>There is no evidence that the candidate has met the requirements of the lower end of the middle marking band, and therefore the mark to be awarded sits within the lower marking band.</i></p>											
Mark 4	<p>Mark justification</p> <p><i>The candidate lacked some confidence when carrying out the discussion with customer, not always making eye contact and standing with arms folded. The candidate asked questions to the customer to try and determine the cause of the fault, however some of the questions asked were irrelevant to the task and fault-finding process. The candidate did eventually ask enough appropriate questions to diagnose the fault, demonstrating a good knowledge of the operating principles/ service requirements of the unvented hot water system. The candidate demonstrates a good understanding of the methods and techniques used to diagnose faults on plumbing systems/ components. The diagnosis of the fault followed a logical sequence The candidate shows some understanding of the techniques used to repair/ rectify faults in relation to the component that has been identified as being faulty. The fault repair tasks followed a methodical order, however some reassurance was needed from the assessor with some aspects and made some minor mistakes that did not impact the finished product. The candidate is able to select the correct tools for the task. The use of tools is mostly good, however some tasks require more than one attempt resulting in tooling marks to components/ pipework.</i></p>											

	Due to the reasons outlined here –the response has been determined to be at the top end of the lower marking band, and a mark of 4 has been awarded to reflect this.
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Internal assessor name	Date
Internal assessor signature	

Total mark
* /90

* Please Note that the Total Mark (90) applies to the full assignment including all Assessment Themes

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We work with governments, organisations and industry stakeholders to help shape future skills needs across industries. We are known for setting industry-wide standards for technical, behavioural and commercial skills to improve performance and productivity. We train teams, assure learning, assess cohorts and certify with digital credentials. Our solutions help to build skilled and compliant workforces.

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