

# **T Level Technical Qualification in Building Services Engineering for Construction - Gas Engineering**

## **Centre Standardisation Materials**

Version 1.0

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For external use

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# 1. Introduction

Gas engineering (8710-34) (354)

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

## 2. Candidate A

### 2.1. Assessment details

This standardisation pack has been developed to reflect the requirements of the **Gas 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](#).

#### 2.1.1. 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 gas cooker and water heater and associated pipework, following the client brief
- b) Measure and mark out work area as detailed in your diagram

##### Task 2 – Installation, commissioning and decommissioning

- a) Install the gas pipework from the primary meter to the water heater and cooker point in accordance with your drawing and as agreed by your assessor.
- b) Connect the electrical supply to the gas cooker 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 the water heater and diagnose fault
- b) Produce a written report of the maintenance activity
- c) Repair and rectify fault

## 2.2. 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
- Materials list
- Installation diagram with ventilation requirements, purge volume requirements and pipework sizing calculations
- Assessor observation of measurements and marking out of space allocation/ work area checked against scale drawing

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
- Materials list
- Installation diagram with ventilation requirements, purge volume requirements and pipework sizing calculations
- Assessor observation of measurements and marking out of space allocation/ work area checked against scale drawing

### **Photographic evidence:**

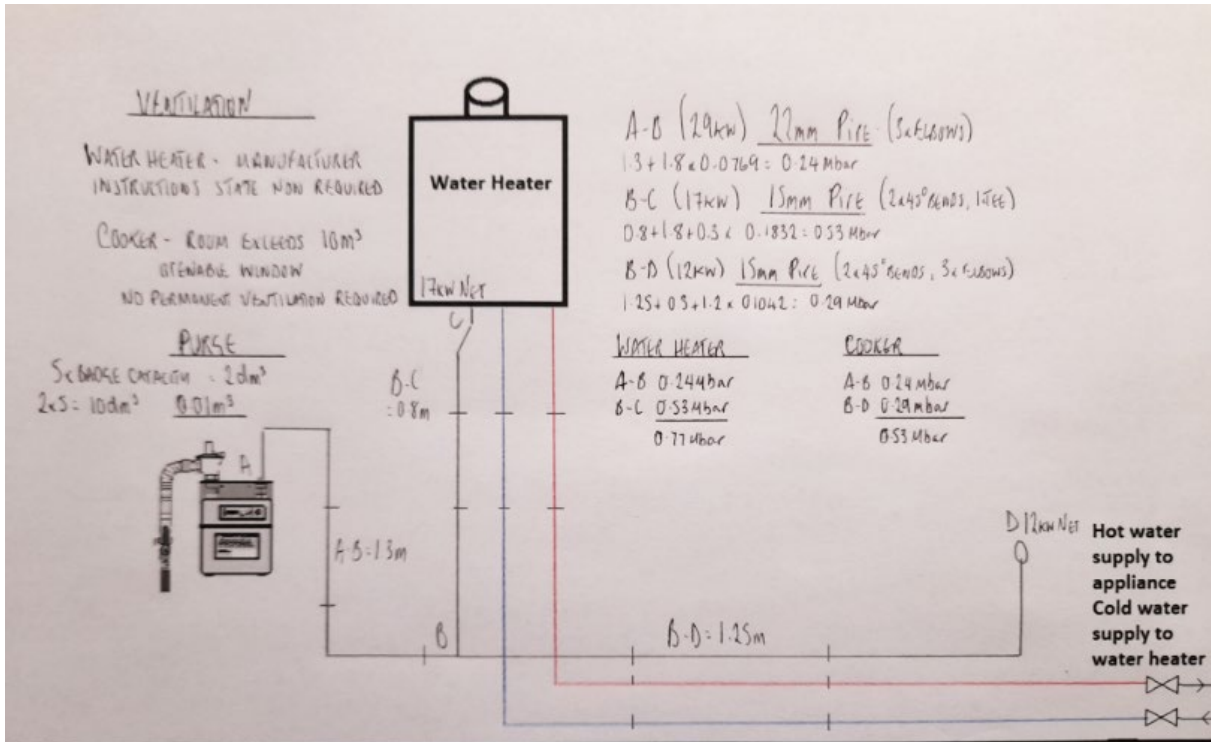
Measuring and marking out of proposed working area.

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.

## 2.2.1. Task 1 - Candidate evidence

### 1.1.1. Installation diagram



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

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	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.
<b>Measuring and marking out of proposed working area</b>	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 height for the installation. This resulted in all dimensions being taken and recorded accurately and free from errors.



### 1.1.3. 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><b>Photograph 1</b></p> <p>Candidate marking out a work area using a spirit level to provide a straight and vertical line on the first attempt.</p>	 A person is kneeling on a light-colored floor, using a yellow spirit level to mark a vertical line on a white wall. The wall has a gas meter and associated pipes. The person is holding the spirit level vertically against the wall and using a pen to mark a line. The spirit level shows a bubble in the center, indicating it is perfectly vertical.
<p><b>Photograph 2</b></p> <p>Work area shows accurate and clear marking out on work surface.</p>	 A close-up view of the white wall showing a clear, straight vertical line marked with a pen. The line is perfectly vertical and extends from the floor to the top of the frame. The wall has a slightly textured appearance.

### 1.1.4. Risk assessment

This risk assessment may be modified by adding items only.

<b>Activity: Installation of pipework</b> <b>Location: Centre A</b>					<b>Date: xxxxx</b> <b>Position: Candidate</b>			
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b>  <b>1 Minor Injury    2 Major Injury    3 Fatality</b>						<b>RISK RATING (RR): Severity x Likelihood</b>  <b>1-2 Low</b> <b>3-5 Medium</b> <b>6-9 High</b>		
<b>LIKELIHOOD (L): Probability that event will occur</b>  <b>1 Remote            2 Possible            3 Likely</b>								
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1-3	L 1-3	RR	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  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	Power tools	Dust and debris from operation  Death  Shock	Self	Correct use of PPE  All power tools are subject to PAT testing procedures	2	1	2	Yes
4	Pipework	Cut	Self	Take care when handling pipework exposed could be sharp	1	1	1	Yes
5	Hazardous substances	Asphyxiation/ irritation/ contamination/ ingestion	Self  Others	Correct use of PPE – wearing gloves. Correct ventilation  Personal hygiene. Refer to material data sheet	3	1	3	Yes

6	Manual handling	Personal injury	Self	Correct kinetic lifting techniques.  Awareness of maximum lifting weight. Suitable training	1	2	2	Yes
7	Commissioning	Explosion	Self Others	Ventilation and no naked flame	3	1	3	Yes

<b>Activity: Decommissioning</b>					<b>Date: xxxxxx</b>			
<b>Location: Centre A</b>					<b>Position: Candidate</b>			
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b>						<b>RISK RATING (RR): Severity x Likelihood</b>		
1 Minor Injury    2 Major Injury    3 Fatality						1-2 Low		
<b>LIKELIHOOD (L): Probability that event will occur</b>						3-5 Medium		
1 Remote            2 Possible            3 Likely						6-9 High		
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1- 3	L 1- 3	RR	Are the Risks Controlled?
1	Hazardous waste	Potential for foul waste and contaminated pipework from flux's or other waste materials	Self Others	Correct use of PPE including gloves  Wash hands carefully and dispose of contaminate waste in suitable location to remove risk from contaminants	2	1	2	Yes
2	Manual handling	Personal injury	Self	Correct kinetic lifting techniques.  Awareness of maximum lifting weight. Suitable training	1	1	1	Yes

<b>Activity: Maintenance</b>				<b>Date: xxxxxx</b>				
<b>Location: Centre A</b>				<b>Position: Candidate</b>				
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b>  <b>1 Minor Injury    2 Major Injury    3 Fatality</b>					<b>RISK RATING (RR): Severity x Likelihood</b>  <b>1-2 Low</b> <b>3-5 Medium</b> <b>6-9 High</b>			
<b>LIKELIHOOD (L): Probability that event will occur</b>  <b>1 Remote            2 Possible            3 Likely</b>								
<b>Item No:</b>	<b>Activity:</b>	<b>Hazard</b>	<b>Persons at Risk</b>	<b>Existing Controls (Mitigation)</b>	<b>S 1- 3</b>	<b>L 1- 3</b>	<b>RR</b>	<b>Are the Risks Controlled?</b>
1	Slipping hazard	Personal injury	Self Others	Wet floor signage  Good housekeeping	2	1	2	Yes
2	Lighting appliance following maintenance task	Burns	Self	Be careful when lighting appliance after maintenance task	1	2	1	Yes
3	Live electrical components	Death Shock	Self Others	Carry out safe isolation procedure under supervised conditions and ensure appliance is locked off	3	1	3	Yes

### 1.1.5. Method statement

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 water heater position, cooker connection 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.

Install the water heater and flue in line with the manufacturer instructions.

Fit the components to the correct height in line with specification and also meet the correct recommended installation height taking into consideration cupboards and kitchen features.

Collect all pipework, fittings and necessary tools required to complete the installation in line with my completed 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 cooker connection point/water heater connection point 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 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 including the connection to the gas meter. (Meter must be removed for soldering)

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 gas tight and free from leaks. Solder all the copper joints ensuring all surfaces are protected from damage using a suitable heat mat or shield.

Carry out the installation of the cooker as detailed in the manufacturer instructions, fix stability chain and complete wiring 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. The wiring to be carried out as per manufacturer instructions.

Complete the installation of the water heater by connecting the hot and cold-water supplies to the pre-existing pipework connections.

Carryout a tightness test and let by test as per industry requirements.

Let by between 7 and 10m bar leave for one minute checking for an increase in pressure.

Tightness test between 20 and 21mbar leave for two minutes checking for a drop in pressure. For this test I would need to lift cooker lids ensuring they are in the upright position.

### 1.1.6. Material list

Equipment/Materials	Quantity
Pencil	1
Spirit level	1
Tape measure	1
Pipe slice	1
Pipe bending machine	1
Philips screwdriver	1
Adjustable spanners	2
Water pump pliers	1
Wire Wool	1
Flux/flux brush	1
Heat proof mat	1
Blow torch	1
Solder	1
Power drill	1
Flat file	1
Electrical screwdriver	1
Side cutters	1
Wire strippers	1
Screws	20
15mm clips	10
15mm pipe	6
22mm clips	10

22mm pipe	6
15mm end feed elbows	4
15mm end feed sockets	2
22mm end feed elbows	2
22mm end feed tee	1
22 x 15 end feed reducer	1
Backplate elbow	1
Gas meter union	1
Bayonet fitting	1
Cooker hose	1
Gas PTFE	1
Meter washer	1
Cooker stability bracket	1
<b><u>PPE</u></b>	
Boiler suit/protective clothing	
Gloves	
Steel toe capped boots	
Goggles	



## 2.3. 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:
  - Safe isolation process
  - Installation of components
  - 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:
  - Safe isolation process
  - Installation of components
  - 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 – **Photographs 4, 5, 6 and 7**
- Use of tools (bending and cutting equipment) and piping skills – **Photograph 8**
- Tolerances have been met for the installation of the cooker and the water heater – **Photographs 9 and 10**
- Results of tool usage – **Photograph 11**
- 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 12**
- Use/type of clips – **Photograph 13**

## Decommissioning

Photographic evidence which shows:

- The system being drained down safely and economically to the correct location – **Photograph 14**
- Decommissioning of pipework and components for the system installation – **Photograph 15**
- The finish of the working area after decommissioning following filling and repainting of surfaces – **Photograph 16**

### 2.3.1. Task 2 - Candidate evidence

#### 1.1.1. Practical Observation Form - Safe isolation

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	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.
<b>Safe isolation</b>	<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 candidate could clearly articulate the purpose of each step in ensuring the electrical supply was correctly isolated. 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

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	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.
<b>Installation of components</b>	<p>Candidate prepared the workspace 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 a safe location. Throughout the task, the candidate demonstrated a good knowledge of health and safety and adhered to the risk assessment throughout the installation.</p> <p>Candidate maintained a safe and clear workspace throughout the task. 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>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>Water heater was installed as per manufacturer instructions. Cooker point was installed at a suitable height for correct operation, however, when measured was not completely accurate but within 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. All tolerances met throughout the</p>

<b>Task</b>	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.
	<p>installation producing a piece of work that was aesthetically pleasing.</p> <p>Candidate correctly selects and uses tools, resulting in no tooling marks to components. Pipework skills resulted in no wasted materials.</p>

### 1.1.3. Photographic evidence

Tolerances have been met for the measurement of pipework.

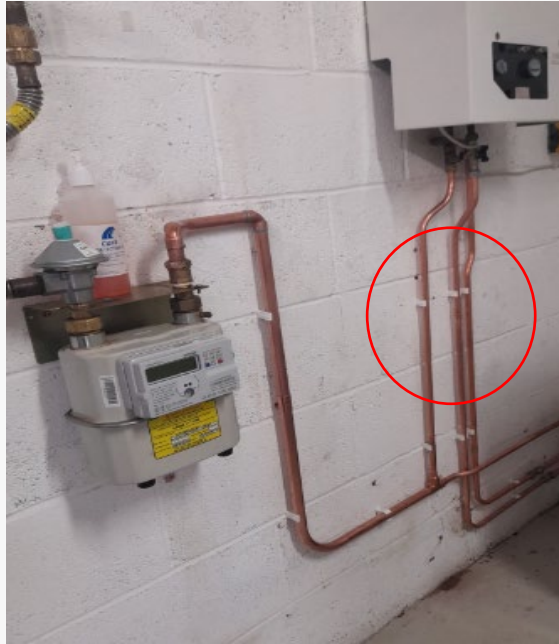
Evidence description	Photo
<p><b>Photograph 3</b></p> <p>Photograph 3 and 4, two photos, one each of each installation showing finished pipework and component positioning which demonstrates the aesthetics of the completed installation.</p> <p>Tolerances of (+/-2mm) have been met during the installation of pipework.</p>	
<p><b>Photograph 4</b></p> <p>Finished installation of the gas cooker and pipework meet all tolerances/standards.</p> <p>Overall aesthetics of the installation have been met.</p>	

**Photograph 5**

Finished installation of the water heater and pipework meet all tolerances/standards.

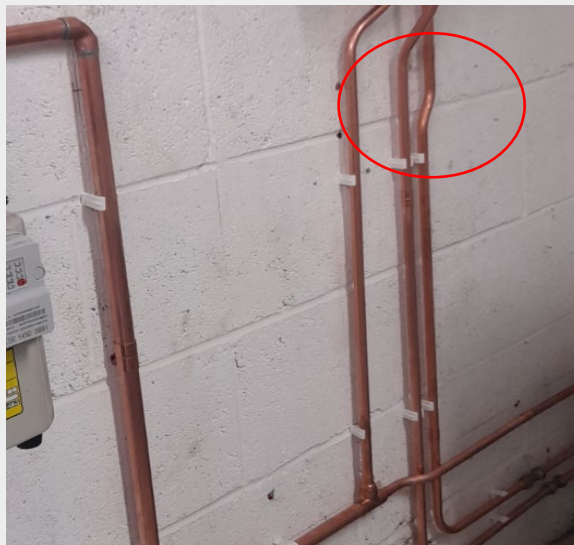
Overall aesthetics of the installation have been met.

Copper pipework installation.



**Photograph 6**

Pipework installed to the required tolerance (+/-2mm). 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**

Fabricated bend with appropriate clearance.

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





### Photograph 9

Tolerances have been met for the installation of the gas cooker and water heater.

Tolerances of (+/-2mm) have been met for the installation of the WHB.



### Photograph 10



### Photograph 11

Results of tool usage.

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



### Photograph 12

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 vulnerable heat sensitive components before soldering commences.



### Photograph 13

Use/type of clips.

Pipework level and adequately clipped with appropriate spacing.

Pipework fabricated without the use of additional fittings.



### 1.1.4. Practical Observation Form - Commissioning

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Commissioning</b>	<p>Candidate follows correct process for commissioning tests using manufacturer’s instruction for the cooker and water heater to ensure no aspects of the commissioning had been omitted.</p> <p>After completing the visual inspection, the candidate carried out a let by test, tightness test, purge and completed operational checks on all the components as detailed in the manufacturer instructions. Candidate ensured both the cooker and water heater was commissioned to industry standards before handing over to customer.</p> <p>Correct use of the combustion analyser throughout all commissioning tasks.</p>

### 1.1.5. Practical Observation Form - Handover to customer

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Handover to customer</b>	<p>Candidate interacts well with customer using eye contact and open body language. Candidate gives information about cooker and water heater operation and explains what to do in the event of a gas leak within the property.</p> <p>Candidate provides detail of maintenance requirements, e.g. cleaning processes, and details service requirements including the requirement to have this completed by a gas safe registered engineer. Candidate makes reference to manufacturer’s instructions at relevant stages of the task, identifying relevant parts.</p>

### 1.1.6. Practical Observation Form - Decommissioning



<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Decommissioning</b>	<p>Candidate follows a logical sequence for decommissioning.</p> <p>Candidate follows safe working practices throughout the duration of the task.</p> <p>The gas and electrical supply are safely isolated.</p> <p>Candidate removes the cooker/water heater first to limit risk of damage to components and where appropriate returned them to original packaging.</p> <p>Candidate removed as much of the straight lengths of pipework that could be reused and securely stored them.</p> <p>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 attempt 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 area to pre-installation condition.</p>

### 1.1.7. Photographic evidence

The system being drained down safely and economically to the correct location.

Evidence description	Photo
<p><b>Photograph 14</b></p> <p>Preparation for draining down: correct equipment and drain point used to drain down system pipework for decommissioning activities.</p>	 A yellow plastic warning sign stands on a light-colored concrete floor. The sign features the word 'PLUMBING' at the top, a large 'Warning' in the middle, a black triangle with a white exclamation mark below it, and the words 'Wet floor' at the bottom. A yellow hose is visible on the floor behind the sign.
<p><b>Photograph 15</b></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>	 A black bucket sits on a concrete floor, filled with several long, straight copper pipes. The pipes are arranged in a somewhat haphazard manner, with some protruding from the top of the bucket. The background shows a plain wall and a portion of a white object.

## Evidence description

### Photograph 16

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.

## Photo



## 2.4. 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 17**
- Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component – **Photograph 18, 19 and 20**
- System on completion of all works – **Photograph 21**



## 2.4.1. Task 3 - Candidate evidence

### 1.1.1. Written report of maintenance activity

#### Maintenance activity

##### **FAULT Faulty Water Heater**

##### **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 with the water heater. 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 faulty water flow control. This would need to be replaced.

##### **Possible solutions**

I decided the best solution to this problem was to isolate the water/gas and electrical supply following the safe isolation procedure, drain the water from the heater and replace the faulty component once I was confident the water is out of the system, as I am confident in safely isolating and draining system installations and I 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 method to drain the water
- Isolate the cold feed supply to the heater
- Isolate the gas/electrical/water supplies
- Open all hot water outlets and drain water from system to the suitable safe location.
- Remove faulty component and replace with a new one
- Ensure the valve compression connections are tight
- Close all outlets
- Refill system
- Recommission system including gas supply
- Inform customer of completed repair.

### 1.1.2. Practical Observation Form - Fault diagnosis and fault rectification

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Fault diagnosis and customer discussions</b>	<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 meaningful 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"> <li>• What is happening?</li> <li>• Frequency of fault?</li> <li>• Affected outlets?</li> </ul> <p>By expanding on the customer responses, this allowed the candidate to make some 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>

<b>Task</b>	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>
<b>Fault rectification</b>	<p>Candidate implemented all the health and safety preparations required to take care of components and customer property, ensuring safe isolation of services. Places warning notices as required.</p> <p>Candidate selects the correct tools and follows a methodical and logical sequence to remove and replace the defective component.</p> <p>The candidate completed the repair efficiently without error and in good time, checking the completed repair.</p>

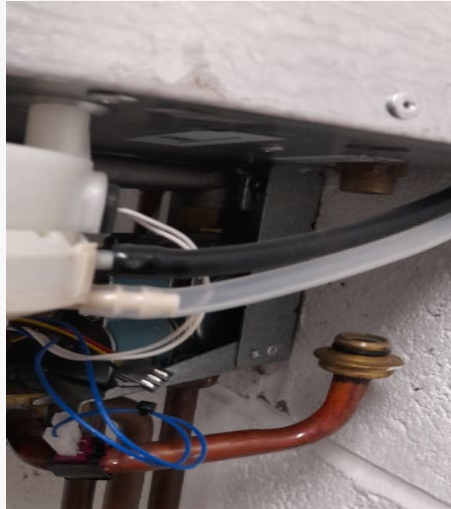
### 1.1.3. Photographic evidence

The system being drained down safely and economically to the correct location.

Evidence description	Photo
<p><b>Photograph 17</b></p> <p>Results of tool usage.</p> <p>Component fitted correctly with no signs of tool marks from installation of the replacement component.</p>	
<p><b>Photograph 18</b></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 with correct tool.</p>	

**Photograph 19**

Removal of faulty component.



**Photograph 20**

Replacement of component.



**Photograph 21**

System on completion of all works.

Repair completed and work area left tidy.



## **2.5. 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 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.

## 2.6. Candidate Record Form (CRF) – Gas engineering (8710-354)

<b>Candidate name</b>	<b>Candidate number</b>
Candidate A	CG12345
<b>Centre name</b>	<b>Centre number</b>
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
<b>Band</b>  3	<p><b>Band justification</b></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. Therefore, the mark to be awarded sits within the upper marking band.</i></p>											
<b>Mark</b>  11	<p><b>Mark justification</b></p> <p><i>The candidate demonstrates a thorough knowledge and understanding of the different types of risk and hazards associated 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
<b>Band</b>  3	<p><b>Band justification</b></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>							
<b>Mark</b>  8	<p><b>Mark justification</b></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 work space is safe and hydraulic pressure testing to ensure the joints are free from leaks. The methods described are both accurate and provide reasoning as to why the actions are carried out.</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 installation, 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 with quantities for each, showing an excellent knowledge and understanding of the different fixing methods, fitting types and jointing methods</i></p>							

*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.*

### Working with faults

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

**Band 3**  
**Band justification**  
*The candidate has demonstrated that they have exceeded the requirements of the middle marking band:*  
*Fault-finding techniques were carried out systematically and logically displaying accurate knowledge of fault-finding techniques.*  
*Investigation and analysis of fault was detailed and logical.*  
*Manufacturer’s instructions were followed at all appropriate stages during the fault diagnosis.*  
*Rectification of fault follows a logical process and is completed efficiently and accurately with no mistakes.*  
*Use of tools is excellent and completed on first attempt, resulting in a high-quality finish.*  
*Therefore, the mark to be awarded sits within the upper marking band.*

**Mark 12**  
**Mark justification**  
*The candidate displayed confidence when carrying out the discussion with the customer, ensuring eye contact and positive interaction and body language throughout the discussion. The candidate asked relevant questions to the customer and was able to determine the cause of the fault, with confidence and efficiency, demonstrating an excellent knowledge and understanding of the operating principles/ service requirements of the water heater. The candidate demonstrates a thorough understanding of the methods and techniques used to diagnose faults on gas systems/ components and the diagnosis of the fault followed a logical sequence. The candidate shows excellent 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 and is carried out confidently/ independently and free from errors. The candidate is able to select the correct tools for the task. The use of tools is excellent and re-installed components/ pipework is aesthetically pleasing.*  
  
*Due to the reasons outlined here –the response has been determined to be in the upper marking band and a mark of 12 has been awarded.*

<b>Internal assessor name</b>	<b>Date</b>
<b>Internal assessor signature</b>	

<b>Total mark</b>
*/90

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

## 3. Candidate B

### 3.1. Assessment details

This standardisation pack has been developed to reflect the requirements of the **Gas 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](#).

#### 3.1.1. 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 gas cooker and water heater and associated pipework, following the client brief
- b) Measure and mark out work area as detailed in your diagram

##### Task 2 – Installation, commissioning and decommissioning

- a) Install the gas pipework from the primary meter to the water heater and cooker point in accordance with your drawing and as agreed by your assessor.
- b) Connect the electrical supply to the gas cooker 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 the water heater and diagnose fault
- b) Produce a written report of the maintenance activity
- c) Repair and rectify fault

## 3.2. 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
- Materials list
- Installation diagram with ventilation requirements, purge volume requirements and pipework sizing calculations
- Assessor observation of measurements and marking out of space allocation/ work area checked against scale drawing

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
- Materials list
- Installation diagram with ventilation requirements, purge volume requirements and pipework sizing calculations
- Assessor observation of measurements and marking out of space allocation/ work area checked against scale drawing

### **Photographic evidence:**

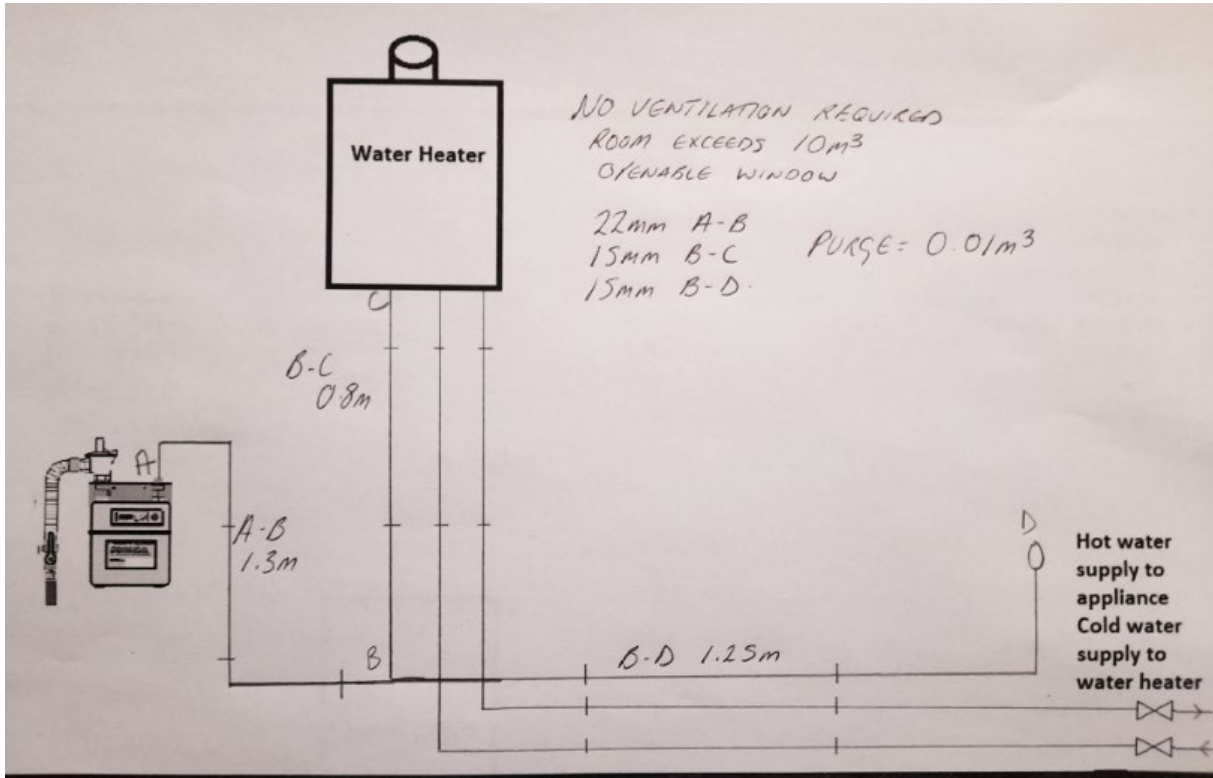
Measuring and marking out of proposed working area.

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.

### 3.2.1. Task 1 - Candidate evidence

#### 1.1.1. Installation diagram



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



<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	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.
<b>Measuring and marking out of proposed working area</b>	<p>The candidate used the edge of the wall and floor to establish the correct level for the installation as per the scale drawing produced. 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 disorganization in working from a set point and this resulted in them having to double check some dimensions for the position of the gas cooker/water heater and appliance connection point. Overall key data was recorded and set out accurately and in line with industry requirements.</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>

### 1.1.3. 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><b>Photograph 1</b></p> <p>Candidate marking out a work area using a straight edge that is not the approved method.</p>	 A photograph showing a person kneeling on the floor, using a long, thin straight edge to mark a wall. The wall is white and has a gas meter and associated pipes. The person is holding the straight edge against the wall and appears to be marking it with a pencil or marker.
<p><b>Photograph 2</b></p> <p>Work area shows multiple marks on work surface from marking out due to initial inaccurate measuring and marking out.</p>	 A close-up photograph of a white wall. The wall has several vertical and horizontal marks, including a prominent vertical line and several shorter horizontal lines, indicating multiple attempts at marking out. A text box is overlaid on the image, stating: "Work area shows multiple marks on work surface from marking out due to initial inaccurate measuring and marking out." data-bbox="471 501 931 586"/>



### 1.1.4. Risk assessment

This risk assessment may be modified by adding items only.

<b>Activity: Installation of pipework</b> <b>Location: Centre A</b>				<b>Date: xxxxxx</b> <b>Position: Candidate</b>				
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b> <b>1 Minor Injury    2 Major Injury    3 Fatality</b>						<b>RISK RATING (RR): Severity x Likelihood</b>		
<b>LIKELIHOOD (L): Probability that event will occur</b> <b>1 Remote            2 Possible            3 Likely</b>						<b>1-2 Low</b> <b>3-5 Medium</b> <b>6-9 High</b>		
Item No:	Activity:	Hazard	Persons at Risk	Existing Controls (Mitigation)	S 1- 3	L 1- 3	RR	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	Power tools	Dust and debris from operation Death Shock	Self	Correct use of PPE All power tools are subject to PAT testing procedures	3	1	3	Yes
3	Hazardous substances	Irritation	Self Others	Correct use of PPE and ventilation	2	1	2	Yes
4	Manual handling	Personal injury	Self	Correct kinetic lifting techniques	1	1	1	Yes
5	Electrical wiring	Death Shock	Self	Carry out safe isolation procedure under supervised conditions and ensure appliance is locked off	3	1	3	Yes
6	Pipework	Cut	Self	Take care when handling pipework exposed could be sharp	1	2	2	Yes

<b>Activity: Decommissioning</b>				<b>Date: xxxxxx</b>				
<b>Location: Centre A</b>				<b>Position: Candidate</b>				
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b> 1 Minor Injury   2 Major Injury   3 Fatality  <b>LIKELIHOOD (L): Probability that event will occur</b> 1 Remote            2 Possible            3 Likely						<b>RISK RATING (RR): Severity x Likelihood</b>  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	RR	Are the Risks Controlled?
1	Hazardous waste	Irritation	Self	Correct use of PPE	2	1	2	Yes
2	Manual handling	Personal injury	Self	Correct kinetic lifting techniques	1	1	1	Yes

<b>Activity: Maintenance</b>				<b>Date: xxxxxx</b>				
<b>Location: Centre A</b>				<b>Position: Candidate</b>				
<b>SEVERITY (S): Degree of harm which may be caused (including numbers affected)</b> 1 Minor Injury   2 Major Injury   3 Fatality  <b>LIKELIHOOD (L): Probability that event will occur</b> 1 Remote            2 Possible            3 Likely						<b>RISK RATING (RR): Severity x Likelihood</b>  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	RR	Are the Risks Controlled?
1	Slip hazard	Personal injury	Self Others	Signs Good housekeeping	2	1	2	Yes
2	Lighting appliance following maintenance task	Burns	Self	Be careful when lighting appliance after maintenance task	1	2	1	Yes

### 1.1.5. Method statement

- 1) Ensure you have the correct PPE
- 2) Install water heater
- 3) Draw the cooker/water heater connection and pipework layout in pencil on the work surface to the correct measurements
- 4) Collect all pipework, fittings and necessary tools
- 5) Measure from the centre line for the cooker point according to the specification and scale drawing
- 6) Fit pipe clips to the correct measurements and according to the specification
- 7) Measure and cut the copper pipe, then continue to pull any angles, kicks, or Passovers needed for the task
- 8) Install the pipework and add the fittings
- 9) Tighten and double check compression fittings
- 10) Remove and cap meter, clean the pipework and apply flux, then solder pipework and fittings together
- 11) Install cooker, electrical supply and stability chain
- 12) Tightness test your work including let by.

### 1.1.6. Material list

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
Fittings	20
Water pump pliers	1
Heat proof mat	1
Blow torch	1
Solder	1
Power drill	1
Flat file	1
Electrical screwdriver	1
Side cutters	1
Wire strippers	1
Screws	20
15mm clips	10
15mm pipe	6

22mm clips	10
22mm pipe	6
Backplate elbow	1
Gas meter union	1
Bayonet fitting	1
Cooker hose	1
Meter washer	1
Cooker stability bracket	1
<u>PPE</u>	
Boiler suit/protective clothing	
Gloves	
Steel toe capped boots	
Goggles	

### 3.3. 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:
  - Safe isolation process
  - Installation of components
  - 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:
  - Safe isolation process
  - Installation of components
  - 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 – **Photograph 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 marking 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 the system installation – **Photograph 13**
- The finish of the working area after decommissioning following filling and repainting of surfaces – **Photograph 14**

### 3.3.1. Task 2 - Candidate evidence

#### 1.1.1. Practical Observation Form - Safe isolation

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	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.
<b>Safe isolation</b>	<p>Candidate took some time starting the task and although was correct in performing the process some initial prompting was required to ensure they were aware of the time. 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>



### 1.1.2. Practical Observation Form - Installation of components and pipework

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.



<b>Task</b>	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.
<b>Installation of components and pipework</b>	<p>Candidate has ensured all H&amp;S and site preparation works are in place before starting task by putting dust sheets on floor, storing tools and materials in safe location. Workplace H&amp;S and clear working area was not maintained during task.</p> <p>Candidate use of tools is mostly good however some tasks require more than one attempt. Candidate looked for some reassurance when selecting and using some tools. Candidate uses water pliers incorrectly on brass fittings, resulting in tooling marks to pipework/ components.</p> <p>Candidate prepared the workspace 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 level and secured. Water heater was installed as per manufacturer instructions.</p> <p>Cooker point was installed at a suitable height for connection, however, when measured was not completely accurate but within 5mm of tolerance. 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, +/- 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 little</p>

<b>Task</b>	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.
	wastage of materials. The exception of having to carry out forming of bends twice due to inaccuracy on first attempt, however, this did not impact the overall time or wastage of the installation.

### 1.1.3. Photographic evidence

#### Installation of components.

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

Evidence description	Photo
<p><b>Photograph 3</b></p> <p>Photograph 3 and 4, 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>Tolerances (+/-5mm) have been met during the installation of pipework.</p>	 <p>A close-up photograph of copper pipework installed against a white textured wall. A yellow measuring tape is stretched horizontally across the pipes, showing measurements in both feet and centimeters. The pipes are supported by white plastic clips.</p>
<p><b>Photograph 4</b></p> <p>Finished installation of the gas cooker and associated pipework.</p> <p>Overall aesthetics of the installation have been met.</p>	 <p>A photograph of a white gas cooker with four burners and an oven, installed in a kitchen. Copper pipework is visible on the wall behind the cooker, connected to a gas control box and a gas valve. The installation is clean and professional.</p>

**Photograph 5**

Finished installation of the water heater and associated pipework.

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**

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

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



**Photograph 9**

Results of tool usage.

Component fitted correctly with 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 and protection of customer property although heat mat not centrally positioned.



### Photograph 11

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



### 1.1.4. Practical Observation Form - Commissioning

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
City & Guilds	Inspecting and testing of systems 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.

<b>Task</b>	<i>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.</i>
<b>Commissioning</b>	<p>Candidate did not follow correct process for commissioning tests as detailed in the manufacturer instructions.</p> <p>Visual inspection and final checks are not completed which results in a failed tightness test. Candidate traces and repairs leak successfully.</p> <p>Commissioning checks and test are completed.</p> <ul style="list-style-type: none"> <li>• tightness test including let by test</li> <li>• purge</li> <li>• combustion analysis.</li> </ul>

### 1.1.5. Practical Observation Form - Handover to customer

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Handover to customer</b>	<p>Candidate has arms folded and doesn't make eye contact.</p> <p>Candidate gives information about cooker/water heater operation but does not explain what to do in the event of a gas leak within the property.</p> <p>Candidate provides detail of maintenance requirements, e.g. cleaning processes, but misses information about service requirements by a gas safe registered engineer.</p> <p>Candidate makes reference to manufacturer's instructions at some stages of the task.</p>



### 1.1.6. Practical Observation Form - Decommissioning



<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Decommissioning</b>	<p>Candidate follows a logical sequence for decommissioning. Candidate follows safe working practices at most stages of the decommissioning.</p> <p>The gas and electrical supply are safely isolated.</p> <p>Candidate removed cooker/water heater first to limit risk of damage.</p> <p>Candidate correctly identified some of the components that could not be reused and disposed of them in the correct recycling bins. 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>

### 1.1.7. Photographic evidence

The system being drained down safely and economically to the correct location.

Evidence description	Photo
<p><b>Photograph 14</b></p> <p>Preparation for draining down: correct equipment and drain point used to drain down system pipework for decommissioning activities.</p>	 A photograph showing a yellow flexible hose connected to a drain point on a wall. The hose is curved downwards, and the drain point is a metal fitting on the wall.
<p><b>Photograph 15</b></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>	 A photograph showing a pile of copper pipes and components on a floor. The pipes are of various lengths and are bundled together. A white electrical outlet is visible on the wall to the left.

## Evidence description

### Photograph 16

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.

## Photo



### 3.4. 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 – **Photographs 16, 17, 18 and 19**
- System on completion of all works – **Photograph 20**

### 3.4.1. Task 3 - Candidate evidence

#### 1.1.1. Written report of maintenance activity

##### Maintenance activity

###### **FAULT Faulty Water Heater**

###### **Description of fault diagnosis**

I checked if the water heater was working in accordance with manufacturer's instructions. After investigation and discussion with my assessor, I confirmed that there was a faulty flow control, this would need to be replaced

###### **Possible solutions**

The solution to this problem is to isolate the water/gas/electrics supply then remove and replace the component.

###### **Actions taken to rectify fault**

To repair the fault, I carried out the following sequence:

- Isolate the gas/electric/water supply
- Remove the faulty component
- Replace the component
- Reinstate all supplies
- Commission water heater as per manufacturer instructions.

**1.1.2. Practical Observation Form - Fault diagnosis and fault rectification**

<b>Assessment ID</b>	<b>Qualification number</b>
8710-354	8710-34
<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Assessment theme</b>
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.

<b>Task</b>	<i>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.</i>
<b>Fault diagnosis and customer discussions</b>	<p>Candidate shows some nerves at the beginning of the customer discussion, with an initial lack of eye contact and poor body language. 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:          What is happening?          Frequency of fault?          How long has the fault been happening?</p> <p>This allowed candidate to make some judgments and trace the fault to the appropriate component although this may have been guesswork/trial and error rather than systematic fault analysis using manufacturer instructions.</p> <p>Candidate carries out a visual inspection of the system to identify the source of the fault.</p>
<b>Fault rectification</b>	<p>Candidate considers health and safety preparations, using dust sheets, removing customer property where required and creating a safe area to carry out the repair, the area is well ventilated.</p>

<p><b>Task</b></p>	<p>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></p>
	<p>Candidate follows a logical sequence, safely isolating the water heater 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 component. The use of adjustable spanners over water pump pliers ensured there was no marking to the new component.</p> <p>The candidate completed the repair efficiently with only minor mistakes, but was hesitant when carrying out the task.</p> <p>There was a lack of order to the fault rectification process which had minor impacts on time management.</p>

### 1.1.3. Photographic evidence

Results of tool usage.

Evidence description	Photo
<p><b>Photograph 15</b></p> <p>Results of tool usage.</p> <p>Component fitted correctly with signs of tool marks from installation of replacement component.</p>	
<p><b>Photograph 16</b></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 using the correct tool.</p>	



**Photograph 17**

Removal of faulty component.



**Photograph 18**

Component removed during repair activity.



**Photograph 19**

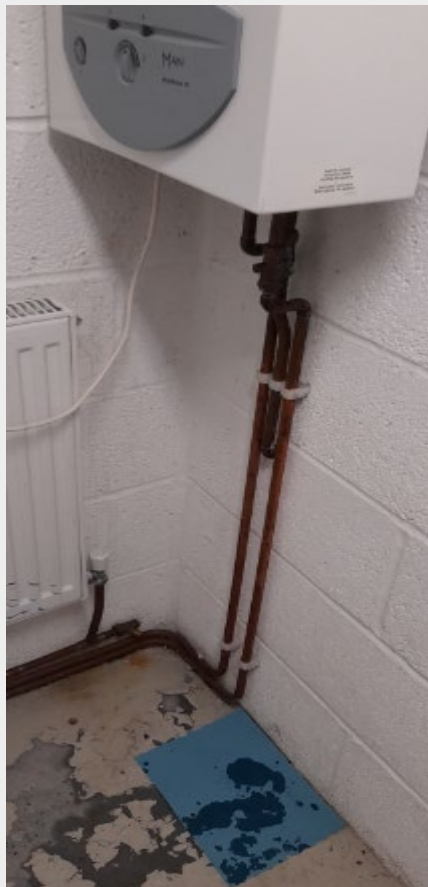
Replacement of component.



**Photograph 20**

System on completion of all works.

Repair completed with signs of leaks which have been repaired.



### **3.5. 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 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.

### 3.6. Candidate Record Form (CRF) – Gas engineering (8710-354)

<b>Candidate name</b>	<b>Candidate number</b>
Candidate B	CG12345
<b>Centre name</b>	<b>Centre number</b>
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
<b>Band</b> 2	<p><b>Band justification</b></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>											
<b>Mark</b> 7	<p><b>Mark justification</b></p> <p><i>The candidate demonstrates a good knowledge and understanding of the different types of risk and hazards associated with gas engineering 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 wet rag to cool hot pipework. The probability of each of the hazards/ risks occurring has been attempted and mostly accurate and realistic.</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
<b>Band</b>  1	<p><b>Band justification</b></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>Therefore, the mark to be awarded sits within the lower marking band.</i></p>								
<b>Mark</b>  3	<p><b>Mark justification</b></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 tightness 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.</i></p> <p><i>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 to allow for a successful installation in line with the assignment brief. The candidate has identified quantities that are accurate and relevant to the tasks. 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</i></p> <p><i>Due to the reasons outlined here –the response has been determined to be in the middle marking band and a mark of 3 has been awarded.</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>								

Working with faults												
	Band 1				Band 2				Band 3			
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Band</b>	<b>Band justification</b>											
<b>1</b>	<p>The candidate has demonstrated that they meet the requirements of the lowest marking band:</p> <p>Fault-finding techniques were carried out with some success demonstrating knowledge of fault-finding techniques that was appropriate.</p> <p>Investigation and analysis of fault was clear and followed some logic</p> <p>Reference was made to manufacturer's instructions at some points during the fault diagnosis.</p> <p>Rectification of fault follows a logical process and is completed efficiently with only minor mistakes.</p> <p>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.</p> <p>Therefore, the mark to be awarded sits within the lower marking band.</p>											
<b>Mark</b>	<b>Mark justification</b>											
<b>4</b>	<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 gas 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> <p><i>Due to the reasons outlined here –the response has been determined to be in the bottom marking band and a mark of 4 has been awarded.</i></p>											

<b>Internal assessor name</b>	<b>Date</b>
<b>Internal assessor signature</b>	

<b>Total mark</b>
* /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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