T-LEVELS | Institute for Apprenticeships & Technical Education

T Level Technical Qualification in Building Services Engineering for Construction

Gas Engineering

Guide standard exemplification material

Threshold competence – Sample 2021

City & Guilds | eal

Version and date	Change detail	Section
June 2021 v1.0	Initial document.	All.
July 2021 v1.1	Transfer of existing content into updated document template	All

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Introduction

The sample assessment materials within this document refers to the gas engineering sample occupational specialism assignment. The aim of these materials is to provide centres with examples of knowledge, skills and understanding that attest to minimal threshold competence. In this document all exemplar evidence attests as examples of minimal threshold competence. The examples provided do not reflect all evidence from the sample assignment as the focus of this material is the quality and standards that need to be achieved rather than the volume of exemplar evidence provided. However, the examples provide a representative of all tasks in the sample assignment. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and standard of performance will vary across task and minimal threshold competence will be based on a synoptic mark across all tasks.

The materials in this GSEM are separated into three sections as described below. Materials are presented against a number of tasks from the assignment.

Task

This section details the tasks that the candidate has been asked to carry out. What needs to be submitted for marking and any additional evidence required including any photographic evidence. Also referenced in this section are the assessment themes the candidates will be marked against when completing the tasks within it. In addition, candidate evidence that has been included or not been included in this GSEM has been identified within this section.

In this GSEM there is candidate evidence from:

Task 1

Task 2

Task 3

Candidate evidence

This section includes exemplars of the candidate's work, photographs of the work in production (or completed) and practical observation records of the assessment completed by centre assessors. This will be exemplar evidence that was captured as part of the assessment and then internally marked by the centre assessor.

Commentary

This section includes detailed comments to demonstrate how the candidate evidence attests to the standard of minimal threshold competence by directly correlating to the grade descriptors for this occupational area. Centres can compare the evidence against the performance indicators in the marking grid descriptors within the assessor packs, to provide guidance on the standard of knowledge, skills and understanding that need to be met for minimal threshold competence.

It is important to note that the commentary section is not part of the evidence or assessment but are evaluative statements on how and why that piece of evidence meets a particular standard.

Grade descriptors

To achieve a pass (threshold competence), a candidate will be able to:

Demonstrate an acceptable performance that meets the requirement of the brief and that is required to enter the industry to begin to work in the occupational area.

Demonstrate the adequate technical skills in cutting, bending, fixing pipework and installing components that is in line with industry standards.

Interpret information, demonstrate planning, assess risk and follow safe working methods when applying practical skills to an acceptable standard as recognised by industry.

Demonstrate basic knowledge and understanding of the principles and processes required for gas engineering.

Work safely showing an understanding in the selection and use of tools and equipment and demonstrate a basic awareness of straightforward preparation and application processes.

Attempt some complex tasks and the level of performance mostly meets an acceptable level.

Identify causes of heating faults and have some knowledge and skills in how to rectify them.

Use industry terminology most of the time that is accurate in both written and verbal contexts.

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:

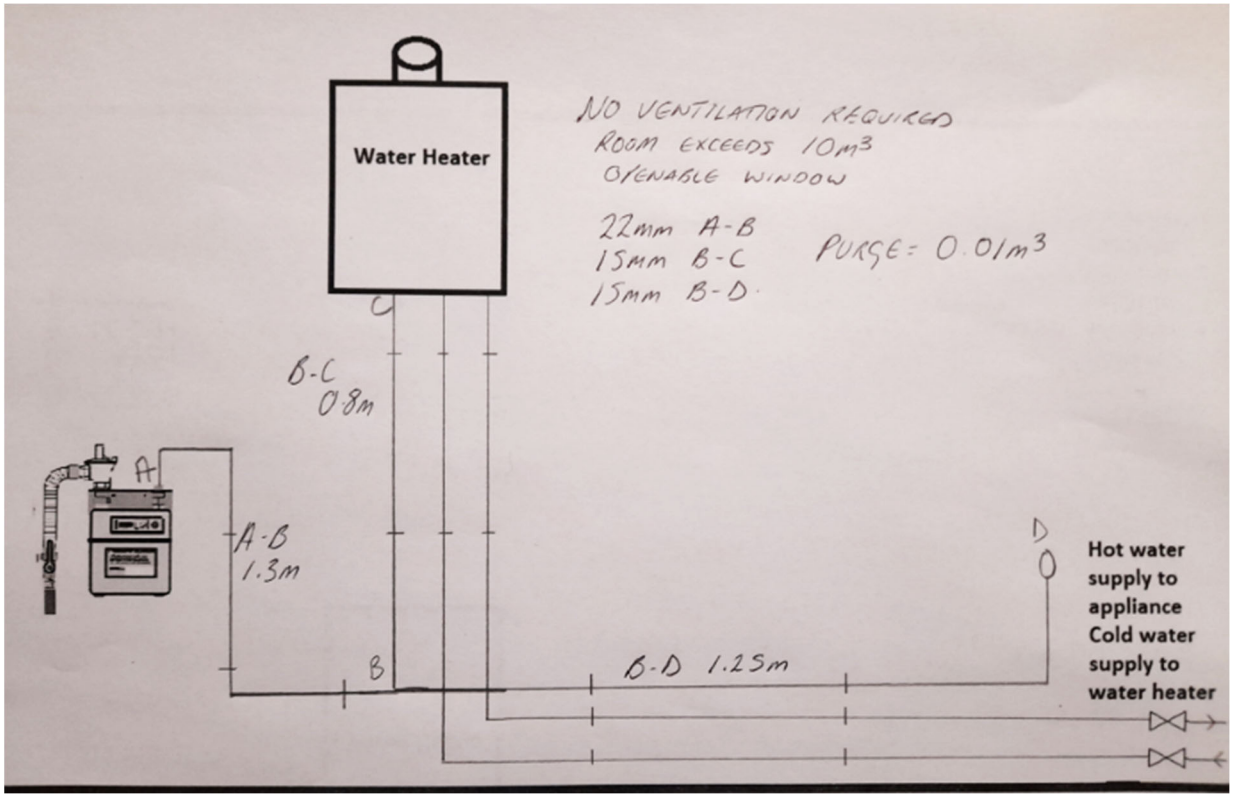
Measuring and marking out of proposed working area.

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.**

Candidate evidence

Installation diagram



Commentary

The candidate has completed the installation diagram considering all aspects required to meet the assignment brief.

The candidate demonstrates good knowledge and understanding of components and functional controls and has correctly identified all of the associated components and functional controls and positioned them in the correct order on the diagram.

The pipework layout is clear.

The completed drawing does have minor inaccuracies, e.g. the distance of the pipe clips are not clearly displayed.

The candidate shows a good understanding of the requirements of installation diagrams and the overall drawing is clear.

The candidate has calculated ventilation requirements, purge volume requirements and pipe sizes and noted these on the diagram, but has not clearly shown their workings or reasoning.

Candidate evidence

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

Assessment ID	Qualification number
8710-354	8710-34
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.

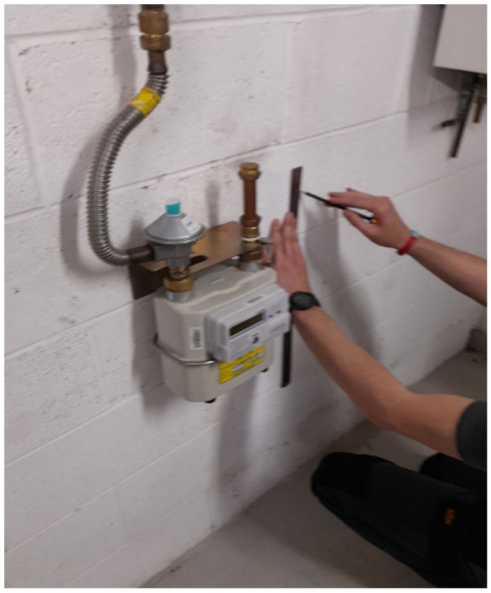
Task	**Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Measuring and marking out of proposed working area	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. 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. Candidate took several attempts to mark out, resulting in lines left on wall. Candidate has marked out all pipe clips to industry standards and spacing is mostly accurate.

Assessor signature	Date
Assessor A	31/01/2021

Photographic evidence

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

Photograph 1



Candidate marking out a work area using a straight edge that is not the approved method.

Photograph 2

Work area shows multiple marks on work surface from marking out due to initial inaccurate measuring and marking out.

Commentary

The candidate demonstrates that they can take measurements from an allocated space/ work area in line with their installation diagram.

The candidate used measuring and marking out equipment which was not best practice for this task. This resulted in some minor inaccuracies, which could impact on the installation pipework not being plumb and level and the finished aesthetics of the installation.

The marking out took several attempts resulting in lines left on wall.

The measurements were recorded accurately and clearly.

The pipe clips have been marked out to industry standards and spacing is mostly accurate.

Candidate evidence

Risk assessment

This risk assessment may be modified by adding items only.

Activity: Installation of pipework **Location: Centre A**	**Date: 31/01/21** **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	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

Activity: Decommissioning **Location: Centre A**	**Date: 31/01/21** **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	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

Activity: Maintenance **Location: Centre A**	**Date: 31/01/21** **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	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

Commentary

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.

Candidate evidence

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.

Commentary

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.

Candidate evidence

Materials 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
PPE	
Boiler suit/protective clothing	
Gloves	
Steel toe capped boots	
Goggles	

Commentary

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

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**

Candidate evidence

Practical Observation Form – Safe isolation

Assessment ID	Qualification number
8710-354	8710-34
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	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. Candidate correctly sourced all the equipment needed and gained permission to proceed from the assessor. The candidate correctly checked the testing equipment and confirmed operation and continued to isolate supply correctly. Tests to prove supply was DEAD had been carried out with accuracy and confirmed the installation was safe.

Assessor signature	Date
Assessor A	31/01/2021

Commentary

Candidate carried out all necessary steps in the safe isolation process. The safe isolation process was correct in method.

Candidate evidence

Practical Observation Form – Installation of components and pipework

Assessment ID	Qualification number
8710-354	8710-34
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 –** *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	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. Workplace H&S and clear working area was not maintained during task. 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. 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. 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. Candidate has effectively marked out and measured pipework to suitable lengths to carry out the installation, with little 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.

Assessor signature	Date
Assessor A	31/01/2021

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.

Photograph 3

Tolerances (+/-5mm) have been met during the installation of pipework.

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

Finished installation of the gas cooker and associated pipework.

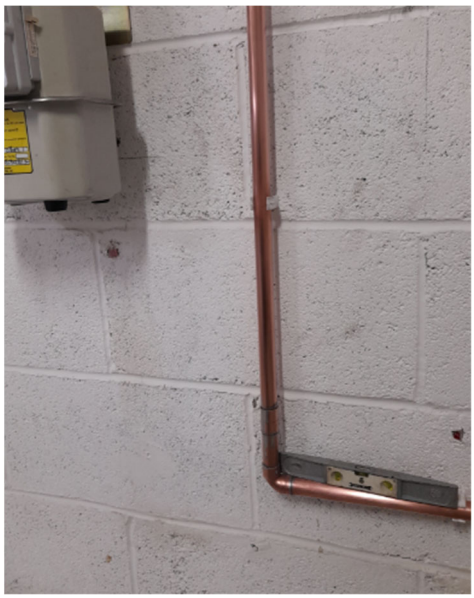
Overall aesthetics of the installation have

Photograph 5

Finished installation of the water heater and associated pipework.

Overall aesthetics of the installation have been met.

Photograph 6



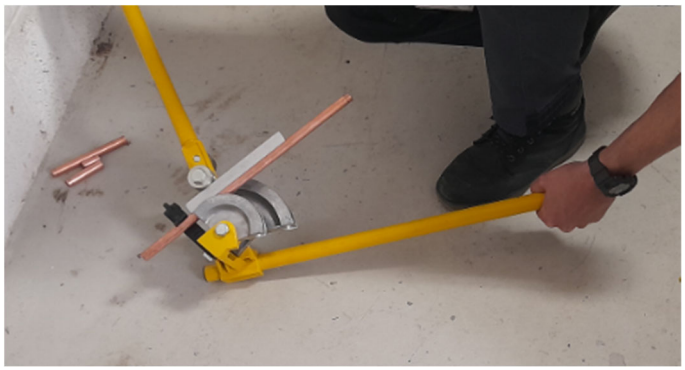
Pipework not level but within tolerance.

Photograph 7

Components correctly installed but not level.

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

Photograph 8



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

Results of tool usage.

Photograph 9

Component fitted correctly with signs of tool marks from installation.

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

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

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

Photograph 11

Incorrect clipped pipe, not plumb.

Commentary

Candidate demonstrates a good understanding of the installation requirements of both the gas cooker and the water heater. The correct process is followed, and the candidate demonstrates an ability to sequence tasks logically as set out in their method statements.

The candidate prepares the workstation with dust sheets and stores tools safely at some stages of the tasks, showing a good consideration and understanding of health and safety.

The candidate is mostly confident in the practical elements of the task, however, they require some reassurance from the assessor, for example with the selection and use of appropriate tools and components. The candidate can successfully select correct tools and components but at times looks for confirmation form the assessor before proceeding with the task. The use of tools is mostly good, however, some tasks require more than one attempt/ or the wrong tool is used, for example water pliers incorrectly used on brass fittings, resulting in tooling marks to pipework/ components.

The candidate meets some tolerances for the task.

The candidate completes the installation in the allocated time, however, it is clear that timing was not planned thoroughly and the later parts of the installation are rushed.

Candidate evidence

Practical Observation Form – Commissioning

Assessment ID	Qualification number
8710-354	8710-34
Candidate name	**Candidate number**
Candidate A	CG12345
Centre name	**Assessment theme**
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.

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	Candidate did not follow correct process for commissioning tests as detailed in the manufacturer instructions. Visual inspection and final checks are not completed which results in a failed tightness test. Candidate traces and repairs leak successfully. Commissioning checks and test are completed. • tightness test including let by test • purge • combustion analysis.

Assessor signature	**Date**
Assessor A	31/01/2021

Commentary

The candidate demonstrates a good understanding of commissioning and completes the required commissioning tests and checks for both installations, however, the tests and checks do not always follow a logical sequence. Test and checks are completed accurately but with some impact on timings, due to missing the visual inspection.

Candidate makes reference to manufacturer's guidance at some stages during the task.

Candidate records all relevant information from the commissioning checks accurately on the commissioning checklists.

Candidate evidence

Practical Observation Form – Handover to the customer

Assessment ID	Qualification number
8710-354	8710-34
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 –** *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.*
Handover to customer	Candidate has arms folded and doesn't make eye contact. 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. Candidate provides detail of maintenance requirements, e.g. cleaning processes, but misses information about service requirements by a gas safe registered engineer. Candidate makes reference to manufacturer's instructions at some stages of the task.

Assessor signature	Date
Assessor A	31/01/2021

Commentary

The candidate demonstrates a good understanding of the handover process and the operating principles of the systems and these were explained to the customer as part of the handover. The handover of the system to the customer was mostly clear and accurate, however, some minor details were missed, e.g. service requirements.

The candidate displays some customer care skills, but these were limited with minimal eye contact and interaction with the customer.

Candidate evidence

Practical Observation Form – Decommissioning

Assessment ID	Qualification number
8710-354	8710-34
Candidate name	**Candidate number**
Candidate A	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	Candidate follows a logical sequence for decommissioning. Candidate follows safe working practices at most stages of the decommissioning. The gas and electrical supply are safely isolated. Candidate removed cooker/water heater first to limit risk of damage. 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. 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.

Assessor signature	Date
Assessor A	31/01/2021

Photographic evidence

Decommissioning.

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

Photograph 12

Preparation for draining down: correct equipment and drain point used to drain down system pipework for decommissioning activities.

Decommissioning of pipework and components for both system installations.

Photograph 13

Pipework decommissioned correctly with minimal consideration of recycling.

No separation of different materials.

No separation of clean/dirty copper.

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

Photograph 14

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

Commentary

The candidate demonstrates good understanding of the decommissioning process and demonstrates the ability to sequence tasks logically whilst decommissioning the system.

The candidate correctly identified some of the components that can be reused, showing a good knowledge and understanding of the reuse and recycling of different materials.

The candidate followed the correct process for the safe disposal of waste and most of the components were recycled correctly.

The candidate shows some understanding of the methods and materials/ resources required to make working area clean and presentable. The candidate completed some of the process, by filling holes, however, does not have time/ or attention to detail lacking when sanding back or re-painting, resulting in a poor-quality finish, demonstrating minimal consideration to customer property.

House keeping was mostly good and candidate made attempts to clean water spillages and debris from sanding.

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**

Candidate evidence

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.

Commentary

The maintenance report completed is brief and, in a bullet-pointed format.

The candidate demonstrates good understanding of the maintenance requirements, for the given task, and provides a brief but accurate description of the fault diagnosis process.

The candidate identifies a brief but accurate 5 step process/ sequence to rectify the fault, which shows a good knowledge and understanding of how to repair and rectify the fault.

No reasoning has been given to support the methods selected to rectify the fault.

Candidate evidence

Practical Observation Form – Fault diagnosis and fault rectification

Assessment ID	Qualification number
8710-354	8710-34
Candidate name	**Candidate number**
Candidate A	CG12345
Centre name	**Assessment themes**
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 discussion	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. The candidate asked various questions to gain an insight into the fault and some of these where irrelevant to the task. Appropriate questions were eventually asked: • What is happening? • Frequency of fault? • How long has the fault been happening? 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 that systematic fault analysis using manufacturer instructions. Candidate carries out a visual inspection of the system to identify the source of the fault.
Fault rectification	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. Candidate follows a logical sequence, safely isolating the water heater prior to selecting the correct tools to remove and replace the defective component. 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. The candidate completed the repair efficiently with only minor mistakes, but was hesitant when carrying out the task

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.*
	There was a lack of order to the fault rectification process which had minor impacts on time management.

Assessor signature	Date
Assessor A	31/01/2021

Photographic evidence

Results of tool usage.

Photograph 15

Component fitted correctly with signs of tool marks from installation of replacement component.

Sequence of photos which show the replacing and removal of the faulty component, and reinstallation of the new component.

Photograph 16

Loosening of faulty component using the correct tool.

Photograph 17

Removal of faulty component.

Photograph 18

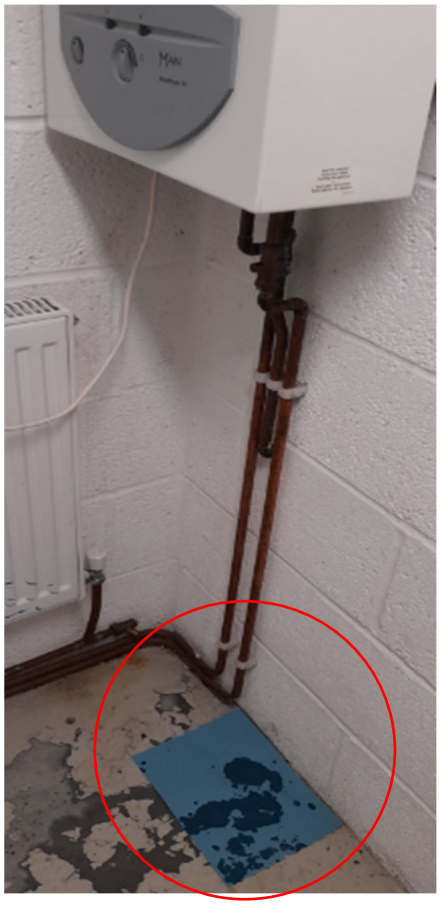
Component removed during repair activity.

Photograph 19

Replacement of component.

System on completion of all works.

Photograph 20



Repair completed with signs of leaks which have been repaired.

Commentary

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.

The T Level is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.