EAL Building Services Engineering (Level 3) - Plumbing and Heating C00/4278/7

Assessment Pack

Version 1.3 – October 2025

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Version information

Version and publication date	Changes
v1 June 2021	Original document
v1.1 February 2023	Grading information in Section 3 updated to highlight that grade boundaries may vary between versions
v1.2 August 2024	Adjusted marks for the Practical Project and amended the mark boundary for the overall grade (pages 37, 50, 60, 62 and 65) Added the design criteria in the MAC 7a and/or 7b (pages 19 – 22)
v1.3 October 2025	Section 4 – updated the assessment specifications (MAC) Section 4, page 28 – removed the requirement for planning evidence submission dates to be agreed no less than 2 weeks before practical work is scheduled to start Section 5, page 48 – updated the available recording methods for the Professional Discussion Appendix 1 – updated the marking grid so there is alignment with the assessment specifications (MAC)

1. Introduction

What is in this document?

- Assessment structure and criteria
- Learner tasks and guidance
- Assessor guidance on assessments, tasks and grading.

Assessment overview

The focus of the assessments is for the learner to fully demonstrate the knowledge, skills and understanding set out in the qualification content.

The learner will be assessed in a number of ways to provide a clear indication of their learning. For this qualification, the learner must successfully complete:

- Two **On-screen assessments** consisting of a range of multiple-choice question types
- A **Practical Project** made up of three sections that requires the learner to show their planning, practical, performing and evaluating skills
- A **Professional Discussion** that contains one section, including the learner's reflection on completion of their Practical Project.

Due to the nature of the assessments, the Practical Project **must** be undertaken prior to the Professional Discussion.

Assessment structure

Assessment	On-screen assessments	Practical Project	Professional Discussion
Approach	Externally set and marked	Internally set, externally verified, internally marked	Externally set, verified and marked
Output	Grade	Grade	Grade
Weighting (contribution to overall qualification grade)	20%	60%	20%

General delivery guidance

Introducing the assessment to learners

The assessor must introduce each of the assessments to the learner when they are deemed ready and prepared to undertake the assessment. This must occur following a period of learning and formative assessment. The assessor must provide a full overview of the assessment process and of the different assessments, so that the learner is fully clear on the assessment journey before they start their first assessment.

Release of the assessment to the learner confirms that the internal assessor has confidence that the learner has undergone sufficient teaching and guidance to have developed a depth of understanding that provides them the opportunity to respond successfully to each of the tasks.

Timings between assessments

The Professional Discussion can only take place once the learner has completed the Practical Project. Centres must ensure a manageable transition between these two assessments. As the discussion builds on the learner's project, it is recommended that a gap of no more than three weeks is left between the learner's finalisation of their project and completion of the Professional Discussion. Professional Discussions must be scheduled using EAL Online Services, providers must schedule Professional Discussions in good time to allow the above timescales to be met.

The On-screen assessment may be taken at any stage in the assessment process, although it is recommended that this is completed prior to the Practical Project and Professional Discussion.

Equal opportunities and diversity

The Consortium expects individuals to have equal access to this assessment irrespective of their sex, marital status, age, religion, colour, race, nationality, ethnic origin or disability. In essence, complying with relevant equalities legislation.

Centres are required to have in place a policy to ensure that such discrimination does not occur either directly, indirectly or as a result of pressure from other bodies. This policy must apply to all satellite centres and there must be arrangements in place to monitor its application and effectiveness. In the unlikely event that complaints relating to issues of inequality cannot be satisfactorily resolved by the centre, learners must be made aware of their right to appeal to EAL through the arrangements outlined in our Appeals Policy.

Level of language

The assessment is intended for learners within Wales. It is not a test of Welsh or English comprehension. Therefore, with the exception of technical terms that are appropriate to the purpose and level of the assessment, the language must be at an appropriate level for the learner. Assessors must also take care to ensure that use of language takes account of the fact that not all learners may have Welsh/English as their first or additional language.

Plagiarism

Your assessor can clarify task instruction and methods for saving work but cannot assist during the assessment in any way.

This is an assessment of your abilities, so the work must be all your own work and carried out under the conditions stated.

Where research is allowed, your tutor/assessor must be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge all sources and clearly reference any information taken from them.

Academic misconduct

Where the Assessor suspects malpractice by the centre/learner – including academic misconduct or collusion, this must be reported in line with the EAL's malpractice policy which can be found on Online Services.

2. Learner guidance

Assessment overview

You are required to complete the following assessments:

On-screen assessments

There are **two** On-screen assessments to complete, each consist of a range of multiple-choice question types and will assess your knowledge and understanding. If you have achieved the Progression (level 2) in Plumbing and Heating qualification, then you do not have to complete Test 1 as part of this qualification as they are the same test. You will only need to take and pass Test 2. If you have not taken the Progression qualification, you must take, and pass both Test 1 and Test 2 to successfully achieve this qualification.

Practical Project

The Practical Project will assess your abilities in your chosen trade area, and will require you to

- **Plan** out the works required for your chosen trade in a larger project
- **Perform** the practical tasks, demonstrating your skills in your chosen trade
- **Evaluate** the approaches you took towards completing the project and the quality of your outcomes.

The Practical Project is also designed to ensure you have the opportunity to demonstrate wider employability skills including:

- Calculation of cost and resourcing
- Time management
- Effective planning
- Setting personal targets
- Problem-solving
- Evaluation skills.

Each element of the project (planning, performing and evaluation) will be marked by your assessor and the project will be graded.

Professional Discussion

Following completion of your Practical Project, you will be required to complete a Professional Discussion. The Professional Discussion will consist of one part within which you will be required to reflect on the Practical Project you have completed within the discussion.

Practical Project task instructions

This is a formal assessment, and you will be marked on the quality and accuracy of your practical performance. It is therefore important that you carry out your work to the highest standard possible. You must show how well you know and understand your chosen trade and how you are able to use your knowledge and skills together to complete the tasks.

You will work with your employer and learning provider to identify, discuss and agree **no more than 4 work-based tasks** to evidence the required criteria that will be completed as part of the Practical Project. Your learning provider will provide details of the criteria which must be achieved as part of this qualification, which will then inform the decision on the number and scale of the work-based tasks to be completed.

This project has three elements: planning, performing, and evaluating.

The project assessment will take place over approximately 74 guided learning hours (GLH), which must include all planning, performing and evaluation elements as follows:

- Approximately 12 hours to complete the planning for your practical tasks
- Approximately 50 hours to complete the practical tasks set in agreement with your employer and learning provider
- Approximately 12 hours to complete the evaluation of your practical tasks.

You will be required to devise a plan(s) showing the approach you will take to complete the tasks agreed to be completed within the project.

As part of the Practical Project you will be required to work towards a specification for each task, set by your employer. Examples of the specification include, but are not limited to:

- A recognised international standard
- A recognised code of practice
- Regulations and Industry Standards
- A work order or job sheet
- Manufacturer's handbook or manual
- Internal company standard
- Customer acceptance criteria.

Once the work-based tasks have been completed you will be required to evaluate your work.

You are required to complete the three sections of the assessment (Planning, Performing, Evaluating) in the order outlined below:

Planning

The tasks to be completed as part of this assessment must be agreed by you, your employer and your assessor.

You must produce and submit for initial assessment planning documentation for all tasks agreed. Initial assessment is to ensure each plan achieves a threshold pass, this must be completed before practical activity is undertaken for each plan, as outlined below.
Planning evidence must be submitted as an electronic copy.

This will be undertaken within a supervised office, classroom or other suitable environment and you will have access to IT equipment and appropriate resource materials (e.g. layout drawings, architectural plans, site layout drawings, etc.) for you to carry out your research. You will not have access to completed employer plans for the work being undertaken as part of the assessment activity.

You will be required to produce the following for each agreed task:

- resource list including tools, materials and equipment needed to complete each task
- method statement identifying work methods that will make the best use of resources (considering cost and waste implications from a financial and environmental perspective) and meet specification, statutory and contractual requirements, with a rationale for why the methods planned are the most appropriate
- schedule of works (with timelines) – your plan must indicate how long you estimate you will take to complete the task, how you plan to phase/order work and any milestones you wish to achieve (for example the main activities in task), including a rationale for why the phasing/ordering of work is the most appropriate approach
- risk assessment and description of risks to delivering work to quality and time requirements and how these risks could be avoided
- success criteria for the task – what will success look like for the task from the perspective of quality of work, material usage, quality of finish
- outline of communication methods and styles that will be used with a range of stakeholders including clients/customers, employers, colleagues, etc.

Your employer and/or assessor will provide any proforma templates required to support planning activity (e.g., risk assessment, method statement). **You must clearly record the total time spent on each plan.**

Planning documents must be submitted to your assessor in line with the dates agreed as part of the assessment/task planning process, your assessor will outline this process to you.
Planning documents must achieve a threshold pass score before being used to support the performing element of each task. Your assessor will let you know whether this has been achieved before you are scheduled to undertake any work based on the plan submitted.

Where success criteria have been set by the employer or customer (e.g., in a job specification or customer specification) for a job being undertaken as part of the assessment, these must be incorporated into your plan alongside your own success criteria and clearly identifiable as employer or customer set.

Only the plan for the largest job undertaken as assessed work will contribute towards your overall grade. The largest job is considered to be the job from which the largest number of criteria will be evidenced.

In this instance a job is defined as a large piece of work undertaken by an organisation/employer/team/etc, which is made up of smaller tasks.

Performing

This element of the assessment will include tasks, where you will showcase the skills that you have learned and acquired. You will use the plan(s) that you have created and complete the task(s) that have been agreed with your employer and learning provider, to meet the employer set specification.

The assessor will carry out assessment visits. This will include observing you performing different competencies at different stages of the task(s), discussing your work with you (the approach taken, methods used, etc) and/or examining your completed work.

A member of staff from your employer, agreed by your learning provider, can act as an expert witness to gather evidence of you completing elements of your agreed project tasks. This evidence will then be shared with your assessor to support the assessment decision and be in the form of, videos, photos, witness testimony or written reports.

You must always work safely when carrying out practical tasks and use any required PPE.

Evaluating

Upon completion of the practical elements of the project you are required to write an evaluation report which reflects on the project. Within this report you must evaluate the approaches taken towards completing the tasks and the quality of the outcomes, comparing the project outcomes with the agreed plan including the success criteria you set.

You will undertake this in an office, classroom or other suitable environment.

Your evaluation must cover:

- Did you meet your success criteria?
- Did you meet the task requirements set within the specification (provided by your employer)?
- Reflect on your own performance – strengths, weaknesses, overall quality of work outputs;
- Review whether timescales were achieved, if not why and what steps could've been taken to avoid this?
- Evaluate handovers – was the information provided clear and did it achieve its' intended purpose, was the correct method of communication chosen?

Also consider as relevant:

- What went well?
- What did not go well?
- What would you do differently if you were to complete the task again? Would you use a different approach next time?
- What impact would working in a different context have had on the project? (e.g. working in/on a building from a different period, having access to tools from a different time period, etc)
- What problems did you encounter? How did you overcome them?
- How well did you communicate with others? Did you build effective working relationships?
- What did you learn in the project?

You are required to write an evaluation report which reflects on the largest job undertaken as part of the project. (As defined above, the largest job is considered to be that which aims to evidence the broadest range of criteria.)

Health and safety

You must always work safely. You must always follow any relevant health and safety regulations and codes of practice.

If your employer/tutor/assessor sees you working in a way that is unsafe for yourself or others, they will ask you to stop immediately, and tell you why. This may lead you to failing the assessment depending on the severity of the infraction.

Presentation of work

Written responses are required for the tasks within the planning and evaluation section of the project. Written responses must be provided as electronic, typed responses. You must ensure that your work is presentable, i.e. use a standard font in a readable size (such as Times New Roman, or equivalent, size 12), use double spacing and include adequate margins.

You must make sure that each piece of submitted work is clearly labelled with your name, centre number, learner number and the assignment reference.

All electronic files must be saved in the following format: SURNAME_FIRST NAME_NAME OF ASSESSMENT_DATE

Professional Discussion

The Professional Discussion is completed in one timed sitting, focussing on your reflections of the work undertaken as part of your Practical Project, and any learning which you could apply to wider contexts within the trade area.

You must complete your Practical Project before undertaking the Professional Discussion.
You are permitted to have your project documentation with you for reference in the Professional Discussion.

You are advised that your assessor will record the Professional Discussion for assessment purposes.

You must have successfully achieved your Employer confirmation for the chosen trade route before you can undertake the Professional Discussion, your learning provider will provide more information on this process.

Timing

The Professional Discussion will last for 40 minutes.

Information to support preparation for the Professional Discussion:

Within this assessment, assessors will seek to gather evidence from across the following discussion areas:

Reflection on the Practical Project

Unit 304

1.1 Organise the resources required
1.2 Set success criteria for the task(s)
1.3 Carry out effective planning
1.4 Rationalise why the proposed approach is the most appropriate
1.5 Recognise cost and waste implications of the work and how these have been taken these into account
1.6 Manage risks associated with completing the task and recognise the steps to be taken to stop risks becoming problems
1.7 Identify the handover requirements of work

2.1 Review the appropriateness of success criteria set
2.2 Evaluate the resource selection and usage
2.3 Evaluate the finished output
2.4 Evaluate own performance
2.5 Review the achievement of timescales
2.6 Evaluate the handover.

Unit 302

2.1 How to develop and maintain productive working relationships
2.2 How to communicate effectively with clients, employers, colleagues and with other stakeholders throughout built environment projects

Unit 301

4.1 The considerations required when performing building services engineering work on pre-1919 buildings and structures.
4.2 Post-1919 and modern construction techniques and building services
4.3 The new and emerging technologies in the building services engineering trade and the impact they are having/may have on existing practice.

3. Assessor guidance - On-screen assessment

Introduction

The On-screen assessment provides learners with the opportunity to demonstrate their knowledge and understanding from across the core learning areas. The on-screen assessments will feature a range of engaging multiple-choice question types and styles, that include ‘drag and drop’, ‘2 of 5’ and ‘hotspot’ questions.

There are two tests that learners must achieve as part of this qualification: Test 1 and Test 2. If learners have achieved the Progression in Building Services Engineering (Level 2) qualification in the same trade chosen within this qualification already, then they are exempt from Test 1, as it is the same test as the Progression qualification, they need only to achieve Test 2. Learners who have not achieved a Progression qualification, or achieved it in a trade different to the one chosen within this qualification, they must achieve both Test 1 and Test 2.

Assessment information: Test 1

Number of questions	50
Marks available	50
Grading	The table below provides indicative grade boundaries for the On-screen assessments; these may vary between versions of these assessments:

Marks (Sample test example)	Assessment Grade	Points
0 – 32	Fail	0
33 – 34	P1	1
35 – 36	P2	2
37 – 39	M1	3
40 – 42	M2	4
43 – 45	D1	5
46 – 49	D2	6
50	D3	7

Type of questions	Multiple-choice
Time allowed	75 minutes
Availability	This assessment is available on-screen on demand. Centres are able to 'book' tests for their learners on a date and time suitable for them. Learners will sit the assessment securely via the on-screen platform.
Assessment Conditions	The test will be carried out online and marked electronically. There is no internal or external verification required. Assessments must be invigilated by a member of staff who have undertaken invigilator training. No reference material permitted. Non-programmable calculator required.
Results	Results for the On-screen assessment will be released immediately following the assessment. A result release will be required from EAL for new versions when they are released.
Resit arrangements	Learners who fail to achieve the required mark for a pass on sitting the assessment are permitted to re-sit. If learners fail to successfully achieve the assessment at the first attempt, they are permitted to resit. There are no limits to the number of times that a learner may resit the assessment. When resitting, learners can achieve the full range of marks and grades available.

Assessment information: Test 2

Number of questions	60
Marks available	60
Grading	The table below provides indicative grade boundaries for the On-screen assessments; these may vary between versions of these assessments:

Marks (Sample test example)	Assessment Grade	Points
0 - 39	Fail	0
40 - 41	P1	1
42 - 43	P2	2
44 - 46	M1	3
47 - 49	M2	4
50 - 54	D1	5
55 - 59	D2	6
60	D3	7

Type of questions	Multiple-choice
Time allowed	90 minutes
Availability	This assessment is available on-screen on demand. Centres are able to 'book' tests for their learners on a date and time suitable for them. Learners will sit the assessment securely via the on-screen platform.
Assessment Conditions	The test will be carried out online and marked electronically. There is no internal or external verification required. Assessments must be invigilated by a member of staff who have undertaken invigilator training. No reference material permitted. Non-programmable calculator required.
Results	Results for the On-screen assessment will be released immediately following the assessment. A result release will be required from EAL for new versions when they are released.
Resit arrangements	Learners who fail to achieve the required mark for a pass on sitting the assessment are permitted to re-sit. If learners fail to successfully achieve the assessment at the first attempt, they are permitted to resit. There are no limits to the number of times that a learner may resit the assessment. When resitting, learners can achieve the full range of marks and grades available.

Assessment specification - On-screen assessment

Assessment specifications for the On-screen assessments within this qualification can be found in Appendix 3 of this document.

4. Assessor guidance – Practical Project

Introduction

Learners are required to complete a Practical Project assessment, that covers the chosen trade area. The planning and evaluation task instructions provided to learners are generic for all trades, **the employer and centre must agree no more than 4 work-based practical assessment tasks** to achieve the minimum assessment content (MAC) and trade content requirements provided within this document.

The assessment **will include a minimum of 3 assessment visits** as outlined in the task specific guidance included below. Learners are required to **plan** the task(s), **perform** the practical elements, and **evaluate** the approaches taken towards completing the task(s) and the quality of the outcomes, completing an evaluation report.

The criteria covered within the assessment must include the **minimum assessment content (MAC)** detailed in the Planning, Performing and Evaluation tables below. In addition to the MAC outlined below the assessment must meet the additional trade criteria requirements, also detailed below. These indicate the minimum number of trade specific criteria which must be demonstrated within the practical element of the project, in addition to the criteria listed in the MAC.

The criteria selected to meet the MAC must be agreed by the employer and the provider prior to the assessment. The learner must work with the employer and the provider to agree when they are ready for assessment, and when and where these will take place.

The Task Planning documents provided must be used to identify the jobs and tasks from which criteria will be evidenced.

Within the context above, “task” and “job” are defined as follows:

- Task: a defined piece of work which is mapped to the criteria and will be assessed
- Job: a large piece of work undertaken by an organisation/employer/team/etc, which comprises of smaller tasks.

The Practical Project has approximately 74 guided learning hours (GLH) assigned to it, which is to be allocated across the planning, practical and evaluation elements as follows:

- approximately 12 hours to complete the planning for practical tasks
- approximately 50 hours to complete the practical tasks provider
- approximately 12 hours to complete the evaluation of practical tasks.

Planning assessment specification (MAC)

1. Planning	Unit and Criteria Reference
Criteria 1	
Produce a resource list that identifies tools, equipment and materials required to complete the task.	Unit 304 - 1.1
Criteria 2	
Produce a schedule of works and method statement to plan the ordering/phasing of work and the methods which will be used to complete the task, explaining why this is the most appropriate way to approach the work. Identify what cost and waste implications there are and how these have been taken these into account.	Unit 304 - 1.3, 1.4, 1.5
Criteria 3	
Produce a risk assessment to identify any potential risks to health and safety, and identifies risks to delivering work on time and to the quality expected. The learner identifies the steps they'll take to prevent risks becoming problems.	Unit 304 - 1.6
Criteria 4	
Set success criteria for the task; identify appropriate success criteria for the task which are achievable and measurable, including smaller milestones which identify key activities, material usage, and quality of finish etc. that support the learner in successfully completing the task and meeting the specification.	Unit 304 - 1.2
Criteria 5	
Plan communication methods and styles to be used when communicating with a range of stakeholders. Identify the information they would need to include in a handover of work to a subsequent trade and/or customer and the most appropriate format to communicate this information.	Unit 302 - 2.2 Unit 304 - 1.7
Criteria 6	
Identify hazards and risks.	Unit 312 - 3

Performing assessment specification (MAC)

2. Performing	Unit and Criteria Reference
4 out of the following 6 criteria must be covered **7a and/or 7b is mandatory**	
Criteria 7a	
Measure and mark out the locations for fitting and fixing the selected appliances, components and accessories in accordance with the plumbing and heating system's design and manufacturer instructions. **Systems** Candidates must be assessed on installing **one** from the following three: • central heating systems • sanitation systems • gravity rainwater systems. **The Pipework** Candidates must be assessed on installing pipework using **at least one** of the following: • copper • plastic pressure pipe • steel (screwed or pressed) • stainless steel • plastic (sanitary) • rainwater. **Fit, fix and connect the selected appliances, components and accessories** in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions. **Systems** Candidates must be assessed on installing **one** from the following three: • central heating systems • sanitation systems • gravity rainwater systems. **The Pipework** Candidates must be assessed on installing pipework using **at least one** of the following: • copper • plastic pressure pipe • steel (screwed or pressed) • stainless steel	Unit 321PH *Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques* LO 3 3.1 LO 16 16.1 16.2 LO 17 17.1, 17.2, 17.3

• plastic (sanitary) • rainwater. **Jointing methods** Candidates must be assessed on jointing using **two** of the following: • compression • push fit plastic pressure • push fit waste • threaded/screwed • soft soldered • crimped • glues/adhesives • fusion welded. **Important note:** If completing **both 7a and 7b**, the following criteria only needs to be completed **once** across **both** 7a and 7b: **Select appliances, components and accessories and confirm that they are of the right type and size, fit for purpose** in accordance with the plumbing and heating system's design, and suitable for the working environment in which they are to be installed. Candidates must be assessed on **one** of the following (it is expected to be the system type installed): **Central Heating** • Calculate central heating system requirements used in dwellings Range: total heat load, emitter load, hot water allowance, pipe size, pump size, emitter size, expansion • Select components in accordance with calculations from predetermined data Range: emitter, boiler, pipe, pump, expansion vessel. **Rainwater** • Calculate system requirements used in dwellings • Select components in accordance with calculations from predetermined data. **Sanitation** • Calculate system requirements used in dwellings Range: gradient, diameter, length, material, system type • Select components in accordance with calculations from predetermined data.	
Criteria 7b	

Measure and mark out the locations for fitting and fixing the selected appliances, components and accessories in accordance with the plumbing and heating system's design and manufacturer instructions. **Systems** Candidates must be assessed on installing cold **and** hot water systems. **The Pipework** Candidates must be assessed on installing pipework using **two** of the following: • copper • plastic pressure pipe • steel (screwed or pressed) • stainless steel. **Fit, fix and connect the selected appliances, components and accessories** in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions. **Systems** Candidates must be assessed on installing cold **and** hot water systems. **The Pipework** Candidates must be assessed on installing pipework using **two** of the following: • copper • plastic pressure pipe • steel (screwed or pressed) • stainless steel. **Jointing methods** Candidates must be assessed on jointing using **two** of the following: • compression • push fit plastic pressure • threaded/screwed • soft soldered • crimped. **Important note:** If completing both **7a and 7b**, the following criteria only needs to be completed **once** across **both** 7a and 7b: **Select appliances, components and accessories and confirm that they are of the right type and size, fit for purpose** in accordance with the plumbing and heating system's design, and	Unit 321PH *Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques* LO 3 3.1 LO 16 16.1 16.2 LO 17 17.1, 17.2, 17.3

<table>
<tr><td colspan="2">suitable for the working environment in which they are to be installed.

Candidates must be assessed on one of the following (it is expected to be the system type installed):

Cold water
Calculate system requirements used in dwellings.
Range: storage requirements, pipe size, outlet size and type.
Select components in accordance with calculations from predetermined data.
Range: storage requirements, pipe size, accumulator, safety device, booster pump.
Hot water
Calculate system requirements used in dwellings.
Range: storage requirements, pipe size.
Select components in accordance with calculations from predetermined data.
Range: storage vessel, pipe, pump, expansion vessel, safety device.</td><td></td></tr>
<tr><td colspan="2">Criteria 7c</td><td></td></tr>
<tr><td colspan="2">Fit, fix and connect the selected appliances, components and accessories in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions.

Components
Candidates must be assessed on six components from Group A with at least three on more than one occasion and three components from Group B:</td><td rowspan="2">Unit 321PH
Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques
LO 17.4</td></tr>
<tr><td>Group A
bath
WC
wash hand basin
sink
shower and tray
cylinder
boiler (connections)
soil stack system
rain water/guttering system
F&E/CWSC Cistern
pump
motorised valves</td><td>Group B
urinal
bidet
booster pump/shower pump
accumulators/expansion vessels
fan convector
low loss header
macerator or waste water lifter/pump
greywater/rainwater station
water softener/filter</td></tr>
</table>

• radiator
• water conditioners/filters.
	• refrigerator cold connection
	• washing machine/dishwasher
	• underfloor heating circuit and underfloor manifold
	• outside tap installation
	• backflow protection components, i.e.
	  ○ EA
	  ○ EB
	  ○ EC
	  ○ ED.	

Criteria 7d		

Commission appliances, components and accessories, adjusting safely and effectively the control features in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions.
 	
Systems
Candidates must be assessed on:
• cold **and** hot water systems
• **one** from the remaining three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
		Unit 321PH
		Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques
		LO 22 22.1

Criteria 7e		

Carry out service and maintenance activities and procedures in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions.
 	
Systems
Candidates must be assessed on:
• cold **and** hot water systems
• **one** from the remaining three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
		Unit 321PH
		Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques
		LO 24 24.1

Criteria 7f		
Carry out the methods and techniques for disconnecting, installing and/or connecting electrical equipment, cables/wiring, accessories and components in accordance with the mechanical building services (plumbing and heating) system's		Unit 320PH *Performing Electrical Work on Plumbing and Heating Systems* LO 6 6.4

design, manufacturer instructions and the correct procedures for safe isolation.
 	
Candidates must be assessed on **four** components, with **at least one on more than one occasion:**
• boiler
• central heating controls
  ○ zone valves (2 port, 3 port, mid position and diverter)
  ○ programmer
  ○ timer
  ○ thermostats
  ○ programmable room stat
  ○ optimizer
  ○ frost stat
  ○ wiring centre
  ○ cylinder stat
  ○ wi-fi routers
  ○ wi-fi range extenders.
• wiring centres.
• immersion heater
• instantaneous shower
• shower pump
• jacuzzi bath/hot tub
• macerator WC
• heat producing or cooling appliances
• pumps
• fans.
 	
Carry out Industry recognised methods and procedures for the functional testing of the electrical equipment, accessories and components associated with the electrical supply and/or control of the mechanical building services system.
	LO 8

All of the following criteria (7g to 7j) must be covered	
Criteria 7g	
Apply relevant organisational procedures. This should include: • information management • method statement • project management • risk assessment • implementing and monitoring health and safety requirements and issues • implementing and monitoring issues relating to the natural environment • customer services • accident reporting	Unit 312 Apply Health and Safety and Environmental Legislation in the Building Services Engineering Sector LO 2

• emergencies • communication with relevant people.	
Criteria 7h	
Ensure that the plumbing and heating system cannot be accidently reactivated or become dangerous.	Unit 321PH *Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques* LO 14
Criteria 7i	
Confirm the integrity of the installed system using appropriate testing procedures.	Unit 321PH *Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques* LO 18
Criteria 7j	
Safe isolation of **electrical equipment** and **components** associated with the electrical supply of the plumbing and domestic heating system.	Unit 320PH *Performing Electrical Work on Plumbing and Heating Systems* LO 6.3

Additional trade criteria requirements

*Within this section the Consortium will list requirements of additional content, over and above the MAC, which must be covered. The table below identifies the minimum number of additional criteria from **each** unit which must be achieved, allowing employers and centres to select the criteria most appropriate to the task(s). Criteria selected to satisfy the below must be different to those specified in the table above.

Trade unit	Additional number of criteria to be covered
Apply Health and Safety and Environmental Legislation in the Building Services Engineering Sector	4 criteria from across 4 of the units
Establish and Maintain Relationships in the Building Services Engineering Sector	
Coordinate a Work Site in the Building Services Engineering Sector	
Performing Electrical Work on Plumbing and Heating Systems	
Performing Plumbing and Heating Systems Installation, Commissioning, Service and Maintenance Techniques	

Evaluation assessment specification (MAC)

3. Evaluation	Unit and Criteria Reference
Criteria 8	
Evaluate work completed against the specification and success criteria – output fit for purpose, safe and in line with specification requirements, quality of work. Evaluate tool selection.	Unit 304 – 2.3, 2.2
Criteria 9	
Were success criteria that the learner set appropriate, did they support successful and efficient achievement of the task.	Unit 304 – 2.1
Criteria 10	
Evaluation of own performance – strengths, weaknesses, areas for improvement. Overall quality of work (fit and finish, etc).	Unit 304 – 2.4
Criteria 11	
Review achievement of timescales – reasons for delays if they occurred and what action could've be taken to prevent/avoid this.	Unit 304 – 2.5
Criteria 12	
Evaluate handover – quality and clarity of information provided, achievement of purpose of the handover, success of communication method chosen.	Unit 304 – 2.6 Unit 302 – 2.2

Task specific guidance

Planning task

The **Task Planning Document** must be completed and agreed by the centre, employer/supervisor and learner prior to the project starting.

The assessment will be internally assessed and quality assured. The planning stage of this assessment must take place within a supervised office, classroom, or other suitable environment that allows the learner to safely plan their work. Employers and/or centres must allocate a member of staff to supervise the planning element and ensure all stated assessment conditions are met – this member of staff will also confirm/validate the time taken to complete each plan by signing the learner's planning documentation.

Learners must produce and submit for initial assessment planning documentation for all tasks agreed (this must be no more than 4 tasks). Initial assessment is to ensure each plan achieves a threshold pass, this must be completed before practical activity is undertaken for each plan, as outlined below. As per the guidance provided to learners, planning evidence must be submitted as an electronic copy.

No set recording forms have been provided for written documentation such as risk assessments or method statements. Employer held or centre-based proformas must be used. **Learners must complete their own versions of these documents for assessment purposes, even if employers have already completed these -** learners must not have access to completed employer plans for the work being undertaken as part of the assessment activity. **Learners must record the total time spent producing each plan, this must be validated by the person assigned to supervise the development of each plan.**

Assessors and employers must, as part of the assessment/task planning process, agree dates for the assessment of practical criteria in the workplace. Based on these plans, assessors, employers and learners must agree a suitable time to allow assessment and potential resubmission of this evidence **before** practical tasks begin.

To support the manageability of ongoing assessment and potential resubmission, the assessor **must mark the planning element and confirm that a minimum threshold pass score has been achieved by gaining at least 1 mark for all criteria for each plan** (details of this can be found in the Marking and Grading section of this document).

Where a threshold pass score isn't achieved for the planning evidence submitted for initial assessment, learners must be given time to revise their plan(s) and resubmit to meet the requirements for failed criteria and achieve a threshold pass – learners must be notified of the criteria they have failed but must not be given guidance on why or what action must be taken.

Learners must **achieve a threshold pass score for each plan** within the planning task.

Notification that a threshold pass score has been achieved for each plan must be provided to learners at least 1 week before practical work is scheduled to start for each plan.

Only the plan for the largest job undertaken as assessed work will contribute towards the overall grade. The largest job is the job from which the greatest number of criteria will be evidenced.

Learners will identify success criteria for the job(s) being undertaken, where employer or customer success criteria exist these must be incorporated into the learner's plan alongside their own success criteria, and clearly identified as employer or customer set criteria.

The learner's plan must show that they have considered the criteria listed within the Planning element of the minimum assessment content (MAC), the following provides a summary of the content to be covered:

- resource list including tools, materials and equipment needed to complete each task
- method statement identifying work methods that will make the best use of resources (considering cost and waste implications from a financial and environmental perspective) and meet specification, statutory and contractual requirements, with a rationale for why the methods planned are the most appropriate
- schedule of works (with timelines) – the learner's plan must indicate how long they estimate they will take on each task, how they plan to phase/order work and any milestones they wish to achieve (for example the main activities in tasks), including a rationale for why the phasing/ordering of work is the most appropriate approach
- risk assessment and description of risks to delivering work to quality and time requirements and how these risks could be avoided
- success criteria for the task – what will success look like for the tasks from the perspective of quality of work, material usage, quality of finish
- outline of communication methods and styles that will be used with a range of stakeholders including clients/customers, employers, colleagues, etc.

The learner's submitted planning work will be assessed outside of the assessment visits against the criteria listed in the planning marking grid in Appendix 1.

Practical task (performing)

This element of the assessment will include the learner showcasing the skills they have learned and acquired. The learner will use the plan that the employer has signed off to complete the task(s).

The assessor will use an assessment plan as a basis for carrying out **a minimum of 3 assessment visits**. This will involve gathering evidence of the learner performing different competencies and at different stages of the tasks, and/or examining their completed work. Assessment visits must be planned to allow assessment of all criteria listed within assessment plans. **Assessment visits must include direct observation of the learner** evidencing the criteria required.

Assessors must aim to assess jobs and tasks at different stages to allow for the consideration of how both work and the learner are developing in assessment decisions. Assessors must aim to assess individual criterion in only one assessment visit as much as is feasibly possible – some criteria are larger than others and require multiple tools, techniques, methods, materials, etc to be used, in this scenario criteria may need to be assessed over multiple assessment visits, where this is necessary assessors must make a holistic assessment decision for criteria based on the performance of the learner across the assessment visits.

Direct observation of the learner is the primary assessment method, additional supporting evidence can be utilised but will be supporting evidence to assessment visits only and cannot be used as the only source of evidence for assessment criteria.

Requirements where direct observation is not possible:
If circumstances change and planned direct observation cannot take place, plans for another observation must be made. If direct observation of any criteria is not possible a clear rationale for why this could not take place must be provided within a revised assessment plan, along with the alternative evidence type that will be used to evidence the criteria.

Additional supporting evidence can include:

- video evidence
- photographic evidence
- expert witness testimony from a designated employer representative.

The above additional supporting evidence must be produced and validated by a designated employer representative – this is to be agreed between the employer and centre, with a record of the representative's qualifications/level of experience provided to the assessor and retained by the internal assessor for quality assurance purposes.

Expert witness testimonies can be used to **support the assessment decisions of the assessor** for work completed prior to or between assessment visits related to the identified assessment tasks. A record of witness testimonies, where they occur, must be kept to support both internal and external quality assurance activity.

Witness testimony cannot be the sole means of evidence for assessment, observation of the learner, and work product evidence must be made available to assessors during assessment visits.

Where these additional supporting evidence types are used, they must valid, reliable and clearly attributable to the learner. Electronic copies of any additional evidence used to support assessment decisions must be retained to support internal and external quality assurance activities.

This evidence will be used to assist the assessor to make informed decisions regarding the learner's performance during the observed periods of assessment and the marking process.

Only work identified in the agreed assessment task(s) will be considered part of the evidence for the overall assessment and completed work will need to be validated by the designated employer representative.

The assessor will use the marking grids when assessing the learners work. For each visit the assessor will mark the learner against the relevant section of the marking grid.

The assessor will need to plan carefully to ensure the learner's work can be inspected at appropriate stages.

The learner must always work safely when carrying out the practical task(s).

The learner's work will be marked using the MAC in the in the context of the specification. This specification will be relevant to the task and set by the employer. Examples of the specification include, but are not limited to:

- A recognised international standard
- A recognised code of practice
- Regulations and Industry Standards
- A work order or job sheet

- Manufacturer's handbook or manual
- Internal company standard
- Customer acceptance criteria.

Evaluation task

The purpose of this element is for the learner to reflect on and evaluate the approaches they took towards completing the task(s) and the quality of the outcomes.

Learners must produce, and submit for assessment, an evaluation for the largest job undertaken as assessed work. The largest job is considered to be the job from which the largest number of criteria will be evidenced.

As part of the evaluation, learners can include witness testimony/client feedback and evaluate that against their success criteria and lessons learned.
The learner's evaluation must show that they have considered the criteria listed within the Evaluation element of the minimum assessment content (MAC), the following provides a summary of the content covered:

- Did they meet their success criteria?
- Did they meet the task requirements set within the specification provided by the employer?
- Reflect on their own performance – strengths, weaknesses, overall quality of work outputs;
- Review whether timescales were achieved, if not why and what steps could've been taken to avoid this?
- Evaluate handover(s) – was the information provided clear and did it achieve its' intended purpose, was the correct method of communication chosen?

The learner's submitted evaluation work will be assessed outside of the observations against the criteria listed in the evaluation marking grid below.

General guidance

Timings

The expectation is that this project will be taken at a time within the programme of learning deemed appropriate by the provider and employer, allowing time for re-sits if needed. The assessment must be planned by the employers and centre to support all tasks to be undertaken in a manageable timeframe for the learner, employer and the centre. This period must support the learner to progress within the tasks without any undue gaps or delays to assessment.

If the learner requires additional time to complete the assessment(s) due to illness/compassionate leave, then any consideration for this must be followed in-line with the guidance provided on the with EAL Reasonable Adjustments and Special Consideration Policy.

Conditions of assessment

The planning stage of this assessment will take place within a supervised office, classroom, or other suitable environment that allows the learner to safely plan their work, ensuring learners have access to IT equipment and appropriate resource materials for them to carry out comprehensive research to support their planning. These may include guidance notes, regulations, and manufacturers' instructions.

The practical element of this assessment must be carried out in the workplace. Learners must be adequately supervised by their employer/supervisor and must work safely.

The evaluation will be carried out within a supervised office, classroom or other suitable environment that allows the learner to evaluate their work, ensuring learners have access to IT equipment and appropriate resource materials which could be normative, industry or legislative source publications, or manufacturers and trade specific materials; enabling learners to carry out comprehensive evaluation.

Resit/resubmission

Resit: submission of a new piece of evidence against failed criteria.

Resubmission: submission of a revised piece of evidence for assessment.

Where a learner does not meet the requirements set within this assessment, evidence must be resubmitted, learners must be provided the following time to complete work prior to resubmission:

- Planning: no more than the time originally taken to complete each planning task
- Practical: no more than the time originally allocated to the task in the Task Planning Document, to complete resit activities as explained below
- Evaluation: no more than 6 hours to complete all work for resubmission.

Planning

Learners must achieve a threshold pass for all plans submitted.

If any plans do not meet a threshold pass, learners must be informed of the criteria failed and resubmit. When resubmitting only criteria failed will be re-assessed within the resubmission.

When resubmitting learners can achieve the full range of marks available.

Performing

Learners must pass all criteria listed within the Task Planning and Assessment Plan documents. If any criteria are failed learners must resit to meet the assessment requirements. A new task must be set, with new Task Planning and Assessment Plan documents completed identifying the criteria to be reassessed.

If the criteria failed are listed within the MAC, then the specific criteria failed must be achieved as part of the resit. For example, if criterion 7a, listed within the MAC, was failed the learner would have to produce new evidence to achieve 7a specifically.

If the criteria failed are not listed within the MAC and were selected as part of the additional trade criteria requirements, centres, employers and learners must agree on the criteria to be included within the resit task in line with the additional trade criteria requirements set – the failed criteria could be chosen, or new criteria that satisfy the additional trade criteria requirements could be selected. For example, if a learner failed criterion 3.1 from unit 321PH, they could choose to either resit that specific criterion, or select an alternative from the range of additional criteria e.g., unit 321PH criterion 4.1.

The criteria contained within the MAC and the Additional Trade Requirements can be found in the Assessment Specification section of this document (pg. 18).

New assessment visits must be planned and carried out.

A learner may not resubmit any work associated with a task in which they received a fail mark.
When resitting learners can achieve the full range of marks available for the criteria/criterion being assessed.

Evaluation

Learners must pass all evaluation related criteria. If any of these criteria are failed, learners must resubmit their work following a period of learning to address any knowledge or skills gaps identified, allowing them to improve their work to reach the standard required. When resubmitting work only the areas failed in the first attempt will be reassessed, learners can achieve the full range of marks available for the criteria/criterion being assessed.

Health and safety

The requirement to follow safe working practices is an integral part of all Consortium qualifications and assessments, and it is the responsibility of centres to ensure that all relevant health and safety requirements are in place before learners start the project assessment.

Where a learner fails to follow correct health and safety practices and procedures during the project assessment, the assessment must be stopped, and the learner advised of the reasons why. The learner must be informed that they have not reached the standard of assessment required. At the discretion of the centre, learners may retake the assessment at a later date when they are able to work safely. In any cases of doubt, guidance should be sought from the External Quality Assurer.

Task planning document

Task Planning forms have been provided within Appendix 2.1 of this document.

These must be used to support in planning tasks to evidence the criteria selected.
Within these providers and employers will provide an overview of the task to be completed, the planned duration of the task, the actual duration of the task, and the criteria which will be evidenced by each task.

Task Planning exemplar

Learner Name:			
Assessor Name:			
What the learner will do (Task)	Install a new bathroom		
Overview of task elements	*Decommission existing bathroom suite, alter pipework and waste system to accommodate a new shower cubical, bath, whb and wc.* *Moving the position of the bath to accommodate the new shower cubical.* *Copper pipework to be surface mounted and boxed in at a later date by the joiner. All copper pipework to be renewed from the initial entry point during the installation. Waste pipework to use existing routes with the shower to be tee'd into the bath waste run.*		
Note: All work must be accessible and visible to be included in the assessment observation, any work not accessible/visible will need to be completed again			
Planned date of practical assessment		**Submission date for Planning evidence**	
Planned Duration	*8 hours*	**Actual Duration**	*7½ hours*
Minimum assessment content (MAC) to be demonstrated	MAC criteria 7a - Fit, fix and connect the selected appliances, components and accessories unit 321PH LO16 (sanitation systems, plastic (sanitary) push fit waste, glues/adhesives) MAC criteria 7b - Fit, fix and connect the selected appliances, components and accessories unit 321PH LO16 (cold and hot water systems, copper, plastic pressure pipe, soft soldered, push fit plastic pressure) MAC criteria 7c - components unit 321PH LO17 (Group A; bath, WC, WHB, shower and tray) MAC criteria 7d - Commission appliances, components and accessories, adjusting safely and effectively the control features, unit 321 LO22 (cold and hot water systems, sanitation systems) MAC criteria 7g - Apply relevant organisational procedures unit 312 LO2 MAC criteria 7h - Ensure that the plumbing and heating system cannot be accidently reactivated or become dangerous unit 321PH LO14 MAC criteria 7i - Confirm the integrity of the installed system using appropriate testing procedures unit 321PH LO18 MAC criteria 7j - Safe isolation of electrical equipment unit 320PH LO6		
Additional trade criteria requirements to be demonstrated	N/A for this work completed		
I confirm these tasks are in line with the industry requirements and standards and will satisfy the minimum assessment content (MAC) as detailed above:			
Assessor Signature	A Sessor	**Date**	*01/01/22*
Learner Signature	J Bloggs	**Date**	*01/01/22*
Employer/Supervisor Signature:	D Jones	**Date**	*01/01/22*

Assessment plan

An assessment planning form has been provided in Appendix 2.2.

The assessor must use this document when working with the employer and provider to plan which tasks and criteria will be assessed at each assessment visit.

Assessment plans will include assessment of the performing element of the project only, assessment of planning and evaluation sections will happen outside of assessment visits and so do not need to be included in assessment plans.

Assessment forms

Assessor Notes and Assessor Narrative forms have been provided in Appendix 2 of this document, these must be used to record assessment activities and decisions and retained for quality assurance purposes.

Marking and grading

Using the grading grid

For the planning and evaluation elements of the project, assessors must use the planning and evaluation sections of the marking grid below to award a mark of 0-2 for each criterion listed.

The Assessor must indicate the mark awarded for each criterion, total these up per section and then complete the mark calculation table to establish an overall mark. The Assessor must then use this overall mark, provided all assessed criteria have been achieved, to determine the overall project grade using the grading table.

Marking grid

Learners must achieve at least a pass in all criteria selected for the assessment.
Grading descriptors for this element:

Mark	Descriptor
Fail (0 marks):	Does not meet specification.
Pass (1 mark):	Learner demonstrates **realistic and appropriate** planning, that **supports** achievement of project tasks. Learner completes tasks **meeting the specification** (as outlined on page 27), **ensuring safe working at all times.** Learner demonstrates **meaningful evaluation** of **relevant aspects** of work undertaken. Example – performing element – learner meets specification but shows limited concern for waste, presentation of work, and tidiness of work and site.
Exceeded (2 marks):	In addition to the Pass descriptor: The learner demonstrates **a detailed approach** to planning which **effectively supports** achievement of project tasks. Learner **excels and achieves a precise and accurate outcome** in work. Meets specification (as outlined on page 27), **demonstrating consideration for aesthetics, quality of finish, and efficient use of tools and materials**. Learner is able **to appropriately and effectively respond to problems** where they arise. Learner demonstrates **considered and detailed evaluation** of their performance **across all aspects of work** undertaken, **linking the impact of their own performance** on the achievement of requirements (within the specification and learner set criteria). *Example – performing element – learner achieves criterion showing due concern for waste, taking steps to limit this. Learner produces precise and accurate outcomes, and dedicates attention to ensuring work is fit for presentation to employer/customer, maintaining a tidy work and site area as they go.*

Marking grids for the Planning, Practical and Evaluation elements of the project can be found in section 1 of the Appendix of this document.

Determining overall grade

The Assessor will grade the candidate using the table below.

Learners must achieve at least the threshold pass mark **by achieving at least 1 mark in all required criterion** within each section of the project to achieve a grade.

Marking and grading information for the trade project is provided in Appendix 1 of this document, these utilise the grade boundaries identified below:

Mark boundary	Grade	Points
41- 42	D3	7
38 - 40	D2	6
35 - 37	D1	5
32 - 34	M2	4
29 - 31	M1	3
26 - 28	P2	2
23 - 25	P1	1

Notification of this provisional grade must be given to the learner within one week of completion of the assessment, with guidance given on the provisional nature of the grade. Provisional results will be subject to both internal and external quality assurance. Results will be submitted to EAL and the final assessment grade aggregated with the other assessment methods to award an overall qualification grade, which will be issued by EAL.

5. Centre guidance – Professional Discussion

Assessment purpose and overview

The purpose of this externally assessed and timed Professional Discussion assessment is for the learner to reflect on the knowledge, skills and understanding required in the completion of the Practical Project, changes in materials, tools and techniques within the building services engineering sector and their chosen trade, and any learning which they could apply to wider contexts within the trade area.

Within this assessment, learners will need to demonstrate a range of knowledge, understanding and performance from the Occupational Standards relevant to their trade. This includes planning and undertaking the work, meeting acceptance criteria/commissioning requirements to an industry standard, and the evaluation of work.

The Professional Discussion has one part, completed in one timed sitting, within which the learner to reflects on the work undertaken as part of their Practical Project.

Learners must have successfully gained their Employer Confirmation before they can be entered for the Professional Discussion assessment, more information on this process can be found on the EAL website.

Where learners have resat any criteria from the practical element of the Practical Project the Professional Discussion can include reference to both failed and passed pieces of work.

The External Assessor will ask a range of structured questions that have been developed through guidance from EAL. The topics on which learners will be questioned will be shared with them in a suitable time frame before the assessment to enable the learner's familiarity and revision.

The assessment will contribute to the learning cycle, reinforcing experiential learning through the learner's own reflection and evaluations to facilitate development in their trade and wider skills.

This assessment is graded and carries a weighing of 20% to the overall grading of the qualification.

The discussion covers areas outlined in the table on the next page.

Learner reflection on the Practical Project: It will utilise the project evidence to augment the Professional Discussion. **What the learner did, and why they did it.**	
Reflection on knowledge and understanding of and skills of:	**Unit ref**
1.1 Organise the resources required. 1.2 Set success criteria for the task(s). 1.3 Carry out effective planning 1.4 Rationalise why the proposed approach is the most appropriate 1.5 Recognise cost and waste implications of the work. 1.6 Manage risks associated with completing the task and recognise the steps to be taken to stop risks becoming problems. 1.7 Identify the handover requirements of work. 2.1 Review the appropriateness of success criteria set. 2.2 Evaluate the resource selection and usage 2.3 Evaluate the finished output 2.4 Evaluate own performance 2.5 Review the achievement of timescales. 2.6 Evaluate the handover.	304 – (LO1, LO2)
2.1 How to develop and maintain productive working relationships 2.2 How to communicate effectively with clients, employers, colleagues and with other stakeholders throughout built environment projects	302 – LO2
4.1 The considerations required when performing building services engineering work on pre-1919 buildings and structures. 4.2 Post-1919 and modern construction techniques and building services 4.3 The new and emerging technologies in the building services engineering trade and the impact they are having/may have on existing practice.	301 – LO4

Introducing the Professional Discussion

The external assessor must:

- ensure the learner has been fully briefed on the purpose of the discussion, specifically the content that will be addressed, and on the type of information the assessor will require and how it is graded
- ensure the learner has any relevant documentation to hand before commencing the Professional Discussion
- ensure any additional requirements highlighted by the centre are taken into consideration in line with the Reasonable Adjustments policy
- make consistent and unbiased assessment decisions, by using planned discussion points and the qualification criteria, enabling consistency and comparability of assessment decisions over time
- try to put the learner at ease, explaining the format, timings, and the purpose of the recording forms.

In addition, the learner can be encouraged to reflect on projects they are currently working or planned for development in the discussion.

During the Professional Discussion

The external assessor should:

- ideally first address points where the learner is likely to be confident in answering, before moving to any more challenging areas. This will give a progressive approach and assist in assigning a mark and gauging the learner's ability
- use open questions with 'why', 'what', 'how', 'where' and 'when' to provide opportunities for all learners to demonstrate attainment
- use follow-up questions, giving the learner the opportunity to explore the discussion point fully. The questions should be thoughtful, relevant and pitched at the appropriate level
- discuss the learner's activities with them, looking for evidence of specific knowledge, procedures and processes, analytical abilities and decision making, together with their competence. Questioning should provide a gradual 'handing over' to the learner. You would expect the learner to be taking the lead in the discussion after the initial opening questions/brief
- identify topic areas in responses which can be further explored later in the discussion.

The discussion must always be related to the relevant topic area. As soon as such a judgement is possible, the discussion must move on to the next topic. When all discussion points have been addressed, it must be ended. If the learner's responses are wandering off topic, the learner should be steered back on track. Keep an accurate record of the start time and duration of the Professional Discussion.

What to avoid during the Professional Discussion:

- using one question type throughout
- answering the question yourself instead of expanding on it to get a response
- overloading the learner with too many questions, allowing them no time to think or to answer fully
- disregarding answers
- spending too long on one area of discussion, reducing the time available for other areas
- asking complex questions too early in the discussion
- avoid the use of closed questions unless a 'yes' or 'no' answer is specifically required. Closed questions can cause learners to 'freeze' or 'block', and this would be more likely under the pressure of examination conditions.

Marking and grading

This assessment is graded and carries a weighing of 20% to the overall grading of the qualification.

Assessors will use the marking grid provided below to award a mark from 0-3 based on the candidate's performance against the marking criteria provided.

A scaling factor of x2 has been applied to the first marking descriptor to be achieved, this is to reflect the broader range of coverage within this descriptor.

Learners must achieve a **minimum mark of 1 for each marking descriptor**, achieving a total minimum mark of 3 to pass.

Through EAL led training and standardisation assessors will apply consistent marking over time.

The assessment grade is determined by totalling the assessment marks awarded and converting this into an overall assessment grade for this assessment using the table below:

Mark boundary	Grade	Points
9	D3	7
8	D2	6
7	D1	5
6	M2	4
5	M1	3
4	P2	2
3	P1	1

Marking grid

Assessors will use the grid below to assess learner performance in the Professional Discussion, awarding marks based on whether the level of response provided meets the marking descriptors provided.

Learner name:	
Assessment date:	

Planning and Evaluation - Mark descriptors	**Marks achieved**
The learner provided A **basic** level of evaluation on the tasks undertaken. The learner demonstrated some **brief** reflections on using information, setting timescales and scheduling activities on how they executed the tasks, both through their planning and preparing and through the performing elements – with some areas of personal strength and challenge **briefly stated**. The learner makes limited connections between areas of strength and challenge with the end quality outcomes derived in the task(s). The learner makes **limited** connections with the information, documentation and communication with the handover to the end user. The learner **stated** several appropriate success criteria, but detail was **limited**. A brief connection in resource selection was provided, but with **limited** linkages made on the impact on the selection for completing the tasks efficiently. The learner has shown **some consideration** for the finished output, considering it is fit for purpose, safe and meets the specification (as outlined on page 27), but these are mostly provided as generic statements that provide little consideration from the learner's own perspective.	**1**
or The learner provided A **considered** level of evaluation on the tasks undertaken. The learner demonstrated **focused** reflections on using information, setting timescales and scheduling activities on how they executed the tasks, both through their planning and preparing and through the performing elements – with areas of personal strength and challenge **noted**, and an **attempt made** to connect these areas with quality outcomes experienced. The learner **connects** the information, documentation, and communication with the handover to the end user. Connections identified contain detail and show a considered response from the learner to transfer what they understand about the importance of a handover. The learner **detailed** a number of appropriate success criteria, with succinct details noted. A range of resources selected are provided, with clear linkages made on the impact on selection for completing the tasks efficiently. The learner has shown **consideration** for the finished output, considering it is fit for purpose, safe and meets the specification (as outlined on page 27), with a coherent approach provided that shows how the learner will attempt to manage these areas as they develop further their career in the sector.	**2**
or	

The learner provided • A **comprehensive** level of evaluation on the tasks undertaken. The learner demonstrated a **coherent** and well-rounded level of reflection on using information, setting timescales and scheduling activities on how they executed the tasks, both through their planning and preparing and through the performing elements – with a range of personal strengths and challenges evaluated and clear synergies noted between these and the final quality outcomes of the task(s). The learner **succinctly outlines** how the information, documentation and communication effects the handover to the end user and how this has influenced their own skills and ways of working. These connections are provided in detail and explain clearly how they have been considered and the reasons why they will actively develop future ways of dealing with the end user. The learner **coherently explored** a range of different success criteria, with a **developed understanding** shown as to their importance. A **broad range** of resource selections are explored, with a developed understanding provided by the learner of the impact on completing the task and the importance of this. The learner shows a **pronounced understanding** of the factors that influence the finished output, considering it is fit for purpose, safe and meets the specification (as outlined on page 27). They provide a **structured and considered** approach that illustrates how they will manage these areas as they develop their career further in the sector.	**3**
Mark achieved x2	**/6**
Communication and consideration of wider contexts - Mark descriptors	**Marks achieved**
The learner provided A reflection on the working relationships they've developed and the role of effective communication in ensuring these relationships are productive. The learner makes **limited** connections between the tasks completed and different contexts (e.g. buildings from different periods, availability of tools, different technologies), identifying how they would transfer and apply what they have learned into the different contexts.	**1**
or The learner provided A considered level of reflection on how their approach to communication has allowed them to develop and maintain productive working relationships with a range of stakeholders. The learner **connects** the task(s) completed with **a range of additional** contexts(e.g. buildings from different periods, availability of tools, different technologies). Connections identified contain detail and show a **considered response** from the learner relating to how they would transfer what they have learned through their tasks and **logically apply** this to different contexts.	**2**
or The learner provided An evaluation of how their approach to communication has allowed them to develop and maintain productive working relationships with a range of stakeholders. The learner demonstrates **understanding of a range of contexts** and provides **coherent and detailed responses** to how they would approach different contexts (e.g. buildings from different periods, availability of tools, different technologies).	**3**

Mark achieved	**/3**
Total mark	**/9**

Assessment conditions

The discussion must take place in an environment that is free from interruptions, and ideally in a supportive and familiar location for the learner.

Assessment controls

The Professional Discussion is a timed and controlled assessment and therefore requires preparation and planning by the centre, assessor and learner. Guidance on this assessment will be made available to centres and learners, to ensure they understand and carry out their respective duties and obligations for this assessment correctly.

Time allowed

This Professional Discussion assessment has an allotted time of **40 minutes,** up to 5 minutes can be added to allow the learner to complete their final answer.

Where the assessment requires a reasonable adjustment (for learners with a particular requirement/s) or translation, the additional time variation will be agreed and notified in advance of the assessment in line with EAL's reasonable adjustments policy.

Guidance and documentation

This assessment will have the following associated guidance:

- **Learner instructions:** these are provided in Section 2 of this document to aid the learner with the relevant knowledge and understanding of the assessment. **It must be shared with the learner not less than 5 days before the assessment to enable them to become familiar with the topics on which they will be questioned**. They aim to assist the learner to be fully prepared for the assessment. The document can be read in conjunction with the learner's brief to help build the learner's confidence in readiness for the final verbal brief by the external assessor prior to the assessment. It will highlight the learner's right to appeal assessment decisions.

- **Centre guidance:** this can be found within this assessment pack and provides the centre with the relevant information to support assessment. Example recording forms can be found in Appendix 4 to facilitate preparation for assessment and provide an audit trail for external assessors. It will provide guidance to external assessors to enable them to develop a range of structured questions.

- **Learner's projects:** to be made available to the external assessor prior to the discussion. Learners are permitted to have their project materials with them for reference within the Professional Discussion.

Preparation and planning for the Professional Discussion

The project evidence must be made available to EAL, via our electronic online portal, no less than **two weeks prior** to the Professional Discussion date to allow for preparation.

Prior to the assessment, the learner shall be given suitable notice, of not less than **five working days**, to provide preparation time (for example to make travel arrangements if necessary). The external assessor must plan the Professional Discussion and review the project, prior to it taking place. Learners will be made aware of their right to appeal the assessment decision.

The Professional Discussion will be carried out on a one-to-one basis between the external assessor and the learner only. Additional personnel may be present for circumstances such as quality assurance, reasonable adjustments or translation, but this will be agreed in advance. The assessment is conducted face-to-face or remotely. Learners need to be fully aware of the assessment arrangements for the qualification from the outset.

Guidance: *It is strongly recommended that learners are familiarised with being recorded on-going (e.g. as part of formative assessment) so they become accustomed to it. This will help ease the learner's nerves in this assessment and it enables learner preparation.*

Questions and discussion points

The Professional Discussion will consist of pre-prepared discussion points. This will facilitate focus and consistency. This will greatly increase accuracy and precision in grading. Where applicable these must be in the context of the project. Questions must be, overall, sufficiently engaging for the learner and promote and sustain their interest.

Space on the recording forms has been provided for the discussion points to map to the qualification unit.

In many cases, the external assessor's opening questions will not fully explore the learner's knowledge and understanding. Follow-up questions may be necessary to probe for further evidence. However, the questions must not lead the learner.

How the project informs the discussion

The project provides the context for the Professional Discussion; therefore, it must be prepared and available during the assessment so the learner can locate any specific evidence such as plans or data. It is recommended that the project should have a table of contents and be set into sections, to facilitate the learner's performance during this assessment.

Although the Practical Project forms the basis of the Professional Discussion, this assessment is graded standalone – therefore external assessors must not (where applicable) double penalise the learner's project work through the Professional Discussion assessment. Instead, the Professional Discussion provides the opportunity for the learner to demonstrate distance measured from the start of the Practical Project, evaluate strengths and weaknesses, and provide a context for the discussion points.

The Professional Discussion can also test the validity and reliability of the learner's project evidence.

Where a learner has failed and element of the Practical Project and had to resit or resubmit work, the Professional Discussion can relate to both the failed evidence and the resit/resubmission. Both will provide an opportunity for the learner to reflect and evaluate, and these should be utilised to support the discussion.

Employer Confirmation

Learners must have successfully gained their Employer Confirmation before they can be entered into the Professional Discussion, more information on this process and the documentation required to complete this can be found on the EAL website.

Materials

The following materials are permitted during the Professional Discussion assessment:

- the learner's project plan and evaluation documents will be required
- any relevant documents such as manufacturers' instructions and plans/drawings
- a device to accurately record the discussion.

Evidence must be referenced to the unit and criteria to provide for the audit trail. These arrangements need to be set up in advance.

Evidence requirements

Provision of an audit trail

The Professional Discussion needs to be recorded and must be captured in a secure and GDPR compliant way. These arrangements need to be set up in advance.

All records must be properly and securely stored. The learner must also sign and date the recording forms as a sign of declaration and authentication. Completed recording forms will be made available for review and sampling as part of external quality assurance activities.

Recording forms will be provided for the external assessor to provide feedback and allocate a provisional grade. Notification of this provisional grade must be given to the learner within one week of completion of the assessment, with guidance given on the provisional nature of the grade. Provisional results will be subject to quality assurance. Results will be submitted to the EAL and the final assessment grade aggregated with the other assessment methods to award an overall qualification grade, which will be issued by EAL.

Resit/resubmission

If the learner fails to successfully achieve the assessment, they are permitted to resit and must resit the whole Professional Discussion.

Assessment results for the Professional Discussion will be made available via EAL Online Services.

If learners fail, then a resit of the Professional Discussion must be booked via EAL Online Services.

When resitting learners can achieve the full range of marks and grades available.

If a learner does not meet the required marking criteria the centre must work with the learner to address criteria failed and opportunities for improvement to support them in preparing to reach the standard required.
If learners are unhappy with their assessment outcomes they must be informed of their right to appeal.

Centres must record any actions taken and/or any additional support given to the learner.

6. Grade aggregation

This qualification is graded **Pass, Merit, Distinction.** If a learner fails, they will not receive a certificate.

The grade aggregation process is completed by EAL. The information below explains how this process works and is to support understanding of how overall qualification grade is calculated.

The overall qualification grade is based on an aggregation of the learner's achievement in the mandatory graded assessments (the On-screen assessments, Practical Project and Professional Discussion).

All assessments must be achieved at a minimum of a P1 grade for the qualification to be awarded. Candidates who fail to reach the minimum standard for a P1 grade for an assessment(s) will not have a qualification grade awarded and will not receive a qualification certificate.

Assessment method Grade scale % contribution

The following table shows the % contribution of each assessment to the overall qualification grade.

On-screen assessment	20%
Practical Project	60%
Professional Discussion	20%

Calculating points values for assessments

The mark a candidate achieves in each assessment is converted into points. These points correspond to a grade on a 7-point scale within that assessment. For the purposes of aggregation, the points are then multiplied by the overall weighting assigned to that assessment. The weighted points are then added together and converted to a qualification grade.

A range of points within the Pass, Merit and Distinction boundaries are accessible to candidates to reflect performance within the grade boundary. The points available for each assessment and their reflective grade are outlined under the individual assessment sections.

Example
The following outlines an example of how the aggregation model works in practice.

A learner achieves the following in each of the assessment components:

	Marks in the assessment	Assessment Grade	Overall points
On-screen test 1	35	P2	2
On-screen test 2	44	M1	3
Practical Project	36	D1	5
Professional Discussion	6	M2	4

Assessment marking and grading

Using the table below we can overlay the grades the candidate achieved for each assessment and get weighted points which will be used for the overall grade.

Assessment Grade	Weighted Points			
	On-Screen Test 1	On-Screen Test 2	Practical Project	Professional Discussion
D3	0.7	0.7	4.2	1.4
D2	0.6	0.6	3.6	1.2
D1	0.5	0.5	3.0	1
M2	0.4	0.4	2.4	0.8
M1	0.3	0.3	1.8	0.6
P2	0.2	0.2	1.2	0.4
P1	0.1	0.1	0.6	0.2
Fail	0	0	0	0

- Test 1 = 0.2
- Test 2 = 0.3
- Practical Project = 3.0
- Professional Discussion = 0.8

Overall qualification grade

Weighted points from each assessment are then combined to provide a total weighted points score for the qualification, this table identifies how this then translates into an overall qualification grade:

Total weighted points score 0.2 + 0.3 + 3.0 +0.8 = **4.3**

Total Weighted Points	Grade
7	Distinction
6	Distinction
5	Distinction
4	Merit
3	Merit
2	Pass
1	Pass

The overall qualification grade using the grade scale shown above would be awarded as a **Merit**.

Results submission and grade calculation

The learner is required to achieve a pass in all assessments to achieve an overall pass grade for the qualification. Grades for the Practical Project and Professional Discussion must be submitted to EAL.

The table below identifies what needs to be achieved for each assessment, and how the submission of results will be undertaken.

Assessment	What needs to be done for achievement	Submission of result
On-screen Assessment	Learner completes the On-screen assessment using the EAL platform. Assessments are automatically marked and a grade will be provided.	Assessment auto-marked with result issued by EAL
Practical Project	Centre award marks for planning, practical and evaluation sections of the Practical Project using the marking criteria to assess performance across the project. Centre uses overall project mark to identify grade achieved using “Determining overall grade” table.	Pass grade confirmed and submitted to EAL Online Services by the centre
Professional Discussion	External Assessor will assess learners against the criteria listed against the Professional Discussion and make an assessment decision. Successful completion of all parts of the Professional Discussion in line with the minimum number of marks required in sections 1 & 2 of the Professional Discussion.	External assessor will confirm grade, this will then be made available to the centre via EAL Online Services.

EAL will carry out grade aggregation and award the overall final grade for the qualification.

Notification of the final learner result will be provided following completion of external quality assurance activities and will occur within eight weeks of final centre submission of both results for the Practical Project and Professional Discussion (and successful completion of the On-screen assessment) to EAL.

Appendices

1. Minimum Assessed Content (MAC) & Marking grids
2. Practical Project recording forms
    - 2.1 Task planning documents
    - 2.2 Assessment planning documents
    - 2.3 Assessment recording forms
3. On-screen assessment
4. Professional Discussion recording forms

1. Practical Project – Performing – Minimum assessment of content (MAC)

The table below contains the MAC for the Practical Project.

Within this section work activities must be carried out in accordance with the specification (details on what this specification can be is available on page 27 of this document).

The project task must take place over approximately of 50 hours – *mandatory criteria (trade and H&S) and additional criteria.*
Observation must take place over a minimum of three assessment visits, direct observation must take place within each visit to observe the criteria identified within their assessment visit plan.

Learner Name:	
Assessor Name:	

Plumbing and heating marking grid – Planning MAC

	Grading Options	Mark Awarded
Criteria 1		*Candidates must only be assessed in line with the observation plan*
Produce a resource list that identifies tools, equipment and materials required to complete the task.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 2		
Produce a schedule of works and method statement to plan the ordering/phasing of work and the methods which will be used to complete the task, explaining why this is the most appropriate way to approach the work. Identify what cost and waste implications there are and how these have been taken these into account.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 3		
Produce a risk assessment to identify any potential risks to health and safety, and identifies risks to delivering work on time and to the quality expected. The learner identifies the steps they'll take to prevent risks becoming problems.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 4		
Set success criteria for the task; identify appropriate success criteria for the task which are achievable and measurable, including smaller milestones which identify key activities, material usage, and quality of finish etc. that support the learner in successfully completing the task and meeting the specification.	Fail = 0 Pass = 1 Exceeded = 2	

Criteria 5		
Plan communication methods and styles to be used when communicating with a range of stakeholders. Identify the information they would need to include in a handover of work to a subsequent trade and/or customer and the most appropriate format to communicate this information.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 6		
Identify hazards and risks.	Fail = 0 Pass = 1 Exceeded = 2	
	Overall mark (Max 12 Marks)	

Plumbing and heating marking grid – Practical MAC

4 out of the following 6 criteria must be covered **7a and/or 7b is mandatory** **Criteria 7a**	**Grading Options**	**Mark Awarded** *Candidates must be assessed in line with their observation plan*

Measure and mark out the locations for fitting and fixing the selected appliances, components and accessories in accordance with the plumbing and heating system's design and manufacturer instructions on the following:
• installing **one** from the following three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
• installing pipework using **at least one** of the following:
  ○ copper
  ○ plastic pressure pipe
  ○ steel (screwed or pressed)
  ○ stainless steel
  ○ plastic (sanitary)
  ○ rainwater.
 	
Fit, fix and connect the selected appliances, components and accessories in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions on the following:
• installing **one** from the following three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
• installing pipework using **at least one** of the following:
	Fail = 0
	Pass = 1
	Exceeded = 2	

○ copper ○ plastic pressure pipe ○ steel (screwed or pressed) ○ stainless steel ○ plastic (sanitary) ○ rainwater. • jointing using **two** of the following: ○ compression ○ push fit plastic pressure ○ push fit waste ○ threaded/screwed ○ soft soldered ○ crimped ○ glues/adhesives ○ fusion welded. **Important note:** If candidates are completing **both 7a and 7b**, the following criteria only needs to be assessed **once** across **both** 7a and 7b (it is expected to be the system type installed): **Select appliances, components and accessories and confirm that they are of the right type and size, fit for purpose** in accordance with the plumbing and heating system's design, and suitable for the working environment in which they are to be installed, on **one** of the following: **Central Heating** • Calculate central heating system requirements used in dwellings • Select components in accordance with calculations from predetermined data. **Rainwater** • Calculate system requirements used in dwellings		

• Select components in accordance with calculations from predetermined data. **Sanitation** • Calculate system requirements used in dwellings • Select components in accordance with calculations from predetermined data.		
Criteria 7b		

Measure and mark out the locations for fitting and fixing the selected appliances, components and accessories in accordance with the plumbing and heating system's design and manufacturer instructions on the following:
• installing cold **and** hot water systems
• installing pipework using **two** of the following:
  ○ copper
  ○ plastic pressure pipe
  ○ steel (screwed or pressed)
  ○ stainless steel.
 	
Fit, fix and connect the selected appliances, components and accessories in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions on the following:
• installing cold **and** hot water systems
• installing pipework using **two** of the following:
  ○ copper
  ○ plastic pressure pipe
  ○ steel (screwed or pressed)
  ○ stainless steel
• jointing using **two** of the following:
  ○ compression
  ○ push fit plastic pressure
	Fail = 0
	Pass = 1
	Exceeded = 2	

○ threaded/screwed ○ soft soldered ○ crimped. **Important note:** If candidates are completing **both 7a and 7b**, the following criteria only needs to be assessed **once** across **both** 7a and 7b (it is expected to be the system type installed): **Select appliances, components and accessories and confirm that they are of the right type and size, fit for purpose** in accordance with the plumbing and heating system's design, and suitable for the working environment in which they are to be installed, on **one** of the following: **Cold water** • Calculate system requirements used in dwellings • Select components in accordance with calculations from predetermined data. **Hot water** • Calculate system requirements used in dwellings • Select components in accordance with calculations from predetermined data.		
Criteria 7c		
Fit, fix and connect the selected appliances, components and accessories in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions on the following: • **six** components from **Group A** with **at least three on more than one occasion** and **three** components from **Group B:**	Fail = 0 Pass = 1 Exceeded = 2	

Group A
• bath
• WC
• wash hand basin
• sink
• shower and tray
• cylinder
• boiler (connections)
• soil stack system
• rain water/guttering system
• F&E/CWSC Cistern
• pump
• motorised valves
• radiator
• water conditioners/filters.
	Group B
	• urinal
	• bidet
	• booster pump/shower pump
	• accumulators/expansion vessels
	• fan convector
	• low loss header
	• macerator or waste water lifter/pump
	• greywater/rainwater station
	• water softener/filter
	• refrigerator cold connection
	• washing machine/dishwasher
	• underfloor heating circuit and underfloor manifold
	• outside tap installation
	• backflow protection components, i.e.
	  ○ EA
	  ○ EB
	  ○ EC
	  ○ ED.		

Criteria 7d			

Commission appliances, components and accessories, adjusting safely and effectively the control features in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions on the following:
• cold **and** hot water systems
• **one** from the remaining three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
	Fail = 0
	Pass = 1
	Exceeded = 2	

Criteria 7e		

Carry out service and maintenance activities and procedures in accordance with the plumbing and heating system's design, the working environment and manufacturer instructions on the following:
• cold **and** hot water systems
• **one** from the remaining three:
  ○ central heating systems
  ○ sanitation systems
  ○ gravity rainwater systems.
	Fail = 0
	Pass = 1
	Exceeded = 2	

Criteria 7f		

Carry out the methods and techniques for disconnecting, installing and/or connecting electrical equipment, cables/wiring, accessories and components in accordance with the mechanical building services (plumbing and heating) system's design, manufacturer instructions and the correct procedures for safe isolation on the following:
• **four** components, with **at least one on more than one occasion**:
• boiler
• central heating controls
  ○ zone valves (2 port, 3 port, mid position and diverter)
  ○ programmer
  ○ timer
  ○ thermostats
  ○ programmable room stat
  ○ optimizer
  ○ frost stat
  ○ wiring centre
  ○ cylinder stat
  ○ wi-fi routers
  ○ wi-fi range extenders.
• wiring centres.
• immersion heater
• instantaneous shower
• shower pump
• jacuzzi bath/hot tub
• macerator WC
• heat producing or cooling appliances
• pumps
• fans.
	Fail = 0
	Pass = 1
	Exceeded = 2	

Carry out Industry recognised methods and procedures for the functional testing of the electrical equipment, accessories and components associated with the electrical supply and/or control of the mechanical building services system.		
Overall mark (Max 8 Marks)		

All of the following criteria (7g to 7j) must be covered	**Grading Options**	**Mark Awarded**
Criteria 7g		*Candidates must be assessed in line with their observation plan*
Apply relevant organisational procedures.	Fail = 0 Pass = 1	
Criteria 7h		
Ensure that the plumbing and heating system cannot be accidently reactivated or become dangerous.	Fail = 0 Pass = 1	
Criteria 7i		
Confirm the integrity of the installed system using appropriate testing procedures.	Fail = 0 Pass = 1	
Criteria 7j		

Safe isolation of **electrical equipment** and **components** associated with the electrical supply of the plumbing and domestic heating system.	Fail = 0 Pass = 1	
Overall mark (Max 4 Marks)		

Plumbing and heating marking grid – Practical additional trade criteria requirements

Please add the criteria chosen to meet the additional trade criteria requirements to the table below and record assessment decisions.

	Grading Options	**Mark Awarded**
Criteria 7k		*Candidates must only be assessed in line with the observation plan*
	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 7l		
	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 7m		
	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 7n		

	Fail = 0 Pass = 1 Exceeded = 2	
Overall mark (Max 8 Marks)		
Total practical mark (Max 20 marks)		

Plumbing and heating marking grid – Evaluation MAC

	Grading Options	Mark Awarded
Criteria 8		*Candidates must only be assessed in line with the observation plan*
Evaluate work completed against the specification and success criteria – output fit for purpose, safe and in line with specification requirements, quality of work. Evaluate tool selection.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 9		
Were success criteria that the learner set appropriate, did they support successful and efficient achievement of the task.	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 10		
Evaluation of own performance – strengths, weaknesses, areas for improvement. Overall quality of work (fit and finish, etc).	Fail = 0 Pass = 1 Exceeded = 2	
Criteria 11		
Review achievement of timescales – reasons for delays if they occurred and what action could've be taken to prevent/avoid this.	Fail = 0 Pass = 1	

	Exceeded = 2	
Criteria 12		
Evaluate handover – quality and clarity of information provided, achievement of purpose of the handover, success of communication method chosen.	Fail = 0 Pass = 1 Exceeded = 2	
	Overall mark (Max 10 Marks)	

Once this assessment has been completed, assessment decisions made, and marks awarded please use the tables and recording forms below to calculate the learner's provisional grade for the Practical Project.

The assessor must use these tables to calculate a provisional grade for the learner. Notification of this provisional grade must be given to the learner within one week of completion of the assessment, with guidance given on the provisional nature of the grade. Provisional results will be subject to both internal and external quality assurance. Results will be submitted to EAL and the final assessment grade aggregated with the other assessment methods to award an overall qualification grade, which will be issued by EAL.

Mark calculation

Element	Planning	Performing	Reviewing
Practical Project	/12	/20	/10
Threshold pass mark	6	12	5
Overall Total	/42		

Mark Achieved
Provisional Grade Awarded

* Learners must achieve a threshold pass mark **by achieving at least 1 mark in all required criterion** in each element. If the learner fails to achieve the minimum mark in any element, they will be referred in that element and will need to be reassessed in line with the resit policy.

Marks awarded within each section must be totalled and combined to create and overall project mark, the table below indicates the grade to be awarded based on the learner's overall mark.

Provisional grade determination

The overall score can be calculated using the table

Mark boundary	Grade	Points
41- 42	D3	7
38 - 40	D2	6
35 - 37	D1	5
32 - 34	M2	4
29 - 31	M1	3
26 - 28	P2	2
23 - 25	P1	1

Provisional grade confirmation

Learner Name:	
Learner Signature:	
Assessor Name:	
Assessor Signature:	
Date:	

2. Practical Project – Recording forms

2.1 Task planning forms

Task X (Use this table to create additional task planning forms as required)

Learner Name:			
Assessor Name:			
What the learner will do (Task)			
Overview of task elements			
Note: All work must be accessible and visible to be included in the assessment observation, any work not accessible/visible will need to be completed again			
Planned date of practical assessment		**Submission date for Planning evidence**	
Planned Duration		**Actual Duration**	
Minimum assessment content (MAC) to be demonstrated			
Additional trade criteria requirements to be demonstrated			
I confirm these tasks are in line with the industry requirements and standards and will satisfy the minimum assessment content (MAC) as detailed above:			
Assessor Signature		**Date**	
Learner Signature		**Date**	
Employer/Supervisor Signature		**Date**	

2.2 Assessment planning forms

The assessor must liaise with the learner and the employer to decide which tasks are to be assessed during each assessment visit, the form below must be used to capture this information.
Additionally, the unit and criteria that will be assessed during each assessment visit must be recorded in the area provided.

Assessment of planning and evaluation sections **will happen outside of the observations** and so **do not need to be included in the table** below.
This plan must be completed prior to conducting any assessment visits.

Learner Name:	
Assessor Name:	

Section 1			
Section 1 will be used to indicate which tasks are assessed during each assessment visit, and the planned evidence types which will be gathered at each visit – where direct observation of any criteria is not used a clear rationale must be provided explaining why, with alternative evidence types planned to be gathered instead listed. If more than 4 tasks are planned please expand the table below to allow these to be referenced. If more than 3 assessment visits are required, please add extra columns to the table to allow information to be recorded.			
Task number	**Assessment visit 1**	**Assessment visit 2**	**Assessment visit 3**
Task 1			
Task 2			
Task 3			
Task 4			

Section 2			
Section 2 will be used to indicate which criteria will be assessed during each assessment visit. Insert any additional trade criteria evidenced in the grid below and identify which assessment visit they will be assessed in.			
	Indicate here which assessment visit and task will assess each criterion		Indicate here which assessment visit and task will assess each criterion
Criteria 6		**Criteria 7h**	
Criteria 7a		**Criteria 7i**	
Criteria 7b		**Criteria 7j**	
Criteria 7c		**Criteria 7k**	
Criteria 7d		**Criteria 7l**	
Criteria 7e		**Criteria 7m**	
Criteria 7f		**Criteria 7n**	
Criteria 7g			

2.3 Assessment recording forms

Use the following table to record notes of each observation, these notes are not marked, nor do they form any contribution to a grade but can be used by the assessor in developing the overall narrative and grade for the candidate.

Learner Name:	
Assessor Name:	
Assessment visit 1 notes	
Assessment visit 2 notes	
Assessment visit 3 notes	

Assessor narrative

Use the box below to provide a narrative on the learner's performance across the whole project. This narrative must take into account the scores given during the assessment visits but should focus on a holistic view of the project in its entirety. Details to be included are the learner's:

- Technical skill and ability
- Their care of tools, equipment and other work areas
- Knowledge and understanding of the project
- Their attitude and approach to the project
- How obstacles were overcome
- Environmental awareness
- Lessons learnt from the project.

The assessor must also include a justification for the grade given.

Learner Name:	
Assessor Name:	
Assessor narrative of the project	

3. On-screen assessment

Test 1P Setting Specification		
Assessment type: Multiple choice Number of questions: 50 Time: 75 minutes Closed book, non-programmable calculator permitted		
Unit title	**Learning outcome**	**Number of marks**
301: Understanding Building Services Engineering Practice in Wales	1. Know the relevant trade bodies and organisations within the building services engineering sector	10
	2. Understand connected practice in construction and building services engineering	
	3. Know the changing construction and built environment sector	
	4. Know the changes in building services engineering materials, tools, and techniques over time	
	5. Understand the relationship between trades and the environment	
305PH: Understand Scientific Principles	1. Understand the units of measurement used in the plumbing and heating industry	11
	2. Understand the properties of materials	
	3. Understand the relationship between energy, heat and power	
	4. Understand the principles of force and pressure and their application in the plumbing and heating industry	
	5. Understand the mechanical principles in the plumbing and heating industry	
	6. Understand the principles of electricity in the plumbing and heating industry	
306PH: Understand Core Plumbing and Heating Systems	1. Understand the appropriate industry standards and regulations relevant to; decommissioning, installing and testing, of plumbing and heating systems	8
	2. Understand how to verify that job information and documentation is current and relevant and that the plant, instruments, access equipment and tools are fit for purpose	
	3. Understand how to produce a risk assessment and method statement for the work to be carried out, including the identification and use of personal protective equipment, in accordance with: the plumbing and heating system's design, the conditions of the working environment, organisational procedures	
	4. Understand the organisational procedures for confirming, before work starts, that the work location and work area can be accessed safely and has been checked for the risk to other personnel on the site, and for taking appropriate action if a risk is present	
	5. Understand the methods for the safe transport and/or disposal of waste materials, substances and liquids in accordance with suppliers' and manufacturers' instructions	
	6. Understand the methods for determining that the appliances, components and accessories are fit for purpose in accordance with industry recognised organisational procedures	
	7. Understand the methods and techniques for inspecting and pre-commissioning the plumbing and heating system in accordance	

	with: the plumbing and heating system's design, the working environment, manufacturers' instructions, the appropriate testing procedures for confirming the systems' integrity	
	8. Understand how to complete relevant documentation in accordance with organisational procedures	
	9. Understand the methods and techniques for decommissioning the plumbing, and heating systems in accordance with: the plumbing and heating system's design, the working environment, manufacturers' instructions	
	10. Understand the methods and techniques to ensure the plumbing and heating system cannot be accidentally reactivated or become dangerous	
	11. Understand how to complete relevant documentation in accordance with organisational procedures	
307PH: Understand Cold water systems	1. Understand The applications, advantages and limitations of cold water systems	5
	2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	
	3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: the plumbing and heating system's design, the working environment, manufacturers' instructions	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
308PH: Understand Hot water systems	1. Understand the applications, advantages and limitations of hot water systems	5
	2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	
	3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: the plumbing and heating system's design, the working environment, manufacturers' instructions	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
309PH: Understand Central heating systems	1. Understand the applications, advantages and limitations of central heating systems	4
	2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	
	3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: the plumbing and heating system's design, the working environment, manufacturers' instructions	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
310PH: Understand Rainwater systems	1. Understand the applications, advantages and limitations of rainwater systems	2
	2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	

311PH: Understand Sanitation Systems	1. Understand the applications, advantages and limitations of sanitary appliances and pipework systems	5
	2. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	
	3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: the plumbing and heating system's design, the working environment, manufacturers' instructions	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	Total	**50**

Test 2P Setting Specification		
Assessment type: Multiple choice Number of questions: 60 Time: 90 minutes Closed book, non-programmable calculator permitted		
Unit title	**Learning outcome**	**Number of marks**
302: Working in the Building Services Engineering Sector in Wales	1. Understand the built environment in Wales	5
313: Establish and maintain relationships in the building services engineering sector	1. Understand the types of technical and functional information that is available for the installation and/or maintenance activity	5
	2. Understand the procedures for supplying technical and functional information to relevant people	
	3. Understand the importance of customer service in relation to installation and/or maintenance activity	
314: Coordinate a work site in the building services engineering sector	1. Understand the requirements for organising and overseeing work activities	5
	2. Understand the requirements for organising the provision and storage of resources that are required for work activities	
303: Understand Health and Safety and Environmental Legislation in The Building Services Engineering Sector	1. Understand appropriate industry standards and regulations	10
	2. Know your responsibilities in accordance with organisational procedures	
	3. Understand the application, advantages and limitations of different working practices	
	4. Understand how to recognise materials and substances that can potentially be harmful	
	5. Understand the documentation associated with the organisational procedures' requirements	
	6. Understand the organisational procedures for dealing with the presence of harmful materials and substances	
	7. Know where and how to locate relevant health and safety information needed to complete the installation and/or maintenance activity in accordance with organisational procedures	
	8. Know what constitutes a hazard or risk	
	9. Understand the methods for handling of hazardous materials and substances in accordance with organisational procedures	
	10. Understand the organisational procedures, suppliers' and manufacturers' instructions for safe use, maintenance, handling, transport and storage of: Tools, plant and access equipment, Equipment and components, Materials and substances	
	11. Understand the warning signs for hazardous materials and substances	

	12. Understand the methods for the safe transport and/or disposal of waste material, substances and liquids in accordance with: Organisational procedures, Suppliers' and manufacturers' instructions	
	13. Understand the organisational procedures relevant to reporting issues	
315PH: Understand Cold Water System Installation, Commissioning, Service and Maintenance Techniques	1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	7
	2. Understand the appropriate industry standards and regulations relevant to • decommissioning • installing and testing • commissioning • service and maintenance of cold water systems	
	3. Understand the organisational procedures for confirming with the relevant people the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	5. Understand how to complete relevant documentation in accordance with organisational procedures	
	6. Understand the methods for determining the type of size of appliances, components and accessories in accordance with industry recognised organisational procedures	
	7. Understand tow to interpret diagrams and drawings for the cold water system to identify the planned location of the appliances, components and accessories	
	8. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	9. Understand the visual and manual checks required to confirm that the appliances, components and accessories have been fixed, fitted and connected in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	10. Understand the methods and techniques for commissioning the cold water system in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	11. Understand the methods for determining the type of size of replacement appliances, components and accessories in accordance with industry recognised organisational procedures	
	12. Understand the methods and techniques for servicing and maintaining appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	

	13. Understand the methods and techniques for replacing/repairing the appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	14. Understand basic fault-finding techniques	
316PH: Understand Hot Water System Installation, Commissioning, Service and Maintenance Techniques	1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	7
	2. Understand the appropriate industry standards and regulations relevant to - decommissioning - installing and testing - commissioning - service and maintenance of hot water systems	
	3. Understand the organisational procedures for confirming with the relevant people the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	5. Understand how to complete relevant documentation in accordance with organisational procedures	
	6. Understand the methods for determining the type of size of appliances, components and accessories in accordance with industry recognised organisational procedures	
	7. Understand how to interpret diagrams and drawings for the hot water system to identify the planned location of the appliances, components and accessories	
	8. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	9. Understand the visual and manual checks required to confirm that the appliances, components and accessories have been fixed, fitted and connected in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	10. Understand the methods and techniques for commissioning the hot water system in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	11. Understand the methods for determining the type of size of replacement appliances, components and accessories in accordance with industry recognised organisational procedures	

	12. Understand the methods and techniques for servicing and maintaining appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	13. Understand the methods and techniques for replacing/repairing the appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	14. Understand basic fault-finding techniques	
317PH: Understand Central Heating System Installation, Commissioning, Service and Maintenance Techniques	1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	7
	2. Understand the appropriate industry standards and regulations relevant to - decommissioning - installing and testing - commissioning - service and maintenance of central heating systems	
	3. Understand the organisational procedures for confirming with the relevant people the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	5. Understand how to complete relevant documentation in accordance with organisational procedures	
	6. Understand the methods for determining the type of size of appliances, components and accessories in accordance with industry recognised organisational procedures	
	7. Understand how to interpret diagrams and drawings for the central heating system to identify the planned location of the appliances, components and accessories	
	8. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	9. Understand the visual and manual checks required to confirm that the appliances, components and accessories have been fixed, fitted and connected in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	

	10. Understand the methods and techniques for commissioning the central heating system in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	11. Understand the methods for determining the type of size of replacement appliances, components and accessories in accordance with industry recognised organisational procedures	
	12. Understand the methods and techniques for servicing and maintaining appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	13. Understand the methods and techniques for replacing/repairing the appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	14. Understand basic fault-finding techniques	
318PH: Understand Rainwater System Installation and Maintenance Techniques	1. Understand the appropriate industry standards and regulations relevant to • decommissioning • installing and testing • commissioning • service and maintenance of rainwater systems	5
	2. Understand the organisational procedures for confirming with the relevant people the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken	
	3. Understand the methods and techniques for fitting, fixing and connecting the selected appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	5. Understand how to complete relevant documentation in accordance with organisational procedures	
	6. Understand the methods for determining the type of size of appliances, components and accessories in accordance with industry recognised organisational procedures	
	7. Understand how to interpret diagrams and drawings for the rainwater system to locate site services and system supply	
	8. Understand how to interpret diagrams and drawings for the rainwater system to identify the planned location of the appliances, components and accessories	
	9. Understand the visual and manual checks required to confirm that the appliances, components and accessories have been fixed, fitted and connected in accordance with: - the plumbing and heating system's design	

	- the working environment - organisational procedures	
	10. Understand the methods and techniques for commissioning the rainwater system in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	11. Understand the methods for determining the type of size of replacement appliances, components and accessories in accordance with industry recognised organisational procedures	
	12. Understand the methods and techniques for servicing and maintaining appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	13. Understand the methods and techniques for replacing/repairing the appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	14. Understand basic fault-finding techniques	
319PH: Understand Sanitation System Installation, Commissioning, Service and Maintenance Techniques	1. Understand the applications, advantages and limitations of appliances, components and accessories in relation to the working environment	6
	2. Understand the appropriate industry standards and regulations relevant to • decommissioning • installing and testing • commissioning • service and maintenance of sanitary appliances and pipework systems	
	3. Understand the organisational procedures for confirming with the relevant people the appropriate actions to be taken to ensure that any variations to the planned programme of work will not introduce a hazard and have minimum negative impact on the installation work to be undertaken	
	4. Understand the appropriate testing procedures for confirming the systems' integrity	
	5. Understand how to complete relevant documentation in accordance with organisational procedures	
	6. Understand the methods for determining the type of size of appliances, components and accessories in accordance with industry recognised organisational procedures	
	7. Understand how to interpret diagrams and drawings for the sanitation system to identify the planned location of the appliances, components and accessories	
	8. Understand how to interpret diagrams and drawings for the sanitation system to identify the planned location of the appliances, components and accessories	
	9. Understand the visual and manual checks required to confirm that the appliances, components and accessories have been fixed, fitted and connected in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	

	10. Understand the methods and techniques for commissioning the sanitation system in accordance with: - the plumbing and heating system's design - the working environment - organisational procedures	
	11. Understand the methods for determining the type of size of replacement appliances, components and accessories in accordance with industry recognised organisational procedures	
	12. Understand the methods and techniques for servicing and maintaining appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	13. Understand the methods and techniques for replacing/repairing the appliances, components and accessories in accordance with: - the plumbing and heating system's design - the working environment - manufacturers' instructions	
	14. Understand basic fault-finding techniques	
320PH: Performing Electrical Work on Plumbing and Heating Systems	1. Understand the limitations of your responsibility when carrying out work on electrical supplies and/or circuits for the control of mechanical building services systems	3
	2. Understand the applications, advantages and limitations of electrical supplies	
	3. Understand the applications, advantages and limitations of different electrical equipment, cables/wiring, accessories and components in relation to the working environment	
	4. Understand the appropriate industry standards and regulations relevant to carrying out work on electrical supplies and/or circuits for the control of mechanical building services systems	
	Total	**60**

4. Professional Discussion recording forms

Note, some example questions have been provided – these are exemplars only, and the assessor must allow the discussion to be candidate-led and to use questions that reflect the discussion as it progresses.

Reflection on the Practical Project

(Some example questions have been inserted)

Learner Name:	
Assessor Name:	

Planning & Evaluation

Assessor to sample:

Unit 304

1.1 Organise the resources required
1.2 Set success criteria for the task(s)
1.3 Carry out effective planning
1.4 Rationalise why the proposed approach is the most appropriate
1.5 Recognise cost and waste implications of the work and how these have been taken these into account
1.6 Manage risks associated with completing the task and recognise the steps to be taken to stop risks becoming problems
1.7 Identify the handover requirements of work

2.1 Review the appropriateness of success criteria set
2.2 Evaluate the resource selection and usage
2.3 Evaluate the finished output
2.4 Evaluate own performance
2.5 Review the achievement of timescales
2.6 Evaluate the handover

Unit 302

2.1 How to develop and maintain productive working relationships
2.2 How to communicate effectively with clients, employers, colleagues and with other stakeholders throughout built environment projects

Unit 301

4.1 The considerations required when performing building services engineering work on pre-1919 buildings and structures.
4.2 Post-1919 and modern construction techniques and building services
4.3 The new and emerging technologies in the building services engineering trade and the impact they are having/may have on existing practice**.**

Example questions:

What resources did you identify for use in completing the tasks? Explain where you sourced them and how this impacted on your overall approach to completing the tasks.

What techniques did you identify for estimating the completion of the tasks? Explain why you chose these techniques and how they impacted on your overall approach to the tasks.

What were the key work activities involved in your work plan? Explain how you estimated the time required in each of the practical tasks.

How did you keep on track with time and pace of the work within your projects? What were your own set objectives/success criteria/milestones? Did you meet them?

What practical techniques did for completing of the tasks? Explain why you chose these techniques and how they impacted on your overall approach to the tasks.

What were the key methods of communication you used during your project and how did you use them to effectively communicate with clients/customers, employers, colleagues and/or other stakeholders?

Did your approach work? What went well? What did not go well? What would you do differently/ what will you do next time/what did you learn about your approach?

What were the success criteria you set yourself for this project? Explain to what extent you met your success criteria.

What were the strengths and weaknesses of your Practical Project? How did you overcome problems?

Who were your key working relationships with during this project and what steps did you take to ensure they were productive?

What was the most difficult part of the installation work for you? What problems arose? How did you deal with them? What improvements will you make next time?

What were the key tasks you carried out within your project? How would you have completed these in a building from a different time period?

How have you improved your work in the projects? (What were the things that have improved; how did they improve)

How have materials, tools, and techniques changed over time within the building services engineering industry and your chosen trade? Thinking about those materials, tools and techniques used pre-1919, post-1919 and 21st Century.

How would you have changed your approach to the task(s) if you had a range of tools available from a different period in time?

Feedback from the assessment:

To achieve this assessment, learners must achieve 1 mark for each descriptor.

Assessor signature:		Date:	
Learner signature:		Date:	
Location:			
Start Time:			
Duration (Min):			