

Level 3 Advanced Technical Diploma in Plumbing (8202-35)

Synoptic Assignment 2019 – v2.0

PAST ASSIGNMENT (2019) DO NOT USE FOR LIVE ASSESSMENT

Version and date	Change detail	Section
2.0 November 2018	Additional guidance has been provided in the candidates brief	Assignment Brief
	Heat emitter catalogue images enlarged for clarity	
	Additional Guidance provided in the candidates tasks	Task
	Addition guidance provided in for the instructions to centres on the task resources	Task instructions for centres
	Altered table for heat loss calculations to allow clarity in what is being asked	Task specific guidance
	Additional clarity provided for expected photographs as candidate evidence	
	Alterations made to candidates method statement template and heat loss calculations template	Found in Recording form pack

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General guidance for candidates

General guidance

This is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of your practical performance and the written work you produce. It is therefore important that you carry your work out to the highest standard you can. How well you know and understand the subject, and how you have used your knowledge and skills together to complete the tasks must be clear to the marker. This means you will have to explain your thinking and the reasons behind the way you have carried out the tasks and how/why you have made your decisions within your written work e.g. as part of your planning, reflections, or evaluations.

Plagiarism

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

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

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

Where research is allowed, your tutor 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.

Timings and planning

Where you have to plan your time, you should take care to make sure you have divided the time available between tasks appropriately. In some assignments, there are specified timings which cannot be changed and which need to be taken into account. You should check your plan is appropriate with your tutor.

If you have a good reason for needing more time, you will need to explain the reasons to your tutor and agree a new deadline date. Changes to dates will be at the discretion of the tutor, and they may not mark work that is handed in after the agreed deadlines.

Health and Safety

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

You must always follow any relevant Health and Safety regulations and codes of practice.

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

Presentation of work

Presentation of work must be neat, legible and appropriate to the task.

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

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

Written work e.g. reports may be word processed or hand written unless stated otherwise.

All sketches and drawings should be neat and tidy, to scale and annotated.

Calculations should be set out clearly, with all working shown, as well as any assumptions made. You should use appropriate units at all times, and answers must be expressed to a degree of accuracy, consistent with the requirements of the task.

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Assignment Brief

The client you are working for is looking to improve the existing S plan heating system within their large domestic property. These improvements include the addition of a heat emitter in the bathroom. You are required to determine what the heating requirements are for the bathroom and propose a design that could be used to ensure the room is heated efficiently.

The bathroom, can be found in Figure 1, is located on the third floor of the property and the cylinder is located on the ground floor in the garage. The bathroom layout and dimensions are given in Bathroom Specification.

The client has complained that often it can take over one minute for the hot outlets to reach temperature in the bathroom. You must diagnosis the cause of this issue and carry out the appropriate rectification works. Before starting the rectification, you must plan what is required and confirm these plans with your supervisor. Once confirmed you should carry out the works and handover to the client an improved system that has been tested.

After you've completed the system improvement, the client has also informed you of another suspected fault. The client has supplied the following symptoms to for you to diagnose the fault.

The hot water tap has been running cold for a few days but the heating has been working fine.

Once diagnosed, the necessary repair works must be carried out and the existing installation must be recommissioned and tested.

When you have handed over to the client you will need to complete a self-evaluation reflecting on all of the work you've carried out. You will need to consider what went well and what you would do differently if you were to carry out a job like this again in the future.

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Bathroom Specification:

- There is no heat loss or gain from the a joining rooms or floor below
- Design room temperature is 22 °C
- The bathroom has:
 - external cavity walls 0.9 W/m²K
 - a timber floor 0.13 W/m²K
 - double glazing 2.2 W/m²K
 - a pitched roof with 300 mm of insulation 0.33 W/m²K
 - unfilled cavity internal walls 0.6 W/m²K
- The bathroom height is 2.4 m
- The floor to window sill height is 1.2 m
- The external temperature is -1 °C
- The average room temperature is 15°C
- The 800 mm wide door is to be treated as part of the wall
- The Δt adjustment factor is 0.890
- The bathroom has an air change rate of 2 per hour
- There are no corrections for intermittent heating, the heating will be on continuously

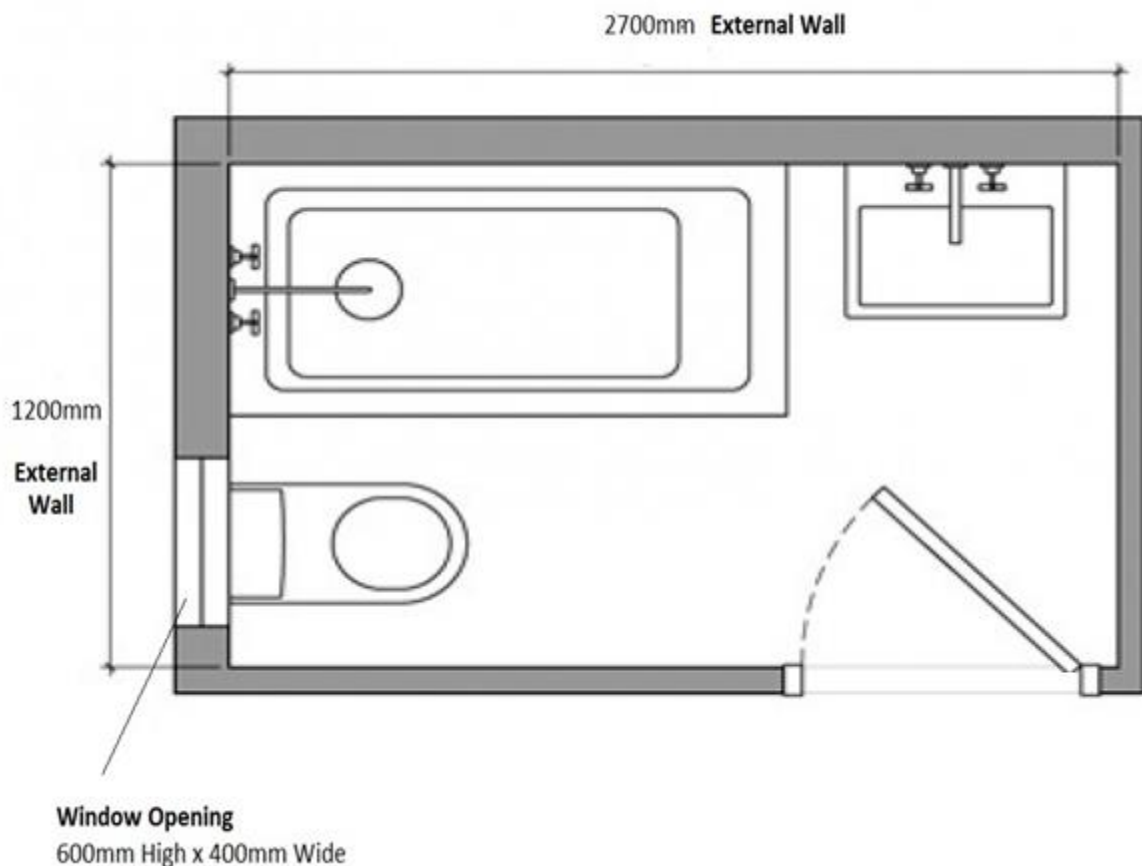


Figure 1

50 Δt
(75/65/20°C)

P1



K1



P+



K2



Height mm	Length mm	Sections	Stelrad UIN	Heat output Watts Btu/hr	Stelrad UIN	Heat output Watts Btu/hr	Stelrad UIN	Heat output Watts Btu/hr	Stelrad UIN	Heat output Watts Btu/hr
300	500	15	-	- -	8430	259 884	8436	388 1324	8442	506 1727
	1000	30	-	- -	8431	517 1765	8437	776 2648	8443	1012 3454
	1500	45	-	- -	8432	776 2648	8438	1164 3973	8444	1518 5181
	2000	60	-	- -	8433	1034 3529	8439	1552 5297	8445	2024 6908
	2500	75	-	- -	8434	1293 4413	8440	1940 6621	8446	2530 8635
	3000	90	-	- -	8435	1551 5294	-	- -	8447	3036 10362
450	400	12	8448	190 648	8461	307 1048	8479	442 1509	8497	564 1925
	500	15	8449	238 812	8462	384 1311	8480	553 1887	8498	705 2406
	600	18	8450	286 976	8463	461 1573	8481	664 2266	8499	845 2884
	700	21	8451	333 1137	8464	538 1836	8482	774 2642	8500	986 3365
	800	24	8452	381 1300	8465	614 2096	8483	885 3021	8501	1127 3846
	900	27	8453	428 1461	8466	691 2358	8484	995 3396	8502	1268 4328
	1000	30	8454	476 1625	8467	768 2621	8485	1106 3775	8503	1409 4809
	1100	33	-	- -	8468	845 2884	8486	1217 4154	8504	1550 5290
	1200	36	8456	571 1949	8469	922 3147	8487	1327 4529	8505	1691 5771
	1400	42	8457	666 2273	8470	1075 3669	8488	1548 5283	8506	1973 6734
	1600	48	8458	762 2601	8471	1229 4195	8489	1770 6041	8507	2254 7693
	1800	54	-	- -	8472	1382 4717	8490	1991 6795	8508	2536 8655
	2000	60	-	- -	8473	1536 5242	8491	2212 7550	8509	2818 9618
	2200	66	-	- -	8474	1690 5768	-	- -	8510	3100 10580
	2400	72	-	- -	8475	1843 6290	-	- -	8511	3382 11543
	2600	78	-	- -	8476	1997 6816	-	- -	8512	3663 12502
	2800	84	-	- -	8477	2150 7338	-	- -	8513	3945 13464
	3000	90	-	- -	8478	2304 7864	-	- -	8514	4227 14427

50 Δt
(75/65/20°C)

STRAIGHT CHROME

Height mm	Length mm	Max Projection mm	Stelrad UIN	Heat output Watts	Btu/hr
650	400	100	148700	174	594
	500	100	148701	236	806
803	600	100	148702	268	915
	500	100	148703	345	1178
1188	600	100	148704	402	1372
	500	100	148705	467	1594
1600	600	100	148706	548	1870
	500	100	148707	524	1788
1785	600	100	148708	614	2095

Tasks

Task 1 - Central heating system design

- a) Calculate the heat loss for the bathroom.
- b) Identify where you would install the heat emitter providing justification.
- c) Select an appropriate heat emitter to install.

Conditions of assessment:

- you must carry the task out on your own under supervised conditions

What you must produce for marking:

- completed heat loss calculations, annotated bathroom layout, selected heat emitter

Task 2 - Diagnosis of system fault and planning rectification works

- a) Diagnose the fault detailed within the brief
- b) Plan how you will carry out the rectification

Conditions of assessment:

- you must carry the task out on your own under supervised conditions

What you must produce for marking:

- practical diagnosis and rectification checklist
- resource list, method statement and risk assessment

Task 3 - Rectification

Carry out rectification work on the hot water system.

Conditions of assessment:

- safe isolation of electrical supply where required must be directly observed by the tutor
- you must carry out the task on your own, under controlled conditions

What you must produce for marking:

- a rectified system that has been performance tested

Additional evidence of your performance that must be captured for marking:

- your assessor's notes of your working practice describing the quality, consistency and accuracy of the finished work
- photographs taken by your assessor throughout this task

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Task 4 - Fault Diagnosis and Rectification

Diagnose, rectify and commission the central heating system.

Conditions of assessment:

- safe isolation of electrical supply where required must be directly observed by the tutor
- you must carry out the task on your own, under controlled conditions

What you must produce for marking:

- practical diagnosis and rectification checklist
- commissioning certificate

Additional evidence of your performance that must be captured for marking:

- your assessor's notes of your working practice describing the quality, consistency and accuracy of the finished work
- photographs taken by your assessor throughout this task

Task 5 - Evaluation

Reflect on the practical work you have carried out in Task 2, 3 and 4.

Consider what has gone well and what you may change if you were to complete these types of jobs like this again in the future.

Conditions of assessment:

- you must carry the task out on your own under supervised conditions

What you must produce for marking:

- a written reflective evaluation that considers all tasks you've carried out within the assignment. It is recommended that your evaluation is approximately 500 words

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Task instructions for centres

Resources

Candidates must have access to a suitable range of resources to carry out the tasks and, where appropriate, to have the opportunity to choose materials demonstrating the ability to select from a range of appropriate materials.

Permitted reference materials for these assessment tasks are:

- BS EN 806 - Specification for installations inside buildings conveying water for human consumption (parts 1-5)
- WRAS - Water Regulations Guide Book
- Manufacture instructions

Centres have to meet the specification in the Candidate Bay Specification as a minimum to ensure consistency in assessment.

The resources available to each candidate must include:

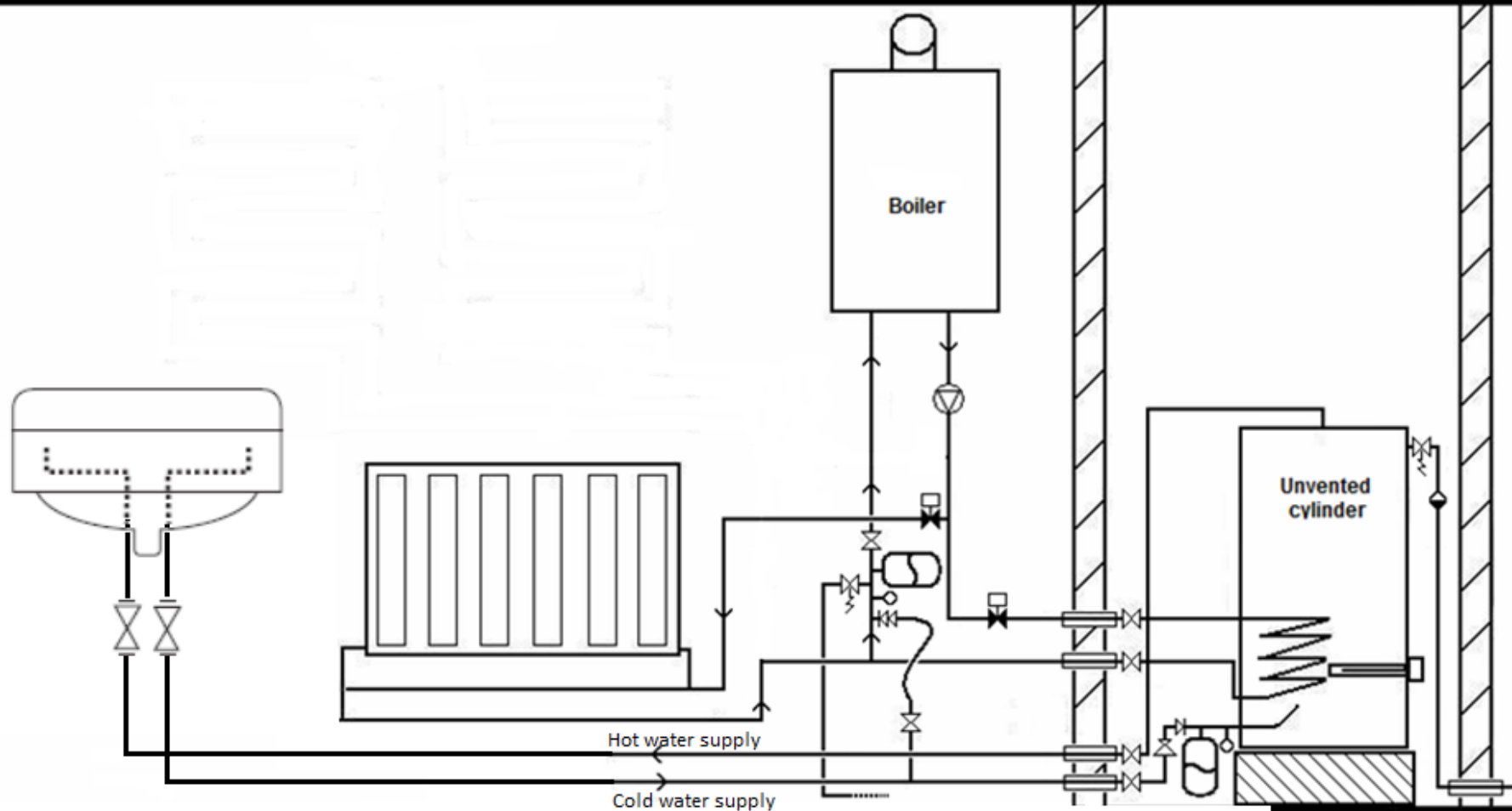
Materials

- PPE
- Secondary return pump
- Copper pipe and fittings
- Pump and isolation valves
- Suitable secondary connection to the cylinder
- Electrical cable
- Suitably located pre-installed fused spur
- Thermometer
- Flow cup
- Proving unit
- Electrical test equipment
- 2-port valve
- Calculator
- Computers containing Word Processing software

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Candidate Bay Specification

ASSESSMENT



PAST ASSESSMENT

Time

The recommended time allocated for the completion of the tasks and production of evidence for this assessment is **13** hours. Only **8** hours of this needs to be carried out in a practical workshop. The other **5** hours can be carried out in a classroom environment.

Suggested timings are given below per task, candidates should be made aware of the time they have available to ensure they formulate an appropriate plan.

Actual time spent preparing the work space, for example loading material is not included in the suggested hours.

The following timings are provided to support centre planning:

Total – 13 hours.

Task 1 – 2 hours

Task 2 – 2 hours

Task 3 – 4 hours

Task 4 – 4 hours

Task 5 – 1 hour

Timings are recommended, where the candidates require extra time this should be captured within the tutors notes and reflected in the marks awarded.

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Task specific guidance

Task 1 –System design

Candidates should produce a heat loss calculation on the template provided for the bathroom specification given in Figure 1. The marking guidance is given below.

The candidate should select a heat emitter of a suitable size to fit on the wall adjacent to the door, meets the heat loss requirement and considers the dimensions of the toilet.

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Assessor Guidance - Heat loss calculation

INPUT DATA	
Room	Bathroom
Floor Area	3.24m ²
Height	2.4m ²
Exterior Wall	9.12m ²
Internal Wall	9.36m ²
Glazing	0.24m ²

SURFACE	U-value
Exterior Walls	0.9
Windows	2.2
Interior Walls	0.6
Ceiling/Roof	0.33
Air Changes per Hour	2

Desired Room Temperature	22
Outside Temperature	-1
Temperature Difference	23

Room Temperature	22
Average Internal Room Temp	15

External Wall	Watts Loss
Area (minus glazing) 9.12m ² x 0.9 (U-value) x 23 (Temp Diff) °C	188.78
Window	
Area 0.24 m ² x 2.2 (U-value) x 23 (Temp Diff) °C	12.14
Ceiling / Roof	
Area 3.24m ² x (U-value) 0.33 x (Temp Diff) 23°C	24.59
Air Change Losses	
Volume 7.78m ³ x 23 (Temp Diff) °C x 2 (per hour)	118.1

TOTAL HEAT LOSS REQUIREMENT	343.61 x 0.89 = 305.81 W
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Task 2 – Diagnosis & Planning

The fault detailed in the brief requires candidates to install a secondary return circuit to the existing system. Candidates need to interpret the scenario to understand what is required of them before planning and carrying out the works.

All candidates should be working on a system that has a live unvented cylinder that the candidate would need to isolate. Candidates must determine appropriate methods to balance the system and must be assessed on their ability to select a suitable solution.

Once the candidate has diagnosed to fault they should check in with the assessor to ensure this has been done correctly. In the event that the wrong diagnosis is given by the candidate, the assessor should capture this on their recording form and award marks that reflect this.

Candidates should be provided with the scenario brief and given time to plan their works in a classroom environment. As a minimum, it is expected that candidates will produce a resource list, a method statement planning their works and a risk assessment.

It is recommended that centres use the templates in the synoptic recording form pack to ensure the candidate captures the materials, equipment and tools, detail quantities of materials needed and reasoning why they are requesting these resources.

A template for the method statement has not been included within the synoptic recording form pack, and centres should not provide candidates with a template. Part of the assignment is assessing the candidate's ability understanding of a method statement and its purpose in a practical setting. When completing their method statement, candidates should also consider the time they have available to them and ensure they plan timings accordingly.

Candidates must complete this activity prior to carrying out the works.

If candidates provide plans that are not fit for purpose it is expected that the assessor will intervene and provide necessary feedback and corrections to the plans prior to the candidate carrying out the installation, however this should be commented on in the marking documentation and reflected in marks awarded.

Task 3 – Rectification

This task requires candidates to install a secondary return into the existing system. Direct supervision of all electrical works, with a 1:1 candidate to assessor ratio.

It is to the discretion of the centre how the secondary return is connected back to the unvented cylinder. Appropriate guidance should be shared with the candidate.

Centres must use a secondary return pump, this can be a variety of materials but cannot be a central heating pump. The pump must be wired from a pre-installed fuse spur.

The location of the hot water outlet can be adapted for each candidate, as required by the centre.

Once the secondary return is installed, the system should be performance tested. The handover should include what work has been carried out and why.

To support the comments made within the Practical Observation form the following photographs should be uploaded as a minimum for each candidate:

1. Initial hot draw off
2. Close up of pump wiring
3. Completed secondary return installation

Task 4 – Fault Diagnosis, rectification and commissioning

Candidates will need to replace a 2-port valve on a central heating system. The motorised valve should be identified as the faulty component and recorded on the documentation. If a candidate does not initially identify the valve, they are allowed to be prompted but this must be reflected in the marking.

They should be working on a system with a working boiler.

The safe isolation procedure should then be followed and directly observed. Once safe isolation has been confirmed the supply should be locked off for the component to be replaced by the candidate. It is expected that the valve is removed safely without causing damage to the surrounding area. The candidate should then replace with a fully operational valve. The power should only be reinstated after dead testing and the assessor is satisfied with the installed and wired component after inspection.

The following is to be taken into consideration:

- sourcing relevant system information
- decommission
- repair and rectification procedures
- continuity test of electrical supply
- completion of relevant paperwork.

Once the fault has been rectified the system must be commissioned:

- visual inspection of the system before commissioning
- fill and vent
- commission the central heating and hot water system (inhibitor can be simulated)
- completion of commissioning certificate
- carry out handover procedures following final commissioning.

To support the comments made within the Practical Observation form the following photographs should be uploaded at a minimum for each candidate:

1. removal of existing valve – showing open ended pipework
2. close up of wiring after valve installation
3. close up showing the reading of outlet temperature
4. close up showing the reading of outlet flow rate
5. completed installation

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Task 5

The purpose of this task is for candidates to reflect upon the work they've carried out, in a classroom environment. As a minimum, it is expected that candidates will produce a minimum of 500 words written self-evaluation, it is recommended that candidates have access to a computer suite to allow them to type-up their evaluations. Candidates should reflect on their own performance and consider how they would change what they did if they were to carry out the activity again. Candidates must complete this activity after to carrying out the works.

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Centre guidance

Guidance provided in this document supports the administration of this assignment. The following documents, available on the City & Guilds website, provide essential generic guidance for centres delivering Technical qualifications and **must** be referred to alongside this guidance:

- **Technical qualifications – marking**
- **Technical qualifications – moderation** (updated annually)
- **Technical qualifications – teaching, learning and assessment**

This synoptic assessment is designed to require the candidate to make use of their knowledge, understanding and skills they have built up over the course of their learning to tackle problems/tasks/challenges.

This approach to assessment emphasises to candidates the importance and applicability of the full range of their learning to practice in their industry area, and supports them in learning to take responsibility for transferring their knowledge, understanding and skills to the practical situation, fostering independence, autonomy and confidence.

Candidates are provided with an assignment brief. They then have to draw on their knowledge and skills and independently select the correct processes, skills, materials, and approaches to take to provide the evidence specified by the brief.

During the learning programme, it is expected that tutors will have taken the opportunity to set shorter, formative tasks that allow candidates to be supported to independently use the learning they have so far covered, drawing this together in a similar way, so they are familiar with the format, conditions and expectations of the synoptic assessment.

Candidates should be made aware during learning what the Assessment Objectives are and how they are implemented in marking the assignment, so they will understand the level of performance that will achieve them high marks.

Candidates should not be entered for the assessment until the end of the course of learning for the qualification so they are in a position to complete the assignment successfully.

Health and safety

Candidates should not be entered for assessment without being clear of the importance of working safely, and practice of doing so. The tutor must immediately stop an assessment if a candidate works unsafely. At the discretion of the tutor, depending on the severity of the incident, the candidate may be given a warning. If they continue to work unsafely however, their assessment must be ended and they must retake the assessment at a later date.

Compliance with timings

The timings provided are estimates to support centre planning. They refer to assessment time, not any additional setting up the centre needs to carry out to create an appropriate assessment environment.

It is the centre's responsibility to plan sufficient assessment sessions, under the appropriate conditions, within the assignment window, to allow candidates reasonable time to complete the assessment tasks.

Where candidates are required to plan their work they should have their plans confirmed for appropriateness in relation to the time allocated for each task.

Candidates should be allowed sufficient time to fully demonstrate the range of their skills, however this also needs to be reasonable and practicable. Candidates should be allowed to overrun their planned timings or professional service times (where they exist) in order for evidence of a range of their skills to be captured. If however, the time required exceeds reasonably set assessment periods, or the tolerance suggested for professional service times, the centre may stop the assessment and base the marking on the evidence up to that point, including the tutor's notes of how far over time the task has taken.

Observation evidence

Where the tutor is required to carry out observation of performance, detailed, descriptive notes must be recorded on the practical observation (PO) form provided. The centre has the flexibility to adapt the form, to suit local requirements (e.g. to use tablet, hand-written formats, or to ease local administration) as long as this does not change or restrict the type of evidence collected.

The number of candidates a tutor will be able to observe at one time will vary depending on:

- the complexity of evidence collection for the task,
- local conditions e.g. layout of the assessment environment
- amount of additional support available (e.g. to capture image/ video evidence), staggered starts etc,
- whether there are any peak times where there is a lot of evidence to collect that will need additional support or any that are quieter

It is advisable to trial the planned arrangements where possible during formative assessment, reviewing the quality of evidence captured and manageability. It is expected that for straight forward observations, (and unless otherwise specified) no more than eight candidates will be observed by a single tutor at one time, and the number will usually be fewer than this maximum. The key factor to consider is the logistics of collecting sufficient evidence.

As far as possible, candidates should not be distracted, or their performance affected by the process of observation and evidence collection.

Observation notes form part of the candidate's evidence and must describe **how well** the activity has been carried out, rather than stating the steps/ actions the candidate has taken. The notes must be very descriptive and focus on the **quality** of the performance in such a way that comparisons between performances can be made. They must provide sufficient, appropriate evidence that can be used by the marker (and moderator) to mark the performance using the marking grid.

Identifying **what it is** about the performances that is **different** between candidates can clarify the qualities that are important to record. Each candidate is likely to carry out the same steps, so a checklist of this information would not help differentiate between them. However qualitative comments on **how well** they do it, and quantitative records of accuracy and tolerances would.

The tutor should refer to the marking grid to ensure appropriate aspects of performance are recorded. These notes will be used for marking and moderation purposes and so must be **detailed, accurate** and **differentiating**.

Tutors should ensure that any required additional supporting evidence including e.g. photographs or video can be easily matched to the correct candidate, are clear, well-lit and showing the **areas of particular interest** in **sufficient detail** and **clarity** for assessment (i.e. taken at appropriate points in production, showing accuracy of measurements where appropriate).

If candidates are required to work as a team, each candidate's contribution must be noted separately. The tutor may intervene if any individual candidate's contribution is unclear or to ensure fair access (see below).

The **Technical qualifications guides on marking and moderation** are essential guidance documents and are available on the City & Guilds website. These provide further information on preparing for assessment, evidence gathering, standardisation, marking and moderation, and must be referred to when planning and carrying out assessment.

Minimum evidence requirements for marking and moderation

The sections in the assignment:

- **What you must produce for marking**, and
- **Additional evidence of your performance that must be captured for marking**

List the minimum requirements of evidence to be submitted for marking and the moderation sample.

Evidence produced during assessment above and beyond this may be submitted, as long as it provides useful information for marking and moderation and has been produced under appropriate conditions.

While technological methods which support the capturing or creating of evidence can be helpful, e.g. pinboard style websites for creating mood boards, the final evidence must be converted to a suitable format for marking and moderation which cannot be lost/ deleted or amended after the end of the assessment period (e.g. screen prints, pdf files). Considerations around tracking authenticity and potential loss of material hosted on such platforms during assessment is the centre's responsibility.

Where candidates have carried out some work as a group, the contribution of each candidate must be clear. It is not appropriate to submit identical information for each candidate without some way for the marker and moderator to mark the candidates individually.

Note: Combining candidates' individual pieces of evidence into single files or zip files may make evidence management during internal marking more efficient and will greatly simplify the uploading of the moderation sample.

Where the minimum requirements have **not been submitted** for the moderation sample by the final moderation deadline, or the **quality of evidence is insufficient** to make a judgement, the moderation, and therefore any subsequent adjustment, will be based on the evidence that *has been submitted*. **Where this is insufficient to provide a mark on moderation, a mark of zero may be given.**

Preparation of candidates

Candidates should be aware of which aspects of their performance (across the AOs) will give them good marks in assessment. This is best carried out through routinely pointing out good or poor performance during the learning period, and through formative assessment.

During the learning programme, direct tutor instruction in how to tackle practical tasks through modelling, support, guidance and feedback are critical. However gradual removal of this support is necessary in preparation for summative assessment. This, supported approach is **not** valid for summative assessment.

The purpose of summative assessment is to confirm the standard the candidate has reached as a result of participating in the learning process. Candidates should be encouraged to do the best they can and be made aware of the difference between these summative assessments and any formative assessments they have been subject to. Candidates may not have access to the full marking grids, as these may be misinterpreted

as pass, merit distinction descriptors. Refer to the **Technical qualifications – teaching, learning and assessment** centre guidance document, available on the City & Guilds website for further information on preparing candidates for Technical qualification assessment.

Guidance on assessment conditions

The assessment conditions that are in place for this synoptic assignment are to:

- ensure the rigour of the assessment process
- provide fairness for candidates
- give confidence in the outcome.

They can be thought of as the rules that ensure that all candidates who take an assessment are being treated fairly, equally and in a manner that ensures their result reflects their true ability.

The conditions outlined below relate to this summative synoptic assignment. These do not affect any formative assessment work that takes place, although it is advised that candidates are prepared for the conditions they will need to work under during summative assessment.

The evidence for the tasks that make up this synoptic assignment must be completed under the specified conditions. This is to ensure authenticity and prevent malpractice as well as to assess and record candidate performance for assessment in the practical tasks. Any aspect that may be undertaken in unsupervised conditions is specified. It is the centre's responsibility to ensure that local administration and oversight gives the tutor sufficient confidence to be able to confirm the authenticity of the candidate's work.

Security and authentication of candidate work

Candidate evidence must be kept secure to prevent unsupervised access by the candidate or others. Where evidence is produced over a number of sessions, the tutor must ensure candidates and others cannot access the evidence without supervision. This might include storing written work or artefacts in locked cupboards and collecting memory sticks of evidence produced electronically at the end of each session.

Candidates are required to sign declarations of authenticity, as is the tutor. The relevant form is included in this assignment pack and must be signed after the production of all evidence.

Where the candidate or tutor is unable to, or does not confirm authenticity through signing the declaration form, the work will not be accepted at moderation and a mark of zero will be given. If any question of authenticity arises e.g. at moderation, the centre may be contacted for justification of authentication.

Accessibility and fairness

Where a candidate has special requirements, tutors should refer to the *Access arrangements and reasonable adjustments* section of the City & Guilds website.

Tutors can support access where necessary by providing clarification to **any** candidate on the requirements or timings of any aspect of this synoptic assignment. Tutors should **not** provide more guidance than the candidate needs as this may impact on the candidate's grade, see the guidance and feedback section below.

All candidates must be provided with an environment, time frame and resources that allows them reasonable access to the full range of marks available.

Where candidates have worked in groups to complete one or more tasks for this synoptic assessment, the tutor must ensure that no candidate is disadvantaged as a result of the performance of any other team member. If a team member is distracting or preventing another team member from fully demonstrating their skills or knowledge, the tutor must intervene.

Guidance and feedback

To support centre file management, tutors may specify a suitable file format and referencing format for evidence (unless otherwise specified e.g. if file naming is an assessment point for the assignment). Guidance must only support access to the assignment and must not provide feedback for improvement. The level and frequency of clarification & guidance must be

- recorded fully on the candidate record form (CRF),
- taken into account along with the candidate's final evidence during marking,
- made available for moderation.

Tutors **must not** provide feedback on the quality of the performance or how the quality of evidence can be improved. This would be classed as malpractice.

Tutors **should** however provide general reminders to candidates throughout the assessment period to check their work thoroughly before submitting it, and to be sure that they are happy with their final evidence as it may not be worked on further after submission.

Candidates can rework any evidence that has been produced for this synoptic assignment during the time allowed. However, this must be as a result of their own review and identification of weaknesses and not as a result of tutor feedback. Once the evidence has been submitted for assessment, no further amendments to evidence can be made.

Tutors **should** check and be aware of the candidates' plans and designs to ensure management of time and resources is appropriate, and so any allowed intervention can take place at an appropriate time.

Tutors **should** ensure that candidates' plans for completion of the tasks distribute the time available appropriately and may guide candidates on where they should be up to at any point in a general way. Any excessive time taken for any task should be recorded and should be taken into account during marking if appropriate.

It is up to the marker to decide if the guidance the candidate has required suggests they are lacking in any AO, the severity of the issue, and how to award marks on the basis of this full range of evidence. The marker must record where and how guidance has had an impact on the marks given, so this is available should queries arise at moderation or appeal.

What is and is not, an appropriate level of guidance

A tutor **should intervene with caution** if a candidate has taken a course of action that will result in them not being able to submit the full range of evidence for assessment. However, this should **only** take place once the tutor has prompted the candidate to check that they have covered all the requirements. Where the tutor has to be explicit as to what the issue is, this is likely to demonstrate a lack of understanding on the part of the candidate rather than a simple error, and full details should be recorded on the CRF.

- The tutor **should not** provide guidance if the candidate is thought to be able to correct the issue without it, and a prompt would suffice. In other words, only the minimum support the candidate actually needs should be given, since the more tutor

guidance provided, the less of the candidate's own performance is being demonstrated and therefore the larger the impact on the marks awarded.

- A tutor **must not** provide guidance that the candidate's work is not at the required standard or how to improve their work. In this way, candidates are given the chance to identify and correct any errors on their own, providing valid evidence of knowledge and skills that will be credited during marking.
- The tutor **must not** produce any templates, pro-formas, work logs etc. unless instructed to in the assignment guidance. Where instructed to do so, these materials must be produced as specified and contain no additional guidance. Templates provided as part of the assignment should be used as provided, and not adapted

All specific prompts and details of the nature of any further guidance must be recorded on the relevant form and reviewed during marking and moderation.

Guidance on marking

Please refer to the **Technical qualifications – marking, and - moderation** centre guidance documents for further information on gathering evidence suitable for marking and moderation, and on using the marking grid and forms.

The candidate record form (CRF) is used to record:

- Details of any guidance or the level of prompting the candidate has received during the assessment period
- Rough notes bringing together relevant evidence from across tasks during marking.
- Summary justifications when holistically coming to an overall judgement of the mark.

The practical observation form (PO) is used to record:

- Descriptive information and evidence of candidate performance during an observation. Although descriptions of the quality of performance should support decisions against the AOs, the notes should follow the flow of the observation, rather than attempting to assign evidence against the AOs at this point.

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Marking grid

For any category, 0 marks may be awarded where there is no evidence of achievement

%	Assessment Objective	Band 1 descriptor Poor to limited	Band 2 descriptor Fair to good	Band 3 descriptor Strong to excellent
10	AO1 Recall of knowledge relating to the qualification LOs - Does the candidate seem to have the full breadth and depth of taught knowledge across the qualification to hand? - How accurate is their knowledge? Are there any gaps or misunderstandings evident? - How confident and secure does their knowledge seem?	(1-2 marks) Recall shows some weaknesses in breadth and/or accuracy. Hesitant, significant gaps, inaccuracy	(3-4 marks) Recall is generally accurate and shows reasonable breadth. Inaccuracy and misunderstandings are infrequent and usually minor. Sound, minimal gaps	(5-6 marks) Consistently strong evidence of accurate and confident recall from the breadth of knowledge. Accurate, confident, complete, fluent
		Examples of types of knowledge expected: Legislation, job roles, types of clients, site responsibilities components and layout features, mechanical and non-mechanical backflow prevention, hot water system supplies and design temperatures, installation requirements and sources of information, positioning, fixing and connection requirements.		
		Where the candidate has demonstrated knowledge it has been limited and/or showing inaccuracies. There are clear gaps in knowledge with little confidence in working independently.	The candidate has shown a good range of knowledge from across the qualification which is sound. The candidate seeks minimal guidance or reassurance in the completion of tasks.	The candidate shows in-depth and detailed knowledge across the whole qualification range, showing a high degree of accuracy. The candidate is confident and requires no reassurance.

20	AO2 Understanding of concepts theories and processes relating to the LOs - Does the candidate make connections and show causal links and explain why? - How well theories and concepts are applied to new situations/the assignment? - How well chosen are exemplars – how well do they illustrate the concept?	(1-4 marks) Some evidence of being able to give explanations of concepts and theories. Explanations appear to be recalled, simplistic or incomplete. Misunderstanding, illogical connections, guessing,	(5-8 marks) Explanations are logical. Showing comprehension and generally free from misunderstanding, but may lack depth or connections are incompletely explored. Logical, slightly disjointed, plausible,	(9-12 marks) Consistently strong evidence of clear causal links in explanations generated by the candidate. Candidate uses concepts and theories confidently in explaining decisions taken and application to new situations. Logical reasoning, thoughtful decisions, causal links, justified
		Examples of understanding expected: interpretation of diagnostic test results, explanations/comparisons related to material and component specifications and performance, why and when different methods, techniques, materials are used, principles (e.g. design, risk management, building services provision)		
		Some concepts are referred to, but explanations are typically weak; little ability to show a chain of cause and effect – i.e. explain why. Candidate plans plumbing system design with some errors, demonstrating basic understanding of system types. Links between systems operation are not clearly made. Limited understanding of how plumbing systems impact on each other. Some components selected correctly with limited consideration of legislative	There is good understanding shown across the qualification, explanations are clear and often show good links between cause and effect – i.e. can explain ‘why’ in familiar contexts well. Candidate demonstrated good system design skills applying understanding of plumbing systems and design principles. Candidate shows consistent demonstration of ideas on system interaction/impact. Most components selected correctly and with consideration of legislative requirements. Reasoned processes following	Concepts and understanding across the qualification are extremely well understood and can be applied consistently and effectively in new contexts. Candidate shows a high level of understanding with excellent plumbing system design and evidence of analytical working when fault finding. Application of good practice in planning is evident with no errors in design plans. Full understanding of how systems interact and impact on each other. All components selected correctly and to meet legislative

		requirements. Incorrect process followed when calculating flow sizes and therefore incorrect pipe sizes used.	when calculating flow sizes but some errors.	requirements. Correct process followed when calculating flow sizes resulting in correctly sized pipework.
40	AO3 Application of practical/ technical skills - How practiced/fluid does hand eye coordination and dexterity seem? - How confidently does the candidate use the breadth of practical skills open to them? - How accurately/ successfully has the candidate been able to use skills/achieve practical outcomes?	(1-8 marks) Some evidence of familiarity with practical skills. Some awkwardness in implementation, may show frustration out of inability rather than lack of care. Unable to adapt, frustrated, flaws, out of tolerance, imperfect, clumsy.	(9-16 marks) Generally successful application of skills, although areas of complexity may present a challenge. Skills are not yet second nature. Somewhat successful, some inconsistencies, fairly adept/ capable.	(17-24 marks) Consistently high levels of skill and/or dexterity, showing ability to successfully make adjustments to practice; able to deal successfully with complexity. Dextrous, fluid, comes naturally, skilled, practiced,
		Examples of skills expected: Working in a safe manner, interpreting test results, use of tools and equipment, use of diagnostic equipment, working with documentation (project, planning, building regulations), producing tender figures, using, production of plans and drawings, carrying out a risk assessment.		
		Bottom of band: Processes can be carried out to a degree, resulting in installation that is inaccurate in places. Complex situations are problematic. Pipework and component installation is of poor quality with weak practical skills shown, not following industry practice. Work is completed safely but not to recognised standards. Assistance required with fault diagnosis and	Bottom of band: Familiar processes are carried out in a capable way resulting in consistent commissioning and installation following industry standards. Installation is of average quality, skills demonstrated are at a level acceptable within industry tolerances. Attempt has been made to plan and organise work.	Bottom of band: Candidate is able to consistently display a high level of skill in all areas of commissioning and installation. Measurements are reliable and accurate, within tolerance even in complex situations. Very good installation with consideration of presentation and meeting manufactures expectations. Good use of time to meet all aspects of task.

		rectification. Tests failed and little or no reference recognised procedures. Top of band: Candidate demonstrates basic skills, with some commissioning and installation errors. Completed systems are functional but not to industry standards. Untidy workmanship displayed with lack of forethought and planning when working. No logical sequence to work. Time is inconsistently allocated and some elements are rushed.	Faults diagnosed but not rectified following recognised procedure. Testing passed with an attempt to follow standard procedures. Top of band: Candidate demonstrates good, consistent installation skills which meets industry standards, partial commissioning procedures demonstrated. Work is well planned following a logical sequence and is completed in a timely manner. Complex situations are attempted well and mostly effectively.	Top of band: Excellent installation and commissioning fully completed following industry requirements, high level of attention to presentation of documentation that is completed professional and correctly. Consideration is made to specific client/situation – adapting techniques to meet requirements. Work is planned and methodical with no damage to surrounding area. Area is left clean and tidy. Faults diagnosed and rectified following a systematic approach. Electrical tests carried out following correct procedures. System commissioned following correct procedures. Tests passed and carried out following correct procedures and pressures without leaks.
20	AO4 Bringing it all together - coherence of the whole subject Does the candidate draw from the breadth of their knowledge and skills?	(1-4 marks) Some evidence of consideration of theory when attempting tasks. Tends to attend to single aspects at a time without considering implication of contextual information. Some random trial and error, new situations are challenging,	(5-8 marks) Shows good application of theory to practice and new context, some inconsistencies. Remembers to apply theory, somewhat successful at achieving fitness for purpose. Some consolidation of theory and practice	(9-12 marks) Strong evidence of thorough consideration of the context and use of theory and skills to achieve fitness for purpose. Purposeful experimentation, plausible ideas, guided by theory and experience, fit for purpose, integrated, uses whole toolkit of theory and skills.

	- Does the candidate remember to reflect on theory when solving practical problems? - How well can the candidate work out solutions to new contexts/ problems on their own?	expects guidance, narrow. Many need prompting.		
		Examples of bringing it all together: Applying knowledge and understanding to a particular scenario/ problem – justifying decisions/approaches taken e.g. materials, techniques, appropriate attention to human comfort factors given stated requirements, adapting practice to meet contextual challenges e.g. difficult sites, consideration of costs		
		There is some evidence of the candidate using their knowledge and understanding together in a few straightforward areas. Poor design criteria selected resulting in a system designed adequately but with some errors. Lack of use of reference materials and application to project design. Little consideration of how plumbing systems integrate with each other. Tasks not appropriately planned with some elements rushed. Little evidence of reference to sources available to make decisions.	The candidate typically brings together their knowledge, understanding and skills well when solving problems that arise when presented with the context, although they may deal with these separately. System design completed to the correct level with some minor errors. Choices and decisions are made with some consideration of wider context. Recognition of how most plumbing systems impact on each other with an attempt to consider how they integrate. Evidence of planning with some attempt to manage time efficiently. Reference to most available sources to make reasoned judgements with.	The candidate has made excellent use of their knowledge, understanding and skills from across the qualification to inform them as to how best to meet the context of the assignment. Choices and decisions have been well informed and considered. Candidate demonstrates detailed understanding of design criteria with no errors, considering of impact of system design on end user/client (e.g. location of components) Systematic consideration of how plumbing systems integrate with each other. All work systematic, with clear evidence of planning - time used efficiently. Evidence of reference of all available documentation to make an informed judgement.

10	AO5 Attending to detail/ perfecting - Does the candidate routinely check on quality, finish etc. and attend to imperfections/ omissions - How much is accuracy a result of persistent care and attention (e.g. measure twice cut once)? - Would you describe the candidate as a perfectionist and wholly engaged in the subject?	(1-2 marks) Easily distracted or lack of checking. Insufficiently concerned by poor result; little attempt to improve. Gives up too early; focus may be on completion rather than quality of outcome. Careless, imprecise, flawed, uncaring, unfocussed, unobservant, unmotivated.	(3-4 marks) Aims for satisfactory result but may not persist beyond this. Uses feedback methods but perhaps not fully or consistently. Variable/intermittent attention, reasonably conscientious, some imperfections, unremarkable.	(5-6 marks) Alert, focussed on task. Attentive and persistently pursuing excellence. Using feedback to identify problems for correction. Noticing, checking, persistent, perfecting, refining, accurate, focus on quality, precision, refinement, faultless, meticulous.
		Examples of attending to detail: Accuracy and detail of drawings, attention to accuracy during work, thinking about and attending to specific requirements of the client, completeness and attention to usability of documentation, following current legislation and regulations		
		There is superficial attention to detail. The drawings and documents show some inaccuracies or gaps. Performance needs are interpreted in a generic rather than specific way with basic attention to their aims. No written detail is provided when designing systems. No reference made to manufacturers' instructions in planning documentation.	There is adequate attention to detail – drawings and documentation are accurate. Performance needs are considered sufficiently to meet their needs in the most straightforward/ conventional way. Candidate provides good written details with some reference made to manufacturers' instructions.	The candidate has been highly focused on tasks showing extreme care in the accuracy in their work. They have been thoughtful in using insights in achieving an outcome that is extremely well presented. Candidate provides a high level of accuracy in drawings and written detail consistently ensuring and checking accuracy of results of diagnostic testing. Consistent reference is made to manufacturers' instructions.

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