



# Level 2 Technical Certificate in Plumbing (8202-25)

October 2017 Version 1.0

**Guide to the examination**

## Who is this document for?

This document has been produced for centres who offer **City & Guilds Level 2 Technical Certificate in Plumbing**. It gives all of the essential details of the qualification's external assessment (exam) arrangements and has been produced to support the preparation of candidates to take the exam/s.

The document comprises of four sections:

1. **Details of the exam.** This section gives details of the structure, length and timing of the exam.
2. **Content assessed by the exam.** This section gives a summary of the content that will be covered in each exam and information of how marks are allocated to the content.
3. **Guidance.** This section gives guidance on the types of questions included and examples of these.
4. **Further information.** This section lists other sources of information about this qualification and City & Guilds Technical Qualifications.

# 1. Details of the exam

## External assessment

City & Guilds Technical qualifications have been developed to meet national policy changes designed to raise the rigour and robustness of vocational qualifications. These changes are being made to ensure our qualifications can meet the needs of employers and Higher Education. One of these changes is for the qualifications to have an increased emphasis on external assessment. This is why you will see an external exam in each of our Technical qualifications.

An external assessment is an assessment that is set and/or marked by the awarding organisation (ie externally). All City and Guilds Technical qualifications include an externally set and marked exam. This must be taken at the same time by all candidates who are registered on a particular qualification. We produce an exam timetable each year. This specifies the date and time of the exam so you can plan your delivery, revision and room bookings/PC allocation in plenty of time.

The purpose of this exam is to provide assurance that all candidates achieving the qualification have gained sufficient knowledge and understanding from their programme of study and that they can independently recall and draw their knowledge and understanding together in an integrated way. Whilst this may not be new to you, it is essential that your learners are well prepared and that they have time to revise, reflect and prepare for these exams. We have produced a Teaching, Learning, and Assessment guide that is you should refer to alongside the present document ([Teaching, Learning and Assessment Guide](#)). If a learner does not pass the exam at their first attempt, there is only one opportunity to resit the exam, so preparation is essential.

## Exam requirements of this qualification

- **Plumbing** – Theory Exam (2 hours)

The exam is graded and a candidate must achieve at least a Pass grade in order to be awarded the qualification. (In addition to the exam, a synoptic assignment must also be completed and passed). You can find full details of the synoptic assignment in the *Qualification Handbook* and the *Synoptic Assessment Guide* – please see the link to the qualification page at the end of this document.

## When does the exam take place?

The exam is offered on two fixed dates in March and June. The exact dates will be published at the start of the academic year in the *Assessments and Exam Timetable*  
<http://www.cityandguilds.com/delivering-our-qualifications/exams-and-admin>.

At the start of the programme of study, in order to effectively plan teaching and exam preparation, centres should know when the exam will be taking place and allocate teaching time accordingly. Section 2 of this document gives a summary of the content that needs to be covered in order to prepare learners for the exam and full details of this are given in the Qualification Handbook.

## Form of exam

The exam for this qualification can be taken either on paper (8202-525) or online (8202-025).

## Can candidates resit the exam?

Candidates may resit the exam once only. If a candidate fails the exam both on the first attempt and when resitting it, that candidate has failed the qualification and cannot achieve it in that academic year.

## How the exam is structured

Each exam has a total of 60 multiple choice questions.

- 29 Knowledge questions
- 19 Understanding questions
- 12 Applied knowledge questions

Multiple choice questions are used to confirm **breadth of knowledge and understanding**.

The applied knowledge multiple choice questions are designed to allow candidates to demonstrate **higher level and integrated understanding** through analysis and evaluation. This question also ensures the exam can differentiate between those learners who are 'just able' and those who are higher achieving.

More details about and examples of question types are given in Section 3 of this document.

## Assessment Objectives

The exams are based on the following set of assessment objectives (AOs). These are designed to allow the candidate's responses to be assessed across the following three categories of performance:

- **Recollection** of knowledge.
- **Understanding** of concepts, theories and processes.
- **Integrated application** of knowledge and understanding.

In full, the assessment objectives covered by the exam for this qualification are:

Assessment objective	Mark allocation (approx %)
<i>The candidate..</i>	
AO1 <b>Recalls knowledge</b> from across the breadth of the qualification	48%
AO2 <b>Demonstrates understanding</b> of concepts, theories and processes from a range of learning outcomes.	32%
AO4 <b>Applies knowledge, understanding and skills</b> from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	20%

## **Booking and taking the exam**

All assessments for City & Guilds Technical Exams must be booked through Walled Garden. There is a deadline for booking exams, synoptic assessments and any other centre marked assessments, please refer to the time line to check these dates.

The exam must be taken under the supervision of an invigilator who is responsible for ensuring that it is conducted under controlled conditions. Full details of the conditions under which the exam must be taken can be found in the Joint Council for Qualifications (JCQ) document, [Instructions for Conducting Examinations \(ICE\)](#).

## **Special consideration**

Candidates who are unable to sit the exam owing to temporary injury, illness or other indisposition at the scheduled time may qualify for special consideration. This is a post-examination adjustment that can, in certain circumstances, be made to a candidate's final grade. The Joint Council for Qualifications' guide to the special consideration process can be found at [www.jcq.org.uk](http://www.jcq.org.uk).

To make a request for special consideration, please contact: [policy@cityandguilds.com](mailto:policy@cityandguilds.com)

## **Access arrangements**

Access arrangements are arrangements that allow candidates with particular requirements, disabilities or temporary illness to take assessments, where appropriate, using their normal way of working. The Joint Council for Qualifications document, *Access Arrangements and Reasonable Adjustments* gives full details and can be downloaded [here](#).

For further information and to apply for access arrangements please see:

[Access arrangements - When and how applications need to be made to City & Guilds](#)  
[Applying for access arrangements on the Walled Garden](#)

## 2. Content assessed by the exam

### Plumbing

The exam assesses:

- **Unit 211: Health and Safety and Industry Practices**
- **Unit 212: Plumbing Processes**
- **Unit 213: Electrical and Scientific Principles**
- **Unit 214: Cold water**
- **Unit 215: Hot Water**
- **Unit 216: Central Heating**
- **Unit 217: Sanitation and Drainage**

Each exam assesses a sample of the content of these units. This means that a single exam will **not** cover 100% of the unit content. The full range of content will be assessed over a number of examination series. Details of the coverage of a particular exam paper will **not** be released in advance of the exam itself. Centres should **not** make assumptions about what will be assessed by a particular exam based on what has been covered on previous occasions. In order to be fully prepared for the exam, learners **must** be ready to answer questions on **any** of the content outlined below.

The table below provides an overview of how the qualification's Learning Outcomes are covered by each exam and the number of **marks** available per Learning Outcome (ie **not** the number of *questions* per Learning Outcome). In preparing candidates for the exam, we recommend that centres take note of the number of marks allocated to Learning Outcomes and to assign teaching and preparation time accordingly.

In preparing candidates for the exam, centres should refer to the Qualification Handbook which gives full details of each Learning Outcome.

The following is a summary of only that qualification content which is assessed by the exam and **not** a summary of the full content of the qualification.

Unit	Learning outcome	Topics	Number of MC Questions/ Marks
211 Health and Safety and Industry Practices	LO1 Understand health and safety legislation in the plumbing and heating industry	1.1 Guidance material and legislation in the plumbing and heating industry 1.2 Purpose of enforcing authorities 1.3 Roles and responsibilities of personnel	8

	LO2 Understand hazardous situations within the plumbing and heating industry	2.1 Preventing potential site hazards 2.2 Types of hazardous substances 2.3 Use power tools 2.3 Dealing with asbestos in the workplace 2.4 Types of Environmental protection	
	LO4 Understand procedures for electrical safety	4.1 Types of electrical supplies used on site 4.2 Types of electrical hazards and safety 4.3 Safe isolation procedure	
212 Plumbing Processes	LO3 Use clips and brackets to support domestic plumbing and heating pipework components	3.1 Fixings used with pipework components 3.2 Install clips and brackets	6
	LO4 Install domestic plumbing and heating pipework	4.1 Installation methods for pipework materials and sizes 4.2 Pipework materials and sizes 4.3 Bend pipework work for installation 4.4 Join pipework for installation 4.5 Install pipework	
213 Electrical and Scientific Principles	LO1 Understand materials used in the plumbing industry	1.1 Material properties used in the plumbing industry 1.2 Uses of materials 1.3 Corrosion protection and degradation	5
	LO2 Understand properties of water, liquids and gases	2.1 Properties of Water 2.2 Properties of Liquids 2.3 Properties of Gases	
	LO3 Understand density, force, pressure, flowrate and basic mechanics	3.1 Types of SI units 3.2 Density of materials	

		3.3 Force pressure and flowrate 3.4 Mechanical principles	
	LO4 Understand heat and power in the plumbing and heating industry	4.1 Approaches to measuring temperature 4.2 States of matter and change 4.3 Types of heat transfer 4.4 Heat capacity and power	
	LO5 Understand the principles of electricity within the plumbing and heating industry	5.1 Principles of electricity 5.2 Units and formula 5.3 Circuit protection and earthing	3
214 Cold water	LO1 Understand cold water supply to dwellings	1.1 Sources and properties of water 1.2 Types of supply into a property 1.3 Treatment and distribution of cold water	6
	LO2 Understand domestic cold water systems	2.1 Sources of information relating to systems 2.2 Service pipework layout 2.3 Selecting cold water systems 2.4 Operating principles of backflow prevention devices	
215 Hot Water	LO1 Understand hot water systems and their layouts	1.1 Sources of information relating to work on hot water systems 1.2 Hot water systems and components 1.3 System safety and efficiency	7
	LO2 Install hot water systems and components	2.1 Prepare for the installation of systems and components 2.2 Decommission systems and components	



		2.3 Install and test systems and components 2.4 Replace defect components	
216 Central Heating	LO1 Understand Central Heating Systems and their layout	1.1 Sources of information 1.2 Operating principles of systems and components 1.3 System layouts 1.4 Filling and venting systems 1.5 Selection of fuels for heat producing appliances	6
	LO3 Understand the decommissioning requirements of central heating systems and their components	3.1 Decommissioning systems 3.2 Preparing for decommissioning 3.3 Decommissioning central heating systems	
217 Sanitation and Drainage	LO1 Understand layouts of gravity rainwater systems	1.1 Systems and materials used in gravity rainwater systems 1.2 Gutter systems and components 1.3 Rainwater pipework and components 1.4 Jointing procedures for gutter and rainwater materials 1.5 Gutter bracket selection and fixing	3
	LO3 Understand service, maintenance requirements and commissioning of gravity rainwater systems	3.1 Maintenance checks 3.2 Defects in systems 3.3 Pre-commissioning checks	
	LO4 Understand sanitary appliances used in dwellings	4.1 Working principles of sanitary appliances	4

		4.2 Features of sanitary pipework and layout	
		4.3 Ground floor systems and appliances	
		4.4 Types of traps and seal loss	
		4.5 Suitability of drainage systems	
		4.6 Condensate drain connections	
	LO6 Understand service and maintenance requirements for sanitary appliances and connecting pipework systems	6.1 Maintenance checks	
		6.2 Defects in systems	
		6.3 Pre commissioning checks	
		Total marks for sections:	48 marks
		Integration across units*:	12 marks
		<b>Total marks for exam:</b>	<b>60 Marks</b>

\* *Integration across units.* These marks relate to Assessment Objective 4. These marks are awarded to differentiate between levels of performance by candidates taking the exam. The marks are given for how well a candidate has applied their knowledge, understanding and skills from across the units that make up the qualification in an integrated way to meet the requirements of the exam questions.

### 3. Guidance

#### Question types

The following explains, and gives examples of, types of questions used in City & Guilds Technical exams. In preparing candidates to take the exam, it is recommended that you familiarise them with the requirements of each question type so that they can be effective and make best use of the time available when sitting the exam.

- An effective candidate will gauge the type and length of response required from the question and the number of marks available (which is given for each question on the exam paper).
- Short answer questions may not require candidates to write in complete sentences. Extended response questions will require a more developed response.
- Candidates should read the exam paper before attempting to answer the questions and should allocate time proportionate to the number of marks available for each question or section.

Question type	Example question	Mark scheme
<b>Multiple Choice questions</b> These are objective questions with a predetermined answer. These consist of a question (or stem) and four options. The candidate should select the correct option (the key). The other 3 options (the distractors) will be plausible but incorrect in some significant respect so that the candidate is required to consider and reject these in order to identify the correct option. These questions are split into <b>three</b> types;		
<b>Knowledge MCQ</b>	What are ripples <b>most</b> commonly caused by when bending copper tube on a bending machine?  a. Excessive pressure from the roller. b. Inadequate pressure from the roller. c. Using new equipment.	Correct answer: B

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d. Using old equipment.

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**Understanding MCQ**

What size over current protection device is most suitable to protect a circuit that has a 9 kW electric shower installed on a 230 Volt supply?

Correct answer: C

- a. 16 amps.
- b. 32 amps.
- c. 40 amps.
- d. 50 amps.

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**Applied knowledge MCQ**

The purpose of such questions is to stretch candidates who are able to and assess them on their higher order thinking skills such as analysis, evaluation and synthesis. When assessing higher order skills through MC we are looking for candidates to be able to formulate and make a judgement.

A ground floor flat in a 5 storey block is having problems with foam and waste water appearing in the bath and WC which are connected to the soil stack. The inspection chamber is checked but there is no blockage. What is the **most** likely reason why this is happening?

Correct answer: D

- a. Incorrect type of traps used on appliances.
  - b. Waste pipes enter stack at the incorrect gradient.
  - c. Too many washing machines and dishwashers are connected to the stack.
  - d. Connection at the base of the stack is less than 750mm to invert level.
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## Examination technique

Candidates with a good understanding of the subject being assessed can often lose marks in exams because they lack experience or confidence in exams or awareness of how to maximise the time available to get the most out of the exam. Here is some suggested guidance for areas that could be covered in advance to help learners improve exam performance.

### Before the exam

Although candidates cannot pre determine the questions they will get in the multiple choice exams, the Technical qualifications do follow a common structure and format. In advance of taking the exam, candidates should:

- be familiar with the structure of the exam (ie number and type of questions).
- be aware of the amount of time they have in total to complete the exam.
- have a plan, based on the exam start and finish time for how long to spend on each question/section of the exam.
- be aware of how many questions are available for each sections.

### At the start of the exam session

At the start of the exam, candidates:

- should carefully read through the instruction at the beginning of the exam paper before answering any questions.

### Answering the questions

Candidates do not have to answer exam questions in any particular order. They may find it helpful to consider, for example:

- tackling first those questions which they find easiest. This should help them get into the 'flow' of the exam and help confidence by building up marks quickly at the start of the exam.

Candidates should **always** attempt every question, even questions where they may be less confident about the answer they are selecting. Candidates should be discouraged however, from spending too long on any answer they are less sure about, this could result in candidates having less time to answer questions that they are better prepared to answer.

### Applied knowledge questions

The purpose of these questions is to stretch candidates who are able to and assess them on their higher order thinking skills such as analysis, evaluation and synthesis. When assessing higher order skills through MC we are looking for candidates to be able to formulate and make a judgement.

Candidates may find it helpful to read through the scenario, where applicable, and identify key information in the scenario. This will help them to analysis and evaluate the distractors to make a correct selection.

### Towards the end of the exam

Candidates should always set aside time at the end of the exam to review their responses in order to make sure they are confident in their selection, ie their chosen answer.

Further guidance on preparing candidates to take the exam is given in the City & Guilds publication, [Technical Qualifications, Teaching, Learning and Assessment](#) which can be downloaded free of charge from City & Guilds website.



## 4. Further information

For further information to support delivery and exam preparation for this qualification, centres should see:

### City & Guilds

Qualification homepage: <https://www.cityandguilds.com/qualifications-and-apprenticeships/building-services-industry/electrical-installation/8202-technical-in-building-services-engineering> which includes:

- Qualification handbook
- Synoptic Assignment
- Sample assessments

*Technical Qualifications, Resources and Support:* [www.cityandguilds.com/techbac/technical-qualifications/resources-and-support](http://www.cityandguilds.com/techbac/technical-qualifications/resources-and-support)

### Joint Council for Qualifications

*Instructions for Conducting Examinations:* <http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations>