QUALIFICATION HANDBOOK

Level 2 Diploma in Plumbing Studies (6035-02)

August 2023 Version 5.7

City & Guilds

Qualification at a glance

Subject area	**Plumbing**
City & Guilds number	6035
Age group approved	16+
Entry requirements	None
Assessment	By online test/practical assignment
Fast track	Available
Support materials	Qualification handbook Level 2 Assessment pack – practical task manual Level 2 Assessor guidance for Assessment pack – practical task manual Text Book Smartscreen
Registration and certification	Consult the Walled Garden/Online Catalogue for last dates

Title and level	GLH	TQT	City & Guilds number	Accreditation number
Level 2 Diploma in Plumbing Studies	453	490	6035-02	600/5500/5

Version and date	Change detail	Section
1.1 Sept 2012	Amended information on where to obtain assessments. Amended the title of outcome 5 for unit 505. Amended the title of learning outcomes 3, 4 and 5 for unit 205/505	**Assessment** **Units**
2.0 September 2012	Added permitted reference materials for Units 505, 506, 508 and 509 Amended timing for duration of Unit 210 test to 40 minutes.	**Assessment**
3.0 May 2013	Added outcome 7, and amended no. of questions and percentages, to (test) table for unit 204/504	**Assessment**
4.0 July 2013	Amended references to 207/507 – to 207 – there is no 507 unit.	**Units**
5.0 October 2013	Replaced references to BS 6700 with BS EN 806	**Assessment, Units**
5.1 March 2014	Amended test spec 509	**Test Specs**
5.2 April 2014	Added 'terminal guards' to range for unit 509 A.C 1.5.	**Units**

5.3 September 2014	Added IQA guidance	**Centre requirements**
5.4 September 2017	Added TQT and GLH details Deleted QCF	**Qualification at a Glance, Structure** **Appendix**
5.5 December 2017	Additional information provided on e-volve tests.	**Test specifications**
5.6 April 2019	Amended reference to learning outcome 05	**Test specifications**
5.7 August 2023	Removal of images	**Throughout**

Contents

1 Introduction

This document tells you what you need to do to deliver the qualification:

Area	Description
Who is the qualification for?	For candidates who want to work as plumbers in the building services engineering sector. This qualification does **not** make candidates fully qualified plumbers (see Appendix 2)
What does the qualification cover?	It allows candidates to learn, develop and practise the skills required for employment and/or career progression in the plumbing sector. See Appendix 2 for further information.
What opportunities for progression are there?	It allows candidates to progress into employment, or to the following City & Guilds qualifications: • Level 3 NVQ Diploma in Plumbing and Heating • Level 3 Diploma in Plumbing Studies

Structure

To achieve the **Level 2 Diploma in Plumbing Studies**, learners must achieve **49** credits from the mandatory units.

Unit accreditation number	City & Guilds unit no.	Unit title	Credit value	Level	GLH
Mandatory					
T/503/9669	201/501	Health and safety in building services engineering	3	2	26
R/503/9677	202/502	Electrical principles and processes for building services engineering	5	2	48
L/504/0133	203	Scientific principles for domestic, industrial and commercial plumbing	4	2	31
D/503/9679	204/504	Common plumbing processes	6	2	54
D/504/0217	205/505	Cold water systems	7	2	68
H/504/0218	206/506	Domestic hot water systems	6	2	55
K/504/0219	207	Sanitation	5	2	48
D/504/0220	208/508	Central heating systems	6	2	56
H/504/0221	209/509	Drainage systems	4	2	39
J/602/2482	210	Understand how to communicate with others within building services engineering	3	2	28

Total Qualification Time

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
Level 2 Diploma in Plumbing Studies	453	490

2 Centre requirements

Approval

Centres already offering City & Guilds qualifications

If your Centre is approved to offer the **6129 Certificate in Basic Plumbing Studies** you can apply for the new **Level 2 Diploma in Plumbing Studies (6035-02)** approval using the **fast track approval form**, available from the City & Guilds website.

Centres should use the fast track form if:

- there have been no changes to the way the qualifications are delivered, and
- they meet all of the approval criteria in the fast track form guidance notes.

Fast track approval is available for 12 months from the launch of the qualification. After 12 months, the Centre will have to go through the standard Qualification Approval Process. The centre is responsible for checking that fast track approval is still current at the time of application.

Centres NOT already offering City & Guilds qualifications

To offer this qualification, new centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual – Supporting Customer Excellence* for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Resource requirements

Physical resources and site agreements

Centres can use specially designated areas within a centre to develop practical skills and to assess the simulated practical assignments. The equipment, systems and machinery must meet industrial standards and be capable of being used under normal working conditions.

Human Resources

Staff delivering this qualification must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be technically competent in the area(s) for which they are delivering training and/or have experience of providing training
- hold appropriate qualifications detailed in this handbook
- have recent relevant experience in the specific area they are assessing
- be able to demonstrate occupational competence in the areas of the Building Services Engineering (BSE) for which they are delivering training and/or assessment. This competence must be at a level equal to, or above, the level of training being delivered and must include current knowledge and skills of each industry (for which the assessment is taking place), its techniques, settings, legislative and regulatory requirements, codes of practice and guidance
- have credible experience of providing training and/or assessment.

Centre staff may undertake more than one role, eg tutor and assessor or internal quality assurer, but must never verify their own assessments.

Assessors must:

- hold, or be working towards TAQA (A1/A2 – D32/33 updated) standards and continue to practice to these standards and possess CPD evidence of personally maintaining these standards, or
- have other suitable equivalent assessor qualifications endorsed by the Sector Skills Council and/or the Awarding Organisation.

Assessor Occupational Competence

For the purposes of this qualification, occupational competence will be deemed to have been demonstrated by the verifiable evidence of **one, preferably more,** of the following:

- **a relevant sector** qualification equal to or at a level above the training and/or assessment being delivered. Where earlier forerunner qualifications are held eg City and Guilds Craft or Advanced Craft Certificated, the assessor must demonstrate through CPD evidence a thorough knowledge of the qualification standards that they meet the required criteria
- **an up-to-date CPD record including relevant CPD qualifications**. Assessors must either be able to demonstrate that they are registered and up-to-date with their registration with an appropriate approved industry registration body (eg Gas Safe Register) or have one or more relevant occupational qualifications to demonstrate that they can be regarded as occupationally competent in terms of assessing or verifying the qualification and the unit contained
- **a verifiable CV** of industry experience and current knowledge of industry practice and techniques relevant to the occupational area in which they assess. This verifiable evidence must be **at or above the level being assessed**
- a thorough **knowledge and understanding** of the qualification standards and requirements

Internal Quality Assurers (IQAs) must:

hold, or be working towards TAQA (A1/A2 – D32/33 updated). The 'working towards' IQA should be mentored by, and have his/her judgements and decisions counter signed by a qualified IQA.

IQA Occupational Competence

For the purposes of this qualification, occupational competence will be deemed to have been demonstrated by the verifiable evidence of **one** of the following:

- Possession of a building services engineering sector related qualification such as a Level 2 NVQ in Plumbing
- Related building services qualification with proven technical expertise
- Related building services qualification with access to plumbing technical expertise during their IQA activities.

Assessor and Internal Quality Assurer continuing professional development (CPD)

The occupational competence of assessors must be updated on a regular basis and be periodically reconfirmed via CPD evidence and quality assured by City & Guilds.

It is the responsibility of the assessor and the IQA to make use of opportunities for CPD such as industry conferences and events, access to trade publications and journals, SSC and professional/Trade Association events, at least on an annual basis to enhance and upgrade their professional development and technical knowledge.

It is imperative that evidence records of these CPD opportunities/ occasions are maintained and retained in a verifiable CPD record.

Guidance note

Where questions arise about the occupational competence/qualification of an individual/trainer/assessor, these should be referred to the centre's Qualifications Adviser for a decision. The Qualification Advisor may decide to refer the decision to the Portfolio/Group Portfolio Consultant for further consideration.

Candidate entry requirements

City & Guilds does not set entry requirements for this qualification. However, centres must ensure that candidates have the potential and opportunity to gain the qualification successfully.

Age restrictions

This qualification is approved for learners aged 16+.

Accreditation of prior learning (APL)

Guidance on APL between this qualification and the 6189 qualification will be available on the website by the start of November 2012.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards their qualification.
- any units they have already completed, or credit they have accumulated which is relevant to the qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualification, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Induction should also be used to ensure that candidates are aware that this qualification does **not** make them qualified plumbers.

All candidates must complete a declaration confirming their understanding. This declaration can be found in Appendix 2.

Support materials

The following resource is available for this qualification:

Description	How to access
Level 2 Assessment pack – practical task manual	City & Guilds website
Level 2 Assessor guidance for Assessment pack – practical task manual	City & Guilds website
Text Book	**www.cityandguildsbookshop.com**
Smartscreen	**www.smartscreen.co.uk**

4 Assessment

Assessment of the qualification

Unit Number	Unit Title	Assessment method	Where to obtain assessment materials
201/501	Health and safety in building services engineering	Practical Assignment (201) City and Guilds on-line multiple choice test (501) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
202/502	Electrical principles and processes for building services engineering	Practical Assignment (202) City and Guilds on-line multiple choice test (502) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
203/803	Scientific principles for domestic, industrial and commercial plumbing	City and Guilds on-line multiple choice test The assessment covers the knowledge requirements of the unit and assesses all learning outcomes to verify coverage of the unit. (803) Proxy unit	Test available for booking on the Walled Garden.

204/504	Common plumbing processes	Practical Assignment (204) City and Guilds on-line multiple choice test (504) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
205/505	Cold water systems	Practical Assignment (205) City and Guilds on-line multiple choice test (505) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
206/506	Domestic hot water systems	Practical Assignment (206) City and Guilds on-line multiple choice test (506) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.

207	Sanitation	Practical Assignment The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
208/508	Central heating systems	Practical Assignment (208) City and Guilds on-line multiple choice test (508) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
209/509	Drainage systems	Practical Assignment (209) City and Guilds on-line multiple choice test (509) The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. Externally set assignment, locally marked and externally verified.	Go to **www.cityandguilds.com** and navigate to the 6035 webpage. Password available on the Walled Garden.
210/810	Understand how to communicate with others within building services engineering	City and Guilds on-line multiple choice test The assessment covers the knowledge and practical requirements of the unit and assesses all learning outcomes to verify coverage of the unit. (810) Proxy unit	Test available for booking on the Walled Garden.

Test Specifications

Test: Unit 501 Health and safety in building services engineering
Assessment method: e-volve online multiple choice test
Duration: 75 minutes
Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).
Permitted materials: Reference material is not permitted.

Unit	Outcome	Number of questions	%
501	01 Know health and safety legislation	**4**	**10**
	02 Know how to handle hazardous situations	**14**	**33**
	03 Know electrical safety requirements when working in the building services industry	**7**	**17**
	04 Know the safety requirements for working with gases and heat producing equipment	**8**	**19**
	05 Know the safety requirements for using access equipment in the building services industry	**4**	**9**
	06 Know the safety requirements for working safely in excavations and confined spaces in the building services industry	**5**	**12**
	Total	**42**	**100**

Test: Unit 502 Electrical principles and processes for building services engineering

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Reference material is not permitted. A calculator is allowed.

Unit	Outcome	Number of questions	%
502	01 Understand electrical supplies used in domestic plumbing systems	10	25
	02 Know the components used in electrical installations	6	15
	03 Understand the procedures for safely isolating supplies	6	15
	05 Understand how to identify safety critical faults on electrical components	8	20
	06 Understand how to undertake basic electrical tasks	10	25
	Total	**40**	**100**

Test: Unit 203 Scientific principles for domestic, industrial and commercial plumbing

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Reference material is not permitted. A calculator is allowed.

Unit	Outcome	Number of questions	%
203	01 Understand the properties of common plumbing materials	**11**	**27.5**
	02 Understand the scientific properties and principles of water	**10**	**25**
	03 Understand the pressure, force and flow of water	**6**	**15**
	04 Understand the principles of heat in relation to plumbing systems	**6**	**15**
	05 Know the principles of combustion and heating gases	**3**	**7.5**
	06 Know the basic principles of electricity	**4**	**10**
	Total	**40**	**100**

Test: Unit 504 Common plumbing processes

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Reference material is not permitted. A calculator is allowed.

Unit	Outcome	Number of questions	%
504	01 Understand the procedures for measuring and bending plumbing tubes	**9**	**23**
	03 Understand how to joint common plumbing materials	**7**	**17**
	04 Know common plumbing hand and power tools	**9**	**23**
	05 Know fixings and components used in common plumbing processes	**6**	**15**
	06 Know common plumbing preparation techniques	**6**	**15**
	07 Know symbols used for identifying plumbing pipework and fittings	**3**	**7**
	Total	**40**	**100**

Test: Unit 505 Cold water systems

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Details of permitted materials can be found on page 22 of this document. A calculator is allowed.

Unit	Outcome	Number of questions	%
505	01 Know the requirements for water distribution to domestic dwellings	**5**	**12.5**
	02 Understand the requirements of the cold water supplies into domestic dwellings	**9**	**22.5**
	03 Know the components used in domestic cold water systems	**7**	**17.5**
	04 Understand the requirements for pipework Installations in domestic cold water systems	**5**	**12.5**
	05 Understand the key requirements of testing and decommissioning of domestic cold water systems	**8**	**20**
	06 Understand the basic maintenance requirements of domestic cold water systems	**6**	**15**
	Total	**40**	**100**

Test: Unit 506 Domestic hot water systems

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Details of permitted materials can be found on page 22 of this document. A calculator is allowed.

Unit	Outcome	Number of questions	%
506	01 Know the types of domestic hot water systems	**8**	**20**
	02 Know the components used in domestic hot water systems	**7**	**17.5**
	03 Understand the installation requirements of domestic hot water plumbing systems	**10**	**25**
	04 Know the design features of showers	**3**	**7.5**
	05 Understand the basic maintenance requirements of hot water systems	**5**	**12.5**
	06 Understand the key requirements of testing and decommissioning of domestic hot water systems	**7**	**17.5**
	Total	**40**	**100**

Test: Unit 508 Central heating systems

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Details of permitted materials can be found on page 22 of this document. A calculator is allowed.

Unit	Outcome	Number of questions	%
508	01 Understand the types of domestic central heating systems installed in domestic dwellings	**12**	**30**
	02 Know the different materials used to install domestic central heating pipework	**7**	**17.5**
	03 Understand heat emitters and their components	**14**	**35**
	04 Understand mechanical central heating controls	**7**	**17.5**
	Total	**40**	**100**

Test: Unit 509 Drainage systems

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Details of permitted materials can be found on page 22 of this document. A calculator is allowed.

Unit	Outcome	Number of questions	%
509	01 Understand the requirements of drainage systems	**14**	**35**
	02 Know the types of traps and associated requirements	**8**	**20**
	03 Know the procedures for soundness testing and commissioning above ground systems	**11**	**27.5**
	05 Know the requirements of rainwater systems and associated guttering	**7**	**17.5**
	Total	**40**	**100**

Test: Unit 210 Understand how to communicate with others within building services engineering

Assessment method: e-volve online multiple choice test

Duration: 75 minutes

Grade boundaries: The pass mark is set at approximately 60%, however this may be adjusted to ensure consistency across cohorts (reliability).

Permitted materials: Reference material is not permitted. A calculator is allowed.

Unit	Outcome	Number of questions	%
210	01 Know the members of the construction team and their role within the building services industry	**5**	**25**
	02 Know how to apply information sources in the building services industry	**9**	**45**
	03 Know how to communicate with others in the building services industry	**6**	**30**
	Total	**20**	**100**

Permitted reference materials

6035-505 (Cold water)

- Water Regulations Guide by Laurie Young & Graham May, published by WRAS, 2000
- BS EN 806- Specification for installations inside buildings conveying water for human consumption (parts 1-5)
- BS 8558- Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages – Complementary guidance to BS EN 806
- BS 8000 part 15 - Workmanship on building sites. Code of practice for hot and cold water services (domestic scale)
- Building Regulations Approved Document A (D in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)
- Building Regulations Approved Document G (P in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)

6035-506 (Hot water)

- Water Regulations Guide by Laurie Young & Graham May, published by WRAS, 2000
- BS EN 806- Specification for installations inside buildings conveying water for human consumption (parts 1-5)
- BS 8558- Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages – Complementary guidance to BS EN 806
- BS 8000 part 15 - Workmanship on building sites. Code of practice for hot and cold water services (domestic scale)
- Building Regulations Approved Document A (D in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)
- Building Regulations Approved Document G (P in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)
- Domestic Building Services Compliance Guide, freely downloaded at **www.planningportal.gov.uk**

6035-508 (Central heating)

- Water Regulations Guide by Laurie Young & Graham May, published by WRAS, 2000
- Building Regulations Approved Document A (D in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)
- CIBSE Domestic Heating Design Guide, published by CIBSE, 2007
- Domestic Building Services Compliance Guide, freely downloaded at **www.planningportal.gov.uk**

6035-509 (Drainage)

- BS 6465 part 2 - Code of practice for space requirements for sanitary appliances
- BS 8000 part 13 - Workmanship on building sites. Code of practice for above ground drainage and sanitary appliances
- BS EN 12056 part 2 - BS EN 12056: 2 - Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation
- Building Regulations Approved Document A (D in Northern Ireland), freely downloaded at **www.planningportal.gov.uk**
- Building Regulations Approved Document H (N in Northern Ireland), freely downloaded at **www.planningportal.gov.uk** (**www.dfpni.gov.uk** in Northern Ireland)

Guidance on permitted reference materials

Candidates are permitted to take the stated reference materials into the online examinations. Candidates **must not** be permitted to communicate with each other or refer to any other materials.

Permitted reference materials taken into examinations **can** contain the following:

- bookmarks (eg blank post-it notes, post-it notes numbered to indicate chapters or corners of pages folded)
- highlighting of text.

Permitted reference materials taken into exams must **not** contain the following:

- sample exam questions, answers or diagrams
- any writing in the regulations or accompanying written notes
- notes, diagrams or any content that may in any way advantage the candidate in answering questions within the exam.

It is the responsibility of the centre to ensure the material in the documents does not unfairly advantage candidates in anyway.

FAQs

Question 1. Do we have to access a copy of all these documents for each candidate?

Answer 1. No, these documents are not required to answer the questions. However, for some questions, access to these documents may be helpful for clarifying or referencing specific regulatory policy or codes of practice that candidates should have been taught in reference to the unit content. Centres may wish to make a single set of the documents concerned available for the candidates to refer to, rather than a set of documents per candidate.

Question 2. Can the relevant extracts from the documents be pulled out as reference for candidates so they don't have to browse through lots of irrelevant pages?

Answer 2. This is acceptable as long as the originator/owner of the document deems this acceptable or has given permission. Please note that as stated in the guidance above, bookmarks or blank post-it notes to indicate chapters or folded corners of pages can be used.

5 Units

Availability of units

The following units can also be obtained from The Register of Regulated Qualifications: **http://register.ofqual.gov.uk/Unit**

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- guided learning hours
- unit aim
- health and safety requirements
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance, where applicable.

Unit 201/501 Health and safety in building services engineering

UAN:	**T/503/9669**
Level:	Level 2
Credit value:	3
GLH:	26
Aim:	This combination unit provides learners with the essential health and safety knowledge and skills to demonstrate best practice in a business services engineering environment or sector. The unit provides learners with an awareness of relevant legislation and should underpin all business services engineering activities learners take part in.
Health and safety:	Health and safety behaviour learned in this mandatory unit should be displayed in all arenas.

Learning outcome
The learner will: 1. Know health and safety legislation
Assessment criteria
The learner can: 1.1 State the aims of health and safety legislation 1.2 Identify the responsibilities of **individuals** under health and safety legislation 1.3 Identify statutory and non-statutory **health and safety materials** 1.4 Identify the different **roles** of Health and Safety Executive in enforcing health and safety legislation.

Range
Health and safety legislation The Health & Safety at Work Act, The Electricity at Work Regulations, Control of Substances Hazardous to Health (COSHH) Regulations, Working at Heights Regulations, Personal Protective Equipment at Work Regulations (PPE), Lifting and Manual Handling Operations Regulations, Provision and Use of Work Equipment Regulations, Control of Asbestos at Work Regulations, Health, Safety and Welfare Regulations, Health and Safety (First Aid) Regulations, Confined Spaces Regulations. **Individuals** Employers, employees and contractors, visitors to site. **Health and safety materials** Acts of Parliament, regulations, approved codes of practice, HSE Guidance notes. **Roles** Improvement notice, prohibition notice, powers of prosecution, providing advice and guidance.

Learning outcome
The learner will: 2. Know how to handle hazardous situations
Assessment criteria
The learner can: 2.1 Identify common **hazardous situations** found on site 2.2 Describe safe systems at work 2.3 Identify the **categories** of safety signs 2.4 Identify **symbols** for hazardous substances 2.5 List common **hazardous substances** used in the building services industry 2.6 List **precautions** to be taken when working with hazardous substances 2.7 Identify the **types of asbestos** that may be encountered in the workplace 2.8 Identify the **actions** to be taken if the presence of asbestos is suspected 2.9 Describe the **implications** of being exposed to asbestos 2.10 State the application of different types of **personal protective equipment** 2.11 Identify the **procedures for manually handling** heavy and bulky items 2.12 Identify the **actions** that should be taken when an accident or emergency is discovered 2.13 State procedures for handling injuries sustained on-site 2.14 State the **procedures for recording accidents** and near misses at work.

Range
Hazardous situations Trailing leads, slippery or uneven surfaces, presence of dust and fumes, handling and transporting equipment or materials, contaminants and irritants, fire, working at heights, malfunctioning equipment, improper use and storage of tools and equipment, potential presence of asbestos. **Safe systems at work** Method statements, permit to work systems, risk assessments, safety signs and notices. **Categories** Mandatory, prohibition, information, warning. **Symbols** Toxic, harmful, corrosive, irritant, oxidising, extremely flammable. **Hazardous substances** Lead - solid and fume, solvents and lubricants, fluxes, jointing compounds, sealants, gases – LPG, oxy-acetylene and carbon dioxide, cleaning agents. **Precautions** PPE, ventilation, risk assessment, method statements, safe systems of work. **Types of asbestos** White asbestos (Chrysotile), brown or grey asbestos (Amosite), blue asbestos (Crocidolite), asbestos cement materials. **Actions** Stop working immediately, report to supervisor. **Implications** Long-term health implications (mesothelioma, asbestosis). **Personal protective equipment** Clothing protection including high visibility, eye protection, hand protection, head protection, foot protection, hearing protection, respiratory protection. **Procedures for manually handling** Single, two-person lift, mechanical lift. **Actions** Raising the alarm, contact emergency services, follow typical emergency evacuation procedures, inform supervisor. **Procedures for handling injuries** Make self safe, make area safe, administer first aid where appropriate, contact emergency services, contact nominated first aid person, contact supervisor. **Procedures for recording accidents** RIDDOR, the use of company accident books, details to be recorded.

Learning outcome
The learner will: 3. Know electrical safety requirements when working in the building services industry
Assessment criteria
The learner can: 3.1 Identify the common **electrical dangers** to be aware of on site 3.2 List different **sources** of electrical supply for tools and equipment 3.3 Describe **reasons** for using reduced low voltage electrical supplies for tool and equipment on site 3.4 Identify how to conduct a **visual inspection** of portable electrical equipment for safe condition before use 3.5 State **actions** to take when portable electrical equipment fails visual inspection 3.6 Outline the Safe Isolation Procedure 3.7 State the **procedures** for dealing with electric shocks.

Range
Electrical dangers Faulty electrical equipment, damaged electrical equipment, exposed conductors, damaged insulation, worn electrical cables and cords, trailing cables, proximity of cables, buried/hidden cables. **Sources** Battery powered supplies, 110 volt supplies, 230 volt supplies, generating sets. **Reasons** Increased likelihood for damage to equipment, operative in better contact with earth, protect from electric shock, reduces trailing leads. **Visual inspection** Checking for a valid PAT test, Inspection for general condition. **Actions** Remove from use, report to supervisor. **Procedures** Removal from supply, CPR method, contact emergency services, report to supervisors, treatment of minor burns.

Learning outcome
The learner will: 4. Know the safety requirements for working with gases and heat producing equipment
Assessment criteria
The learner can: 4.1 Identify different **types of gases** used on site 4.2 Describe how bottled gases and equipment should be safely transported and stored 4.3 Describe how to conduct a **visual inspection** on heat producing equipment for safe condition 4.4 Describe how **combustion** takes place 4.5 State the **dangers** of working with heat producing equipment 4.6 State the **procedures** to follow on discovery of fires on site 4.7 Identify different classifications of fires 4.8 Identify types of fire **extinguisher** for different classifications of fires.

Range
Types of gases Propane, butane, oxy-acetylene, nitrogen. **Visual inspection** Inspection for general condition. **Combustion** Three elements of the fire triangle. **Dangers** Fires, burns, fumes, equipment damage, explosions. **Procedures** Raise the alarm, follow safety evacuation procedures, fight fire if trained to do so. **Classifications of fires** Class A, B, C, D, electrical fires. **Fire extinguisher** Carbon dioxide, water, powder, foam.

Learning outcome
The learner will: 5. Know the safety requirements for using access equipment in the building services industry
Assessment criteria
The learner can: 5.1 Identify different types of access equipment 5.2 Select suitable equipment for carrying out work at heights based on the **work being carried out** 5.3 Describe the **safety checks** to be carried out on access equipment 5.4 Describe safe erection methods for **access equipment**.

Range
Types of access equipment Step ladders, ladders, roof ladders and crawling boards, mobile tower scaffolds, podiums fixed scaffolds and edge protection, mobile elevated work platforms including scissor lifts and cherry pickers, telescopic ladders. **Work being carried out** Duration at work, action points for heights. **Safety checks** Visual, tagging, fit for purpose, secure level ground. **Access equipment** Step ladders, ladders, roof ladders, mobile tower scaffolds, podiums, telescopic ladders.

Learning outcome
The learner will: 6. Know the safety requirements for working safely in excavations and confined spaces in the building services industry
Assessment criteria
The learner can: 6.1 Identify the situations in which it may be necessary to work in excavations 6.2 Describe how excavations should be **prepared** for safe working 6.3 State **precautions** to be taken to make excavations safe 6.4 Identify areas where working in **confined space** may be a consideration 6.5 State **safety considerations** when working in confined spaces.

Range
Prepared Safe access into the excavation, trench support systems. **Precautions** Use of warning signs, use of barriers, vehicle proximity to excavation edges. **Confined space** Drainage systems, Plant rooms, Main service duct-rooms, In tanks, cylinders, boilers or cisterns, Under suspended timber floors, In roof spaces. **Safety considerations** Ventilation, lighting, PPE, evacuation procedures, medical conditions, lone working.

Learning outcome
The learner will: 7. Be able to apply safe working practice
Assessment criteria
The learner can: 7.1 Perform **manual handling** techniques 7.2 Manually handle loads using mechanical lifting aids 7.3 Demonstrate the safe method of assembly of **access equipment** 7.4 Use access equipment safely.

Range
Manual handling Single, two-person lift. **Access equipment** Step ladders, ladders, mobile tower scaffolds.

Unit 201/501 Health and safety in building services engineering

Supporting information

Guidance

Electrical equipment

Includes power tools, lights etc

Safe Isolation Procedure

Recommend referring to JIB Safe Isolation Procedure

On Site

Where reference to 'on site' is made in this unit, the intention is that this covers building sites and domestic sites.

It is recommended that assessors cover employee rights in relation to Health and Safety.

This First Aid element of this unit is not intended to replicate a full First Aid course but to give learners the underpinning knowledge to understand the types of injuries they may come across in a work place.

Unit 202/502 Electrical principles and processes for building services engineering

UAN:	**R/503/9677**
Level:	Level 2
Credit value:	5
GLH:	48
Aim:	This unit provides learners with the knowledge and understanding to work safely with types of electrical supplies, earthing systems and components used in domestic building services. Learners will use tools and equipment to demonstrate safe isolation, use of temporary continuity bonds, simple wiring tasks and identify basic faults. The unit is intended to be taken by learners who are gaining experience in a building services engineering environment either through employment or study.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Understand electrical supplies used in domestic plumbing systems
Assessment criteria
The learner can: 1.1 Identify **documents** required to design electrical systems 1.2 Identify the different types of **supplies** used in domestic plumbing systems 1.3 Identify the common **voltages** used in domestic plumbing systems 1.4 Describe the layouts of electrical supplies and connections 1.5 Identify the different **types** of earthing systems 1.6 Describe protective equipotential bonding 1.7 Describe supplementary earthing bonding 1.8 Describe the protection **methods** used on electrical systems 1.9 Explain the relationship between the size of fuses and the current in the system.

Range
Documents Manufacturer's instructions, electrical regulation, building regulation, British/European standards. **Supplies** AC Supplies, DC Supplies. **Voltages** 240 Volts, 24 Volts, 12 Volts. **Electrical supplies and connections** Lighting circuits, ring mains, spurs fused outlets, consumer units, s-plan, y-plan. **Types** TT System, TN System, TN-CS system. **Methods** Miniature circuit breakers, residual current devices, cartridge fuses, wired fuses, RCBO.

Learning outcome
The learner will: 2. Know the components used in electrical installations
Assessment criteria
The learner can: 2.1 Identify incoming electrical **systems** in domestic dwellings 2.2 Identify the **types of wiring** used in electrical systems 2.3 Identify types of wire protection 2.4 State the **relationship** between the size of wire to the voltage carried 2.5 Identify **components** on electrical systems.

Range
Systems Electric meter, consumer unit. **Types of wiring** Cable, flex, heat resistant flex. **Types of wire protection** Trunking, conduit. **Relationship** Volts, current, insulation, cross section of wiring. **Components** 3 Pin plugs, plug sockets (switched and non-switched), fuse spurs (switched and non-switched), one and two way switches, junction boxes, pull cords, isolators, electrical timers.

Learning outcome
The learner will: 3. Understand the procedures for safely isolating supplies
Assessment criteria
The learner can: 3.1 Identify the test **equipment** required to carry out safe isolation of an electrical supply 3.2 Describe how to test voltage indicators on a known source 3.3 Identify the correct **locations** to carry out safe isolation 3.4 Describe the **procedure** for preventing the supply being turned back on 3.5 Describe how to check the supply is dead.

Range
Equipment Voltage indicators, proving devices, labels, locking off devices. **Locations** Consumer unit, fuse spurs, electrical isolators. **Procedure** Isolate, test, lock, label, re-test device.

Learning outcome
The learner will: 4. Be able to safely isolate electrical supplies
Assessment criteria
The learner can: 4.1 Select test **equipment** required to carry out safe isolation of an electrical supply 4.2 Test voltage indicators on known sources 4.3 Select the correct **locations** to carry out safe isolation 4.4 Demonstrate safe isolation of electrical supplies.

Range
Equipment Voltage indicators, proving devices, labels, locking off devices. **Locations** Consumer unit, fuse spurs, electrical isolators.

Learning outcome
The learner will: 5. Understand how to identify safety critical faults on electrical components and systems
Assessment criteria
The learner can: 5.1 Describe the **consequences** of the failure to rectify faults on electrical systems 5.2 Describe safety critical **faults** on electrical installations 5.3 Identify **responsible persons** to be informed of any electrical faults 5.4 Explain the **actions** to be taken when finding a fault on an electrical installation.

Range
Consequences Electrocution, death, fire, component failure, reduced lifecycle of component. **Faults** Damaged cables and flex, loose wires, incorrect cables (size, type), broken junction boxes, missing earth bonding, incorrect size fuse. **Responsible persons** Home owners, tenants, landlords, site manager, supervisor, co-contractors, site agent, caretakers, managing agents. **Actions** Safe isolation, report to responsible person.

Learning outcome
The learner will: 6. Understand how to undertake basic electrical tasks
Assessment criteria
The learner can: 6.1 Explain the importance of electrical temporary continuity bonds 6.2 Describe the **procedure** for applying temporary electrical continuity bonds 6.3 Describe the process for wiring three 3 pin plugs 6.4 Identify the **tools** required to cut and join cable 6.5 Describe the method for attaching a cable to a junction box 6.6 Describe **basic safety electrical checks**.

Range
Procedure Identify pipe, remove paint, secure clamping device, correctly position. **Tools** Insulated screw drivers, insulated wire cutters and pliers, wire strippers, crimping tools. **Basic safety electrical checks** Earth continuity, short circuit, resistance to earth, polarity, socket tester.

Learning outcome
The learner will: 7. Be able to undertake basic electrical tasks
Assessment criteria
The learner can: 7.1 Demonstrate the **procedure** for temporary electrical continuity bonds 7.2 Perform wiring of 3 pin plugs 7.3 Attach cables to junction boxes 7.4 Carry out **basic safety electrical checks**.

Range
Procedure Identify pipe, remove paint, secure clamping device, correctly position. **Basic safety electrical checks** Earth continuity, short circuit, resistance to earth, polarity, socket tester.

Unit 203/803 Scientific principles for domestic, industrial and commercial plumbing

UAN:	**L/504/0133**
Level:	Level 2
Credit value:	4
GLH:	31
Aim:	This unit provides the learner with the knowledge and understanding of basic scientific principles applied to domestic, industrial and commercial plumbing systems. Learners will be introduced to pressure, force, flow, temperature, electricity and gas and heat transfer methods.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Understand the properties of common plumbing materials
Assessment criteria
The learner can: 1.1 Identify different uses of **materials** in plumbing 1.2 Describe the **properties** of materials used in plumbing 1.3 Describe specific heat capacity 1.4 Describe coefficient linear expansion 1.5 Describe heat conductivity 1.6 Explain the concept of capillarity in liquids 1.7 Describe the different **effects** of capillarity in plumbing materials 1.8 Explain the **causes** of corrosion in plumbing system materials 1.9 Identify **methods** of corrosion prevention in plumbing materials.

Range
Materials Steel, iron, ferrous metals, plastic, alloys, non-ferrous metals. **Properties** Mass/weight – relative density, malleability, ductility, hardness, tensile strength, specific heat capacity. **Effects** Positive and negative. **Causes** Electrolytic action, atmospheric corrosion. **Methods** Enamelling, painted coatings, galvanised coatings, inhibitors, sacrificial anodes.

Learning outcome
The learner will: 2. Understand the scientific properties and principles of water
Assessment criteria
The learner can: 2.1 Identify the different **states of water** 2.2 Describe the changing state of water in relation to **temperature** 2.3 Describe relative density of water 2.4 Describe maximum density of water 2.5 Explain the concept of latent heat 2.6 Describe the expansion of water 2.7 Explain how different factors can affect the **properties** of water 2.8 Describe the **effects** of hard water on plumbing systems and components 2.9 Identify **methods** of water treatment.

Range
States of water Solid, liquid, gas. **Temperatures** Freezing, boiling, maximum density. **Properties** Temporary and permanent hard or soft water. **Effects** Corrosion, lime-scale, reduced lifespan of material, performance of appliance. **Methods** Softeners, conditioners.

Learning outcome
The learner will: 3. Understand the pressure, force and flow of water
Assessment criteria
The learner can: 3.1 Identify the **units of measurement** for pressure 3.2 Describe the relationship between pressure and head of water 3.3 Explain the procedure for calculating pressures of water 3.4 Describe frictional resistance to water flow in **pipes and fittings** 3.5 Describe principles of velocity 3.6 Describe the principles of siphonic action.

Range
Units of measurement Pascale, Newton, Bar, metres head. **Pipes and fittings** Steel, plastic, copper. Elbows, bends, tees, valves, reducers, taps.

Learning outcome
The learner will: 4. Understand the principles of heat in relation to plumbing systems
Assessment criteria
The learner can: 4.1 Identify **units of measurement** for temperature 4.2 Explain the procedure for calculating heat capacity 4.3 Compare the methods of **heat transfer** 4.4 Describe the effectiveness of different **surfaces and finishes** in the relationship to heat transfer 4.5 Describe the **advantages** of insulators used in plumbing systems 4.6 State the **negative** aspects of heat transfer.

Range
Units of measurement Celsius, Kelvin. **Heat transfer** Conduction, convection, radiation. **Surfaces and finishes** Shiny, dull. **Advantages** Energy efficiency, controls heat transfer. **Negative** Heat loss, wastage, condensation.

Learning outcome
The learner will: 5. Know the principles of combustion and heating gases
Assessment criteria
The learner can: 5.1 Describe the **requirements** for combustion 5.2 Identify combustion temperatures of **gases** 5.3 Describe the **properties** of gases used for heating purposes.

Range
Requirements Fuel, oxygen, ignition. **Gases** Natural, Butane, Propane. **Properties** Relative density, calorific value, air requirements.

Learning outcome
The learner will: 6. Know the basic principles of electricity
Assessment criteria
The learner can: 6.1 Identify **units of measurement** for electricity 6.2 Explain the procedure for calculating basic electricity relationships 6.3 Describe the differences of AC and DC currents 6.4 Identify how AC and DC currents are generated.

Range
Units of measurement Amps, volts, watts, ohms.

Unit 204/504 Common plumbing processes

UAN:	**D/503/9679**
Level:	Level 2
Credit value:	6
GLH:	54
Aim:	This unit provides the learner with the knowledge, understanding and skills of common plumbing processes. Learners will be introduced to measuring, bending and jointing tubes and the tools required. Learners will also carry out basic preparation tasks commonly used in plumbing.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Understand the procedures for measuring and bending plumbing tubes
Assessment criteria
The learner can: 1.1 Identify **equipment** used for measuring and bending 1.2 Identify **common materials** used for plumbing tubes 1.3 Identify different **angles** 1.4 Describe the **procedure** for bending different angles 1.5 Explain the **method** of measuring tube.

Range
Equipment Steel rule, measuring tape, scissor bending machine, copper stand bending machine, hydraulic bender, internal spring, external spring, electric tube bender, mini benders. **Common materials** Copper, steel, plastic. **Angles** 90 degree bend, 45 degree bend, Passover, off-set, kickover. **Procedure** Select materials, select correct machine, measure, mark, bend. **Method** Using x and z dimensions.

Learning outcome
The learner will: 2. Be able to measure and bend plumbing tubes
Assessment criteria
The learner can: 2.1 Select **equipment** for measuring and bending 2.2 Perform bending of tubes made from different **materials** 2.3 Perform bending of tubes to different **angles** 2.4 Carry out **methods** for measuring tubes.

Range
Equipment Steel rule, measuring tape, scissor bending machine, hydraulic bender. **Materials** Copper, steel. **Angles** 90 degree bend, 45 degree bend, passover, off-set, kickover. **Methods** Using x and y dimensions.

Learning outcome
The learner will: 3. Understand how to joint common plumbing materials
Assessment criteria
The learner can: 3.1 Identify common plumbing **fittings** 3.2 Describe methods for joining plumbing materials using common **jointing** techniques 3.3 Identify different **sealing material** used for tubes 3.4 Identify **hazards** associated with soldering copper tube 3.5 Describe the importance of appropriate ventilation when soldering.

Range
Fittings Elbows, tees, couplings, sockets, reducers. **Jointing** Threaded, soldered, compression, manipulative, solvent weld, steel compression fitting, push-fit high low pressure, press-fit. **Sealing material** PTFE, jointing compounds. **Hazards** Burns, fires, explosions.

Learning outcome
The learner will: 4. Know common plumbing hand and power tools
Assessment criteria
The learner can: 4.1 Identify plumbing **hand tools** 4.2 Identify plumbing **power tools** 4.3 Identify common **faults** found on power tools 4.4 Describe **safe working practice** when using hand and power tools 4.5 Describe maintenance requirements for plumbing hand tools.

Range
Hand tools Pipe grips, pipe cutters, adjustable spanner, hammers, screwdrivers, chisels, hacksaws. **Power tools** Battery drill, 240V hammer drill, SDS chuck, battery screwdriver, circular saw, jig-saw. **Faults** Frayed lead, damaged plugs, mechanical damage, missing safety features. **Safe working practice** Follow manufacturer's instructions, awareness of environment and others, use of PPE, selection of tool.

Learning outcome
The learner will: 5. Know fixings and components used in common plumbing processes
Assessment criteria
The learner can: 5.1 List different **screws heads** used for fixing during plumbing activities 5.2 Describe the **rationale** for using screws made from different materials 5.3 Identify **fixings** used in plumbing activities 5.4 Identify different **clips** used for plumbing installations 5.5 Describe the **reasons** for using different clipping distances 5.6 Describe which fixing to use on different **surfaces**.

Range
Screws heads Slotted, Phillips, Pozidriv, roundhead and countersunk. **Rationale** Longevity, cost, hygiene, corrosive properties, safety. **Fixings** Plastic plugs, spring toggles, wall bolts, rawl bolts, Fischer fixings. **Clips** Plastic push on clips for copper, brass school board clips, Munsen rings, plastic clips. **Reasons** Horizontal, vertical, tube material. **Surfaces** Wood, block, tiles, plasterboard, brick.

Learning outcome
The learner will: 6. Know common plumbing preparation techniques
Assessment criteria
The learner can: 6.1 Describe **methods of preparing** flooring materials 6.2 Identify **risk factors** to consider when removing flooring materials 6.3 Describe different types of flooring materials 6.4 Describe the process of replacing flooring materials 6.5 Identify the **requirements** to consider when carrying out notching 6.6 Describe **installation techniques** for fitting pipework in concealed locations.

Range
Methods of preparing Measuring, marking out. **Risk factors** Buried pipework and cables. **Types of flooring materials** Tongue and groove, chipboard. **Requirements** Building regulations. **Installation techniques** Ducting, notching, clipping, sleeving.

Learning outcome
The learner will: 7. Know symbols used for identifying plumbing pipework and fittings
Assessment criteria
The learner can: 7.1 Identify different **plumbing symbols** 7.2 Identify colour coding of plumbing pipes and tubes 7.3 Describe **drawing methods** used for plumbing installations.

Range
Plumbing symbols British standard. **Drawing methods** Isometric, plans.

Learning outcome
The learner will: 8. Be able to carry out common plumbing processes
Assessment criteria
The learner can: 8.1 Interpret **drawings** for plumbing installations 8.2 Use common **hand tools** to carry out plumbing tasks 8.3 Operate common **power tools** 8.4 Prepare **tubes** and fittings for jointing 8.5 Demonstrate procedures for **jointing** tubes 8.6 Identify different **surfaces** 8.7 Select **fixing methods** for different **surfaces** 8.8 Measure clip distances 8.9 Perform fixing of **clips** to different **surfaces**. 8.10 Measure joists for notching in line with building regulations 8.11 Demonstrate notching of joists 8.12 Demonstrate replacing timber floor board.

Range
Drawings Plans. **Hand tools** Pipe grips, pipe cutters, adjustable spanner, hammers, screwdrivers, chisels, hacksaws. **Power tools** Battery drill, 240V hammer drill. **Tubes** Copper, steel, plastic. **Jointing** Threaded, soldered, compression, push fit high low pressure. **Surfaces** Wood, block, tile, plasterboard. **Fixing methods** Plastic plugs, spring toggles, wall bolts. **Clips** Plastic push on clips for copper, brass school board clips, Munsen rings, plastic clips.

Unit 205/505 Cold water systems

UAN:	**D/504/0217**
Level:	Level 2
Credit value:	7
GLH:	68
Aim:	This unit provides learners with knowledge and practical experience in fitting types of domestic cold water systems and components. Learners will explore direct and indirect cold water systems, pipework, maintenance requirements, fault recognition and back flow prevention. This unit also provides learners with the knowledge and experience of carrying out commissioning tasks.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Know the requirements for water distribution to domestic dwellings
Assessment criteria
The learner can: 1.1 Identify the key sources of **information** related to the installation of cold water systems 1.2 Describe the rainwater cycle 1.3 Describe the different **sources** of water supply 1.4 Identify **treatment methods** of water supply prior to its distribution to properties 1.5 Describe typical **distribution pipework systems** from treatment works to properties.

Range
Information Water regulations, guide to the water regulations, BS EN 806- Specification for installations inside buildings conveying water for human consumption (parts 1-5) BS 8558- Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages – Complementary guidance to BS EN 806 **Sources** Surface sources - lakes, reservoirs, rivers, streams. Underground sources – wells, bore-holes, springs. **Treatment methods** Filtered, ionized, chlorinated, UV treated, aeration. **Distribution pipework systems** Mains, local mains, pumping stations, service pipe.

Learning outcome
The learner will: 2. Understand the requirements of the cold water supplies into domestic dwellings
Assessment criteria
The learner can: 2.1 Describe Medium-Density Polyethylene (MDPE) pipework 2.2 Explain the difference between a communication pipe and a service pipe 2.3 Explain the key **requirements** related to the supply pipework into a domestic dwelling 2.4 Identify pipework isolation points 2.5 Identify the different **types** of water meter installations 2.6 Describe **key aspects** of incoming mains into domestic dwellings 2.7 Identify **factors** that may impact measurements 2.8 Identify basic domestic cold water **systems**.

Range
Requirements Depth of supply pipework, supply pipework entry to the property, prevention of freezing, insulation requirements. **Pipework isolation points** Property boundary, entry to the property. **Types** Underground, external to the building, internal within the building. **Key aspects** Pressure, flow rate. **Factors** Time of day, location, incoming size of main, local demand. **Systems** Direct cold water system, indirect cold water system, rainwater harvesting systems, grey water systems.

Learning outcome
The learner will: 3. Know the components used in domestic cold water
Assessment criteria
The learner can: 3.1 State **reasons** for using approved water fittings in cold water plumbing systems 3.2 Describe methods of operation of key **isolation valves** 3.3 Explain the method of operation of float operated valves used in cisterns 3.4 Describe the methods of operation of different **taps** 3.5 Explain the requirements for positioning drain valves in cold water plumbing systems 3.6 Explain the **requirements** for a cold water storage cistern (CWSC) in a domestic cold water plumbing system. 3.7 Explain the procedures for linking two small cisterns in a plumbing system.

Range
Reasons Legal requirement, backflow, contamination, corrosion. **Isolation valves** Supply stop valve, screw down stop valve, service valve (high pressure), spherical plug valve and screw down stop valve, service valve (low pressure) – gate valve, drain valve, full-bore, water-fuse (surestop). **Taps** Bib taps with rising spindles, pillar taps with rising spindles, taps with non-rising spindles, taps with ceramic discs as their operating mechanism, mixer taps – including water mixing in the valve body and twinflow. **Requirements** Need for a lid, screened vent and overflow. Position and purpose of the float operated valve. Purpose of the overflow. Position of outlets from the cistern. Cistern support requirements – plastic/metallic cisterns, insulated jacket, adequate access, height in relation to feed and expansion cistern.

Learning outcome
The learner will: 4. Understand the requirements for pipework installations in domestic cold water systems
Assessment criteria
The learner can: 4.1 Explain the **reasons** for insulating cold water systems pipework and components 4.2 Describe the key contamination **issues** in plumbing systems 4.3 Describe the fluid categories 4.4 Describe the need for point of use backflow protection 4.5 Identify the use of backflow protection **devices** in typical domestic dwellings.

Range
Reasons Frost protection, prevention of undue warming, normal conditions, exposed conditions. **Issues** Non-approved materials, backflow, back syphonage cross connection. **Fluid categories** 1 to 5. **Devices** Type AUK2 tap gap to domestic basins and baths. Type AUK3 tap gap to domestic sinks. Double check valve to outside tap supply. Single check valve to mixer taps (hot and cold mixing in valve body).

Learning outcome
The learner will: 5. Understand the key requirements of testing and decommissioning of domestic cold water systems
Assessment criteria
The learner can: 5.1 Explain **methods** of testing cold water pipework systems 5.2 Describe how to use hydraulic test equipment 5.3 Describe the **requirements** for flushing a system 5.4 Identify the key **phases** in soundness testing a cold water system 5.5 Describe commissioning **checks** for cold water systems 5.6 Describe the differences between permanently and temporarily decommissioning a cold water system 5.7 Explain the method for draining cold water systems 5.8 Describe the **negative impact** of dead legs in systems.

Range
Methods Plastic – type A and type B. Metal procedure. **Requirements** Wholesome water to be flushed through following any amendments. **Phases** Visual inspection Setting up hydraulic test equipment Test period Final check Completion of documentation. **Checks** Flow rate, pressure, no dirt or debris, taps working, valves, documentation completion. **Method for draining cold water systems** Notify, identify, warning notice, isolate, check drained water going to appropriate location. **Negative impact** Bacteria growth, Legionella, noise.

Learning outcome
The learner will: 6. Understand the basic maintenance requirements of domestic cold water systems
Assessment criteria
The learner can: 6.1 Identify common **defects** found in cold water components 6.2 Explain procedures for rectifying common **defects** in cold water components 6.3 Identify the **sources** of noise in the system 6.4 Describe reasons for **inadequate water supply** 6.5 State the procedure for leak identification 6.6 Explain the procedure for repairing leaks on cold water components.

Range
Defects Worn or broken washer, defective tap seat, jammed headgear, ceramic disc failure. **Sources** Insecure pipework, air in system, loose components, defective washer. **Inadequate water supply** Underground bursts, blocked/partially blocked components, incorrectly sized components, partially closed valves, air locks to low pressure systems, low incoming water pressure.

Learning outcome
The learner will: 7. Be able to install cold water systems and components
Assessment criteria
The learner can: 7.1 Install cold water **pipework** using different **methods** 7.2 Connect cold water pipework to **components** 7.3 Carry out **commissioning tasks** on cold water pipework installations 7.4 Install insulation to cold water pipework and storage cisterns.

Range
Pipework Copper, plastic. **Methods** Soldered, compression, push fit. **Components** Bath tap, basin tap, sink tap, WC cistern. **Commissioning tasks** Flush systems, adjust float valves, flow rates, pressure readings, temperature readings, complete documentation, soundness testing.

Unit 206/506 Domestic hot water systems

UAN:	**H/504/0218**
Level:	Level 2
Credit value:	6
GLH:	55
Aim:	This unit provides learners with knowledge and practical experience in fitting types of domestic hot water systems and components. Learners will maintenance, installation and commissioning requirements. This unit also provides learners with the knowledge and experience of carrying out installation tasks.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Know the types of domestic hot water systems
Assessment criteria
The learner can: 1.1 Identify the key sources of **information** related to the installation of hot water systems 1.2 Identify the main **types** of hot water systems 1.3 Describe the operating principles of basic hot water **storage systems** in domestic dwellings. 1.4 Describe the operating principles of basic hot water **non storage systems** 1.5 Identify the **fuel types** used with direct and indirect hot water storage systems 1.6 Explain the advantages of **hot water storage systems** 1.7 Explain the disadvantages of **hot water storage systems**.

Range
Information Water Regulations, guide to the Water Regulations, BS EN 806- Specification for installations inside buildings conveying water for human consumption (parts 1-5) BS 8558- Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages – Complementary guidance to BS EN 806 **Types** Storage – vented, unvented. Non-storage (instantaneous) - multipoint, single point. **Storage systems** Direct type, indirect. **Non storage systems** Electric, gas, single point, multipoint, combi boiler. **Fuel types** Gas, solar thermal, electric, geo-thermal, solid fuel/biomass. **Hot water storage systems** Direct, indirect.

Learning outcome
The learner will: 2. Know the components used in domestic hot water systems
Assessment criteria
The learner can: 2.1 Identify the types of storage **cylinder** used in domestic hot water systems 2.2 Describe the **operating principles** of immersion heaters 2.3 Explain the **importance** of temperature control on hot water systems 2.4 Identify **methods** of controlling temperature 2.5 Describe the operating principles of blending valves 2.6 Identify types of **showers** used in domestic water systems.

Range
Cylinder Direct, indirect, single feed, twin feed, unvented, single coil, twin coil, triple coil, quad coil, un-lagged, pre-lagged, copper, steel, combination, high recovery. **Operating principles** Thermostat, element, isolation, rating, cabling, timer. **Importance** Avoid scalding, avoid explosion, economy, environmental, build up of scale. **Methods** Control thermostats, over heat thermostats, temperature relief valves, blending valve. **Showers** Gravity, pumped, electric.

Learning outcome
The learner will: 3. Understand the installation requirements of domestic hot water plumbing systems
Assessment criteria
The learner can: 3.1 Explain the **requirements for pipework** from a cold water storage cistern (CWSC) to a domestic hot water storage cylinder 3.2 Identify the key installation **features** of hot water storage cylinders 3.3 Describe **requirements** for minimising the installation of long hot water draw-offs 3.4 List the **methods** of optimising the length of hot water draw-offs 3.5 Identify the **considerations** when installing pipework in relation to hot water pipework and cold water pipework 3.6 Identify the **reasons** for insulating hot water systems pipework and components 3.7 Describe the fluid categories 3.8 Identify the key contamination **issues** in plumbing systems 3.9 Identify the need for point of use backflow protection 3.10 Identify the use of backflow protection **devices**.

Range
Requirements for pipework Feed, vent, no valve on vent pipes, gate valve, should rise, minimum height of vent over cistern. **Features** Cylinder specification – compliance with Part L1 Building Regulations, avoidance of parasitic circulation, stratification in hot water storage cylinders, temperature control methods – solid fuel (uncontrolled), other fuel types, thermostatic control, application of horizontal cylinders and combination cylinders. **Requirements** Energy conservation, wastage of water, risk of Legionella. **Methods** Trace heating, pumped secondary circulation system, centralised direct heat source, centralised hot water storage cylinder. **Considerations** Location of pipes (hot to cold transfer), insulation. **Reasons** Frost protection, heat loss, energy conservation, limit undue consumption. **Fluid categories** 1 to 5. **Issues** Non-approved materials backflow, backpressure, back syphonage cross connection. **Devices** Type AUK2 tap gap, type AUK3 tap gap, single and double check valves.

Learning outcome
The learner will: 4. Know the design features of showers
Assessment criteria
The learner can: 4.1 Identify the pipework configurations of hot water **showers** 4.2 Explain the importance of balanced water supplies 4.3 Explain the different options for **shower controls**.

Range
Showers Pumped, gravity, mains fed. **Shower controls** Manual, thermostatic, low or high pressure.

Learning outcome
The learner will: 5. Understand the basic maintenance requirements of hot water systems
Assessment criteria
The learner can: 5.1 Describe the **indicators** of faults found in hot water systems 5.2 Describe common **faults** that are found in hot water systems 5.3 Explain the **reasons** for the build-up of limescale in hot water systems 5.4 Identify the **methods** of removing limescale in hot water systems.

Range
Indicators Poor flow rate through mixer and shower rose, unbalanced hot/cold pressures, valves passing water, water leak, expansion noise. **Faults** Thermostat failure, immersion element failure, failure of heat source, failure of coil, loss of air bubble in single feed cylinder, water boiling, warming to cold pipes, air locks, blockages, limescale. **Reasons** Water heated too high, hard water. **Methods** Water softeners, water filters, water conditioners, magnetic.

Learning outcome
The learner will: 6. Understand the key requirements of testing and decommissioning of domestic hot water systems
Assessment criteria
The learner can: 6.1 Describe **methods** of testing hot water pipework systems 6.2 Describe how to use hydraulic test equipment 6.3 Describe the **requirements** for flushing a system 6.4 Identify the key **phases** in soundness testing a hot water system 6.5 Describe commissioning **checks** for hot water systems 6.6 Describe the differences between permanently and temporarily decommissioning a hot water system 6.7 Describe the method for draining hot water systems.

Range
Methods Plastic – Type A and Type B Metal procedure. **Requirements** Wholesome water to be flushed through following any amendments, hot water to be flushed through following any amendments. **Phases** Visual inspection Setting up hydraulic test equipment Test period Final check Completion of documentation. **Checks** Flow rate, pressure, no dirt or debris, taps working, valves, blending valves, temperature, check thermostat settings and operation, documentation completion. **Method for draining hot water systems** Notify, identify, warning notice, isolate, check drained water going to appropriate location, temperature.

Learning outcome
The learner will: 7. Be able to install cold water systems and components
Assessment criteria
The learner can: 7.1 Be able to carry out a soundness test on hot water **pipework** 7.2 Install hot water **pipework** using different **methods** 7.3 Connect hot water pipework to **components** 7.4 Install open vented hot water storage cylinder 7.5 Carry out **commissioning tasks** on hot water pipework installations 7.6 Install insulation to hot water pipework.

Range
Pipework Copper, plastic. **Methods** Soldered, compression, push fit. **Components** Bath tap, basin tap, sink tap, WC cistern. **Commissioning tasks** Flush systems, flow rates, temperature readings, complete documentation, soundness testing.

Unit 207 Sanitation

UAN:	**K/504/0219**
Level:	Level 2
Credit value:	5
GLH:	48
Aim:	This unit provides the learner with the knowledge, understanding and skills of common sanitation systems. Learners will be introduced to common sanitary installations and associated installation practices. Learners will also carry out basic installation tasks commonly used in plumbing.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Know the appliances and associated components used in sanitary installation
Assessment criteria
The learner can: 1.1 describe the working principles of different types of **toilets** 1.2 List different types of **urinal** 1.3 Explain the working principles of an automatic flushing cistern 1.4 Identify different types of **bidet** 1.5 Identify different types of **wash basin** 1.6 Identify **factors** to consider when selecting taps for installing with a bath and basin 1.7 Identify different types of **sinks** 1.8 Describe methods of connecting **waste fittings** to sanitary appliances 1.9 Identify alternate means of waste disposal.

Range
Toilets Single siphonic, double siphonic, wash down, high and low level, concealed, close coupled, dual flush, single flush, siphonic, flushing valves. **Urinal** Slab, bowl, trough. **Bidet** Over the rim, ascending spray. **Wash basin** Pedestal, wall hung, countersunk, in wall, counter top. **Factors** Size (¾ and ½ inch), location, appearance, type, operation, design of basin/bath. **Sinks** London, Belfast, stainless steel, ceramic, manmade, single drainer, double drainer, corner. **Waste fittings** Slotted, internal, external, overflow. **Alternate means of waste disposal** Macerator, sink waste disposal unit.

Learning outcome
The learner will: 2. Know the requirements for installing sanitary appliances
Assessment criteria
The learner can: 2.1 Identify **safe storage methods** for sanitary appliances 2.2 Describe the **importance** of safe storage methods for sanitary appliances 2.3 Identify **safe handling** of sanitary appliances 2.4 Describe the different **fixing methods** required for installing sanitary appliances 2.5 Describe the **method** of installing sanitary appliances 2.6 State bespoke **tools** used for the installation of sanitary appliances 2.7 Describe **quality checks** of sanitary appliances.

Range
Safe storage methods Protective covering/packaging, racking, secure environment, labelling. **Importance** Protect sanitary appliances from damage, avoid replacement costs, customer satisfaction. **Safe handling** Manual handling, PPE. **Fixing methods** Wall-hung, freestanding, pedestal, countertop, countersunk, in-built. **Method** Identify correct location, measure, level, mark, fit components parts (dress), connect waste pipes, connect water pipework. **Tools** Tap box spanner, telescopic basin wrench, basin wrench, soft jaw plumbing pliers, trap spanner, tap reseating tool, toilet seat installation tool, magnetic telescopic plumber's mirror. **Quality checks** Installed level, Installed securely, water tight/no leaks.

Learning outcome
The learner will: 3. Be able to install sanitary appliances
Assessment criteria
The learner can: 3.1 Demonstrate the use of bespoke **tools** to install sanitary appliances 3.2 Confirm **suitability** for installation of sanitary appliances 3.3 Demonstrate the installation of **sanitary appliances** 3.4 Carry out **quality checks** of sanitary appliances.

Range
Tools Tap box spanner, telescopic basin wrench, soft jaw plumbing pliers. **Suitability** Location, size. **Sanitary appliances** Bath, close coupled WC and cistern, wash hand pedestal basin. **Quality checks** Installed level, installed securely, water tight/no leaks.

Unit 208/508 Central heating systems

UAN:	**D/504/0220**
Level:	Level 2
Credit value:	6
GLH:	56
Aim:	This unit provides the learner with the core knowledge and understanding of central heating principles and processes applied to plumbing. Learners will be introduced to heating system types, tube materials, pipework systems, component parts, heat emitters, radiator valves, mechanical central heating controls, bespoke tools, and demonstrate competence in installing a single panel radiator with fittings.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Understand the types of domestic central heating systems installed in domestic dwellings
Assessment criteria
The learner can: 1.1 State the **purpose** of central heating systems 1.2 Identify the principle pipework **systems** 1.3 Compare the **operating performance** of principle pipework systems 1.4 Explain the function of the pipework **component** parts 1.5 Compare the different **types** of space heating systems 1.6 Describe the **configuration** of space heating systems.

Range
Purpose Provide thermal comfort, economy. **Systems** Gravity hot water, pumped heating with gravity hot water, fully pumped system. **Operating performance** Cost (installation/maintenance/efficiency), general performance, control. **Component** Feed and expansion cistern, float valve, open vent pipe, air separator, gate valve, full-bore valve, drain-off valve, automatic bypass, lock shield, thermostatic radiator valve. **Types** Full central heating, background, selective. **Configuration** Gravity hot water systems and pumped only heating systems: one pipe and two pipe. C and C+ system. The different types of fully pumped systems. Y plan and S plan.

Learning outcome
The learner will: 2. Know the different materials used to install domestic central heating pipework
Assessment criteria
The learner can: 2.1 Identify the principle **materials** used in domestic central heating applications 2.2 Describe the use of plastic barrier tube for installing central heating circuits 2.3 Describe the **advantages** of insulating pipework 2.4 State types of pipework **insulation** 2.5 State bespoke **tools** used for the installation of domestic central heating systems.

Range
Materials Copper, mild steel, plastic. **Advantages** Saves energy, good for the environment, draw off temperature at the outlet is improved, water stays warmer for longer, frost protection. **Insulation** Polyethylene pipe, foil backed lagging, nitrile rubber. **Tools** Radiator spanner, radiator valve spanner ½" Hex, water pump pliers, radiator bleed key, pipe freezing system.

Learning outcome
The learner will: 3. Understand heat emitters and their components
Assessment criteria
The learner can: 3.1 Identify different **heat emitters** used in domestic systems. 3.2 Explain the working principles of **different types of heat emitter** used in domestic systems. 3.3 Identify the European **Standard** for the Manufacture of Radiators 3.4 Define **Delta T** 3.5 Compare the **advantages** and **disadvantages** of using underfloor heating 3.6 Describe the **importance** of radiator valves found in domestic installations 3.7 Explain how **radiator valves** operate 3.8 Explain how to **hang** a radiator 3.9 Describe how to bleed a radiator.

Range
Heat emitters Compact steel radiators, kick-space heaters (fan assisted convectors), cast-iron column radiators, towel radiators, flat panel radiators, skirting convector heaters, low surface temperature radiators, underfloor. **Different types of heat emitter** Convector, radiator, fan assisted, underfloor. **Standard** BSEN442. **Delta T** The difference between the mean water temperature in the radiator and ambient air temperature. **Advantages** Low temperature of operation, better suited for use with heat pumps and solar, even heat distribution, heat emitter is not visible. **Disadvantages** Increased cost of components and installation, takes longer to heat room from cold state, could induce 'sweating' in furniture, not always practical. **Importance** Cost effective, comfort, control, environmental, best practice. **Radiator valves** Thermostatic, manual. **Hang** Identify location, mark out location, level, install brackets, correct height, hang, fit valves, connect pipework, fill.

Learning outcome
The learner will: 4. Understand mechanical central heating controls
Assessment criteria
The learner can: 4.1 Describe the function of a domestic circulator pump 4.2 Describe the **effects** of the circulating pump in relation to feed and vent 4.3 State the differences between **motorised valves** 4.4 Describe the process to exchange a Synchron Motor.

Range
Effects Positive, negative pressure. **Motorised valves** Two-port, mid-position, W-plan priority hot water 3 port diverter.

Learning outcome
The learner will: 5. Be able to carry out radiator installation tasks
Assessment criteria
The learner can: 5.1 Demonstrate the use of bespoke **tools** to install domestic central heating systems 5.2 Perform radiator **hanging** 5.3 Demonstrate bleeding radiators.

Range
Tools Radiator spanner, radiator valve spanner ½" Hex, radiator bleed key. **Hanging** Identify location, mark out location, level, install brackets, correct height, hang, fit valves, connect pipework, fill.

Guidance

Radiator need only be a single panel radiator remotely installed rather than on an active system. To simulate a live system a hydraulic pump could be used to fill, test and bleed

Unit 209/509 Drainage systems

UAN:	**H/504/0221**
Level:	Level 2
Credit value:	4
GLH:	39
Aim:	This unit provides the learner with the knowledge, understanding and skills of common sanitation and drainage systems. Learners will be introduced to soils systems, common sanitary installations and associated installation practices. Learners will also carry out basic installation tasks commonly used in plumbing.
Health and safety:	Health and safety behaviour learned in mandatory unit 201/501 should be displayed in all arenas.

Learning outcome
The learner will: 1. Understand the requirements of drainage systems
Assessment criteria
The learner can: 1.1 Identify **documents** relating to sanitation and AGD systems and components 1.2 Identify different types of **above ground drainage system** 1.3 Explain the installation **considerations** for primary ventilated stack systems 1.4 Describe the **requirements** of a stub stack system 1.5 Identify **terminals** associated with stacks and stub stacks 1.6 Describe the differences between permanently and temporarily decommissioning above ground drainage systems 1.7 Describe below ground drainage systems 1.8 Identify **health hazards** when working with drainage systems.

Range
Documents Manufacturer's instructions, Building Regs H, Building Regs G, BS 6465 Sanitary Installations, BS EN 12056 Gravity drainage systems inside buildings. **Above ground drainage system** Primary ventilated stack (single stack), ventilated branch system, secondary ventilated, stub stacks, grey water recovery systems. **Considerations** Volume of waste, branch connections, self cleansing gradients, inspection eyes. **Requirements** Another associated ventilated stack, minimum/maximum height of waste connection, internal valve. **Terminals** Air admittance valves, terminal guards. **Below ground drainage systems** Combined, separate, partially separate. **Health hazards** Weil's disease, Hepatitis, dermatitis.

Learning outcome
The learner will: 2. Know the types of traps and associated requirements
Assessment criteria
The learner can: 2.1 Identify **different traps** used for sanitary appliances 2.2 Describe the purpose of trap seals 2.3 Describe design considerations 2.4 Describe the **reasons** for trap seal loss 2.5 Describe **methods** for ensuring traps maintain their seal.

Range
Different traps P, S, bottle, sink, self-sealing/re-sealing, running traps, mechanical traps, anti siphon, waterless traps. **Design considerations** Minimum/maximum dimensions, falls. **Reasons** Induced syphonage, undersized pipework. **Methods** Design, correct fall, pipe-bore.

Learning outcome
The learner will: 3. Know the procedures for soundness testing and commissioning above ground systems
Assessment criteria
The learner can: 3.1 Identify **equipment required** for testing above ground systems 3.2 Describe the procedure for checking minimal seal water levels in traps 3.3 Describe the procedure for carrying out soundness testing of a primary ventilated stack system 3.4 Identify common **faults** in drainage systems 3.5 Identify **equipment used** for maintaining drainage systems 3.6 Describe **procedures** for unblocking drainage pipes 3.7 State the **requirements** of informing others when testing is taking place.

Range
Equipment required Manometer, hand pump, seal, cap. **Faults** Loss of trap seal, blocked drains, pipe sagging. **Equipment used** Drain rods, plungers, coil flexible drain unblocker, flushing machines. **Procedures** Jetting, rodding, plunging, flushing. **Requirements** Label, warning notices, secure area.

Learning outcome
The learner will: 4. Be able to install and test above ground systems
Assessment criteria
The learner can: 4.1 Use **equipment** to install primary stack systems 4.2 Perform **connections** to primary ventilated stacks 4.3 Perform soundness test of above ground systems.

Range
Equipment Manometer, seal, cap, drain test plug, hand bellows, y-piece connector. **Connections** WC connection, Wash hand basin connection, bath connection.

Learning outcome
The learner will: 5. Know the requirements of rainwater systems and associated guttering
Assessment criteria
The learner can: 5.1 Describe rainwater systems 5.2 Identify different **materials** used for rainwater systems 5.3 Describe the different **designs** of rainwater systems 5.4 Identify **considerations** when fixing rainwater systems 5.5 Identify **access considerations** required for working with rainwater systems 5.6 Describe the installation **method** for rainwater systems.

Range
Rainwater systems Gutters, downpipes. **Materials** Cast iron, plastic, aluminium. **Designs** Ogee, half round, square, round. **Considerations** Fall, clipping distances, bracketing, leaf guard. **Access considerations** Working at heights, access, PPE. **Method** Identify location, measure, mark, level to fall, secure, termination point, test.

Learning outcome
The learner will: 6. Be able to install rainwater systems
Assessment criteria
The learner can: 6.1 Identify suitability of area for installation 6.2 Measure fall of rainwater gutter 6.3 Perform **installation** of rainwater systems.

Range
Installation Mark, level to fall, secure, termination point, test.

Unit 210/810 Understand how to communicate with others within building services engineering

UAN:	**J/602/2482**
Level:	Level 2
Credit value:	3
GLH:	28
Aim:	This knowledge unit provides learning in the development and continued maintenance of effective working relationships in the building services industry associated with work in dwellings, industrial and commercial premises and for private and contract type clients.

Learning outcome
The learner will: 1. Know the members of the construction team and their role within the building services industry
Assessment criteria
The learner can: 1.1 identify the key roles of the site management team: • architect • project manager/clerk of works • structural engineer • surveyor • building services engineer • quantity surveyor • buyer • estimator • contracts manager • construction manager 1.2 identify the key roles of the individuals that report to the site management team: • sub contractors • site supervisor • trade supervisor • trades: o bricklayer o joiner o plasterer o tiler o electrician o H&V fitter o gas fitter o decorator o groundworkers 1.3 identify the key roles of site visitors: • building control inspector • water inspector • HSE inspector • electrical services inspector.

Learning outcome
The learner will: 2. Know how to apply information sources in the building services industry
Assessment criteria
The learner can: 2.1 identify the types of statutory legislation and guidance information that applies to working in the industry: • legislation: o data protection o equal opportunities o health and safety o employment • regulations • british standards • codes of practice • manufacturer guidance: o installation instructions o service and maintenance instructions o user instructions 2.2 identify the purpose of information that is used in the workplace: • job specifications • plans/drawings • work programmes • delivery notes • time sheets • policy documentation – health and safety, environmental, customer service 2.3 identify the purpose of information given to customers: • quotations • estimates • invoices/statements • statutory cancelation rights • handover information 2.4 state the importance of company policies and procedures that affect working relationships: • company working policies/procedures: o behaviour o timekeeping o dress code o contract of employment • limits to personal authority: o apprentices o level 2 qualified staff o level 3 qualified staff • supervisor and management responsibilities.

Learning outcome
The learner will: 3. Know how to communicate with others in the building services industry
Assessment criteria
The learner can: 3.1 identify suitable communication methods for use in work situations: • oral communication • written communication: o e-mail o fax o letter 3.2 define methods of effective communication for people with: • physical disabilities • learning difficulties • language differences: o dialects o accents o foreign and second language issues 3.3 state the actions to take to deal with conflicts between: • customers and operatives • co-workers • supervisors and operatives 3.4 state the effects that poor communication may have on an organisation: • between operatives • between operatives and management • company to customer.

Appendix 1 Relationships to other qualifications

Links to other qualifications

This qualification has connections to the:

- Level 3 Diploma in Plumbing Studies (6035)
- Level 2 NVQ in Plumbing and Heating (6189)
- Level 3 NVQ in Plumbing and Heating (6189)
- Level 3 NVQ in Electrotechnical Services (2357)
- Level 2 NVQ in Heating and Ventilating (6188)
- Level 3 NVQ in Heating and Ventilating (6188)
- Level 2 NVQ in Refrigeration and Air Conditioning (6087)
- Level 3 NVQ in Refrigeration and Air Conditioning (6087)
- Level 2 Diploma in Electrical Installations (Buildings and Structures) (2365)
- Level 3 Diploma in Electrical Installations (Buildings and Structures) (2365)
- Level 2 Diploma in Heating and Ventilating (7188)
- Level 3 Diploma in Heating and Ventilating (7188)
- Level 2 Diploma in Refrigeration, Air Conditioning and Heat Pump Systems (7189)
- Level 3 Diploma in Refrigeration, Air Conditioning and Heat Pump Systems (7189)

Literacy, language, numeracy and ICT skills development

This qualification can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales – see **www.cityandguilds.com/esw**

Appendix 2 Disclaimer

This document must be completed by the candidate and the tutor as part of the qualification induction.

You have been enrolled on the **Level 2 Diploma in Plumbing Studies (6035-02).** This is a qualification that tests both practical and knowledge based skills in a realistic working environment. When you have successfully completed this qualification you will be at an **Improver/Plumber's Mate** level.

In order to fully qualify as a Plumber you will need to fully meet the performance criteria as laid down in the National Occupational Standards put together by Summit Skills, the Sector Skills Council. This is covered in the City and Guilds 6189 Level 2 and 3 NVQ Diploma in Plumbing and Heating.

Your tutor/assessor will be able to explain how you may progress onto the City and Guilds 6189 Level 2 and 3 NVQ Diploma in Plumbing and Heating. **However, you should be aware that the relevant performance units will need to be carried out in industry.** Completion of the 6189 will enable you to apply to join a competent person's scheme.

I can confirm that as part of my induction the above statement has been explained and I understand that completing the City and Guilds Level 2 Diploma in Plumbing Studies (6035-02) qualification will <u>not</u> make me a fully qualified Plumber.

Candidate _____ Date _____

Tutor _____ Date_____

Appendix 3 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden**: how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for GOLA/e-volve assessments.

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Useful contacts

UK learners **General qualification information**	**T: +44 (0)844 543 0033** **E: learnersupport@cityandguilds.com**
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: **intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: **singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: **business@cityandguilds.com**
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Land Based Services (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

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City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)844 543 0000
F +44 (0)20 7294 2413
www.cityandguilds.com

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