Qualification Specification:

OCN NI Level 2 Diploma in Plumbing Skills

- Qualification No: 610/2678/5

Version: 1.4

1. Specification Updates

Key changes have been listed below:

Section	Detail of change	Version and date of Issue
Section 10	Scope and teaching content added for each unit	Version 1.4 May 2024

2. Contents

3. Introduction to Open College Network Northern Ireland (OCN NI)

The Open College Network Northern Ireland (OCN NI) is a UK recognised awarding organisation based in Northern Ireland. We are regulated by CCEA Regulation to develop and award regulated professional and technical (vocational) qualifications from Entry Level up to and including Level 5 across all sector areas. In addition, OCN NI is also regulated by Ofqual to award qualifications in England.

OCN NI is also an educational charity that advances education by developing nationally recognised qualifications and recognising the achievements of learners. We work with centres such as Further Education Colleges, Private Training Organisations, Voluntary & Community Organisations, Schools, SME's and Public Sector bodies to provide learners with opportunities to progress into further learning and/or employment. OCN NI's Strategic Plan can be found on the OCN NI website www.ocnni.org.uk.

For further information on OCN NI qualifications or to contact us, you can visit our website at www.ocnni.org.uk. The website should provide you with details about our qualifications, courses, contact information, and any other relevant information you may need.

OCN NI Contact Details

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4. About this Specification

This specification details OCN NI's specific requirements for the delivery and assessment of the **OCN NI Level 2 Diploma in Plumbing Skills.**
This specification will provide guidelines for centres to ensure the effective and correct delivery of this qualification. OCN NI qualification specifications are based on research and engagement with the practitioner community to ensure they provide appropriate skills and knowledge for learners.

The qualification specification will detail the following aspects of the **OCN NI Level 2 Diploma in Plumbing Skills.**

- **Qualification Features**: this includes the key characteristics and features of this qualification, such as their intended audience, purpose, and credit value.

- **Centre Requirements:** this details the prerequisites and obligations that centres must fulfil to be eligible to deliver and assess this qualification. These include guidelines on staff qualifications, resources, and required procedures.

- **Structure and Content:** this details the structure and content of the qualification including units, and any specific content that learners will be required to study.

- **Assessment Requirements:** this details assessment criteria and assessment methods for this qualification, ensuring that summative assessment approaches are clear.

- **Quality Assurance:** the quality and consistency of delivery and assessment of this qualification are of paramount importance to OCN NI. The mandatory quality assurance arrangements including processes for internal and external verification that all centres offering this qualification must adhere to are detailed.

- **Administration:** guidance on the administrative aspects of delivering this qualification, including registration, certification, and record-keeping.

- Reference to other handbooks and policies as appropriate to the qualification.

It is important to note that OCN NI will communicate any significant updates or changes to this specification in writing to our Centres. Additionally, we will make these changes available on our official website at www.ocnni.org.uk.

To stay current, please refer to the online version of this specification as it is the most authoritative and up-to-date publication. Be aware that downloaded and printed copies may not reflect the latest revisions.

4.1 Additional Support

OCN NI offers a comprehensive range of support services designed to assist Centres in meeting the delivery and quality assurance requirements of OCN NI qualifications. These services include:

- **Learner Assessment Booklets**: These booklets are created to assist learners in demonstrating the fulfilment of assessment criteria and organising the quality assurance prerequisites for each individual unit.

- **Specimen Assessment Materials**: These have been designed to work in conjunction with the learning content for each individual unit and assist learners to provide evidence which enables them to meet each assessment criteria.

- **Qualification Support Pack**: A support pack has been developed to support Centres in the delivery of this qualification. The pack includes, planning and assessment templates, guides to best practice, etc.

- **Professional Development for Educators**: OCN NI provides opportunities for professional development tailored to meet the various needs of practitioners and quality assurance staff. Centres can join our training sessions, available in both face-to-face and online formats, or explore a wealth of training materials by visiting www.ocnni.org.uk

- **OCN NI Subject Advisors**: Our team of subject advisors offers vital information and support to Centres. They provide guidance on specification details, non-exam assessment advice, updates on resource developments, and various training opportunities. They actively engage with subject communities through an array of networks to facilitate the exchange of ideas and expertise, to support practitioners to provide quality education programs to learners.

All centres can access information, support and guidance to support the delivery and quality assurance of this qualification by contacting their designated Business Development Advisor or by contacting us on Contact Us | OCN NI

5. About this Qualification

5.1 Qualification Regulation Information

OCN NI Level 2 Diploma in Plumbing Skills

Qualification Number: 610/2678/5

Operational start date: 15 May 2023
Operational end date: 30 April 2028
Certification end date: 30 April 2030

The qualification's operational start and end dates define the regulated qualification's lifecycle. The operational end date is the final date for learner registration, while learners have until the certificate end date to complete the qualification and receive their certificates.

It is important to note that all OCN NI regulated qualifications are listed on the Register of Regulated Qualifications (RQF), which can be found at Ofqual Register. This register is maintained by Ofqual in England and CCEA Regulation in Northern Ireland. It contains information about qualifications that are regulated and accredited. It is a key resource for learners, employers, and educational institutions to verify the status and recognition of qualifications.

Centres must adhere to administrative guidelines diligently, with special attention to the fact that fees, registration, and certification end dates for the qualification may be subject to changes. It is a centre's responsibility to make itself aware of updates on any modifications to ensure compliance with the latest requirements. OCN NI provides centres with timely updates through various channels including website, newsletters and through this specification. Information on qualification fees can be found on the Centre Login section of the OCN NI website www.ocnni.org.uk .

5.2 Sector Subject Area

A subject sector area is a specific category used to classify academic and vocational qualifications. Subject sector areas are part of the educational and qualifications framework to organise and categorise qualifications. The sector subject for this qualification is:

5.2 Building and construction

5.3 National Occupational Standards

National Occupational Standards (NOS) are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. This qualification is linked to the following NOS:

BSEPH04 Install and test plumbing and heating systems - National Occupational Standards (ukstandards.org.uk)

BSEPH05 Service and maintain plumbing and heating systems - National Occupational Standards (ukstandards.org.uk)

BSEPH06 Inspect and pre-commission plumbing and heating systems - National Occupational Standards (ukstandards.org.uk)

BSEPH07 Commission plumbing and heating systems - National Occupational Standards (ukstandards.org.uk)

5.4 Qualification Aim and Objectives

Qualification Aim

The OCN NI Level 2 Diploma in Plumbing Skills will enable the learner to develop a broad base of plumbing skills and practical plumbing techniques.

Qualification Objectives

The objectives of the OCN NI Level 2 Diploma in Plumbing Skills are to enable learners to gain skills and knowledge relating to the following:

- health and safety
- installing sanitaryware
- installing central heating
- installing and maintaining open vented hot water systems
- sustainability in the plumbing industry
- installing and maintaining an above ground drainage system
- practical plumbing techniques

5.5 Target Learners

The qualification is targeted at learners who wish to gain employment within the plumbing or mechanical services sector.

The OCN NI Level 2 Diploma in Plumbing has been designed for:

- learners aiming to advance to apprenticeships and / or further or higher education in the field of plumbing
- learners seeking entry into employment in the field of plumbing or mechanical services

5.6 Entry Requirements

In order to take this qualification learners must be at least 16 years old.

5.7 Progression

The OCN NI Level 2 Diploma in Plumbing Skills will enable learners to progress to higher level qualifications including a Level 3 Apprenticeship, Level 3 Further Education or into employment.

Please note that on completion of this qualification learners are not fully qualified plumbers.

5.8 Delivery Language

This qualification is exclusively available in English. If there is a desire to offer this qualification in Welsh or Irish (Gaeilge), we encourage you to get in touch with OCN NI. They will assess the demand for such provisions and, if feasible, provide the qualification in the requested language as appropriate.

6. Centre Requirements for Delivering this Qualification

6.1 Centre Recognition

New and existing OCN NI recognised centres must apply for and be granted approval to deliver this qualification prior to the commencement of delivery.

6.2 Qualification Approval

Once a Centre has successfully undergone the Centre Recognition process, it becomes eligible to apply for qualification approval. The Centre's capability to meet and sustain the qualification criteria will be assessed. Throughout the qualification approval process, OCN NI will aim to ensure that:

- centres possess suitable physical resources (e.g., plumbing equipment, IT, learning materials, teaching rooms) to support qualification delivery and assessment
- centre staff involved in the assessment process have relevant expertise and/or occupational experience
- robust systems are in place for ensuring ongoing professional development for staff delivering the qualification
- centres have appropriate health and safety policies concerning learner equipment use
- qualification delivery by centres complies with current equality and diversity legislation and regulations
- as a part of the assessment process for this qualification, learners should have access to a practical work setting

6.3 Centre Staffing

To offer this qualification centres are mandated to establish the following roles as a minimum, although a single staff member may serve in more than one capacity*:

- Centre contact
- Programme Co-ordinator
- Assessor
- Internal Verifier

*Note: An individual cannot serve as an Internal Verifier for their own assessments.

6.4 Tutor Requirements

Tutors responsible for delivering this qualification are expected to possess a high degree of occupational competency. They should meet the following criteria:

- **Occupational Competency:** Tutors should demonstrate a clear understanding of the subject matter, including up-to-date knowledge of the plumbing and mechanical services industry. This competence should enable them to effectively impart knowledge and practical skills to learners.

- **Qualifications:** Tutors should hold qualifications at a level that is at least one level higher than the qualification they are teaching. This ensures that they have the necessary academic foundation to provide in-depth guidance and support to learners.

- **Relevant Industry Experience:** In addition to academic qualifications, tutors must have a minimum of three years of relevant, hands-on experience in the plumbing and mechanical services industry.

These requirements collectively ensure that learners receive instruction from highly qualified and experienced instructors, thereby enhancing the quality and effectiveness of their educational experience in the plumbing and mechanical services field.

6.5 Assessor Requirements

The assessment of this qualification takes place within the Centre and is subjected to OCN NI's rigorous quality assurance procedures. The achievement of individual units is based on the criteria defined in each unit.

Assessors play a pivotal role in ensuring the validity and fairness of assessments. They are required to meet the following criteria:

- **Occupational Competency:** Assessors should possess a high degree of occupational competency in the relevant subject matter. This expertise enables them to accurately evaluate and measure a learner's knowledge and skills. Additionally, they should hold qualifications at a level that is at least one level higher than the qualification they are assessing, ensuring their in-depth understanding of the subject matter.

- **Relevant Industry Experience:** A minimum of three years of practical experience in plumbing is a prerequisite. This practical background is essential for assessors to effectively evaluate a learner's capabilities in real-world contexts.

- **Assessment Expertise:** Assessors should have direct or related experience in the field of assessment. This includes knowledge of best practices in designing, conducting, and grading assessments. Their expertise ensures that assessments are both fair and valid.

- **Assessors Qualification:** Assessors should hold or be currently undertaking a recognised assessor's qualification; or must have attended the OCN NI Assessment Training.

- **Comprehensive Assessment Oversight:** Assessors are responsible for evaluating all assessment tasks and activities comprehensively. They must thoroughly review and assess each element to ensure a fair and accurate representation of a learner's skills and knowledge.

These rigorous requirements uphold the quality and integrity of the qualification's assessment process, ensuring that learners receive a fair and reliable evaluation of their competencies in the plumbing sector.

6.6 Internal Verifier Requirements

The Internal Verifier plays a crucial role in the Centre's internal quality assurance processes. The Centre must designate a skilled and trained Internal Verifier who assumes the role of an internal quality monitor responsible for verifying the delivery and assessment of the qualification.

The Internal Verifier for this qualification must meet the following criteria:

- **Relevant Industry Experience:** A minimum of three years of practical experience in the plumbing industry is a prerequisite. This practical background is essential for assessors to effectively evaluate a learner's capabilities in real-world contexts.
- **Internal Verification Expertise:** Internal Verifiers should have direct or related experience in the field of verification. This includes knowledge of best practices in designing, conducting, and grading assessments. Their expertise ensures that assessments are both fair and valid.
- **Internal Verifiers Qualification:** Internal Verifiers should hold or be currently undertaking a recognised Internal Verifier's qualification; or must have attended the OCN NI Internal Verification Training.
- **Thorough Evaluation of Assessment Tasks and Activities:** Internal verifiers are tasked with conducting in-depth reviews and assessments of all assessment tasks and activities. Their responsibility is to ensure a comprehensive and meticulous oversight of each element to guarantee a just and precise reflection of a learner's abilities and knowledge and to ensure that all assessment and quality assurance requirements are fulfilled.

7. Qualification Structure

7.1 Qualification Purpose

The OCN NI Level 2 Diploma in Plumbing Skills is unitised qualification on a scale of pass or fail. Learners are expected to demonstrate a comprehensive understanding of the subject matter, ensuring a level of proficiency. This qualification will enable learners to acquire practical skills in plumbing, equipping learners with the capabilities required for progressing to a Level 3 Apprenticeship, Level 3 Further Education or into employment.

7.2 Qualification Level

In the context of the OCN NI Level 2 Diploma in Plumbing Skills it is essential to understand the significance of qualification levels, as they play a pivotal role in assessing the depth and complexity of knowledge and skills required for successful attainment. This qualification aligns with Level 2, which signifies a moderate level of difficulty and intricacy. It's important to note that qualification levels in the educational framework range from Level 1 to Level 8, complemented by three 'entry' levels, namely Entry 1 to Entry 3.

7.3 Qualification Size

Total Qualification Time (TQT)

This represents the total amount of time a learner is expected to spend to complete the qualification successfully. It includes both guided learning hours (GLH) and independent study or additional learning time.

Guided Learning Hours (GLH)

These are the hours of guided instruction and teaching provided to learners. This may include classroom instruction, tutorials, or other forms of structured learning.

OCN NI Level 2 Diploma in Plumbing Skills
Total Qualification Time (TQT): 570 hours
Total Credits Required: 57 credits
Guided Learning Hours (GLH): 470 hours

7.4 How to Achieve the Qualification

To achieve the OCN NI Level 2 Diploma in Plumbing Skills learners must complete all units - 57 credits.

8. Assessment Structure

This qualification is assessed through internal assessment and each unit is accompanied by specific assessment criteria that define the requirements for achievement.

8.1 Assessment Guidance: Portfolio

The portfolio for this qualification is designed to provide a comprehensive view of a learner's skills and knowledge. It is an holistic collection of evidence that may include a single piece of evidence that satisfies multiple assessment criteria. There is no requirement for learners to maintain separate evidence for each assessment criterion.

When learners are creating their portfolio, they should refer to the assessment criteria to understand the evidence required. Explanations of command words/verbs used in the assessment criteria can be found in Appendix 1 of this document.

It is essential that the evidence in the portfolio reflects the application of skills in real-world situations. Learners should ensure that they provide multiple examples or references whenever the assessment criteria require it.

8.2 Understanding the Units

The units outlined in this specification establish clear assessment expectations. They serve as a valuable guide for conducting assessments and ensuring quality assurance efficiently. Each unit within this specification follows a consistent structure. This section explains the operational framework of these units. It is imperative that all educators, assessors, internal verifiers, and other personnel overseeing the qualification review and familiarise themselves with this section to ensure a comprehensive understanding of how these units function.

- **Title:** The title will reflect the content of the unit and should be clear and concise.
- **Level:** A unit can have one of six RQF levels: Entry, One, Two, Three, Four or Five. All units within this qualification are level 2.
- **Credit Value:** This describes the number of credits ascribed to a unit. It identifies the number of credits a learner is awarded upon successful achievement of the unit. One credit is awarded for the learning outcomes which a learner, on average, might reasonably be expected to achieve in a notional 10 hours of learning.
- **Learning Outcome:** A coherent set of measurable achievements.
- **Assessment Criteria:** These enable a judgement to be made about whether or not, and how well, the students have achieved the learning outcomes.
- **Assessment Guidance and Methods:** These detail the different assessment methods within the unit that may be used.
- **Possible Content:** This provides indicative content to assist in teaching and learning.

9. Qualification Summary by Unit

OCN NI Level 2 Diploma in Plumbing Skills
Total Qualification Time (TQT) for this qualification: 570 hours
Guided Learning Hours (GLH) for this qualification: 470 hours

To achieve this qualification learners must successfully complete all units - 57 credits.

Unit Reference Number	OCN NI Unit Code	Unit Title	Credit Value	GLH	Level
J/650/7184	CBG199	Health and Safety in the Plumbing Industry	4	30	Two
K/650/7185	CBG200	Plumbing Industry Processes, Techniques and Principles	10	80	Two
L/650/7186	CBG201	Installing and Maintaining Cold Water Pipework Systems	9	75	Two
M/650/7187	CBG202	Planning and Preparing for the Installation of a Central Heating System	7	60	Two
R/650/7188	CBG203	Installing Underfloor Heating Systems	7	60	Two
T/650/7189	CBG204	Installing and Maintaining an Open Vented Hot Water System	7	60	Two
D/650/7190	CBG205	Sustainability in the Plumbing Industry	2	15	Two
F/650/7191	CBG206	Installing and Maintaining Sanitary Systems	7	60	Two
H/650/7192	CBG207	Practical Plumbing Project	4	30	Two

10. Unit Content

Title	Health and Safety in the Plumbing Industry
Level	Two
Credit Value	4
Guided Learning Hours (GLH)	30
OCN NI Unit Code	CBG199
Unit Reference No	J/650/7184
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to understand relevant health and safety legislation and requirements within the plumbing industry.	
Learning Outcomes	**Assessment Criteria**
1. Be aware of health and safety legislation in the plumbing industry.	1.1. Describe health and safety legislation in the plumbing industry including: a) employer and employee responsibilities under the Health and Safety at Work (NI) Order 1978 b) roles and responsibilities of the Health and Safety Executive in Northern Ireland c) Control of Substances Hazardous to Health Regulations (COSHH) d) Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) e) Working at Height Regulations f) Personal Protective Equipment Regulations (PPE) g) documentation in line with building services engineering operational, legal, regulatory and organisational requirements.
2. Be able to identify hazards and controls in a plumbing environment and carry out a risk assessment.	2.1. Identify common hazards and controls relating to working in a plumbing environment including: a) work activities b) equipment with moving parts c) electrically powered equipment 2.2. Describe what is meant by risk assessments and method statements and the purpose of each. 2.3. Carry out a risk assessment for a given situation. 2.4. Identify different signs, safety and warning notices used in the plumbing environment. 2.5. Describe how changing work practices may increase the risk of hazards and how these may be managed. 2.6. Describe how to ensure plumbing equipment is maintained and stored safely. 2.7. Outline why it is important to maintain a safe and tidy workplace.

3. Understand the reporting procedures for accidents and emergencies at work.	3.1. Outline using examples, types of plumbing industry accidents that need to be reported under RIDDOR. 3.2. Describe the actions to be taken and the records that must be completed by employers following different types of accidents at work.
4. Be able to use access equipment and work safely at heights.	4.1. Identify different types of access equipment when working at heights. 4.2. Identify possible risks when working at heights. 4.3. Demonstrate safe working practices when using access equipment at heights.
5. Be able to use PPE appropriately within the plumbing industry.	5.1. Demonstrate the appropriate use of PPE for different plumbing jobs including checking for wear and damage and appropriate storage.
6. Be aware of fire risks and associated prevention strategies in the plumbing industry.	6.1. Identify possible causes of fire in the plumbing industry and associated fire prevention strategies. 6.2. Illustrate the actions to be taken should a fire break out. 6.3. Identify the main types of fire extinguishers and their uses.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Health and Safety in the Plumbing Industry

1. Be aware of health and safety legislation in the plumbing industry.	**Scope**
	
	Teaching will cover:
	
	Legislation
	Acts of Parliament
	Regulations
	Approved Code Of Practice
	British Standards and CE/European Standards and Approval
	• Health and Safety at Work Order 1978 (NI) in regard to the responsibilities of employers, employees and self-employed
	• Construction (Design and Management) Regulations (NI) and how these apply to duty holders
	• Health and Safety Executive NI – role / enforcement / responsibilities and possible outcomes of inspection including:
	  ○ warning a duty holder
	  ○ Improvement notice
	  ○ Prohibition notice
	  ○ Caution or Prosecution
	• COSHH regulations and how they should be implemented in relation to the plumbing industry
	• Control of Asbestos Regulation (NI) and how they should be implemented in relation to the plumbing industry
	• Types of asbestos including:
	  ○ Chrysotile
	  ○ Amosite
	  ○ Crocidolite
	• RIDDOR regulations (NI)
	• Accident reporting procedures
	• Working at Heights regulations (NI) including:
	  ○ type of equipment used to permit working at heights in the industry with reference to appropriate suitability, safety checks and an overview of assembly procedures (this list is not exhaustive but is minimum):
	  ▪ step ladders
	  ▪ ladders
	  ▪ roof ladders
	  ▪ crawling boards
	  ▪ mobile platforms (MEWPS)
	  ▪ fixed & mobile scaffolds with edge boards and stabilisers where appropriate
	  ○ prevention measures / safety checks to reduce accidents resulting from falls from heights
	• Personal Protective Equipment Regulations (NI) including:
	  ○ Responsibilities of employer and employee in relation to PPE
	  ○ Suitability of PPE in relation to activity
	  ○ PPE provision its maintenance and reporting of defects

	• Manual Handling regulations, Electricity at Work regulations, Confined Space regulation, First Aid at Work regulations, Building Regulations approved documents relevant to industry • Legal and organisational documentation requirements

2. Be able to identify hazards and controls in a plumbing environment and carry out a risk assessment.	**Scope**
	
	Teaching will cover:
	
	• Potential hazards that may be encountered in the workplace and possible precautions including:
	  ○ slips and trips / falls
	  ○ electricity
	  ○ infection whilst working on sanitation
	  ○ eye injuries
	  ○ noise
	• Precautions required when working with:
	  ○ solvents and cleaning agents
	  ○ jointing compounds and fluxes
	  ○ sealants
	• Site safety signs
	• Hazards associated with heat producing equipment including:
	  ○ safe assembly, storage, transportation, use and disposal
	• Safe electrical isolation
	• Safe lifting techniques
	• Tool box talks
	• Risk assessment - the five steps used to produce a risk assessment and when the law requires a risk assessment
	• Relationship between a Method statement and Risk assessment
	• Plumbing tools their safe use and storage

3. Understand the reporting procedures for accidents and emergencies at work.	**Scope** Teaching will cover: • RIDDOR including the use of the HSENI RIDDOR booklet (NI) • HSENI online RIDDOR reporting tool

4. Be able to use access equipment and work safely at heights.	**Scope** Teaching will cover: • Classifications of ladders including manufactured standards • Possible risks when working at heights • Correct selection process of access equipment, its safe use and storage

5. Be able to use PPE appropriately within the plumbing industry.	**Scope**
	
	Teaching will cover:
	
	• Safe use of PPE including:
	  ○ hard hat
	  ○ eye protection
	  ○ gloves
	  ○ ear defenders
	• PPE maintenance checks and storage

6. Be aware of fire risks and associated prevention strategies in the plumbing industry.	**Scope** Teaching will cover: • Sources of ignition when working with heat producing apparatus used in plumbing operations and procedures to reduce risks • Alternative pipe jointing methods used that eliminate the risk of fire • role of the responsible person and the elements within a fire risk assessment • Fire safety procedures • Fire extinguishers and appropriate use

Title	Plumbing Industry Processes, Techniques and Principles
Level	Two
Credit Value	10
Guided Learning Hours (GLH)	80
OCN NI Unit Code	CBG200
Unit Reference No	K/650/7185
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to understand and demonstrate key processes, techniques and principles used within the plumbing industry.	

Learning Outcomes	Assessment Criteria
1. Be able to identify and use plumbing hand and power tools safely.	1.1. Describe how to safely use and maintain the following hand and power tools: a) screwdrivers b) hammers c) chisels d) grips e) wrenches f) spanners g) spirit levels h) manual pipe threaders i) pipe cutters j) hand saws k) pliers l) bending tools m) power drills n) drill bits o) circular saws p) jigsaws q) portable pipe threading machines r) hydraulic machine benders s) portable pipe freezing kit 1.2. Use the following hand and power tools to carry out work on plumbing and heating systems: a) screwdrivers b) hammers c) chisels d) grips e) wrenches f) spanners g) spirit levels h) manual pipe threaders i) pipe cutters j) hand saws k) pliers l) bending tools m) power drills n) drill bits o) portable pipe threading machines p) hydraulic machine benders q) portable pipe freezing kit
2. Know the types of domestic plumbing and heating pipework and their jointing principles.	2.1. Identify and describe the following: a) pipework materials and sizes used in domestic plumbing and heating work b) common methods of jointing new hot and cold-water pipes c) general fitting types used in dwellings d) methods of jointing pipework used in dwellings e) methods of bending pipework used in dwellings

3. Know common fixings for domestic plumbing and heating pipework and components.	3.1. Illustrate the process for measuring and marking out for fixings to pipework and plumbing and heating components. 3.2. Describe common plumbing fixing devices. 3.3. Describe different clip and bracket types for domestic plumbing and heating work.
4. Understand the installation techniques and requirements of domestic plumbing and heating pipework.	4.1. Describe the methods of installing domestic plumbing and heating pipework. 4.2. Describe how to select pipework materials and fittings from plans and drawings.
5. Understand the standard units of measurement used in the mechanical services industry.	5.1. Describe with examples the internationally recognised (SI) standard units of measurement used in the mechanical services industry.
6. Understand the properties and principal applications of gasses used in the mechanical services industry.	6.1. Describe the properties and principal applications of gasses used in the mechanical services industry.
7. Understand the relationship between energy, heat and power in the mechanical services industry.	7.1. Summarise the relationship between the Celsius and Kelvin temperature scales. 7.2. Describe what is meant by the terms latent and sensible heat as they apply to liquids and gases. 7.3. Illustrate the methods of heat transfer. 7.4. Illustrate how units of energy and heat are related and derived. 7.5. Calculate heat, energy, power and temperature calculations. 7.6. Calculate the quantity of power and heat energy required to raise the temperature of a substance.
8. Know the principles of force and pressure and their application in the mechanical services industry.	8.1. Describe how units of force and pressure are derived from SI units. 8.2. Describe the application and use of units of measurement of pressure and flow rate. 8.3. Calculate force and pressure calculations. 8.4. Illustrate the relationship between velocity, pressure and flow rate in systems. 8.5. Describe why pipework restricts the flow of liquids and gases.
9. Know the principles of electricity in the mechanical services industry.	9.1. Describe the basic principles of electron flow theory. 9.2. Describe the purpose and application of simple units of electrical measurement. 9.3. Calculate electrical calculations for different mechanical services. 9.4. Describe the requirements for earthing of electrical circuits.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Plumbing Industry Processes, Techniques and Principles
1. Be able to identify and use plumbing hand and power tools safely.	**Scope** Teaching will cover: • Choosing the correct hand tool and their appropriate use within the industry • Hand and power tool appropriate PPE requirements • Importance of following any manufacturers related instructions and safety guidelines • Safe handling and storage of tools and equipment • Waste Electrical and Electronic Equipment (WEEE) regulations - safe disposal of power tools • Correct use of hand and power tools • Regular maintenance requirements to ensure tools are safe to use and prolong their lifespan

2. Know the types of domestic plumbing and heating pipework and their jointing principles.	**Scope**
	
	Teaching will cover:
	
	• Pipework materials used within the industry and common diameters
	• Environmental considerations of pipework materials
	• PPE safety requirement depending on type:
	  ○ copper: and grades
	  ○ plastic (PVCu, MuPVC, MDPE)
	  ○ composite
	  ○ low carbon mild steel
	  ○ stainless steel
	  ○ galvanised
	• Fitting identification (for ordering purposes)
	• Jointing principles and techniques:
	  ○ soldering of copper pipe/fittings and crimped fittings procedures
	  ○ push fittings (to include sanitation fittings)
	  ○ compression fittings (include MDPE & flared)
	  ○ mechanical / threaded fittings and jointing compounds necessary
	  ○ solvent weld fittings (sanitation) and safety considerations
	• Tools and equipment used to bend various types of pipe
	• Their parts and any routine checks and maintenance requirements, safety considerations with each including manual handling guidance
	• Mathematical procedures to determine required pipe lengths when bending

3. Know common fixings for domestic plumbing and heating pipework and components.	**Scope**
	
	Teaching will cover:
	
	• Common fixings/clips as minimum:
	  ○ Masonry
	  ○ Plasterboard
	  ○ Timber

	• Fixings/clips advantages and disadvantages in relation to load carrying, interior and exterior use • Relevant regulations and guidance on clip spacing
4. Understand the installation techniques and requirements of domestic plumbing and heating pipework.	**Scope** Teaching will cover: • Site preparation prior to installing pipework: ○ identify pipe runs, cabling techniques ○ pipework notching and drilling in joists include Technical Booklet D (NI) building regs Flooring construction types and the safety measures to take when working with them • Procedures for removing/lifting flooring for pipework installation • Use drawings and specifications to identify pipework and components by symbols
5. Understand the standard units of measurement used in the mechanical services industry.	**Scope** Teaching will cover: • SI system of measurement benefits, base units and conversions • The use of a scale rule
6. Understand the properties and principal applications of gasses used in the mechanical services industry.	**Scope** Teaching will cover: • Gasses encountered within the industry: ○ safety compliance ○ relevant legislation ○ safe moving and storage • Brief overview of Gas safety regulations
7. Understand the relationship between energy, heat and power in the mechanical services industry.	**Scope** Teaching will cover: • Conduction, Convection and Radiation • Celsius and Kelvin on the temperature scale: ○ convert to each form of measurement • Matter change due to temperature change: ○ Sensible Heat Transfer ○ Latent Heat • Calculations used in heat, energy, power and temperature in relation to the industry
8. Know the principles of force and pressure and their application in the mechanical services industry.	**Scope** Teaching will cover: • Velocity, Acceleration, Flow rate, Force, Pressure, Stress • Static pressure, Dynamic pressure, Atmospheric pressure • Pressure - kPa, Bar / Millibar, Meters head • Flow rate – m3/s, L/s, Kg/s

	• Increasing and reducing pressure, increasing and reducing pipe size • Bernoulli effect • Different pipework materials internal surfaces, changes of pipework directions, length, diameters in relation to restrictions
9. Know the principles of electricity in the mechanical services industry.	**scope** Teaching will cover: • Molecules, atoms • Conductors, insulators • Voltage, amperage, resistance and power • Direct current, alternating current • Ohm's law • Consumer unit, fuse, residual current device • Inadequate earthing – electric shock – electrical faults • Equipotential bonding • Temporary bonding

Title	Installing and Maintaining Cold Water Pipework Systems
Level	Two
Credit Value	9
Guided Learning Hours (GLH)	75
OCN NI Unit Code	CBG201
Unit Reference No	L/650/7186
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to demonstrate the skills involved in the installation and commissioning of a cold water system.	

Learning Outcomes	Assessment Criteria
1. Know different types of cold water supply route to dwellings.	1.1. Describe the two main types of cold water supply to dwellings. 1.2. Describe the mains water treatment process and typical mains water distribution systems from treatment works to dwellings.
2. Know the types of cold water systems and their layout requirements.	2.1. Illustrate cold water system pipework features between the water undertaker's main and the main internal stop valve into dwellings. 2.2. Identify the type of cold water systems from different layout diagrams. 2.3. Identify the factors which influence the selection of cold-water systems for dwellings. 2.4. Describe typical pipe sizes used in cold water systems in dwellings. 2.5. Describe factors that can lead to backflow from cold water outlets and equipment in dwellings. 2.6. Identify standard backflow prevention devices that are used in cold water systems in dwellings and their appliances. 2.7. Describe the working principles of cold-water system components. 2.8. Identify the system layout features for cold water storage cisterns (CWSC).
3. Understand site preparation requirements for cold water systems and components.	3.1. Describe the sources of information which may be used when preparing to undertake work on cold water systems. 3.2. Describe the necessary building fabric preparatory work required to be undertaken to install, decommission or maintain cold water systems and components. 3.3. Describe the protection measures required to the building fabric or customer property, during and on completion of work on cold water systems and components. 3.4. Identify the pipework materials and fittings required to complete work on cold water systems. 3.5. Identify hand and power tools required to complete work on cold water systems and components. 3.6. Describe the necessary safety checks to be carried out before commencing work on cold water systems and components.

4. Be able to install cold water systems and components.	4.1. Describe how to take readings of the incoming water supply pressure and flow rate. 4.2. Identify suitable methods of connecting cold water system supply pipework to incoming service pipework. 4.3. Assess the positioning requirements of components in cold water systems. 4.4. Demonstrate how to measure, mark out and drill plastic storage cisterns to receive pipework connections. 4.5. Demonstrate how to make pipework connections to storage cisterns. 4.6. Demonstrate the positioning and fixing requirements for cold water system pipework and components. 4.7. Install and join cold water pipework components in copper with capillary soldered and compression fittings. 4.8. Demonstrate how to position, fix, and connect pipework to appliance outlets. 4.9. Identify suitable methods of making new pipework connections into existing cold water system pipework. 4.10. Assess the insulation requirements of cold water system components. 4.11. Ensure that cold water systems or components cannot be brought into operation by the end user before the work has been fully completed.
5. Be able to carry out inspection and soundness testing on cold water systems and components.	5.1. Demonstrate the checks to be carried out during a visual inspection of a cold water system to confirm that it is ready to be filled with water. 5.2. Fill cold water pipework with water at normal operating pressure and check for leakage. 5.3. Carry out a soundness test to industry requirements on cold water systems pipework and components. 5.4. Flush the system with wholesome water on completion of soundness testing.
6. Be able to service and maintain cold water systems and components.	6.1. Demonstrate how to use manufacturer instructions and job maintenance schedules for routine checks and periodic servicing requirements of cold water system components. 6.2. Carry out repairs to defects in cold water system components. 6.3. Complete the required details contained in a simple maintenance record for a cold water system.
7. Be able to carry out the decommissioning requirements of cold water systems and components.	7.1. Describe the information to be provided to others before decommissioning work takes place. 7.2. Describe how to temporarily decommission cold water system components and connecting pipework systems. 7.3. Outline the methods used during the decommissioning process to prevent the end-user from operating cold water system components.

	7.4. Carry out temporary decommissioning of cold water system components and connecting pipework systems ensuring the end-user is informed appropriately. 7.5. Ensure that the decommissioning procedures carried out in AC 7.4 prevent the end-user from operating cold water system components.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Installing and Maintaining Cold Water Pipework Systems

1. Know different types of cold water supply route to dwellings.	**Scope**
	
	Teaching will cover:
	
	• The rainwater cycle
	• Sources of water:
	  ○ Deep and Shallow Well
	  ○ Borehole
	  ○ Borehole & Aquifer
	  ○ River
	  ○ Spring
	• Water PH level and hard water
	• Water treatment:
	  ○ Sedimentation, Filtration. Sterilisation
	  ○ UV and Ionized water
	• Scale reduction
	• Water recycling

2. Know the types of cold water systems and their layout requirements.	**Scope**
	
	Teaching will cover:
	
	• Water distribution:
	  ○ gravity and pumped
	  ○ trunk main network distribution
	  ○ single dwelling and multi-storey building water main arrangements and pipe diameters
	  ○ suitable connection methods to trunk mains
	• Water supply regulations NI compliance and backflow prevention:
	  ○ fluid categories
	  ○ air gaps and mechanical backflow prevention devices
	• Water main point of entry to a dwelling
	• Direct and Indirect methods of cold water supply within a dwelling with standard pipe diameters, valve positions and typical pipework routes
	• Types of cold water storage cisterns and their material types
	• Recommended cold water only and combined cistern capacities
	• Positioning, components, inlet and outlet requirements and insulation of C.W.S cisterns in relation to the water supply regulations NI
	• Linking C.W.S cisterns

3. Understand site preparation requirements for cold water systems and components.	**Scope** Teaching will cover: • C.W.S. Manufacturer's instructions • Outlet design flow rates • Building/dwelling drawings in relation to safe and proper roof space access/ walkways, Building regulations • Water supply regulations NI compliance

		• Forms of customer agreement and walk round prior to commencement of works • Methods of protecting building surfaces and property • Specific risk assessments **Blended teaching from unit CBG200 Learning Outcome 4 embedding learning below:** • Procedures for removing/lifting flooring for pipework installation • Pipework notching and drilling in joists include Technical Booklet D (NI) building regulations
4.	Be able to install cold water systems and components.	**Scope** Teaching will cover: • Incoming mains flow rate and pressure readings • Manufacturer's recommended incoming pressure and flow rate and working pressure and flow rate • Water regulations approval scheme (W.R.A.S) components and fittings • C.W.S Cistern connections and positions and appropriate drilling method • Pipework in walls and passing through walls, fire stopping • Surface mounting pipework and the correct choice of pipework material and clipping • Frost protection **Blended teaching from unit CBG200 Learning Outcome 4 embedding learning below:** • Site preparation prior to installing pipework: ○ identify pipe runs, cabling techniques • Jointing principles and techniques
5.	Be able to carry out inspection and soundness testing on cold water systems and components.	**Scope** Teaching will cover: • Visual inspection points • Cold water pipework testing in accordance with British standard 806 • Commissioning procedures for cold water systems and components • Commissioning procedures for cold water storage cisterns

6.	Be able to service and maintain cold water systems and components.	**Scope**
		
		Teaching will cover:
		
		• Maintenance procedures in accordance with manufacturer's instructions and industry standards:
		  ○ taps and valves
		  ○ float operated valves
		  ○ syphons
		  ○ shower valve
		  ○ terminal fittings

	• Maintenance reports, planned and emergency maintenance
7. Be able to carry out the decommissioning requirements of cold water systems and components.	**Scope** Teaching will cover: • Temporary and permanent decommissioning procedures • Alternative system and appliance arrangements when decommissioning • Methods on time efficiencies when decommissioning • Procedures for communication pre, during and post decommissioning

Title	Planning and Preparing for the Installation of a Central Heating System
Level	Two
Credit Value	7
Guided Learning Hours (GLH)	60
OCN NI Unit Code	CBG202
Unit Reference No	M/650/7187
Learn Direct Code	TH3

Unit purpose and aim(s): This unit will enable the learner to understand the fundamentals of planning and preparing for the installation of a central heating system.

Learning Outcomes	Assessment Criteria
1. Understand central heating systems in dwellings.	1.1. Describe the purpose of central heating systems used in dwellings. 1.2. Describe different types of space heating systems used in dwellings.
2. Understand the principles of different types of central heating and their system layout requirements.	2.1. Describe the working principles of central heating systems. 2.2. Identify the type of central heating systems from different layout diagrams. 2.3. Assess the system layout features for filling and venting systems. 2.4. Describe the general operating principles of the following: a) solid fuel heat producing appliances b) oil-fired heat producing appliances c) gas-fired heat producing appliances d) heat emitters e) central heating control components f) devices used in central heating systems to minimise the build-up of sediment
3. Know the installation requirements of central heating systems and components.	3.1. Describe the procedures required to assemble valves to radiators and mount radiators on wall surfaces. 3.2. Describe the positioning and fixing requirements of central heating pipework and components. 3.3. Describe how expansion and contraction may be catered for in central heating pipework. 3.4. Identify clips and brackets appropriate to different central heating system pipework and industry recommended spacings. 3.5. Identify different joints for use in central heating system pipework. 3.6. Identify the positioning and fixing requirements of components in central heating systems. 3.7. Describe suitable methods for making new central heating pipework connections to components and into existing central heating circuits. 3.8. Identify how to position, fix and connect new central heating pipework to components. 3.9. Assess the insulation requirements of central heating system components.
4. Understand site preparation requirements for central heating systems and components.	4.1. Describe the sources of information which may be used when undertaking work on central heating systems. 4.2. Describe the necessary building fabric preparation work required to install,

	decommission or maintain central heating systems. 4.3. Describe the protection measures required to the building fabric or customer property, during and on completion of work on central heating systems and components.
5. Be able to carry out site preparation requirements for central heating systems and components.	5.1. Demonstrate the safety checks to be carried out to ensure the location is safe for work to proceed. 5.2. Identify personal protective equipment to be used when installing, decommissioning or maintaining central heating systems and components. 5.3. Carry out the appropriate protection measures to the building fabric or customer property, during and on completion of work on central heating systems and components. 5.4. Select the pipework materials and fittings required to complete work on central heating systems ensuring that they are not damaged. 5.5. Select the appropriate hand and power tools required to complete work on central heating systems. 5.6. Carry out preparatory work to install central heating systems.
6. Be able to install central heating systems and components to include panel radiators and pipework.	6.1. Demonstrate the correct assembly of heat emitter components. 6.2. Demonstrate how to make pipework fixings for at least two of the following: a) copper b) low carbon steel c) plastic d) crimped central heating system pipework 6.3. Demonstrate the positioning, fixing and connecting of new central heating pipework to component heat emitters. 6.4. Apply insulation to central heating system pipework. 6.5. Outline the methods used during the decommissioning process to prevent the end-user from operating central heating systems before work has been fully completed. 6.6. Carry out a soundness test to industry requirements on central heating systems pipework and components.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable	Record of observation Learner notes/written work Learner log

	learners to practise and apply skills and knowledge	
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Planning and Preparing for the Installation of a Central Heating System

1. Understand central heating systems in dwellings.	**Scope**
	
	Teaching will cover:
	
	• Customer needs and occupancy
	• Energy efficiency
	• Building layout
	• Fuel type and environmental impact
	• Open vented & sealed heating systems
	• Semi gravity systems:
	  ○ one pipe and two pipe systems
	• Fully pumped:
	  ○ three port and two port motorised valve systems
	• Heat emitter types, design standards and operating principles

2. Understand the principles of different types of central heating and their system layout requirements.	**Scope**
	
	Teaching will cover:
	
	• Controls, components incorporated, their system installation positions and operating principles within system types:
	  ○ open vented & sealed
	  ○ semi gravity
	  ○ microbore
	  ○ reverse return
	  ○ fully pumped – three port and two port motorised valve systems
	  ○ underfloor heating
	• Fuelled by:
	  ○ solid fuel
	  ○ oil fired
	  ○ gas fired
	• Primary open vent
	• Cold feed, open vent and circulating pump positions
	• Feed and expansion cistern type, function and capacities
	• Expansion vessel purpose, position and operation
	• Condensing and non-condensing boilers
	• Electrolytic corrosion, sedimentation:
	  ○ system additives
	  ○ preventative installed components within a system

3. Know the installation requirements of central heating systems and components.	**Scope**
	
	Teaching will cover:
	
	• System component, assembly and installation procedures to include as minimum:
	  ○ radiators
	  ○ F and E cisterns
	  ○ expansion vessel
	• Expansion joints and pipework expansion noise prevention

	• Pipework insulation type, use and u-values
	
	Blended teaching from unit CBG200 Learning Outcomes 2 and 3 embedding learning below:
	
	• Pipework materials used within the industry and common diameters:
	  ○ soldering of copper pipe/fittings and crimped fittings procedures
	  ○ push fittings
	  ○ compression fittings (include flared)
	  ○ mechanical / threaded fittings and jointing compounds necessary
	• Common fixings/clips as minimum:
	  ○ masonry
	  ○ plasterboard
	  ○ timber
	• Fixings/clips in relation to load carrying, interior and exterior use
	• Relevant regulations and guidance on clip spacing

4. Understand site preparation requirements for central heating systems and components.	**Scope**
	
	Teaching will cover:
	
	• Legislation:
	  ○ Building Regulations, NI Technical Booklet L, F1 and F2
	  ○ Part L UK Approved Documentation
	  ○ Domestic Building Services Compliance Guide
	  ○ Building Control Approvals
	
	Blended teaching from unit CBG200 Learning Outcome 4 embedding learning below:
	
	• Site preparation prior to installing pipework:
	  ○ identify pipe runs, cabling techniques

5. Be able to carry out site preparation requirements for central heating systems and components.	**Scope** Teaching will cover: • Specific risk assessments • Methods of protecting building surfaces and property • Forms of customer agreement and walk round prior to commencement of works
6. Be able to install central heating systems and components to include panel radiators and pipework	**Scope** Teaching will cover: • System component, assembly of radiators • Pipework fixings techniques for: ○ copper, low carbon mild steel, plastic and crimped • Techniques for the connection of central heating pipework to heat emitters • Temporary & permanent decommissioning procedures to include electrical isolation process • Visual inspection points

	• Open vented and sealed test pressures • Open vented and sealed filling procedure • Balancing system heat emitters

Title	Installing Underfloor Heating Systems
Level	Two
Credit Value	7
Guided Learning Hours (GLH)	60
OCN NI Unit Code	CBG203
Unit Reference No	R/650/7188
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to install an underfloor heating system to include low temperature heat source.	

Learning Outcomes	Assessment Criteria
1. Be able to install central heating systems and components including an underfloor heating installation.	1.1. Demonstrate the correct assembly of underfloor manifold components. 1.2. Demonstrate how to make pipework fixings to underfloor heating manifold and low temperature heat source. 1.3. Demonstrate the positioning, fixing, and connecting of new central heating pipework to flooring grid and manifold. 1.4. Apply insulation to central heating system pipework. 1.5. Demonstrate how central heating components and pipework systems cannot be brought into operation by the end user before the work has been fully completed.
2. Be able to apply the service and maintenance requirements of central heating systems and components, to include an underfloor heating installation.	2.1. Demonstrate how to use manufacturer instructions and job maintenance schedules for routine checks and periodic servicing requirements of central heating systems components. 2.2. Identify operation adjustment system filling and venting components. 2.3. Carry out the procedures for dealing with defects and undertaking repairs in central heating components and pipework. 2.4. Complete the required details contained on a maintenance record for central heating systems.
3. Understand the decommissioning requirements of central heating systems and components.	3.1. Describe the information to be provided to others before decommissioning work takes place including working methods that may reduce the periods of decommissioning. 3.2. Describe how to temporarily decommission central heating and connecting pipework systems. 3.3. Describe the work sequences for permanently decommissioning central heating and pipework systems. 3.4. Outline the procedures for safely draining and disposing of central heating system contents. 3.5. Outline the methods used during the decommissioning process to prevent the end-user from operating the heating system.
4. Be able to decommission central heating systems and components.	4.1. Demonstrate how to advise appropriate persons before central heating components or pipework are isolated to undertake work. 4.2. Carry out temporary decommissioning of central heating system components and connecting pipework systems.

	4.3. Ensure that the decommissioning procedures carried out in AC 4.2 prevent the end-user from operating the heating system.
5. Demonstrate how to inspect and soundness test central heating systems and components.	5.1. Follow a visual inspection of a central heating system to confirm that it is ready to be filled with water. 5.2. Demonstrate how to fill central heating systems with water at normal operating pressure and check for leakage. 5.3. Apply a soundness test to industry requirements on central heating systems pipework and components.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Installing Underfloor Heating Systems

1. Be able to install central heating systems and components including an underfloor heating installation.	**Scope**
	
	Teaching will cover:
	
	• Legislation:
	  ○ Part F1 and F2 Northern Ireland Technical booklets
	  ○ Part L UK Approved documentation
	  ○ Domestic Building Services Compliance Guidance
	  ○ Controls and space heating zones
	• Current floor U-Values in relation to underfloor heating applications reference building regulations and BS EN 1264
	• Types of Insulation boards used in conjunction with underfloor heating *(this list is not exhaustive but is minimum)*:
	  ○ XPS
	  ○ EPS
	  ○ PIR
	• Underfloor heating heat distribution principles
	• Appropriate floor screeds and coverings
	• Advantages and disadvantages of underfloor heating in a dwelling
	• Efficient heating sources to complement underfloor heating
	• Pipework configuration/patterns used in installation of underfloor heating, pipework material and fixing methods
	• Installation processes of work carried out on different floor types
	• Installation technique of at least one underfloor heating circuit, manifold and associated components
	• Temporary and permanent decommissioning procedures to include electrical isolation process

2. Be able to apply the service and maintenance requirements of central heating systems and components, to include an underfloor heating installation.	**Scope**
	
	Teaching will cover:
	
	• Manufacturer's warranty and its relationship to a standard of benchmarking include in teaching as minimum
	  ○ Manufacturer Service and Maintenance Record
	  ○ Building Control Certificate of Completion / Compliance Certificates
	• Power flushing procedures
	• Maintenance procedures in accordance with manufacturer's instructions and industry standards
	  ○ System pressure check
	  ○ Pump operations
	  ○ Visual check of water colour in underfloor manifold
	  ○ Central heating control check to include underfloor heating zone operation
	
	Blended teaching from unit CBG202 Learning Outcomes 2 and 6 embedding learning below:
	
	• Magnetic filters, central heating inhibitors and cleaners

	• Correct filling and venting procedures open vented, sealed systems and underfloor heating loops
3. Understand the decommissioning requirements of central heating systems and components.	**Scope** Teaching will cover: • COSHH data sheets for inhibitors and cleaners • Alternative system and appliance arrangements when decommissioning • Methods to improve on time efficiencies when decommissioning • Procedures for communication pre, during and post decommissioning **Blended teaching from unit CBG202 Learning Outcome 6 embedding learning below:** • Temporary and permanent decommissioning procedures to include electrical isolation

4. Be able to decommission central heating systems and components.	**Scope**
	
	Teaching will cover:
	
	• Techniques / apparatus for:
	  ○ communication pre, during and post decommissioning
	  ○ temporary and permanent decommissioning
	  ○ alternative system and appliance arrangements

5. Demonstrate how to inspect and soundness test central heating systems and components.	**Scope**
	
	Teaching will cover:
	
	• Legislation soundness testing include:
	  ○ Water Supply (Water Fittings) NI Regulation
	  ○ BS8558
	  ○ BS EN 806
	  ○ BS EN 14336
	  ○ Manufacturer's instructions
	• Soundness test technique on plastic & copper pipe
	
	Blended teaching from unit CBG202 Learning Outcome 6 embedding learning below:
	
	• Visual inspection points
	• Open vented and sealed test pressures
	• Open vented and sealed filling procedure

Title	Installing and Maintaining an Open Vented Hot Water System
Level	Two
Credit Value	7
Guided Learning Hours (GLH)	60
OCN NI Unit Code	CBG204
Unit Reference No	T/650/7189
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to understand the fundamentals of hot water systems and processes involved with testing and commissioning.	

Learning Outcomes	Assessment Criteria
1. Understand different hot water systems and their layout requirements.	1.1. Describe factors to be considered when selecting a hot water system for use in a building. 1.2. Describe the layout requirements of hot water system components.
2. Understand centralised hot water storage systems.	2.1. Identify different pipe sizes used in centralised open vented hot water systems in dwellings and how they are installed. 2.2. Describe the system layout features for the open vent and cold feed pipes of primary and secondary open vented hot water circuits. 2.3. Describe the connection requirements for feed and expansion cisterns into open vented primary hot water circuits. 2.4. Describe the system layout features for plastic feed and expansion cisterns. 2.5. Identify different types and typical sizes of open vented storage cylinders used in hot water systems in dwellings.
3. Understand instantaneous, centralised and localised hot water storage systems.	3.1. Describe the system layout features for hot water heaters for centralised and localised systems. 3.2. Identify typical pipe sizes used with mains fed instantaneous hot water heaters and open vented point of use water heaters in dwellings. 3.3. Describe the need for temperature control of hot water systems. 3.4. Illustrate the system layout features for the installation of hot water components.
4. Understand different types of shower installations and booster pumps that support them.	4.1. Identify different shower valves used in a domestic installation. 4.2. Identify the process for installing and testing the system layout features of thermostatic and boosted shower units.
5. Be aware of different methods and the importance of adequate prevention of backflow and back siphonage.	5.1. Assess factors that may lead to backflow from hot water outlets and equipment in dwellings. 5.2. Identify standard backflow and back siphonage prevention devices that are used in hot water systems in dwellings supplying water to appliances. 5.3. Describe different backflow prevention devices and air gaps.
6. Be able to carry out different methods of testing and commissioning of a hot water system.	6.1. Carry out a visual inspection of a hot water system to confirm that it is ready to be filled with water. 6.2. Fill hot water pipework with water at normal operating pressure and check for leakage.

	6.3. Carry out a soundness test to industry requirements on hot water systems pipework and components. 6.4. Flush hot water systems and components. 6.5. Describe the actions that must be taken when inspection and testing reveal defects in hot water systems. 6.6. Complete a commissioning certificate to industry standard.
7. Be able to identify and rectify common faults which occur in hot water system components and pipework.	7.1. Describe the procedures for dealing with defects in hot water components and pipework. 7.2. Identify common faults and carry out repairs to defects in hot water system components.
8. Be able to carry out decommissioning and maintenance of hot water systems.	8.1. Describe the working methods that reduce the time periods during which hot water systems need to be isolated. 8.2. Describe the information that needs to be provided to others before decommissioning work takes place. 8.3. Describe how to temporarily decommission hot water system components and connecting pipework systems. 8.4. Illustrate the work sequences for permanently decommissioning hot water components and pipework systems. 8.5. Outline the methods used during the decommissioning process to prevent the end-user from operating hot water system components. 8.6. Describe how to advise appropriate persons before hot water components or pipework are isolated to undertake work. 8.7. Carry out temporary decommissioning of hot water system components and connecting pipework systems. 8.8. Assess that the decommissioning procedures carried out prevent the end-user from operating the hot water system components. 8.9. Use manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of system components. 8.10. Carry out routine checks on hot water components and pipework as part of a periodic maintenance programme. 8.11. Describe the procedures for dealing with defects in hot water components and pipework. 8.12. Outline the types of information to be provided on a maintenance record for hot water systems.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Installing and Maintaining an Open Vented Hot Water System

1. Understand different hot water systems and their layout requirements.	**Scope**
	
	Teaching will cover:
	
	• Legislation:
	  ○ Building Regulations, NI Technical Booklet P, F1, F2
	  ○ Water Supply Regulation NI
	  ○ British standard EN 806 Parts 1-5
	  ○ Domestic Building Services Compliance Guide
	  ○ Benchmark
	• Customer needs and occupancy
	• Energy efficiency
	• Building layout
	• Environmental impact
	• Storage type and location
	• Pressure and flow rates
	• Capacities of storage and feed cistern
	• Open vented indirect and direct double feed and single feed hot water storage systems
	• Cylinder positioning and support
	• Secondary circulation
	• Hot water heat recovery, cylinder coils
	• Cylinder insulation and grades
	• Sacrificial anodes
	• Valve positions
	• Backflow prevention
	• Immersion heaters
	• Thermostatic mixing valves

2. Understand centralised hot water storage systems.	**Scope** Teaching will cover: • Centralised storage and instantaneous hot water systems • Open vented combination cylinders • Primary and secondary water • Open vent pipe purpose, diameter, height and parasitic circulation • Cold feed pipe cistern connection, cylinder connection and position/diameters • Pipework materials • Cylinder capacities, manufactured material, vertical and horizontal cylinders • Feed and expansion cistern pipe diameters and system connection points • Hot water stratification
3. Understand instantaneous, centralised and localised hot water storage systems.	**Scope** Teaching will cover: • Combined primary storage units, instantaneous multipoint and single point water heaters

	• Expansion integration in localised water heaters to include their controls and fittings • Common pipe material, diameters and capacities in accordance with regulations and manufacturer's instructions
4. Understand different types of shower installations and booster pumps that support them.	**Scope** Teaching will cover: • Electric and thermostatic showers • Cistern head height • Positive and negative head shower pumps: ○ twin and single impeller • Balanced and unbalanced supplies • Cistern fed supply • Hot water distribution to shower pipework connections layout and fittings/components
5. Be aware of different methods and the importance of adequate prevention of backflow and back siphonage.	**Scope** Teaching will cover: • Appliances / connections on a hot water system that pose a risk of backflow or back siphonage • Hot water fluid category risk • Appropriate backflow prevention devices and air gaps
6. Be able to carry out different methods of testing and commissioning of a hot water system.	**Scope** Teaching will cover: • Cylinder benchmark • Hot water system isolation points **Blended teaching from unit CBG201 Learning Outcome 5 embedding learning below:** • Visual inspection points • Hot water pipework testing in accordance with British Standard 806 • Commissioning procedures for hot water systems and components

7. Be able to identify and rectify common faults which occur in hot water system components and pipework.	**Scope**
	
	Teaching will cover:
	
	• Procedure to notify appropriate person of defects and defect rectification
	• Common routine maintenance schedule of components and fittings:
	  ○ taps and valves
	  ○ shower valve
	  ○ thermostatic mixing valve
	  ○ thermostats controls and devices (temperatures)
	  ○ airlocks
	  ○ expansion of pipework and termination
	• Emergency maintenance procedures

8. Be able to carry out decommissioning and maintenance of hot water systems.	**Scope** Teaching will cover: • Maintenance procedures in accordance with manufacturer's instructions and industry standards • Temporary and permanent decommissioning procedures including safe electrical isolation • Alternative system and appliance arrangements when decommissioning • Methods on time efficiencies when decommissioning • Procedures for communication pre, during and post decommissioning

Title	Sustainability in the Plumbing Industry
Level	Two
Credit Value	2
Guided Learning Hours (GLH)	15
OCN NI Unit Code	CBG205
Unit Reference No	D/650/7190
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to gain an understanding of the importance of sustainability in the plumbing industry.	

Learning Outcomes	Assessment Criteria
1. Know the legislation and standards associated with sustainability within the plumbing industry.	1.1. Describe key sustainability legislation and standards within the plumbing industry identifying who is responsible for energy conservation and the methods used to reduce waste.
2. Be aware of the importance of the operating principles for different sustainable heat sources within the plumbing industry.	2.1. Describe the importance of the operating principles for different heat sources within the plumbing industry including handover procedures to the end user.
3. Understand how low carbon green technologies are used to reduce energy consumption within the plumbing industry.	3.1. Compare at least three different types of green technologies used in modern properties and how they may be used to reduce energy consumption within the plumbing industry.
4. Understand different types of insulation available within the plumbing industry.	4.1. Compare at least three different types of insulation within the plumbing industry including strategies to protect against overheating.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary

E-assessment	The use of information technology to assess learners' work Electronic portfolio E-tests	Electronic portfolio E-tests

Learning Outcome	Unit Content - Sustainability in the Plumbing Industry

1. Know the legislation and standards associated with sustainability within the plumbing industry.	**Scope**
	
	Teaching will cover:
	
	• Legislation:
	  ○ Part F1 and F2 Northern Ireland technical booklets
	  ○ Part L UK Approved documentation
	  ○ Energy performance certificate (EPC)
	  ○ Water supply Regulations NI
	  ○ Domestic building services compliance guide
	  ○ Seasonal efficiencies for domestic boilers in the UK (SEDBUK)
	• Construction waste management on site

2. Be aware of the importance of the operating principles for different sustainable heat sources within the plumbing industry.	**Scope**
	
	Teaching will cover:
	
	• Operating principles of:
	  ○ heat pump
	  ○ solar thermal
	  ○ micro combined heat and power
	  ○ biomass
	• System handover procedures and compliance forms
	
	Blended teaching from unit CBG202 Learning Outcome 2 embedding learning below:
	• Controls, components incorporated, their system installation positions and operating principles with and off system types
	  ○ open vented and sealed

3. Understand how low carbon green technologies are used to reduce energy consumption within the plumbing industry.	**Scope** Teaching will cover: • Renewable and fossil fuels environmental impacts • Renewable and fossil fuel system lifespan costing / savings • Renewable technologies as primary heat source environmental benefits

4. Understand different types of insulation available within the plumbing industry.	**Scope**
	
	Teaching will cover:
	
	• Manufacturer's insulation data sheets and applications
	
	Blended teaching from unit CBG203 Learning Outcome 1 embedding learning below:
	• Types of Insulation boards used in conjunction with underfloor heating (this list is not exhaustive but is minimum):
	  ○ XPS
	  ○ EPS
	  ○ PIR

Title	Installing and Maintaining Sanitary Systems
Level	Two
Credit Value	7
Guided Learning Hours (GLH)	60
OCN NI Unit Code	CBG206
Unit Reference No	F/650/7191
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to gain a knowledge of the principles and working practices associated with sanitary installation work at ground level.	

Learning Outcomes	Assessment Criteria
1. Know sanitary appliances and their operating principles within dwellings.	1.1. Describe different types of sanitary appliances and the purpose and operating principles of each.
2. Understand sanitary pipework and their system layout requirements within dwellings.	2.1. Identify different sanitary pipework systems and where they may be used. 2.2. Describe factors that lead to trap seal loss in sanitary pipework systems. 2.3. Describe the system layout features for discharge stacks including wetted and dry portion plumbing. 2.4. Compare system layout features for branch discharge pipework. 2.5. Describe the system layout features for stack ventilation including dry portion of the stack. 2.6. Describe the system layout features for systems and appliances located on the ground floor.
3. Understand site preparation requirements for sanitary appliances and pipework.	3.1. Describe the sources of information which may be used when preparing to undertake work on sanitary appliances and pipework systems including: a) drawings b) job specifications c) manufacturer instructions and specifications 3.2. Describe the necessary building fabric preparation work required to install, decommission or maintain sanitary appliances and pipework systems. 3.3. Describe the protection measures required to the building fabric or customer property, during and on completion of work on sanitary appliances and pipework systems. 3.4. Identify the pipework materials and fittings required to complete work on sanitary appliances and pipework systems. 3.5. Identify hand and power tools required to complete work on at least three different sanitary appliances and pipework systems. 3.6. Describe the necessary safety checks to be carried out before commencing sanitary appliance and pipework installation.

4. Know the assembly requirements for sanitary appliances and pipework.	4.1. Demonstrate how to assemble sanitary appliance fixtures and fittings. 4.2. Demonstrate how to make joints to sanitary pipework systems. 4.3. Demonstrate the positioning requirements of components in sanitary pipework systems. 4.4. Describe how to account for expansion and contraction in plastics pipework. 4.5. Identify suitable methods for making new plastic pipework connections. 4.6. Identify the suitability of below ground drainage systems to receive foul soil and wastewater. 4.7. Describe suitable methods for making new plastic pipework connections into existing soil and waste systems.
5. Be able to prepare and install sanitary appliances.	5.1. Demonstrate the preparatory work required to be undertaken to the building fabric and site prior to the installation of a given sanitary system taking appropriate building protection measures. 5.2. Install sanitary appliances completing the following: a) identifying and using appropriate tools b) ensuring the workplace is safe and free of hazards c) assembling sanitary fittings to industry standard d) assembling joints to industry standard e) assembling and positioning sanitaryware and fittings to industry standard 5.3. Describe the methods for making new plastic pipework connections into existing soil and waste systems including cast iron and plastic.
6. Be able to carry out inspection and air testing on sanitary appliances and pipework.	6.1. Demonstrate the checks to be carried out during a visual inspection of a sanitation system to confirm that it is ready to receive foul water. 6.2. Demonstrate how to carry out an air test on a sanitary pipework system to industry standards.
7. Be able to service and maintain sanitary systems and pipework.	7.1. Demonstrate how to use manufacturer instructions and job maintenance schedules to carry out routine checks and periodic servicing of sanitary pipework systems and components. 7.2. Carry out repairs to defects in sanitary system components.
8. Be able to carry out the decommissioning requirements of sanitary systems and components.	8.1. Describe the information to be provided to the end-user before decommissioning work takes place. 8.2. Describe how to temporarily decommission sanitary system components and connecting pipework systems. 8.3. Outline the methods used during the decommissioning process to prevent the end-user from operating sanitary system components.

	8.4. Carry out temporary decommissioning of sanitary system components and connecting pipework before commencing work ensuring end-user is informed appropriately. 8.5. Ensure that the decommissioning procedures carried out in AC 8.4 prevent the end-user from operating sanitary system components.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/ PBL assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Learning Outcome	Unit Content - Installing and Maintaining Sanitary Systems

1. Know sanitary appliances and their operating principles within dwellings.	**Scope**
	
	Teaching will cover:
	
	• Appliance types and operating principles:
	  ○ WCs and their cisterns
	  ○ wash hand basins
	  ○ sinks
	  ○ shower trays, wet rooms, pods
	  ○ baths
	  ○ urinals
	  ○ bidets
	• Appliance manufactured material types

2. Understand sanitary pipework and their system layout requirements within dwellings.	**Scope**
	
	Teaching will cover:
	
	• Primary ventilated stack
	• Ventilated stack
	• Secondary ventilated stack
	• Stub stack
	• Soil and vent pipe
	• Low level stack connections
	• Trap seal loss to include as minimum:
	  ○ self-siphonage
	  ○ induced siphonage
	  ○ capillary attraction
	• Methods of preventing trap seal loss
	• Prevention of cross flow
	• Soil stack branch connections heights and angles

3. Understand site preparation requirements for sanitary appliances and pipework.	**Scope**
	
	Teaching will cover:
	
	• Technical Booklet N NI
	• Document M UK
	• Appliance activity spacing:
	  ○ British Standard 6465-2 2017
	• Selection installation and maintenance:
	  ○ British Standard 6465-3 2020
	• Above ground drainage manufactures instructions
	• Specific risk assessments
	• Sanitary waste pipe fittings and components
	
	Blended teaching from unit CBG201 Learning Outcome 3 embedding learning below:
	• Methods of protecting building surfaces and property

4. Know the assembly requirements for sanitary appliances and pipework.	**Scope**
	
	Teaching will cover:
	
	• Dressing sanitaryware appliances and fixing
	• Manufacturer's pipework co-efficiency of expansion rates and recommended provision procedures
	• Bathroom layout spacing incorporating activity spacing
	• Below ground drainage:
	  ○ separate, combined and partially combined systems
	  ○ septic tanks
	  ○ cesspits
	  ○ soakaways

5. Be able to prepare and install sanitary appliances.	**Scope** Teaching will cover: • Site preparation techniques to include as minimum work area and safe access for installation • Specific risk assessment • Sanitary appliance installation techniques • Alternative pipework fittings used for retrofitting into various sanitary waste pipe material types
6. Be able to carry out inspection and air testing on sanitary appliances and pipework.	**Scope** Teaching will cover: • Visual inspection points • Sanitary system air test procedure and technique

7. Be able to service and maintain sanitary systems and pipework.	**Scope**
	
	Teaching will cover:
	
	• Maintenance procedures in accordance with manufacturer's instructions and industry standards and rectification techniques:
	  ○ sanitary appliances
	  ○ traps
	  ○ blockages

8. Be able to carry out the decommissioning requirements of sanitary systems and components.	**Scope** Teaching will cover: • Procedures for communication pre, during and post decommissioning • Temporary and permanent decommissioning procedures and techniques • Alternative system and appliance arrangements when decommissioning

Title	Practical Plumbing Project
Level	Two
Credit Value	4
Guided Learning Hours (GLH)	30
OCN NI Unit Code	CBG207
Unit Reference No	H/650/7192
Learn Direct Code	TH3
Unit purpose and aim(s): This unit will enable the learner to undertake a plumbing project demonstrating appropriate industry skills and knowledge.	

Learning Outcomes	Assessment Criteria
1. Be able to research, develop and present solutions for a plumbing project.	1.1. Research and develop a minimum of two solutions for a given plumbing project considering: a) types of material and costs b) health and safety considerations c) plumbing techniques and skills required 1.2. Present and evaluate the solutions identified in AC 1.1 including costs, timeframe and resources required.
2. Be able to carry out a plumbing project.	2.1. Carry out the plumbing solution justified in AC 1.2 to include the following: a) completion of a risk assessment b) completion of a project plan including timeframes c) appropriate use of tools and equipment required d) personal protective equipment required
3. Be able to assess completed plumbing project.	3.1. Assess own plumbing project carried out in AC 2.1 identifying possible areas for improvement and present findings on how the design met requirements.

Delivery Guidance

This unit must be delivered last and will simulate or be an 'on the job' activity. Learners will be given an opportunity to research the appropriate materials, tools and layouts which will be submitted through a pre-assessment report.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Practical demonstration/observation	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log

Learning Outcome	Unit Content - Practical Plumbing Project

1. Be able to research, develop and present solutions for a plumbing project.	**Scope**
	
	Teaching will cover:
	
	• Summary of previous system operating principles
	• Summary of risk assessment development
	• Preparing project documents for a pre-tender interview process:
	  ○ how a solution meets the client brief
	  ○ costings
	  ○ health and safety
	  ○ programme of works

2. Be able to carry out a plumbing project.	**Scope** Teaching will cover: • Summary of risk assessment development • Installation techniques of project solution • Operating principles of systems
3. Be able to assess completed plumbing project.	**Scope** Teaching will cover: • Model the process of evaluation • Provide feedback on the project

11. Quality Assurance of Centre Performance

11.1 Internal Assessment

When delivering and assessing this qualification, Centres must align with stakeholders' expectations and address learners' needs by implementing a practical and applied programme. Centres have the flexibility to customise programmes to meet local requirements and establish connections with local employers and the broader vocational sector.

The Assessor should work with the Internal Verifier to ensure that the assessment is planned in line with OCN NI requirements. Assessment Plans must be developed and approved by the Internal Verifier prior to the delivery of the qualification.

All units within this qualification must undergo internal assessment. Learners must provide evidence that they have appropriately met all assessment criteria required for that grade.

The assessment format for all units involves a task conducted after the delivery of the unit's content, or part of it, if multiple tasks are used. Tasks may exhibit in various forms, encompassing practical and written types. Please refer to 'OCN NI's Assessment Definitions Guide' for additional details.

A task constitutes a distinct activity completed independently by learners, separated from teaching, practice, exploration, and other activities guided by tutors. Tasks are assigned to learners with a specified start date, completion date, and explicit requirements for the evidence to be produced. Some tasks may include observed practical components and require diverse forms of evidence.

A valid assignment will enable a clear and formal assessment outcome, which meets the requirements of the assessment criteria. Assessment decisions are based on the specific assessment criteria given in each unit and set at each grade level. The way in which individual units are written provides a balance of assessment of understanding, practical skills and vocational attributes appropriate to the purpose of qualifications.

It is the Assessor's role to ensure that learners are appropriately prepared for assessment, this begins from induction onwards. Assessors should ensure that learners understand how assessment tasks are used to determine the award of credit, the importance of meeting assessment timelines, and that all learners work must be independently created, where source documents are used this should be appropriately referenced, learners should be aware of what would constitute plagiarism and the possible consequences.

When conducting the assessment, Assessors must ensure they do not provide direct input, instructions or specific feedback which may compromise the authenticity of the work submitted.

Once the Assessor has authenticated the learners work, they must transparently demonstrate the rationale behind their assessment decisions. Once a learner completes all assigned tasks for a unit, the Assessor will allocate a grade for the unit. Refer to the 'Unit Grading Matrix' for additional information on the grading process.

Once the Assessor has completed the assessment process for the task, the assessment decision is recorded formally, and feedback is provided to the learner. The feedback should show the learner the outcome of the assessment decision, how it was determined or where the criteria has been met, it may indicate to the learner why achievement of the assessment criteria has not been met. It must be clear to the learner that this Assessment outcome is subject to verification.

For further information on assessment practice, please see the 'OCN NI Centre Handbook'. Assessment Training is also available and can be booked through the OCN NI Website.

11.2 Internal Verification

The role of the Internal Verifier is to ensure appropriate internal quality assurance processes are carried out. The Internal Verifier must oversee that assessments are conducted in accordance with relevant OCN NI policies, regulations, and this specification.

The Internal Verifier must ensure assessments are fair, reliable, and uniform, thereby providing a consistent standard for all learners.

Internal Verifiers are required to provide constructive feedback to Assessors, identifying areas of strength and those that may require improvement. This feedback contributes to the ongoing professional development of Assessors.

Contributing to the standardisation of assessment practices within the Centre is an important function of this role. This entails aligning assessment methods, grading criteria, and decision-making processes to maintain fairness and equity.

Internal Verifiers will actively engage in the sampling and monitoring of assessments to ensure the consistency and accuracy of assessment decisions. This process helps identify trends, areas for improvement, and ensures the robustness of the overall assessment system.

For further information on internal verification practice, please see the 'OCN NI Centre Handbook'. Internal Verification Training is also available and can be booked through the OCN NI Website.

11.3 Documentation

For internal quality assurance processes to be effective, the internal assessment and internal verification team needs to keep effective records.

- The programme must have an assessment and internal verification plan. When producing a plan, they should consider:
    - the time required for training and standardisation activities
    - the time available to undertake teaching and carry out assessment,

- consider when learners may complete assessments and when quality assurance will take place
- the completion dates for different assessment tasks
- the date by which the assignment needs to be internally verified
- sampling strategies
- how to manage the assessment and verification of learners' work so that they can be given formal decisions promptly
- how resubmission opportunities can be scheduled.

The following documents are available from OCN NI and document templates can be found in the Centre Login section of the OCN NI website www.ocnni.org.uk:

- A1 – Learner Assessment Record per Learner
- A2 – Assessment Decision Form per Learner
- learner authentication declarations
- Records of any reasonable adjustments applied for and the outcome – please see 'OCN NI's Reasonable Adjustments and Special Consideration Policy' for further information
- M1 Internal Verification Sample Record
- M2 Feedback to Assessor
- Records of any complaints or appeals

11.4 External Quality Assurance

All OCN NI recognised centres are subject to External Quality Assurance. External quality assurance activities will be conducted to confirm continued compliance with the conditions of recognition, OCN NI terms and conditions and the requirements outlined within this qualification specification.

The External Quality Assurance is assigned by OCN NI. The External Quality Assurer will review the delivery and assessment of this qualification. This will include, but is not limited to, the review of a sample of assessment evidence and evidence of the internal verification of assessment and assessment decisions. This will form the basis of the External Quality Assurance report and will help OCN NI determine the Centres risk.

The role of the External Quality Assurer serves as an external overseer of assessment quality, working to uphold consistency, compliance, and continuous improvement within the assessment process. Their role is crucial in ensuring that assessments are valid, reliable, fair, and aligned with the required standards and regulations.

For further information on OCN NI Centre Assessments Standards Scrutiny (CASS) Strategy, please see the OCN NI Centre Handbook.

11.5 Standardisation

As a process, standardisation is designed to ensure consistency and promote good practice in understanding and the application of standards. Standardisation events:

- make qualified statements about the level of consistency in assessment across centres delivering a qualification
- make statements on the standard of evidence that is required to meet the assessment criteria for units in a qualification
- make recommendations on assessment practice
- produce advice and guidance for the assessment of units
- identify good practice in assessment and internal verification

Centres offering this qualification must carry out internal standardisation activities prior to the claim for certification.

Centres offering units of an OCN NI qualification must attend and contribute assessment materials and learner evidence for standardisation events if requested.

OCN NI will notify centres of the nature of sample evidence required for standardisation events (this will include assessment materials, learner evidence and relevant Assessor and Internal Verifier documentation). OCN NI will make standardisation summary reports available and correspond directly with centres regarding event outcomes.

12. Administration

12.1 Registration

A centre must register learners for this qualification within 90 days of commencement of the delivery of the programme.

For further information on learner registration please see the OCN NI Centre Handbook and the QuartzWeb Manual, available through the Centre Login section of the OCN NI website. Administration training is also available and can be booked through www.ocnni.org.uk.

12.2 Certification

Once all internal quality assurance activities have been successfully completed, the Centre can claim certification for the learner(s).

Certificates will be issued to centres within 20 working days from completion of a satisfactory external quality assurance activity, if appropriate, alternatively from the submission of an accurate and complete marksheet.

It is the responsibility of the centre to ensure that certificates received from OCN NI are held securely and distributed to learners promptly and securely.

For further information on the uploading of results please see the QuartzWeb Manual for guidance, administration training is also available and can be booked through OCN NI

12.3 Charges

OCN NI publishes all up-to-date qualification fees in its Fees and Invoicing Policy document. Further information can be found on the centre login area of the OCN NI website.

12.4 Equality, Fairness and Inclusion

OCN NI's are committed to ensuring all learners have an equal opportunity to access our qualifications and assessment, and that our qualifications are awarded in a way that is fair to every learner.

OCN NI is committed to making sure that:

- learners with a protected characteristic are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers

For information on reasonable adjustments and special considerations please see the OCN NI Centre Handbook and Reasonable Adjustments and Special Considerations Policy held in the back office of the OCN NI website.

12.5 Retention of Evidence

OCN NI has published guidance for centres on the retention of evidence. Details are provided in the OCN NI Centre Handbook and can be accessed via the OCN NI website.

OCN NI Level 2 Diploma in Plumbing Skills
Qualification Number: 610/2678/5

Operational start date: 15 May 2023
Operational end date: 30 April 2028
Certification end date: 30 April 2030

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12.6 Appendix 1 - Definition of OCN NI's Assessment Verbs

The following verbs are working definitions of those used in OCN NI assessments with examples of how they can be applied and used in different but equally valid contexts.

Verb	Definition	Example
Apply	Apply rules, procedures and/or conventions in regard to an activity showing skills and knowledge.	Apply your knowledge and/or practical skills to perform a task or solve a problem. This can be in the context of system installation activities, maintenance activities or a procedure used to perform equipment, component or sundries fitting and/or fixing.
Assess	Make a judgment in line with given criteria regarding one or each of a range of given things or information.	Assess the requirements of the given situation. The answer may include: • The option/s chosen from the range of pipework insulation available in regard to the correct type for the scenario, thickness or appropriate u-value • An appropriate position/s identified for system valves and/or components after a judgments has been made with reference to the industry standards and regulations
Calculate	To judge the number or amount of something.	To gain the correct result use mathematical procedures such as: • Area • Conversion factors/formula • Adding & multiplication • efficiency, size and weighting This will enable the correct purchase of equipment and components, system efficiency and basic safety measures.
Carry out	Perform a given task.	Carry out a task in line with industry standards procedures and regulations. Carry out a: • System soundness test in accordance with regulations • Maintenance tasks in line with manufacturer's instructions • Temporary decommissioning with reference to industry standards • A Plumbing solution after all H&S, design and specifications are in place

Compare	Make a judgment regarding the contrast between (positive and/or negative) two or more from a range of given things or information against each other in line with given criteria.	Compare the current systems and or components installed in the industry against a common denominator such as: • Particular green technology heat sources that can reduce energy • Branch connections on a soil stack compared to a scenario brief and the regulations
Complete	To finish a given task to the required criteria.	Complete all tasks in full in order to ensure all standards and regulations and are achieved and to establish a record of reliable evidence to support the work carried out such as: • System handovers • Maintenance tasks
Describe	To paint a full picture of a concept, process or thing in words.	Describe the key aspects of a posed question such as: • The H&S at work (NI) order 1978 employers and employees' responsibilities under this Write a brief description to use as means to conveying information or understanding such as: • Ensuring clarity on design information and specific requests • Working procedures to instruct others on Plumbing and Heating system operation or maintenance Describe specific documentation that needs to be completed for work related activities in the industry by identification and brief purpose.
Demonstrate	Undertake an activity with a system or process showing skills and knowledge in more than one area and/or context.	During an activity knowledge is guiding operational functions and practical skills are performed with specific practices in place such as: • Plumbing, Heating and Sanitation systems installed in conjunction with the correct PPE, tools and equipment in use
Ensure	Make sure, certain that an activity with a system or process has happened.	Ensure that after a procedure has been carried out in accordance with industry standards that it is a surety that it is correct such as: • Plumbing, Heating and Sanitation systems temporarily decommissioned cannot be brought back into operation by the end user

Fill	To make or become full and reach capacity.	To correctly add water to the Plumbing and Heating systems and components whilst undertaking soundness tests in accordance with the regulations and also fill the system with water for operationally purposes.
Follow	Adhere to rules, procedures and/or conventions in regard to an activity showing skills and knowledge in more than one area and /or contexts.	Follow a procedure such as: • Visual inspection prior to a system commissioning checking all joints are made, correctly tightened, pipe clipping is correct, valves are correct and that the system meets in general the regulations and standards
Flush	To cleanse by passing or directing water through.	On the hot and cold water systems using wholesome water as part of the commissioning process flush out the entire contents of system water to remove fluxes etc.
Identify	To select and list appropriate items from information that you have been given or collected.	Identify an answer, method or solution after an investigative process such as: • Different types of access equipment when work at heights depending on the height and work to be carried out • Risks when working at height and a method to prevent these • Pipework materials and fittings needed for the specific task/system completion and list them • Identify the plumbing, heating and sanitation systems used commonly in the industry to enable an informed system choice for a brief/scenario
Illustrate	Show a process or activity or portray information in graphic forms.	Produce a drawing/sketch/pictures with/or annotation of an activity or to offer visual understanding of a process or task such as installation heights for fixings of components such as radiators or sanitaryware. Methods of heat transfer such as convection, conduction, radiation.
Install	To place or fix (equipment or machinery) in position ready for use.	Install systems pipework and/or competent to industry standards and regulations to ensure they operate to their design function such as: • Plumbing systems and central heating pipework and components

Outline	To give general idea and overview without going into detail.	Outline by means of bullet points or brief statements such as: • Safety checks on equipment used to work at heights • Methods used to prevent the end user from operating a system that has been decommissioned
Present and evaluate	Introduce, display information or ideas to others for their consideration or understanding and to assess, appraise the value or quality through an analysis or judgement.	Prepare a presentation of specific information in the form of documents and/or visual format on a given scenario or brief for unit CBG207 such as: • Costings, system design and H&S requirements of the works to be carried out for the plumbing projects • Carryout an appraisal on this plumbing project contained in unit CBG207 after completion
Research and Develop	Identifying and collecting data or information about a subject and presenting it in a structured form. Research may be combined with other related verbs such as analyse and evaluate.	Using learned knowledge and in reference to a brief analyse systems used in plumbing and heating and choose an appropriate type which will match the brief. Develop a design of the system on the drawing provided in unit CBG207 in association with material costings and legislative H&S requirements.
Select	Choose in preference to others.	From a range select the appropriate items such as: • Pipework, materials and fittings required to complete a task of installing a radiator and connecting pipework, also the hand and power tools required
Summarise	A brief account giving the main points.	Summarise in a statement the relationship between Celsius and Kelvin temperature to include the main point of difference although they are similar.
Use	Operate a system or process showing skills and knowledge in more than one area and /or contexts and generally carried out on at least three occasions.	Use in a practical sense a piece of apparatus such as • Hand tools when carrying out the installation or maintenance of Plumbing and Heating system