REGULATED QUALIFICATION FRAMEWORK (RQF)
Qualification Specification

- **LCL Awards Level 2 Diploma in the Installation & Maintenance of Plumbing & Heating Systems 603/7341/6**

- **LCL Awards Level 2 NVQ Diploma in the Installation & Maintenance of Plumbing & Heating Systems 603/7342/8**

Objective

The objective of the Diploma qualification is to provide learners who are unable to access workplace practice to gain experience with the knowledge and skills to install and maintain plumbing and heating systems in an LCL Awards approved centre in accordance with legislation, regulations and industry standards.

The objective of the NVQ Diploma qualification is to provide learners, who are able to access workplace practice and gain experience, that they are competent in the installation and maintenance of plumbing and heating systems in an LCL Awards approved centre and in the workplace in accordance with legislation, regulations and industry standards.

Target Groups

The target group for the Diploma qualification are those learners who are;

- New entrants to the plumbing and heating sector who are preparing for employment in the sector.

The target group for the NVQ Diploma qualification are those learners who are;

- Either new entrants to the plumbing and heating sector who are preparing for employment in the sector or who are experienced plumbing and heating fitters seeking to obtain a qualification.

Both qualifications will prepare learners to progress to a qualification in a similar subject area which is at a higher level or one requiring more specific knowledge, understanding and skills.

1. Qualification Framework:

The qualification comprises of 12 mandatory Units and 1 optional Unit

Mandatory Units 1 - 12

Unit Title	Reference Number	Type of Unit	Level	Credit Rating
Building Services and Structures	LCL - P2001	Knowledge	2	2
Cold Water System Installation and Maintenance	LCL - P2002	Knowledge & Performance	2	5
Know and Apply Domestic Above Ground Drainage System Installation and Maintenance	LCL – P2003	Knowledge & Performance	2	6
Electrical Installation of Plumbing Systems and Components.	LCL - P2004	Knowledge & Performance	2	4
Energy, Waste and Water Conservation	LCL – P2005	Knowledge	2	2
Hand and Power Tools	LCL - P2006	Knowledge	2	1
Health and Safety in Installing and Maintaining Plumbing Systems	LCL - P2007	Knowledge	2	2
Hot Water Systems Installation & Maintenance	LCL - P2008	Knowledge & Performance	2	5
Plumbing Science, Principles and Practice	LCL - P2009	Knowledge	2	9
Water Supply Regulations and Water Byelaws	LCL - P2010	Knowledge	3	3
Central Heating Circuits	LCL - P2011	Knowledge & Performance	2	5
Working Practices in the Plumbing Sector *(Diploma route)*	LCL – P2012	Performance	2	1
Working Practices in the Plumbing Sector *(NVQ route)*			2	16
			Totals	45/61

Optional Unit (A18)

Unit Title	Reference Number	Type of Unit	Level	Credit Rating
Know and Apply Domestic Rainwater System Installation and Maintenance Techniques	LCL - P2013	Knowledge & Performance	2	4

Qualification Structure:

- **LCL Awards Level 2 Diploma in the Installation & Maintenance of Plumbing & Heating Systems**
- QAN (603/7341/6)
- The Guided Learning Hours (GLH) are 427 hours
- The Total Qualification Time (TQT) is 450 hours
- The total credit required to achieve the qualification is 45

- **LCL Awards Level 2 NVQ Diploma in the Installation & Maintenance of Plumbing & Heating Systems**
- QAN (603/7342/8)
- The Guided Learning Hours (GLH) are 585 hours
- The Total Qualification Time (TQT) is 608 hours
- The total credit required to achieve the qualification is 61

2. Unit Grading Structure:

The learner is required to successfully achieve a pass in all elements of the mandatory units for these qualifications to be awarded.

Any Learner undertaking the optional unit is required to successfully achieve a pass in all elements of the mandatory units in addition to the optional unit for the unit credit certificate to be awarded.

3. Unit Specification:

LCL-P2001 Building Services and Structures

Learning Outcome 01: The learner will know the types and characteristics of construction materials.

The learner will demonstrate knowledge of:

1.1 The types of metals;
- Pure metals.
- Ferrous metals.
- Non-ferrous metals.
- Alloys.

1.2 The properties of metals;
- Strength.
- Hardness.
- Ductility.
- Malleability.
- Conductivity.

1.3 Heat treatments and their effects on metals.
1.4The effects of corrosion on metals.
1.5The precautions taken to stop the effects of corrosion on metals.

Learning Outcome 02. The learner will know the construction methods used in domestic buildings.

The learner will demonstrate knowledge of:

2.1 The following building components;
- Damp proof courses.
- Brick/block Walls – exterior, load bearing.
- Partition Walls.
- Flooring types – concrete and wooden.
- Ceilings.
- Lintels.
- Wall plates.
- Roofing types- flat, traditional and trussed.
- Types of Roof tiling.

LCL- P2002 Cold Water System Installation and Maintenance

Learning Outcome 01. The learner will know the cold-water supply routes into buildings.

The learner will demonstrate knowledge of:

1.1 The key stages in the rainwater cycle.
1.2 The various water supply sources and the typical properties of water from those sources;
- Surface sources – lakes, reservoirs, rivers and streams
- Underground sources – deep and shallow wells, artesian wells, bore-holes, springs.

1.3 The two main types of water supply to buildings;
- Supply from a water undertaker's main
- Supply from a private source.

1.4 The mains water treatment process and typical mains water distribution system from treatment works to property.
1.5 The uses of cold water supplied to buildings;
- Wholesome water for domestic purposes - drinking, washing, food preparation
- Recycled water – WC flushing, water for outdoor use, clothes washing.

Learning Outcome 02. The learner will know the types of cold-water system and their layout requirements.

The learner will demonstrate knowledge of:

2.1 The cold-water system pipework features between the water undertaker's main and the main internal stop valve in buildings;
- Connection methods to the main
- Communication pipe
- Service pipe
- Main external stop valve and meter housing including surface mounted meter boxes (Ground breaker)
- Depth of external service pipework below ground level
- Correct methods of entry of the service pipework to a building.
- The positions for water service entries into buildings

2.2 The type of cold-water system from layout diagrams.
2.3 The factors which affect the selection of cold-water systems for buildings;
- Direct cold-water system
- Supplying a storage cistern
- Supplying a combination boiler

- Indirect cold-water system.

2.4 The typical pipe sizes used in cold water systems in buildings;
- Supply pipe
- Distributing pipe
- Service pipe

2.5 The factors that can lead to backflow from cold water outlets and equipment in buildings.

2.6 The standard backflow prevention devices that are used in cold water systems in buildings supplying water to appliances;
- Baths
- WCs
- Over the rim bidets
- Wash hand basins
- Sinks
- Mixer taps
- Outside taps
- Shower mixer valves/ instantaneous showers
- Refrigerators, washing machines and dishwashers.

2.7 The working principles of cold-water system components
- Stop valves
- Servicing valves
- Drain valves
- Float operated valves
- Terminal fittings
- Pillar taps
- Bib taps
- Mixer taps
- Ceramic disc taps
- Shower mixer valves
- Gravity
- Mains fed
- Water softeners
- Water filters
- Water conditioners
- Water meters
- Backflow prevention devices
- Simple air gap arrangements
- Double and single check valves
- Cold water storage cisterns
- Combined feed and expansion cisterns
- Reduced Pressure Zone (RPZ) valve
- Accumulators

2.8 The system layout features for protected plastic storage cisterns
- Typical cistern sizes for small buildings
- Warning pipe (overflow) arrangements
- Inlet/ outlet position
- Position of float operated valve
- Position of cistern vent
- Position of open vent pipe connection
- Requirement for a rigid close-fitting lid
- Service valve requirements
- Cistern base support requirements

- Clearance requirements around and above cisterns

2.9 The methods of linking cold water storage cisterns for use in buildings

Learning Outcome 03. The learner will know the site preparation techniques for cold water systems and components.

The learner will demonstrate knowledge of:

3.1 The sources of information required when undertaking work on cold water systems
- Statutory regulations
- Industry standards
- Manufacturer technical instructions.

3.2 The preparatory work required to be undertaken to the building fabric in order to install, decommission or maintain cold water systems and components.

3.3 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 The pipework materials and fittings required to complete work on cold water systems
- External water service pipework
- Internal water supply pipework.

3.5 The range of hand and power tools required to complete work on cold systems and components.

Learning Outcome 04. The learner will be able to apply site preparation techniques for cold water systems and components.

The learner will be able to:

4.1 Check the safety of the work location in order for the work to safely proceed
- Safe access and exit
- Immediate work location e.g., tripping hazards
- Appropriate risk assessments/ method statements are available.

4.2 Select and Wear Personal Protective Equipment appropriate to the installation, decommissioning or maintenance task being carried out.

4.3 Apply protection measures to the building fabric or customer property, during and on completion of work on cold water systems and components.

4.4 Select the pipework materials and fittings required to complete work on cold water systems ensuring that they are not damaged.

4.5 Select the hand and power tools required to complete work on cold water systems and components.

4.6 Carry out preparatory work in order to install cold water systems and components.

Learning Outcome 05. The learner will know the installation requirements of cold-water systems and components.

The learner will demonstrate knowledge of:

5.1 How to take readings of the incoming water supply pressure and flow rate.

5.2 The methods of connecting cold water system supply pipework to incoming service pipework
- Medium density polyethylene (MDPE)
- Copper
- Lead.

5.3 The positioning requirements of components in cold water systems;
- Supply stop valves

- Drain valves
- Water meters
- Water conditioning devices
- Service valves
- Backflow prevention devices.

5.4 How to measure, mark out and drill plastic storage cisterns to receive pipework connections.
5.5 How to make pipework connections to storage cisterns.
5.6 The positioning and fixing requirements for cold water system pipework and components;

- In suspended timber floors
- In solid floors
- Embedded in walls
- In areas of the building subject to frost
- That may be exposed to warming.

5.7 How to select clips and brackets appropriate to the cold-water system pipework and the recommended spacing's;

- Horizontally mounted pipework
- Vertically mounted pipework.

5.8 How to position, fix and connect new cold-water pipework to outlets

- Bath tap or shower mixer valve
- Wash hand basin tap
- Sink tap
- Combination boiler
- WC flushing cistern
- Cold water storage cistern.

5.9 The methods of making new pipework connections into existing cold water system pipework

- Copper
- Plastic
- Lead
- Galvanised steel.

5.10 The insulation requirements of cold-water system components

- Pipework sections
- Storage cisterns.

Learning Outcome 06. The learner will be able to install cold water systems and components.
The learner will be able to:

6.1 Use test instruments to take readings of the incoming water supply pressure and flow rate.
6.2 Connect cold water supply pipework to incoming service pipework

- MDPE to copper coupler
- Supply stop and drain valve.

6.3 Fabricate and joint pipework, fittings and components in copper with capillary soldered and mechanical fittings
6.4 Fabricate and joint pipework, fittings and components in plastic using push fit and mechanical fittings
6.5 Measure, mark out and drill plastic storage cisterns to receive pipework connections.
6.6 Make pipework connections to storage cisterns.
6.7 Make pipework fixings to copper pipework.
6.8 Position, fix and connect new cold-water pipework to outlets;

- Bath tap or shower mixer valve
- Wash hand basin tap
- Sink tap

- Combination boiler
- W.C flushing cistern
- Cold water storage cistern.

6.9 Apply insulation to cold water system components;
- Pipework sections
- Storage cisterns.

6.10 Demonstrate that cold water systems or components cannot be brought into operation by the end user before the work has been fully completed.

Learning Outcome 07. The learner will know the service and maintenance requirements of cold-water systems and components.

The learner will demonstrate knowledge of:

7.1 How to use manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of cold-water system components.

7.2 How to carry out routine checks on cold water system components as part of a periodic maintenance programme;
- Visual inspection of pipework for leakage and adequate support
- Effective operation of terminal fittings
- Effective operation of float operated valves
- Effective operation of stop and service valves
- Condition of protected cold water storage cistern.
- Charge pressure of expansion vessels and accumulators

7.3 The procedures for diagnosing and dealing with defects in cold water components and pipework;
- Cistern failure
- Incorrect support to cold water system pipework and storage cisterns
- Excessive noise in pipework systems
- Leakage of internal cold water system pipework and fittings
- Leakage from below ground cold water service pipework
- Leakage or ineffective operation of:
  - Terminal fittings
  - Float operated valves
  - Stop and service valves.

7.4 The types of information to be provided on a maintenance record for cold water systems.

Learning Outcome 08. The learner will be able to service and maintain cold water systems and components.

The learner will be able to:

8.1 Use manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of cold-water system components.

8.2 Carry out routine checks on cold water system components as part of a periodic maintenance programme
- Visual inspection of pipework for leakage and adequate support
- Effective operation of terminal fittings
- Effective operation of float operated valves
- Effective operation of stop and service valves
- Condition of protected cold water storage cistern.

8.3 Carry out repairs to defects in cold water system components

- Leakage of cold-water system pipework and fittings – repair to water-filled pipework
- Leakage or ineffective operation of -
- Terminal fittings
- Float operated valves
- Stop and service valves.

8.4 Complete a maintenance record for a cold-water system.

Learning Outcome 09. The learner will know the decommissioning requirements of cold water systems and components.

The learner will demonstrate knowledge of:

9.1 The working methods that reduce the time periods during which cold water systems need to be isolated.
9.2 The information that needs to be provided to other persons before decommissioning work takes place.
9.3 How to temporarily decommission cold water system components and connecting pipework systems.
9.4 Identify the work sequences for permanently decommissioning cold water system components.
9.5 Identify the methods used during the decommissioning process to prevent the end-user from operating cold water system components;

- Isolation of stop/ servicing valves
- Temporary capping of pipework sections
- Use of warning notices and signs.

Learning Outcome 10. The learner will be able to decommission cold water systems and components.

The learner will be able to:

10.1 Advise and seek authorisation from appropriate persons before cold water system components or pipework are isolated in order to undertake work.
10.2 Carry out temporary decommissioning of cold-water system components and connecting pipework systems.
10.3 Check to ensure that the decommissioning procedures carried out prevent the end-user from operating cold water system components.

Learning Outcome 11. The learner will know the inspection, commissioning, and soundness testing requirements of cold-water systems and components.

The learner will demonstrate knowledge of:

11.1 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.
11.2 How to fill cold water pipework with water at normal operating pressure and check for leakage.
11.3 How to carry out a soundness test to industry requirements on cold-water systems pipework and components.
11.4 The flushing procedure for cold water systems and components.
11.5 The actions that must be taken when inspection and testing reveals defects in cold-water systems

- Dealing with systems that do not meet correct installation requirements
- Remedial work associated with defective pipework bracketing

- Remedial work associated with leakage from pipework systems.

Learning Outcome 12. The learner will be able to inspect, commission and soundness test cold water systems and components.

The learner will be able to:

12.1 Carry out a visual inspection of a cold-water system to confirm that it is ready to be filled with water.
12.2 Fill cold water pipework with water at normal operating pressure and check for leakage.
12.3 Perform a soundness test to industry requirements on cold water systems pipework and components.
12.4 Flush the system with wholesome water on completion of soundness testing.

Learning Outcome 13. The learner will know the processes for fabricating and joining plumbing pipework and how to apply them.

The learner will demonstrate knowledge of:

13.1 The plumbing application of both R220 soft coils and R290 hard lengths of copper pipework.
13.2 The methods of jointing R220 soft coils and R290 hard lengths of copper pipework.
13.3 Types of clips/brackets suitable for R220 soft coils and R290 hard lengths of copper pipework.
13.4 The correct methods of bending low carbon steel (LCS).
13.5 Methods of jointing LCS pipework.
13.6 Types of clips/brackets suitable for LCS pipework.
13.7 The plumbing application of both Thermo plastics and Thermo-setting plastics.
13.8 Methods of jointing polypropylene pipework.
13.9 Types of clips/brackets suitable for polypropylene pipework.
13.10 The methods of jointing UPVC/ABS pipework.
13.11 The types of clips/brackets suitable for UPVC/ABS pipework.
13.12 The fabrication and joining of copper pipework:

- Copper (up to 28mm):
- R220 soft coils
- R290 hard lengths
- Types of fittings suitable for R220 soft coils and R290 hard lengths of copper pipework
- Jointing methods of R220 soft coils and R290 hard lengths of copper pipework
- Pipe clips/brackets for R220 soft coils and R290 hard lengths of copper pipework

13.13 The fabrication and joining of plastic pipework:

- Plastic pipe (up to 28mm):
- Polythene
- Polybutylene
- Polyethylene
- Polypropylene
- Types of fittings suitable for all types of plastic materials
- Jointing methods all types of plastic pipework.
- Pipe clips/brackets for all types of plastic pipework
- Plastic;
  - UPVC
  - ABS
- Types of fittings suitable for all types of plastic materials
  - Pipe clips/brackets for all types of plastic pipework
  - Jointing methods for all types of plastic pipework:

- Push fit joints
- Compression joints
- Ring seal joints
- Solvent weld joints

LCL – P2003 Domestic Above Ground Drainage System Installation and Maintenance

Learning Outcome 01: The learner will know the uses of sanitary appliances and their operating principles.

The learner will demonstrate knowledge of:

1.1. The purpose of sanitary appliances used in buildings.
1.2. The different types of sanitary appliances used in buildings.
1.3. The working principles of sanitary appliances;
- Conventional WCs (not macerators)
- Baths
- Bidets
- Wash hand basins
- Showers/cubicles
- Sinks (not waste disposal units)
- Macerators

Learning Outcome 02: The learner will know the types of sanitary pipework and system layout requirements.

The learner will demonstrate knowledge of:

2.1. The types of sanitary pipework system and where they may be used in buildings.
- Primary ventilated stack system
- Secondary ventilated stack system
- Ventilated branch discharge system.
- Stub stack system

2.2. The factors that lead to trap seal loss in sanitary pipework systems.
2.3. The system layout features for a discharge stack, in buildings up to 5 stories in height.
- Type of bend
- Proximity of low-level connections.

2.4. The system layout features for discharge stacks.
- Soil stack sizes based on WC outlet size
- Waste pipe sizes serving waste appliances only
- Use of bends in the wetted portion of the stack.

2.5. The system layout features for branch discharge pipework.
- Layout of unventilated and ventilated branch discharge pipework – maximum length of pipework and pipework gradient
- Sizes of branch discharge pipework for soil and waste appliances
- Use of traps and self-sealing valves in preventing noxious smells in buildings
- Methods of ventilating branch discharge pipework
- Methods of connecting multiple waste appliances to branch discharge pipework
- Methods of connecting branch discharge pipework into the main stack.

2.6. The system layout features for stack ventilation.
- Proximity of vent outlet to open-able windows
- Use of air admittance valves.

2.7. The system layout features for systems and appliances located on the ground floor.

- Stub stack systems
- Waste appliance connections to gullies
- Waste appliance connections direct to drain
- W.C connection direct to drain.

Learning Outcome 03: The learner will know site preparation techniques for sanitary appliances and connecting pipework systems.

The learner will demonstrate knowledge of:

3.1 The sources of information required when carrying out work on sanitary appliances and pipework systems.
- Statutory regulations
- Industry standards
- Manufacturers' technical instructions.

3.2. The preparatory work required to be carried out to the building fabric in order to install, decommission or maintain sanitary appliances and pipework systems.
3.3. 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. The pipework materials and fittings required to complete work on sanitary pipework systems.
3.5. The hand and power tools required to complete work on sanitary appliances and pipework systems.

Learning Outcome 04: The learner will be able to apply site preparation techniques for sanitary appliances and connecting pipework systems.

The learner will be able to:

4.1. Check the safety of the work location in order for the work to safely proceed.
- Safe access and exit
- Immediate work location e.g., tripping hazards
- Appropriate risk assessments/ method statements are available.

4.2. Wear Personal Protective Equipment relevant to the installation, decommissioning or maintenance task being carried out.
4.3. Apply protection measures to the building fabric or customer property, during and on completion of work on sanitary appliances and pipework systems.
4.4. Select the pipework materials and fittings required to complete work on sanitary pipework systems ensuring that they are not damaged.
4.5. Select the hand and power tools required to complete work on sanitary appliances and pipework systems.
4.6. Carry out preparatory work in order to install sanitary appliances and pipework systems.

Learning Outcome 05: The learner will know the installation requirements of sanitary appliances and connecting pipework systems.

The learner will demonstrate knowledge of:

5.1. How to assemble sanitary appliance fixtures and fittings.
- Waste fittings to appliances
- Terminal fittings to appliances
- Flushing cistern assemblies
- Pre-fabricated supports and fixings.

5.2. How to make joints to sanitary pipework systems.
- Ring seal joints
- Solvent weld joints
- Compression joints
- Specialist joints such as pan connectors.

5.3. How expansion and contraction may be catered for in plastics pipework.
- Ring seal joints
- Solvent weld joints
- Compression joints.

5.4. The positioning and fixing requirements of sanitary appliances.
- Conventional WCs (not macerators)
- Baths
- Bidets
- Wash hand basins
- Showers/cubicles
- Sinks (not waste disposal units)
- Disabled facilities (Document “M”)

5.5. How to select brackets appropriate to the sanitary pipework and the industry recommended spacing’s
- Horizontally mounted pipework
- Vertically mounted pipework.

5.6. The suitability of below ground drainage systems to receive foul soil and waste water.
- Combined drainage systems
- Separate drainage systems
- Partially separate drainage systems.

5.7. Suitable methods for making new plastic pipework connections.
- Soil stack at ground level to below ground plastic, clay or cast-iron drainage pipework
- Waste pipework discharging to ground floor gullies
- Stub waste connection to ground floor drainage pipework
- W.C pan connector direct to ground floor drain.

5.8. Suitable methods for making new plastic pipework connections into existing soil and waste systems.
- Soil and waste connections to existing cast iron pipework
- Soil and waste pipework to existing plastic pipework.

Learning Outcome 06: The learner will be able to apply site techniques for sanitary appliances and connecting pipework systems.

The learner will be able to:

6.1. Assemble sanitary appliance fixtures and fittings.
- Waste fittings to appliances
- Terminal fittings to appliances
- Flushing cistern assemblies
- Pre-fabricated supports and fixings.

6.2. Joint sanitary pipework systems.
- Ring seal joints
- Solvent weld joints
- Compression joints
- Specialist joints such as pan connectors.

6.3. Position and fix bathroom appliances to new systems pipework.
- Bath or shower tray
- Wash hand basin
- W.C.

6.4. Make plastic sanitary pipework connections.
- To above and below ground drainage systems

6.5. Demonstrate that sanitary appliances or pipework systems cannot be brought into operation by the end user before the work has been fully completed.

Learning Outcome 07: The learner will know the service and maintenance requirements of sanitary appliances and connecting pipe work systems.

The learner will demonstrate knowledge of:

7.1. The use of manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of system components.

7.2. How to carry out routine checks on sanitary appliances and pipework systems as part of a periodic maintenance programme.
- Visual inspection of pipe work for leakage and adequate support
- Operation of flushing cisterns/mechanisms
- Fitting of effective waste outlet plugs
- Effective operation of appliance traps/ self-sealing valves.

7.3 The procedures for dealing with defects in sanitary pipe work systems.
- Leakage from plastic soil and waste pipe work
- Improper support to plastic pipe work systems
- Loss of trap seal at sanitary appliances
- Blockage in above ground soil and waste pipe work
- Blockage in below ground drainage systems.

7.4 The types of information to be provided on a maintenance record for sanitary appliances and pipe work systems.

Learning Outcome 08: The learner will be able to apply site preparation techniques for the service and maintenance of sanitary appliances and connecting pipe work systems.

The learner will be able to:

8.1. Use manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of system components.
8.2. Carry out routine checks on sanitary appliances and pipe work systems as part of a periodic maintenance programme.
- Visual inspection of pipe work for leakage and adequate support
- Operation of flushing cisterns/mechanisms
- Fitting of effective waste outlet plugs
- Effective operation of appliance traps/ self-sealing valves.

8.3. Carry out repairs to defects in sanitary pipe work systems.
- Leakage from plastic soil and waste pipe work
- Loss of trap seal at waste appliances
- Blockage in above ground sanitary appliances.

8.4. Complete the required details in a maintenance record for a sanitation system.

Learning Outcome 09: The learner will know the decommissioning requirements of sanitary appliances and connecting pipework systems.

The learner will demonstrate knowledge of:

9.1. The working methods that reduce the periods during which toilet and washing facilities are not available to building users.
9.2. The information that needs to be provided to other persons before decommissioning work takes place.
9.3. The safety procedures for safely handling sanitary appliances and pipe work components that may be contaminated with foul waste.
9.4. How to temporarily decommission sanitary appliances and connecting pipework systems.
9.5. The work sequences for permanently decommissioning sanitary appliances and pipe work systems.
9.6. The methods used during the decommissioning process to prevent the end-user from operating the appliance or system.
- Temporary capping of pipe work sections
- Use of warning notices and signs.

Learning Outcome 10: The learner will be able to decommission sanitary appliances and connecting pipe work systems.

The learner will be able to:

10.1. Advise appropriate persons before a sanitary appliance or pipe work system is isolated in order to undertake work.
10.2. Carry out temporary decommissioning of sanitary appliances and connecting pipe work systems.
10.3. Check to ensure that the decommissioning procedures carried out prevent the end-user from operating the appliance or system.
- Temporary capping of pipe work sections
- Use of warning notices and signs.

Learning Outcome 11: The learner will know the inspection and soundness testing requirements of sanitary appliances and connecting pipe work systems.

The learner will demonstrate knowledge of:

11.1. The checks to be carried out during a visual inspection of a sanitation system to confirm that it is ready to receive foul water.
11.2. How to carry out an air test on a sanitary pipe work system.
11.3. The actions that must be taken when inspection and testing reveals defects in sanitary pipe work systems.

- Dealing with systems that do not meet correct installation requirements
- Remedial work associated with defective pipe work bracketing
- Remedial work associated with leakage from pipe work systems

Learning Outcome 12: The learner will be able to inspect and soundness test sanitary appliances and connecting pipe work systems.

The learner will be able to:

12.1. Carry out a visual inspection of a sanitation system to confirm that it is ready to receive foul water.
12.2. Perform an air test on a sanitary pipe work system.
12.3. Record appropriate air test results.

LCL- P2004 Electrical Installation of Plumbing Systems and Components.

Learning Outcome 01. The learner will know the electrical standards that apply to plumbing systems.

The learner will demonstrate knowledge of:

1.1 The statutory legislation, regulations and guidance that applies to electrical supply and control of plumbing systems and their components;

- Building Regulations.
- Electrical installation standards.
- Mechanical services specific legislation.
- Professional body guidance.
- Codes of practice.
- Manufacturer installation & service/maintenance instructions.
- Manufacturer user instructions.

1.2 The procedure for notifying works carried out to the relevant authority.

- Building Control Body
- District Network Operator

Learning Outcome 02. The learner will know the principles of electricity supply to buildings.

The learner will demonstrate knowledge of:

2.1 The methods by which electricity is generated;

- Basic power station operation.
- Principles of generation.

Types of supply;

- Single phase.

- Multi-phase

2.2 The methods by which generated electricity is distributed to buildings;

- Operation of the national grid and local distribution systems.
- Sub-stations.
- Supply transformers.
- Local distribution of three – and single-phase supplies to premises.

2.3 The purpose of electrical components at entry to the building;

- Main fuse (single phase) and cable head connection.
- Meter.
- Consumer unit.
- Main earth terminal.

Learning Outcome 03. The learner will know the layout features of electrical circuits in buildings.

The learner will demonstrate knowledge of:

3.1 The system layout features for electrical circuits in buildings

- Ring main circuit.
- Radial circuit.
- Fixed appliance supplies;
- Immersion heater.
- Instantaneous shower.
- Central heating.
- Shower pump
- Jacuzzi.
- Hot tub

3.2 The need for, and requirements of earthing systems;

- Main earthing systems
- TT system.
- TN - S system.
- TN-C-S system.
- Protective equipotential bonding.
- Supplementary earthing (bonding).
- Temporary continuity bonding

Learning Outcome 04. The learner will know the safe electrical isolation procedures.

The learner will demonstrate knowledge of:

4.1 The test equipment required to prove that circuits to be worked on are dead;

- Approved voltage indicating device.
- Proving unit.

4.2 The electrical industry procedure for safe isolation of electrical circuits.

4.3 The methods used to ensure circuits cannot be re-activated while work is taking place on them.

Learning Outcome 05. The learner will know the site preparation techniques for the electrical connection of plumbing wiring and components.

The learner will demonstrate knowledge of:

5.1 The sources of information required when carrying out work on plumbing electrical systems;
- Statutory regulations.
- Industry standards.
- Manufacturer technical instructions.

5.2 The preparatory work required to be carried out to the building fabric in order to install, commission, decommission or maintain electrical plumbing wiring and or components.

5.3 The types of pre-existing damage to the existing building fabric or customer property that may be encountered before commencing work on electrical systems and components;
- Building wall/floor surfaces.
- Existing electrical system components.
- Building décor and carpets.

5.4 The protection measures to be applied to the building fabric or customer property, during and on completion of work on electrical systems and components;
- Building wall/floor surfaces.
- Existing and new electrical systems and kitchen furniture.
- Building décor and carpets.

5.5 The cable, materials and fittings required to complete work on electrical systems.

5.6 The hand and power tools required to complete work on electrical systems.

Learning Outcome 06. The learner will know the installation and connection requirements of electrical components.

The learner will demonstrate knowledge of:

6.1 The types of cable termination methods approved for use in buildings;
- Screw terminals
- Pillar terminals
- Claw and washer terminals
- Crimping
- Strip connectors.

6.2 The method of installation and wiring termination;

From existing appliance supply point;
- Central heating control system.
- Shower pump
- Jacuzzi
- Hot Tub.
- Immersion heater.
- Shower.

Learning Outcome 07. The learner will know the inspection and testing requirements of electrically operated plumbing components.

The learner will demonstrate knowledge of:

7.1 The requirements of a visual inspection of completed electrical installation work for plumbing systems prior to electrical inspection and testing.
7.2 The equipment used for electrical testing of installed components.
7.3 The importance of carrying out tests on dead circuits.

Learning Outcome 08. The learner will be able to prepare to carry out safe electrical isolation, safe to touch procedures.

The learner will be able to:

8.1 Carry out a risk assessment of the work location in order for the work to proceed;
- Safe access and exit.
- Immediate work location e.g., tripping hazards.
- Control methods and or method statements are followed.

8.2 Wear Personal Protective Equipment relevant to the electrical installation, decommissioning or maintenance tasks being carried out.

Learning Outcome 09. The learner will be able to carry out safe electrical isolation - safe to touch procedures.

The learner will be able to:

9.1 Check to ensure that test equipment is safe to be used.
9.2 Carry out the safe electrical isolation procedures.
9.3 Carry out safe to touch procedures on existing plumbing installation.

Learning Outcome 10. The learner will know the requirements for maintaining electrical safety, earthing protection systems and associated dangers.

The learner will demonstrate knowledge of:

10.1 The potential electrical dangers in buildings to include the following;
- Signs of damage or worn electrical cables on power tools and property hard wiring systems.
- Signs of visual fault on electrical components.
- Trailing cables.
- Proximity of cables to plumbing pipework.
- Buried and hidden cables.
- Avoidance of cables under wooden floors.

10.2 The safe use of electrical tools and equipment including;
- 110V supplied tools and equipment.
- 230V supplied tools and equipment.

10.3 The purpose and key elements included in the visual inspection of power tools.
10.4 The potential risks of electric shock resulting from;
- The existing electrical installation.
- Faulty electrical tools and equipment.

10.5 The use of electrical earth bonding labels.

10.6 The process for applying a temporary continuity bond when cutting into fixed metallic pipe work.

LCL-P2005 Energy, Waste and Water Conservation

Learning Outcome 01. The learner will know the energy conservation legislation that applies to the building services industry.

The learner will demonstrate knowledge of:

1.1 The aims of energy conservation legislation.
1.2 The requirements of the Building Regulations Approved Document (AD) Part L1 and how to apply them to the building services industry.
1.3 The responsibilities of plumber in complying with energy conservation legislation.
1.4 The following environmental factors, responsibilities, initiatives and regulations:

- The importance of energy conservation
- The main requirements of environmental legislation
- The Application of AD Part L1 Building Regulations
- The Standard Procedure (SAP) for Energy Rating of Buildings
- The Application of the Water Regulations
- How the plumbing/heating industry can contribute to energy conservation
- The planning requirements for the integration of environmental technology within systems in new build situations and as additions to existing buildings
- The responsibilities of members of the construction team under energy conservation legislation
- Clients (customers)
- Designers
- Employers
- Employees

Learning Outcome 02. The learner will know the applications of energy sources used in the building services industry.

The learner demonstrate knowledge of:

2.1 Three types of high carbon energy used in buildings
2.2 Four types of Low carbon energy used in buildings
2.3 Three types of Zero carbon energy used in buildings
2.4 The basic operating principles of installations containing environmental energy sources including:

- Solar thermal
- Solid fuel (biomass)
- Heat pumps (water, air and ground source)
- Combined heat & power (CHP)
- Combined cooling, heat & power (CCHP)
- Underfloor heating

2.5 Where to find information on alternative energy sources
2.6 The names organisations which give guidance and advice on energy saving and conservation techniques
2.7 How to use energy rating tables and their effect on component selection
2.8 Renewable and non-renewable energy sources:

- Types of energy – High carbon non-renewable:
  - Natural Gas / LPG

  - Fuel Oils
  - Solid fuels (coal & peat)
  - Electricity – generated from fossil fuels
- Types of energy – Low carbon renewable:
  - Solar thermal
  - Solid fuel (Biomass)
  - Hydrogen fuel cell
  - Heat pumps (ground and air source)
  - Combined heat & power (CHP)
  - Combined cooling heat & power (CCHP)
- Types of energy – Zero carbon renewable:
  - Electricity - wind
  - Electricity – tidal
  - Hydroelectric
  - Solar photovoltaic
- Uses and basic operating principles of environmental technologies:
  - Underfloor heating
  - Solar hot water heating
  - Heat pumps (water, ground and air source)
  - Biomass
  - Combined heat and power (CHP)
  - Combined cooling heat & power (CCHP)
- Uses of other environmental technologies:
  - Solar photo voltaic
  - Wind energy system
  - Micro hydro

- Building Regulations (including energy efficiency for new dwellings).
- The general advise that can be given on methods of reducing waste of resources and effecting savings including environmental technologies – Energy Savings Trust
- Domestic Building Services Compliance Guide
- SEDBUK Rating of Boilers WQSR

2.9 The importance of energy efficiency, and where relevant, water efficiency considerations when selecting systems, equipment or components

Learning Outcome 03. The learner will know the importance of energy conservation when commissioning building services systems.

The learner will demonstrate knowledge of:

3.1 The role of the commissioning process in conserving energy usage
3.2 The advice to be given during the system handover procedure to the customer that will contribute to conserving energy usage
3.3 The following factors affecting energy conservation when commissioning building services systems:

- Customer Advice for Energy Conservation
- The importance of ensuring that installed systems and components are correctly commissioned and customers are informed on key operating requirements
- Sources of information and advice:
- Information that needs to be passed to relevant people to ensure the correct and economical use of energy dependant systems
- Manufacturers' instructions

- Operating procedures
- Customer / client advice
- Using principles that minimise the usage of energy in installed systems and components
- Using principles that minimise the usage of water in installed systems and components

Learning Outcome 04. The learner will know the methods of reducing waste and conserving energy.

The learner will demonstrate knowledge of:

4.1 The working practices that can be employed to conserve energy and protect the environment
4.2 The methods of reducing material wastage

Learning Outcome 05. The learner will know how to safely dispose of materials used in the building services industry.

The learner will demonstrate knowledge of:

5.1 The statutory legislation for waste management on construction sites.
5.2 The requirements when conducting carriage of waste by road.
5.3 The approved processes for recycling materials i.e., Metals, Plastics, Wood and cardboard
5.4 The Purpose of regulations covering the disposal of materials used in the plumbing sector, including:

- The Controlled Waste Regulations
- Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations
- Control of Asbestos at Work Regulations
- Packaging Regulations
- The Waste Electrical and Electronic Equipment Regulations (WEEE)

5.5 The disposal requirements of potentially hazardous materials i.e., Asbestos, Electrical and electronic equipment and Refrigerants (fluorinated gases).
5.6 The regulations which cover the disposal of hazardous waste and outline the actions to take if work activities endanger the environment, including:

- The Special Waste Regulations
- The Hazardous Waste Regulations
- Licensed waste disposal sites
- Specialist waste disposal requirements e.g., asbestos
- Carriage of waste by roads – waste carrier's license
- Water Supply Regulations Methods of disposing of waste

Learning Outcome 06. The learner will know the methods of conserving and reducing wastage of water within the building services industry.

The learner will demonstrate knowledge of:

6.1 The statutory legislation for water wastage and misuse.
6.2 The criteria for water efficiency calculations for new buildings.
6.3 Two methods of reducing water wastage in buildings.
6.4 The methods available for capturing surface water and recycling used water.
6.5 The uses of captured and recycled water in buildings.
6.6 The methods of conserving and reducing wastage of water within the building services industry including;

- The Application of the Water Regulations

- The Application of Part G of the Building Regulations
- Methods of reducing water wastage in new and existing buildings utilising:
- Flow reducing valves
- Spray taps
- Low volume flush WC
- The basic working principles of captured and recycled water systems
- Rain water harvesting
- Grey water systems
- The planning requirements for the integration of environmental technology within systems in new build situations and as additions to existing buildings.

LCL-P2006 Hand and Power Tools

Learning Outcome 01. The learner will know how to use hand and power tools.
The learner will demonstrate knowledge of:

1.1 The range of hand tools and their uses;
- Screwdrivers
- Hammers
- Chisels (masonry and wood)
- Grips
- Wrenches
- Spanners – (fixed and adjustable)
- Box spanners and sockets
- Measures (Tapes and rules)
- Spirit levels
- Pipe cutters
- Handsaws
- Hacksaws
- Bending springs
- Bending machines
- Blow torches
- Files and rasps

1.2 The range of battery-operated tools and their uses.
- Portable drills and screwdrivers
- Press fitting machines
- Portable lighting
- Cable locators

1.3 The range of power tools (110V and 230V) and their uses.
- Drills
- Screwdrivers

1.4 The safety checking of tools carried out prior to their use;
- Visual inspections.
- Portable appliance testing / electrical checks.
- Use of RCD adaptors.

1.5 The tools required and the methods used for cutting; Metal, wood and plastic.
1.6 The methods and types of drills used for drilling through;
- Metal
- Steel
- Wood
- Copper

- Alloys
- Plastics
- Brick
- Concrete
- Thermalite block
- Studded, dry lined, & timber frame walls.

LCL-P2007 Health and Safety in Installing and Maintaining Plumbing Systems

Learning Outcome 01. The learner will know the Health and Safety legislation associated with the installation and maintenance of plumbing systems.

The learner will demonstrate knowledge of:

1.1 The aims of Health and Safety Legislation in protecting the workforce and members of the public.
1.2 The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).
1.3 Where RIDDOR is used in connection with plumbing work.
1.4 The key responsibilities of employees, employers and customers (clients) under Health and Safety Legislation.
1.5 The role of the Health and Safety Executive (HSE) in health and safety legislation.
1.6 The roles, responsibilities and powers of HSE inspectors under Health and Safety Legislation for issue of improvement and Prohibition notices Powers of prosecution.
1.7 The HSE role in providing advice and guidance.

Learning Outcome 02. The learner will know the health and safety measures applied in the installation and maintenance of plumbing systems.

The learner will demonstrate knowledge of:

2.1 The potential hazards and dangers found in a plumbing system work location.
2.2 The purpose and importance of completing a risk assessment.
2.3 The categories which are completed as part of a risk assessment;
- Hazards.
- Risks.
- Likelihood.
- Severity.

2.4 Risk control measures;
- Eliminate.
- Reduce.
- Isolate.
- Control.
- Personal Discipline.

2.5 The types and purpose of personal protective equipment (PPE) and clothing including;
- Eye Protection.
- Hand protection.
- Head protection.
- Foot protection.
- Clothing protection/Visibility.
- Hearing Protection.
- Respiratory Protection.

2.6 How and when PPE must be used, cleaned and stored.
2.7 The purpose of and contents of;

- “Method Statements”.
- “Permit to Work Systems”.

2.8 Risk assessment models.

Learning Outcome 03. The learner will know the requirements for the use and disposal of hazardous substances.

The learner will demonstrate knowledge of:

3.1 The key purpose of the control of substances hazardous to health regulations (COSHH).
3.2 Hazardous substances and examples from each classification category including;

- Toxic.
- Harmful.
- Corrosive.
- Irritant.
- Oxidising.
- Flammable.

3.3 The precautions to be taken when working with commonly encountered substances including;

- Fluxes.
- Solder.
- Lead.
- Jointing Compounds.
- Sealants.
- Gaskets.

3.4 The purpose of the Control of Asbestos at Work Regulations.
3.5 The different types of asbestos found in the workplace.
3.6 The risks associated with the following types of asbestos;

- White Asbestos (Chrysotile).
- Brown or Grey asbestos (Amorite).
- Blue Asbestos (Crocidolite).
- Asbestos cement materials.

3.7 The methods and actions required to protect workers and members of the public from the risk of asbestos.
3.8 The removal and disposal of asbestos.

Learning Outcome 04. The learner will know manual handling and lifting techniques.

The learner will demonstrate knowledge of:

4.1 The process of planning a lift including;

- How to assess a load.
- Moving the load, route safety.
- Duration of lift accessibility.
- Informing others.

4.2 The safe manual handling of heavy and bulky loads.
4.3 The risks of personal injury associated with lifting and handling.
4.4 Kinetic lifting techniques.
4.5 The safe lifting technique used;

- To move loads single handed.
- For a 2-person lift.
- Using mechanical aids.

Learning Outcome 05. The learner will know how to identify and respond to accidents which occur at work.

The learner will demonstrate knowledge of:

5 .1 The responsibilities of the employer and employee under the 'Health and Safety at Work Act 1974'
5.2 The requirements for personal first aid provision.
5.3 The accident and incident recording and reporting procedures whilst at work.
5.4 The benefits of reporting accidents and near misses.
5.5 The classification of minor and major workplace injuries.
5.6 The responsibilities and procedures for dealing with minor and major workplace injuries.
5.7 How to deal with victims of electric shock including the removal from a live electrical supply.
5.8 The method of placing an accident victim in the recovery position and identify when this action should be performed.
5.9 The procedures for reporting accidents and serious occurrences.

Learning Outcome 06. The learner will know fire safety prevention.

The learner will demonstrate knowledge of:

6.1 The three elements of the combustion triangle.
6.2 When not to attempt to extinguish or contain a fire.
6.3 Which type of fire extinguisher should be to use to extinguish;
- Electrical fires.
- General fires.
- Gas fires.
- Small paper fires.

6.4 When it would be appropriate to use a fire blanket to extinguish a fire.
6.5 The precautions to be taken when using blow torches;
- Near to flammable materials.
- In or under wooden floors.
- In roof spaces and other hazardous areas.
- In proximity to electrical equipment and cables.
- Permits to carry out hot works

6.6 The safe storage, transportation, assembly, testing and use of blow torches.

Learning Outcome 07. The learner will know the safety requirements for working at heights.

The learner will demonstrate knowledge of:

7.1 The circumstances where it is necessary to work at heights.
7.2 The safety measures and checks needed when working with steps and ladders.
7.3 The types of equipment used when working at heights;
- Step Ladders.
- Ladders.
- Roof ladders and crawling boards.
- Mobile tower scaffolds.

7.4 How to assemble, erect and use;
- Step Ladders.
- Ladders.
- Roof ladders and crawling boards.

- Mobile tower scaffolds.

Learning Outcome 08. The learner will know how to work safety in confined spaces.
The learner will demonstrate knowledge of:

8.1 The definition of a confined space and the requirements of the confined spaces legislation.
8.2 The typical confined spaces encountered in the workplace;
- Roof spaces.
- Under wooden floors.
- Cellars.

8.3 The dangers when working in confined spaces.
8.4 The safety measures which need to be taken when working in confined spaces.
8.5 Situations where working in confined spaces is required.

LCL P2008 Hot Water Systems Installation & Maintenance

Learning Outcome 01. The learner will know the types and configurations of hot water systems including the design installation requirements.
The learner will demonstrate knowledge of:

1.1 The types of domestic hot water supply systems;
- Centralised systems
- Unvented hot water systems
- Open vented hot water systems
- Localised systems
- Unvented point of use heaters
- Instantaneous heaters.

1.2 The types of hot water systems;
- Indirect storage systems
- Direct storage systems
- Electrically heated
- Gas or oil fired
- Small point of use (under sink)
- Bulk Storage heaters (combination tank)
- Plate heat exchanges
- Solar Thermal hot water systems
- Combination boilers.

1.3 Hot water system pipework layout features including systems with secondary circulation;
- Direct and indirect vented and unvented
- Direct and indirect cylinders
- Solar Thermal
- Thermal stores
- Combination boilers
- Secondary circulation
  - Location of pump and types
  - Automated timing devices
  - Methods of balancing systems.

1.4 The recommended design temperatures within hot water systems;
- Hot water storage vessels
- Hot water delivery
- Secondary return

- Sterilization
- Point of use
    - Instantaneous heaters
    - Storage system
    - Fixed bath
    - Basin
    - Blending valves.

1.5 The layout requirements, location and safety features for unvented and vented hot water systems.

Learning Outcome 02. The learner will know the requirements for the installation of cold-water components associated with hot water systems.

The learner will demonstrate knowledge of:

2.1 The installation and siting requirements of cold-water cisterns.
2.2 The effects of heat from hot water systems on cold water services and pipework
2.3 The requirements for positioning a cold-water pipework in relation to sources of heat.
2.4 The requirements for insulating hot water service pipework

Learning Outcome 03. The learner will know the site preparation techniques for hot water systems and components.

The learner will demonstrate knowledge of:

3.1 The sources of information required when undertaking work on hot water systems
- Statutory regulations
- Industry standards
- Manufacturer technical instructions.

3.2 The preparatory work required to be undertaken to the building fabric in order to install, decommission or maintain hot water systems and components.
3.3 The protection measures required to the building fabric or customer property, during and on completion of work on hot water systems and components.
3.4 The pipework materials and fittings required to complete work on hot water systems.
3.5 The range of hand and power tools required to complete work on hot water systems and components.

Learning Outcome 04. The learner will be able to apply site preparation techniques for hot water systems and components

The learner will be able to:

4.1 Check the safety of the work location in order for the work to safely proceed;
- Safe access and exit
- Immediate work location e.g., tripping hazards
- Appropriate risk assessments/ method statements are available.

4.2 Select and Wear Personal Protective Equipment appropriate to the installation, decommissioning or maintenance task being carried out.
4.3 Apply protection measures to the building fabric or customer property, during and on completion of work on hot water systems and components.
4.4 Select the pipework materials and fittings required to complete work on hot water systems ensuring that they are not damaged.

4.5 Select the hand and power tools required to complete work on hot water systems and components.
4.6 Carry out preparatory work in order to install hot water systems and components.

Learning Outcome 05. The learner will know the installation requirements of hot water systems and components.

The learner will demonstrate knowledge of:

5.1 The positioning and fixing requirements for hot water system pipework and components;
- Hot water storage or appliance
- Pipework
  - In suspended timber floors
  - In solid floors
  - Embedded in walls
- Installation considerations;
  - In areas of the building subject to frost
  - Adjacent to components sensitive to heat.

5.2 The selection of clips and brackets appropriate to the hot water system pipework and components;
- Horizontally mounted pipework
- Vertically mounted pipework.
- Recommended spacings

5.3 How to position, fix and connect new hot water pipework to hot water supply and outlets;
- Combination boiler
- Point of use water heater
- Hot water cylinder
- Bath tap or shower mixer valve
- Wash hand basin tap
- Sink tap

5.4 The methods of making new pipework connections into existing hot water system pipework;
- Copper
- Plastic
- Galvanised steel.

5.5 The insulation requirements of hot water system pipework and components.

Learning Outcome 06. The learner will be able to install hot water systems and components.

The learner will be able to:

6.1 Locate and site hot storage vessel or water heating appliance in accordance with a work plan.
6.1 Connect hot water supply pipework to storage vessel or water heating appliance.
6.2 Fabricate and joint pipework, fittings and components in copper with capillary soldered and mechanical fittings.
6.4 Fabricate and joint pipework, fittings and components in plastic using push fit and mechanical fittings.
6.5 Position, fix and connect new hot water pipework to outlets;
- Bath tap or shower mixer valve
- Wash hand basin tap
- Sink tap

6.6 Apply insulation to hot water pipework and system components.

Learning Outcome 07. The learner will know the commissioning & maintenance requirements of hot water systems and components.

The learner will demonstrate knowledge of:

7.1 The checks to be carried out during a visual inspection.
7.2 The commissioning procedure for hot water systems including vented hot water storage and point of use appliances.
7.3 The procedure for carrying out a soundness test on a hot water system;
- Metallic systems
- Plastic pipework systems.

7.4 The flushing procedure after completion of a soundness test.
7.5 Completion commissioning documentation.
7.6 Setting hot water systems to work and handover to customer.
7.7 The maintenance requirements for hot water systems and components.

Learning Outcome 08. The learner will be able to carry out the commissioning & maintenance requirements of hot water systems.

The learner will be able to:

8.1 Carry out a soundness test on a hot water system.
8.2 Carry out the commissioning of a point of use water heater.
8.3 Carry out the commissioning of a vented hot water system.
8.4 Flush a hot water system.
8.5 Complete commissioning documentation, set hot water system to work and handover to customer.
8.6 Carry out maintenance of hot water systems and components.

LCL-P2009 Plumbing Science, Principles and Practice.

Learning Outcome 01. The learner will know the principles of plumbing science and how to apply them.

The learner will demonstrate knowledge of:

1.1 The boiling and freezing point of water.
1.2 The change of state and molecular changes of water when converting to ice and steam/super-heated steam.
1.3 The principles of mass, weight and density in relation to liquids including density at differing temperatures.
1.4 The meaning of water hardness – soft, temporary hard and permanently hard.
1.5 pH values and the effects of corrosion on plumbing systems and components.
1.6 Capillary action and siphonage.
1.7 The units of force, volume and pressure used in water systems.
1.8 The meaning of force, volume and pressure head in water systems.
1.9 Pressure calculations to determine the static pressure and dynamic pressure of a water system.
1.10 The Science: relating to the following:
- Properties of water:
  - Boiling and freezing point
  - Change of state and molecular change
  - Density at differing temperatures
  - Relative density

- Capillarity
- Acidity and alkalinity
- pH value of water
- Water hardness
- Soft water
- Hard water - temporary and permanent

- Force and pressure in water-based systems:
  - Units of force and pressure
  - Atmospheric pressure
  - Principle of the siphon
  - Simple force calculations
  - Pressure head
  - Simple pressure calculations:
  - Static pressure
  - Dynamic pressure

1.11 The units of velocity and flow rate used in water-based systems.

1.12 The effects on velocity and flow rate of water due to reducing pressures, increasing/reducing pipe sizes and pipework friction.

1.13 The difference between heat and temperature.

1.14 The combustion of gas and other fossil fuels and their potential risks

- The characteristics of complete and incomplete combustion including air and fuel requirements.
- The symptoms/effects when humans are exposed to carbon monoxide.
- Sources of carbon monoxide and carbon dioxide found in buildings.
- Ambient levels of carbon dioxide and levels that have an adverse effect.
- The types carbon monoxide detectors,
- The warning signs associated with incomplete combustion and leakage of products of combustion.
- The actions to take in the event of a report of fumes.

1.15 The sources of energy and heat transfer;

- Renewable and non-renewable energy.
- The different types of non-renewable energy to include:
  - Gas and LPG
  - Oil
  - Solid fuel
  - Electricity generated by fossil fuels
- The different types of renewable energy to include:
  - Electricity generated by wind, hydro and wave power
  - Solar
  - Biomass
  - Hydrogen fuel cells
  - Air source
  - Ground source
- The transfer of heat via:
  - Radiation
  - Conduction
  - Convection

LCL-P2010 Water Supply Regulations and Water Byelaws.

Learning Outcome 01. The learner will know the regulatory requirements for water fittings.
The learner will demonstrate knowledge of:

1.1 The fitness for purpose of water fittings in relation to;
- British Standards or equivalent
- Immunity and protection from galvanic action.

1.2 The requirements of installed water fittings for the following:
- Water tightness
- Prevention of ingress from contaminants
- Prevention from damage by freezing and other causes
- Prevention from deterioration by permeation
- The supporting pipework
- The fixings for water fittings.

1.3 The requirement for pressure testing plumbing systems:
- Metallic pipework
- Plastic pipework.

1.4 How surges within a pipework system can affect system performance in relation to:
- Water hammer
- Relief valve discharge
- Pneumatic accumulators.

1.5 The connection requirements for the following in relation to the installation of a pump on a supply pipe:
- Permissible pump output capacity
- Permitted siting of a pump.

1.6 The connection and siting requirements for the installation of a pumped shower.

1.7 The installation requirements for pipes and operational fittings:
- Located in the cavity of a cavity wall
- Embedded in any wall or solid floor
- Located below a suspended floor
- Below a solid floor at ground level, location and accessibility to operational fittings.

1.8 The installation requirements for pipes entering a building:
- Depth of pipework
- Insulation requirements
- Protection of pipework.

1.9 The installation requirements for underground pipework in relation to pipes:
- Laid underground
- Laid over an underground obstruction
- Under an underground obstruction
- Supplying water to a building below street level
- Beneath a stream.

1.10 The terms ‘concealed fitting’ and ‘dezincification resistant material.

Learning Outcome 02. The learner will know the regulatory requirements for the design and installation requirements for a water supply system.

The learner will demonstrate knowledge of:

2.1 The types of distribution system available for the following within a building:
- Direct fed system
- Indirect fed system
- Combination of direct and indirect fed systems.

2.2 The installation requirements relating to Stop valves for the following:
- Individual buildings
- Locations within premises supplied with water
- Blocks of flats and multiple occupancy buildings supplied from a common supply pipe
- Blocks of flats and multiple occupancy buildings with separate supply pipes to each flat.

2.3 The installation requirements for the provision, operation and location of servicing valves in relation to the:
- Inlet to Float Operated Valve (FOV)
- Outlet of storage cisterns
- Inlet to appliances
- Accessibility of servicing valves
- Methods of operation.

2.4 The installation requirements for the provision of draining taps in relation to:
- Location
- Accessibility
- Types.

2.5 The requirements with respect to dead legs and redundant fittings.

2.6 The requirements for pressure testing the following different systems:
- Systems that do not include any plastic
- Systems that include plastic pipes.

2.7 The reason for and requirements the flushing of a system installation.

2.8 When system disinfection is required.

Learning Outcome 03. The learner will know the regulatory requirements for the prevention of cross connection to unwholesome water.

The learner will demonstrate knowledge of:

3.1 The meaning of unwholesome water in relation to:
- Rainwater
- Recycled water
- Any fluid not supplied by a water undertaker.

3.2 The requirements for identifying an unwholesome water system so that it is readily distinguishable from a wholesome system in relation to:
- Colour coding for pipes and fittings
- Labelling for pipes and terminal fittings.

Learning Outcome 04. The learner will know the different fluid categories.

The learner will demonstrate knowledge of:

4.1 The five fluid categories and the risk posed to persons, animals and the environment

Learning Outcome 05. The learner will know the guidance clauses relating to backflow prevention.

The learner will demonstrate knowledge of:

5.1 The installation requirements for a mechanical backflow protection device relating to:
- Accessibility
- Location
- Requirement to not be buried in the ground or where liable to flooding
- Vented and verifiable
- Installation requirements for devices with relief outlets
- Requirements for line strainers
- The lowest point of discharge from the ground
- Termination with a Type AA air gap.

5.2 The requirements for appliances supplied through or incorporating a pump.
5.3 The requirements for the installation of a bidet or appliance with a hand-held spray.
5.4 The requirements for a water supply to a manually operated WC or urinal using a pressure flushing valve when supplied from a supply pipe or distributing pipe.
5.5 The requirements for tap outlets in relation to:
- Single outlet taps
- Combination taps, assembly outlets
- Fixed shower heads over basins, baths and bidets.

5.6 The requirements for a sink in a non-domestic environment.
5.7 The requirements for submerged inlets to baths and washbasins in buildings:
5.8 The requirements for the installation of a drinking water fountain.
5.9 The requirements for the installation of washing machines, washer-dryers and dishwashers in relation to:
- A dwelling
- A non-dwelling.

5.10 The requirements for the installation of hose pipes for:
- Use outside.

5.11 When whole site and zone protection are required.

Learning Outcome 06. The learner will know the regulatory requirements for the installation of cold-water services.

The learner will demonstrate knowledge of:

6.1 The installation requirements and methods of connection for water fittings in relation to:
- Float operated valves
- Inlets to cisterns
- Outlets from cisterns
- Warning and overflow pipes
- Cold water storage cisterns.

Learning Outcome 07. The learner will know the regulatory requirements for the installation of hot water services.

The learner will demonstrate knowledge of:

7.1 The installation requirements and methods of connection for water fittings in relation to:
- Directly heated unvented hot water systems
- Indirectly heated unvented hot water systems
- Point of use water heaters
- Methods of accommodating expanded water in a hot water system
- Maximum temperature within a hot water system
- Hot water distribution temperatures
- Temperature of hot water at terminal fittings
- Surface temperature of hot water pipes.

7.2 The requirements for discharge pipes from safety devices.
7.3 The requirements for discharge pipes from expansion valves.
7.4 The requirements for vent pipes from a primary circuit.
7.5 The requirements for vent pipes from a secondary hot water storage system.
7.6 The methods of filling closed circuits.

Learning Outcome 08. The learner will know the types of bath, sink, showers and taps their location and installation requirements.

The learner will demonstrate knowledge of:

8.1 The requirements for drinking water points in buildings.
8.2 The requirements for drinking water supplies in relation to water:
- Supplied from a supply pipe
- Supplied from a pumped supply pipe
- Supplied from a storage cistern
- That has been softened and used for drinking purposes.

8.3 The requirements for waste outlets from appliances.

Learning Outcome 09. The learner will know the regulatory requirements for water supplied for outside use.

The learner will demonstrate knowledge of:

9.1 The installation requirements for animal drinking troughs or bowls in relation to:
- Methods of controlling the inflow to a trough or bowl
- The siting of servicing valves
- Backflow protection.

9.2 The installation requirements for ponds, fountains and pools in relation to:
- Impervious liners and water tightness
- Temporary connections to ponds, pools and fountains.

LCL-P2011 Central Heating Systems, Circuits and Controls.

Learning Outcome 01. The learner will know the types of central heating systems and circuits.
The learner will demonstrate knowledge of:

1.1 The pipework configuration of central heating circuits;
- One pipe
- Two pipe

1.2 The types of central heating systems;
- Full central heating
- Background heating
- Selective heating using smart controls
- Open
- Closed (sealed)
- Gravity
- Pumped

1.3 The legislation and standards relating to central heating systems;
- Installation
- Service and maintenance
- Commissioning
- Corrosion protection

1.4 Central heating pipework materials;
- Metallic
- Non metallic

1.5 The types and operating principles of heat sources (boilers);
- Electric
- Biomass
- Solid Fuel
- Oil boilers
- Gas

1.6 The types of operation of domestic central heating systems and boiler types:
- Fully pumped using 2 x two port valves
- Fully pumped using a mid-position valve
- Gravity circulation
- Combination boiler
- Open vented boiler
- System boiler

Learning Outcome 02 The learner will know the pipework and component configurations of central heating systems.
The learner will demonstrate knowledge of:

2.1 The heating system layout features;
- Open vented systems;
- Feed and expansion cistern position
- Pump positions
- Cold feed and open vent pipe connections
- Methods of releasing air from the system
- Sealed systems;
- Expansion vessel positions

- Pressure gauge, pressure relief valve and filling loop positions
- Pump positions
- System filling points
- Methods of releasing air from the system

2.2 The siting and location of boilers

2.3 Condensing boiler components.

- Pluming kits
- Condensate disposal
- Passive flue gas heat recovery

2.4 The types of heat emitters;

- Panel and column radiators.
- Low surface temperature radiators
- Fan convectors;
- Towel rails

2.5 The fabrication and fixing of heat emitter components

2.6 The operation of central heating controls;

- 2 Port valves
- 3 Port valves
- Room thermostats
- Cylinder thermostats
- Frost and pipe combined thermostats
- Timing devices – clocks and programmers
- Weather compensation
- Load compensation
- Smart Controls

2.7 The operation of components of central heating system;

- Air separators
- Air vents
- Balancing valves
- By pass valves
- Cold feed
- Discharge pipework
- Expansion tank
- Expansion vessels
- Filling loop
- Filters
- Primary and heating circuit flow and return pipework
- Insulation
- Open vent
- Pressure gauge
- Pressure relief valves
- Circulator (Pump)
- Radiator valves
- Zone valves
- Drain valves

Learning Outcome 03 The learner will know the installation requirements of central heating systems and components.

The learner will demonstrate knowledge of:

3.1. The positioning and fixing requirements of central heating pipework and components;
- In suspended timber floors
- In solid floors and walls
- In areas of the building subject to frost

3.2. Expansion and contraction in central heating pipework;
- Non-metallic
- Metallic

3.3. The requirements for the support and clipping for pipework:
- Horizontally mounted
- Vertically mounted

3.4. Jointing methods used in central heating system pipework;
- Non-metallic pipework
- Push fit
- Metallic pipework
- Capillary
- Mechanical
- Press fit

3.5. The positioning and fixing requirements of components in central heating systems;
- Radiator valves – thermostatic and manual valves
- Automatic air vents
- Feed and expansion cisterns
- Expansion vessels
- Filling loop
- Discharge and overflow pipes
- Motorised valves
- Circulating pumps
- Automatic bypass valves
- Drain valves
- Timing devices – clocks and programmers
- Room thermostats
- Cylinder thermostats
- Frost and pipe combined thermostat
- Weather compensators
- Load compensators
- Smart Controls

3.6. The insulation requirements of central heating system components;
- Pipework
- Cisterns
- Cylinders

Learning Outcome 04 The learner will know the commissioning and maintenance requirements of central heating systems and components.

The learner will demonstrate knowledge of:

4.1 Manufacturer and job instructions to establish the commissioning and periodic servicing requirements of system components
4.2 The checks to be carried out during a visual inspection
4.3 The commissioning procedure for heating systems
4.4 The flushing, filling and venting procedure
4.5 Setting central heating systems to work
4.6 The completion of commissioning documentation and handover to customer
4.7 The maintenance requirements for central heating systems and components.
4.8 Dealing with defects in central heating boilers, components and pipework;

- Failure and replacement of controls and valves
- Leakage in system pipework, valves and heat emitters
- Replacement of valves, pipework and heat emitters

4.9 The types of information to be provided on maintenance records for central heating systems.

Learning Outcome 05 The learner will know how to decommission central heating systems and components.

The learner will demonstrate knowledge of:

5.1 The working methods that reduce the periods during which central heating systems are not available to occupiers
5.2 The information that needs to be provided to others before decommissioning work takes place.
5.3 Temporarily decommissioning central heating systems.
5.4 Permanently decommissioning central heating systems.
5.5 The procedures for draining and disposing of central heating system contents.
5.6 The methods used during the decommissioning process to prevent the end-user from operating the appliance or system by;

- Isolation of the fuel/electricity supply to the system.
- Temporary isolation of pipework sections.
- Use of warning notices and signs.

Learning Outcome 06 The learner will know the soundness testing requirements of central heating systems and components.

The learner will demonstrate knowledge of:

6.1 The checks to be carried out during a visual inspection of a central heating system to confirm that it is ready to be tested for soundness.
6.2 Filling the central heating systems with water at normal operating pressure and check for leakage.
6.3 Carrying out a soundness test to industry requirements.
6.4 The soundness test pass and fail criteria

Learning Outcome 07 The learner will be able to install and commission central heating systems and components.

The learner will be able to:

7.1. Position, fix and connect new central heating pipework to system components;
- Boilers.
- Valves and controls.
- Heat emitters.
- Hot water storage cylinders.

7.2. Fabricate metallic and non-metallic central heating pipework.
7.3. Join central heating pipework systems using;
- Push fit fittings.
- Capillary fittings.
- Mechanical compression fittings.

7.4 Assemble and fit heat emitters and components.
7.5. Fill the central heating system with water.
7.6. Carry out a soundness test of the system to industry standards.
7.7. Repair any leaks resulting from the soundness test.
7.8. Commission appliance and central heating system.
7.9. Instruct the occupier in the operation of the appliance and central heating components.
7.10. Apply insulation to central heating system pipework and components.

Learning Outcome 08 The learner will be able to service and maintain central heating systems and components.

The learner will be able to:

8.1 Use manufacturer instructions and job maintenance schedules to establish the periodic servicing requirements of system components.
8.2 Carry out routine checks on central heating components and pipework systems as part of a periodic maintenance programme by;
- Visual inspection of appliance and component.
- Visual inspection of pipework for leakage and adequate support.
- Checking for poor circulation in heat emitters.
- Checking for poor flow rate through heating systems.
- Venting of gas build up within heat emitters.
- Checking the operation of boiler and control components.
- Checking the effective operation of thermostats and controls.
- Operation/ adjustment – system filling and venting components.
- Cleaning magnetic filters
- Cleaning appliance components

8.3. Carry out repairs to defects in central heating system components;
- Identify and replace a defective radiator valve
- Identify and replace a defective zone valve

8.4. Complete the details contained in a maintenance record for a central heating system.

Learning Outcome 09 The learner will be able to decommission central heating appliances, components and systems.

The learner will be able to:

9.1. Advise the occupiers before central heating components or pipework are isolated in order to undertake work.
9.2. Carry out decommissioning of central heating system appliance, components and pipework.
9.3. Ensure that the decommissioning procedures carried out prevent the occupiers from operating the appliance or system.

LCL- P2012 Working Practices in the Plumbing Sector.
**NVQ route covers on-site requirements as outlined in the centre guidance*

Learning Outcome 01. The learner will be able to plan and prepare to complete plumbing work activities

The learner will be able to:

1.1 Introduce and identify self to customer.
1.2 Agree work-plan with the customer, providing all relevant information.
1.3 Resolve customer concerns and issues.
1.4 Select appropriate tools, equipment, materials and personal protective equipment (PPE) for the allocated activity.
1.5 Prepare the working area.
1.6 Obtain authorisation to carry out the work from the responsible person.

Learning Outcome 02. The learner will be able to identify, respond to and resolve problems and areas for improvement in own area of responsibility

The learner will be able to:

2.1 Identify problems and areas for improvement in own area of responsibility relating to 2 of the following within the plumbing sector:

- Materials
- Tools
- Equipment
- Information sources
- People
- Safety
- Workmanship
- Time
- Weather

2.2 Respond to problems and areas for improvement.
2.3 Resolve problems and areas for improvement.
2.4 Resolve issues and problems to complete the plumbing work.

Learning Outcome 03. The learner will be able to create and maintain effective working relationships

The learner will be able to:

3.1 Dress appropriately for the working being undertaken
3.2 Communicate effectively with customers and others.

Learning Outcome 04. The learner will be able to contribute to own personal learning and development

The learner will be able to:

4.1 Identify personal learning and development needs.
4.2 Determine an action plan to address personal learning and development needs.
4.3 Review and revise personal development records.
4.4 Reflect on personal learning and development

LCL- P2013 Know and Apply Domestic Rainwater System Installation and Maintenance Techniques
(A18 Optional Unit)

Learning Outcome 01: The learner will know the general principles of gravity rainwater systems.
The learner will demonstrate knowledge of the:

1.1 Purpose of gravity rainwater systems used on dwellings.
1.2 Working principles of gravity rainwater systems used on dwellings.
1.3 Common gravity rainwater system component materials;
- PVC-U
- Extruded Aluminium
- Cast Iron.

1.4 Different types of gutter systems used on dwellings;
- Half round
- Square
- Ogee
- High capacity.

1.5 The different types of rainwater pipework used with gutter systems on dwellings;
- Round section
- Square section.

Learning Outcome 02: The learner will know the layout requirements of gravity rainwater systems.
The learner will demonstrate knowledge of:

2.1 The factors which are used to determine the type (size) of gutter system used on a dwelling;
- Rainfall intensity
- Roof area
- Running outlet position
- Gutter fall
- Changes of direction in the gutter run
- Customer preference.

2.2 The jointing procedures for gutter systems;
- PVC-U
- Extruded Aluminium
- Cast Iron.

2.3 The purpose of components used in an eaves gutter system;
- Running outlets
- Gutter angles
- Gutter unions

- Stop ends
- Specialist unions between different gutter materials.

2.4 How building features determine gutter bracket selection for buildings;
- Fascia boards
- Exposed rafters (no fascia boards)
- No fascia board or exposed rafters (direct fixings to masonry surfaces).

2.5 The purpose of components used in rainwater pipework;
- Offsets
- Angles
- Branches
- Hopper heads
- Shoes
- Specialist connectors to the drainage system.

Learning Outcome 03: The learner will know the site preparation techniques for gravity rainwater systems.
The learner will demonstrate knowledge of:

3.1 The sources of information required when carrying out work on gravity rainwater systems;
- Statutory regulations
- Industry standards
- Manufacturer technical instructions.

3.2 The preparatory work required to be carried out to the building fabric in order to install or maintain gravity rainwater systems.
3.3 The types of pre-existing damage to the existing building fabric or customer property that may be found before commencing work on gravity rainwater systems;
- Building wall surfaces
- Existing gravity rainwater system components.

3.4 The protection measures required to the building fabric or customer property, during work on gravity rainwater systems.
3.5 The pipework materials and fittings required to complete work on gravity rainwater systems.
3.6 The hand and power tools required to complete work on gravity rainwater systems.

Learning Outcome 04: The learner will be able to apply site preparation techniques for gravity rainwater systems.
The learner will be able to:

4.1 Check the safety of the work location in order for the work to safely proceed;
- Safe access
- Immediate work location e.g. tripping hazards
- Appropriate risk assessments/ method statements are available.

4.2 Wear Personal Protective Equipment relevant to the installation or maintenance task being carried out.
4.3 Apply protection measures to the building fabric or customer property, during work on gravity rainwater systems.
4.4 Select the pipework materials and fittings required to complete work on gravity rainwater systems ensuring that they are not damaged.
4.5 Select the hand and power tools required to complete work on gravity rainwater systems.

Learning Outcome 05: The learner will know the installation requirements of gravity rainwater systems.
The learner will demonstrate knowledge of:

5.1 How expansion and contraction may be catered for in PVC-u gravity rainwater systems.
5.2 The positioning and fixing requirements of gutter system components;
- Gutter brackets – fascia, rafter and drive-in types
- Running outlets
- Gutter angles
- Gutter unions
- Stop ends
- Specialist unions between different gutter materials.

5.3 How to install lengths of PVC-u gutter and make joints to gutter systems;
- Running outlet
- Gutter angle
- Gutter union
- Stop ends.

5.4 How to select brackets for rainwater pipework and space them at appropriate intervals.
5.5 The suitable methods for making new rainwater pipework connections to the drainage system;
- Discharge to gully using a shoe
- Direct connection to drainage bend
- Direct connection to gulley
- Direct connection to a soakaway

5.6 The suitable methods for making new PVC-u pipework connections into existing rainwater pipework.

Learning Outcome 06: The learner will be able to install gravity rainwater systems.
The learner will be able to:

6.1 Position and fix eaves gutter brackets at recommended spacing intervals.
6.2 Install lengths of PVC-u gutter and make joints to gutter systems;
- Running outlet
- Gutter angle
- Gutter union
- Stop ends.

6.3 Make pipework fixings to rainwater pipework.
6.4 Install lengths of rainwater pipework and make connections to;
- Existing drainage systems
- Eaves gutter systems using offset connection.

Learning Outcome 07: The learner will know the service and maintenance requirements of gravity rainwater systems.
The learner will demonstrate knowledge of:

7.1 How to carry out routine checks on gravity rainwater systems as part of a periodic maintenance programme;
- Visual inspection of guttering and rainwater pipework for leakage and adequate support
- Visual inspection of guttering and rainwater pipework for damage.

7.2 The procedures for dealing with defects in gravity rainwater systems;
- Leakage from systems
- Blockages in systems

- Improper support to PVC-u gutter systems.

7.3 The procedures for safely handling gravity rainwater system components that may be contaminated with foul waste.

Learning Outcome 08: The learner will be able to service and maintain gravity rainwater systems.
The learner will be able to:

8.1 Carry out routine checks on gravity rainwater systems as part of a periodic maintenance programme;

- Visual inspection of guttering and rainwater pipework for leakage and adequate
- support
- Visual inspection of guttering and rainwater pipework for damage.

8.2 Carry out routine maintenance procedures on gravity rainwater systems;

- Replacement of a section of gutter
- Replacement of a gutter union.

Learning Outcome 09: The learner will know the inspection and testing requirements of gravity rainwater systems.
The learner will demonstrate knowledge of:

9.1 The checks to be carried out during a visual inspection of a gravity rainwater system to confirm that it is ready to receive rainwater.
9.2 The test arrangements for gravity rainwater systems to check for leakage.
9.3 The actions that must be taken when inspection and testing reveals defects in gravity rainwater systems;

- Dealing with systems that do not meet correct installation requirements
- Remedial work associated with defective gutter and pipework bracketing
- Remedial work associated with leakage from systems.

Learning Outcome 10: The learner will be able to inspect and test gravity rainwater systems.
The learner will be able to:

10.1 Carry out a visual inspection of a gravity rainwater system to confirm that it is ready to receive rainwater.
10.2 Test the gravity rainwater system for leakage using an appropriate source of water.

4. National Occupational Standard:

The Units used in this qualification have a direct relationship with the National Occupational Standards for the areas of work contained within.

5. RQF Descriptor Level 2.

Knowledge descriptor (the holder):

- *Has knowledge and understanding of facts, procedures and ideas in an area of study or field of work to complete well-defined tasks and address straightforward problems.*
- *Can interpret relevant information and ideas.*
- *Is aware of a range of information that is relevant to the area of study or work.*

Skills descriptor (the holder can):

- *Select and use relevant cognitive and practical skills to complete well-defined, generally routine tasks and address straightforward problems.*
- *Identify, gather and use relevant information to inform actions.*
- *Identify how effective actions have been.*

6. Prior qualifications, knowledge, skill or understanding which the learner is required to have before taking these qualifications. (Pre-requisites)

None prescribed.

7. Units which a learner must have completed before the qualification will be awarded and any optional routes.

Learners must complete the 12 mandatory units before the qualification will be awarded. See Section 4.0 above.

8. Other requirements which a learner must have satisfied before the learner will be assessed or before the qualification will be awarded.

See Section 8.0 above.

9. The design and delivery of the examination associated with these units are based on the following documents;

- Water Regulations
- Water Bye Laws
- Building Regulations (Approved Documents)
- British Standards
- Health and safety legislation
- Health and Safety (HSE) guidance publications
- National Occupational Standards

10. The criteria against which learners' level of attainment will be measured.

The Learning Outcomes and Assessment Criteria against which learners' level of attainment will be measured are detailed in Section 4 of this specification.

11. Planned exemptions

Learners who hold a qualification with the equivalence to the LCL Awards Level 2 Diploma in the Installation & Maintenance of Plumbing & Heating Systems who register for the LCL Awards Level 2 NVQ Diploma in the Installation & Maintenance of Plumbing & Heating Systems may be exempt from completing the examinations and assessments covered by the learning outcomes completed as part of the qualification being held by that learner. However, learners will be required to undertake and provide evidence of completing two different on-site plumbing jobs on separate occasions.

At least one of the jobs must be assessed by an approved assessor observing learners carrying out the plumbing work and grading the outcome (completed work), the other job may be assessed by the learner uploading diverse evidence of work to their e-portfolio.

12. Specimen assessment materials.

There are no specimen assessment materials available for either qualification.

13. Specified levels of attainment

Learners must satisfy the Assessment Criteria in each Learning Outcome within the Units.

Learners must achieve;

- A minimum score of 75% to pass each written examination and to
- Satisfy all performance assessment criteria and the sufficiency of evidence requirements for the qualification to be awarded.

14. Other information

These qualifications are within SSA: 5.2 Building and Construction

LCL Awards has received letters of support for the development and introduction of the qualifications from two plumbing and heating businesses and a training centre with potential applicants for the qualifications.

Where the qualification(s) is awarded in the various devolved regions of the UK i.e., England, Scotland, Northern Ireland and Wales, the performance assessments will be conducted in accordance with the legislation, normative standards and guidance applicable in that region should they differ from those in England.
Examination questions are set and responded to in the context of the legislation, normative standards and guidance applicable in England.

15. Progression Routes

Acquisition of either qualification may lead to learners progressing to other mechanical engineering sector qualifications at level 2 and level 3 including;

- Gas engineering
- Oil engineering
- Renewable energy technologies

SSAs: 5.2 - Building and construction Review Date: 1st May 2024

Assessment and Examination Terminology

AC – *Approved Centre; an examination conducted either at the approved centre or a location approved by the centre, using staff approved by the centre to conduct the examination.*

CBSR – ***Closed Book*** *Short Response; Short response written questions will be set by the awarding organisation and administered and marked locally at the approved centre by approved markers. Learners will be prohibited from using industry normative or informative documents.*

CE *– Customer Evidence; evidence provided by a customer in the form of a written witness statement confirming a competent performance by the learner. That evidence may also be provided by an employing supervisor or manager of the learner. Witness statements that relate to a technical competence will only be accepted from a person technically competent in that particular activity to provide the statement.*

IK – *Inferred Knowledge; inferred knowledge is assessed as part of a performance assessment by a centre approved assessor. To deem the learner as having sufficient knowledge the learner must satisfactorily pass the performance assessment.*

LE – *Learner Evidence; learner generated evidence is for example documented recordings of readings, calculations or the production of a risk assessment or other procedural document.*

MC *– Multiple Choice; set by the awarding organisation and administered and marked locally or electronically. Learners will be able to answer multi-choice questions using reference to appropriate industry normative or informative sources.*

O/L – on-line: a secure web-based assessment system (XAMS)

OP – *Observed Performance; the assessment of a learner's performance by an approved assessor either in the learner's work place or at the approved centre or a location approved by the centre.*

OQ – *Oral Questions; oral questions may be asked by an assessor as part of a performance assessment or knowledge examination to confirm the understanding of the criteria by the learner*.

PA – *Performance Assessment; a performance assessment conducted either in the learner's work place or at the approved centre or a location approved by the centre.*

RWE – *Realistic Work Environment; an area at the approved centre or a location approved by the centre which replicates and has the features of a Work Place. The learner must not be permitted to be familiar with the simulated environment prior to undertaking assessment*.

SR – Short Response question

WP – *Work Place; is the naturally occurring environment in which the learner works, typically that would be in a customer's premise where work is being paid for by the customer*.

Amended 21.10.21 to include optional Unit 2013