Level 2 Certificate in Basic Plumbing Studies

6129

Scheme Standards
Level 2 Units

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These units were originally numbered by Plumbing NTO, Sector Skills Council numbering is in brackets

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Level 2 Unit 1 - Safety

General Range: the systems associated activities in which the candidate has to demonstrate safety to meet the requirements of this unit are:

Activities on non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling, as covered by the technical units at Level 2

Unit 21 Maintain the Safe Working Environment When Undertaking Plumbing Work Activities

Element 21.1 Use Safe Procedures When Working With Others

Knowledge Outcomes

1. the general responsibilities of the employer and employee for ensuring safety in the work place
(PC 21.1.1, 21.1.2) (Range 1, 2, 3, 4)

1.1 the general requirements of health and safety legislation for the employer's responsibilities for safety in the workplace

1.2 the employee's responsibilities for his/her own and other's safety at work

1.3 the employer's responsibilities for the provision of personal protective equipment

2. the requirements of current safety legislation for the range of work operations
(PC 21.1.1) (Range 1, 3, 4)

2.1 the general requirements of construction safety legislation for safety in work locations where plumbing operations may be carried out

2.2 the general requirements of safety legislation for the safe handling and lifting of materials and components

2.3 the general requirements of current legislation regarding safe working with electrically operated tools and equipment, including temporary electrical supplies in work locations

2.4 the general requirements of current legislation regarding safe working with hazardous materials

2.5 the general requirements of current legislation regarding safe working with lead

2.6 the general requirements of current legislation regarding working in excavations

3. the potential hazards or risks associated with the range of work locations in which work on systems is undertaken, the measures to be taken to reduce risk
(PC 21.1.2) (Range 3, 4)

3.1 the particular risks associated with different types of work location, including new building sites, occupied buildings, service and maintenance sites, working at heights, in excavations and confined spaces, with hazardous materials

3.2 the types of personal protective equipment used in plumbing work

3.3 the safety signs and notices used in work locations in which plumbing work is carried out

3.4 the typical measures used to prevent accidents in plumbing work locations

3.5 the measures used in and around plumbing work locations to protect the workforce and the public

3.6 the special measures to be taken to protect plumbing operatives working on drains and sanitary appliances

3.7 the measures to be taken to protect the workforce when working with lead

3.8 the measures to be taken to protect the workforce and property when using heating gases/ heating appliances

3.9 the essential personal hygiene procedures to protect the health of the workforce – minimum provisions for toilet and washing facilities in the workplace

3.10 the minimum provisions for first aid facilities in the workplace

3.11 the types of fire fighting equipment appropriate for use in plumbing work – correct methods of use

3.12 the measures to be taken within work locations to provide safe access routes for the movement of the workforce and materials

3.13 correct handling and lifting techniques to be employed for the range of materials and equipment used in plumbing work

4. general measures to be taken to create safety awareness – company on site policies – applying and supervising site safety practices including measures to report potential safety hazards
(PC 21.1.1, 21.1.2) (Range 1, 2, 3)

4.1 the purpose and content of company safety policies

4.2 the range of safety signs and notices used in construction locations

4.3 the importance or reporting to an appropriate person any defects in safety equipment, or potential hazards in the workplace

5. accident reporting procedures
(PC 21.1.1) (Range 1, 3)

5.1 the statutory requirements for reporting accidents in the workplace

5.2 methods of reporting and recording accidents

5.3 the importance of safe keeping of accident records

6. basic first aid procedures
(PC 21.1.2) (Range 3)

6.1 the basic first aid procedures for minor injuries in the workplace

6.2 the immediate actions to take in the event of serious injury to persons in the workplace, resulting from cuts, contact with heat source, contact with electrical supply, falls, foreign substances in the eye

Unit 21 **Maintain the Safe Working Environment When Undertaking Plumbing Work Activities**

Element 21.2 **Use Safe Work Practices**

Knowledge Outcomes

1. how to work from general risk assessments and how to apply them in the workplace
(PC 21.2.1) (Range 1)

1.1 the purpose of a risk assessment – levels of risk – the importance of complying with the requirements of a risk assessment

1.2 the general risks associated with work locations, tools and equipment, hazardous materials hazardous processes

2. safe practices when carrying out work on the range of systems and components
(PC 21.1.1, 21.2.3, 21.2.5, 21.2.6, 21.2.8) (Range 1, 2, 3, 6)

2.1 the sources of information of safety in installation and maintenance work for the range of systems and components

3. the range of tools and equipment for installation or maintenance work – their safe use maintenance requirements – safety equipment
(PC 21.2.3, 21.2.4) (Range 2)

3.1 the maintenance requirements for the range of tools required for installation and maintenance of plumbing components, including hand tools, power operated tools, test equipment,

3.2 the care and maintenance requirements for access equipment used in plumbing operations

3.3 the care and maintenance requirements for safety equipment used in the installation and maintenance of plumbing components

4. the range of tools and equipment whose use is controlled by legislation (PC 21.2.3, 21.2.4) (Range 2)

4.1 the tools and equipment whose use is controlled by legislation, including cartridge operated fixing tools.

4.2 the tools and equipment whose maintenance is controlled by legislation, including abrasive wheels

5. the range of potentially hazardous materials used for system installation or maintenance work (PC 21.2.6) (Range 3)

5.1 the potential hazards arising from the incorrect assembly and use of LPG or other gas fired heating equipment

5.2 the potential hazards arising from the use of cleaning agents

5.3 the potential hazards arising from the use of lead

5.4 the potential hazards which could arise from the presence of asbestos

5.5 the main requirements of COSHH Regulations

6. the methods of identifying potentially hazardous materials and level of risk including asbestos (PC 21.2.6) (Range 3)

6.1 how to identify the hazardous substances that may commonly be encountered in the workplace, the level of risk that each presents, including cleaning agents, lead, asbestos

6.2 the physical properties/characteristics of commonly occurring hazardous materials

7. safety precautions including the use of personal protective equipment (PC 21.2.1, 21.2.3, 21.2.5, 21.2.6) (Range 1, 2, 3, 4)

7.1 the range of safety checks for the presence of hazardous materials, and precautions that should be undertaken in a typical work location

7.2 the importance of selecting the types of PPE, checking for safe condition at each occasion of use, and wearing at all times when there is a risk

7.3 the importance of handling potentially hazardous materials in an appropriate and safe manner

8. the legislation or recommendations governing the safe use or disposal of hazardous materials
(PC 21.2.6) (Range 3)

8.1 the hazardous materials used in plumbing systems, including materials that could provide a threat to the environment

8.2 the recommendations of safety directives for the safe disposal of hazardous materials

9. the methods of protecting customers' property within the range of locations in which system installation or maintenance work is carried out
(PC 21.2.7) (Range 4, 5)

9.1 the range of customers' property for which it may be necessary to provide protection, including external building fabric, internal building fabric, furnishings and fitting, ornaments and accessories, motor vehicles

9.2 methods of protecting customer's property during work operations on plumbing systems, including covering, removal to safe storage.

10. how to liaise with the customer, pre-work inspection, reporting existing damage or identifying damage arising from work operations
(PC 21.2.7) (Range 4, 5)

10.1 the importance of liaising with the customer at the appropriate times, on measures to be taken to protect property

10.2 the importance of carrying out an inspection of any customer's property in the work location and recording and reporting any existing damage, before plumbing operations commence

10.3 the importance of promptly recording and reporting any damage that occurs during work operations

11. the procedures for summoning the different emergency services. The information required by the emergency services to permit them to respond promptly
(PC 21.2.7) (Range 4)

11.1 the responsibilities of the three emergency services – typical situations when each may be required

11.2 procedures for summoning the emergency services and the types of information that each will require to permit them to respond promptly

11.3 any actions that could be taken while awaiting the arrival of the emergency services to assist their actions on arrival

12. the range of fire extinguishers used for different types of fire and how to extinguish small fires in a safe manner
(PC 21.2.7) (Range 4)

12.1 the different classes of fire and their fuel sources

12.2 the types of fire extinguisher and their uses for the different classes of fire

12.3 circumstance when it would be appropriate to fight a fire, and circumstances when it would not

13 . typical evacuation procedures for work locations in which system installation or maintenance work may be carried out
(PC 21.2.5) (Range 4)

13.1 the reasons why it may become necessary to evacuate a building in which work is being carried out including fire, and toxic atmosphere

13.2 typical evacuation procedures and the precautions to be observed during evacuation

13.3 the purpose of an assembly point for building evacuation, and the importance of complying with any instructions relating to assembly upon the evacuation of a building

Level 2 Unit 2 - Key Plumbing Principles

General Range: the systems associated activities in which the candidate has to demonstrate knowledge of key plumbing principles to meet the requirements of this unit are:

Activities on non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling, as covered by the technical units at Level 2

Key principles are the basic plumbing science and mathematics underpinning the installation, decommissioning and maintenance of plumbing systems.

The Units/Elements/ Knowledge items to which the Key Principles are related are identified as follows,

For example:

The knowledge item on the principles of combustion (item 2 below) is referenced as follows

Unit 21.2/12 PC 21.2.5 Range 4

This identifies the knowledge item as a requirement of

Unit 21	Maintain the safe working environment when undertaking plumbing work activities
Element 21.2	Use Safe Work Practices
Knowledge item 12	The range of fire extinguishers used for different types of fire and how to extinguish small fires in a safe manner
PC 21.2.5	The PC that is linked to the Knowledge item in the unit/element
Range 4	the range item that is linked to the knowledge item in the unit/element

Knowledge Outcomes

1. Properties of heating gases

Unit 21.2/1 PC 21.2.1	**Range 1**
Unit 21.2/2 PC 21.2.1, 21.2.3, 21.2.5, 21.2.6, 21.2.8	**Range 1, 2, 3, 6**
Unit 21.2/5 PC 21.2.6	**Range 3**
Unit 7.1/11 PC 7.1.1	**Range 1**

1.1 The properties of gases used for heating purposes in plumbing activities – LPG – propane – butane

1.2 The properties of gases used as fuels in hot water and heating systems – Natural gas and LPG

2. Principles of combustion

Unit 21.2/12 PC 21.2.5 **Range 4**

2.1 The three requirements for combustion - fuel – oxygen – ignition

2.2 The combustion temperatures of common materials

3. Properties of water – relative density – max. density and changes of state – latent heat of fusion of ice – latent heat of vaporization
Unit 7.2/3 PC 7.1

3.1 boiling point – freezing point

3.2 behaviour at various temperatures

4. Properties of water – relative density – max. density and changes of state – latent heat of fusion of ice – latent heat of vaporization
Unit 7.2/3 PC 7.1

4.1 the relative density of water

4.2 the maximum density of water and what happens when water changes state

4.3 the concept of latent heat – heat lost/gained when water changes state - latent heat of fusion of ice – latent heat of vaporization of water

5. Force and pressure in water – intensity of pressure – pressure head - units of measurement
Unit 7.2/3 PC 7.1
Unit 7.2/8 PC 7.2.8, 7.2.9 **Range 2, 5, 8, 9**

5.1 The concept of 'head of water' – static head – intensity of pressure

5.2 The concept of gravitational acceleration - units of measurement of pressure– Pascal – bar - Newton

5.3 Procedures for calculation pressure and intensity of pressure using standard units of measurement

6. Flow of water in pipes and channels – frictional resistance – principles of self-cleansing velocity
Unit 7.2/2 PC 7.2.2, 7.2.3, 7.2.4, 7.2.5 **Range 2, 3, 4, 5, 6**
Unit 7.2/3 PC 7.2.3, 7.2.4 **Range 2, 3, 4**

6.1 The concept of frictional resistance to water flow in pipes and channels – principles of self-cleansing velocity

7. Atmospheric pressure – principles of the siphon
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

7.1 The principles of siphonic action and their application in plumbing systems and components

8. Measurement of temperature
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

8.1 Procedures for measuring the temperatures of solid, liquids, and gases using the Celsius temperature scale

9. Specific heat capacity
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

9.1 The concept of specific heat capacity

9.2 The specific heat capacity of water and its application to plumbing systems

10. Methods of heat transfer – conduction – convection – radiation
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

10.1 The concept of heat transfer by conduction – good and bad conductors – positive and negative aspects of conduction in plumbing systems – properties of insulators and their application in plumbing systems

10.2 The concept of heat transfer by convection – application of the principles of convection to plumbing system design and operation

10.3 The concept of heat transfer by radiation – effectiveness of different surfaces and finishes as good or bad radiators

11. Hardness in water- PH values – Temporary and permanent hardness
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

11.1 The concept of the 'water cycle' – properties of water from different sources – acidity and alkalinity in water

11.2 The concept of the PH value of water

11.3 Causes of temporary and permanent hardness in water

12. Effects of hardness in water on plumbing systems – water treatment – water softeners
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

12.1 Effects of hardness in water on plumbing systems and components

12.2 Methods of water treatment – principles of operation of water softeners

13. Electrolytic action and corrosion in systems – methods of preventing corrosion
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**

13.1 The causes of corrosion in systems – the 'electromotive series' – good and bad combinations of metals

13.2 Corrosion 'troublespots' in plumbing systems

13.3 Methods of preventing corrosion in plumbing systems – selection of combinations of metals – use of sacrificial anodes - use of coatings to prevent corrosion e.g. galvanising

14. Capillarity in liquids – adhesion and cohesion – surface tension – positive and negative effects of capillarity in plumbing systems
Unit 16.3/1 PC 16.3.1 **Range 1, 2, 3, 4**
Unit 16.3/2 PC 16.3.2, 16.3.4 **Range 4, 5, 2, 3**
Unit 7.2/2 PC 7.2.2, 7.2.3, 7.2.4, 7.2.5 **Range 2, 3, 4, 5, 6**

14.1 The concept of capillarity in liquids – the role of adhesion and cohesion and surface tension in capillarity

14.2 Positive and negative effects of capillarity in plumbing systems and components

15. Properties of plumbing materials – mass/weight – relative density – specific heat capacity
Unit 7.2/2 PC 7.2.2, 7.2.3, 7.2.4, 7.2.5 **Range 2, 3, 4, 5, 6**

15.1 Properties of plumbing materials – mass/weight – relative density

15.2 Properties of plumbing materials – malleability – ductility – hardness – tensile strength

15.3 Properties of plumbing materials – specific heat capacity

16. Properties of plumbing materials – coefficient of linear expansion – heat conductivity – specific heat capacity
Unit 7.2/2 PC 7.2.2, 7.2.3, 7.2.4, 7.2.5 **Range 2, 3, 4, 5, 6**

16.1 Properties of plumbing materials – coefficient of linear expansion

16.2 Properties of plumbing materials – heat conductivity

16.3 Properties of plumbing materials – specific heat capacity

17. Principles of electrical supply – AC /DC current – units of measurement of voltage, current, resistance, single and three phase supply – domestic supplies – earth continuity bonding – circuit protection devices

Unit 7.2/2 PC 7.2.2, 7.2.3, 7.2.4, 7.2.5	**Range 2, 3, 4, 5, 6**
Unit 7.2/3 PC 7.2.3, 7.2.4	**Range 2, 3, 4**
Unit 7.2.4 PC 7.2.5	**Range 2, 3, 5, 6**
Unit 12.2/3 PC 12.1.4	**Range 2, 5**
Unit 12.2/4 PC 12.1.3	**Range 2, 3**
Unit 12.2/5 PC 12.1.4	**Range 2, 3, 5**

17.1 the principles of electricity – generation – flow of electricity – electromotive force - electrical resistance – AC and DC current – conductors and insulators

17.2 the principles of single and three phase supply – series and parallel circuits

17.3 the principles of design of layouts of electrical supplies to domestic premises – mains supplies and connections – consumer units and use of fuses – cables and components including jointing components – power and lighting circuits – earthing procedures and requirements.

17.4 the principles of operation of circuit protection devices – fuses – miniature circuit breakers – residual current devices

17.5 the supply, connection, and protection requirements of electrically powered plumbing components

17.6 the principles and procedures for applying temporary earth continuity bonding

Level 2 Unit 3 – Common Plumbing Processes

General Range of systems

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

This unit covers a range of common plumbing installation, decommissioning & maintenance processes that apply to the range of plumbing systems covered in the Level 2 units.

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 sources of information on the layout of buildings, including their construction details and materials, and provisions for systems installation

1.2 the sources of information on the requirements of health and safety legislation governing safety in work locations

1.3 that information for smaller installations, or additions or amendments to systems, may be in the form of verbal instructions from the customer, and the importance of confirming such instructions.

1.4 methods of accommodating systems pipework within walls, floors, roof spaces

1.5 the preparatory work to be carried out by other trades (when in attendance)

2. regulations, recommendations governing safety in the workplace. General responsibilities of the operative for his/her own safety and that of others
(PC 7.1.1, 7.1.2) (Range 1, 2)

2.1 the general requirements of health and safety legislation for the safety of work locations

2.2 general responsibilities of operatives for their own safety and the safety of others

2.3 requirements of health and safety legislation for the safe movement of the workforce, materials, site visitors, and members of the public

3. the equipment necessary to provide safe access to work at heights, or in confined spaces
(PC 7.1.2, 7.1.9) (Range 2, 9, 10)

3.1 the equipment necessary to provide safe access to work at heights, including ladders, trestles, fixed and mobile scaffolds, checks for safe condition, erection, dismantling, and safe and secure storage, appropriate warning notices, and barriers

3.2 checking the safety of temporary walkways for access to work locations, and the movement of materials and system components

3.3 ensuring the provision of adequate lighting levels within work locations

4. how to protect customer's property or the building fabric prior to the work commencing
(PC 7.1.4, 7.1.3) (Range 3, 4)

4.1 the importance of checking work locations to identify any existing damage to customer's property, including building fabric, furnishings and fittings, ornaments and accessories.

4.2 the importance of recording and reporting any existing damage to the customer's property, before commencing any work

4.3 the importance of taking appropriate measures to protect customer's property including the use of protective sheeting and the removal and safe storage of items that might be damaged during installation work

4.4 the importance of liaising with the customer on temporary storage arrangements for property that could be damaged by work activities

4.5 the importance of liaising with other trades on measures to protect work in progress, or materials ready to be fitted

7. how to ensure that the customer is fully briefed on all aspects of the installation programme
(PC 7.1.6) (Range 6)

7.1 the persons whose activities may be affected by the system installation work

7.2 the types of information that it is appropriate to pass to the customer, or other persons, including work schedules and operating instructions for systems and components

7.3 the importance of ensuring that information is passed to the customer, or other person at the appropriate time

8. the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 procedures for ordering materials and components

8.2 the purpose of supply and delivery documents

8.3 the importance of checking deliveries of materials and components for compliance with the supply order, and noting and reporting any deficiencies or damage

8.4 the importance of ensuring that material orders and supply dates will meet the job schedule

9. the actions to be taken should materials not be available at site to commence the installation activity
(PC 7.1.7, 7.1.9) (Range 7, 8, 9, 10)

9.1 the importance of checking that tools, equipment, materials and components will be on site before job commencement

9.2 the importance of reporting promptly to the appropriate persons any anticipated delays in deliveries of tools, equipment, materials, and components

9.3 the importance of liaising with other trades whose work may be affected by delays in tools, equipment, material or component delivery

10. secure storage procedures for tools, equipment, materials and components–basic stores procedures to ensure security and to minimise loss or wastage.
(PC 7.1.8 7.1.9) (Range 7, 9, 10)

10.1 the types of secure storage provision that may be required for tools, equipment, materials, and components for systems installations

10.2 the importance of arranging storage provision before deliveries

11. the actions to take in the event of a suspected gas danger –
- **incorrectly installed appliances**
- **incorrect discharge of products of combustion/ incorrect combustion**
- **leakage**

(PC 7.1.1) (Range 1)

11.1 the dangers from incorrectly installed appliances

11.2 the dangers from incorrectly installed or leaking flues

11.3 the persons to whom suspected gas dangers should be reported

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes (PC 7.2.2) (Range 2, 3)

1.1 methods of measuring locations into systems pipework and components are to be installed and recording dimensions, angles, and sizes of pipework for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components (PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing materials used for Systems installations

3. the positioning and fixing requirements for system components to conform to the system design and intended functions (PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 how to fix system components to conform to industry standards and system design requirements

3.2 the methods of making fixings to the range of structural materials

5. methods of working which protect the building décor, customer property and existing systems or components (PC 7.2.6) (Range 7, 9)

5.1 the importance of liaising with the customer on measures to protect property during work operations

5.2 the importance of taking appropriate measures to protect customer's property including the use of protective sheeting and the removal and safe storage of items that might be damaged during installation work

5.3 the importance of checking and reporting any existing damage to customer's property before commencing work activities

5.4 the importance of keeping work locations clean and tidy

6. job management structures and methods of reporting and recording job progress or problems delaying progress
(PC 7.2.7) (Range 9)

6.1 typical job management structures in plumbing companies

6.2 reporting procedures within plumbing companies

6.3 reporting procedures when plumbing company is sub-contracted to a main contractor

7. the care and maintenance requirements of tools and equipment and checks for safe condition.
(PC 7.2.1) (Range 1)

7.1 the maintenance requirements for hand and power tools used for the installation of systems and components

7.2 the checks for safe condition for hand power tools used for the installation of systems and components

7.3 the maintenance requirements for access equipment, including steps, ladders, trestles

7.4 the checks for safe condition of access equipment, including steps, ladders, trestles

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

6 how to safely collect and dispose of system contents that may be hazardous to health or the environment.
(PC 12.1.3, 12.1.4) (Range 2, 3, 4)

6.1 the types of system content that could prove hazardous to health or the environment

6.2 how to ensure that systems contents are disposed of safely to appropriate drainage provisions when decommissioning systems

Unit 16 **Maintain Non Complex Plumbing Systems and Components**

Element 16.1 **Establish Maintenance Requirements for Systems and Components**

Knowledge Outcomes

1. the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
(PC 16.1.3) **(Range 1, 2, 3)**

1.1 the range of information that should be available on systems component maintenance including specifications and schedules, manufacturers' information, services and maintenance schedules

1.2 the details that may be obtained from the different information sources

3. how to plan maintenance procedures to minimise interference with system operation and customer routines
(PC 16.1.2, 16.1.3, 16.1.4, 16.1.5) **(Range 2, 3, 4, 5)**

3.1 the other persons, including the customer and co-contractors whose work or routines may be affected by maintenance activities on systems component

4. how and when to liaise with others during maintenance activities
(PC 16.1.5) **(Range 5)**

4.1 how to identify other users of the system, or the building, with whom it would be appropriate to liaise, including customers and other trades

4.2 the points within the maintenance activities at which t would be appropriate to liaise with others

Unit 16 **Maintain Non Complex Plumbing Systems and Components**

Element 16.2 **Carry out the Maintenance of Systems and Components**

Knowledge Outcomes

3. how to complete records and reports of the maintenance of systems and components
(PC 16.2.3) **(Range 3, 2)**

3.1 the information that should be included on a maintenance record

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

2. the work procedures for the rectification of faults in systems or components which will ensure minimum disruption to customers and routines
(PC 16.3.2, 16.3.4) (Range 4, 5, 2, 3)

2.1 the persons, including customers, co-workers, other system users, with whom it may be necessary to liaise when carrying out routine maintenance of systems & components

2.2 the points within the maintenance process when liaison with others will be necessary

2.3 the importance of advising appropriate persons of the completion of maintenance activities, and the intention to re-activate systems

3. how to liaise with others to ensure co-operation in the fault rectification process
(PC 16.3.2) (Range 5)

3.1 methods of communication appropriate to liaising with customers, co-contractors, other system users

3.2 the actions to take if others are not co-operative

6. the actions to be taken when the system or component cannot be restored to full performance
(PC 16.3.4) (Range 1, 2, 3, 6)

6.1 the persons to be advised when systems or components cannot be restored to full working order

6.2 the importance of agreeing with the customer, or other system users, the temporary actions to be taken when systems cannot be restored to full working order

6.3 circumstances where it may be necessary to obtain a written instruction for further action when systems cannot be restored to full working order

Level 2 Unit 4 - Cold Water Systems

General Range:

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

The range covered is direct and indirect systems.

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for Direct and Indirect Cold Water Systems, including pipe materials, fittings, controls, storage cisterns, and incoming services

1.2 sources of information on the fixing and installation requirements for Cold Water Systems components

5. the input services or supplies required for new systems or components, or for extending systems or adding components to existing systems - how to confirm that input services are adequate
(PC 7.1.5) (Range 5)

5.1 methods of identifying the water supply requirements of Direct or Indirect Cold Water Systems or components

5.2 methods of confirming that incoming water services or existing supply meet the requirements of the system or components

6. the persons to whom deficiencies in input services should be reported and procedures for isolating input services
(PC 7.1.5) (Range 5)

6.1 the persons to whom deficiencies in input water services should be reported, including the customer, co-contractors, or other building users

6.2 the importance of ensuring that appropriate actions are taken to remedy deficiencies in services or supply before the connection of the system or component

8. the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures.
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of Cold Water Systems and components

8.2 the range of materials and components required for the installation of Cold Water Systems, including pipe materials, pipe fittings, controls, fixings, storage cisterns

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes
(PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of Cold Water Systems installations to establish positions of pipework, fittings, fixings, controls, storage cisterns

1.2 methods of measuring locations into which Cold Water Systems pipework and components are to be installed and recording dimensions, angles, and sizes of pipework for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing all materials used for Cold Water Systems installations

2.2 approved methods of cutting storage cistern materials

2.3 the industry standards of workmanship for Cold Water Systems installations

2.4 the safety practices appropriate to fabrication and installation work on Cold Water Systems

2.5 how to interpret system design information on the positioning requirements for Cold Water System components

2.6 how to interpret information on the fixing requirements of Cold Water System components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of Cold Water Systems to conform to legislative requirements and recommendations

3.2 the positioning of Cold Water System components to conform to industry standards and system design requirements

3.3 how to fix Cold Water System components to conform to industry standards and system design requirements, including the fixing of pipework, controls, storage cisterns, insulation sets

4. the procedures required for connecting to input services or connecting pipework into existing systems
(PC 7.2.5) (Range 2, 3, 5, 6)

4 .1 how to connect Cold Water Systems components to input services using methods that conform to industry requirements, including positioning of control valves, and system drainage provisions

4.2 how to connect Cold Water Systems components to existing systems pipework using methods that conform to industry requirements

4.3 how to connect Cold Water Systems pipework to storage cisterns, including connection and termination of overflow and warning pipes.

4.4 the jointing methods and materials approved for use on Cold Water Systems components

8. the range of tests used to confirm the soundness of systems and components and how to use the range of soundness test equipment
(PC 7.2.8, 7.2.9) (Range 2, 5, 8, 9)

8.1 the different types of test used for Cold Water Systems installations including pressure, static pressure, and air tests, and procedures and work sequences for each type of test

8.2 the hygiene and charging procedures for newly installed, or extensions to existing Cold Water Systems

8.3 methods of preventing the unauthorised/inadvertent use of Cold Water Systems installations that are not ready for use, including sealing all open ends on pipework, securing controls on incoming service or supply, placing warning notices on controls, advising customers or other trades

8.4 the importance of advising customers or line managers when testing is about to take place, when testing has been completed, and when the system is ready for use

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

1. the importance of confirming the system design, specification, functions and outcomes of suspending the operation of the system
(PC 12.1.1, 12.1.3, 12.1.4) (Range 1, 2, 3, 4)

1.1 the importance of interpreting information on the Cold Water System or component, including information gained from site inspection, to confirm the outcomes of decommissioning the system or component

1.2 the persons with whom liaison should take place before, during and after the decommissioning process, including customers, other appropriate trades, line manager

1.3 the industry requirements, standards, and tests and procedures used for decommissioning Cold Water Systems

2. the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
(PC 12.1.1, 12.1.2) (Range 1)

2.1 how to identify other persons, including customers, and other trades whose work or routines may be affected by the decommissioning procedures

2.2 how to liaise with other persons to minimise disruption to their work or routines

3. the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place
(PC 12.1.4) (Range 5, 2)

3.1 the potential safety hazards that could arise from the decommissioning of Cold Water Systems, including the interruption of supply to other systems

3.2 the checks to be carried out in advance of system decommissioning to ensure that any potential hazards that could arise, have been removed

4. de-commissioning procedures for temporary and permanent de-commissioning of systems
(PC 12.1.3) (Range 2, 3)

4.1 identify the differences between the tests and procedures for temporary and permanent decommissioning of Cold Water Systems

4.2 the different actions and procedures to be used when a full or part system, or individual component is being decommissioned

5. the precautions to ensure that de-commissioned systems do not prove a safety hazard – measures to prevent systems being brought into operation – safety and warning notices
(PC 12.1.4) (Range 2, 3, 5)

5.1 the precautionary actions including liaison with customer or other system or building users, sealing of open pipework, labelling of controls, to ensure that decommissioned Cold Water Systems do not become a hazard

5.2 the types of warning notices that are appropriate for use on temporarily or permanently decommissioned systems

7. how to complete systems de-commissioning records
(PC 12.1.3) (Range 2, 3, 4)

7.1 how to identify situations where it would be appropriate to complete records of the decommissioning of Cold Water Systems

7.2 the types of information that a decommissioning record should contain

Unit 16 **Maintain Non Complex Plumbing Systems and Components**

Element 16.1 **Establish Maintenance Requirements for Systems and Components**

Knowledge Outcomes

1. the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
(PC 16.1.3) (Range 1, 2, 3)

1.1 the range of information that should be available on Cold Water Systems components including specifications and schedules, manufacturers' information, services and maintenance schedules

1.2 the details that may be obtained from the different information sources

2. the maintenance procedures across the range of systems and components
(PC 16.1.2, 16.1.5, 16.1.6) (Range 2, 4, 5, 6)

2.1 the activities that make up routine maintenance schedules for Cold Water Systems components

2.2 the industry standards for routine maintenance of Cold Water Systems components, including compliance with Codes of Practice, BS Recommendations, Manufacturers' specifications.

2.3 the requirements of health and safety legislation for safety in the routine maintenance of Cold Water Systems components

3. how to plan maintenance procedures to minimise interference with system operation and customer routines
(PC 16.1.2, 16.1.3, 16.1.4, 16.1.5) (Range 2, 3, 4, 5)

3.1 the other persons, including the customer and co-contractors whose work or routines may be affected by maintenance activities on Cold Water Systems components

3.2 how to plan the maintenance of Cold Water Systems components to minimise system downtime

3.3 the importance of ensuring that all tools, equipment, and materials will be available as required, and the costs of delays

5. the materials required for routine maintenance
(PC 16.1.4) (Range 4)

5.1 the consumable materials required for the maintenance of Cold Water System components, including replacement parts for controls, gland packings, floats, washers.

5.2 the sources of information on the materials required for routine maintenance of Cold Water Systems components

6. the tools and equipment required for routine maintenance operations
(PC 16.1.4) (Range 4)

6.1 the tools and equipment required for maintenance operations, including hand and powered tools

6.2 the access equipment used for routine maintenance operations on Cold Water Systems components including stand steps, ladders, and trestle

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.2 Carry out the Maintenance of Systems and Components

Knowledge Outcomes

1. how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
(PC 16.2.1) (Range 1, 2)

1.1 the Cold Water Systems components that require routine maintenance, including pipe materials, controls, and storage cisterns

1.2 how to interpret the required performance of Cold Water Systems and components using performance specifications, manufacturer's technical data, codes of practice and BS Recommendations

1.3 the routine maintenance procedures necessary to maintain Cold Water System component performance

2. the maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine maintenance activities
(PC 16.2.1, 16.2.2) (Range 1, 2)

2.1 the industry requirements for routine maintenance of Cold Water Systems pipe materials and components, including compliance with specifications, manufacturer's technical data, codes of practice and BS Recommendations

2.2 how to ensure compliance with the requirements of safety legislation in carrying out routine maintenance of Cold Water Systems components

3. how to complete records and reports of the maintenance of systems and components
(PC 16.2.3) (Range 3, 2)

3.1 the types of maintenance activity for which it will be necessary to complete records of maintenance work

3.2 the information that should be included on a maintenance record

4. the action to take when the system or component does not work to full performance specification
(PC 16.2.1) (Range 1)

4.1 procedures for reporting the continued failure of the Cold Water Systems component

4.2 the persons to whom it would be necessary to report continued failure of a Cold Water Systems component

4.3 circumstances in which it might be necessary to implement emergency or temporary provisions for Cold Water Supply due to delay in correcting faults

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

1. how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
(PC 16.3.1) (Range 1, 2, 3, 4)

1.1 the types of information sources on Cold Water System or component performance

1.2 how to carry out visual inspections of Cold Water Systems components to check their performance against specifications

1.3 how to obtain information on component performance from customers or system users

1.4 how to carry out diagnostic tests to determine the causes of faults in Cold Water Systems components

1.5 the causes of faults in Cold Water Systems including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

4. the work action and sequences required to rectify faults in systems and components
(PC 16.3.1, 16.3.3) (Range 1, 2, 3, 4)

4.1 work sequences required to rectify faults in Cold Water System pipework or components, including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

5. the measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out rectification procedures
(PC 16.3.2, 16.3.4) (Range 5, 6, 2, 3)

5.1 the importance of ensuring that appropriate liaison has taken place before, during, and after maintenance activities

5.2 the measures to be taken to prevent the unauthorised use of systems or components on which maintenance work is being carried out, including safe isolation of the system component, sealing of any open pipework, labelling of controls

7. how to isolate unsafe systems and components
(PC 16.3.4) (Range 6, 2, 3)

7.1 how to interpret information, including that gained by visual inspection, and information given by customers or persons in authority, to determine systems layouts, including the positions of pipework, controls, storage cisterns

7.2 methods of ensuring that unsafe systems cannot be used, including securing of controls, labelling controls, draining sections of pipework, posting warning notices, informing system users

Level 2 Unit 5 - Domestic Hot Water Systems

General Range:

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

The range covered is direct & indirect systems fed from storage (excludes unvented hot water systems).

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for Direct and Indirect Domestic Hot Water Systems, including pipe materials, fittings, controls, storage cisterns and cylinders, and incoming services

1.2 sources of information on the fixing and installation requirements for Domestic Hot Water Systems components

5. the input services or supplies required for new systems or components, or for extending systems or adding components to existing systems - how to confirm that input services are adequate
(PC 7.1.5) (Range 5)

5.1 methods of identifying the water supply requirements of Direct or Indirect Domestic Hot Water Systems or components

5.2 methods of confirming that input water supply or existing supply meets the requirements of the system or components

6. the persons to whom deficiencies in input services should be reported and procedures for isolating input services
(PC 7.1.5) (Range 5)

6.1 the persons to whom deficiencies in input water supply should be reported, including the customer, co-contractors, or other building users

6.2 the importance of ensuring that appropriate actions are taken to remedy deficiencies in input water supply before the connection of the system or component

8. the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of Domestic Hot Water Systems and components

8.2 the range of materials and components required for the installation of Domestic Hot Water Systems, including pipe materials, pipe fittings, controls, fixings, storage cisterns and cylinders

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes
(PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of Domestic Hot Water Systems installations to establish positions of pipework, fittings, fixings, controls, storage cisterns & cylinders

1.2 methods of measuring locations into which Domestic Hot Water Systems pipework and components are to be installed and recording dimensions, angles, and sizes of pipework for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing all materials used for Domestic Hot Water Systems installations

2.2 the industry standards of workmanship for Domestic Hot Water Systems installations

2.3 the safety practices appropriate to fabrication and installation work on Domestic Hot Water Systems

2.4 how to interpret system design information on the positioning requirements for Domestic Hot Water System components

2.5 how to interpret information on the fixing requirements of Domestic Hot Water System components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of Domestic Hot Water Systems to conform to legislative requirements and recommendations

3.2 the positioning of Domestic Hot Water System components to conform to industry standards and system design requirements

3.3 how to fix Domestic Hot Water System components to conform to industry standards and system design requirements, including the fixing of pipework, controls, storage vessels, and insulation sets

4. the procedures required for connecting to input services or connecting pipework into existing systems
(PC 7.2.5) (Range 2, 3, 5, 6)

4.1 how to connect Domestic Hot Water Systems components to input supply using methods that conform to industry requirements, including positioning of control valves, and system drainage provisions

4.2 how to connect Domestic Hot Water Systems components to existing systems pipework using methods that conform to industry requirements

4.3 how to connect Domestic Hot Water Systems pipework to storage vessels, including connection and termination of overflow and warning pipes.

4.4 the jointing methods and materials approved for use on Domestic Hot Water Systems components

8. the range of tests used to confirm the soundness of systems and components and how to use the range of soundness test equipment
(PC 7.2.8, 7.2.9) (Range 2, 5, 8, 9)

8.1 the different types of test used for Domestic Hot Water Systems installations including pressure, static pressure, and air tests, and procedures and work sequences for each type of test

8.2 the hygiene and charging procedures for newly installed, or extensions to existing Domestic Hot Water Systems

8.3 methods of preventing the unauthorised/inadvertent use of Domestic Hot Water Systems installations that are not ready for use, including sealing all open ends on pipework, securing controls on input supply, placing warning notices on controls, advising customers or other trades

8.4 the importance of advising customers or line managers when testing is about to take place, when testing has been completed, and when the system is ready for use

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

1. the importance of confirming the system design, specification, functions and outcomes of suspending the operation of the system
(PC 12.1.1, 12.1.3, 12.1.4) (Range 1, 2, 3, 4)

1.1 the importance of interpreting information on the Domestic Hot Water System or component, including information gained from site inspection, to confirm the outcomes of decommissioning the system or component

1.2 the persons with whom liaison should take place before, during and after the decommissioning process, including customers, other appropriate trades, line manager

1.3 the industry requirements, standards, and tests and procedures used for decommissioning Domestic Hot Water Systems

2. the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
(PC 12.1.1, 12.1.2) (Range 1)

2.1 how to identify other persons, including customers, and other trades whose work or routines may be affected by the decommissioning procedures

2.2 how to liaise with other persons to minimise disruption to their work or routines

3. the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place
(PC 12.1.4) (Range 5, 2)

3.1 the potential safety hazards that could arise from the decommissioning of Domestic Hot Water Systems, including the interruption of supply to other systems

3.2 the checks to be carried out in advance of system decommissioning to ensure that any potential hazards that could arise, have been removed

4. de-commissioning procedures for temporary and permanent de-commissioning of systems
(PC 12.1.3) (Range 2, 3)

4.1 identify the differences between the tests and procedures for temporary and permanent decommissioning of Domestic Hot Water Systems

4.2 the different actions and procedures to be used when a full or part system, or individual component is being decommissioned

5 the precautions to ensure that de-commissioned systems do not prove a safety hazard – measures to prevent systems being brought into operation – safety and warning notices
(PC 12.1.4) (Range 2, 3, 5)

5.1 the precautionary actions including liaison with customer or other system or building users, sealing of open pipework, labelling of controls, to ensure that decommissioned Domestic Hot Water Systems do not become a hazard

5.2 the types of warning notices that are appropriate for use on temporarily or permanently decommissioned systems

7. how to complete systems de-commissioning records
(PC 12.1.3) (Range 2, 3, 4)

7.1 how to identify situations where it would be appropriate to complete records of the decommissioning of Domestic Hot Water Systems

7.2 the types of information that a decommissioning record should contain

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.1 Establish Maintenance Requirements for Systems and Components

Knowledge Outcomes

1. the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
(PC 16.1.3) (Range 1, 2, 3)

1.1 the range of information that should be available on Domestic Hot Water Systems components including specifications and schedules, manufacturers' information, services and maintenance schedules

1.2 the details that may be obtained from the different information sources

2. the maintenance procedures across the range of systems and components
(PC 16.1.2, 16.1.5, 16.1.6) (Range 2, 4, 5, 6)

2.1 the activities that make up routine maintenance schedules for Domestic Hot Water Systems components

2.2 the industry standards for routine maintenance of Domestic Hot Water Systems components, including compliance with Codes of Practice, BS Recommendations, Manufacturers' specifications.

2.3 the requirements of health and safety legislation for safety in the routine maintenance of Domestic Hot Water Systems components

3. how to plan maintenance procedures to minimise interference with system operation and customer routines
(PC 16.1.2, 16.1.3, 16.1.4, 16.1.5) (Range 2, 3, 4, 5)

3.1 the other persons, including the customer and co-contractors whose work or routines may be affected by maintenance activities on Domestic Hot Water Systems components

3.2 how to plan the maintenance of Domestic Hot Water Systems components to minimise system downtime

3.3 the importance of ensuring that all tools, equipment, and materials will be available as required, and the costs of delays

5. the materials required for routine maintenance
(PC 16.1.4) (Range 4)

5.1 the consumable materials required for the maintenance of Domestic Hot Water System components, including replacement parts for controls, gland packings, floats, washers.

5.2 the sources of information on the materials required for routine maintenance of Domestic Hot Water Systems components

6. the tools and equipment required for routine maintenance operations
(PC 16.1.4) (Range 4)

6.1 the tools and equipment required for maintenance operations, including hand and powered tools

6.2 the access equipment used for routine maintenance operations on Domestic Hot Water Systems components including stand steps, ladders, and trestles

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.2 Carry out the Maintenance of Systems and Components

Knowledge Outcomes

1. how to use performance specifications for systems and components, and maintenance procedures necessary to restore or maintain the continued performance of systems and components
(PC 16.2.1) (Range 1, 2)

1.1 the Domestic Hot Water Systems components that require routine maintenance, including pipe materials, controls, and storage vessels

1.2 how to interpret the required performance of Domestic Hot Water Systems and components using performance specifications, manufacturer's technical data, codes of practice and BS Recommendations

1.3 the routine maintenance procedures necessary to maintain Domestic Hot Water System component performance

2. the maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine maintenance activities
(PC 16.2.1, 16.2.2) (Range 1, 2)

2.1 the industry requirements for routine maintenance of Domestic Hot Water Systems pipe materials and components, including compliance with specifications, manufacturer's technical data, codes of practice and BS Recommendations

2.2 how to ensure compliance with the requirements of safety legislation in carrying out routine maintenance of Domestic Hot Water Systems components

3. how to complete records and reports of the maintenance of systems and components
(PC 16.2.3) (Range 3, 2)

3.1 the types of maintenance activity for which it will be necessary to complete records of maintenance work

3.2 the information that should be included on a maintenance record

4. the action to take when the system or component does not work to full performance specification
(PC 16.2.1) (Range 1)

4.1 procedures for reporting the continued failure of the Domestic Hot Water Systems component

4.2 the persons to whom it would be necessary to report continued failure of a Domestic Hot Water Systems component

4.3 circumstances in which it might be necessary to implement emergency or temporary provisions for Domestic Hot Water supply due to delay in correcting faults

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

1. how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
(PC 16.3.1) (Range 1, 2, 3, 4)

1.1 the types of information sources on Domestic Hot Water System or component performance

1.2 how to carry out visual inspections of Domestic Hot Water Systems components to check their performance against specifications

1.3 how to obtain information on component performance from customers or system users

1.4 how to carry out diagnostic tests to determine the causes of faults in Domestic Hot Water Systems components

1.5 the causes of faults in Domestic Hot Water Systems including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

4. the work action and sequences required to rectify faults in systems and components
(PC 16.3.1, 16.3.3) (Range 1, 2, 3, 4)

4.1 work sequences required to rectify faults in Domestic Hot Water System pipework or components, including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

5. the measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out rectification procedures
(PC 16.3.2, 16.3.4) (Range 5, 6, 2, 3)

5.1 the importance of ensuring that appropriate liaison has taken place before, during, and after maintenance activities

5.2 the measures to be taken to prevent the unauthorised use of systems or components on which maintenance work is being carried out, including safe isolation of the system component, sealing of any open pipework, labelling of controls

7. how to isolate unsafe systems and components
(PC 16.3.4) (Range 6, 2, 3)

7.1 how to interpret information, including that gained by visual inspection, and information given by customers or persons in authority, to determine systems layouts, including the positions of pipework, controls, storage vessels

7.2 methods of ensuring that unsafe systems cannot be used, including securing of controls, labelling controls, draining sections of pipework, posting warning notices, informing system users

Level 2 Unit 6 - Above Ground Discharge Pipework Systems

General Range:

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

The systems range for this unit includes the knowledge of Below Ground Drainage Pipework Systems that is required to permit the connection of Above Ground Discharge Pipework Systems

Above Ground Discharge Pipework Systems (including sanitary appliances)
- Single Stack Systems
- Ventilated Systems
- Ventilated Stack Systems
- Rainwater pipe and gutter systems (in plastics)

Below Ground Drainage Systems
- Separate Systems
- Combined Systems

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems, including pipe materials, fittings, components, and appliances

1.2 sources of information on the fixing and installation requirements for Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems, components and appliances

5. the supply and discharge provisions required for new systems or components, or for extending systems or adding components to existing systems - how to confirm that supply and discharge provisions are adequate
(PC 7.1.5) (Range 5)

5.1 methods of identifying the water supply and discharge requirements of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems or components

5.2 methods of confirming that water supply and discharge provision or existing water supply and discharge provisions meet the requirements of the system or components

6. the persons to whom deficiencies in water supply or discharge provisions should be reported and procedures for isolating supply or discharge provisions (PC 7.1.5) (Range 5)

6.1 the persons to whom deficiencies in water supply or discharge provisions should be reported, including the customer, co-contractors, or other building users

6.2 the importance of ensuring that appropriate actions are taken to remedy deficiencies in water supply or discharge provisions before the connection of the system or component

8. the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures (PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems and components

8.2 the range of materials and components required for the installation of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems, including pipe materials, pipe fittings, fixings, components and sanitary appliances

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes (PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems installations to establish positions of pipework, fittings, fixings, components, and sanitary appliances

1.2 methods of measuring locations into which Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems pipework and components are to be installed and recording dimensions, angles, and sizes of pipework for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, jointing, and installing all materials used for Above Ground Discharge Pipework Systems, and cutting materials to make connections to Below Ground Discharge Pipework Systems installations

2.2 the industry standards of workmanship for Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems installations

2.3 the safety practices appropriate to fabrication and installation work on Above Ground Discharge Pipework Systems, and connections to Below Ground Discharge Pipework Systems

2.4 how to interpret system design information on the positioning requirements for Above Ground Discharge Pipework System, and connection to Below Ground Discharge Pipework System components

2.5 how to interpret information on the fixing requirements of Above Ground Discharge Pipework System, and connection to Below Ground Discharge Pipework System components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems to conform to legislative requirements and recommendations

3.2 the positioning of Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System components to conform to industry standards and system design requirements

3.3 how to fix Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System components to conform to industry standards and system design requirements, including the fixing of pipework, components, and appliances

3.4 the preparatory, positioning and fixing requirements of all types of sanitary appliances installed in domestic premises

4. the procedures required for connecting to supply or discharge provisions or connecting pipework into existing systems
(PC 7.2.5) (Range 2, 3, 5, 6)

4.1 how to connect Above Ground Discharge Pipework System, and Below Ground Discharge Pipework Systems components to supply and discharge provisions using methods that conform to industry requirements, including positioning of controls for sanitary appliances, and connections to system drainage provisions

4.2 how to connect Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components to existing systems pipework using methods that conform to industry requirements

4.3 how to connect Above Ground Discharge Pipework Systems to sanitary appliances and to Below Ground Discharge Pipework Systems pipework, including connection and termination of overflow and warning pipes.

4.4 the jointing methods and materials approved for use on Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

8. the range of tests used to confirm the soundness of systems and components and how to use the range of soundness test equipment
(PC 7.2.8, 7.2.9) (Range 2, 5, 8, 9)

8.1 the different types of test used for Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems installations including pressure, static pressure, and air tests, and procedures and work sequences for each type of test

8.2 the hygiene and charging procedures for newly installed, or extensions to existing Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems

8.3 methods of preventing the unauthorised/inadvertent use of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems installations that are not ready for use, including sealing all open ends on pipework, securing controls on system supply, placing warning notices on controls, advising customers or other trades

8.4 the importance of advising customers or line managers when testing is about to take place, when testing has been completed, and when the system is ready for use

8.5 procedures for checking and testing that sanitary appliances are leak free

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

1. the importance of confirming the system design, specification, functions and outcomes of suspending the operation of the system
(PC 12.1.1, 12.1.3, 12.1.4) (Range 1, 2, 3, 4)

1.1 the importance of interpreting information on the Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System or component, including information gained from site inspection, to confirm the outcomes of decommissioning the system or component

1.2 the persons with whom liaison should take place before, during and after the decommissioning process, including customers, other appropriate trades, line manager

1.3 the industry requirements, standards, and tests and procedures used for decommissioning Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems

2. the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
(PC 12.1.1, 12.1.2) (Range 1)

2.1 how to identify other persons, including customers, and other trades whose work or routines may be affected by the decommissioning procedures

2.2 how to liaise with other persons to minimise disruption to their work or routines

3. the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place
(PC 12.1.4) (Range 5, 2)

3.1 the potential safety hazards that could arise from the decommissioning of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems, including the interruption of supply, or discharge provisions to other systems

3.2 the checks to be carried out in advance of system decommissioning to ensure that any potential hazards that could arise, have been removed

4. de-commissioning procedures for temporary and permanent de-commissioning of systems
(PC 12.1.3) (Range 2, 3)

4.1 identify the differences between the tests and procedures for temporary and permanent decommissioning of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems

4.2 the different actions and procedures to be used when a full or part system, or individual component is being decommissioned

5. the precautions to ensure that de-commissioned systems do not prove a safety hazard – measures to prevent systems being brought into operation – safety and warning notices
(PC 12.3.4) (Range 2, 3, 5)

5.1 the precautionary actions including liaison with customer or other system or building users, sealing of open pipework, labelling of supply controls, to ensure that decommissioned Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems do not become a hazard

5.2 the types of warning notices that are appropriate for use on temporarily or permanently decommissioned systems

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.1 Establish Maintenance Requirements for Systems and Components

Knowledge Outcomes

1. the range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
(PC 16.1.3) (Range 1, 2, 3)

1.1 the range of information that should be available on Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components including specifications and schedules, manufacturers' information, services and maintenance schedules

1.2 the details that may be obtained from the different information sources

2. the maintenance procedures across the range of systems and components
(PC 16.1.2, 16.1.5, 16.1.6) (Range 2, 4, 5, 6)

2.1 the activities that make up routine maintenance schedules for Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

2.2 the industry standards for routine maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components, including compliance with Codes of Practice, BS Recommendations, Manufacturers' specifications.

2.3 the requirements of health and safety legislation for safety in the routine maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

3. how to plan maintenance procedures to minimise interference with system operation and customer routines
(PC 16.1.2, 16.1.3, 16.1.4, 16.1.5) (Range 2, 3, 4, 5)

3.1 the other persons, including the customer and co-contractors whose work or routines may be affected by maintenance activities on Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

3.2 the types of commercial or industrial operations that may be affected by maintenance activities on Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

3.3 how to plan the maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components to minimise system downtime

3.4 the importance of ensuring that all tools, equipment, and materials will be available as required, and the costs of delays

5. the materials required for routine maintenance
(PC 16.1.4) (Range 4)

5.1 the consumable materials required for the maintenance of Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System components, including replacement parts supply systems components, including WC cisterns

5.2 the sources of information on the materials required for routine maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components, including WC cisterns

6. the tools and equipment required for routine maintenance operations
(PC 16.1.4) (Range 4)

6.1 the tools and equipment required for maintenance operations, including hand and powered tools

6.2 the access equipment used for routine maintenance operations on Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components including stand steps, ladders, and trestle

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.2 Carry out the Maintenance of Systems and Components

Knowledge Outcomes

1. how to use performance specifications for systems and components and maintenance procedures necessary to restore or maintain the continued performance of systems and components
(PC 16.2.1) (Range 1, 2)

1.1 the Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components that require routine maintenance, including pipe materials, supply controls to appliances, including WC Cisterns.

1.2 how to interpret the required performance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems and components using performance specifications, manufacturer's technical data, codes of practice and BS Recommendations

1.3 the routine maintenance procedures necessary to maintain Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System component performance

2. the maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine maintenance activities
(PC 16.2.1, 16.2.2) (Range 1, 2)

2.1 the industry requirements for routine maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems pipe materials and components, including compliance with specifications, manufacturer's technical data, codes of practice and BS Recommendations

2.2 how to ensure compliance with the requirements of safety legislation in carrying out routine maintenance of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

4. the action to take when the system or component does not work to full performance specification
(PC 16.2.1) (Range 1)

4.1 procedures for reporting the continued failure of the Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

4.2 the persons to whom it would be necessary to report continued failure of an Above Ground Discharge Pipework System, or Below Ground Discharge Pipework System component

4.3 circumstances in which it might be necessary to implement emergency or temporary provisions for Above Ground Discharge Pipework System, or Below Ground Discharge Pipework System due to delay in correcting faults

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

1. how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
(PC 16.3.1) (Range 1, 2, 3, 4)

1.1 the types of information sources on Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System or component performance

1.2 how to carry out visual inspections of Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components to check their performance against specifications

1.3 how to obtain information on component performance from customers or system users

1.4 how to carry out diagnostic tests to determine the causes of faults in Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems components

1.5 the causes of faults in Above Ground Discharge Pipework Systems, and Below Ground Discharge Pipework Systems including inadequate supply, discharge from warning pipes, leaks in system components, loss of trap seals, corrosion of system components, inadequate performance of appliances

4. the work action and sequences required to rectify faults in systems and components
(PC 16.3.1, 16.3.3) (Range 1, 2, 3, 4)

4.1 work sequences required to rectify faults in Above Ground Discharge Pipework System, and Below Ground Discharge Pipework System pipework or components, including inadequate supply, discharge from warning pipes, leaks in system components, loss of trap seals, corrosion of system components, inadequate performance of appliances

5. the measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out rectification procedures
(PC 16.3.2, 16.3.4) (Range 5, 6, 2, 3)

5.1 the importance of ensuring that appropriate liaison has taken place before, during, and after maintenance activities

5.2 the measures to be taken to prevent the unauthorised use of systems or components on which maintenance work is being carried out, including safe isolation of the system component, sealing of any open pipework, labelling of controls

7. how to isolate unsafe systems and components
(PC 16.3.4) (Range 6, 2, 3)

7.1 how to interpret information, including that gained by visual inspection, and information given by customers or persons in authority, to determine systems layouts, including the positions of pipework, supply controls, system discharge connections

7.2 methods of ensuring that unsafe systems cannot be used, including securing of supply controls, labelling controls, disconnecting appliances, stopping up sections of pipework, posting warning notices, informing system users

Level 2 Unit 7 - Central Heating Systems (Pipework Systems Only)

General Range:

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

Central Heating Systems – systems pipework and components only – systems up to 45kW heat input, open vented systems only, competences related to controls systems only relates to the installation of controls and the replacement of defective individual controls – full controls principles and fault diagnostics are covered at Level 3.

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for Central Heating Pipework Systems, including pipe materials, fittings, controls, feed and expansion cisterns, and supply

1.2 sources of information on the fixing and installation requirements for Central Heating Pipework Systems components

5. the water supplies required for new systems or components, or for extending systems or adding components to existing systems - how to confirm that water supplies are adequate
(PC 7.1.5) (Range 5)

5.1 methods of identifying the water supply requirements of Central Heating Pipework Systems or components

5.2 methods of confirming that the system water supply or existing system feed meet the requirements of the system or components

8. the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of Central Heating Pipework Systems and components

8.2 the range of materials and components required for the installation of Central Heating Pipework Systems, including pipe materials, pipe fittings, controls, fixings, feed and expansion cisterns

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes
(PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of Central Heating Pipework System installations to establish positions of pipework, fittings, fixings, controls, feed and expansion cisterns

1.2 methods of measuring locations into which Central Heating Pipework Systems pipework and components are to be installed and recording dimensions, angles, and sizes of pipework for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing all materials used for Central Heating Pipework Systems installations

2.2 approved methods of cutting feed and expansion cistern materials

2.3 the industry standards of workmanship for Central Heating Pipework Systems installations

2.4 the safety practices appropriate to fabrication and installation work on Central Heating Pipework Systems

2.5 how to interpret system design information on the positioning requirements for Central Heating Pipework System components

2.6 how to interpret information on the fixing requirements of Central Heating Pipework System components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of Central Heating Pipework Systems to conform to legislative requirements and recommendations

3.2 the positioning of Central Heating Pipework System components to conform to industry standards and system design requirements

3.3 how to fix Central Heating Pipework System components to conform to industry standards and system design requirements, including the fixing of pipework, controls, feed and expansion cisterns, insulation sets

4. the procedures required for connecting to input supply or connecting pipework into existing systems
(PC 7.2.5) (Range 2, 3, 5, 6)

4.1 how to connect Central Heating Pipework Systems components to input supply using methods that conform to industry requirements, including positioning of control valves, and system drainage provisions

4.2 how to connect Central Heating Pipework Systems components to existing systems pipework using methods that conform to industry requirements

4.3 how to connect Central Heating Pipework Systems pipework to feed and expansion cisterns, including connection and termination of overflow and warning pipes.

4.4 the jointing methods and materials approved for use on Central Heating Pipework Systems components

8. the range of tests used to confirm the soundness of systems and components and how to use the range of soundness test equipment
(PC 7.2.8, 7.2.9) (Range 2, 5, 8, 9)

8.1 the different types of test used for Central Heating Pipework System installations including pressure, static pressure, and air tests, and procedures and work sequences for each type of test

8.2 the hygiene and charging procedures for newly installed, or extensions to existing Central Heating Pipework Systems

8.3 methods of preventing the unauthorised/inadvertent use of Central Heating Pipework Systems installations that are not ready for use, including sealing all open ends on pipework, securing controls on incoming supply, placing warning notices on controls, advising customers or other trades

8.4 the importance of advising customers or line managers when testing is about to take place, when testing has been completed, and when the system is ready for use

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

1. the importance of confirming the system design, specification, functions and outcomes of suspending the operation of the system
(PC 12.1.1, 12.1.3, 12.1.4) (Range 1, 2, 3, 4)

1.1 the importance of interpreting information on the Central Heating Pipework System or component, including information gained from site inspection, to confirm the outcomes of decommissioning the system or component

1.2 the persons with whom liaison should take place before, during and after the decommissioning process, including customers, other appropriate trades, line manager

1.3 the industry requirements, standards, and tests and procedures used for decommissioning Central Heating Pipework Systems

2. the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
(PC 12.1.1, 12.1.2) (Range 1)

2.1 how to identify other persons, including customers, and other trades whose work or routines may be affected by the decommissioning procedures

2.2 liaison with other persons to minimise disruption to their work or routines

3. the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place
(PC 12.1.4) (Range 5, 2)

3.1 the potential safety hazards that could arise from the decommissioning of Central Heating Pipework Systems, including the interruption of supply to other systems, and the interruption of supply to industrial processes

3.2 the checks to be carried out in advance of system decommissioning to ensure that any potential hazards that could arise, have been removed

4. the precautions to ensure that de-commissioned systems do not prove a safety hazard – measures to prevent systems being brought into operation – safety and warning notices
(PC 12.1.4) (Range 2, 3, 5)

4.1 the precautionary actions including liaison with customer or other system or building users, sealing of open pipework, labelling of controls, to ensure that decommissioned Central Heating Pipework Systems do not become a hazard

4.2 the types of warning notices that are appropriate for use on temporarily or permanently decommissioned systems

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.1 Establish Maintenance Requirements for Systems and Components

Knowledge Outcomes

2. the maintenance procedures across the range of systems and components
(PC 16.1.2, 16.1.5, 16.1.6) (Range 2, 4, 5, 6)

2.1 the activities that make up routine maintenance schedules for Central Heating Pipework Systems components

2.2 the industry standards for routine maintenance of Central Heating Pipework Systems components, including compliance with Codes of Practice, BS Recommendations, Manufacturers' specifications.

2.3 the requirements of health and safety legislation for safety in the routine maintenance of Central Heating Pipework Systems components

Unit 16 Maintain Non Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

1. how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
(PC 16.3.1) (Range 1, 2, 3, 4)

1.1 the types of information sources on Central Heating Pipework System or component performance

1.2 how to carry out visual inspections of Central Heating Pipework Systems components to check their performance against specifications

1.3 how to obtain information on component performance from customers or system users

1.4 how to carry out diagnostic tests to determine the causes of faults in Central Heating Pipework Systems components

1.5 the causes of faults in Central Heating Pipework Systems including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

4. the work action and sequences required to rectify faults in systems and components
(PC 16.3.1, 16.3.3) (Range 1, 2, 3, 4)

4.1 work sequences required to rectify faults in Central Heating Pipework System pipework or components, including inadequate supply, air locks, noise, discharge from warning pipes, leaks in system components, control malfunction, corrosion of system components

5. the measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out rectification procedures
(PC 16.3.2, 16.3.4) (Range 5, 6, 2, 3)

5.1 the importance of ensuring that appropriate liaison has taken place before, during, and after maintenance activities

5.2 the measures to be taken to prevent the unauthorised use of systems or components on which maintenance work is being carried out, including safe isolation of the system component, sealing of any open pipework, labelling of controls

7.	**how to isolate unsafe systems and components (PC 16.3.4)**	**(Range 6, 2, 3)**
7.1	how to interpret information, including that gained by visual inspection, and information given by customers or persons in authority, to determine systems layouts, including the positions of pipework, controls, feed and expansion cisterns	
7.2	methods of ensuring that unsafe systems cannot be used, including securing of controls, labelling controls, draining sections of pipework, posting warning notices, informing system users	

Level 2 Unit 8 - Electrical Supply and Earth Continuity Systems

Note:

1 **It is emphasised that this unit is intended to provide the essential knowledge that is required to permit Level Two candidates to work safely within the limits of their own competence with electrical supply and continuity systems, and to offer appropriate advice to customers**

2 **Possession of the knowledge and understanding outlined above does not confer competence in the installation, decommissioning, or servicing and maintenance of electrical systems, or in work on earth continuity systems**

General Range:

Non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling

1 – Electrical supply to domestic appliances

Dishwashers
Washing machines
Macerator type WC
Electric water heaters
Electric showers
Electrical immersion heaters
Waste disposal units

2 – Controls for central heating systems

Connections to central heating control components

3 – Earth continuity systems

Main and supplementary bonding of extraneous metallic parts of plumbing systems
Temporary earth continuity bonding to permit work on system

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for Electrical Supply and Earth Continuity Systems, including cables, controls, consumer units, earthing provisions

1.2 sources of information on the fixing and installation requirements for Electrical Supply and Earth Continuity Systems components

5. the input supplies or earthing provision required for new systems or components, or for extending systems or adding components to existing systems - how to confirm that input services are adequate
(PC 7.1.5) (Range 5)

5.1 methods of identifying the electrical supply and earthing requirements of systems or components

5.2 methods of confirming that the electrical supply and earthing provisions meet the requirements of the system or components

6. the persons to whom deficiencies in electrical supply and earthing provisions should be reported and procedures for isolating electrical supply
(PC 7.1.5) (Range 5)

6.1 the persons to whom deficiencies in electrical supply and earthing provisions should be reported, including the customer, co-contractors, or other building users

6.2 the importance of ensuring that appropriate actions are taken to remedy deficiencies in electrical supply and earthing provisions before the connection of the system or component

8. the tools, equipment, materials and components required for the electrical supply and earthing system installation – order and supply advice, delivery and checking procedures
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of Electrical Supply and Earth Continuity Systems and components

8.2 the range of materials and components required for the installation of Electrical Supply and Earth Continuity Systems, including cables, fixings, controls, jointing components

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes
(PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of Electrical Supply and Earth Continuity Systems installations to establish positions of cables, fixings, controls, jointing components

1.2 methods of measuring locations into which Electrical Supply and Earth Continuity Systems cables, fixings, controls, jointing components are to be installed and recording dimensions, angles, and sizes of cables/conduit for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing all materials used for Electrical Supply and Earth Continuity Systems installations

2.2 the industry standards of workmanship for Electrical Supply and Earth Continuity Systems installations

2.3 the safety practices appropriate to fabrication and installation work on Electrical Supply and Earth Continuity Systems

2.4 how to interpret system design information on the positioning requirements for Electrical Supply and Earth Continuity System components

2.5 how to interpret information on the fixing requirements of Electrical Supply and Earth Continuity System components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of Electrical Supply and Earth Continuity Systems to conform to legislative requirements and recommendations

3.2 the positioning of Electrical Supply and Earth Continuity System components to conform to industry standards and system design requirements

3.3 how to fix Electrical Supply and Earth Continuity System components to conform to industry standards and system design requirements, including the fixing of cables, fixings, controls, jointing components

4. the procedures required for connecting to electrical supply or earthing provisions or connecting into existing provisions
(PC 7.2.5) (Range 2, 3, 5, 6)

4 .1 how to connect Electrical Supply and Earth Continuity Systems components to input services using methods that conform to industry requirements

4.2 how to connect Electrical Supply and Earth Continuity Systems components to existing systems pipework using methods that conform to industry requirements

4.3 the jointing methods and materials approved for use on Electrical Supply and Earth Continuity Systems components

8. the range of tests used to confirm the soundness of systems and components and how to use the range of soundness test equipment
(PC 7.2.8, 7.2.9) (Range 2, 5, 8, 9)

8.1 the different types of test used for Electrical Supply and Earth Continuity Systems installations including earth continuity, polarity, insulation resistance, over current protection devices

8.2 methods of preventing the unauthorised/inadvertent use of Electrical Supply and Earth Continuity Systems installations that are not ready for use – safe isolation procedure for electrical systems

8.3 the importance of advising customers or line managers when testing is about to take place, when testing has been completed, and when the system is ready for use

Unit 12 Decommission Non-Complex Plumbing Systems and Components

Element 12.1 Decommission Systems

Knowledge Outcomes

1. the importance of confirming the system design, specification, functions and outcomes of suspending the operation of the system
(PC 12.1.1, 12.1.3, 12.1.4) (Range 1, 2, 3, 4)

1.1 the importance of interpreting information on the Electrical Supply and Earth Continuity System or component, including information gained from site inspection, to confirm the outcomes of decommissioning the system or component

1.2 the persons with whom liaison should take place before, during and after the decommissioning process, including customers, other appropriate trades, line manager

1.3 the industry requirements, standards, and tests and procedures used for decommissioning Electrical Supply and Earth Continuity Systems – safe electrical system isolation procedure

2. the need to liaise with others whose procedures or routines may be affected by the suspension of the system operation
(PC 12.1.1, 12.1.2) (Range 1)

2.1 how to identify other persons, including customers, and other trades whose work or routines may be affected by the decommissioning procedures

2.2 liaison with other persons to minimise disruption to their work or routines

3.	**the potential hazards that could arise from de-commissioning activities and the checks to be carried out before de-commissioning takes place (PC 12.1.4) (Range 5, 2)**
3.1	the potential safety hazards that could arise from the decommissioning of Electrical Supply and Earth Continuity Systems, including the interruption of supply to other systems
3.2	the checks to be carried out in advance of system decommissioning to ensure that any potential hazards that could arise, have been removed

4.	**de-commissioning procedures for temporary and permanent de-commissioning of systems (PC 12.1.3) (Range 2, 3)**
4.1	identify the differences between the tests and procedures for temporary and permanent decommissioning of Electrical Supply and Earth Continuity Systems
4.2	the different actions and procedures to be used when a full or part system, or individual component is being decommissioned
4.3	the purpose of temporary continuity bonding and where it would be used need to be used when carrying out decommissioning, maintenance or installation activities on systems

5.	**the precautions to ensure that de-commissioned systems do not prove a safety hazard – measures to prevent systems being brought into operation – safety and warning notices (PC 12.1.4) (Range 2, 3, 5)**
5.1	the precautionary actions including liaison with customer or other system or building users – safe isolation procedures for use on electrical systems
5.2	the types of warning notices that are appropriate for use on temporarily or permanently decommissioned systems

Level 2 Unit 9 - Sheet Lead Weathering Systems

General Range:

Sheet weathering systems in lead for chimneys, abutments, roof penetrations to slated, tiled roof surfaces

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.1 Prepare Work Locations for the Installation of Systems and Components

Knowledge Outcomes

1. the sources of information on the preparatory work necessary for the system or component installation
(PC 7.1.1, 7.1.9) (Range 1, 9, 10)

1.1 the sources of legislation governing the layout and positioning of components for sheet weathering systems, including lead sheet materials, fixings, underlays

1.2 sources of information on the fixing and installation requirements for sheet weathering systems components

1.3 sizes and locations of sheet lead weathering components that have to be accommodated by the building structure

1.4 methods of accommodating sheet lead weathering components on roofs, walls, and other surfaces

1.5 the preparatory work to be carried out by other trades, when in attendance

2 regulations, recommendations governing safety in the workplace. General responsibilities of the operative for his/her own safety and that of others
(PC 7.1.1, 7.1.2) (Range 1, 2)

2.1 the general requirements of health and safety legislation for the safety of work locations

2.2 general responsibilities of operatives for their own safety and the safety of others

2.3 requirements of health and safety legislation for the safe movement of the workforce, materials, site visitors, and members of the public

4 how to protect customer's property or the building fabric prior to the work commencing
(PC 7.1.4, 7.1.3) (Range 3, 4)

4.1 the importance of checking work locations to identify any existing damage to customer's property, including building fabric, furnishings and fittings, ornaments and accessories.

4.2 the importance of recording and reporting any existing damage to the customer's property, before commencing any work

4.3 the importance of taking appropriate measures to protect customer's property including the use of protective sheeting and the removal and safe storage of items that might be damaged during installation work

4.4 the importance of liaising with the customer on temporary storage arrangements for property that could be damaged by work activities

4.5 the importance of liaising with other trades on measures to protect work in progress, or materials ready to be fitted

8 the tools, equipment, materials and components required for the system installation – order and supply advice, delivery and checking procedures
(PC 7.1.7, 7.1.9) (Range 7, 9, 10)

8.1 the range of tools and equipment required for the installation of sheet weathering systems and components

8.2 the range of materials and components required for the installation of sheet weathering systems, including sheet lead, underlays, fixings

Unit 7 Install Non Complex Plumbing Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Knowledge Outcomes

1. how to measure and record installation and site details for prefabrication purposes
(PC 7.2.2) (Range 2, 3)

1.1 how to interpret drawings of sheet weathering systems installations to establish positions of sheet lead components, underlays and fixings

1.2 methods of measuring locations into which sheet weathering systems components are to be installed and recording dimensions, angles, and sizes of sheet for prefabrication purposes

2. the industry practices and work standards for fabricating and installing system components
(PC 7.2.2, 7.2.3, 7.2.4, 7.2.5) (Range 2, 3, 4, 5, 6)

2.1 methods of cutting, bending, jointing, and installing all materials used for sheet lead weathering systems installations

2.2 approved methods of cutting sheet lead

2.3 the industry standards of workmanship for sheet lead weathering systems installations

2.4 the safety practices appropriate to fabrication and installation work on sheet weathering systems

2.5 how to interpret system design information on the positioning requirements for sheet weathering system components

2.6 how to interpret information on the fixing requirements of sheet weathering system components

3. the positioning and fixing requirements for system components to conform to the system design and intended functions
(PC 7.2.3, 7.2.4) (Range 2, 3, 4)

3.1 layouts of sheet weathering systems to conform to legislative requirements and recommendations

3.2 the positioning of sheet weathering system components to conform to industry standards and system design requirements

3.3 how to fix sheet weathering system components to conform to industry standards and system design requirements, including the fixing of sheet lead, and underlays

Unit 16 Maintain Non - Complex Plumbing Systems and Components

Element 16.3 Diagnose the Cause and Rectify Faults in Systems and Components

Knowledge Outcomes

1. how to interpret information on system or component performance, including advice from users, visual inspections or checks or diagnosis tests to locate faults
(PC 16.3.1) (Range 1, 2, 3, 4)

1.1 the types of information sources on sheet weathering system or component performance

1.2	how to carry out visual inspections of sheet weathering systems components to check their performance against specifications
1.3	how to obtain information on component performance from customers or system users
1.4	the causes of faults in sheet weathering systems including water penetration into buildings, blocked gutters, lead staining of building fabric, corrosion of components, lead damage from debris, wind lift, lead damage from thermal movement, lead damage from incorrect sizing, lead damage from inadequate expansion allowances

Level 2 **Unit 10 - Environmental Awareness**

General Range: the systems associated activities in which the candidate has to demonstrate environmental awareness to meet the requirements of this unit are:

Activities on non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling, as covered by the technical units at Level 2.

This unit provides the knowledge to undertake the installation, decommissioning & maintenance of the systems in an environmentally friendly manner.

Unit 22 **Contribute to the Improvement of the Plumbing Work Environment**

Element 22.1 **Demonstrate Environmental Awareness within the Workplace**

Knowledge Outcomes

1. the potential implications for the environment of the work procedures used in installing or maintaining systems or components
(PC All) **(Range 1, 2)**

1.1 the plumbing processes, including production of materials, that use non-renewable sources

1.2 the energy consumption of processes used in plumbing installations

1.3 the plumbing processes that result in exhaust gases, and the characteristics of exhaust gases

2. alternative 'low risk' materials, products and procedures
(PC 22.1.1, 22.1.3) **(Range 1, 2)**

2.1 plumbing products/materials for which there is an 'environmentally friendly' option

2.2 plumbing procedures and methods of working which minimise harmful emissions

3. prefabrication and installation methods that reduce material wastage
(PC 22.1.1) **(Range 1, 2)**

3.1 work procedures that minimise waste of consumable materials

3.2 the importance of accurate measurement of material requirements

4. the importance of reporting hazards to the environment that arise from work procedures within the scope of the candidate's area of responsibility and ensuring that appropriate actions are taken
(PC 22.1.2) (Range 1, 2)

4.1 how to identify any potential hazard to the environment in routine or non-routine plumbing procedures

4.2 the persons to whom potential or actual hazards to the environment should be reported

4.3 the importance of ensuring that action has been taken to remedy situations that provide a hazard to the environment

5. the range of information that needs to be passed to the customer to ensure the correct and economical use of energy dependant systems
(PC 22.1.1) (Range 1, 2)

5.1 the importance of ensuring that all information necessary to the correct operation of appliances is available to the customer

5.2 the importance of ensuring that all appliance and system controls are correctly adjusted on hand over of the system or component

6 the general advice that can be given to customers on methods of reducing waste of resources, and effecting savings
(PC 22.1.3) (Range 1, 2)

6.1 the types of advice that would assist the customer to minimise use of resources, including minimum operating times for appliances, optimum settings for appliance controls

6.2 the cost savings arising from insulation, or additional insulation of properties

7 the disposal methods used by the organisation for waste materials
(PC 22.1.1) (Range 1, 2)

7.1 the content of typical company policies on collection and disposal of waste materials

7.2 the importance of complying with local authority re-cycling facilities for waste materials

Level 2 Unit 11 - Effective Working Relationships

General Range: the systems associated activities in which the candidate has to demonstrate effective working relationships to meet the requirement of this unit are:

Activities on non-complex systems and components to meet the requirements of systems in dwellings, or in buildings (or parts of buildings) with a similar systems requirement to a dwelling, as covered by the technical units at Level Two.

This unit provides the knowledge to support developing effective working relationships with customers, colleagues and co-contractors whilst undertaking the installation, decommissioning & maintenance of the range of plumbing systems.

Unit 24 Maintain Effective Plumbing Working Relationships

Element 24.1 Establish, Develop and Maintain Effective Working Relationships with Others

Knowledge Outcomes

1 the range of other people encountered within the work environment with whom it may be necessary to establish working relationships (PC 24.1.1) (Range 1)

1.1 the general range of other people likely to be encountered on a large building site, where the plumbing work is sub-contracted

1.2 the other people likely to be encountered on domestic installation or maintenance work where the plumbing employer is the main contractor

2 the different types of management structures for organisations employing M.E.S labour– the roles and responsibilities of the different individuals within the structure (PC 24.1.1, 24.1.2, 24.1.4) (Range 1, 2)

2.1 typical management structures for a large building company – main roles and responsibilities

2.2 typical management structures for a small plumbing company – main roles and responsibilities

2.3 typical management structures for a large building site – main roles and responsibilities, including responsibilities of sub-contractors

3 other persons' expectations of a good working relationship (PC 24.1.4) (Range 1)

3.1 the different expectations of the range of persons within the work situation

4 the types of job information that may be requested by others in the workplace – sources of information – methods of accessing information and possible restrictions on passing information to others
(PC 24.1.2) (Range 2)

4.1 the range of job information

4.2 the range of job information that may be requested by other trades

4.3 the range of job information that may be requested by the immediate supervisor/site management

5 the forms of communication used for the range of job or company information best suited to its purpose – using the key principles of good communication in work situations, including methods of confirming that the communication has been understood
(PC 24.1.3) (Range 3, 2)

5.1 the different forms of communication, including verbal, written, diagrams and sketches

5.2 the most appropriate form of communication for passing detailed technical information

5.3 the importance of confirming that the information has been understood

6 The actions that are necessary to begin to develop, and maintain good working relationships, or restore working relationships
(PC 24.1.1, 24.1.4) (Range 1)

6.1 the initial actions necessary to begin the development of good working relationships, including being helpful to others, co-operating with other trades, listening to others, using appropriate forms of communication

7 the principles of good working relationships and reasons why relationships may break down
(PC All) (Range All)

7.1 the ongoing actions necessary to continue good relationships

7.2 recognising the signs of a potential breakdown in working relationships

8 the actions to take to restore working relationships where a breakdown occurs
(PC All) (Range All)

8.1 how to establish the underlying reasons for the other persons discontent

8.2 when and how to seek the help of a third party as intermediary

Level 2 Unit 12 – Practical Unit

Summary of Contents of the Unit

This unit contains the practical skills requirement for the following

1.0 Units of Competence

Unit 7 Install Non – Complex Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

Unit 16 Maintain Non-Complex Systems and Components

Element 16.2 Carry out Maintenance of Systems and Components

2.0 Range of Systems covered by the unit

2.1 The range of systems covered by the unit is

Cold Water Systems – Direct and Indirect Systems
Hot Water Systems – Direct and Indirect Systems
Above Ground Discharge – Pipework Systems
Below Ground Discharge – Pipework Systems (connections only)
Central Heating Systems – Pipework systems only
Sheet Weathering Systems – Basic range
Electrical Supply and Earth Continuity Systems

2.2 Main practical outcomes resulting from this module

The practical outcomes describe the practical competences that candidates should be able to demonstrate under centre workshop conditions, upon completion of the training course.

The main practical outcomes (listed below) vary according to the different contexts against which they are set.

Each section covers a different context e.g. different range of tools, or e.g. different range of components.

The Practical Outcomes' for the different sections (contexts) are described by the 'Practical outcome definitions'

A series of practical task activities at Level 2 are derived from this specification. The practical tasks are centrally set by the awarding body as a set national standard to be applied across all centres that offer the award.

Practical outcomes

Unit 7 Install Non-Complex Systems and Components

Element 7.2 Carry out the Installation of Systems and Components

A Check for safe condition and safely use the range of tools, and equipment for the installation of systems within the range

Section 1 Plumbing tools and equipment - hand tools and equipment
Section 2 Tools and equipment – power tools
Section 3 Access equipment

B Select and use materials for systems installation

Section 4 Materials for systems installations

C Fabricate system components using work methods that conform to industry requirements

Section 5 Copper pipework fabrication
Section 6 Low carbon steel pipework fabrication
Section 7 Plastics pressure pipe fabrication
Section 8 Plastics soil and waste, and rainwater pipe and gutter fabrication
Section 9 Lead sheet weathering fabrication

D Position and install system components using work methods that conform to industry requirements

Section 10 Systems pipework (and gutter)
Section 11 Systems pipework in timber floors
Section 12 Application of temporary earth continuity bonding
Section 13 Lead sheet weathering components
Section 14 Systems components other than pipework

E Connect system components using methods that conform to industry standards

Section 15 Connections between the range of systems components

F Terminate systems pipework using methods that comply with industry requirements

Section 16 Termination of overflow, warning and soil pipes

G Test systems pipework and components for soundness

Section 17 Testing of cold water systems, hot water systems, above ground discharge pipework systems

H Check systems and components for correct operation

Section 18 Check cold water systems, hot water systems, above ground discharge pipework systems, and their components for correct operation

Unit 16 Maintain Non-Complex Systems And Components

Element 16.2 - Carry out the routine maintenance of systems components

Section 1 Carry out routine maintenance of systems components in accordance with industry procedures and restore components to working order

3.0 Scope of systems

The systems covered by this module are intended to provide facilities for ablutionary, cleaning, culinary purposes, or to supply other systems, to dwellings, or small commercial or industrial buildings, in which the total requirements of the building, or of separate accommodations within the building are similar to that required in a dwelling

Practical Skills Requirements

Unit 7 - Install Non-Complex Systems and Components

Practical skills outcomes - the candidate should under training centre conditions be able to -

Practical Outcome A **Check for safe condition and safely use the range of tools, and equipment for the installation of systems within the range**

Section 1 - Plumbing tools and equipment – hand tools

Practical Outcome definition

A.1 Check for safe condition, and carry out routine maintenance on a selection of the following tools and equipment

A.2 Correctly select for the prefabrication, installation, fixing, and connection of materials, and safely use the following tools and equipment

1.1 tools for measuring installation situations, and marking/setting out

- rules
- squares
- tape measures
- pencils, chalks, scribers

1.2 tools for levelling and plumbing

- spirit levels
- plumb lines
- chalk lines

1.3 tools for cutting materials

- hacksaws (junior and frame) – blades for different materials
- panel saws for timber and plastics
- knives – for general purposes
- pipecutters – for copper – steel – plastics
- reamers
- files - for different materials
- rasps
- hand tools for cutting building materials – chisels – hammers
- lead knives
- snips for sheet leadwork

1.4 tools for pipe bending

- hand benders for copper tube in the size ranges 10mm –28mm
- bending springs – 15mm
- hydraulic bending machines for low carbon steel up to 25mm (1”)
- lead dresser – bossing sticks – chase wedges – setting in sticks - mallets

1.5 tools for jointing and connecting materials

- LPG or butane heating equipment (cylinder and cartridge) (assemble – test - use)
- Heatproof mats
- Fire extinguishers (cartridge type for personal use) (simulated use is permissible)
- Spanners – fixed and adjustable
- Wrenches – stillson wrenches – basin wrenches – strap wrenches – chain wrenches
- Pliers – cutting pliers – gland pliers – gas pliers
- Threading equipment - Hand stocks and dies for low carbon steel – in the size range 12mm (½") – 25mm (1") – taper and plug taps for clearing internal threads
- Stand vices – yoke and chain
- Engineers vices (inc. jaw protectors)
- Shave hooks (See 1.4 for other lead working tools)
- Oxy-acetylene welding equipment (for lead welding)

1.6 tools for the installation of systems materials (inc. making fixings)

- hand drills
- drill bits for timber – metals – plastics – brickwork – stone – ceramic tile
- bradawls
- hole saws for timber – metals – plastics
- screwdrivers - slotted – Phillips/Pozidrive
- hammers

1.7 personal protective equipment for use in the prefabrication, installation, fixing, and connection of plumbing materials

- safety helmets
- eye protection – goggles and eye shields (general eye protection and leadwelding)
- ear defenders
- dust masks/respirators
- protective clothing
- protective footwear
- barrier creams

1.8 tools/equipment for testing and leak detection

- test kits for testing by air – pumps – gauges – stop ends for pipework
- manometers

Section 2 - Tools and equipment - Power tools

Practical outcome definition

A.3 Check for safe condition the following tools and equipment used in the installation of systems

A.4 Correctly select for the prefabrication, installation, fixing, and connection of materials, and safely use the following tools and equipment

A.5 Comply with any requirements of safety legislation which control the use of the following

2.1 Power equipment

- Hand held electric drills – mains operated – battery operated
- Stand drills – mains operated
- Jig-saws
- Threading machines

Section 3 - Access equipment

Practical outcome definition

A.6 Check for safe condition, the following access equipment

A.7 Correctly select and use for access to work situations

A.8 Comply with any requirements of safety legislation which control the use of the following

3.1 ladders

- Extension ladders (safely erect, secure, use, lower, and store in safe position)
- Stand steps (safely erect, secure, use, lower, and store in safe position)

3.2 scaffolds

- sectional scaffolds/working platform up to 4m high (check for secure access)

Practical outcome B - Select and use materials for systems installations

Section 4 – Materials for systems installations

Practical outcome definitions

B.1 Correctly select materials for the prefabrication, installation, fixing, and connection of systems

B.2 Safely handle and use the following materials/components

4.1 Pipework materials

- Copper pipe
- Low carbon steel pipe
- Plastics pipe
- Insulating materials for pipework and components

4.2 System components

- Storage cisterns
- Storage cylinders
- Sanitary fittings
- Heat exchangers
- Controls

4.3 Sheet lead weathering materials

- Sheet lead in appropriate codes

4.4 Substances with a potential health hazard

- Fluxes (for soldering)
- Cleaning materials (inc. solvents)
- Lubricants
- Abrasives (inc steel wool)
- Leak detection fluids
- Solders
- Lead

Practical Outcome C - Fabricate system components using work methods that conform to industry requirements

Section 5 – Copper pipework fabrication

Practical outcome definition

C.1 Measure installation situations, record dimensions and details, select the materials, tools and equipment, and prefabricate assemblies to include

5.1 copper pipework up to 28mm

- marking out pipework for prefabrication
- cutting pipework
- bending pipe to form details - square and obtuse bends, offsets and passovers
  (copper tube up to 28mm by machine)
- jointing pipework by use of solder capillary fittings – non/manipulative compression fittings – push-fit fittings (inc. forming offsets and passovers)

Section 6 – Low Carbon Steel pipework fabrication

6.1 low carbon steel pipework up to 25mm (1")

- marking out pipework for prefabrication
- cutting pipework
- bending pipe up to 32mm to form details - square and obtuse bends, offsets and passovers
- jointing pipework by use of screw thread fittings (inc. forming offsets and passovers)

Section 7 – Plastics pressure pipe fabrication

7.1 plastics pressure pipe

- marking out pipework for prefabrication
- cutting pipework
- jointing pipework by use of proprietary fittings

Section 8 - Plastics soil, waste, and rainwater pipe and gutters

8.1 plastics soil pipe

- marking out pipework for prefabrication
- cutting pipework
- jointing pipework by use of solvent cement welded fittings, and push fit fittings (

8.2 plastics waste systems

- marking out pipework for prefabrication
- cutting pipework
- jointing pipework by use of solvent cement welded fittings, and push fit fittings

8.3 plastics rainwater pipe and gutter

RWP
- marking out pipework for prefabrication
- cutting pipework
- jointing pipework by use of solvent cement welded fittings, and push fit fittings

8.4 plastics gutter
- marking out gutter for prefabrication
- cutting gutter
- jointing gutter by use of snap-in fittings

Section 9 - Lead sheet weatherings

9.1 sheet lead

- marking out lead sheet for prefabrication
- cutting lead sheet
- forming lead sheet components by bossing and leadwelding
- jointing lead sheet by leadwelding, overlaps, and turn in to building structure

Practical Outcome D - Position and install system components using work methods that conform to industry requirements

Section 10 – Systems pipework (and gutter)

Practical outcome definition

D.1 Position components as required by the job specification, and fix to building surfaces in accordance with industry standards

10.1 copper pipework up to 28mm

- using standard pipe fastenings, spaced according to recommended distances
- fixings to brickwork using appropriate types of plugs
- fixings to timber
- fixings to finished wall surfaces

10.2 low carbon steel pipework up to 25mm (1”)

- using standard pipe fastenings, spaced according to recommended distances
- fixings to brickwork using appropriate types of plugs
- fixing to timber

10.3 plastics soil, and waste systems pipework

- using standard pipe fastenings, spaced according to recommended distances
- fixings to brickwork and/or timber

10.4 rainwater pipe

- using standard pipe fastenings, spaced according to recommended distances
- fixings to brickwork using appropriate types of plugs

10.5 rainwater gutter

- using standard gutter fixings, spaced according at recommended distances
- fixings to timber fascia

Section 11 – Systems pipework in timber floors

Practical outcome definition

D.2 Position components as required by the job specification, and install in timber floors in compliance with industry standards

11.1 copper pipework up to 22mm

- ensure appropriate methods of fixing pipes
- ensure appropriate methods of protection for concealed

Section 12 – Application of temporary earth continuity bonding

Practical outcome definition

D.3 Demonstrate the correct application of temporary continuity bonding whilst undertaking pipework systems installation

12.1 apply temporary continuity bonding to maintain the integrity the bonding system and one's own personal safety whilst replacing a section of systems pipework of up to 22mm diameter

Section 13 – Install lead sheet weathering components

13.1 lead sheet chimney weathering sets, brickwork chimney – to tiled roof, and a slate roof

- cut chases in brickwork seams
- fit lead sheet components in a logical sequence
- secure using methods that meet industry requirements
- replace tiles/slate and check installation for conformity to specification

13.2 lead sheet weathering to a roof penetration (lead slate)

- fit lead sheet component
- secure using methods that meet industry requirements
- replace tiles/slate and check installation for conformity to specification

Section 14 – Install systems components, other than pipework, in buildings

Practical outcome definition

D.4 Check compliance of component with specification

D.5 Check component for any damage

D.6 Assemble components and install in the positions required by the system specification, in accordance with industry standards

14.1 sanitary fittings – bath – wash hand basin – WC suite – sink drainer – shower tray

- assemble component and fit any associated taps or waste fittings
- place in position required by the specification
- level/plumb as required
- make any fixings to wall/floor using appropriate fixing methods

14.2 storage cisterns

- cut cistern material and fit any controls as required
- check the provision of the cistern platform for conformity to requirements
- place in position required by the specification

14.3 hot water storage cylinders

- check the provision of the cylinder platform for conformity to requirements
- place in position required by the specification

14.4 combi boiler jig

- check that all components are fitted on the jig
- fit the jig to the wall surface in accordance with manufacturer's instructions

14.5 panel radiators

- make all components to radiators
- fix radiator to manufacturer specification
- check for correct position, firm and level

Practical outcome E – Connect systems components using methods that conform to industry standards

Section 15 – Connections between the range of systems components

Practical outcome definitions

E.1 Make system connections using methods that conform to industry requirements

15.1 connections between systems pipework and sanitary appliances - bath - wash hand basin - WC suite

- check that pipework system is suitable for the component that is to be connected
- use correct pipe fittings/fitting arrangements
- use correct jointing material (where appropriate)
- use correct tools for making connections

15.2 connections between systems pipework and cold water storage cisterns

- check that pipework system is suitable for the component that is to be connected
- use correct pipe fittings/fitting arrangements
- use correct jointing material (where appropriate)
- use correct tools for making connections

15.3 connections between systems pipework and hot water storage cylinders

- check that pipework system is suitable for the component that is to be connected
- use correct pipe fittings/fitting arrangements
- use correct jointing material (where appropriate)
- use correct tools for making connections

15.4 connections between systems pipework and below ground discharge pipework systems

- check that pipework system is suitable for the component that is to be connected
- use correct pipe fittings/fitting arrangements
- use correct jointing material (where appropriate)
- use correct tools for making connections

15.5 connections between systems pipework and combi boiler jig and panel radiators

- check that pipework system is suitable for the component that is to be connected
- use correct pipe fittings/fitting arrangements
- use correct jointing material (where appropriate)
- use correct tools for making connections

Practical outcome F – Terminate systems pipework using methods that comply with industry requirements

Section 16 – Terminations of overflow, warning and soil pipes

Practical outcome definition

F.1 System pipework is terminated in accordance with industry standards

16.1 external termination of warning and overflow pipes from storage cisterns

- check that warning pipe is at correct incline
- pipe terminated at correct distance from building structure
- pipe end prepared in accordance with specification

16.2 internal termination of warning pipes

- termination in accordance with specification

16.3 external termination of soil pipe penetrating roof surface

- weathering of roof penetration in accordance with specification
- pipe terminated at correct distance from building structure
- pipe end termination in accordance with specification

Practical outcome G – Test systems pipework and components for soundness

Section 17 – Testing of Cold water systems, hot water systems, above ground discharge pipework systems

Practical outcome definition

G.1 System pipework is tested in accordance with industry standards

17.1 Cold Water Systems pipework

- test equipment is checked for good working order
- test procedures comply with industry procedures
- test pressures are in accordance with industry standards

17.2 Hot Water Systems pipework

- test equipment is checked for good working order
- test procedures comply with industry procedures
- test pressures are in accordance with industry standards

17.3 Above Ground Discharge Pipework Systems

- test equipment is checked for good working order
- test procedures comply with industry procedures
- test pressures are in accordance with industry standards

17.4 Central Heating Systems pipework

- test equipment is checked for good working order
- test procedures comply with industry procedures
- test pressures are in accordance with industry standards

Practical outcome H – Check systems and components for correct operation

Section 18 – Check cold water systems, hot water systems, above ground discharge Pipework systems, and their components for correct operation

Practical outcome definition

H.1 check the system for conformity to specification, including the correct positioning of components

H.2 Check that the types and sizes of components conform to the system specification

18.1 Cold Water Systems components

- check that pipework layout is correct, and in accordance with design specification
- check that pipe and component sizes and materials are in accordance with specification
- check that connections between components are in accordance with design specifications
- check that numbers and types of fixings for components are in accordance with industry requirements

18.2 Hot Water Supply Systems components

- check that pipework layout is correct, and in accordance with design specification
- check that pipe and component sizes and materials are in accordance with specification
- check that connections between components are in accordance with design specifications
- check that numbers and types of fixings for components are in accordance with industry requirements
- check that discharge rates at/from appliances are in accordance with design specification

18.3 Above Ground Discharge Pipework Systems (Including Rainwater pipes and gutters)

- check that pipework layout is correct, and in accordance with design specification
- check that pipe and component sizes and materials are in accordance with specification

- check that connections between components are in accordance with design specifications
- check that numbers and types of fixings for components are in accordance with industry requirements
- check that discharge rates at/from appliances are in accordance with design specification

18.4 Central Heating Systems components

- check that pipework layout is correct, and in accordance with design specification
- check that pipe and component sizes and materials are in accordance with specification
- check that connections between components are in accordance with design specifications
- check that numbers and types of fixings for components are in accordance with industry requirements

18.5 Lead sheet weatherings

- check that weathering components layout is correct, and in accordance with design specification
- check that weathering components sizes and materials are in accordance with specification
- check that joints/laps between components are in accordance with design specifications
- check that numbers and types of fixings for components are in accordance with industry requirements

Unit 16 - Maintain Non-Complex Systems And Components

Practical outcome - A Carry out the routine maintenance of systems components

Section 1 – Carry out routine maintenance of system components in accordance with industry procedures and restore component to working order

Practical outcome definition

A.1 identify the maintenance requirement of the component

A.2 confirm that all tools and equipment necessary to the maintenance work are available before commencement of the maintenance operation

A.3 follow procedures and work sequences that meet industry standards

1.1 cold Water Systems and Hot Water Systems discharge fittings for wash basins, sinks, baths

- check for correct isolation of the component from the supply
- strip down fitting using the appropriate tools
- replace serviceable parts
- reassemble
- restore supply and test for correction operation

1.2 float valves for Cold Water Storage cisterns, and WC cisterns

- check for correct isolation of the component from the supply
- strip down fitting using the appropriate tools
- replace serviceable parts
- reassemble
- restore supply and test for correction operation

1.3 shower valves

- check for correct isolation of the component from the supply
- strip down fitting using the appropriate tools
- replace serviceable parts
- reassemble
- restore supply and test for correction operation

1.4 WC siphon/ drop valve

- check for correct isolation of the component from the supply
- strip down fitting using the appropriate tools
- replace serviceable parts
- reassemble
- restore supply and test for correction operation