

Unit 020

Install and maintain domestic plumbing and heating systems

Level: 2
Credit value: 4
UAN: D/602/2939

Unit aim

This performance unit confirms job competence at Level 2 in the installation, maintenance decommissioning and soundness testing of a range of basic plumbing and heating systems and components in dwellings and industrial/commercial properties (of similar size and scope to domestic dwellings).

Learning outcomes

There are **five** learning outcomes to this unit. The learner will:

1. Be able to prepare sites for the installation of plumbing and heating systems and components in the workplace
2. Be able to install plumbing and heating systems and components in the workplace
3. Be able to soundness test plumbing and heating systems and components in the workplace
4. Be able to decommission plumbing and heating systems in the workplace
5. Be able to maintain plumbing and heating components in the workplace

Guided learning hours

It is recommended that **4** hours should be allocated for this unit for co-ordinating evidence collection and assessment planning activities, although patterns of delivery are likely to vary. Guided learning hour specifications do not include time allocations for observation and assessment activities conducted in the workplace.

Details of the relationship between the unit and relevant national standards

This unit is linked to the following SummitSkills National Occupational Standards (NOS) for the Mechanical Services Industry:

- SummitSkills NOS M7, M10, M12, M13, M25.

Support of the unit by a sector or other appropriate body

This unit is endorsed by SummitSkills.

Assessment

This unit will be assessed by evidence collection and assessment in the workplace. See notes for guidance at end of unit for assessment requirements.

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Outcome 1

Be able to prepare sites for the installation of plumbing and heating systems and components in the workplace

Assessment Criteria

The learner can:

1. Check that all necessary job information is available before commencing the installation work
2. Liaise with other persons to confirm the detail of the installation work to be carried out
3. Comply with health and safety requirements when carrying out the installation work
4. Prepare a safe and unobstructed access route to the work areas to carry out the installation work
5. Check that all required tools, equipment and materials are available to undertake the installation work
6. Use job information to identify the location of the building fabric that requires preparatory work to be carried out
7. Report any pre-existing damage to the building fabric or customer property to other persons before carrying out the installation work
8. Provide protection to the building fabric or customer property as the work progresses
9. Carry out preparatory work to the building fabric:
 - Lifting timber floor surfaces.
 - Cutting holes and notches in timber floor joists.
 - Cutting chases in wall or floor surfaces.

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Outcome 2

Be able to install plumbing and heating systems and components in the workplace

Assessment Criteria

The learner can:

1. Confirm that the incoming or outgoing main supplies meet the requirements of the system or component being installed
2. Measure and mark out the position of the components to be installed:
 - System pipework.
 - Main system components.
 - System controls.
3. Make pipework and component fixings to the building fabric
4. Position and fix pipework and components to the building fabric:
 - Copper.
 - Plastics.
5. Connect pipework to system controls and main components:
 - Cold water systems.
 - Hot water systems.
 - Central heating systems.
 - Sanitation systems.
 - Gravity rainwater systems.
6. Connect system pipework to incoming supplies or outgoing services:
 - Existing system pipework and components.
 - Cold water supply pipework.
 - Below ground drainage pipework.
7. Carry out installation work minimising the wastage of equipment and materials
8. Take precautions to ensure that the system cannot be brought into operation before the installation work is fully completed.

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Outcome 3

Be able to soundness test plumbing and heating systems and components in the workplace

Assessment Criteria

The learner can:

1. Carry out a visual inspection of the system or component to be tested to make sure that it is ready to be filled with water
2. Charge the system to normal operating pressure and check for leakage:
 - Cold water systems.
 - Hot water systems.
 - Central heating systems.
3. Perform a soundness test to industry requirements on the installed system or component:
 - Cold water systems.
 - Hot water systems.
 - Central heating systems.
 - Sanitation systems.
 - Gravity rainwater systems.
4. Flush the system with cold water on completion of soundness testing
5. Rectify any leakage from the system or component found during the soundness test procedure.

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Outcome 4

Be able to decommission plumbing and heating systems in the workplace

Assessment Criteria

The learner can:

1. Check that all necessary job information is available before commencing the decommissioning work
2. Liaise with other persons to confirm the detail of the decommissioning work to be carried out
3. Arrange for temporary supplies or services to be available for the duration of decommissioning
4. Comply with health and safety requirements when carrying out decommissioning work
5. Prepare a safe and unobstructed access route to the work areas to carry out the decommissioning work
6. Check that all required tools, equipment and materials are available to undertake the decommissioning work
7. Report any pre-existing damage to the building fabric or customer property to other persons before carrying out the decommissioning work
8. Provide protection to the building fabric or customer property as the work progresses
9. Isolate the system from the supply source or outgoing service:
 - Turn off the electricity and fuel supply to the system.
 - Turn off the water supply to the system.
 - Prevent the use of sanitary appliances.
10. Drain and safely dispose of the system contents:
 - Cold water systems.
 - Hot water systems.
 - Central heating systems.
11. Take precautions to ensure that the system cannot be brought back into operation before the decommissioning work is complete
12. Advise other persons that the system has been successfully decommissioned.

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Outcome 5

Be able to maintain plumbing and heating components in the workplace

Assessment Criteria

The learner can:

1. Check that all necessary job information is available before commencing the maintenance work
2. Liaise with other persons to confirm the detail of the maintenance work to be carried out
3. Comply with health and safety requirements when carrying out maintenance work
4. Prepare a safe and unobstructed access route to the work areas to carry out the maintenance work
5. Check that all required tools, equipment and materials are available to undertake the maintenance work
6. Report any pre-existing damage to the building fabric or customer property to other persons before carrying out the maintenance work
7. Provide protection to the building fabric or customer property as the work progresses
8. Isolate the component from the supply source or outgoing service:
 - Turn off the electricity and fuel supply to the component.
 - Turn off the water supply to the component.
 - Prevent the use of sanitary appliances.
9. Drain the component contents
10. Take precautions to ensure that the component cannot be brought back into operation before the maintenance work is complete
11. Carry out the maintenance or replacement of the component to industry requirements
12. Re-instate the supply or service to the component and check it for correct operation.
13. Advise other persons that work on the system or component has been successfully completed
14. Complete the details contained in simple maintenance records

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Notes for guidance

All the evidence provided must be from the learner's workplace, simulated assessment activities are not acceptable in meeting the outcomes of the unit.

Learning Outcomes 1 – 3 (Prepare work sites, install and soundness test)

Evidence must be provided (as a minimum) of work carried out on three of the following five system types:

- Cold water system
- Hot water system
- Central heating system
- Sanitation system
- Gravity rainwater system

Of the three system types selected, evidence must be provided of the assessment criteria being met on two separate occasions, ie as a minimum on two different jobs at separate addresses.

Evidence for outcomes 1-3 can be provided in the form of:

- Direct observation of the learner carrying out work by a qualified plumbing assessor
- Product assessment of work already completed by a qualified plumbing assessor
- Witness testimony type evidence (log book) countersignature required by a qualified in-company expert witness
- Professional review undertaken by a qualified assessor of the learner's competence

Scope of the Evidence to be produced for Learning Outcomes 1-3

Hot and cold water systems

The on-site installation in a dwelling must comprise of a minimum of bath or shower, basin and WC which must be part of a new installation or replacement of an existing bathroom suite. Alternatively evidence may be provided from an industrial or commercial environment of the installation of a minimum of three appliances (two of which must be of different appliance types eg Urinal and Basin). In either case the work must include the complete replacement of all hot and cold pipework within the room (other than the supply tails entering the room).

Minimum direct observation requirement for this system type

- The installation of one sanitary appliance and its associated pipework at one address from the above.

Central heating systems

The on-site installation must comprise a minimum of a new or replacement system including 4 radiators, associated controls and connections to the boiler (electrics and fuel supply system are not included in the scope of the assessment activity). The work must include the new installation or complete replacement of pipework in the system.

Minimum direct observation requirement for this system type

- The installation of one radiator and associated pipework connections to the heating mains at one address from the above.

Sanitation systems

The on-site installation must in a dwelling comprise of the installation or complete replacement of a soil pipe and appropriate venting arrangements to a bathroom suite including a minimum of bath or shower, basin and WC. Alternatively evidence may be provided from an industrial or commercial environment of the installation of a minimum of three appliances (two of which must be of different appliance types but including a WC eg W C and Basin. In either case the work must include the complete replacement or new installation of all soil, vent and waste pipework to its point of connection at the below ground drainage system.

Minimum direct observation requirement for this system type

- The installation of one sanitary appliance and its soil/waste connection to the stack at one address from the above.

Gravity rainwater systems

The on-site installation must comprise of the new installation or complete replacement of the gutter system and associated rainwater pipework (down pipes) to a property.

Minimum direct observation requirement for this system type

- The installation of a significant section of gutter system or a complete section of rainwater pipework at one address from the above.

Learning Outcome 4 (Decommission)

Evidence must be provided (as a minimum) of work carried out on two of the following four system types:

- Cold water system
- Hot water system
- Central heating system
- Sanitation system

Of the two system types selected, evidence must be provided of the assessment criteria being met on one occasion at a property.

Evidence for outcome 4 can be provided in the form of:

- Direct observation of the learner carrying out work by a qualified plumbing assessor
- Witness testimony type evidence (log book) countersignature required by a qualified in-company expert witness
- Professional review undertaken by a qualified assessor of the learner's competence

Scope of the Evidence to be produced for Learning Outcome 4

Evidence must be produced of either the temporary decommissioning of a system eg taking the system out of service to add a new component such as a radiator or the movement of a radiator to a different location in a building, or the permanent decommissioning of a system such as when a system is being fully replaced as part of a major refurbishment of a property. In an industrial/commercial work environment the evidence can include the decommissioning of a significant part of a system such as a complete washroom or public convenience.

Minimum direct observation requirements for Learning Outcome 4

- The decommissioning of one of the system types at a property.

Learning Outcome 5 (Maintenance)

Component repair or replacement

Evidence must be provided (as a minimum) of repair or replacement work carried out on four of the following non-electrical components:

- Taps – mixer or pillar
- Float valve
- Shower mixer valve
- Stop valve
- Gate valve (or similar service valve)
- Drain valve
- Radiator valve
- Thermostatic radiator valve
- WC siphon/ drop valve
- Sanitary appliance trap

System maintenance

Evidence must be provided (as a minimum) of maintenance work carried out on two of the following faults:

- Leaks in system pipework
- Noise in systems
- Corrosion of system components
- Inadequate supply pressure at discharge points
- Loose pipework
- Trap seal loss
- Blockages in system components/pipework

Evidence for outcome 5 can be provided in the form of:

- Direct observation of the learner carrying out work by a qualified plumbing assessor
- Witness testimony type evidence (log book) countersignature required by a qualified in-company expert witness
- Professional review undertaken by a qualified assessor of the learner's competence

Minimum direct observation requirements for Learning Outcome 5

- None specified owing to the sporadic nature of arranging on-site visits for maintenance type work.