



## **National Occupational Standards**

<b>Sector</b>	Building & Construction
<b>Job Family</b>	Plumbers
<b>Job Title</b>	Plumber
<b>MQF</b>	Level 3

### **Mandatory Competences**

- BUP: 301** Apply Occupational Health and Safety and Working Practices
- BUP: 302** Identify Systems, Equipment and Components
- BUP: 303** Calculating, Positioning and Drawing
- BUP: 304** Identifying and Applying Systems, Equipment and Components
- BUP: 305** Maintain Effective Relationships
- BUP: 306** Identify, Rectify, and Plan Maintenance

## **BUP: 301**

### **Apply Occupational Health and Safety and Working Practices**

<p><b>Description of Unit</b></p>	<p>This unit is about being able to use safe procedures and safe work practices. The persons carrying out this work must possess the necessary knowledge and skills to ensure that their actions do not create health and safety risks to others, identify risks and hazards associated with the working environment, tools and equipment and materials and substances used.</p>
<p><b>Performance Criteria</b></p>	<p>The candidate must have the necessary knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Carry out safe working practices to prevent and identify hazards and to ensure the safety of himself, workers and members of the public.</li> <li>2. Carry out safe working practices using appropriate equipment and materials to prevent damages to work areas.</li> <li>3. Carry out the safe erection, use and dismantling of simple access platforms less than 2m high.</li> <li>4. Set up safety barriers around a work environment hazard to protect workers and members of the public.</li> <li>5. Use protective clothing and safety equipment to accomplish tasks.</li> <li>6. Use, handle and store materials hazardous to health in a safe manner.</li> <li>7. Locate and manually operate the isolating valve to disconnect domestic water services from the main water supply.</li> <li>8. Complete a risk assessment and prepare a report for the work to be carried out.</li> </ol>

**Required  
 Knowledge**

1. Understands the roles and responsibilities of themselves and others under the Health and Occupational health and safety Act 2000.
2. Knows the health and safety hazards and associated risks inherent in their role which include use of tools, materials and equipment and working practices and procedures.
3. Recognises potential hazards in the workplace.
4. Understands the procedures for dealing with potential hazardous material in the place of work.
5. Understands health concerns associated with the workplace and safe practices when carrying out work.
6. Seeks expert assistance when help is needed.
7. Knows when there is a hazard in the place of work (such as electricity, slippery and uneven surfaces, dust and fumes, handling and transporting, contaminants and irritants, fire, heights, improper use of tools and equipment).
8. Understands the importance of being alert to the presence of hazards in the place of work.
9. Knows the responsible persons to whom to report health and safety matters.
10. Knows the emergency procedures at the place of work.
11. Knows the first aid facilities that exist within the work area.
12. Understands the general risk assessments, method statements and how to apply them at the place of work.
13. Understands the use of barriers and warning signs.
14. Knows and understands the method used to protect work areas from damage due to portable heating and lighting equipment.
15. Understands and explains how to safely use access platforms (less than 2m).

<b>Required Knowledge</b>	<ol style="list-style-type: none"> <li>16. Understands the necessary safety precautions including the use of protective clothing and equipment for a range of applications.</li> <li>17. Knows and understands the methods used for protecting customers' property.</li> <li>18. Identifies domestic water services isolating valves.</li> <li>19. Knows and understand when it is required to isolate domestic water services from the main water supply.</li> <li>20. Describes any materials hazardous to health used in plumbing installations.</li> <li>21. Outlines the preventative and remedial actions to be taken in the case of exposure to materials hazardous to health</li> <li>22. Explains the method by which a risk assessment is completed, including identifying the task procedure, identifying hazards and identifying control actions to reduce hazard.</li> </ol>
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<b>Required Skills</b>	<ol style="list-style-type: none"> <li>1. Identifies which health and safety procedures are relevant to the working environment.</li> <li>2. Complies with duties and obligations as defined by the Occupational health and safety act 2000 and any applicable LNs.</li> <li>3. Follows workplace policies and employer's instructions for the safe use and maintenance of tools and equipment.</li> <li>4. Controls health and safety hazards within their capability and job responsibility.</li> <li>5. Reports any hazards which may present risk to relevant persons.</li> <li>6. Ensures that correct procedures are taken in the place of work so that the health and safety of themselves, other workers and members of the public are not endangered.</li> <li>7. Follows correct procedures in the event of injuries to themselves or others.</li> </ol>
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**Required  
Skills**

8. Takes corrective action and control measures where work methods are not in line with risk assessment requirements.
9. Adheres to work production and installation processes which are in line with health and risk assessments safety requirements.
10. Applies the necessary skills to erect, use and dismantle simple access platforms (less than 2m).
11. Complies with warning signs and sets up safety barriers around a plumbing hazard.
12. Presents oneself with the appropriate protective clothing and safety equipment for specific tasks.
13. Locates and operates the isolating valve to disconnect water services from the main water supply.
14. Handles, Uses and stores material hazardous to health in a safe manner.
15. Completes a risk assessment including the identification of hazardous objects and surroundings, dangerous substances, machinery and working practices.
16. Prepares a report identifying and describing the potential hazards.

## BUP: 302

### Identify Systems, Equipment and Components

<p><b>Description of Unit</b></p>	<p>This unit is about applying the necessary preparations prior to work being conducted. This unit is about identifying and applying materials for specific applications based on their technical properties and identifying environmental impacts and benefits of plumbing materials and water treatment processes.</p>
<p><b>Performance Criteria</b></p>	<p>The candidate must have the necessary knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Identify and select copper pipe and fittings from given specifications and based on their technical properties for specific jobs.</li> <li>2. Identify and select steel pipe and fittings from given specifications and based on their technical properties for specific jobs.</li> <li>3. Identify and select plastic pipe and fittings from given specifications and based on their technical properties for specific jobs.</li> <li>4. Identify and select iron pipe fittings from given specifications and based on their technical properties for specific jobs</li> <li>5. Identify and select stainless steel fittings from given specifications and based on their technical properties for specific jobs.</li> <li>6. Identify the different types of solder and flux based on their technical properties used for specific jobs.</li> <li>7. Identify the jointing compounds and tapes based on their technical properties used for specific jobs.</li> <li>8. Identify valves based on their technical properties used for specific jobs.</li> <li>9. Identify and select sanitary accessories and fittings from given specifications and based on their technical properties for specific jobs.</li> </ol>

<p><b>Performance          Criteria</b></p>	<ol style="list-style-type: none"> <li>10. Identify water storage tanks from given specifications and based on their technical properties for a specific job.</li> <li>11. Identify and select various fixings from given specifications and based on their technical properties for a specific job.</li> <li>12. Identify and select sands and aggregates from given specifications and based on their technical properties for a specific job.</li> <li>13. Identify and select insulating and protective material from given specifications to be used for specific jobs.</li> <li>14. Identify and select rainwater guttering materials and downpipes from given specifications to be used for specific jobs.</li> <li>15. Write a report on the availability, suitability of plumbing material and labour for a specific job.</li> <li>16. Write a report on the environmental impacts of water supply and sewage disposal.</li> </ol>
<p><b>Required          Knowledge</b></p>	<ol style="list-style-type: none"> <li>1. Knows and understands the range of materials, products and procedures applicable to the relevant work and their benefits.</li> <li>2. Knows and understands the basic functions of plumbing pipe systems.</li> <li>3. Knows and understands the basic functions and types of pipe fitting.</li> <li>4. Knows and understands the different methods of connection.</li> <li>5. Defines and understands the basic properties of copper pipe grades and sizes.</li> <li>6. Defines and understands the technical properties of copper pipe grades and sizes.</li> <li>7. Defines and understands the types of copper fittings, materials and properties.</li> </ol>

**Required  
Knowledge**

8. Defines and understands the basic properties of steel pipe grades and sizes.
9. Defines and understands the technical properties of steel pipe grades and sizes.
10. Defines and understands the types of steel pipe fittings and properties.
11. Defines and understands the basic properties of plastic pipe types and sizes.
12. Defines and understands the technical properties of plastic pipe types and sizes.
13. Defines and understands the types of plastic pipe fittings, materials and properties.
14. Defines and understands the basic properties of iron pipe types and sizes.
15. Defines and understands the technical properties of iron pipe types and sizes.
16. Defines and understands the types of iron pipe fittings, materials and properties.
17. Defines and understands the basic properties of stainless steel pipe types and sizes
18. Defines and understands the technical properties of stainless steel pipe and fittings.
19. States the basic properties and use of different types of solder and flux.
20. States the technical properties and use of different types of solder and flux.
21. States the technical properties of jointing compounds and tapes.
22. States the technical properties of valves.
23. Defines the basic properties and types of sanitary accessories and fittings.



<p><b>Required Knowledge</b></p>	<ol style="list-style-type: none"> <li>24. Defines the technical properties and types of sanitary accessories and fittings.</li> <li>25. Knows and understands the basic properties and types of water storage tanks.</li> <li>26. States the technical properties of water storage tanks.</li> <li>27. States the basic properties of fixings including masonry, concrete and timber.</li> <li>28. States the technical properties of fixings including masonry, concrete and timber.</li> <li>29. States the technical properties of insulating and protective materials.</li> <li>30. Knows the technical properties of rainwater guttering materials and downpipes materials.</li> <li>31. Knows and understands the environmental effects of water supplies and effluent waste disposal.</li> <li>32. Names and explains methods used for conserving water in domestic water systems.</li> </ol>
<p><b>Required Skills</b></p>	<ol style="list-style-type: none"> <li>1. Identifies the different types of materials, products, methods and procedures applicable to the relevant work.</li> <li>2. Identifies the relevant pipes and fittings for a required job.</li> <li>3. Confirms that all materials, tools and equipment necessary for the installation process are available as required.</li> <li>4. Confirms that all material, tools and equipment are fit for their intended purpose.</li> <li>5. Assembles all the components through methods that conform to industry requirements.</li> </ol>

**Required Skills**

6. Connects components through methods that conform to industry requirement.
7. Identifies and selects copper pipe and fittings from given specifications.
8. Identifies and selects copper pipe and fittings, based on their technical properties, to be used for specific jobs.
9. Identifies and selects steel pipe and fittings from given specifications.
10. Identifies and selects steel pipe and fittings, based on their technical properties, to be used for specific jobs.
11. Identifies and selects plastic pipe and fittings from given specifications.
12. Identifies and selects plastic pipe and fittings, based on their technical properties, to be used for specific jobs.
13. Identifies and selects iron pipe and fittings from given specifications.
14. Identifies and selects iron pipe and fittings based on their technical properties to be used for specific jobs.
15. Identifies and selects stainless steel pipe and fittings from given specifications.
16. Identifies and selects stainless steel pipe and fittings, based on their technical properties to be used for specific jobs.
17. Distinguishes between the different types of solder and flux.
18. Applies solder and fluxes based on their technical properties.
19. Identifies and selects jointing compounds based on their technical properties to be used for specific jobs.
20. Identifies and selects valves based on their technical properties to be used for specific jobs.
21. Identifies and selects sanitary accessories and fittings from given specifications.

**Required Skills**

22. Identifies and selects sanitary accessories based on their technical properties to be used for specific jobs.
23. Identifies and selects valves, based on their technical properties, to be used for specific jobs.
24. Selects water storage tanks from given specifications.
25. Identifies and selects various fixings from given specifications, to be used for specific jobs.
26. Identifies and selects insulating and protective material from given specifications to be used for specific jobs.
27. Identifies and selects rainwater guttering materials and downpipes from given specifications to be used for specific jobs.
28. Produces a report which includes the relevant calculations and suitability of plumbing materials and labour.
29. Prepares a report on the environmental impact of water supplies and sewage disposal.

## BUP: 303

### Calculating, Positioning and Drawing

<p><b>Description of Unit</b></p>	<p>This unit is about obtaining dimensions from drawings of plumbing systems as well as below ground drainage pipework, calculation of excavations and material in preparation of a specific task, positioning of a drainage system and producing working drawings to complete a specific task.</p>
<p><b>Performance Criteria</b></p>	<p>The candidate must have the necessary knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Obtain accurate dimensions from drawings of below ground drainage pipe work.</li> <li>2. Calculate volumes from dimensions obtained from drawings of excavations.</li> <li>3. Calculate costs of materials obtained from drawings.</li> <li>4. Calculate pipe sizes from drawings.</li> <li>5. Calculate the expansion and contraction of pipework.</li> <li>6. Measure and position domestic pipework systems from drawings.</li> <li>7. Produce working drawings from plans and details of drainage systems.</li> <li>8. Produce drawings from plans and details of domestic services.</li> </ol>
<p><b>Required Knowledge</b></p>	<ol style="list-style-type: none"> <li>1. Knows and understands the method used to calculate bedding and backfill material.</li> <li>2. Knows and understands the method used to calculate costs of material and labour required to complete a specific job.</li> <li>3. Knows and understands the method used to calculate the sizes of pipes to be used for a specific task.</li> <li>4. Knows and understands the method used to calculate the expansion and contraction of pipework.</li> </ol>

<b>Required Knowledge</b>	<ol style="list-style-type: none"> <li>5. Understands and explains the correct procedure for positioning domestic drainage pipework.</li> <li>6. Knows, understands and interprets scale working drawings obtained from schematic drawings, plans and details of drainage systems.</li> <li>7. Knows, understands and interprets scale working drawings obtained from schematics, plans and details of domestic services.</li> </ol>
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<b>Required Skills</b>	<ol style="list-style-type: none"> <li>1. Obtains accurate dimensions from drawings of below ground drainage pipe work.</li> <li>2. Calculates volumes from dimensions obtained from drawings of excavations.</li> <li>3. Translates drawings to calculate cost of material and labour required to carry out a specific job.</li> <li>4. Calculates pipe sizes for specific domestic jobs.</li> <li>5. Calculates the expansion and contraction of pipework.</li> <li>6. Measures and position domestic pipework systems obtained from drawings.</li> <li>7. Illustrates plans and details of drainage systems by producing working drawings.</li> <li>8. Illustrates plans and details of domestic services by producing working drawings.</li> </ol>
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## BUP: 304

### Identifying and Applying Systems, Equipment and Components

<p><b>Description of Unit</b></p>	<p>This Unit is about applying skills to position, assemble, install, test and commission domestic water, sanitation and drainage pipework, rainwater gutters and downpipes.</p>
<p><b>Performance Criteria</b></p>	<p>The candidate must have the appropriate knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Position, assemble and install domestic mains cold water pipework on two levels.</li> <li>2. Position, assemble and install domestic tank fed cold water pipework on two levels.</li> <li>3. Position, assemble and install domestic mains hot water pipework on two levels.</li> <li>4. Examine and authorise domestic pipework systems.</li> <li>5. Test and authorise a domestic gas pipework system.</li> <li>6. Position, assemble and install a domestic sanitation pipework system.</li> <li>7. Position, assemble and install a domestic drainage pipework system.</li> <li>8. Lay out and set up drain pipe bedding.</li> <li>9. Check domestic sanitation and drainage pipework systems..</li> <li>10. Install a bathroom suite and connect to water and sanitary service pipework.</li> <li>11. Install a kitchen sink and connect to water and sanitary service pipework.</li> <li>12. Set up connections for a domestic appliance.</li> <li>13. Set up connections for domestic appliances.</li> <li>14. Position, assemble and install a domestic rainwater system.</li> <li>15. Test a domestic rainwater system.</li> </ol>

**Required  
Knowledge**

1. Explains with the aid of a sketch, how the mains fed hot and cold domestic water systems using a mains fed hot water tank are positioned.
2. Explains with the aid of a sketch, how the mains fed hot and cold domestic water systems using a mains fed cold water tank are positioned.
3. Explains possible methods used for supporting a plastic cold water tank.
4. Explains the correct testing procedures to be applied to ensure the reliability of the installed domestic water pipework systems.
5. Defines the different methods that can be used for heating water in a domestic system.
6. Explains, with the aid of a sketch, how a domestic sanitary pipework system is positioned.
7. Explains, with the aid of a sketch, how a domestic drainage pipework system is positioned.
8. Explains the correct testing procedures to be applied to ensure the reliability of the installed domestic sanitation and drainage pipework system.
9. Explains, with the aid of a sketch, how a domestic rainwater system is positioned.
10. Explains the correct testing procedures to be applied to ensure the reliability of the installed domestic rainwater system.

**Required Skills**

1. Positions, assembles and installs the system components for a domestic mains cold water pipework system using the required pipework materials, bends and fittings.
2. Positions, assembles and installs the system components for a domestic tank fed cold water pipework system using the required pipework materials, bends and fittings.
3. Positions, assembles and installs the system components for a domestic tank fed hot water pipework system using the required pipework materials, bends and fittings.
4. Ensures the reliability of the installed domestic water pipework systems using the correct testing procedures.
5. Positions, assembles and installs the system components for domestic gas pipework system.
6. Ensures the reliability of the installed domestic gas pipework system using the correct testing procedures in line with the national standards.
7. Positions, assembles and installs the system components for a domestic drainage pipework system using the required pipework materials, bends and fittings.
8. Lays out and prepares natural, crushed or manufactured bedding for drain pipes.
9. Ensures the reliability of the installed sanitation and drainage pipework systems using the correct testing procedures in line with the national standards.
10. Installs a bathroom suite and connects system components to water and sanitary service pipework.
11. Installs a kitchen sink and connects system components to sanitary service pipework.
12. Connects system components to systems and input services that conform to industry requirements.
13. Positions, assembles and installs a domestic rainwater system.



**Required Skills**

14. Ensures the reliability of the installed domestic rainwater system using the correct testing procedures.

## BUP: 305

### Maintain Effective Relationships

<p><b>Description of Unit</b></p>	<p>This Unit is about applying the necessary communication skills and information technology at the place of work to contribute to maintain positive working relationships with other people. This unit is about dealing with others, keeping them informed about work plans and activities that affect them.</p>
<p><b>Performance Criteria</b></p>	<p>The candidate must have the appropriate knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Communicate effectively in both written and oral forms.</li> <li>2. Interpret, apply and draw diagrams.</li> <li>3. Apply national standards.</li> <li>4. Gather technical information to be used at the place of work.</li> <li>5. Use information technology systems to communicate with customers and fellow workers.</li> <li>6. Establish and maintain productive working relationships with the relevant people as to deal with disagreements in a positive way.</li> <li>7. Identify and confirm the needs of colleagues and customers.</li> <li>8. Keep others informed about work plans and activities.</li> </ol>
<p><b>Required Knowledge</b></p>	<ol style="list-style-type: none"> <li>1. Understands the importance of keeping customers informed of progress made at all times.</li> <li>2. Understands workplace requirements for the completion of all tasks.</li> <li>3. Knows how to compile and complete all necessary documentation related to tasks.</li> <li>4. Recognizes the importance of customer communication and care.</li> </ol>

<b>Required Knowledge</b>	<ol style="list-style-type: none"> <li>5. Knows how to communicate effectively with customers.</li> <li>6. Understands the importance of listening effectively to customers.</li> <li>7. Explains technical matters to non-technical customers in a simple way.</li> <li>8. Recognizes the importance to care for customers and work towards customer satisfaction.</li> <li>9. Explains the costs and timeframes for completion of a task to customers.</li> <li>10. Identifies and explains the use of various electronic and information technology systems for communication.</li> <li>11. Identifies the use of national and international standards used in the construction industry.</li> <li>12. Knows and understands the principles of good working relationships and actions to be taken if working relationships break down.</li> </ol>
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<b>Required Skills</b>	<ol style="list-style-type: none"> <li>1. Obtains necessary information from clients to carry out an assessment of their own perceived needs.</li> <li>2. Provides customers with accurate and relevant information related to tasks, courses of action to be taken and implications and the estimated costs.</li> <li>3. Provides necessary advice to customers in a way to be understood by all.</li> <li>4. Comes to an agreement with the customer on timeframes, costs, extent and nature of work to be done and terms and conditions.</li> <li>5. Confirms that the customer has understood what the agreement entails.</li> <li>6. Ensures that all documentation is recorded, complete and accurate in the format specified.</li> </ol>
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**Required Skills**

7. Advises customer should the proceedings are not adhered to the agreement made.
8. Communicates effectively through both written and oral modes.
9. Interprets uses and draws diagrams related to the work environment.
10. Obtains and selects technical information related to national and international standards.
11. Applies information technology systems for communication related to work environment.
12. Contribute effectively with colleagues using the appropriate methods of communication.

## BUP: 306

### Identify, Rectify, and Plan Maintenance

<b>Description of Unit</b>	<p>This Unit is about applying basic tool skills to carry out alteration, repair and planned maintenance on existing systems.</p>
<b>Performance Criteria</b>	<p>The candidate must have the appropriate knowledge and skills to:</p> <ol style="list-style-type: none"> <li>1. Inspect, identify faults and repair domestic water pipework.</li> <li>2. Inspect, identify faults and repair domestic drainage pipework.</li> <li>3. Inspect, identify faults and repair domestic gas pipework.</li> <li>4. Dismantle, service, reassemble and test domestic valves.</li> <li>5. Dismantle, service, reset, reassemble and test a domestic tap.</li> <li>6. Dismantle, service, reassemble and test a water closet (WC).</li> <li>7. Inspect water storage tanks.</li> <li>8. Adjust existing pipework to add a new sanitary fitting.</li> <li>9. Complete a maintenance report for domestic services.</li> </ol>
<b>Required Knowledge</b>	<ol style="list-style-type: none"> <li>1. Lists the types of corrosion that may occur in water systems.</li> <li>2. Names the effects different soils and rocks have on water grade.</li> <li>3. Names the effects of temperature on water systems.</li> <li>4. States and describes the faults that may occur in hot and cold domestic pipework.</li> <li>5. Explains the procedure taken for isolating and draining domestic water pipework systems for repairs to be undertaken.</li> <li>6. Explains the procedure for repairing leaking joints.</li> <li>7. Explains the procedure for using freezing equipment to isolate a section of domestic water pipework.</li> </ol>

	<ol style="list-style-type: none"> <li>8. Explains the procedure for repairing joints in a domestic sanitation pipework system.</li> <li>9. Explains the procedure for rectifying a faulty trap seal in a sanitation pipework system.</li> <li>10. Explains the procedure for repairing leaking joints in a domestic drainage pipework system.</li> <li>11. Explains the procedure for detecting leaks in a domestic gas pipework system.</li> <li>12. Explains the procedure to be taken for isolating domestic gas pipework systems to carry out repairs.</li> <li>13. Explains the procedure for servicing domestic water taps and valves.</li> <li>14. Explains the procedure to be taken for servicing domestic water closets (WC).</li> <li>15. Knows and understands what to include when preparing a maintenance report for domestic services.</li> </ol>
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<b>Required Skills</b>	<ol style="list-style-type: none"> <li>1. Inspects, repairs domestic water pipework systems.</li> <li>2. Inspects and repairs domestic sanitation pipework systems.</li> <li>3. Inspects and repairs drainage pipework systems.</li> <li>4. Inspects and repairs domestic gas pipework systems.</li> <li>5. Dismantles services, reassembles and tests domestic valves.</li> <li>6. Dismantles, services, resets, reassembles and tests a domestic tap.</li> <li>7. Dismantles services, reassembles and tests a water closet (WC).</li> <li>8. Inspects water storage tanks.</li> <li>9. Adjusts existing pipework to add a new sanitary fitting.</li> <li>10. Prepares a maintenance report.</li> </ol>
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