

## INSTALL WATER SUPPLY SYSTEMS

**UNIT CODE:** CON/OS/PL/CR/01/5/A

### UNIT DESCRIPTION

This unit specifies the competencies required to install water supply systems. It involves preparing working drawings, identifying materials, quantifying and costing, identifying and using pipework tools and equipment, installing pipe works, designing simple pipework and install water distribution system. It applies in the construction industry.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the <b>key outcomes</b> which make up <b>workplace function</b> .	<b>PERFORMANCE CRITERIA</b> These are <b>assessable</b> statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the Range</b></i>
1. Prepare working drawings	1.1 Drawings are identified and selected based on the <i><b>working drawings</b></i> . 1.2 Scale of the drawing is read based on the drawing. 1.3 Measurements are converted based on best practice. 1.4 Symbols are identified based on standard practices. 1.5 Isometric pipework drawings are sketched based on best practice. 1.6 Simple working drawings are prepared based on specifications
2. Identify materials, quantify and cost	2.1 Materials are identified and selected based on working drawings and specifications 2.2 Materials are quantified and costed as per the market rate 2.3 Materials schedule are prepared based on best practice 2.4 Supplies are identified based on specifications

<p>3. Identify and use pipework tools and equipment</p>	<p>3.1 <b>Personal Protective Equipment</b> is used in line with occupational safety and health requirements</p> <p>3.2 <b>Pipework tools and equipment</b> are identified based on job requirements.</p> <p>3.3 Pipework tools and equipment are used based on best practice and manufacturer’s manual.</p> <p>3.4 Pipework tools and equipment are cared for and maintained based on manufacturer’s manual and workplace policy</p> <p>3.5 Pipework tools and equipment are stored based on work place policy.</p>
<p>4. Install pipe works</p>	<p>4.1 Positions of pipes are set out and marked based on working drawings</p> <p>4.2 Pipes are threaded based on standards and specifications.</p> <p>4.3 Pipes are jointed in accordance with best practices and manufacturer’s instructions.</p> <p>4.4 Pipes are cut based on type of pipe, drawing specifications and job requirements</p> <p>4.5 Flanged <b>joints</b> are prepared based on best practices</p> <p>4.6 Pipes are bent based on type of pipe, drawing specifications and requirements of the job.</p> <p>4.7 Pipes are fitted based on drawing specifications.</p> <p>4.8 Housekeeping is conducted as per workplace procedures</p> <p>4.9 Safety and health practices are observed based on OSH functionality tests are conducted based on best practices.</p> <p>4.10 Faults in functionality and leakage are corrected based on best practice</p>

<p>5. Design simple pipework</p>	<p>5.1 Number and type of <i>appliances</i> are identified based on working drawings</p> <p>5.2 Flow rates are calculated based on flow charts</p> <p>5.3 Pipes are <i>sized</i> based on standards</p>
<p>6. Install Water distribution system</p>	<p>6.1 Water distribution systems is identified and interpreted based on the drawing</p> <p>6.2 Positions of pipes are set out and marked based on working drawings</p> <p>6.3 Water distribution materials and supplies are estimated based on the drawing.</p> <p>6.4 Tools and equipment are identified according to job requirement.</p> <p>6.5 Water distribution system is installed based on codes of practice</p> <p>6.6 <i>Housekeeping</i> is conducted as per workplace procedures</p> <p>6.7 <i>Functionality tests</i> are conducted based on best practices.</p> <p>6.8 <i>Faults</i> in functionality and leakage are corrected based on best practice.</p> <p>6.9 Safety and health practice are observed based on OSHA.</p>

**RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variables	Range
<p>1. Working <i>drawings</i> may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Pictorial</li> <li>• Line drawing</li> <li>• Freehand sketching</li> </ul>

	<ul style="list-style-type: none"> <li>• Scale drawings</li> </ul>
2. Joints may include but not limited to:	<ul style="list-style-type: none"> <li>• Threaded</li> <li>• Brazed</li> <li>• Soldered</li> <li>• Welded</li> <li>• Flanged</li> </ul>
3. Appliances may include but not limited to:	<p>:</p> <ul style="list-style-type: none"> <li>• Wash hand basin</li> <li>• Water closet</li> <li>• Bath tub</li> <li>• Urinal</li> <li>• Bidet</li> <li>• Kitchen sink</li> <li>• Jacuzzi</li> <li>• Shower head</li> </ul>
4. Personal Protective Equipment may include but not limited to:	<ul style="list-style-type: none"> <li>• Helmet</li> <li>• Gloves</li> <li>• Dustcoat / overall</li> <li>• Safety shoes / boots</li> </ul>
5. Pipework tools and equipment may include but not limited to:	<ul style="list-style-type: none"> <li>• Pipe wrench</li> <li>• Pipe cutter</li> <li>• Hacksaw</li> <li>• Pipe Threading Equipment</li> <li>• Tap and Punch</li> <li>• Files</li> <li>• Screwdrivers</li> <li>• Drill with various sizes of bits</li> <li>• Mallet</li> <li>• Ball hammer</li> <li>• Masonry chisel</li> <li>• PPR machine / Heat Fusion equipment</li> </ul>

	<ul style="list-style-type: none"> <li>• Pipe bender</li> </ul>
6. Pipes may include but not limited to:	<ul style="list-style-type: none"> <li>• PPR</li> <li>• PVC</li> <li>• CPVC</li> <li>• GI</li> <li>• UPVC</li> <li>• HDPE</li> </ul>
7. Faults in pipe work may include but not limited to:	<ul style="list-style-type: none"> <li>• Leakages</li> <li>• Air lock</li> <li>• Water hammer</li> <li>• blockages</li> </ul>
8. Housekeeping may include but not limited to:	<ul style="list-style-type: none"> <li>• Protecting existing works and sanitary appliances</li> <li>• Clearing work area</li> <li>• Cleaning work area</li> <li>• Keeping work area tidy</li> </ul>
9. Sized may include but not limited to:	<ul style="list-style-type: none"> <li>• 13mm</li> <li>• 19mm</li> <li>• 25mm</li> <li>• 32mm</li> <li>• 38mm</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

### Required Skills

The individual needs to demonstrate the following skills:

- Interpersonal skills
- Communication skills
- Sketching skills
- Interpretation skills
- Problem-solving skills
- Critical thinking skills
- Organizing skills
- Measuring skills

- Numeracy skills
- Cutting skills
- Threading skills
- Bending and forming skills
- Interpersonal Relationship skills

### **Required Knowledge**

The individual needs to demonstrate knowledge of:

- Interpretation of symbols
- Conversion of units
- Types of pipes
- Materials and supplies
- Piping tools and equipment's
- Jointing of pipes
- Bending methods
- Mensuration
- Piping systems
- Faults in pipe work
- Functionality tests
- Water sources
- Water treatment
- Costing
- Estimation

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### **EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Correctly identified and selected working drawings.</li> <li>1.2 Correctly read and used drawing scales.</li> <li>1.3 Identified symbols appropriately</li> <li>1.4 Correctly sketched isometric pipework</li> <li>1.5 Correctly Prepared Simple working</li> <li>1.6 Identified and selected materials appropriately</li> <li>1.7 Quantified and costed materials accurately</li> <li>1.8 Correctly prepared material schedule</li> <li>1.9 Correctly identified supplies</li> <li>1.10 Appropriately used Personal Protective Equipment</li> <li>1.11 Identified Pipework tools and equipment appropriately.</li> <li>1.12 Correctly used Pipework tools and equipment.</li> <li>1.13 Maintained pipework tools and equipment appropriately</li> <li>1.14 Stored Pipework tools and equipment appropriately</li> </ul>
<p>2. Resource Implications</p>	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> <li>2.1 A functional workshop with plumbing tools, equipment, materials and supplies.</li> <li>2.2 References and manuals including construction working drawings</li> <li>2.3 Personal protective equipment</li> </ul>
<p>3. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral Questioning</li> <li>3.3 Written Tests</li> <li>3.4 Third party report</li> <li>3.5 Portfolio</li> </ul>
<p>4. Context of Assessment</p>	<p>Assessment may be done:</p> <ul style="list-style-type: none"> <li>4.1 On-the-job,</li> <li>4.2 Workshop simulation or</li> <li>4.3 During Work placement.</li> </ul>
<p>5. Guidance information for assessment</p>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>