

INSTALL DRAINAGE SYSTEMS

UNIT CODE: CON/OS/PL/CR/03/5/A

UNIT DESCRIPTION

This unit specifies the competencies required to install drainage systems. It involves preparing working drawings, quantifying and cost drainage materials, using drainage tools and equipment setting out drainage systems, install above ground drainage system identifying drainage materials and installing below ground drainage system and testing. It applies in the construction industry.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function .	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range</i>
1. Preparing working drawing	1.1 Drawings are identified and selected based on the job. 1.2 Scale of the drawing is determined based on the specifications. 1.3 Measurements are converted based on scale. 1.4 Symbols are identified based on standard practices. 1.5 Isometric pipework drawings are sketched based on drawings. 1.6 Simple working drawings are produced based on specifications.
2. Quantify and cost drainage materials	2.1 <i>Drainage materials and supplies</i> are identified based on the drawings and specifications. 2.2 Materials are estimated based on drawings and specifications 2.3 Materials cost estimates are calculated from the market rates 2.4 A schedule of materials is developed based on the drawing.

<p>3. Use drainage tools and equipment</p>	<p>3.1 Personal Protective Equipment is used in line with occupational safety and health requirements</p> <p>3.2 Drainage tools and equipment are identified based on the requirements of the job.</p> <p>3.3 Drainage tools and equipment are used based on manufacturer's instructions.</p> <p>3.4 Drainage tools and equipment are cared for and maintained based on manufacturer's manual and workplace place policy.</p> <p>3.5 Drainage tools and equipment are stored based on work place policies.</p>
<p>4. Set out Drainage systems</p>	<p>4.1 Measurements are transferred to the ground based on working drawings</p> <p>4.2 Joint positions are identified based on the working drawings and standards</p> <p>4.3 Invert levels are taken based on the gradient.</p>
<p>5. Install above ground drainage system</p>	<p>5.1 Soil and waste water is identified based on the working drawings.</p> <p>5.2 Setting out is carried out based on the working drawing.</p> <p>5.3 Pipes are laid based on the levels.</p> <p>5.4 Housekeeping is conducted based on workplace procedure</p> <p>5.5 Safety and health practise are observed based on OSHA.</p> <p>5.6 Functionality tests are conducted based on best practices</p> <p>5.7 Faults in the system are corrected based on best practice.</p>
<p>6. Install below ground drainage system</p>	<p>6.1 Excavation is carried out based on the layout.</p> <p>6.2 Pipeline base is stabilized based on drawings.</p> <p>6.3 Pipes are laid based on the levels</p> <p>6.4 Pipe work is protected based on specifications</p> <p>6.5 Inspection chambers, man holes and traps are constructed according to specifications.</p> <p>6.6 Housekeeping is conducted based on workplace procedure</p>

	<p>6.7 Functionality tests are conducted based on best practices</p> <p>6.8 Faults in drainage system are corrected based on best practice.</p> <p>6.9 Backfilling and making-good is carried out based on best practice.</p> <p>6.10 Safety and health practices is observed according to OSHA and NEMA.</p> <p>6.11 Above ground signage is placed based on best practice.</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
1. Drainage materials and Supplies may include but not limited to	<ul style="list-style-type: none"> • Various types and sizes of fittings • Caulking materials • Various types of pipe supports • Clay pipes • UPVC • Cast iron • Concrete
2. Personal Protective Equipment may include but not limited to	<ul style="list-style-type: none"> • Helmet • Gloves • Dustcoat / overall • Safety shoes / boots
3. Drainage tools and equipment may include but not limited to	<ul style="list-style-type: none"> • Measuring tools • Levelling equipment's • Mason trowels • Mason square • Spirit level

	<ul style="list-style-type: none"> • Boning rods • Floats • Mallet • Ball hammer • Masonry chisel
4. Functionality tests may include but not limited to	<ul style="list-style-type: none"> • Smoke test • Water test • Air test • Pressure test • Dye test
5. Faults in drainage system may include but not limited to	<ul style="list-style-type: none"> • Leakages • Air lock • Water hammer • Blockages
6. Housekeeping may include but not limited to	<ul style="list-style-type: none"> • Protecting existing works • Clearing work area • Cleaning work area • Keeping work area tidy

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
- Joining and jointing skills
- Organizing skills
- Measuring skills
- Numeracy skills
- Cutting skills

- Threading skills
- Bending skills
- Interpersonal Relationship skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Interpretation of symbols
- Conversion of units
- Levelling
- Drainage materials and supplies
- Drainage tools and equipment
- Types of pipes
- Materials and supplies
- Joining and jointing
- Mensuration
- Drainage systems
- Faults in drainage system
- Functionality tests

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"> 1.1 Identified and selected Drawings correctly 1.2 Read and used Scales of the drawings accurately 1.3 Converted measurements appropriately 1.4 Identified symbols accurately. 1.5 Sketched isometric drawings accurately 1.6 Identified Drainage materials correctly 1.7 Identified supplies correctly. 1.8 Quantified and costed materials accurately 1.9 Developed schedule of materials correctly 1.10 Identified soil and waste water correctly 1.11 carried setting out correctly
--	---

	<p>1.12 laid Pipes correctly</p> <p>1.13 conducted Housekeeping appropriately</p> <p>1.14 Observed safety and health practise correctly</p> <p>1.15 Conducted tests appropriately</p> <p>1.16 corrected Faults in the system appropriately</p> <p>1.17 Carried out excavation works correctly</p> <p>1.18 Stabilized pipeline base correctly.</p> <p>1.19 protected Pipe work correctly</p> <p>1.20 Constructed inspection chambers and man-holes appropriately</p> <p>1.21 Conducted housekeeping correctly</p>
2. Resource Implications	<p>The following resources must be provided:</p> <p>2.1 A functional workshop with plumbing tools, equipment, materials and supplies.</p> <p>2.2 References and manuals including construction working drawings</p> <p>2.3 Personal protective equipment</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Practical Tests</p> <p>3.2 Oral Questioning</p> <p>3.3 Written Tests</p> <p>3.4 Third party report</p> <p>3.5 Portfolio</p>
4. Context of Assessment	<p>Assessment may be done:</p> <p>4.1 On-the-job,</p> <p>4.2 Off-the-job or</p> <p>4.3 During Work placement.</p>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended</p>