



Australian Government

Department of Education, Employment and Workplace Relations

CPCPPS5008A Design trade waste pre-treatment systems

Release: 1

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Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit of competency specifies the outcomes required to design trade waste pretreatment systems for commercial and industrial premises. The unit requires identification of appropriate installation details and preparation of specifications.

Application of the Unit

Application of the unit This unit of competency supports development of skills and knowledge required for competent workplace performance in a consultancy or supervisory capacity in relation to plumbing services and hydraulics.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluate design parameters.	<p>1.1. <i>Scope of work</i> is established for trade waste pre-treatment systems.</p> <p>1.2. <i>Design requirements</i> are determined from plans, specifications and client briefs.</p> <p>1.3. <i>Statutory and regulatory requirements and Australian and New Zealand standards</i> for the design of trade waste pre-treatment systems are analysed and applied.</p> <p>1.4. <i>Trade waste applications</i> are analysed and a <i>cost-benefit analysis</i> is conducted, comparing a range of pipe materials and system designs.</p> <p>1.5. <i>Manufacturer requirements</i> and trade and technical manuals are interpreted.</p> <p>1.6. Additional research, including a <i>desktop study</i>, is conducted to outline design parameters.</p> <p>1.7. <i>Performance requirements</i> are established.</p>
2. Plan and detail system components.	<p>2.1. <i>Layout of pipework systems</i> and type and location of <i>fittings and valves</i> are planned.</p> <p>2.2. <i>Solid removal systems</i> are planned and detailed.</p> <p>2.3. <i>Grease and oil interceptors, neutralising chambers and wash-down areas</i> are planned and detailed.</p> <p>2.4. <i>Diffused air flotation systems</i> are planned and detailed.</p> <p>2.5. <i>Bacterial treatment processes and combination and specialised treatment processes</i> are detailed for a range of commercial and industrial applications.</p> <p>2.6. <i>Stormwater diversion and first-flush systems</i> are detailed.</p> <p>2.7. <i>System calculations</i> are performed for a range of applications.</p> <p>2.8. <i>Pumpwell, pump and pump control requirements</i> are sized and detailed.</p> <p>2.9. <i>Pipe fixings</i> are designed for a range of applications.</p> <p>2.10. Approved <i>materials, jointing methods and installation requirements</i> for trade waste pre-treatment systems are specified.</p>
3. Design and size systems.	<p>3.1. Trade waste pre-treatment systems are designed for a range of applications.</p> <p>3.2. Trade waste pre-treatment systems are designed and sized using <i>computer software packages</i>.</p>

ELEMENT	PERFORMANCE CRITERIA
4. Prepare documentation.	4.1. <i>Plans</i> are prepared for a range of trade waste pre-treatment systems. 4.2. <i>Specification</i> for a trade waste pre-treatment system is prepared. 4.3. <i>Testing</i> and <i>commissioning schedule</i> is prepared. 4.4. <i>Operation and maintenance manual</i> is produced.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills for this unit are:

- communication skills to:
 - communicate with others to ensure safe and effective work practices
 - confirm job specifications and client requirements
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - read and interpret:
 - plans, specifications, drawings and design briefs
 - standards and manufacturer requirements and manuals
 - statutory and regulatory requirements
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals
- written skills to prepare documentation, including:
 - operation and maintenance manual
 - plans, specifications and schedules
- innovation skills to develop creative and responsive approaches
- numeracy skills to apply measurements and calculations
- planning and organisational skills to:
 - research, collect, organise and understand information relating to the design of trade waste pre-treatment systems
 - take initiative and make decisions
- problem solving skills to analyse requirements, consider options and design an appropriate system

REQUIRED SKILLS AND KNOWLEDGE

- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities.

Required knowledge

Required knowledge for this unit is:

- common terminology and definitions used in the design of trade waste pre-treatment systems for all classes of building
- drafting principles
- nature of materials used and effects of performance under various conditions
- principles of technology used in the design of trade waste pre-treatment systems
- requirements of state regulatory authorities, Australian standards and manufacturer specifications, including hazards identified in relation to devices and systems used
- workplace safety requirements, including relevant statutory regulations, codes and standards.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment providing that simulated or project-based assessment techniques fully replicate plumbing and services workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of:

- evaluating and documenting design parameters, including client, trade-waste policy, regulatory, manufacturer and Australian and New Zealand standard requirements for a range of trade waste pre-treatment systems
- planning and detailing system components, including pre-treatment systems and piping systems
- designing and sizing trade waste systems
- designing and sizing wash-down and first-flush systems
- preparing plans for a range of trade waste pre-treatment systems to industry standards
- preparing specifications for trade waste pre-treatment systems
- preparing schedules for testing and commissioning
- producing operation and maintenance manuals.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

EVIDENCE GUIDE

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the minimum task requirements
- relevant specifications and work instructions, including design brief drawings, specifications, codes, design concepts and construction schedules
- tools and equipment appropriate to applying safe work practices, including computers, software and calculators
- workplace instructions relating to safe working practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace

EVIDENCE GUIDE

- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Scope of work includes:

- interpretation of plans and specifications, and sizing and documenting layout of trade waste systems, for residential, commercial and industrial applications for either new projects or existing structures being renovated, extended, restored or maintained.

Design requirements include:

- architectural specifications
- builder specifications

RANGE STATEMENT

<p><i>Statutory and regulatory requirements and Australian and New Zealand standards</i> include:</p>	<ul style="list-style-type: none"> • owner requirements • specialist water use applications. • Acts, regulations and local and state government policies, including group and strata titling • AS/NZS3500 National plumbing and drainage set • AS2200 Design charts for water supply and sewerage • Building Code of Australia • local government trade waste policies.
<p><i>Trade waste applications</i> include:</p>	<ul style="list-style-type: none"> • chemical facilities • commercial and industrial facilities that produce a liquid waste stream • food preparation facilities • photography development facilities • wash-down facilities.
<p><i>Cost-benefit analysis</i> includes:</p>	<ul style="list-style-type: none"> • comparison of the range of suitable materials and system choices available to enable cost-effective choices to be made without compromising integrity of project.
<p><i>Manufacturer requirements</i> include:</p>	<ul style="list-style-type: none"> • material specifications • pump tables • sizing tables • technical and trade manuals.
<p><i>Desktop study</i> includes collection and interpretation of existing data for design purposes from:</p>	<ul style="list-style-type: none"> • architectural and building plans • council plans • developer plans • manufacturers' data • other documents, including: <ul style="list-style-type: none"> • applications • forms • sewer detail maps • other reports as available.
<p><i>Performance requirements</i> include:</p>	<ul style="list-style-type: none"> • pipe grades, cover, flow conditions and discharge requirements, established using Australian and New Zealand standards and local authority plans.
<p><i>Layout of pipework systems:</i></p>	<ul style="list-style-type: none"> • includes: <ul style="list-style-type: none"> • gravity systems

RANGE STATEMENT

	<ul style="list-style-type: none"> • pumped systems • should not unduly affect building integrity and aesthetic appeal • should have principles of economy, serviceability, durability and fit for use applied.
<i>Fittings and valves</i> include:	<ul style="list-style-type: none"> • bends • inspection openings • junctions • reflux valves • traps.
<i>Solid removal systems</i> include removal of:	<ul style="list-style-type: none"> • bone • dirt • grit • metal • paper • plastic • rubbish • sand • silt • wood • other solid contaminants.
<i>Grease and oil interceptors</i> include:	<ul style="list-style-type: none"> • coalescing plate separators • grease traps • skimmers • vertical separators.
<i>Neutralising chambers</i> include:	<ul style="list-style-type: none"> • acid neutralisation • chemical neutralisation.
<i>Wash-down areas</i> include:	<ul style="list-style-type: none"> • bin wash down • commercial and industrial wash-down processes that may or may not require stormwater diversion • floor wash down • machinery wash down.
<i>Diffused air flotation systems</i> include:	<ul style="list-style-type: none"> • removal of contaminants from commercial and industrial processes.
<i>Bacterial treatment processes</i> include:	<ul style="list-style-type: none"> • aerobic • anaerobic • facultative and specialised bacteria for the removal of grease and other contaminants.

RANGE STATEMENT

Combination and specialised treatment processes are any combination of processes, including:

- bacterial treatment processes
- diffused air flotation systems
- first-flush systems
- neutralising chambers
- solid removal systems
- specialised treatment process
- stormwater diversion.

Stormwater diversion and first-flush systems include:

- exclusion of stormwater from sewerage systems or admittance of first portion of stormwater generated by a rain event to the sewerage system.

System calculations include:

- determination of flow and fixture loadings
- gradient calculations
- interpretation of design charts and tables
- pipe sizing calculations
- reduced level calculations
- treatment system sizing.

Pumpwell, pump and pump control requirements include:

- automatic controls
- capacity
- chains
- corrosion-resistant materials
- detailing
- high and low-level water controls and alarms
- impeller sizing
- inlet and outlet design requirements
- installation and mounting requirements
- ladder access
- macerator requirements
- pump selection
- pump sizing
- pumpwell sizing
- space requirements
- step irons
- valve requirements
- warning system.

Pipe fixings include:

- anchors
- bedding
- bracket spacing
- concrete support
- corrosion protection

RANGE STATEMENT

- cover
 - hanging brackets
 - material requirements
 - saddles
 - wall and ceiling brackets.
- Materials** include:
- cast iron
 - concrete
 - copper
 - earthenware
 - fittings and fixtures, including sound attenuation requirements
 - high density polyethylene (HDPE)
 - unplasticised polyvinyl chloride (PVC-U).
- Jointing methods** include:
- brazing
 - gluing
 - mechanical joints
 - rubber ring
 - solvent cement welding
 - threading.
- Installation requirements** include:
- bedding
 - clipping
 - concrete support
 - installation details
 - jointing requirements
 - level of workmanship.
- Computer software packages** include:
- proprietary design software
 - manufacturers' software.
- Plans** include:
- axonometrics
 - cross-sections
 - details
 - elevations
 - isometrics
 - schematics, which may be produced using:
 - computer generation
 - Indian ink
 - pencil
 - pigment liner
 - sections.

RANGE STATEMENT

- Specification*** includes:
- bedding
 - clipping
 - concrete support
 - detailing of specialised components
 - jointing
 - manholes
 - manufacturer requirements
 - materials
 - sewer admission limits
 - workmanship.
- Testing*** includes:
- air pressure test
 - drainage inspection
 - hydrostatic test
 - quality assurance (QA) audit.
- Commissioning schedule*** includes:
- charging traps
 - leak check
 - operational commissioning
 - pump commissioning
 - treatment system commissioning.
- Operation and maintenance manual*** includes:
- check for blockages
 - leak detection
 - pump maintenance
 - regular treatment system maintenance
 - regular water quality testing
 - water auditing
 - yearly maintenance requirements.

Unit Sector(s)

Unit sector Plumbing and services

Co-requisite units

Co-requisite units Nil

Co-requisite units Nil

Functional area

Functional area