Australian Government

# CPCPPS5028A Design trade waste pre-treatment systems

**Release 1**

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

# CPCPPS5028A Design trade waste pre-treatment systems

## Modification History

Changes to unit descriptor, performance criteria, required skills and knowledge, range statement and critical aspects
Not equivalent to CPCPPS5008A

## Unit Descriptor

This unit of competency specifies the outcomes required to design trade waste pre-treatment systems for commercial and industrial premises prior to discharge to authority's point of sewer connection. The unit requires identification of appropriate installation details and preparation of specifications.

## 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

In some jurisdictions, this unit of competency may form part of accreditation, licensing, legislative, regulatory or certification requirements.

## Pre-Requisites

Nil

## Employability Skills Information

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

# Elements and Performance Criteria

| | | | |
|---|---|---|---|
| **1** | **Evaluate design parameters.** | 1.1 | ***Scope of work*** is established for trade waste pre-treatment systems prior to discharge to authority's point of sewer connection. |
| | | 1.2 | ***Design requirements*** are determined from relevant Australian standards, codes, plans, specifications, authorities' requirements and client brief. |
| | | 1.3 | ***Statutory and regulatory requirements and relevant Australian standards and codes*** for the design of trade waste pre-treatment systems are analysed and applied. |
| | | 1.4 | ***Trade waste applications*** are analysed and a ***cost-benefit analysis*** is conducted, comparing a range of pipe materials and system designs. |
| | | 1.5 | ***Manufacturer requirements*** and trade and technical manuals are interpreted. |
| | | 1.6 | Additional research, including a ***desktop study***, is conducted to outline design parameters. |
| | | 1.7 | ***Performance requirements*** are established, considering safety of system users or building occupants. |
| **2** | **Plan and detail system components.** | 2.1 | ***Layout of pipework systems*** and type, and location of ***fittings*** and controls are planned. |
| | | 2.2 | ***Solid removal systems*** are planned and detailed. |
| | | 2.3 | ***Grease and oil interceptors***, ***neutralising chambers*** and ***wash-down areas*** incorporating stormwater exclusion are planned and detailed. |

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| | | 2.4 | Diffused air flotation systems are planned and detailed. |
| | | 2.5 | ***Bacterial treatment processes*** and ***combined and specialised treatment processes*** are detailed for a range of commercial and industrial applications. |
| | | 2.6 | General housekeeping procedures are incorporated to minimise discharge of trade waste. |
| | | 2.7 | ***System calculations*** are performed for a range of applications. |
| | | 2.8 | ***Pumpwell, pumps, controls and equipment requirements*** are sized and detailed. |
| | | 2.9 | ***Pipe supports*** are designed for a range of applications. |
| | | 2.10 | Approved ***materials***, ***jointing methods*** and ***installation requirements*** for trade waste pre-treatment systems are specified. |
| **3** | **Design and size systems.** | 3.1 | Trade waste pre-treatment systems are designed and sized for a range of applications using calculations and ***computer software packages***. |
| | | 3.2 | ***Sustainability principles and concepts*** are applied throughout the design process. |
| **4** | **Prepare documentation.** | 4.1 | Client brief of the desired design is prepared. |
| | | 4.2 | ***Plans*** and ***specifications*** are prepared for a range of trade waste pre-treatment systems. |
| | | 4.3 | ***Testing*** and ***commissioning schedule*** is prepared. |
| | | 4.4 | ***Operation and maintenance manual*** is produced, including information on how to properly and safely maintain the system. |

# Required Skills and Knowledge

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

### Required skills

- 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
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
- initiative and enterprise skills to develop creative and responsive approaches
- literacy skills to:
  - prepare written documentation, including:
    - operation and maintenance manual
    - plans, specifications and schedules
  - read and interpret:
    - plans, specifications, drawings and design briefs
    - standards and manufacturer requirements and manuals
    - statutory and regulatory requirements
- numeracy skills to apply measurements and calculations
- planning and organising 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
- 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
- technical skills to recommend general housekeeping procedures to minimise trade waste
- technology skills to:
  - access and understand site-specific instructions in a variety of media
  - use mobile communication technology

### Required knowledge

- relevant Australian standards, codes, manufacturer specifications, National Construction Code (NCC), relevant authorities' requirements and operating procedures relevant to the

sector

- hazards associated with devices and systems used in the hydraulic sector
- design of the options for the pre-treatment of trade waste
- approved installation methods for trade waste pre-treatment systems
- key features of work plans and specifications
- nature of materials and effect of their performance in a variety of conditions
- organisational quality procedures and processes
- terminology and definitions used in hydraulic design
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards

# 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, as a minimum, evidence of the ability to:

- design, size and document the installation and layout details for a trade waste pre-treatment system, including a specification for two of the following:
  - commercial kitchen
  - vehicle mechanical workshop
  - commercial laundry
  - metal plating process
- evaluate and document design parameters to relevant Australian standards, codes, client information, local authorities' trade waste policy, and manufacturer installation requirements
- evaluate health risks associated with the trade waste system
- plan and detail system components, including pre-treatment systems and piping systems
- design and size trade waste systems
- design and size wash-down and stormwater exclusion systems
- prepare plans and specifications for the trade waste pre-treatment installations to industry standards
- prepare schedules for testing and commissioning
- produce operation and maintenance manuals
- apply sustainability principles and concepts throughout installations
- communicate with others to ensure safe and effective workplace operations.

**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.

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
- 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

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***:

- must include:
  - interpreting plans and specifications
  - sizing and documenting layout of trade waste pre-treatment systems for commercial and industrial applications
- may be for new projects or an existing structure being renovated, extended, restored or maintained.

***Design requirements*** must include:

- architectural plans
- building specifications
- cleaning and maintenance procedures
- installation requirements
- odour control
- owner requirements
- pipework identification
- sizing
- trade waste treatment
- ventilation.

***Statutory and regulatory requirements and relevant Australian standards and codes*** may include:

- AS/NZS3500 National plumbing and drainage
- AS2200 Design charts for water supply and sewerage
- commonwealth, state or territory and local governments requirements
- National Construction Code
- other relevant Australian standards and codes.

***Trade waste applications*** may include:

- chemical facilities
- commercial and industrial facilities that produce a liquid waste stream
- commercial and industrial laundry
- food preparation facilities
- laboratories
- motor vehicle workshops
- photography development facilities
- wash-down facilities.

***Cost-benefit analysis***:

- compares the range of suitable materials and system choices available to enable cost-effective choices to be made without compromising integrity of project
- may include:
  - design styles
  - energy costs
  - expected design life
  - labour costs
  - material costs
  - safety factors

- speed of installation
- suitable materials
- authorities' requirements.

***Manufacturer requirements*** may include:

- containment
- design and installation
- installation space
- material specifications
- pipe sizing
- pump installation
- storage systems
- technical and trade manuals
- ventilation.

***Desktop study*** may include collection and interpretation of existing data for design purposes in:

- architectural and building plans
- developer plans
- manufacturer data
- documents, which may include:
  - applications
  - brochures
  - forms
  - policies
  - other reports as available
- trade waste publications.

***Performance requirements*** must:

- establish acceptable discharge standards for the relevant authority
- comply with relevant Australian standards, codes and local authorities' requirements.

***Layout of pipework systems***:

- may include:
  - location of pipework (fire rating of enclosure)
  - trade waste plumbing and drainage
  - pumped systems
  - accessibility
- should not unduly affect building integrity and aesthetic appeal
- should have principles of economy, serviceability, durability and fit for use applied.

| | |
|---|---|
| ***Fittings*** may include: | • bends<br>• junctions<br>• reflux valves<br>• inspection openings<br>• expansion joints. |
| ***Solid removal systems*** may remove: | • bone<br>• dirt<br>• grit<br>• metal<br>• paper<br>• plastic<br>• rubbish<br>• sand<br>• silt<br>• wood<br>• other solid contaminants. |
| ***Grease and oil interceptors*** may include: | • coalescing plate separators<br>• dissolved air flotation (DAF)<br>• grease traps<br>• skimmers<br>• vertical separators. |
| ***Neutralising chambers*** may neutralise: | • acid<br>• alkaline<br>• chemicals. |
| ***Wash-down areas*** may include: | • bin<br>• commercial and industrial wash-down processes that may or may not require stormwater diversion<br>• floor<br>• vehicle<br>• machinery. |
| ***Bacterial treatment processes*** may include: | • aerobic<br>• anaerobic |

- facultative and specialised bacteria for the removal of grease and other contaminants.

***Combined and specialised treatment processes*** may include:

- bacterial treatment
- cooling pits
- diffused air flotation systems
- neutralising chambers
- solid removal systems
- specialised treatment.

***System calculations*** must include:

- calculating gradient
- interpreting design charts and tables
- calculating pipe sizing
- calculating reduced level
- determining flow and fixture loadings
- sizing treatment system
- storage tank capacity.

***Pumpwell, pumps, controls and equipment requirements*** may include:

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

***Pipe supports*** include:

- anchors
- bedding
- bracket spacing
- concrete support
- corrosion protection
- cover
- hanging brackets
- manufacturer-recommended specific fixings
- material requirements
- saddles
- provision for expansion
- wall and ceiling brackets.

***Materials*** may include:

- pipes may include:
  - cast iron or epoxy lined
  - earthenware or vitrified clay pipe (VCP)
  - polyethylene (PE)
  - polypropylene (PP)
  - other approved material
- fittings and fixtures, including sound attenuation requirements.

***Jointing methods*** may include:

- electrofusion welding
- mechanical joints
- rubber ring
- threading.

***Installation requirements*** may include:

- bedding
- pipe protection, which may include:
  - cover
  - corrosion
  - impact
- fire rating
- level of workmanship
- manufacturer-recommended specific fixings
- pipe support
- provision for expansion
- serviceability and access.

***Computer software packages*** include:

- proprietary design software
- manufacturer software.

***Sustainability principles and concepts***:

- cover the current and future social, economic and environmental use of resources
- may include:
  - selecting appropriate material to ensure minimal environmental impact
  - efficient use of material
  - efficient energy usage/capital outlay comparison
  - effect on the environment due to overflow or leakage
  - material selected to convey the type of discharge
  - water efficiency.

***Plans***:

- may include:
  - axonometrics
  - cross-sections
  - details
  - elevations
  - isometrics
  - schematics
  - sections
- may be produced using:
  - computer generation
  - drawing equipment.

***Specification*** may include:

- access chambers (manholes)
- bedding
- commissioning
- concrete support and detailing specialised components
- jointing
- manufacturer requirements
- materials
- pumps

- safety (WHS)
- support
- testing
- workmanship.

***Testing*** may include:

- air pressure
- compliance with authorities' discharge requirements
- drainage inspection
- hydrostatic
- performance
- quality assurance (QA) audit.

***Commissioning schedule*** may include:

- checking for foreign material
- checking system defects
- checking that system functions as per design
- containment
- leak check
- operational commissioning
- pump commissioning
- system certification
- treatment system commissioning.

***Operation and maintenance manual*** may include:

- as installed drawings
- certification documentation
- results of commissioning test
- maintenance schedules
- manufacturer brochures and technical information
- odour control
- regular treatment system maintenance
- regular water quality testing
- ventilation
- water auditing.

# Unit Sector(s)

**Functional area**

**Unit sector** Plumbing and services

# Custom Content Section

Not applicable.