Australian Government

Department of Education, Employment and Workplace Relations

CPCPSN4011A Design and size sanitary plumbing 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, size and document the layout of sanitary plumbing systems for multi-floor buildings.

Application of the Unit

Application of the unit Site location for application of the plans will be residential or commercial, and may be a new work site or an existing structure being renovated, extended, restored or maintained.

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. Prepare for planning.	1.1. Nature and scope of planning task are identified and confirmed. 1.2. ***Safety*** (***OHS***) requirements associated with planning, sizing and documenting the layout of sanitary pipework and fixtures, and workplace ***environmental requirements***, are adhered to throughout the work. 1.3. Work is organised and sequenced in conjunction with others involved in or affected by the work and ***statutory and regulatory authority*** requirements. 1.4. ***Tools and equipment*** required for planning, sizing and documenting the layout of sanitary pipework and fixtures, including personal protective equipment, are selected and checked for serviceability. 1.5. Work area in which planning process is to be conducted is prepared.
2. Identify system requirements.	2.1. ***Information*** and specifications for required ***system*** work are obtained and confirmed, if necessary by site inspection. 2.2. Regulations and Australian standards relevant to the work are consulted and applied to all aspects of the work. 2.3. Quantity, location and type of fixtures are determined from design drawings, plans and elevations. 2.4. Fixture unit loading is determined in accordance with relevant Australian standards and regulatory authorities' requirements. 2.5. System is sized in accordance with relevant Australian standards, and regulatory authorities' and workplace requirements.
3. Plan system layout.	3.1. Layout of sanitary pipework and fixtures is planned in accordance with building plans, relevant Australian standards and workplace procedures. 3.2. ***Materials*** required are specified and optimised in accordance with relevant Australian standards from the proposed design. 3.3. Plans are recorded in accordance with regulatory authorities' and workplace requirements. 3.4. ***Sustainability principles and concepts*** are applied to work preparation and application.

ELEMENT	PERFORMANCE CRITERIA
4. Restore work area.	4.1. Work area is restored in accordance with workplace procedures. 4.2. Tools and equipment used in the process are refurbished and left in accordance with workplace procedures. 4.3. Documentation, including work backup, is completed in accordance with workplace requirements.

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:
  - access information
  - complete workplace documentation
  - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
  - follow instructions
  - identify requirements, including system requirements
  - organise and sequence tasks with others
  - read and interpret:
    - documentation from a variety of sources
    - regulations, relevant Australian standards, plans, specifications and drawings
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
- written skills to:
  - complete workplace documentation
  - record plans
- documenting the layout of sanitary pipework and fixtures
- identifying and accurately reporting to appropriate personnel any faults in tools, equipment or materials
- numeracy skills to apply measurements and calculations

REQUIRED SKILLS AND KNOWLEDGE

- organisational skills, including the ability to plan and set out work
- 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
- technological skills to:
  - access and understand site-specific instructions in a variety of media
  - use mobile communication technology.

Required knowledge

Required knowledge for this unit is:

- accessing relevant information sources for the work activity
- characteristics and the application of different pipe systems, including their fittings and fixture supports, and fixing and joining techniques
- computers and computer-aided design software
- handling of hazardous waste
- infectious diseases
- job safety analysis (JSA) and safe work method statements (SWMS)
- pipe materials and sanitary fixtures
- principles of drainage
- principles of sanitary plumbing
- process of planning, sizing and documenting the layout of sanitary pipework and fixtures
- relevant statutory and authority requirements related to planning, sizing and documenting the layout of sanitary plumbing systems
- SI system of measurements
- Australian standards applicable to the system
- workplace and equipment safety requirements.

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

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	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:
	• locating, interpreting and applying relevant information, Australian standards and specifications to planning, sizing and documenting the layout of sanitary pipework and fixtures for a multi-floor building
	• applying safety requirements throughout the work sequence, including electrical requirements and the use of personal protective clothing and equipment
	• as a minimum, the ability to design, size and document the layout details for a commercial (Class 6) and residential building; using two approved sanitary plumbing systems to a minimum of six floors, inclusive of a basement, to include fixtures on each floor level (excluding the basement), ensuring:
	  • correct identification of details of the plan
	  • correct selection and use of appropriate processes, tools and equipment
	  • completion of all work to specification
	  • compliance with regulations, relevant Australian standards and organisational quality procedures and processes
	  • application of sustainability principles and concepts
	  • communicating and working effectively and safely with others.

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

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- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- 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

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	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.

Safety (***OHS***) is to be in accordance with commonwealth, state and territory legislation and regulations and may include:	• handling of materials
	• hazard control
	• personal protective clothing and equipment prescribed under legislation, regulations and workplace policies and practices
	• safe operating procedures, including recognising and preventing hazards associated with:
	  • electricity
	  • hazardous materials and substances
	  • other machines
	  • surrounding structure and facilities
	  • trip hazards
	  • underground services
	  • use of tools and equipment
	  • work site visitors and the public
	  • working at heights
	  • working in confined spaces
	  • working in proximity to others
	• use of firefighting equipment
	• use of first aid equipment
	• workplace environment and safety.

RANGE STATEMENT

Environmental requirements cover water quality management and may include:	• clean-up protection • stormwater protection • waste management.
Statutory and regulatory authorities include:	• commonwealth, state and local authorities administering applicable Acts, regulations and codes of practice.
Tools and equipment may include:	• drawing instruments • measuring equipment • tools and equipment, which may include computers running appropriate computer-aided design software.

Information may include:	• charts and hand drawings
	• diagrams or sketches
	• instructions issued by authorised organisational or external personnel
	• job drawings manufacturer specifications and instructions
	• material safety data sheets (MSDS)
	• memos
	• organisation work specifications and requirements
	• regulatory and legislative requirements, particularly those pertaining to:
	  • building codes
	  • OHS and environmental requirements
	  • plumbing regulations
	• relevant Australian standards, including AS/NZS3500 National plumbing and drainage set: Part 2 Sanitary plumbing and drainage
	• safe work procedures relating to planning, sizing and documenting the layout of sanitary pipework and fixtures
	• signage
	• verbal, written and graphical instructions
	• work bulletins
	• work schedules, plans and specifications.

Fixtures may include:	• ablution trough • bain marie • basin • bath • bidet • domestic and commercial clothes washing machine

RANGE STATEMENT

	• domestic and commercial dish washing machine • glass washing machine • laundry trough • shower • sink • slop hopper • urinal • WC.
System may include:	• approved sanitary plumbing systems • discharge pipes • elevated pipework • soil and waste fixtures.
Materials may include:	• building plans and specifications, including drainage plans.

Sustainability principles and concepts:	• cover the current and future social, economic and environmental use of resources
	• may include:
	  • efficient design principles that have minimal environmental impact
	  • efficient use of material in the design, including recycling of material
	  • efficient energy and water use
	  • disposal of waste material to ensure minimal environmental impact.

Unit Sector(s)

Unit sector Plumbing and services

Co-requisite units

Co-requisite units Nil

Functional area

Functional area