



Australian Government

Assessment Requirements for CPCPCM5014 Design sewer infrastructure systems

Release: 2

Assessment Requirements for CPCPCM5014 Design sewer infrastructure systems

Modification History

- Release 2 This version first released with CPC Construction, Plumbing and Services Training Package Release 5.1.
Changes to Elements and Performance Criteria 5.4.
- Release 1 This version first released with CPC Construction, Plumbing and Services Training Package Release 5.0.
Supersedes and is equivalent to CPCPCM5014A Design sewer infrastructure systems. Updated to meet the Standards for Training Packages 2012.

Performance Evidence

To demonstrate competency, a candidate must meet the performance criteria for this unit by:

- designing, sizing and documenting the installation and layout details for a sewer infrastructure system for a residential development of 50 properties, incorporating a gravity system and pumping station, to include:
 - sewer reticulation mains
 - pump station
 - pump rising main
 - ventilation
 - odour control
- evaluating and documenting design parameters to relevant Australian standards and codes, and regulatory, client and manufacturer requirements.

Knowledge Evidence

To be competent in this unit, a candidate must demonstrate knowledge of:

- common terminology and definitions used in the design of sewer infrastructure systems
- application of statutory and regulatory requirements and relevant Australian standards and codes:
 - Acts, regulations and Commonwealth, state or territory and local government policies
 - AS/NZS 3500 National plumbing and drainage
 - AS 2200 Design charts for water supply and sewerage
 - Environmental Protection Authority (EPA)
 - National Construction Code (NCC)

- Sewerage Code of Australia
- other relevant Australian standards and codes
- utility provider's design standards -e.g. Water Corporation (WA), Urban Utilities (QLD)
- scope of work requirements:
 - interpreting plans and specifications
 - sizing and documenting layout sewer infrastructure system
- design requirements:
 - architectural plans
 - builder specifications
 - fire safety requirements
 - owner requirements
 - pipework identification
 - flow requirements and sizing of pipework
 - ventilation requirements
- cost–benefit analysis comparing the range of suitable materials and system choices available to enable cost-effective choices without compromising the integrity of the project
- nature of materials used and effects of performance under various conditions:
 - cast iron
 - concrete
 - vitrified clay pipes (VCP)
 - polyethylene (PE)
 - polypropylene (PP)
 - unplasticised polyvinyl chloride (uPVC)
 - other approved materials
- manufacturer requirements:
 - material specifications
 - collection and storage systems
 - design and installation
 - equipment installation
 - pump installation
 - technical manuals
- trench safety procedures:
 - conditions affecting trench stability
 - condition of soils disturbed by previous excavations
 - effect of water on excavations
 - effects of moisture content on excavated trenches
 - traffic and vibrations
 - confined space safety requirements e.g. for exhaust emissions

- prevention of trench collapse
- trench collapse procedures
- trench collapse inspection procedures
- trench excavation methods used for different:
 - backfilling methods
 - bedding methods
 - depth
 - • slope
 - support systems
 - types
- safety procedures with reference to:
 - advisory standards
 - compliance standards
 - industry standards
 - Work Health and Safety Act
 - other acts, codes or regulations relating to trenching
 - working in confined spaces
- layout of pipework systems:
 - gravity
 - pumped and rising mains
 - vacuum
 - identification of easements and location for sewer infrastructure systems, including pumping rising mains
 - layout requirements to:
 - not unduly affect building integrity and aesthetic appeal
 - apply principles of economy, serviceability, durability and fitness for use
- characteristics and application of different fittings, valves and controls:
 - fittings
 - bends
 - flanges
 - junctions
 - inspection openings
 - unions
 - valves non-return and isolation
 - controls
 - level
 - alarms
 - management communication systems
- pipelaying procedures:
 - cutting, handling and storage procedures

- fittings used for sewerage work
- jointing methods and procedures
- laying procedures for pipework
- methods of dewatering trenches
- methods of grading and maintaining pipe direction and reduced levels
- methods of placing bedding materials, encasing pipes, backfilling and compacting
- methods of testing sewer drains
- methods of pressure testing pump rising mains
- processes for calculating pipe size, pipe grade and ventilation requirement:
 - determination of flow and loadings
 - gradient calculations
 - equivalent population (EP) density
 - interpretation of design charts and tables
 - pipe sizing calculations
 - projected flows
 - pumping flow rates
 - reduced level calculations
 - self-cleaning pipe velocities
 - stormwater infiltration
 - system ventilation
- access chamber details:
 - access
 - benching
 - connections
 - covers
 - flow and gradient
 - open and closed channel
 - sizing
- pump station, pumps, controls and equipment requirements:
 - access covers
 - access ladders
 - automatic controls
 - capacity
 - corrosion-resistant materials
 - emergency storage and power supply
 - impeller sizing and selection
 - inlet and outlet design
 - installation and mounting
 - odour control
 - macerator requirements

- management communication system
- provision for servicing
- pump selection
- pump well sizing
- space requirements
- valves
- ventilation
- warning system
- characteristics and application of different jointing methods
- installation requirements:
 - bedding
 - pipe protection
 - cover
 - corrosion
 - impact
 - level of workmanship
 - manufacturer-recommended specific fixings
 - pipe support
 - provision for pipe movement
 - serviceability and access
- rising main systems:
 - approved pressure pipe and fittings
 - calculated rise and pump delivery requirements
 - environmental protection
 - pump sizing to meet calculated flow conditions
 - self-cleaning pipe velocities
 - odour control
- the use and limitations of computer software packages including manufacture and proprietary design software
- plans and specifications requirements:
 - axonometric
 - cross-sections
 - details
 - elevations
 - isometrics
 - schematics
 - site
 - sections
 - specifications
 - bedding

- commissioning
- excavation requirements
- support
- concrete support and detailing specialised components
- jointing
- access chambers (manholes)
- manufacturer requirements
- materials
- piping
- pumps
- pumping stations
- WHS
- testing
- workmanship
- testing methods:
 - air pressure
 - drainage inspection
 - hydrostatic
 - performance
 - compliance with authorities' discharge requirements
 - quality assurance (QA) audit
- commissioning schedule requirements:
 - system certification
 - check for foreign material
 - containment
 - leak check
 - operational
 - pumping
 - system defects
 - system functions as per design
 - ventilation
 - odour control
 - WHS compliance
- operation and maintenance manual requirements:
 - as installed drawings
 - certification documentation
 - emergency procedures
 - results of commissioning test
 - maintenance schedules
 - manufacturer brochures and technical information

- odour control
- WHS requirements
- ventilation
- sustainability principles and concepts:
 - selecting appropriate material to ensure minimal environmental impact
 - efficient use of material
 - efficient energy usage/capital outlay comparison
 - consideration of the Green Building Council of Australia rating scheme
- principles of technology in the design of sewer infrastructure systems.

Assessment Conditions

Assessors must satisfy the requirements for assessors listed in the Standards for Registered Training Organisations.

This unit must be assessed in the workplace or a close simulation using realistic workplace conditions, materials, activities, responsibilities, procedures, safety requirements and environmental considerations.

Links

Companion volumes to this training package are available at the VETNet website -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad>