



Australian Government

Assessment Requirements for CPCPPS5030

Design pump systems

Release: 2

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Modification History

- Release 2 This version first released with CPC Construction, Plumbing and Services Training Package Release 6.5.
Change to Performance Criteria 4.1.
- Release 1 This version first released with CPC Construction, Plumbing and Services Training Package Release 5.0.
Supersedes and is equivalent to CPCPPS5030A Design pump 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 water and wastewater pumping systems required for the hydraulic services installation of:
 - a high-rise mixed development building to a minimum of 29 floors, including a basement with fixtures on all levels, and
 - a wide span project (such as a school or industrial complex)
- planning and detailing both system components and include:
 - ancillaries
 - control panel
 - fittings
 - flow switches
 - mounting
 - piping
 - plinths
 - pressure switches
 - pump duty.

Knowledge Evidence

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

- hazards associated with pumping equipment used in hydraulic systems
- key features of work plans and specifications
- approved installation methods for pump systems
- principles of technology in the design of pump installations for hydraulic systems

- research methods
- terminology and definitions used in pump installation
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards
- scope of work:
 - interpretation of plans and specifications
 - sizing and documenting layout of pump systems for wide span and high-rise building projects
- pump types:
 - centrifugal
 - circulating
 - constant flow variable speed
 - macerator
 - multiple stage
 - piston
 - positive displacement
 - submersible
 - vacuum
 - variable speed control
- pump duties:
 - constant pressure
 - flow rate
 - head
 - velocity
- design requirements:
 - acoustic performance
 - architectural plans
 - available flow and pressure from authority's main
 - building specifications
 - fire safety
 - owner's requirements
 - pipework identification
 - pump duty
 - sizing of pipework
 - ventilation
 - vibration
 - viscosity of fluids
- cost-benefit and life cycle analysis:
 - balancing initial cost with durability, longevity, maintenance and ongoing fuel and energy cost requirements

- comparing the range of suitable materials, pumps and system designs available to enable cost-effective choices to be made without compromising integrity of project
- cost-benefit considerations:
 - design
 - energy costs
 - expected design life
 - labour costs
 - material costs
 - safety factors
 - speed of installation
 - suitable materials
- statutory and regulatory requirements which may include Acts and regulations Commonwealth, state or territory and local government requirements
- Australian Standards and codes:
 - AS/NZS 3500 Plumbing and drainage set
 - AS 2419 Fire hydrant installations system design, installation and commission
 - AS/NZS 1547 On-site domestic wastewater management
 - AS 2200 Design charts for water supply and sewerage
 - National Construction Code (NCC)
 - other relevant Australian Standards
- manufacturer requirements:
 - material installation specifications
 - pump tables
 - pipe sizing
 - recommended installation and fixings for pipework
 - technical and trade manuals
 - ventilation requirements
- information gathered during desktop study to support design research:
 - architectural and building plans
 - developer plans
 - manufacturer data
 - applications
 - brochures
 - forms
 - policies
 - reports
- flow and pressure tests which may include on-site measurement of flow (l/s), velocity (m/s) and pressure (kPa)
- performance requirements including flow, velocity, pressure and discharge requirements, to satisfy the requirements of the hydraulic system
- pump, controls and pump room requirements:

- acoustics
- ancillaries
- automatic controls
- inlet and outlet design
- installation and mounting
- plinths
- pump sizing and selection
- space
- ventilation
- vibration
- layout of pipework systems:
 - access
 - identification
 - insulation
 - isolation
 - maintenance
 - principles of economy, serviceability, durability and fit for use
 - replacement
- fittings:
 - bends
 - flanges
 - inlet and outlet pressure gauges
 - tees
 - unions
- valves:
 - air relief
 - excess pressure
 - isolating
 - non-return
 - pressure limiting
 - pressure reduction
 - strainers
 - vibration couplings
- energy sources:
 - diesel and diesel-electric generator sets
 - electrical, single phase and three-phase
 - petrol
- pump plinth bases designed to resist forces exerted by pump:
 - concrete
 - masonry

- timber
- steel
- pump mountings:
 - anchoring bolts
 - inertia pads
 - rubber and synthetic
 - spring loaded
 - vibration mounts
- piping materials:
 - copper (Cu)
 - galvanised steel
 - stainless steel
 - polyethylene (PE)
 - polypropylene (PP)
 - polybutylene (PB)
 - other approved material
- pump materials:
 - cast iron
 - bronze
 - stainless steel
 - other appropriate materials
- jointing methods:
 - brazing
 - electrofusion welding
 - mechanical joints
 - other approved jointing method
- installation requirements:
 - pipe protection:
 - corrosion
 - impact
 - fire rating
 - level of workmanship
 - manufacturer-recommended specific fixings
 - pipe support
 - provision for vibration
 - serviceability and access
 - thrust brackets
- delivery systems:
 - circulation
 - constant flow variable speed pump

- hydropneumatic
- lift
- pressure
- rising main
- vacuum
- methods of applying sustainability principles and concepts:
 - selecting appropriate material to ensure minimal environmental impact
 - efficient use of material
 - efficient energy usage/capital outlay comparison
 - effect on the environment due to pump or pipe failure
 - pump efficiency
- types of plans:
 - axonometrics
 - cross-sections
 - details
 - elevations
 - isometrics
 - sections
 - schematics produced using:
 - computer generation
 - drawing equipment
- specification:
 - acoustic performance
 - fire safety
 - jointing
 - manufacturer requirements
 - materials
 - pump duty
 - residual pressures
 - WHS
 - specialised components
 - support
 - testing
 - valve selection
 - vibration control
 - workmanship
- testing of:
 - defect inspection
 - hydrostatic
 - performance

- quality assurance (QA) audit
- commissioning schedule information:
 - system certification
 - exhaust pipe check
 - flow check
 - leak check
 - pressure check
 - system purge
 - system defects
 - system functions as per design
 - valve operation
 - acoustic performance
- operation and maintenance manual information:
 - as installed drawings
 - results of commissioning test
 - certification documentation
 - emergency shutdown procedures
 - maintenance schedules
 - manufacturer brochures and technical information
 - valve function.

Assessment Conditions

Assessors must meet the requirements for assessors contained 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>