

Unit of Competency CPCPFS5012

Design fire hydrant and hose reel systems

Application

This unit specifies the skills and knowledge required to design fire hydrant, hose reel and storage systems to Australian and New Zealand standards, the National Construction Code (NCC) and other relevant legislative requirements in order to meet fire protection standards for a range of wide span and high-rise building applications.

This unit is suitable for those using specialised knowledge to complete routine and non-routine tasks and using their own judgement to deal with predictable and sometimes unpredictable problems.

The design of fire hydrants, hose reels and storage systems must comply with Australian and New Zealand standards, the National Construction Code (NCC) and other relevant legislative requirements in order to meet fire protection standards.

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

Prerequisite Unit

Nil.

Elements and Performance Criteria

1. Evaluate design parameters.	<ul style="list-style-type: none">1.1 Establish scope of work for fire hydrants, hose reels and distribution systems for wide span and high-rise building projects.1.2 Determine design requirements from plans, specifications and client brief.1.3 Conduct cost-benefit analysis comparing a range of pipe materials and system designs.1.4 Interpret manufacturer requirements and trade, technical and sizing manuals for the design parameters.1.5 Conduct research to outline design parameters.1.6 Conduct flow and pressure tests.1.7 Establish performance requirements.
2. Plan and detail system components.	<ul style="list-style-type: none">2.1 Plan layout of pipework and type and location of fittings and valves2.2 Detail type, location and requirements for backflow prevention devices2.3 Calculate pipe sizes, velocities, flows and pressures for a range of applications.2.4 Specify approved materials, jointing methods and installation requirements.2.5 Detail hydrant booster, standpipe and hose reel assemblies.2.6 Design thrust blocks and pipe fixings for a range of applications.2.8 Size and detail pump, pump controls and pump room requirements2.9 Design and detailed water storage systems.
3. Design and size	<ul style="list-style-type: none">3.1 Design fire hydrant and hose reel systems for a range of wide span and high-

systems.	<p>rise building applications.</p> <p>3.2 Design combined water supply, fire hydrant, hose reel and sprinkler systems for a range of wide span and high-rise building applications.</p> <p>3.3 Design a range of delivery systems.</p> <p>3.4 Design and size Fire hydrant and hose reel systems using computer software packages.</p> <p>3.5 Apply sustainability principles and concepts when preparing for and undertaking work process.</p>
4. Prepare documentation.	<p>4.1 Prepare plans for a range of fire hydrant and hose reel systems.</p> <p>4.2 Prepare block plan booster cabinet according to Australian and New Zealand standards.</p> <p>4.3 Prepare specification for a fire hydrant and hose reel system.</p> <p>4.4 Prepare testing and commissioning schedule.</p> <p>4.5 Produce operation and maintenance manual.</p>

Foundation skills

A person demonstrating competency in this unit must have the following language, literacy, numeracy and employment skills:

- problem-solving skills to:
 - o analyse requirements
 - o carry out tests
 - o consider options
 - o design an appropriate system
 - o identify typical faults and action required to rectify problems
- technology skills to:
 - o access and understand site-specific instructions in a variety of media
 - o use mobile communication technology.

Unit Mapping Information

Supersedes and is equivalent to CPCPFS5012A Design fire hydrant and hose reel systems.

Links

Companion Volume Implementation Guide:

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

Assessment Requirements for CPCPFS5012

Design fire hydrant and hose reel systems

Performance Evidence

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

- establishing and evaluating design parameters for a range of fire hydrant and hose reel systems
- planning system components for a range of fire hydrant and hose reel systems:
 - o application of sustainability principles and concepts
 - o booster assemblies
 - o hose reels
 - o hydrants
 - o storage tanks
 - o thrust blocks
- complying with WHS regulations applicable to workplace operations
- applying organisational quality procedures and processes within context of restoring plastered surfaces to conservation requirements
- designing and sizing a range of fire hydrant and hose reel systems
- developing a checklist with all information and formulas required to carry out flow and pressure tests
- preparing plans for a range of fire hydrant and hose reel systems
- preparing a specification for a fire hydrant and hose reel system
- preparing a testing and commissioning schedule
- producing an operation and maintenance manual
- communicating with others to ensure safe and effective work site operations.

Knowledge Evidence

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

- Australian and New Zealand standards:
 - o AS/NZS3500 National plumbing and drainage: Part 1
 - o AS2419 Fire hydrant installations system design, installation and commission
 - o AS2441 Installation of fire hose reels
 - o AS/NZS2118 Automatic fire sprinkler systems general requirements
 - o NCC
- fire department, statutory and regulatory requirements and Australian and New Zealand standards for the design of fire hydrants, hose reels and distribution systems
- flow and pressure:
 - o results of flow and pressure tests
 - o on-site measurement of flow (l/s), velocity (m/s) and pressure (kPa)

- performance requirements:
 - flow, velocity, pressure and discharge requirements, established using Australian and New Zealand standards and local statutory authority's plans
- layout of pipework:
 - dual feed
 - ring main
 - single pipe
- fittings and valves:
 - fittings:
 - mechanical fittings
 - bends
 - elbows
 - tees
 - unions
 - valves:
 - backflow prevention
 - pressure relief
 - isolating
 - pressure limiting
 - pressure reduction
 - materials:
 - copper
 - galvanised steel
 - fittings and fixtures
 - other approved materials
- jointing methods:
 - flanged
 - mechanical joints
 - silver braze
 - threaded
 - welded
 - other approved methods of jointing
- installation requirements:
 - corrosion and elements protection
 - installation details
 - jointing requirements
 - supports
 - workmanship and quality control
- booster and standpipe assemblies:
 - cabinet and block plans
 - non-return and isolating valves
 - fire appliance (hard stand) access
 - pressure gauges
 - suction and delivery outlets
 - testing points
 - signage
- hose reel assemblies:

- o Australian standards' requirements for clearances and requirements
 - o non-return and backflow prevention valves
 - o pipe sizes
- design elements of thrust blocks:
 - o designed and installed to AS/NZS3500
 - o design details for tees, elbows and valves
 - o keying and anchorage points
 - o sizes
 - o soil characteristics
 - o velocity and flow forces to be resisted
- pipe fixings:
 - o bedding and thrust blocks
 - o corrosion protection
 - o covers
 - o masonry fixing
 - o material requirements
 - o pipe supports spacings and locations
 - o vertical support fixing
- pump, pump controls and pump room requirements:
 - o electrical supply requirements
 - o heating
 - o inlet and outlet design requirements
 - o installation and mounting requirements
 - o manual and automatic controls
 - o pump selection
 - o space requirements
 - o valve requirements
 - o ventilation requirements
- water storage systems:
 - o inlet valve design and sizing
 - o outlet valve design and sizing
 - o overflow requirements
 - o safe tray requirements
 - o tank sizes
 - o vortex plates
- delivery systems:
 - o gravity feed
 - o mains pressure
 - o pump supply
- sustainability principles and concepts:
 - o cover the current and future social, economic and environmental use of resources:
 - o selecting appropriate material to ensure minimal environmental impact
 - o efficient use of material
 - o efficient energy usage
 - o efficient use and recycling of material
 - o disposing of waste material to ensure minimal environmental impact

- o efficient water usage, harvesting and/or disposal
- o life cycle cost-benefit analysis
- o consideration of the Green Building Council of Australia rating scheme.

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

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