

Unit of Competency CPCSFS5007

Create detailed designs for hydrant and hose reel systems

Application

This unit specifies the skills and knowledge required to obtain, process and set up drawings for the detailed design of hydrant and hose reel systems for low to high-rise buildings over 25 metres and 45 metres in height.

This unit of competency supports the role of fire systems designers and hydraulic design consultants who manage their own work and take responsibility for assessing and selecting component requirements, setting out the locations of components and creating final notated drawings for hydrant and hose reel systems.

The role may involve interaction with fire engineers, architects, contractors, suppliers, clients and relevant planning authorities and requires a sound understanding of applicable legislation, standards and codes, including the National Construction Code (NCC).

This unit does not apply to fire systems for special hazard locations.

Licensing, legislative, regulatory or certification requirements may apply to this unit.

Prerequisite Unit

Nil.

Elements and Performance Criteria

1. Set up fire systems design drawings.	<ul style="list-style-type: none">1.1. Access and review project drawings and documentation.1.2. Clean drawings to leave minimal essential information.1.3. Import layers showing designs of other services into clean architectural or structural drawings.1.4. Add details from drawings of the floor level above, if these affect the design.1.5. Process the detailed design drawings in accordance with workplace procedures.
2. Lay out the hydrant and hose reel design.	<ul style="list-style-type: none">2.1. Conduct a site visit if possible, to confirm dimensions and assess installation risks and constraints.2.2. Determine the exact location of hydrants and hose reels and notate on the drawing according to relevant codes and standards.2.3. Determine the most efficient and workable layout and location of hydrant and hose reel system components and notate on the drawing.2.4. Calculate and check dimensions and notate on the drawing.
3. Submit drawings for approval and finalise design process.	<ul style="list-style-type: none">3.1. Submit fire hydrant and hose reel system design drawings to relevant persons within the scheduled timeframe.3.2. Make or negotiate amendments to design drawings as required.3.3. Process and distribute final approved design drawings according to project and workplace requirements.

Foundation skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Supersedes and is equivalent to CPCSF55007A Create detailed designs for 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 CPCSFS5007 Create detailed designs for hydrant and hose reel systems

Performance Evidence

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

- producing fully compliant designs for hydrant and hose reel systems for the following sites:
 - o low-rise building
 - o medium-rise building
 - o high-rise building (over 25 metres)
 - o building over 45 metres in height
 - o building classifications in the National Construction Code (NCC).
- processing design drawings using parametric modelling software and workplace procedures.

Designs for all the above include:

- o fire engineer's designs for alternative solutions
- o technical issues impacting on hydrant and hose reel system designs
- o relevant regulatory approval and fire systems design certification processes.

Knowledge Evidence

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

- workplace design tools and processes
- level of accuracy required in detailed design drawings
- naming conventions for design drawings and drawing register
- fire science:
 - o fire behaviour and dynamics
 - o impact of fire on structures and materials
 - o products of combustion
 - o fire control strategies
 - o fire retardants
 - o fire detection technologies
 - o fire suppression technologies
 - o fire containment
- computer software functions and operation:
 - o word processing
 - o spreadsheet
 - o email

- o internet
 - o proprietary project management software
 - o proprietary hydraulic calculation software
 - o parametric modelling software
- relevant current legislation, codes and standards:
 - o building acts
 - o building regulations
 - o infrastructure supply regulations
 - o National Construction Code (NCC)
 - o Australian standards for fire systems
 - o international standards for fire systems
 - o other fire system standards commonly required by building insurers
- protection requirements for different buildings
- fire systems technology and components for hydrant and hose reel systems
- purpose and operation of fire systems:
 - o layout
 - o system operation
 - o performance requirements
 - o maintenance standards
 - o system activation and operation
- characteristics and limitations of products and materials used in fire systems and issues relating to material compatibility
- passive fire safety elements:
 - o identification of passive elements
 - o impact of fire systems design on passive elements
 - o specifications required to safeguard integrity of passive fire element performance where penetrations are necessitated by the fire systems design
- interconnection of fire systems:
 - o cause and effect matrix
 - o interface with other services
- basic principles of structural engineering
- characteristics of building materials
- construction industry terminology
- roles and responsibilities of relevant building project personnel:
 - o architect
 - o lead contractor
 - o mechanical engineer
 - o hydraulic engineer
 - o electrical engineer
- on-site issues that can arise during the construction phase and impose changes to the designs of fire systems and other services
- installation methods:
 - o access requirements
 - o work health and safety (WHS) requirements

- sustainability requirements and ratings:
 - energy conservation
 - water conservation
- pipe fabrication methods and constraints
- mathematical principles, equations and calculation methods:
 - financial calculations, for example to assess cost-effectiveness of fire systems
 - trigonometry, for example to amend dimensions of pipe allowing for fittings
- flow calculations:
 - area of operations
 - discharge rates and quantities
 - discharge times
 - pressure gain and loss
 - K-factors
 - pressure, temperature and volume relationship
 - Hazen-Williams equation
 - Darcy-Weisbach equation
 - computational fluid dynamics
- principles of organic and inorganic chemistry
- basic principles of thermodynamics:
 - effects of heat
 - stratification of gases
 - smoke and heat dynamics
- contractual processes
- project drawings:
 - architectural
 - structural
 - mechanical
 - electrical
 - hydraulic
- fire engineer's or estimator's specifications
- efficient and workable layout and location considerations:
 - selection of cost-effective components and materials
 - penetrations
 - conflict with other services
 - WHS risks
 - access constraints
 - installation problems
 - aesthetic requirements
 - efficiencies to facilitate work on site and reduce labour costing
- negotiations regarding amendments to design drawings which may arise due to:
 - non-compliance with applicable legislation, codes and standards
 - impact on installation risks and constraints
 - impact on cost-effectiveness

- hydrant and hose reel system components:
 - o hose reels
 - o hydrant valves
 - o booster valves.

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 Volume Implementation Guide:

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