

Unit of Competency CPCSFS5009

Create detailed designs for fire systems' water supplies

Application

This unit of competency specifies the outcomes required to obtain, process and set up drawings for the detailed design of water supplies for fire systems. The unit also involves assessing and selecting component requirements, setting out the locations of components and creating final notated drawings.

This unit of competency supports the role of fire systems designers with responsibility for creating detailed designs for water supplies for fire systems.

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. Confirm water-based fire systems designs.	<ul style="list-style-type: none">1.1 Request, receive, name and file relevant project drawings and documentation according to workplace procedures.1.2 Confirm details and dimensions and to assess water supply installation risks and constraints.1.3 Notate the exact location of fire system components on detailed design drawings according to relevant codes and standards.1.4 Name, file and back up the detailed design drawings according to workplace procedures.
2. Calculate pipe sizes and pump and tank requirements.	<ul style="list-style-type: none">2.1 Determine the initial fire flow demands for the site based on the occupancy classifications.2.2 Analyse water flow and pressure test results to establish the minimum levels of available supply in accordance with local jurisdictional requirements.2.3 Determine and analyse the town main water capabilities for the fire services serving the site to identify if fire pumps and fire tanks are required.2.4 Consider options for cost-effective and efficient solutions with reference to manufacturer specifications for the performance of components and according to workplace policies.
3. Lay out the water supply design.	<ul style="list-style-type: none">3.1 Identify methodologies used in making town main connections.3.2 Determine and notate the most efficient and workable layout and location of water supply components on the drawings according to workplace procedures.3.3 Calculate, check and notate dimensions on the drawings according to relevant codes and standards and component manufacturer's recommendations and

		workplace procedures.
	3.4	Determine the locations of backflow prevention devices and their accessibility.
	3.5	Review proposed locations of booster connections with local fire authority.
4. Submit drawings for approval and finalise design process.	4.1	Submit water supply design drawings to relevant personnel within the scheduled timeframe.
	4.2	Make or negotiate required amendments to design drawings as required.
	4.3	Process and distribute final approved design drawings according to relevant codes and standards and component manufacturer's recommendations 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 CPCSF55009A Create detailed designs for fire systems' water supplies.

Links

Companion Volume Implementation Guide:

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

Assessment Requirements for CPCSFS5009

Create detailed designs for fire systems' water supplies

Performance Evidence

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

- effectively applying principles relating to the design of water supplies for fire systems for four types of buildings including a:
 - o commercial building
 - o factory
 - o residential nursing home
 - o high-rise building.

Knowledge Evidence

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

- workplace design tools and processes
- project drawings and documentation:
 - o proposed water-based fire system designs
 - o mechanical
 - o electrical
 - o hydraulic
- level of accuracy required in detailed design drawings
- naming conventions for design drawings and drawing register
- computer software functions and operation:
 - o word processing
 - o spreadsheet
 - o email
 - o internet
- relevant current legislation, codes and standards:
 - o building Acts
 - o building regulations
 - o infrastructure supply regulations
 - o the Building Code of Australia (BCA)
 - o National Construction Code (NCC)
 - o Australian standards for fire systems
 - o international standards for fire systems
 - o jurisdictional authorities in addition to the BCA and NCC
 - o other fire system standards commonly required by building insurers
- protection requirements for different buildings including:
 - o low-rise buildings

- o processing building applications
 - o warehouse buildings under 13.7 m high
 - o warehouse buildings over 13.7 m high
 - o medium-rise buildings
 - o high-rise buildings (over 25 metres)
 - o buildings over 50 metres in height
- fire systems' technology and components
- fire system water supply technology and components:
 - o electric pumps
 - o diesel pumps
 - o tanks
 - o pressure vessels
 - o booster configurations
 - o components for water recovery systems
- purpose and operation of fire systems:
 - o layout:
 - consideration of a range of sustainable options for producing the required water pressure for water-based fire systems
 - selection of cost-effective components and materials
 - consideration of:
 - conflict with other services
 - work health and safety (WHS) risks
 - access constraints
 - installation problems
 - aesthetic requirements
 - efficiencies to facilitate work on site and reduce labour costing
 - o performance requirements
 - o maintenance standards
- characteristics and limitations of products and materials used in water supplies for fire systems and issues relating to material compatibility
- construction industry terminology
- roles and responsibilities of relevant building project personnel:
 - o architect
 - o lead contractor
 - o structural engineer
 - o mechanical engineer
 - o hydraulic engineer
 - o electrical engineer
 - o civil engineer
 - o fire engineer
 - o building (private) certifier or surveyor
- installation methods:
 - o access requirements
 - o WHS requirements
- water supplies:
 - o common water sources
 - o conservation requirements

- o in-ground reticulation
 - o booster configurations
- fluid mechanics and hydraulics relating to:
 - o water supply
 - o pressure
 - o tank selection
 - o pressure vessels
 - o pipe range
- fluid dynamics, hydraulics and the calculations required for the design of water supplies for fire systems
- sustainability requirements and ratings:
 - o energy conservation
 - o water conservation
- pipe fabrication methods and constraints
- mathematic principles, equations and calculation methods:
 - o flow calculations, including:
 - o pressure gain and loss
 - o K-factors
 - o Hazen-Williams equation
 - o Darcy-Weisbach equation
 - o Colebrook White equations and/or tables
 - o Manning formula and/or tables
 - o AS 2200 Design charts for water supply and sewerage
 - o computational fluid dynamics.

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>