

Unit of Competency CPCPFS5010

Design fire-compliant hydraulic services

Application

This unit of competency specifies the skills and knowledge required to design fire protection systems for hydraulic services in wide span and high-rise buildings. The fire protection systems ensure that hydraulic services maintain integrity, insulation and structural adequacy in case of fire.

It involves interpretation of plans and specifications and the design, detailing and documentation of fire-compliant hydraulic services for applications including residential, commercial and industrial and may be for new projects or an existing structure being renovated, extended, restored or maintained.

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.

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 Evaluate fire and non-fire-rated compartments of buildings and specify the application of evaluation to hydraulic services.1.2 Determine design requirements from plans, specifications and client brief.1.3 Conduct cost-benefit analysis, comparing a range of pipe materials, system designs and penetration protection systems.1.4 Interpret and apply statutory, regulatory, Australian and New Zealand standards and relevant building code requirements for the design of fire-compliant hydraulic services.1.5 Interpret and apply manufacturer requirements and trade and technical manuals.1.6 Conduct additional research, including a desktop study, and establish performance requirements.
2. Plan and detail system components.	<ul style="list-style-type: none">2.1 Plan layout of pipework systems and type and location of fire check materials.2.2 Specific approved fire-rated materials, penetration techniques, insulation and filler materials to appropriate fire-resistance level.2.3 Design pipe fixings for a range of applications.2.4 Design pipework for sprinklered and non-sprinklered areas for a range of applications.2.5 Specify installation requirements.2.6 Conduct compliance inspection in accordance with workplace procedures.

3. Design and size systems.	<p>3.1 Design fire-compliant hydraulic services for a range of wide span and high-rise building applications.</p> <p>3.2 Design a range of fire-compliant duct systems using fire-rated building materials.</p> <p>3.3 Design hydraulic services using non fire-rated materials to comply with building fire ratings.</p> <p>3.4 Design and size fire-compliant hydraulic distribution 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 and detail plans for a range of fire-compliant hydraulic services.</p> <p>4.2 Prepare specifications for fire-compliant hydraulic services.</p> <p>4.3 Prepare compliance report in accordance with workplace procedures.</p> <p>4.4 Produce operation and maintenance manual in accordance with workplace procedures.</p>

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 CPCPFS5010A Design fire-compliant hydraulic services.

Links

Companion Volume Implementation Guide:

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

Assessment Requirements for CPCPFS5010

Design fire-compliant hydraulic services

Performance Evidence

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

- evaluating and documenting design parameters, including client, regulatory, manufacturer, NCC and Australian and New Zealand standard requirements for a range of fire-compliant hydraulic services
- planning and detailing system components, including:
 - applying sustainability principles and concepts
 - conducting a compliance inspection
 - designing fire-compliant hydraulic systems
 - designing fire-compliant systems for fire-rated materials
 - designing fire-compliant systems for non-fire-rated materials
 - ducts
 - fire check collars
 - insulation and filler materials
 - penetrations
 - preparing a compliance report
 - preparing a specification for fire-compliant hydraulic services
 - preparing an operation and maintenance manual.

Knowledge Evidence

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

- sustainability principles and concepts covering the current and future social, economic and environmental use of resources:
 - selecting appropriate material to ensure minimal environmental impact
 - efficient use of material
 - efficient energy usage
 - efficient use and recycling of material
 - disposing of waste material to ensure minimal environmental impact
 - efficient water usage, harvesting and/or disposal
 - lifecycle cost-benefit analysis
 - consideration of the Green Building Council of Australia rating scheme.
- design requirements:
 - architectural specifications
 - builder specifications
 - design of fire-compliant hydraulic services should ensure that hydraulic services maintain the integrity, insulation and structural adequacy of a building in case of fire

- o owner requirements
 - o specialist design applications
- statutory, regulatory, Australian and New Zealand standards and relevant building code requirements:
 - o AS/NZS3500 National plumbing and drainage
 - o manual of authorisation procedures for plumbing and drainage products (MP52)
 - o material and authorisation standards specified by:
 - statutory plumbing authority
 - local authority
 - National Construction Code (NCC)
 - o relevant Acts, regulations and local and state government policies
 - o relevant fire standards
- manufacturer requirements:
 - o material specifications
 - o technical and trade manuals
- layout of pipework systems:
 - o car park systems
 - o concealed pipework
 - o duct systems
 - o exposed pipework
 - o fire-rated pipework
 - o non fire-rated pipework
 - o sprinklered and non-sprinklered areas
 - o should have principles of economy, serviceability, durability and fit for use applied
- fire check materials:
 - o fire pillows
 - o fire-rated sealants
 - o smoke seals
 - o range of intumescent collars
- fire-rated materials:
 - o fittings
 - o pipework
 - o valves
- penetration techniques:
 - o concrete floors
 - o fire and smoke doors
 - o fire dampers
 - o galvanised decking systems
 - o ply formwork systems
 - o post and pre-tensioned concrete flooring systems
 - o pre-cast flooring systems
- insulation and fill materials:
 - o caulking compounds
 - o fibreglass
 - o fire pillows
 - o foams

- o proprietary fill materials
 - o rock wool
- fire-resistance level:
 - o insulation
 - o integrity
 - o structural adequacy
- pipe fixings may include fire and load-rated:
 - o bedding and thrust blocks
 - o corrosion protection
 - o cover
 - o masonry fixing
 - o material requirements
 - o pipe supports spacings and locations
 - o vertical support fixing
- installation requirements may include:
 - o corrosion and element protection
 - o installation details
 - o jointing requirements
 - o supports
 - o workmanship and quality control
- compliance inspection:
 - o approved materials appropriate to fire-rated compartments and required fire-resistance level are used
 - o clipping and insulation comply with regulatory requirements
 - o fire compartments are not compromised by hydraulic services
 - o installation is appropriate for the fire-resistance level
- fire-compliant duct systems:
 - o brick
 - o concrete
 - o masonry
 - o plasterboard
- fire-rated building materials:
 - o brick
 - o concrete
 - o masonry
 - o plasterboard
 - o other building materials as applicable.

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>