



Australian Government

Assessment Requirements for CPCSF8001 Define scope of and initiate special hazard fire systems design projects

Release: 1

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Modification History

Release 1.

This version first released with CPC Construction, Plumbing and Services Training Package Version 1.

Replaces superseded equivalent CPCSF7001A Define scope of and initiate special hazard fire systems design projects.

Performance Evidence

A person demonstrating competency in this unit must satisfy all of the elements, performance criteria and foundation skills of this unit. The person must define the scope of and initiate two special hazard fire systems design (SHFSD) projects for special hazard sites as outlined in the range of conditions.

For each project, the person must:

- establish and communicate project parameters and task allocation, coordination and scheduling
- ensure systems are in place for project communication, file management, quality assurance and regulatory approvals
- define the requirements for the SHFSD
- gather and conduct a detailed analysis of project documentation relating to:
 - structural characteristics
 - functions and occupancies
- read and interpret notations and measure and interpret dimensions, ratios and scales on drawings, including:
 - architectural
 - electrical
 - hydraulic
 - mechanical
 - structural
- confirm the hazard classification for the special hazard site and determine applicable compliance and requirements, including those specified by insurers
- produce a risk assessment confirming the type or types of special hazard detection and suppression system that will be designed for the special hazard site, ensuring that the systems are compliant and effective and address the specific conditions of the project.

In particular the person should demonstrate:

- project management skills to coordinate, schedule, resource and oversee the initiation of two SHFSD projects
- the ability to read and interpret a range of design documents, including concept briefs, design briefs, drawings, plans and specifications
- the ability to apply legislation, codes, standards, and regulatory and insurance requirements that may apply to SHFSD projects, including Australian and United States National Fire Protection Association (NFPA) standards
- the ability to conduct risk assessment processes.

Knowledge Evidence

A person demonstrating competency in this unit must be able to demonstrate knowledge of:

- electrics and electronics theory, including:
 - units used to measure current (AC and DC), power, capacitance, inductance and sound attenuation
 - effects of AC and DC current in series and parallel circuit paths that include resistive, inductive and capacitive loads
 - relationship between voltage drops around a circuit and applied voltage
 - definition of voltage ratings as defined in communication and electrical safety regulations, including extra low voltage, low voltage and hazardous voltages
 - layout of electrical wiring systems to meet communication and electrical safety regulations applicable to fire detection and warning systems
 - basic operation of common electronic and electrical components used in fire detection and warning systems
 - basic operation of communication protocols on addressable systems, peripheral devices (printers) and high-level interfaces to other communication devices used in fire detection and warning systems
 - acoustics and speech intelligibility for occupant warning systems
- basic principles of structural engineering
- construction industry terminology used in project documentation and relevant standards
- contractual processes
- current legislation, regulations, codes and standards applicable to SHFSD, including:
 - building Acts and regulations
 - infrastructure supply regulations
 - Australian standards for fire systems
 - National Construction Code (NCC)
 - other fire system standards commonly required by building insurers, including NFPA standards and International Organization for Standardization (ISO) standards
- financial processes and calculations required to support commercially sound SHFSD projects, including:
 - budgeting
 - cost-effectiveness
- level of accuracy required in detailed design drawings

- mathematical principles, equations and calculation methods required for SHFSD, including:
 - trigonometry to amend dimensions of pipe allowing for fittings
 - flow calculations, including:
 - 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
 - electrical calculations for alarm systems, including:
 - voltage drops
 - battery sizes
 - battery back-up
 - power supplies
 - cabling range
 - system calculations for gas or special hazard fire systems
 - other calculations, including:
 - motor output
 - piping friction loss
 - pump capacity
- naming conventions for design drawings and drawing register
- organisational frameworks and functions, including:
 - industry associations
 - enterprises
 - government bodies
- principles of basic physics, including:
 - Boyle's Law
 - Charles' Law
 - Dalton's Law
 - Henry's Law
- principles of fire engineering, including:
 - engineered solutions
 - innovative fire systems
 - fire modelling
- principles of fire science, including:
 - fire behaviour and dynamics

- impact of fire on structures and materials
- products of combustion
- fire control strategies
- fire retardants
- fire detection technologies
- fire suppression technologies
- fire containment
- human psychology especially fire avoidance behaviour
- range of fire protection technologies suitable for SHFSD projects, including:
 - passive fire safety elements:
 - identification of passive elements
 - impact of fire systems design on passive elements
 - specifications required to safeguard integrity of passive fire element performance where penetrations are necessitated by the fire systems design
 - water-based systems, including:
 - deluge and drencher
 - dry pipe sprinkler
 - early suppression fast response (ESFR)
 - fire pumpsets
 - hydrants, hose reels and monitors
 - pre-action sprinkler
 - water supply tanks
 - wet pipe sprinkler
 - water supplies, including:
 - booster configurations
 - common water sources
 - conservation requirements
 - in-ground reticulation
 - fluid mechanics and hydraulics relating to:
 - pipe range
 - pressure
 - pressure vessels
 - pump selection
 - tank selection
 - water supply
 - detection and warning systems, including:
 - emergency lighting systems
 - emergency warning and intercommunication systems (EWIS)
 - fire detection and alarm systems
 - smoke control systems

- chemical systems, including:
 - powder
 - wet chemical
- purpose and operation of fire systems, including:
 - characteristics and limitations of products and materials used in fire systems and issues relating to material capability
 - layout
 - maintenance standards
 - performance requirements
 - special products and hazards
 - system activation and operation
 - system operation
- pipe fabrication methods and constraints
- interconnection of fire systems, including:
 - cause and effect matrix
 - interface with other services
- sustainability requirements relevant to the project:
 - energy conservation
 - water conservation
- principles of organic and inorganic chemistry, including basic chemical reactions and substances
- principles of thermodynamics, including:
 - effects of heat
 - stratification of gases
 - smoke and heat dynamics
- protection requirements for different buildings, including:
 - consideration of construction materials used
 - egress requirements of occupants
 - existence of special zones
- risk management processes
- requirements for installation:
 - access requirements
 - work health and safety requirements
- roles and responsibilities of relevant building project personnel
- types of workplace design and project management tools, and processes suitable for scoping and initiating SHFSD projects, including:
 - proprietary fire engineering and modelling programs
 - parametric modelling of services coordination using proprietary software, such as Navis-Works or MEP-REVIT.

Assessment Conditions

Assessment must be conducted in the workplace or a close simulation of the workplace.

Suitable assessment of performance would require:

- equipment:
 - computer with internet and email access
 - software: word processing and spreadsheet functionality; parametric modelling; and proprietary estimating, hydraulic calculation, and project management
- materials:
 - access to current legislation, codes and standards relevant to the jurisdiction in which the work is taking place, including:
 - building Acts and regulations
 - infrastructure supply regulations
 - Australian standards for fire systems
 - NCC
 - other fire system standards commonly required by building insurers, including NFPA standards and ISO standards
 - project documentation, including design briefs, design drawings, specifications, construction schedules and other supporting documents.

Assessor requirements

Assessors must satisfy the assessor requirements in the Standards for Registered Training Organisations (RTOs) current at the time of assessment.

Links

Companion Volume implementation guides are found in VETNet -

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