Unit of Competency CPCPPS5000 Design gas bulk storage systems

Application

This unit specifies the skills and knowledge required to design gas bulk storage systems for residential, commercial and industrial buildings.

The unit covers determining installation requirements, preparing plans and system specifications, producing testing and commissioning schedules and creating maintenance and operation manuals.

The role may involve interaction with architects, builders, suppliers, clients and relevant planning authorities and requires a sound understanding of applicable legislation, standards and codes.

This unit applies to experienced people such as hydraulic design consultants, plumbers or persons in a supervisory capacity who work in plumbing services on a new or existing site.

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.	1.1 Establish scope of work for gas bulk storage systems. 1.2 Establish system performance requirements. 1.3 Determine design requirements from plans, specifications and client brief. 1.4 Review and analyse statutory and regulatory requirements and Australian and New Zealand Standards for the design of gas bulk storage systems. 1.5 Conduct research, including a desktop study to identify a range of system options. 1.6 Interpret manufacturer requirements and trade and technical manuals for installing gas bulk storage systems. 1.7 Conduct a cost-benefit analysis to compare a range materials and system designs.
2. Plan and detail system components.	2.1 Determine layout of a liquefied petroleum gas (LPG) bulk storage installation according to regulatory authorities. 2.2 Prepare site plans for bulk installations, including layout of pipework systems. 2.3 Specify fire protection systems according to Australian and New Zealand standards and provide detail of deluge systems. 2.4 Plan and detail control valves and fittings. 2.5 Analyse and locate content gauges according to code requirements and specify meters and regulators. 2.6 Evaluate and specify vaporisers and calculate vaporisation rates. 2.7 Perform system calculations for a range of applications according to regulations and manufacturer requirements. 2.8 Determine pipe fixings for a range of applications. 2.9 Specify approved materials, jointing methods and installation requirements for gas bulk storage systems.

3. Design and size systems.	3.1 Design complex gas bulk storage systems using plans and details of system components and established design parameters. 3.2 Design a range of suitable system approaches. 3.3 Design and size systems using computer software packages.
4. Prepare documentation.	4.1 Prepare system plans. 4.2 Prepare system specifications. 4.3 Prepare system testing and commissioning schedule. 4.4 Produce operation and maintenance manual.

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 CPCPPS5000B Design gas bulk storage systems.

Links

Companion Volume Implementation Guide:
https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad

Assessment Requirements for CPCPPS5000 Design gas bulk storage systems

Performance Evidence

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

- evaluating and documenting design parameters for a range of gas bulk storage systems
- planning and detailing system components, including:
    - meters
    - pipes
    - regulators
    - valves
    - vaporisers
- designing a deluge system
- designing and sizing gas bulk storage systems using appropriate software.

Knowledge Evidence

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

- common terminology and definitions used in design of gas bulk storage systems for all classes of building
- drafting principles
- nature of materials used and effects of performance under various conditions such as:
    - minimum safe operating temperature
    - minimum safe operating pressure
    - maximum safe operating pressure
    - maximum permissible loading on supports
- principles of technology in the design of gas bulk storage systems
- requirements of state regulatory authorities, Australian Standards and manufacturer specifications, including hazards identified in relation to devices and systems used
- workplace safety requirements, including relevant statutory regulations, codes and standards
- scope of work:
    - interpretation of plans and specifications
    - principles of operation of various types of LPG components and fault conditions in LPG components
    - sizing and documenting layout of gas bulk storage installations including fire protection systems such as:
        - chemical injection
        - extinguishers
        - hose reels

        - hydrants
        - monitors
        - portable and fixed types of firefighting equipment
        - spray systems
- design requirements:
    - architectural specifications
    - builder specifications
    - owner requirements
    - specialist gas use applications
- cost-benefit analysis
- statutory and regulatory requirements and Australian and New Zealand Standards:
    - Acts, regulations and local and state government policies, including group and strata titling
    - AS/NZS1596 The storage and handling of LP gas
    - AS/NZS 2430.3 Classification of hazardous areas Examples of area classification - Flammable gases
    - AS/NZS 5601.1 Gas installations - General installations
    - National Construction Code (NCC)
- manufacturer information:
    - pump tables
    - sizing tables
    - specifications
    - technical and trade manuals
- operational and safety requirements established using Australian and New Zealand Standards and local and state authority plans
- layout of pipework system considerations:
    - not unduly affecting building integrity and aesthetic appeal
    - applying principles of economy, serviceability, durability and fit for purpose
- control valves:
    - applications of valves and code requirements for installation
    - emergency shutdown valves
    - excess flow valves
    - hydrostatic relief valves
    - individual valve types
    - over pressure shut off devices
- types of fittings:
    - bends
    - inspection openings
    - junctions
    - meters
    - reflux valves
    - staged regulators
    - traps
    - vaporisers

- pumps and compressors
- meters:
    - mass flow
    - positive displacement
    - turbine
- system calculations:
    - determination of flow and appliance loadings
    - interpretation of design charts and tables
    - pipe sizing calculations
- pipe fixings:
    - anchors
    - bedding
    - bracket spacing
    - concrete support
    - corrosion protection
    - cover
    - hanging brackets
    - material requirements
    - saddles
    - wall and ceiling brackets
- materials:
    - concrete
    - copper
    - fittings and valves
    - high density polyethylene (HDPE)
    - measures to prevent the spread of fire
- jointing methods:
    - brazing
    - mechanical joints
    - solvent cement welding
    - threading
- installation requirements:
    - bedding
    - clipping
    - concrete support
    - installation details
    - jointing requirements
    - level of workmanship
- types of plans:
    - axonometrics
    - cross-sections
    - details
    - elevations

    - isometrics
    - sections
    - schematics produced using:
        - computer generation
        - drawing equipment
- specification:
    - clipping
    - details of specialised components
    - jointing
    - manufacturer requirements
    - materials
    - valves
    - workmanship
- testing for:
    - flow testing
    - leak check
    - vaporisation rate check
- commissioning schedule requirements:
    - flow testing
    - leak check
    - vaporisation rate check
- inclusions required in operation and maintenance manuals.

Assessment Conditions

Assessors must satisfy the requirements for assessors listed 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