

Unit of Competency CPCPPS5002

Design gas reticulation systems

Application

This unit specifies the skills and knowledge required to design and size gas reticulation systems, including determining material, placement and ventilation requirements.

The unit also covers the analysis and interpretation of relevant gas codes and standards, the preparation of documentation for testing and commissioning and creating associated operation and maintenance manuals.

The role involves 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 and plumbers or persons in a supervisory capacity who work in plumbing services on new or existing sites.

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 Establish scope of work for gas reticulation 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 reticulation 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 gas reticulation systems.1.7 Conduct a cost-benefit analysis to compare materials and system designs.
2. Plan and detail system components.	<ul style="list-style-type: none">2.1 Plan layout of pipework systems including the type and location of fittings and valves.2.2 Calculate pipe sizes for a range of applications.2.3 Specify ventilation and flue requirements of applications.2.4 Conduct gas metering and measurement of gas consumption.2.5 Detail distribution pressures and specifications of regulators and appliances for applications.2.6 Design and detail cylinder and tank systems.2.7 Specify safety, ignition, thermostat and gas control devices in compliance with relevant standards and codes.

	2.8 Plan pipe fixings for applications. 2.9 Specify approved materials, jointing methods and installation requirements for gas reticulation systems.
3. Design and size systems.	3.1 Design and size range of gas reticulation systems. 3.2 Design and size pressure loss through pipework, valves and meters. 3.3 Design and size ventilation systems for gas systems and appliances. 3.4 Design and layout plantroom containing liquefied petroleum gas (LPG) appliances.
4. Prepare documentation.	4.1 Prepare plans for gas reticulation systems. 4.2 Prepare specification for gas reticulation systems. 4.3 Prepare 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 CPCPPS5002B Design gas reticulation systems.

Links

Companion Volume Implementation Guide:

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

Assessment Requirements for CPCPPS5002 Design gas reticulation systems

Performance Evidence

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

- evaluating and documenting design parameters for at least two gas reticulation systems, including:
 - preparing and producing a plan for layout of gas reticulation 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 reticulation systems for all classes of building
- principles of technology used in design of gas reticulation systems
- requirements of state regulatory authorities, Australian Standards and manufacturer specifications, including hazards identified in relation to devices and systems
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards
- scope of work:
 - interpretation of plans and specifications
 - sizing and documenting layout of gas reticulation systems for applications, including residential, commercial and industrial
 - new projects or existing structures being renovated, extended, restored or maintained
- design requirements:
 - architectural specifications
 - builder specifications
 - owner requirements
 - specialist 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/NZS 1596 The storage and handling of LP gas
 - AS/NZS 5601.1 Gas installations - General installations
 - National Construction Code (NCC)
 - gas utility and supplier information and requirements
 - industry standards

- requirements from manufacturers:
 - material specifications
 - pump tables
 - sizing tables
 - technical and trade manuals
- desktop study including collection and interpretation of existing data for design purposes:
 - architectural and building plans
 - council plans
 - developer plans
 - applications
 - reports as available
- layout of pipework systems:
 - have principles of economy, serviceability, durability and fit for use applied
 - not unduly affect building integrity and aesthetic appeal
- fittings and valves:
 - bends
 - couplings
 - regulators
 - tees
 - unions
- calculations for:
 - energy
 - gas volume
 - pressure
 - sizing
 - storage
- ventilation and flue requirements which must include appliance flue design and ventilation requirements according to standards, regulations and gas authorities' requirements
- specifications of regulators:
 - adjustment procedures of regulators
 - excessive pressure protection types of regulators
 - gas regulation method
 - identification, analysis and documentation of regulator faults
 - principles of operation
 - selection and installation requirements
 - sizing of regulators
 - types of gas regulators
- specifications of appliances:
 - commercial appliances
 - components
 - construction of the appliance
 - domestic appliance design
 - electronic controls

- o industrial appliances
- design of cylinder and tank systems based on:
 - o anticipated use
 - o appropriate time period between refilling
 - o gas storage requirements calculations
- pipe fixings:
 - o anchors
 - o bracket spacing
 - o corrosion protection
 - o cover
 - o hanging brackets
 - o material requirements
 - o saddles
 - o wall and ceiling brackets
- materials:
 - o copper (Cu)
 - o fittings and fixtures
 - o galvanised steel
 - o polyethylene (PE)
 - o unplasticised polyvinyl chloride (uPVC)
- jointing methods:
 - o brazing and threading
 - o gluing
 - o mechanical joints
 - o rubber ring
 - o solvent cement welding
- installation requirements:
 - o clipping, bedding and installation detail
 - o installation requirements for mobile, marine installation and portable appliances (high and low-pressure)
 - o jointing requirements
 - o level of workmanship
- plans:
 - o axonometrics
 - o cross-sections
 - o details
 - o elevations
 - o sections
 - o isometrics
- schematics which may be produced using:
 - o computer generation
 - o drawing equipment
- specification:

- o appliances
- o bedding
- o clipping
- o details of specialised components
- o jointing
- o manufacturer requirements
- o materials
- o valves
- o workmanship
- testing for:
 - o bubble leak
 - o electronic gas leak detection
 - o flow
 - o inspection checklist
 - o pressure
 - o quality assurance (QA) audit
- commissioning schedule information:
 - o checking for burrs and obstructions
 - o commissioning appliances
 - o confirming fit for purpose
 - o purging system
 - o removing contaminants
- information for operation and maintenance manuals:
 - o check for blockages
 - o leak detection
 - o regular inspection
 - o regular maintenance requirements.

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>