

# Unit of Competency CPCPMS5013

## Design hydronic heating and cooling systems

### Application

This unit specifies the skills and knowledge required to design hydronic heating and cooling systems, determine relevant installation details and prepare system specifications for residential and commercial buildings with at least three split levels and incorporating a roof top plant room and undercroft level.

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 is suitable for experienced tradespeople such as hydraulic design consultants or persons in a supervisory capacity in relation to 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.	<ul style="list-style-type: none"><li>1.1 Establish scope of work for hydronic heating and cooling systems using codes, plans, specifications manufacturer requirements and client brief.</li><li>1.2 Determine design requirements from relevant Australian standards, codes, plans and specifications.</li><li>1.3 Analyse and apply statutory and regulatory requirements and relevant Australian standards and codes for the design of hydronic heating and cooling systems.</li><li>1.4 Apply sustainability principles and concepts throughout the design process.</li><li>1.5 Establish performance requirements considering safety of system users or building occupants.</li><li>1.6 Conduct research to outline design parameters.</li><li>1.7 Determine factors that contribute to quality, safety and time efficiency.</li><li>1.8 Conduct cost-benefit analysis to compare a range of pipe materials and system designs.</li></ul>
2. Plan and detail system components.	<ul style="list-style-type: none"><li>2.1 Plan layout of pipework systems including type and location of fittings and valves.</li><li>2.2 Perform pipe size requirement calculations for a range of applications according to regulations and manufacturer requirements.</li><li>2.3 Specify system components and circuits.</li><li>2.4 Detail pump and compressor systems.</li><li>2.5 Specify distribution flows, velocities and pressures for a range of applications.</li><li>2.6 Specify insulation for the application.</li><li>2.7 Plan pipe supports for a range of applications.</li><li>2.8 Specify approved materials, jointing methods and installation requirements for hydronic heating and cooling systems.</li></ul>

	2.9 Provide allowance for expansion and contraction.
3. Design and size systems.	3.1 Design hydronic systems and circuits for a range of applications. 3.2 Design and size hydronic systems using calculations and computer software packages. 3.3 Design and size manifold distribution systems for hydronic systems. 3.4 Design and size pumps associated with hydronic systems.
4. Prepare documentation.	4.1 Prepare a client brief for the preferred design. 4.2 Prepare plans and specifications for a range of hydronic heating and cooling systems. 4.3 Prepare testing and commissioning schedule. 4.4 Produce an 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 CPCPMS5013A Design hydronic heating and cooling systems.

## Links

Companion Volume Implementation Guide:

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

# Assessment Requirements for CPCPMS5013 Design hydronic heating and cooling systems

## Performance Evidence

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

- designing, sizing and documenting the layout details for a hydronic heating and cooling system for a residential or commercial building with a three split level home incorporating a roof top plant room and under croft level.

## Knowledge Evidence

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

- application of the National Construction Code (NCC) and relevant Australian standards and codes, manufacturer specifications and operating procedures relevant to the sector
- common terminology and definitions used in design of hydronic heating and cooling systems for all classes of building
- drafting principles
- nature of materials used in hydronic heating and cooling systems and effects of performance under various conditions
- principles of technology in the design of hydronic heating and cooling systems
- work health and safety (WHS) requirements, relevant statutory regulations, codes and standards
- hydronic applications for buildings:
  - fire rating of pipework and penetrations
- sustainability principles and concepts
- statutory and regulatory requirements and relevant Australian Standards and codes
- types and system components of boilers
- health risks associated with heated water supply
- health risks associated with cooling towers
- types of insulation and sheathing
- pipe supports
- testing and commissioning schedules
- 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.

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