Unit of Competency CPCPPS5023 Design solar water heating systems

Application

This unit specifies the skills and knowledge required to design efficient cost-effective solar water heating systems for residential, commercial and industrial applications for buildings with a minimum of 29 floors and a wide span, multi-building project, using proprietary components and manufacturer design information.

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 people such as hydraulic design consultants, plumbers or persons in a supervisory capacity in plumbing services working 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.	1.1 Establish scope of work for solar water heating system design using codes, plans, specifications manufacturer requirements and client brief. 1.2 Assess locations of solar collectors and evaluate effect of each location on efficiency. 1.3 Analyse and identify statutory and regulatory requirements and relevant Australian Standards and codes for the design of solar water heating systems. 1.4 Establish performance requirements considering safety of system users or building occupants. 1.5 Evaluate environmental and community benefits of solar water heating systems. 1.6 Apply sustainability principles and concepts as part of the design process. 1.7 Conduct research including a desktop study to outline design parameters. 1.8 Determine factors that contribute to quality, safety and time efficiency. 1.9 Conduct cost-benefit analysis to compare a range of materials and system designs.
2. Plan and detail system components.	2.1 Plan layout of pipework systems including type and location of fittings and valves. 2.2 Select and evaluate the configuration and application of a range of proprietary solar heated water systems, materials and valves. 2.3 Perform calculations for solar water heating systems. 2.4 Plan and detail typical configuration of a hydraulic circuit (flow and return) and its components for a pumped-storage solar water heating system. 2.5 Specify water quality and water pre-treatment methods. 2.6 Specify suitable types and levels of insulation for system components and detail a range of methods to protect from freezing and over performance.

	2.7 Calculate pipe size, velocity, flow and pressure for a range of applications. 2.8 Plan pipe supports for a range of applications. 2.9 Specify approved materials, jointing methods and installation requirements. 2.10 Provide allowance for expansion and contraction.
3. Design and size systems.	3.1 Select solar collectors to meet identified installation requirements. 3.2 Design and size solar water heating, solar pre-heat and solar pool and spa heating systems to meet requirements. 3.3 Consider legionella bacteria mitigation design principles in the design of solar water heating systems.
4. Prepare documentation.	4.1 Prepare client brief for the preferred design. 4.2 Prepare plans and specifications for solar water heating 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 CPCPPS5023A Design solar water heating systems.

Links

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

Assessment Requirements for CPCPPS5023 Design solar water heating systems

Performance Evidence

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

- designing, sizing and documenting an approved layout using two methods of solar heated water systems with:
    - one gas-boosted commercial solar system
    - one heat pump-boosted system
- for:
    - a high-rise unit development building to a minimum of 29 floors including sanitary fixtures on each floor level
    - a wide span, multi-building project such as a school, nursing home or university incorporating a solar pre-heat systems and heating systems.

Each project is to include a specification and maintenance manual.

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 solar water systems
- work health and safety (WHS) requirements, relevant statutory regulations, codes and standards
- cost-benefit analysis
- inclusions for establishing scope of work:
    - interpreting plans and specifications
    - sizing and documenting layout solar water heating systems:
        - characteristics
        - compatibility
        - dimensions
        - location
        - patterns
        - quantities
        - sizes
        - surfaces
        - types of product and service
- design requirements:
    - architectural specifications
    - builder specifications
    - owner requirements
    - specialist use applications
- manufacturer requirements:

    - material specifications
    - pump tables
    - sizing tables
    - technical and trade manuals
- types of information collected during desktop study for design purposes:
    - council plans
    - developer plans
    - applications
    - architectural and building plans
    - other reports as available
- principles of technology used in design of solar water heating systems:
    - solar radiation calculations
    - solar efficiencies
    - sustainability principles and concepts
- installation requirements
- health risks and hazards associated with solar water heating systems
- testing and commissioning schedule
- 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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