



**Australian Government**

# **CPCPPS5024A Conduct a water audit and identify water-saving initiatives**

**Release 1**

# **CPCPPS5024A Conduct a water audit and identify water-saving initiatives**

## **Modification History**

Changes to unit descriptor, application, performance criteria, required skills and knowledge, range statement and critical aspects

Not equivalent to CPCPPS5004A

## **Unit Descriptor**

This unit of competency specifies the outcomes required to identify wasted water and leaks in pipework and fixtures and, where water use reduction is possible, types of water-saving devices that are appropriate. The unit also requires the preparation of a report that reflects this assessment.

## **Application of the Unit**

This unit of competency supports the development of skills and knowledge required to conduct water and energy audits and recommend water-saving initiatives in relation to plumbing services and construction hydraulics.

Application of the unit is relevant to multi-storey residential, commercial and industrial buildings with or without connection to reticulated water supply.

## **Licensing/Regulatory Information**

In some jurisdictions, this unit of competency may form part of accreditation, licensing, legislative, regulatory or certification requirements.

## **Pre-Requisites**

Nil

## **Employability Skills Information**

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

- |   |   |
|---|---|
| <b>1 Calculate water use.</b>                     | <p>1.1 <b><i>Scope of work</i></b> for conducting water audits is established.</p> <p>1.2 <b><i>Client requirements</i></b> are identified from relevant Australian standards, codes, plans, specifications and client brief.</p> <p>1.3 <b><i>Types of flow and pressure-measuring devices</i></b>, and their use and location are specified.</p> <p>1.4 <b><i>Flow and pressure tests</i></b> are conducted and flows at outlets are measured.</p> <p>1.5 Actual water use is compared to ideal use, and the difference is calculated.</p> <p>1.6 <b><i>Statutory and regulatory requirements</i></b> for the use of water are interpreted and applied.</p> <p>1.7 <b><i>Manufacturer requirements</i></b> and trade and technical manuals are interpreted.</p> <p>1.8 <b><i>Desktop study</i></b> is conducted and <b><i>performance requirements</i></b> are established.</p> |
| <b>2 Identify excessive water and energy use.</b> | <p>2.1 <b><i>Leak identification processes</i></b> are implemented, considering safety of system users or building occupants.</p> <p>2.2 Flows are measured and evaluated against relevant standards and user requirements.</p> <p>2.3 Suitability of existing fixtures and fittings is evaluated</p>   |

- against new technology.
- 2.4 Water use times are identified and compared to optimal timing.
  - 2.5 Existing inefficient system conditions, such as dead legs, are identified and analysed.
  - 2.6 Pressure test is conducted and consequences of high and low pressures are identified and compared to industry standards.
  - 2.7 Energy saving associated with reduction in water use is evaluated.
- 3 Evaluate methods to conserve water and energy.**
- 3.1 Flow restrictors, *sensors* and pressure-limiting devices are identified for a range of applications.
  - 3.2 *Automatic systems* are identified for a range of applications.
  - 3.3 *Alternative processes and practices* are evaluated for optimum water and energy savings.
  - 3.4 *Alternative fixtures and fittings* are evaluated for optimum water and energy savings.
  - 3.5 *Rainwater harvesting* techniques and processes are applied.
  - 3.6 *Recycling and re-use processes* are designed.
  - 3.7 *Sustainability principles and concepts* are applied throughout water audit process.
- 4 Report findings.**
- 4.1 *Cost-benefit analysis* is conducted, including the investment return period.
  - 4.2 *Water and energy audit report* is prepared.
  - 4.3 Resultant environmental benefits and water and energy savings are identified and reported.

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required skills

- communication skills to:
  - communicate with others to ensure safe and effective work practices
  - confirm job specifications and client requirements
  - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
- literacy skills to:
  - prepare a water and energy audit report
  - read and interpret:
    - plans, specifications, drawings and design briefs
    - standards and manufacturer requirements and manuals
    - statutory and regulatory requirements
- initiative and enterprise skills to:
  - comply with WHS and organisational quality procedures and processes
  - develop creative and responsive approaches to conserving water and energy
- numeracy skills to apply measurements and calculations
- planning and organising skills to:
  - research, collect, organise and understand information relating to water use
  - take initiative and make decisions
- problem-solving skills to:
  - analyse requirements
  - carry out tests
  - consider options
  - recommend appropriate water and energy saving measures
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technical skills to:
  - accurately apply design principles relating to hydraulic systems, design concepts, measurements and calculations
  - apply and interpret documentation from a wide range of sources, including legislation, standards, drawings and specifications
- technology skills to:

- access and understand site-specific instructions in a variety of media
- use mobile communication technology

### **Required knowledge**

- hazards associated with devices and systems used in the hydraulic sector
- installation methods used in hydraulic systems
- nature of materials and effect of their performance in a variety of conditions
- preparation and interpretation of plans and specifications
- requirements of commonwealth, state or territory regulatory authorities, relevant Australian standards and codes, manufacturer specifications, National Construction Code (NCC) and other relevant codes, standards and operating procedures
- terminology and definitions used in hydraulic design
- variety of applications of technology principles in design of water and energy-efficient usage systems for all classes of building
- work health and safety (WHS) requirements, including relevant statutory regulations, codes and standards

## Evidence Guide

---

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment providing that simulated or project-based assessment techniques fully replicate plumbing and services workplace conditions, materials, activities, responsibilities and procedures.

It could be assessed on its own or as part of an integrated assessment activity involving audit of water and energy use in at least two different types of building and the preparation of comprehensive reports.

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to, as a minimum, provide evidence of the ability to:

- conduct a water audit and identify water saving initiatives for a:
  - 50 unit residential building
  - 20 floor commercial office building
  - a commercial laundry
- including:
  - applying sustainability principles and concepts throughout the audit and identifying water-saving initiatives
  - conducting pressure and flow measurements
  - interpreting and applying statutory and local government requirements for the use of water
  - reporting water wasting practices and processes, including leaks
  - specifying sensors and automatic systems for a range of applications
  - recommending recycling and re-use processes
  - preparing a water and energy audit report
  - conducting a cost-benefit analysis, including investment return period
  - identifying and reporting on environmental

benefits and water savings

- applying sustainability principles and concepts throughout the water audit and identify water-saving initiatives
- communicating with others to ensure safe and effective work site operations.

### **Context of and specific resources for assessment**

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the minimum task requirements
- relevant specifications and work instructions, including design brief drawings, specifications, codes, design concepts and construction schedules
- tools and equipment appropriate to applying safe work practices, including computers, software and calculators
- workplace instructions relating to safe working practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry-related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

### **Method of assessment**

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and



correctly interpret the essential underpinning knowledge required for practical application

- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

## Range Statement

---

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

***Scope of work*** must include:

- compiling reports
- identifying:
  - procedures, practices and products to reduce

water and energy consumption

- wasted water
- water-saving initiatives
- producing a cost-benefit analysis.

***Client requirements*** must include:

- compliance with regulatory requirements
- more efficient use of water resources
- reduction in water and energy costs
- maintaining satisfactory system performance.

***Types of flow and pressure-measuring devices*** include:

- applications, which may include:
  - domestic cold and heated water supply
  - cooling towers
  - industrial processes
  - irrigation
  - mechanical
  - sanitation
  - trade waste
- measuring methods, which may include:
  - direct
  - electronic
  - hand-held
  - indirect
  - in-line
  - mechanical.

***Flow and pressure tests*** may include:

- interpretation of flow and pressure tests conducted by a contractor
- on-site measurement of flow (l/s), velocity (m/s) and pressure (kPa).

***Statutory and regulatory requirements*** may include:

- Acts, regulations and commonwealth, state or territory, and local government regulations
- National Construction Code
- other relevant Australian standards and codes.

***Manufacturer requirements*** must include:

- flow and pressure requirements.

- Desktop study*** includes:
- comparison of range of suitable materials and system choices available to enable cost-effective choices to be made without compromising integrity of project
  - research and evaluation of water-saving products, processes and procedures currently available.
- Performance requirements*** must include:
- maintenance of flow, velocity, pressure and discharge requirements of the client, using relevant Australian standards, National Construction Code, or other relevant codes and standards.
- Leak identification processes*** may include:
- electronic leak detection
  - listening devices
  - measuring equipment
  - cameras.
- Sensors*** may include:
- pressure switches
  - flow switches
  - high and low level
  - moisture.
- Automatic systems*** may include:
- electronic and mechanical timer
  - pressure-activated
  - user-activated.
- Alternative processes and practices*** may include:
- change in personal water habits
  - change in timing
  - discontinuation of a process
  - irrigation before sunrise and after sunset
  - lower water pressures
  - modifying a process
  - modifying wash-down cleaning procedures and order of operation
  - rainwater harvesting and usage
  - running dishwashers and washing machines with full loads
  - testing pipe systems with air instead of water
  - using water-efficient appliances and fixtures
  - waste water collection and reuse.

***Alternative fixtures and fittings*** may include:

- drip systems
- irrigation systems
- low-energy and water-use appliances, such as:
  - air cooling towers
  - dishwashers
  - dual flush low volume toilet flushing systems
  - tapware
  - waterless and sensor control urinals
  - washing machines
- low-flow shower roses
- outlet-flow control devices
- pressure control devices.

***Rainwater harvesting*** must include:

- collection, storage and distribution of rainwater, including the use of tanks and dams.

***Recycling and re-use processes*** may include:

- black water treatment and reuse options
- industrial processes
- grey water treatment and reuse options
- recovery of test water, such as fire.

***Sustainability principles and concepts:***

- cover the current and future social, economic and environmental use of resources
- may include:
  - efficient energy usage/capital outlay comparison
  - selecting water efficient appliances and fixtures
  - using alternative water supplies
  - consideration of the Green Building Council of Australia rating scheme.

***Cost-benefit analysis*** compares:

- installation, set-up and running costs against the capital investment to determine the cost recovery period
- the range of suitable materials and system choices available to enable cost-effective choices to be made without compromising integrity of project.

***Water and energy audit report*** is a comprehensive report written to industry standards that includes:

- client brief
- analysis
- results
- methodology
- conclusions
- recommendations.

## **Unit Sector(s)**

### **Functional area**

**Unit sector** Plumbing and services

## **Custom Content Section**

Not applicable.