



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **CPCPPS5004A Conduct a water audit and identify water-saving initiatives**

**Release: 1**

## **CPCPPS5004A Conduct a water audit and identify water-saving initiatives**

### **Modification History**

Not Applicable

### **Unit Descriptor**

**Unit descriptor** This unit of competency specifies the outcomes required to identify wasted water and leaks in pipework and fixtures and, where water 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**

**Application of the unit** This unit of competency supports the needs of experienced tradespeople with a responsibility for conducting water and energy audits and recommending water-saving initiatives.

### **Licensing/Regulatory Information**

Not Applicable

### **Pre-Requisites**

**Prerequisite units** Nil

## Employability Skills Information

**Employability skills**      This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

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Elements describe the essential outcomes of a unit of competency.

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

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Calculate water usage.	1.1. <i>Scope of work</i> is established for water auditing. 1.2. <i>Client requirements</i> are identified from plans, specifications and client briefs. 1.3. <i>Types of meter and flow measuring devices</i> and their use and location are specified. 1.4. <i>Flow and pressure tests</i> are conducted and flows at outlets are calculated. 1.5. Anticipated water use is compared to actual use and difference is calculated. 1.6. <i>Statutory and local government regulatory requirements</i> for the use of water are interpreted and applied. 1.7. <i>Manufacturer requirements</i> and trade and technical manuals are interpreted. 1.8. <i>Desktop study</i> is conducted and <i>performance requirements</i> are established.
2. Identify excessive water and energy usage.	2.1. <i>Leak identification processes</i> are implemented. 2.2. Flows are measured and evaluated against national and industry standards. 2.3. Suitability of existing fixtures and fittings is evaluated 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.
3. Evaluate measures to conserve water and energy.	3.1. Flow restrictors, <i>sensors</i> and pressure-limiting devices are specified for a range of applications. 3.2. <i>Automatic systems</i> are specified for a range of applications. 3.3. <i>Alternative processes and practices</i> are evaluated for optimum water and energy usage. 3.4. <i>Alternative fixtures and fittings</i> are evaluated for optimum water and energy usage. 3.5. <i>Rainwater harvesting</i> techniques and processes are applied. 3.6. <i>Recycling and re-use processes</i> are designed.
4. Report findings.	4.1. <i>Cost-benefit analysis</i> is conducted, including the investment return period. 4.2. <i>Water and energy audit report</i> is prepared. 4.3. Resultant environmental benefits and water and

**ELEMENT****PERFORMANCE CRITERIA**

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energy savings are identified and reported.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

Required skills for this unit are:

- accurately applying design principles relating to hydraulic systems, design concepts, measurements and calculations
- applying and interpreting documentation from a wide range of sources, including legislation, standards, drawings and specifications
- 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
  - read and interpret:
    - plans, specifications, drawings and design briefs
    - standards and manufacturer requirements and manuals
    - statutory and regulatory requirements
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
- written skills to prepare a water and energy audit report
- complying with OHS and organisational quality procedures and processes
- innovation skills to develop creative and responsive approaches to conserving water and energy
- numeracy skills to apply measurements and calculations
- planning and organisational 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

## **REQUIRED SKILLS AND KNOWLEDGE**

- 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.

### **Required knowledge**

Required knowledge for this unit is:

- 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 work drawings and specifications
- requirements of state regulatory authorities, Australian and New Zealand standards, manufacturer specifications, Building Code of Australia (BCA) and other applicable codes or standard operating procedures relevant to the sector
- 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.

# Evidence Guide

## EVIDENCE GUIDE

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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 provide evidence of:

- conducting a water audit
- conducting pressure and flow measurements
- interpreting and applying statutory and local government requirements for the use of water and energy
- 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 and energy savings.

### 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:

## EVIDENCE GUIDE

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- 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



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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

### RANGE STATEMENT

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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* includes:

- compiling reports
- identifying:
  - alternative procedures, practices and products that reduce water and energy consumption
  - wasted water
  - water-saving initiatives
- producing a cost-benefit analysis.

## RANGE STATEMENT

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- Client requirements*** include:
- compliance with regulatory requirements
  - more efficient use of water resources
  - reduction in water and energy costs
  - reserve capacity.
- Types of meter and flow measuring devices*** include:
- applications, which may include:
    - domestic supply
    - irrigation
    - mechanical
    - sanitation
    - trade waste
  - direct
  - electronic
  - hand-held
  - indirect
  - in-line
  - mechanical.
- Flow and pressure tests*** include:
- interpretation of flow and pressure tests conducted by a contractor
  - on-site measurement of flow (l and s), velocity (m and s) and pressure (kPa).
- Statutory and local government regulatory requirements*** include:
- Acts and regulations
  - BCA
  - state and local government policies.
- Manufacturer requirements*** include:
- material specifications
  - pump tables
  - sizing tables
  - technical and trade manuals.
- Desktop study*** includes:
- research and evaluation of water-saving products, processes and procedures currently available.
- Performance requirements*** include:
- flow, velocity, pressure and discharge requirements, established using Australian and New Zealand standards, local authority plans and BCA.
- Leak identification processes*** include:
- electronic leak detection
  - listening devices
  - metering
  - pipe inspection cameras.
- Sensors*** include:
- energy
  - entry and exit

## **RANGE STATEMENT**

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- heat
- high and low level
- moisture
- motion.

## RANGE STATEMENT

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***Automatic systems*** include:

- electronic and mechanical timer
- pressure-activated
- sprinkler
- sun-tracking
- use-activated
- wind-activated.

***Alternative processes and practices*** include:

- processes such as wash-down processes and order of operation
- alternatives may include:
  - change in materials used in a process
  - change in timing of a process
  - discontinuation of a process
  - modification of a process
- practices include:
  - running dishwashers and washing machines with full loads
  - testing pipe systems with air instead of water
  - washing teeth with the tap off
  - watering before sunrise and after sunset.

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

- continuous-flow gas water heaters
- heat-pump heated water systems
- irrigation systems
- low-energy and water-use appliances, include:
  - air conditioners
  - cisterns
  - cooling towers
  - dishwashers
  - freezers
  - low volume toilet flushing systems
  - refrigerators
  - tapware
  - urinals
  - washing machines
- low-flow shower roses
- outlet-flow control devices
- solar heated water systems.

***Rainwater harvesting*** includes:

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

## RANGE STATEMENT

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

- recycling water from washing down floors
- re-use of rinse water from washing processes
- grey water re-use options.

***Cost-benefit analysis*** includes:

- comparison of installation and set-up costs and cost recovery period with environmental water and energy savings.

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

- methodology
- results
- analysis
- conclusions
- recommendations.

## Unit Sector(s)

**Unit sector** Plumbing and services

## Co-requisite units

**Co-requisite units** Nil

## Functional area

**Functional area**