



Australian Government

Department of Education, Employment and Workplace Relations

NWP104B Sample and test water sources and quality

Revision Number: 2

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Modification History

NWP104B Release 2: Layout adjusted. No changes to content.

NWP104B Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to collect and prepare water samples and perform water flow and quality tests according to specified standards and parameters relevant to water quality standards.

Training and assessment against this unit of competency must incorporate relevant OHS and related legislative requirements.

Application of the Unit

This unit supports the attainment of skills and knowledge required for those who are preparing to enter or considering entry to the water industry workforce or undertaking assignment and field work related to water research. The candidate will be assisted by partnership with a water industry organisation. There are opportunities to integrate delivery and assessment of this unit with mainstream high school programs (mathematics, science, geography, physics, engineering and English). The unit may be applied in a work-like or educational environment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit of competency 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 range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for and conduct water quality sampling	1.1 Develop sampling plan documenting required <i>samples, sampling locations</i> and sampling schedules to meet <i>assignment requirements</i>. 1.2 Select and check appropriate <i>sampling equipment</i> for the task prior to use. 1.3 Collect samples according to sampling plan and ensure safety procedures are followed to limit hazards and contamination to self, work area and environment. 1.4 Maintain <i>integrity of samples</i> during sampling and label sample containers according to organisational requirements. 1.5 Check and record sample information. 1.6 Record results of repeat sampling to identify trends.
2 Prepare for and conduct water quality tests	2.1 Confirm instructions for conducting and recording basic water quality tests and <i>plan testing work</i> according to <i>standard practice</i>. 2.2 Select, check and use required testing and personal protective clothing and equipment. 2.3 Identify and record correct samples for testing. 2.4 Conduct <i>basic water quality tests</i> according to standard procedures, ensuring that sample integrity is maintained during the testing process.
3 Finalise work	3.1 Make <i>records</i> according to assignment requirements. 3.2 Report observations or measurements that are outside established organisational guidelines for further action. 3.3 Dispose of samples and clean and store test equipment according to organisational procedures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- prepare, collect, label and preserve water samples
- dispose of waste and spent samples correctly
- produce reports and logs
- plan work activities
- conduct basic water quality tests
- use and calibrate testing equipment
- work effectively as part of a team
- perform task-related calculations
- follow plans and instructions
- apply procedures and standards
- use literacy skills for verbal and written communication in the assignment
- use personal protective clothing and equipment

Required knowledge:

- types and purposes of water samples
- procedures and techniques for water sampling
- range and purpose of basic water quality testing
- test procedures
- procedures for disposal of waste and excess water samples
- task-related calculations
- relevant policies, procedures and standards
- assignment planning processes

Evidence Guide

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

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

The candidate should demonstrate the ability to collect and prepare water samples and perform water flow and quality tests according to specified standards and parameters relevant to water quality standards including:

- identifying potential hazards in water sampling
- planning and organising sampling and testing assignment
- using appropriate sampling and testing equipment and personal protective clothing and equipment
- understanding and applying procedures for water sampling and testing
- determining and reporting accurate and relevant results from testing

Context of and specific resources for assessment

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning knowledge.

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. Add any 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.

- Samples*** may include:
- grab, composite or flow-weighted composite samples for:
 - microbiological testing
 - testing for chemical and physical characteristics
- Sampling locations*** may include:
- raw water supply, including:
 - surface water
 - groundwater
 - water distribution and treatment systems
- Assignment requirements*** for sampling procedures that may be established in a real or simulated environment may include:
- standard procedures
 - Australian Standards, such as AS/NZS 5667 Water quality - sampling
 - state Environment Protection Authority sampling guidelines
 - legislative requirements
 - safety procedures
- Sampling equipment*** may include:
- buckets or wide-mouthed containers
 - depth samplers
 - sample dippers
 - sterile sample containers:
 - plastic
 - glass
 - test-specific (such as acid washed)
 - weighted sample bottles
 - dip tubes
 - composite and discrete automatic samplers
 - equipment for preservation of samples, including:
 - refrigeration
 - cool storage devices
 - screw top containers
 - containers for storing and carrying samples safely
- Integrity of samples*** is maintained by ensuring:
- application of correct:
 - holding time
 - storage procedures
 - sub-sampling procedures
- Plan testing work*** to address
- timelines

a range of requirements, including:

- communication with other team members and individuals
- interpretation of organisational and statutory requirements
- locations, such as:
 - on-site testing
 - field-based testing
 - laboratory
- range of testing procedures and techniques that applies to organisational, plant or field sites
- variety of samples to be tested
- testing equipment to be used
- test reporting systems

Standard practice for testing procedures that may be established in a real or simulated environment, may include:

- standard procedures for testing
- equipment manufacturers' operations manuals
- methods recommended by Australian Public Health Association (APHA) reference document: 'Standard methods for the examination of water and wastewater'
- methods recommended by American Society for Testing Materials (ASTM) International
- safety procedures, including:
 - risk and hazard assessment
 - safe handling of samples and chemicals
 - use of personal protective clothing and equipment
- relevant organisational policies
- local authority regulations and federal, state or territory legislative requirements

Basic water quality tests include the range of tests required for competent performance of work tasks in an organisational context, and should comprise at least three of the following types of test:

- pH
- temperature
- electrical conductivity
- microscopy
- turbidity
- colour
- chlorine residue
- jar testing
- alkalinity
- hardness
- dissolved oxygen

Records may include:

- sample records, field detail sheets or chain of custody forms, including information such as:
 - time sample was taken
 - details of person collecting sample
 - sample point
 - volume of sample

- data gathered at time of collection
- pre-treatment
- preservation
- instructions to transporters
- time and logging of sample receipt and testing
- visual observations
- equipment identification
- atypical results
- test results

Unit Sector(s)

Not applicable.