



**Australian Government**

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

# **RTD3507A Undertake sampling and testing of water**

**Release: 1**

## **RTD3507A Undertake sampling and testing of water**

### **Modification History**

Not applicable.

### **Unit Descriptor**

This competency standard covers the process of sampling and testing water quality as part of a monitoring program. It requires the ability to plan for sampling and testing, prepare equipment and resources, carry out sampling and testing and complete water sampling and testing activities. Sampling and testing water quality requires knowledge of monitoring schedules, hydrological cycle, water quality determinations and standards, principles of water quality control, sampling and testing methods and groundwater salinity.

### **Application of the Unit**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

Not applicable.

### **Elements and Performance Criteria Pre-Content**

Not applicable.

# Elements and Performance Criteria

## Elements and Performance Criteria

Element	Performance Criteria
1 Plan for sampling and testing field work	1.1 Monitoring schedule is read/heard and confirmed with manager.
	1.2 <b>Advanced water quality and environmental parameters</b> are identified.
	1.3 Samples to be collected to determine water quality and environmental parameters are identified by supervisory staff.
	1.4 <b>Equipment</b> requirements for water sampling and testing are determined and arranged.
	1.5 Range of likely operating conditions, hazards and difficult/sensitive environments are assessed for impact on sampling and testing.
2 Prepare equipment and resources	2.1 Equipment required for sampling and testing is sourced according to monitoring procedures.
	2.2 Equipment is checked for availability and serviceability in accordance with enterprise procedures.
	2.3 Testing and correlation is carried out to verify correct and accurate performance of equipment.
	2.4 <b>Repairs and maintenance</b> of field-based equipment and instruments are carried out in accordance with enterprise procedures and manufacturer's instructions.
	2.5 Data or record sheets/books are collected for use.
	2.6 Equipment, data sheets and personnel are moved to sampling sites without injury or damage and readied for use.
	2.7 Equipment is installed and protected according to manufacturer's specifications, safety and enterprise requirements.
	2.8 Staff undertaking sampling and testing are briefed on and are aware of responsibilities in accordance

- with monitoring schedule.
- 2.9 Testing equipment is confirmed and serviceable for monitoring procedures in field conditions to enterprise and manufacturers' requirements.
- 3 Carry out sampling and testing of water
- 3.1 Tests are undertaken in accordance with monitoring plan and enterprise procedures to avoid **erroneous readings**.
- 3.2 **Samples** are taken and tested in accordance with monitoring standards and guidelines.
- 3.3 **Samples for external analysis** are prepared, packaged and sent to laboratory in accordance with monitoring schedule and laboratory standards.
- 3.4 Specific and general observations including information on relevant ambient and **antecedent environmental conditions** are made in accordance with monitoring schedule.
- 3.5 Personnel undertaking sampling and testing tasks are supervised and feedback given on work performance.
- 3.6 Equipment operation and work practices conform to **OHS requirements**.
- 4 Complete water sampling and testing activities
- 4.1 Equipment and clothing is cleaned, sanitised, repaired and stored in accordance with enterprise procedures.
- 4.2 Damaged or malfunctioning equipment is repaired on site or sent to manufacturer or specialist.
- 4.3 Test results and observations are accurately recorded on data sheets and forwarded in accordance with enterprise procedures.
- 4.4 Changes in field conditions and equipment are conveyed to supervisor according to enterprise procedures.

## Required Skills and Knowledge

Not applicable.

## Evidence Guide

### What evidence is required to demonstrate competence for this standard as a whole?

Competence in sampling and testing water quality requires evidence that water quality has been appropriately sampled and tested for a given site according to prescribed scientific procedures, standards and principles, monitoring schedules and industry best practice. The skills and knowledge required to sample and test for water quality must be **transferable** to a range of work environments and contexts. For example, this could include different locations, environments and monitoring schedules.

### What specific knowledge is needed to achieve the performance criteria?

Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this unit are listed below:

Hydrological cycle.

Water monitoring schedules and guidelines.

Standards for water quality.

Sampling and testing methods.

Groundwater contamination evaluation.

Sources of groundwater contamination.

Groundwater salinity - mechanisms, occurrence and management.

Irrigation induced salinity, mechanisms and management.

**What specific skills are needed to achieve the performance criteria?**

To achieve the performance criteria, some complementary skills are required. These skills include the ability to:

Plan for sampling and testing.

Prepare equipment and resources.

Carry out sampling and testing.

Complete water sampling and testing activities.

Record and input data into various data entry systems.

### What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where 0 = not required, 1 = perform the process, 2 = perform and administer the process and 3 = perform, administer and design the process.

- |  |   |
|--|---|
| 1. How can <b>communication of ideas and information (2)</b> be applied?       | Recording and reporting on sampling and testing activities.   |
| 2. How can <b>information be collected, analysed and organised (3)</b> ?       | Through completion of record sheets, taking of samples for external analysis and recording of observations. |
| 3. How are <b>activities planned and organised (3)</b> ?                       | Using appropriate equipment and in accordance with enterprise guidelines.                                   |
| 4. How can <b>team work (3)</b> be applied?                                    | Co-operation in sampling and testing activities.  |
| 5. How can the use of <b>mathematical ideas and techniques (2)</b> be applied? | Through evaluation of sampling and testing results and reporting to supervisor.                             |
| 6. How can <b>problem-solving skills (2)</b> be applied?                       | Assessing threats and changes to area being monitored.  |
| 7. How can the <b>use of technology (2)</b> be applied?                        | Use of field equipment and machinery.   |

### Are there other competency standards that could be assessed with this one?

This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

For information about **assessing this competency standard for consistent performance and where and how it may be assessed**, refer to the Assessment Guidelines for this Training Package.

## Range Statement

### Range of Variables

The Range of Variables defines the different contexts, work environments and parameters governing the performance of this competency standard. The variables chosen in training and assessment will need to reflect local industry and regional contexts

<p>What <b>advance water quality parameters</b> may be relevant to this competency standard?</p>	<p>Dissolved or suspended solids, nitrogenous products (TKN, TAN, NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>), redox, ozone, soil pH, clay content of soil, contaminants (including pesticides, herbicides, heavy metals), biological oxygen demand, bacterial levels (<b>E. coli</b> and faecal coliforms), aquatic life, chlorophyll, phosphorus (total and orthophosphate), macro-invertebrates and macrophytes.</p>
<p>Which <b>environmental parameters</b> may be included?</p>	<p>Changes in native land-based and/or aquatic life around the site, sediment and debris levels, wastes and contaminants, toxic microalgae and presence of severe weather conditions.</p>
<p>What <b>water quality and environmental parameters</b> may be relevant to this standard?</p>	<p>Dissolved oxygen, hardness, ammonia, nitrite, nitrate, carbon dioxide, alkalinity, temperature, salinity, pH and turbidity.</p>
<p>What <b>equipment</b> may be included?</p>	<p>Electronic machines, probes, grabs, nets, dredges, plankton nets, water sample bottles, fox whistle, bailer, still and video cameras, specialised machinery, micropipettes, soil analysis kits, and refractometer.</p>
<p>What <b>repairs and maintenance</b> may apply to field-based equipment?</p>	<p>Adjustment of probes or other settings for calibration, correlation and replacement of electronic parts, covers, probes.</p>
<p>How can <b>erroneous readings</b> be avoided?</p>	<p>By following monitoring schedule and standards, through regular readings (e.g., at the same time each month), by taking readings before irrigation cycles commence, by bailing out before taking the reading (especially where salinity levels are being assessed).</p>
<p>What types of <b>samples</b> may be included?</p>	<p>Water, weather station/meteorological data, sediments or soils, pests, predators or fouling organisms and vegetation (land and aquatic).</p>



What <b>samples for external analysis</b> may be relevant?	Contaminants (such as heavy metals, pesticides, herbicides and other chemicals), proximate analysis of culture or other organisms, trace elements, mineral content of waters/soils and pathology.
What is meant by <b>antecedent environmental conditions</b> ?	Previously relevant weather, rainfall, irrigation, tides or floods that could influence sample/test results.
Which <b>OHS requirements</b> may be included?	Codes of Practice, regulations and/or guidance notes which may apply in a jurisdiction, and enterprise-specific OHS procedures, policies or standards

For more information on contexts, environment and variables for training and assessment, refer to the Sector Booklet.

## **Unit Sector(s)**

Not applicable.