

41236**Apply science principles to operate and control water services treatment operations**

Kaupae Level	4
Whiwhinga Credit	10
Whāinga Purpose	This skill standard is for people who work as operators in drinking water and wastewater treatment environments. People with this skill standard can apply context-specific physics, chemistry, and microbiology principles to interpret operational conditions and make routine decision-making when operating and controlling water services treatment processes. This skill standard aligns with the: • New Zealand Certificate in Drinking Water Treatment Operations (Level 4) with optional strands in Pre-Treatment, Clarification, Coagulation and Flocculation, Non-Chlorine Disinfection, Fluoridation, and Filtration [Ref: 5672] • New Zealand Certificate in Wastewater Plant Operations (Level 4) with optional strands in Activated Sludge, Effluent Disinfection, Fixed Growth Reactor, Separation, Sludge Treatment, and Ponds [Ref: 5673] This skill standard may also contribute to other water services industry credentials.

Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

Hua o te ako Learning outcomes	Paearu aromatawai Assessment criteria
1. Apply physics principles to interpret hydraulic and physical conditions in water services operations.	a. Determine pressure, flow, or velocity conditions relevant to a water services operation.
	b. Explain how physical factors affect water movement, treatment performance, or system operation.
	c. Apply physics principles to interpret and respond to routine hydraulic or physical conditions in a water services context.

2. Apply chemistry principles to interpret and control water quality in water services operations.	a. Determine chemical characteristics of treated and untreated water relevant to operational control.
	b. Explain the purpose and effect of chemical dosing used in water services treatment processes.
	c. Apply chemistry principles to monitor, adjust or respond to water quality conditions in water services operations.
3. Apply microbiology principles to evaluate biological risks and apply control measures in water services operations.	a. Identify microbiological organisms relevant to water services and describe their impacts on water quality.
	b. Explain environmental and operational factors that influence microbiological growth, survival, and control.
	c. Apply microbiological principles to interpret biological risks and apply routine control measures in water services operations.

Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria

Assessment specifications:

Scientific principles are applied within the context of water services operations and data interpretation relevant to water services operations and compliance requirements.

Assessment focuses on the practical application and interpretation of foundational scientific principles to support operational decision-making, monitoring, and control of water treatment processes.

Definitions

Water services refer to industries responsible for working on or around water supplies, networks, plants, and systems.

Water services operations refer to the management and delivery of water services to and from communities.

Ngā momo whiwhinga | Grades available

Achieved.

Ihirangi waitohu | Indicative content**Physics**

- Hydrostatic pressure.
- Flow characteristics: laminar, turbulent.
- Fluid velocity.
- Pressure gradient force.
- Impacts on water conductivity and temperature.

Chemistry

- Periodic table.
- Chlorine, UV, pH balancing, alkalinity.
- Differences between organic and inorganic chemistry.
- Reduction-oxidation reactions.

Microbiology

- Microbiological nutrition requirements.
- Microbe reproduction and die-off.
- Indicator organisms.
- Emerging contaminants.
- Pathogens.

Rauemi | Resources

- Drinking Water Quality Assurance Rules - [Drinking Water Quality Assurance Rules](#).
- Drinking Water Standards for New Zealand) - [Water Services \(Drinking Water Standards for New Zealand\) Regulations 2022 \(SL 2022/168\) – New Zealand Legislation](#).
- Wastewater Standards - [Wastewater standards | The Water Services Authority - Taumata Arowai](#).

Pārongo Whakaū Kounga | Quality assurance information

Ngā rōpū whakatau-paerewa Standard Setting Body	Energy and Infrastructure Industry Skills Board
Whakaritenga Rārangi Paetae Aromatawai DASS classification	Engineering and Technology > Water Industry > Water - Generic
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga CMR	0120

Hātepe Process	Putanga Version	Rā whakaputa Review Date	Rā whakamutunga mō te aromatawai Last date for assessment
Rēhitatanga Registration	1	28 May 2026	N/A
Kōrero whakakapinga Replacement information	N/A		
Rā arotake Planned review date	31 December 2032		

Please contact Energy and Infrastructure Industry Skills Board at qualifications@energyinfra-skills.nz if you wish to suggest changes to the content of this skill standard.

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