

Title	Demonstrate technical knowledge of and evaluate resource efficiency options for water and wastewater		
Level	5	Credits	15

Purpose	<p>This unit standard is for people who may be working as resource efficiency programme managers and consultants.</p> <p>People credited with this unit standard are able to demonstrate technical knowledge of water and wastewater sources, units and methods of measurement; and evaluate resource efficiency options for water and wastewater.</p>
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Classification	Zero Waste > Resource Efficiency
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Available grade	Achieved
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Guidance Information

- Legislation and documents that apply to this unit standard include:

Hazardous Substances and New Organisms Act 1996;
Health Act 1956;
Health (Drinking Water) Amendment Act 2007;
Resource Management Act 1991;
Drinking-water Standards for New Zealand 2005 (Revised 2008) (Wellington: Ministry of Health, 2008) available at <http://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2008-0>;
AS/NZS 5667:1998 *Water Quality – Sampling (Revised 2016)*., Part 1 - *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*, Part 5 - *Guidance on sampling of drinking water and water used for food and beverage processing*, and Part 10 - *Guidance on sampling of waste waters*;
AS/NZS 3500.3:2015 *Plumbing and drainage – Stormwater drainage*;
AS/NZS 4234:2008 *Heated water systems – Calculation of energy consumption*;
AS/NZS 4276.1:2007 *Water microbiology – General information and procedures (ISO 8199:2005, MOD)*;
AS/NZS ISO 31000:2018 *Risk management – Guidelines*;
NZS 9201.7:2007 *Model general bylaws – Water supply*;
Workplace Exposure Standards and Biological Exposure Indices available at <https://worksafe.govt.nz>
local authority bylaws and rules.
- Recommended texts

New Zealand Municipal Wastewater Monitoring Guidelines (Wellington: NZ Water Environment Research Foundation, 2002), available at <https://www.waternz.org.nz/>;

Water Measurement Manual: A Water Resources Technical Publication
(Washington: United States Department of the Interior Bureau of Reclamation, 2001)
available at <https://www.usbr.gov/tsc/techreferences/mands/wmm/index.htm>.

3 Recommended websites

Ministry for the Environment – <http://www.mfe.govt.nz/>;
Water New Zealand – <http://www.waternz.org.nz>.

4 Definitions

Organisation refers to an entire business entity in the private or public sector or a business unit within the organisation.

Waste management hierarchy refers to a preferred order of management approaches – eliminate, reduce at source, reuse, recycle, recover, dispose with minimal impact on environment.

Outcomes and performance criteria

Outcome 1

Demonstrate technical knowledge of water and wastewater systems.

Performance criteria

1.1 Water from different sources is described in terms of its composition.

Range water for and in organisations;
sources – mains, bore, river, rainwater.

1.2 Water systems are explained in terms of meeting requirements for the supply and storage of clean water.

Range water for and in organisations;
requirements – Drinking-water Standards, local authority bylaws and rules, organisational.

1.3 Sources of wastewater are described in terms of wastewater content, wastewater quality, storage, treatment, and disposal methods.

Range wastewater in organisations;
sources – discharge, trade waste, grey water, recycled or reused process water, water end product, condensate, elutriate, evaporative loss.

Outcome 2

Demonstrate technical knowledge of units of measurement for water and wastewater.

Performance criteria

- 2.1 Terminology used for measuring water and wastewater is defined and explained in accordance with recommended texts.

Range measurement of – flow rate, density, volume, temperature, pH, chemical composition, turbidity, suspended solids, dissolved solids, particulates, chemical oxygen demand, biochemical oxygen demand, dissolved oxygen, conductivity, nitrates.

- 2.2 Selection of appropriate units of measurement for water and wastewater is explained in accordance with AS/NZS 5667 and recommended texts.

Range for measuring water and wastewater in – a process, an organisation, a local authority.

Outcome 3

Demonstrate technical knowledge of methods for measurement of water and wastewater.

Performance criteria

- 3.1 Water flow and quality measurement methods are described in accordance with recommended texts and methods for collecting accurate data for water and wastewater audits are explained in accordance with recommended texts.

Range methods – flow meters, bucket and stop watch, flumes, level sensor, V notch weir, level sensor, velocity depth transducer, in place meter, portable meter, indicator paper, thermometer, pH meter, dissolved oxygen meter, conductivity meter, ion-selective electrode, automatic sampler, grab sample, laboratory methods.

- 3.2 Flow estimation methods are described in accordance with recommended texts and methods for collecting accurate data for water and wastewater audits are explained in accordance with recommended texts.

Range estimation of – pipe flow, open channel flow.

- 3.3 The importance of accuracy in applying water measuring devices is explained in relation to attaining measurements within prescribed accuracy bounds.

Range selection of devices, installation, calibration data and analyses, user operation, sufficiently frequent inspection, maintenance, continual verification.

Outcome 4

Evaluate resource efficiency options for water and wastewater.

Performance criteria

- 4.1 The evaluation explains and prioritises resource efficiency options for improving water use in one or more organisations.

Range ten of – sedimentation, filtration, pH adjustment, mechanical cleaning, chemical treatment, biological treatment, reed beds, evapotranspiration, infiltration, separation, rinsing efficiency, flocculation, coagulation, process sequencing, solvent recovery, electrolysis, reverse osmosis, counter current rinsing, air blasting, dry stripping, substitution, steam distillation, pigging, spray irrigation, dilution.

- 4.2 The evaluation is guided by the waste management hierarchy.

- 4.3 The evaluation takes account of legislative and local authority bylaws and rules relating to water use and disposal.

Planned review date	31 December 2023
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	17 June 2011	31 December 2015
Revision	2	21 November 2013	N/A
Rollover and Revision	3	28 June 2018	N/A

Consent and Moderation Requirements (CMR) reference	0014
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.