Title	**Demonstrate knowledge of, and apply, mathematics in the water industry**		
Level	**3**	**Credits**	**4**

Purpose	People credited with this unit standard are able to: describe the SI units used in the water industry; perform calculations using prefixes in the SI system of measurement; use formulae to solve for unknown variables; calculate flow rate; calculate detention or storage time given a flow rate and fixed volume vessel; describe solution strengths; and perform calculations relating to diameter of pipes, flow, and velocity.

Classification	Water Industry > Water - Generic

Available grade	Achieved

Guidance Information

1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements.

2 Legislation relevant to this unit standard includes the Health and Safety at Work Act 2015, Water Services Act 2021, Hazardous Substances and New Organisms Act 1996, Health and Safety at Work (Hazardous Substances) Regulations 2017, and subsequent amendments.

3 Definitions
Industry requirements include manufacturers' specifications; and enterprise requirements which may include documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
SI refers to *Système International d'unités* or *International System of Units,* which comprises a coherent system of measurement based on seven base units for measuring length, mass, time, electric current, temperature, quantity of matter, and luminous intensity. For the purpose of this unit standard, SI units include those for length, mass, and time.

Outcomes and performance criteria

Outcome 1

Describe the SI units used in the water industry.

Performance criteria

1.1 The units used in the SI metric system are described in terms of their applications in the water industry.

Range length, area, time, volume, mass, velocity, flow rate, pressure, temperature.

Outcome 2

Perform calculations using prefixes in the SI system of measurement.

Performance criteria

2.1 Calculations are performed using appropriate prefixes, and answers are converted into other prefix units using the standard prefix ranges.

Range three of – mega, kilo, milli, micro, nano.

Outcome 3

Use formulae to solve for unknown variables.

Performance criteria

3.1 A simple formula is transposed to make the unknown variable the subject of the equation and is then used to solve for the unknown variable.

Range volume calculation of a cylinder or rectangle unit, time to fill a volume.

Outcome 4

Calculate flow rate.

Performance criteria

4.1 Flow rate is calculated.

Outcome 5

Calculate detention or storage time given a flow rate and fixed volume vessel.

Performance criteria

5.1 Calculations are performed for different flow rates and volumes of detention or storage.

Range time to fill or empty, changes in volume, changes in flow rate.

Outcome 6

Describe solution strengths.

Performance criteria

6.1 Solutions are described in terms of the solutions encountered, concentration calculations, and the units used to describe them.

Range units may include – g/m^3, mg/m^3, mg/l, %, ppm, cfu/100ml, kg/day

Outcome 7

Perform calculations relating to diameter of pipes, flow, and velocity.

Performance criteria

7.1 Sectional area and velocity are calculated from the pipe diameter and flow rate.

Range evidence is required for at least three common pipe sizes.

Planned review date	31 December 2026

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 May 2002	31 December 2018
Revision	2	12 February 2003	31 December 2018
Review	3	19 September 2008	31 December 2018
Review	4	16 March 2017	31 December 2024
Review	5	24 February 2022	N/A

Consent and Moderation Requirements (CMR) reference	0101

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.