

Title	Demonstrate knowledge of water reticulation systems cleaning and disinfection		
Level	3	Credits	5

Purpose	People credited with this unit standard are able to describe: the consequences of not cleaning water mains and reservoirs, or inadequate maintenance of reservoirs; the techniques used for cleaning and disinfecting water mains; the planning, and techniques used for cleaning of water reservoirs; and the use of chlorine compounds for disinfection.
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Classification	Water Industry > Water Reticulation
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Available grade	Achieved
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Guidance Information

- 1 Legislation and references relevant to this unit standard include: Health and Safety at Work Act 2015, Hazardous Substances and New Organisms (HSNO) Act 1996, and subsequent amendments;
Excavation Safety – Good Practice Guidelines 2016, available from <http://www.worksafe.govt.nz/worksafe/information-guidance/all-guidance-items/excavation-safety-gpg>;
NZS 4404:2010 *Land Development and Subdivision Infrastructure*;
AS/NZS 2865:2009 – *Confined spaces*, available from <https://infostore.saiglobal.com/>;
Local authority hygiene codes.
- 2 Definition
Organisational procedures – instructions to staff, and procedures which are documented in memo or manual format and are available in the workplace. These requirements include but are not limited to – site specific requirements, manufacturers' specifications, product quality specifications, and legislative or regulatory requirements.

Outcomes and performance criteria

Outcome 1

Describe the consequences of not cleaning water mains and reservoirs, or inadequate maintenance of reservoirs.

Performance criteria

- 1.1 The impacts of detritus build up in water supply mains and reservoirs are described in terms of protection of microbes from disinfectants.
- 1.2 The opportunities for contamination due to inadequate reservoir maintenance or security are described in terms of water quality risks and methods to reduce these risks.

Outcome 2

Describe the techniques used for cleaning and disinfecting water mains.

Performance criteria

- 2.1 The use of flushing flows is described in terms of cleaning efficiency.
- 2.2 The use of pigging/swabbing is described in terms of cleaning efficiency.
- 2.3 Single fill/hold and flow through chlorination following main laying or repair are described in terms of techniques.

Outcome 3

Describe the planning, and techniques used, for cleaning water reservoirs.

Performance criteria

- 3.1 Techniques for reservoir cleaning are described in terms of equipment used and cleaning efficiency.
- 3.2 A reservoir cleaning plan is described in terms of the time taken, and the sequence of operations.
- 3.3 Use of a disinfectant following cleaning is described in terms of the efficiency of the technique, and safety requirements.

Range	dose levels, contact times, need for prior detritus removal, disposal of dosed water.
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- 3.4 The opportunities for contamination during cleaning are described in terms of water quality risks, and methods to reduce these risks.

Outcome 4

Describe the use of chlorine compounds for disinfection.

Performance criteria

- 4.1 The forms of chlorine available are described in terms of their effectiveness, and safety issues.
Range chlorine gas, calcium hypochlorite, sodium hypochlorite.
- 4.2 The safety procedures and equipment used when handling chlorine compounds are described in terms of organisational procedures.
Range manufacturer’s Safety Data Sheets, personal protective equipment.
- 4.3 The storage of chlorine compounds is described in terms of safety procedures.
Range chlorine gas, calcium hypochlorite, sodium hypochlorite.
- 4.4 The application of chlorine compounds is described in terms of concentration, dilution, and safe handling.
Range chlorine gas, calcium hypochlorite, sodium hypochlorite.
- 4.5 The concept of contact time is described in terms of disinfection effectiveness.
Range Ct values, typical values, strength of different chlorine forms, vulnerability to high pH levels, g/m³, check tests.
- 4.6 The impacts of releasing highly chlorinated water are described in terms of the receiving environment, sewage plants, and consumers in water reticulation.
- 4.7 The neutralisation of chlorine prior to discharge to waste is described in terms of the techniques used.

Replacement information	This unit standard, unit standard 19211, unit standard 22097, unit standard 22100, unit standard 24922, and unit standard 27330 were replaced by unit standard 31449.
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

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
Review	2	19 September 2008	31 December 2018
Review	3	16 March 2017	31 December 2021
Review	4	27 September 2018	31 December 2021

Consent and Moderation Requirements (CMR) reference	0101
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

This unit standard is Expiring