

Title	Demonstrate knowledge of the installation, commissioning, and maintenance of hot water supply systems		
Level	4	Credits	10

Purpose	<p>This unit standard is for people who work, or intend to work, in the plumbing industry.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of regulatory requirements, selection of methods and materials, and underpinning concepts and principles, as applied to the installation, commissioning, and maintenance of hot water supply systems; – describe types of hot water supply systems; – describe heat sources for hot water supply systems; – describe the positioning of hot water supply systems; – describe the installation and commissioning of hot water supply systems; and – describe the maintenance and rectifications of faults for hot water supply systems.
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Classification	Plumbing, Gasfitting and Drainlaying > Plumbing
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Available grade	Achieved
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Guidance Information

- 1 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the:
- Building Act 2004;
 - Health and Safety at Work Act 2015;
 - Plumbers, Gasfitters, and Drainlayers Act 2006;
 - Plumbers, Gasfitters, and Drainlayers Regulations 2010.

The following standards, which are available at <https://www.standards.govt.nz>:

- AS/NZS 3500.4:2021 *Plumbing and drainage, Part 4: Heated water services*;
- NZS 3604:2011 *Timber-framed buildings*;
- NZS 4305:1996 *Energy efficiency – Domestic type hot water systems*.

The following Building Code clauses, and any related Acceptable Solution and Verification Method documents, which are available at <https://www.building.govt.nz>:

- New Zealand Building Code Clause B1 Structure,
- New Zealand Building Code Clause B2 Durability,
- New Zealand Building Code Clause G10 Piped Services,
- New Zealand Building Code Clause G12 Water Supplies,

New Zealand Building Code Clause H1 Energy Efficiency.

Any new, amended or replacement referenced standards, codes of practice, guidelines, Building Code Acceptable Solutions and Verification Methods, or authority requirements affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

2 Definitions

Hot water supply systems refer to low pressure systems, which include open vented, valve vented, controlled and uncontrolled heat sources, and free outlet (push through) systems, and mains pressure systems.

Job requirements refer to specific requirements of the job at hand not covered by job specifications.

Job specifications refer to instructions (oral, written, graphic) and may include any of the following – manufacturer instructions; design drawing detail specifications; specifications from a specialist source such as an architect, designer, engineer, or a supervisor; and site or work specific requirements.

Low pressure refers to hot water supply systems less than or equal to 120 kilopascals.

Mains pressure refers to hot water supply systems at pressures above 300 kilopascals.

Maintenance may refer to all or any of – repair, upgrade, alteration, removal.

- 3 Candidates must hold a current limited certificate trainee authorisation or exemption under supervision as issued under the Plumbers, Gasfitters, and Drainlayers Act 2006.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of regulatory requirements, selection of methods and materials, and underpinning concepts and principles, as applied to the installation, commissioning, and maintenance of hot water supply systems.

Performance criteria

- 1.1 Describe applicable sections of legislation, referenced standards, Acceptable Solutions and Verification Methods, and codes in terms of their application to the installation, commissioning, and maintenance of hot water supply systems.
- 1.2 Justify selection of methods and materials.
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| Range | job specifications, operation of the installed system and components, suitability and durability of materials. |
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- 1.3 Explain underpinning concepts and principles in terms of their application to the installation, commissioning, and maintenance of hot water supply systems.

Range bacteria control, conduction, convection, radiation, corrosion, electrical earthing and bonding, energy efficiency, expansion and contraction, freezing, friction, heat and latent heat, hydraulic gradient, hydrostatics and hydraulics, pH, pressure on boiling point, properties of metals, relative density, siphon, temperature and behaviour of water at temperature, water hardness and softness.

Outcome 2

Describe types of hot water supply systems.

Performance criteria

- 2.1 Describe low pressure hot water supply systems in terms of pressure control, expansion control, controlled and uncontrolled heat source, and pressure maximums.

Range tank-fed open vented, valve-fed open vented, valve-fed valve vented.

- 2.2 Describe free outlet (push-through) hot water supply systems in terms of flow control, expansion control, controlled heat source and pressure maximums.

- 2.3 Describe mains pressure hot water storage supply systems in terms of pressure control valves, devices to manage thermal expansion, controlled and uncontrolled heat source, and pressure maximums.

- 2.4 Describe continuous flow hot water supply systems in terms of their operation, components, uses, and limitations.

- 2.5 Describe circulatory hot water systems in terms of their operation, components, uses, and limitations.

Range tempered, untempered.

Outcome 3

Describe heat sources for hot water supply systems.

- 3.1 Describe primary heat sources for hot water supply systems.

Range includes but is not limited to – electricity, gas, heat pump.

- 3.2 Describe direct and indirect heating via supplementary heat sources.

Range includes but is not limited to – solar, wetback.

Outcome 4

Describe the positioning of hot water supply systems.

Performance criteria

- 4.1 Describe the positioning of hot water supply systems to measurements in accordance with job specifications and relevant standards and codes.

Range includes but is not limited to - provision for safe tray, access for maintenance.

Outcome 5

Describe the installation and commissioning of hot water supply systems.

Performance criteria

- 5.1 Describe the selection of appropriate hot water supply systems in accordance with job specifications.

- 5.2 Describe the installation of hot water supply systems in accordance with job specifications and relevant standards and codes.

Range includes but not limited to - seismic restraints.

- 5.3 Describe the connection of hot water supply systems to connection and termination points in accordance with job specifications and relevant standards and codes.

- 5.4 Describe the selection and installation of hot water delivery temperature control devices in accordance with job specifications and relevant standards and codes.

- 5.5 Describe the requirements of hot water storage temperature control devices in accordance with job specifications and relevant standards and codes.

Range includes but is not limited to - minimum temperature.

- 5.6 Describe the installation and commissioning requirements for circulatory hot water control systems.

Range includes but is not limited to - minimum temperature.

- 5.7 Describe the protection of hot water supply systems in accordance with job specifications and relevant standards and codes.

- 5.8 Describe the identification of hot water supply systems and pipelines by label and/or colour that comply with relevant standards and codes.

5.9 Describe the commissioning requirements of hot water supply systems.

Range includes but is not limited to - soundness tests, setting temperature control devices, pressure control devices, handover to customer (operation and maintenance requirements).

Outcome 6

Describe the maintenance and rectification of faults for hot water supply systems.

Range low pressure, mains pressure.

Performance criteria

6.1 Describe preventative maintenance requirements for hot water supply systems.

Range may include but is not limited to – pressure vessels, anodes, filters, valve maintenance.

6.2 Describe the identification of faults in terms of causes and means of rectification.

6.3 Describe the rectification of faults in accordance with maintenance requirements, job specifications, and relevant standards and codes.

Replacement information	<p>This unit standard and unit standard 30551 replaced unit standard 23850.</p> <p>This unit standard and unit standard 30552 replaced unit standard 23851.</p>
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Planned review date	31 December 2029
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 October 2017	31 December 2028
Review	2	30 May 2024	N/A

Consent and Moderation Requirements (CMR) reference	0003
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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 Waihangā Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihangaararau.nz if you wish to suggest changes to the content of this unit standard.