

<b>Title</b>	<b>Demonstrate knowledge of the installation, testing, commissioning, and maintenance of solar water heating systems</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	<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"> <li>– demonstrate knowledge of regulatory requirements, selection of methods and materials, and underpinning concepts and principles, as applied to the installation, commissioning, testing, and maintenance of solar water heating systems;</li> <li>– describe solar water heating systems;</li> <li>– demonstrate knowledge of preparation for installation of solar water heating systems;</li> <li>– describe the installation, commissioning, and testing of solar water heating systems; and</li> <li>– describe the maintenance of solar water heating systems.</li> </ul>
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<b>Classification</b>	Plumbing, Gasfitting and Drainlaying > Plumbing
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<b>Available grade</b>	Achieved
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## Guidance Information

### 1 References

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 <http://www.standards.govt.nz>:

AS/NZS 2712:2007 *Solar and heat pump water heaters – Design and construction*,

AS/NZS 3500.4:2003 *Plumbing and drainage – Part 4 Heated water services*,

AS/NZS 5601.1:2010 *Gas installations - Part 1: General installations*,

NZS 3604:2011 *Timber-framed buildings*;

The following clauses, and any related compliance documents, which are available at

<https://www.building.govt.nz/>:

New Zealand Building Code Clause E1 Surface Water,

Clause E2 External Moisture,

Clause G10 Piped Services,

Clause G12 Water Supplies;

and all subsequent amendments and replacements.

- 2 This unit standard requires the application of theory as included in the Plumbers, Gasfitters, and Drainlayers Regulations 2010.
- 3 Credit for this unit standard does not entitle the candidate to legally perform certain electrical aspects of this Electrical work unless registered or supervised by a registered person under the provisions of the Electricity Act 1992.
- 4 Range  
Solar water heating systems include – open loop, closed loop, thermosiphon, pump.
- 5 Definitions  
*Job requirements* – specific requirements of the job at hand not covered by job specifications.  
*Job specifications* – 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. Where job specifications are in conflict with applicable legislation, standards, and/or codes, such legislation, standards, and/or codes shall take precedence for the purpose of assessment.  
*Maintain* may refer to all or any of – repair, upgrade, alter, remove.
- 6 Candidates must hold a current limited certificate or exemption under supervision as issued under the Plumbers, Gasfitters, and Drainlayers Act 2006.

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## 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, testing, and maintenance of solar water heating systems.

### Performance criteria

- 1.1 Describe applicable sections of legislation, standards, and codes in terms of their application to the installation, commissioning, testing, and maintenance of solar water heating systems.
- 1.2 Justify selection of methods and materials.
 

Range	job specifications, job requirements, operation of the installed system and components, prudent use and longevity of materials.
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- 1.3 Explain underpinning concepts and principles in terms of their application to the installation, commissioning, testing, and maintenance of solar water heating systems.
 

Range	capillary attraction, corrosion, friction, heat transfer, point loading, seismic forces, structural support, thermosiphon, wind forces, wind loading, flow rate, collector size.
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**Outcome 2**

Describe solar water heating systems.

**Performance criteria**

- 2.1 Describe types of solar water heating systems in terms of their operation and components.
- Range operation – pump systems, thermosiphon systems, closed loop, open loop;  
components – collector, tank, pump, controllers, pipework, valving, dosing tanks.
- 2.2 Describe solar water heating systems in terms of loading support and fixing requirements.
- 2.3 Describe solar water heating systems in terms of penetrations and weathertightness.

**Outcome 3**

Demonstrate knowledge of preparation for installation of solar water heating systems.

**Performance criteria**

- 3.1 Explain how to obtain building consent in accordance with job specifications.
- 3.2 Describe the confirmation of positioning, pipework layout, and structural and aesthetic requirements in accordance with job specifications and customer requirements.
- 3.3 Describe safety requirements relating to working at heights and lifting loads in accordance with relevant legislation and codes.
- 3.4 Describe the preparation of materials and equipment in accordance with job specifications and job requirements.

**Outcome 4**

Describe the installation, commissioning, and testing of solar water heating systems.

**Performance criteria**

- 4.1 Describe the confirmation of fixing and/or support in accordance with job specifications.
- 4.2 Describe the installation of brackets and any other required fixing support in accordance with job specifications.
- 4.3 Describe requirements for the maintenance of weather tightness when making penetration for pipes and/or wiring in accordance with job specifications.

- 4.4 Describe the installation and connection of required pipework.
- 4.5 Describe requirements for any needed wiring to be installed and connected by other trade personnel.
- 4.6 Describe the commissioning, testing, and dosing systems in accordance with relevant legislation, standards, and codes.

### Outcome 5

Describe the maintenance of solar water heating systems.

### Performance criteria

- 5.1 Describe the identification of faults in terms of causes and means of rectification.
- 5.2 Describe the rectification of faults in accordance with maintenance requirements, job specifications, and relevant standards and codes.

<b>Replacement information</b>	This unit standard and unit standard 30611 replaced unit standard 24305.
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<b>Planned review date</b>	31 December 2022
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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	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	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 The Skills Organisation [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.