

AS/NZS 60335.2.21:2023



Australian/New Zealand Standard™

Household and similar electrical appliances — Safety

Part 2.21: Particular requirements for storage water heaters (IEC 60335-2-21 Ed 7, MOD)



AS/NZS 60335.2.21:2023

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies. It was approved on behalf of the Council of Standards Australia on 8 November 2023 and by the New Zealand Standards Approval Board on 1 November 2023.

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- Association of Accredited Certification Bodies
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- Australian Retailers Association
- Better Regulation Division (Fair Trading, Safework NSW, TestSafe)
- Business New Zealand
- Consumer Electronic Suppliers Association, Australia
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- Electrical consultants
- Engineers Australia
- JAS-ANZ
- National Retailers Association (Australia)
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Third edition 1964.
Revised and redesignated AS 3142—1976.
Second edition 1982.
Third edition 1986.
Fourth edition 1994.
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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

AS/NZS 60335.2.21:2023

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2.21: Particular requirements for storage water heaters****Foreword**

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002 - Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 60335.2.21:2013 three years from the date of publication of this Standard. During this period AS/NZS 60335.2.21:2013 and its amendments will also remain current. Regulatory authorities that reference this Standard in regulation may apply these requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the appliance and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand.

The text of IEC 60335-2-21 Ed 7, prepared by IEC Technical TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption of the IEC standard as a Standards Australia/Standards New Zealand joint standard.

The principal changes in this edition as compared with the 2013 edition of AS/NZS 60335.2.21 are as follows (minor changes are not listed):

- a) alignment with AS/NZS 60335.1:2022;
- b) some notes have been converted to normative text (Clause 1, 5.2, 15.3, 19.1, 19.2, 19.3, 19.4, 22.47, 22.104, 22.110, Annex AA introduction);
- c) updated requirement restricting use of appliance inlets (25.1).

This Standard is an adoption with national modifications of the seventh edition of IEC 60335-2-21, *Household and similar electrical appliances – Safety – Part 2-21: Particular requirements for storage water heaters*. It has been varied as indicated to take account of Australian and New Zealand conditions.

This part 2 has to be used in conjunction with the latest edition of AS/NZS 60335.1 *Household and similar electrical appliances – Safety – Part 1: General requirements* and its Amendments, unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of AS/NZS 60335.1:2022.

This part 2 supplements or modifies the corresponding clauses of AS/NZS 60335.1 so as to convert it into the Australian/New Zealand Standard: Safety requirements for storage water heaters.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

NOTE 1 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letters AZ.

NOTE 2 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and associated noun are also in bold.

p NOTE 3 In this document, p is used in the margin to indicate instructions for preparing a consolidated version.

The essential safety requirements in AS/NZS 3820¹ that could be applicable to requirements for storage water heaters are covered by this standard.

The national variations to IEC 60335-2-21 Ed 7 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).

¹ AS/NZS 3820 *Essential safety requirements for electrical equipment*

The text of the International Standard IEC 60335-2-21 Ed 7 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.

AUSTRALIAN NATIONAL VARIATIONS

The following national variations to this Part 2 are additional to those listed in the national variations in AS/NZS 60335.1:2022.

1 Scope

- p *Replace* the second dashed item of the second paragraph by the following variation:

However, **immersion heater units** intended to be retrofitted in a **heat exchange closed water heater** are prohibited unless:

- the **immersion heater unit** has been tested with the tank models and brands listed in the instructions of the **immersion heater unit**;
- the tank models and brands list the models of the **immersion heater units** that can be retrofitted.

3 Terms and definitions

- p **3.5.104** After Note to entry 3 *insert* the following variation:

Note to entry 301 Tank-attached and side-fed storage water heaters as described in AS 1056.1, are different forms of a **cistern-type water heater** and unless otherwise specified, are subject to the requirements that are specified for **cistern-type water heaters**.

7 Marking and instructions

- p **7.1** *Replace* the first paragraph of the Addition with the following variation:

Appliances, other than **cistern-fed water heaters** and **cistern-type water heaters** shall be marked with the **rated pressure** in pascals.

Cistern-fed water heaters shall be marked with the **rated pressure** in working head of water in metres.

Closed water heaters shall be marked with the substance of the following warning:

WARNING: The valve or drain valve outlet pipe must not be sealed or blocked.

Closed water heaters shall be marked with the relief valve setting in kPa and power rating in kW.

Closed water heaters intended for direct connection to the water main shall be marked with a statement that a temperature-operated relief valve is to be fitted in the installation unless it is incorporated in the appliance.

NOTE This valve may be combined with the pressure relief valve if this valve is fitted to the hot water side of the **storage water heater**.

Heat exchange water heaters shall be marked with a statement that a pressure relief valve is to be fitted in the installation unless it is incorporated in the heat exchanger of the appliance.

Replace the fourth paragraph of the Addition with the following variation:

Closed water heaters having a **rated pressure** less than 0,85 MPa and **low pressure water heaters** shall be marked with a statement that a pressure reducing valve is to be fitted in the installation.

- p **7.12** *Add* the following as a new paragraph to the Addition:

The instructions for **closed water heaters** and **low-pressure water heaters** not designed for connection to a supplementary heat source shall state the substance of the following warning:

DANGER: The operation of the thermal cut-out indicates a possibly dangerous situation. Do not reset the thermal cut-out until the water heater has been serviced by a qualified person.

- p **7.12.1** Replace the last dash item in the first paragraph of the Addition with the following variation:

- the type or characteristics of a pressure reducing valve and the installation details (for appliances having a rated pressure less than 0,85 MPa);

Replace the second paragraph of the Addition with the following variation:

The instructions for **closed water heaters** designed for connection to a supplementary heat source shall give details of the installation of control devices and their temperature setting, to prevent operation of the **thermal cut-out** caused by the heat from the supplementary heat source.

Replace the third paragraph of the Addition with the following variations:

The instructions for **cistern-fed water heaters** and **low-pressure water heaters** designed for connection to a supplementary heat source shall contain the substance of the following warning:

WARNING: Do not connect any restrictor or pressure relief device to the vent pipe of this water heater.

The instructions for **closed water heaters** shall state the substance of the following warning:

DANGER: Failure to operate the relief valve easing gear at least once every six months may result in the water heater exploding. Continuous leakage of water from the valve may indicate a problem with the water heater.

The instructions for **closed water heaters** shall state the substance of the following:

If the water supply pressure exceeds the rated pressure, a pressure reducing valve is to be fitted in the installation.

- p **7.15** After Clause 7.12.1 *insert* the following variation:

7.15 Addition:

The marking of the relief valve setting and power rating shall be close to the mounting position of pressure relief valves.

19 Abnormal operation

- p **19.1** Replace the second paragraph of the Modification but not the dash items with the following variation:

For closed water heaters, low-pressure water heaters and open-outlet water heaters, compliance is checked by the tests of 19.2, 19.3 and 19.4 if applicable. However, these appliances are not tested if they are not liable to be emptied in normal use and they have all four of the following features:

- p **19.101** Replace Clause 19.101 with the following variation:

19.101 VOID

22 Construction

- p **22.47** Replace the fourth dash item with the following variation:

- 0,03 MPa for **cistern-type water heaters**, except side-fed storage water heaters;
- 1,5 times the pressure measured within the heat exchanger for **heat exchange water heaters**, when it is sealed at the inlet and outlet with the **thermostat short-circuiting**

otherwise rendered inoperative, the water in the static water tank having been allowed to boil for one hour.

- p **22.101** Replace the first two paragraphs of the requirement with the following variation:

The **rated pressure** of **closed water heaters** intended for direct connection to the water main shall be at least 0,85 MPa.

The **rated pressure** of **closed water heaters** and **low-pressure water heaters** intended to be supplied by a pressure reducing valve which is not incorporated in the appliance shall be at least 0,076 MPa.

- p **22.106** After the first paragraph of the requirement *insert* the following variation:

This requirement also applies to **low-pressure water heaters** unless they are designed for connection to a supplementary heat source.

- p **22.111** Replace the first paragraph of the requirement with the following variation:

Closed water heaters designed for connection to a supplementary heat source shall be constructed so that during normal use the **thermal cut-out** does not operate due to heat from the supplementary source.

24 Components

- p **24.102** Replace Clause 24.102 with the following variation:

24.102 The operating temperature of the **thermal cut-out** of a **closed water heater** shall ensure that the water temperature cannot exceed 95 °C.

Compliance is checked by the test of 24.102.1.

- p **24.102.1** Replace the third paragraph with the following variation:

The temperature shall not exceed 95 °C.

- p **24.102.2** Replace Clause 24.102.2 with the following variation:

24.102.2 VOID

- p **24.301** After Clause 24.102.2 *insert* the following variations:

24.301 The operating temperature of the temperature-operated pressure relief valve of a closed water heater shall not exceed 99 °C.

Compliance is checked by the following test.

*The appliance is operated under the conditions specified in Clause 11, with all **thermostats** and **thermal cut-outs** short-circuited or otherwise rendered inoperative. The pressure within the storage water heater is maintained at approximately 50 % of the pressure relief valve pressure setting or 0,5 MPa, whichever is the lesser.*

The temperature of the water is measured by a thermocouple that is positioned approximately level with the water outlet.

The temperature shall not exceed 99 °C.

24.302 Pressure relief valves and temperature-operated pressure relief valves shall be tested and shown to comply with AS 1357.1.

Compliance is checked by inspection and the appropriate tests

NEW ZEALAND NATIONAL VARIATIONS

The following national variations to this Part 2 are additional to those listed in the national variations in AS/NZS 60335.1:2022.

1 Scope

- p *Replace* the second dashed item of the second paragraph by the following variation:

However, **immersion heater units** intended to be retrofitted in a **heat exchange closed water heater** are prohibited unless:

- the **immersion heater unit** has been tested with the tank models and brands listed in the instructions of the **immersion heater unit**;
- the tank models and brands list the models of the **immersion heater units** that can be retrofitted.

3 Terms and definitions

- p **3.5.104** After Note to entry 3 *insert* the following variation:

Note to entry 301 Tank-attached and side-fed storage water heaters as described in AS 1056.1, are different forms of a **cistern-type water heater** and unless otherwise specified, are subject to the requirements that are specified for **cistern-type water heaters**.

7 Marking and instructions

- p **7.1** *Replace* the first paragraph of the Addition with the following variation:

Appliances, other than **cistern-fed water heaters** and **cistern-type water heaters** shall be marked with the **rated pressure** in pascals.

Cistern-fed water heaters shall be marked with the **rated pressure** in working head of water in metres.

Closed water heaters shall be marked with the substance of the following warning:

WARNING: The valve or drain valve outlet pipe must not be sealed or blocked.

Closed water heaters shall be marked with the relief valve setting in kPa and power rating in kW.

Closed water heaters intended for direct connection to the water main shall be marked with a statement that a temperature-operated relief valve is to be fitted in the installation unless it is incorporated in the appliance.

NOTE This valve may be combined with the pressure relief valve if this valve is fitted to the hot water side of the **storage water heater**.

Heat exchange water heaters shall be marked with a statement that a pressure relief valve is to be fitted in the installation unless it is incorporated in the heat exchanger of the appliance.

Replace the fourth paragraph of the Addition with the following variation:

Closed water heaters having a **rated pressure** less than 0,85 MPa and **low pressure water heaters** shall be marked with a statement that a pressure reducing valve is to be fitted in the installation.

- p **7.12** *Add* the following as a new paragraph to the Addition:

The instructions for **closed water heaters** and **low-pressure water heaters** not designed for connection to a supplementary heat source shall state the substance of the following warning:

DANGER: The operation of the thermal cut-out indicates a possibly dangerous situation. Do not reset the thermal cut-out until the water heater has been serviced by a qualified person.

- p **7.12.1** *Replace* the last dash item in the first paragraph of the Addition with the following variation:

- the type or characteristics of a pressure reducing valve and the installation details (for appliances having a rated pressure less than 0,85 MPa);

Replace the second paragraph of the Addition with the following variation:

The instructions for **closed water heaters** designed for connection to a supplementary heat source shall give details of the installation of control devices and their temperature setting, to prevent operation of the **thermal cut-out** caused by the heat from the supplementary heat source.

Replace the third paragraph of the Addition with the following variations:

The instructions for **cistern-fed water heaters** and **low-pressure water heaters** designed for connection to a supplementary heat source shall contain the substance of the following warning:

WARNING: Do not connect any restrictor or pressure relief device to the vent pipe of this water heater.

The instructions for **closed water heaters** shall state the substance of the following warning:

DANGER: Failure to operate the relief valve easing gear at least once every six months may result in the water heater exploding. Continuous leakage of water from the valve may indicate a problem with the water heater.

The instructions for **closed water heaters** shall state the substance of the following:

If the water supply pressure exceeds the rated pressure, a pressure reducing valve is to be fitted in the installation.

- p **7.15** After Clause 7.12.1 *insert* the following variation:

7.15 Addition:

The marking of the relief valve setting and power rating shall be close to the mounting position of pressure relief valves.

19 Abnormal operation

- p **19.1** *Replace* the second paragraph of the Modification but not the dash items with the following variation:

For closed water heaters, low-pressure water heaters and open-outlet water heaters, compliance is checked by the tests of 19.2, 19.3 and 19.4 if applicable. However, these appliances are not tested if they are not liable to be emptied in normal use and they have all four of the following features:

- p **19.101** *Replace* Clause 19.101 with the following variation:

19.101 VOID

22 Construction

- p **22.47** *Replace* the fourth dash item with the following variation:

- 0,03 MPa for **cistern-type water heaters**, except side-fed storage water heaters;
- 1,5 times the pressure measured within the heat exchanger for heat exchange water heaters, when it is sealed at the inlet and outlet with the thermostat short-circuited or otherwise rendered inoperative, the water in the static water tank having been allowed to boil for one hour.

- p **22.101** *Replace* the first two paragraphs of the requirement with the following variation:

The **rated pressure** of **closed water heaters** intended for direct connection to the water main shall be at least 0,85 MPa.

The **rated pressure** of **closed water heaters** and **low-pressure water heaters** intended to be supplied by a pressure reducing valve which is not incorporated in the appliance shall be at least 0,076 MPa.

- p **22.106** After the first paragraph of the requirement *insert* the following variation:

This requirement also applies to **low-pressure water heaters** unless they are designed for connection to a supplementary heat source.

- p **22.111** *Replace* the first paragraph of the requirement with the following variation:

Closed water heaters designed for connection to a supplementary heat source shall be constructed so that during normal use the **thermal cut-out** does not operate due to heat from the supplementary source.

24 Components

- p **24.102** *Replace* Clause 24.102 with the following variation:

24.102 The operating temperature of the **thermal cut-out** of a **closed water heater** shall ensure that the water temperature cannot exceed 95 °C.

Compliance is checked by the test of 24.102.1.

- p **24.102.1** *Replace* the third paragraph with the following variation:

The temperature shall not exceed 95 °C.

- p **24.102.2** *Replace* Clause 24.102.2 with the following variation:

24.102.2 VOID

- p **24.301** After Clause 24.102.2 *insert* the following variations:

24.301 The operating temperature of the temperature-operated pressure relief valve of a closed water heater shall not exceed 99 °C.

Compliance is checked by the following test.

*The appliance is operated under the conditions specified in Clause 11, with all **thermostats** and **thermal cut-outs** short-circuited or otherwise rendered inoperative. The pressure within the storage water heater is maintained at approximately 50 % of the pressure relief valve pressure setting or 0,5 MPa, whichever is the lesser.*

The temperature of the water is measured by a thermocouple that is positioned approximately level with the water outlet.

The temperature shall not exceed 99 °C.

**Annex ANZ
(normative)****Normative references to international publications with their
corresponding joint Australia/New Zealand publications**

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used. Where there is no equivalent international publication listed to a listed Australia/New Zealand publication, then the Australia/New Zealand publication applies

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>AS/NZS</u>	<u>Year</u>
IEC 60584-1,		<i>Thermocouples – Part 1: EMF specifications and tolerances</i>		
IEC 60730-1	2013	<i>Automatic electrical controls –</i>		
IEC 60730-1/AMD1	2015	<i>Part 1: General requirements</i>		
IEC 60730-1/AMD2:	2020			

