

Australian/New Zealand Standard™

**Household and similar electrical
appliances—Safety**

**Part 2.21: Particular requirements for
storage water heaters
(IEC 60335-2-21 Ed 5.2, MOD)**



AS/NZS 60335.2.21:2002

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. It was approved on behalf of the Council of Standards Australia on 8 October 2002 and on behalf of the Council of Standards New Zealand on 2 October 2002.

This Standard was published on 22 November 2002.

The following are represented on Committee EL-002:

Association of Certification Bodies
Australian Chamber of Commerce and Industry
Australian Electrical and Electronic Manufacturers Association
Canterbury Manufacturers Association New Zealand
Consumer Electronic Suppliers Association, Australia
Electrical Regulatory Authorities, Australia
Electrical Test Laboratories
Electrical Consultants
Electricity Supply Association of Australia
Institution of Engineers Australia
Metal Trades Industries Association of Australia
Ministry of Consumer Affairs, New Zealand

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

Australian/New Zealand Standard™

Household and similar electrical appliances—Safety

Part 2.21: Particular requirements for storage water heaters (IEC 60335-2-21 Ed 5.2, MOD)

First published as AS C142—1941.
Second edition 1949. Redated 1954. Third edition 1964.
Revised and redesignated AS 3142—1976.
Second edition 1982. Third edition 1986. Fourth edition 1994.
Jointly revised and redesignated in part as AS/NZS 3350.2.21:1999.
Jointly revised and redesignated as AS/NZS 60335.2.21:2002.
Reissued incorporating Amendment No. 1 (October 2004).
Reissued incorporating Amendment No. 2 (June 2005).
Reissued incorporating Amendment No. 3 (October 2009).

COPYRIGHT

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope	7
2 Normative references	7
3 Definitions	8
4 General requirement.....	9
5 General conditions for the tests	9
6 Classification.....	9
7 Marking and instructions	9
8 Protection against access to live parts	12
9 Starting of motor-operated appliances.....	12
10 Power input and current.....	12
11 Heating	12
12 Void	12
13 Leakage current and electric strength at operating temperature	12
14 Transient overvoltages	12
15 Moisture resistance	12
16 Leakage current and electric strength	13
17 Overload protection of transformers and associated circuits	13
18 Endurance.....	13
19 Abnormal operation	13
20 Stability and mechanical hazards.....	14
21 Mechanical strength	14
22 Construction.....	14
23 Internal wiring.....	17
24 Components	17
25 Supply connection and external flexible cords	18
26 Terminals for external conductors	19
27 Provision for earthing.....	19
28 Screws and connections	19
29 Clearances, creepage distances and solid insulation	19
30 Resistance to heat and fire	19
31 Resistance to rusting	19
32 Radiation, toxicity and similar hazards	20

Figure 101 – Examples of types of storage water heaters	21
Figure 101 – Examples of types of storage water heaters (continued)	22
Figure 102a – Position of thermocouples for metallic containers	23
Figure 102b – Position of thermocouples for non-metallic containers.....	23
Figure 102 – Examples of positions of the thermocouples	23
Annexes	24
Annex A (informative) Routine tests	24
Annex ZZ (informative) Variations to IEC 60335-2-21 Ed 5.2 for application in Australia and New Zealand	26
Bibliography	25

AUSTRALIA/NEW ZEALAND STANDARD

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 3350.2.21:1999, seven years from the date of publication. During this seven year period either AS/NZS 3350.2.21:1999 or AS/NZS 60335.2.21:2002 may be used for regulatory purposes in both Australia and New Zealand.

A3

This Standard incorporates Amendment No. 1 (October 2004), Amendment No. 2 (June 2005) and Amendment 3 (October 2009). The changes required by the amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

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.

A3

This Standard is an adoption with national modifications and contains the full text of the fifth edition of IEC 60335-2-21, *Household and similar electrical appliances – Safety - Part 2-21: Particular requirements for storage water heaters* including its Corrigendum 1 (2007) and its amendment 1 (2004) and amendment 2 (2008) and has been varied as indicated to take account of Australian and New Zealand conditions. It is 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. It was established on the basis of AS/NZS 60335.1:2002.

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 of storage water heaters.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to AS/NZS 60335.1.

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 in Part 1 is to be adapted accordingly.

NOTE 2 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.

NOTE 3 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 the associated noun are also in bold.

A3 | The numbering of clauses, subclauses, notes, tables, figures and annexes follows that of IEC 60335-2-21 Ed 5.2. To allow for the introduction of additional material by the IEC, the numbers 101 to 200 have been reserved. To allow for additional material to be introduced by Australia and New Zealand, the numbers 201 to 300 are used to number further clauses, subclauses, notes, tables and figures in part 1. The numbers 301 to 400 are used to number further clauses, subclauses, notes, tables and figures in this part 2. Additional annexes are lettered ZA, ZB and so on.

This scheme has been introduced to reduce the likelihood of the IEC and Australia and New Zealand using the same identifier for different purposes.

The use of the word VOID indicates that the IEC text is not used in Australia or New Zealand. The use of this word also avoids the need to renumber, clauses, notes, tables and figure if an earlier clause, note, table or figure is not used.

Clause 2 has been reformatted to indicate the Australia/New Zealand standard that is equivalent to the IEC standard or ISO standard to which normative reference is made.

The bibliography has been reformatted to indicate the Australia/New Zealand standard that is equivalent to the IEC standard or ISO standard to which reference is made.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown on the cover and title page only.
- (b) In the source text "this International Standard" should read "this Australian/New Zealand Standard".

A full point substitutes for a comma when referring to a decimal marker.

A3 | Variations to IEC 60335-2-21 Ed 5.2 are indicated at the appropriate places throughout this standard. Strikethrough (~~example~~) identifies IEC tables, figures and passages of text which, for the purposes of this Australian/New Zealand standard are deleted. Where Australian/New Zealand tables, figures or passages of text are added, each is set in its proper place and identified by shading (example). Added figures are not themselves shaded, but are identified by a shaded border.

A3 | Variations made to IEC 60335-2-21 Ed 5.2 form the Australian and New Zealand variations for the purposes of the IECEE scheme for recognition of testing to standards for safety of electrical equipment (the CB scheme). These variations have been incorporated in the body of the standard. They are listed in Annex ZZ for easy reference.

INTRODUCTION

It has been assumed in the drafting of this Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

A1 | This Standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This Standard takes into account the requirements of AS/NZS 3000 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains.

If an appliance within the scope of this Standard also incorporates functions that are covered by another part 2 of AS/NZS 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

A3 | When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this Standard will not necessarily be considered to comply with the safety principles of the Standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the Standard.

The essential safety requirements in AS/NZS 3820 that could be applicable to storage water heaters are covered by this Standard

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2.21: Particular requirements for storage water heaters

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric **storage water heaters** for household and similar purposes and intended for heating water below boiling temperature, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- A3
- persons (including children) whose
 - physical, sensory or mental capabilities; or
 - lack of experience and knowledge
 prevents them from using the appliance safely without supervision or instruction;
 - children playing with the appliance.

NOTE 101 Attention is drawn to the fact that

- for appliances intended to be used at high altitudes, additional requirements may be necessary;
- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities;
- in many countries regulations exist for the installation of equipment connected to the water mains.

NOTE 102 This standard does not apply to

- appliances for boiling water (IEC 60335-2-15);
- instantaneous water heaters (IEC 60335-2-35);
- commercial dispensing appliances and vending machines (IEC 60335-2-75);
- appliances intended exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

2 Normative references

This clause of Part 1 is applicable