

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Amendment No. 2
to
AS/NZS 4474.1:2007
Performance of household electrical appliances—
Refrigerating appliances
Part 1: Energy consumption and performance

REVISED TEXT

The 2007 edition of AS/NZS 4474.1 is amended as follows; the amendment(s) should be inserted in the appropriate place(s).

SUMMARY: This Amendment applies to the Preface, Clauses 1.3.7, 1.3.22, 1.3.30 (new), 1.3.31 (new), 3.1, 3.5, 3.7.1, 3.7.3, 3.8 (new), 3.9 (new), Figure 3.1(b), Tables 3.5 and Appendices A, C, D, K, L, O, R and S (new).

Published on 31 March 2011.

Approved for publication in New Zealand on behalf of the Standards Council of New Zealand on 9 March 2011.

Preface

Insert new fourth and fifth paragraphs as follows:

Amendment 2 (2011) to this Standard includes a number of changed requirements regarding the operation of ice-makers during energy tests and an additional requirement for adaptive defrost systems. It also deals with the testing of products that contain automatic anti-condensation heaters where the power is varied in response to changes in ambient conditions (e.g. humidity and/or temperature). It now requires the declaration of any controls that may alter the operation of the refrigerating appliance under specific operating conditions. Amendment 2 (2011) no longer permits products with circumvention devices to comply with the requirements of this Standard.

Amendment 2 forms part of this Standard on publication. AS/NZS 4474.2 sets out transition provisions for the use of this Standard (excluding Amendment 2) for registration purposes.

Clause 1.3.7

Delete list item (b) and (b)(i) to (b)(iv) and replace with the following:

- (b) **Adaptive defrost**—A form of **automatic defrosting system** where total energy consumed over time is optimized by an automatic process that adjusts the time between successive defrosts over a range of intervals in response to changes in **normal use** by using an operating condition variable (or variables) other than, or in addition to, elapsed time or compressor run time. It provides a defrosting frequency based more accurately on the defrosting need during **normal use**. An **adaptive defrost** system must operate during **normal use** and not just under test conditions.

NOTE: Requirements to qualify as **adaptive defrost** are set out in Clause 3.8.

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Clause 1.3.22

Insert new list items (g) and (h) as follows:

- (g) **Steady state operation**—Operation in a constant ambient temperature where the temperatures in all compartments and the total power consumption of the appliance over one or several **temperature control cycles** remains at a relatively constant value, and which would continue for an indefinite period in the absence of defrost events or user interactions.
- (h) **Normal use**—When the appliance is subjected to a range of different conditions that could occur during use, including operation in a range of indoor temperatures (including those defined in the operating temperature performance test, see Appendix J), a range of different humidity levels and a range of user-related actions, such as door openings (which may be frequent, infrequent, long, short or a mixture thereof) and the addition, general storage and removal of foodstuffs.

Clause 1.3.30 (new)

Insert a new Clause 1.3.30 as follows:

1.3.30 Circumvention device

Any undeclared control, control device, software, component or part that alters the operating characteristics during any test procedure, resulting in measurements that are unrepresentative of the appliance's true characteristics that may occur during **normal use** under comparable conditions. Generally, **circumvention devices** save energy during an energy test, but not during **normal use**.

Some examples of **circumvention devices** may include any variation to normal operation when the appliance is subjected to testing, and includes devices that—

- (a) alter compartment temperature set points during the test;
- (b) activate or de-activate heaters or other energy-consuming devices during the test;
- (c) manipulate compressor cycle time or other operating parameters during the test; or
- (d) manipulate the defrost interval.

NOTE: Control of a **refrigerating appliance** in response to home networks and smart grid requirements are under consideration.

Clause 1.3.31 (new)

Insert a new Clause 1.3.31 as follows:

1.3.31 Declared automatic controls

Controls that operate automatically over a restricted, specific range of conditions and have a legitimate basis for their operation during **normal use** and under the test procedure for energy consumption.

NOTE: Requirements for **declared automatic controls** are set out in Clause 3.9.

The following controls and devices are not included in the scope of **declared automatic controls**—

- (a) automatic controls that are required for the maintenance of satisfactory food preservation temperatures within unfrozen compartments in a refrigerator-freezer when operating at low ambient temperatures (low ambient temperature compensation heaters);
- (b) **adaptive defrost** controls as defined in Clause 1.3.7(b) and that comply with the requirements of Clause 3.8; or

- (c) ambient controlled anti-condensation heaters (within the scope of Appendix S).

NOTE: Specific requirements regarding ambient controlled anti-condensation heaters are set out in Appendix S. Low ambient temperature compensation heaters are allowed to operate normally for energy tests. Additional controls that are outside the scope of declared automatic controls may be added by amendment to this Clause.

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Clause 3.1

Delete Clause and *replace* with the following:

3.1 GENERAL

A **refrigerating appliance** shall not contain a **circumvention device**. Any refrigerating appliance that is found to contain a **circumvention device** does not comply with the requirements of this Standard.

When tested in accordance with this Standard, the **refrigerating appliance** shall not behave in a manner that is different from the way that it would operate when set up and used by a consumer during **normal use** under comparable conditions. Where the operation of a **circumvention device** is suspected during a verification test, a laboratory **should** subject the appliance to measures such as door openings or other appropriate actions in an attempt to detect presence and operation of any such devices. Details of any such action and their effect **shall** be included in the test report. Where a **circumvention device** is suspected or detected during testing for registration, a laboratory **shall** report that information to the client.

Where a **circumvention device** is found to be present and operating during an energy test, where possible, the **circumvention device** shall be defeated in order to obtain an energy test value to assess the impact of the **circumvention device**. Where it is not possible to defeat the **circumvention device**, the energy impact of the device **shall** be quantified and this value used to adjust the measured energy consumption to give the expected value during **normal use** under comparable conditions for assessment purposes.

NOTE: For example, where any **circumvention device** affects the defrost interval (length of the **defrost control cycle**), the average defrost interval that does or would occur with the **circumvention device** defeated is used for energy consumption calculations.

A **refrigerating appliance** may contain a **declared automatic control** that alters the energy consumption during **normal use** or under other specific conditions. The requirements for such controls are set out in Clause 3.9.

A **refrigerating appliance** shall provide appropriate stable temperatures for the safe, convenient storage and preservation of **foodstuffs**. The intent is that temperatures and temperature characteristics as set, **shall** not vary significantly during **normal use** in unchanged external temperature conditions.

Any **automatic defrost** system (including an **adaptive defrost** system) **shall** meet all ongoing defrosting needs, without any user intervention, as may occur under a wide range of **normal use** conditions.

During **normal use** under any ambient condition or control setting, any abnormal occurrence such as any excess melting water from an **evaporator** or other refrigerated surface of the appliance **shall** be collected, evaporated or otherwise disposed of. Any pooling of water or water leaking from the appliance door **shall** be deemed as a failure of this requirement, even under heavy usage conditions.

To meet this objective **refrigerating appliances** shall comply with Clauses 3.6 and 3.7. Should new technology allow appliances to meet the specific test requirements of this Standard but not the intent, as noted above, this Standard will be amended accordingly.

Clause 3.5

- 1 *Delete* the word 'CAPACITY' from the heading.
- 2 *Add* the following new paragraphs and Notes to the end of the Clause:

Where an appliance includes an automatic ice-making feature that produces and stores ice, the space that the ice storage bin occupies **shall** conform to all requirements of the **frozen food storage compartment** within which it is located, unless it, or its ice storage bin, is specifically registered as a separate **sub-compartment**.

If the automatic ice-maker or its associated storage bin is located in an **unfrozen food storage compartment**, it **shall** be declared as a **sub-compartment** and **shall** conform to the temperature requirements of a **compartment** of an ice-making or colder type **compartment**; whether it is producing ice or not; and **shall** meet the requirements of Clauses 3.6 and 3.7.

If an automatic ice-making bin is operated as a **sub-compartment** (refer to Clause 1.3.3(b)) it **shall** be declared under 'Compartment Details' in the Regulatory Test Report (refer to Appendix R, Paragraph R2).

NOTES:

- 1 Appendix C, Paragraph C2.5(b) sets out requirements for setting up and testing of products with automatic ice-makers. Specific setup requirements for energy consumption testing are set out in Appendix C, Paragraph C2.8.
- 2 The adjusted volume for the ice storage bin is based on the compartment or sub-compartment type used for performance and energy assessments.

Clause 3.7.1

- 1 In the third paragraph, *delete* the third sentence and *replace* with the following:

Where such an energy reduction mode cannot be disabled for the duration of the energy consumption test, then the energy impact **shall** be quantified and this value used to adjust each measured energy consumption rate (as specified in Appendix K, Paragraph K8).

- 2 *Insert* a new fourth paragraph (after the Note) as follows:

Where an energy reduction mode affects the **steady state operation** (including management of heaters), the additional power during **normal use** **shall** be included in energy consumption calculations as specified in Appendix K, Paragraph K8 (also refer to Appendix Q, Paragraph Q2). Where an energy reduction mode affects the characteristics of the **defrost and recovery period** or the length of the **defrost control cycle**, the average **defrost and recovery period** characteristics and the average length of the **defrost control cycle** that does or would occur during **normal use** **shall** be used for energy consumption calculations as specified in Appendix K, Paragraph K8 (also refer to Appendix Q, Paragraph Q3).

Table 3.5

Delete Table 3.5 and replace with the following:

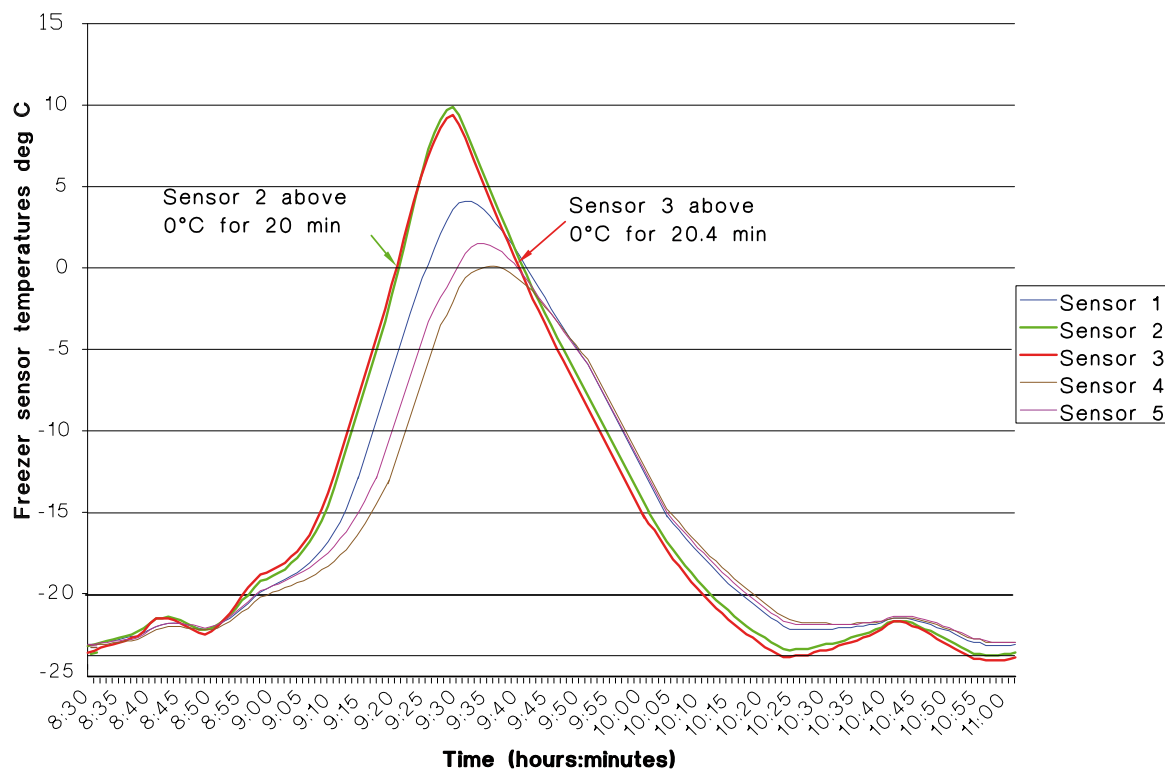
TABLE 3.5
TARGET TEMPERATURES FOR MEASUREMENT OF
ENERGY CONSUMPTION FOR COMPARTMENTS

Compartment type	Target average air temperature °C
UNFROZEN FOOD TYPES	
Cellar	12
Fresh food	3
Chill	0
Special (unfrozen)	Midpoint of claimed range
FROZEN FOOD TYPES	
Ice-making*	No target temperature
Short-term frozen food	–9
Freezer	–15
Special (frozen)	Claimed maximum operating temperature

* Where an automatic ice-making storage bin sub-compartment is claimed as an ice-making compartment type, then the target average air temperature for energy consumption determination **shall** be –2°C.

Figure 3.1(b)

Delete Figure and its Note and *replace* with the following:



NOTE: This Figure is a schematic representation of requirement as defined in Clause 3.7.3(a), but Sensor 2 just fails the performance requirement of Clause 3.7.3(a).

FIGURE 3.1(b) ILLUSTRATION OF REQUIREMENT AS DEFINED IN CLAUSE 3.7.3(a)