



National Differences For

Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

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National Differences For

Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

Second Edition

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This new edition of ANSI/UL 60335-2-24, the harmonized Standard for Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, UL 60335-2-24, is based off of Edition 7.1 of IEC 60335-2-24.

This document provides a single listing of the National Differences included in the UL adoption of the corresponding IEC standard.

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Preface

This document provides a single listing of the technical National Differences included in the UL adoption of the corresponding IEC standard.

In its IEC-based standards, UL uses the notations indicated below to identify national difference type, and these types are additionally noted in this document. The standard may not use all types of these deviations.

D1 - These are deviations which are based on basic safety principles and requirements, elimination of which would compromise safety for U.S. consumers and users of products.

D2 - These are deviations based on safety practices. These are deviations for IEC requirements that may be acceptable, but adopting the IEC requirements would require considerable retesting or redesign on the manufacturer's part.

DC - These are deviations based on the component standards and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE - These are deviations based on editorial comments or corrections.

DR - These are deviations based on the national regulatory requirements.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

National Differences

2DV.1 DC Modification to add the following to Clause 2 of the Part 2:

16 CFR Part 1500

Hazardous Substances and Articles; Administration and Enforcement Regulations

ANSI Z97.1

Safety Glazing Materials Used In Buildings – Safety Performance Specifications and Methods of Test

ASHRAE 15

Safety Standard for Refrigeration Systems

ASHRAE 34

Designation and Safety Classification of Refrigerants

ASTM B344

Standard Specification for Drawn or Rolled Nickel-Chromium and Nickel-Chromium-Iron Alloys for Electrical Heating Elements

ASTM E162

Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

CSA B52

Mechanical Refrigeration Code

CSA C22.2 No. 0.3

Test Methods for Electrical Wires and Cables

IEC 60695-11-20

Fire Hazard Testing – Part 11-20: Test Flames – 500 W Flame Test Method

UL 94

Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

UL 1441

Coated Electrical Sleeving

UL 1581

Electrical Wire, Cables, and Flexible Cords

UL 1694

Tests for Flammability of Small Polymeric Component Materials

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2DV.2 DC Modification to add the following to Clause 2 of the Part 2 (US only):

16 CFR Part 1750

Devices to Permit the Opening of Household Refrigerator Doors from the Inside

3.109DV DR Modification of Clause 3.109 of the Part 2 as follows:

Replace "ISO 5149" with "ASHRAE 34 or CSA B52".

3.111DV DR Modification of Clause 3.111 of the Part 2 as follows:

Replace "60 l" with "56,6 l (2 ft³)".

3.117DV DE Add the following definition to Clause 3 of the Part 2 as follows:

ACCESSORY: An optional electrical device, such as an INCORPORATED ICE-MAKER, intended for installation in or connection to a refrigerator for the purpose of modifying or supplementing the functions of the refrigerator. It can be factory installed or intended for installation by the user or service personnel.

3.118DV DE Add the following definition to Clause 3 of the Part 2 as follows:

ELECTRICAL CONNECTION: The physical interface between two points in a circuit such as spade terminals, pin terminals, micro switch contacts, relay contacts, timer contacts, crimped connections, and connections that are welded or soldered.

3.119DV DE Add the following definition to Clause 3 of the Part 2 as follows:

ICE DISPENSING SYSTEM: The parts of a refrigerator used in moving ice, including the motor, auger, ice bucket, ICE-MAKER (where a broken part could be dispensed), and mechanical parts used to move or modify ice.

5.7DV D1 Modification of Clause 5.7 of the Part 2 by replacing the second paragraph and three temperatures for the various climatic classes as follows:

For other appliances, tests specified in Clauses 10, 11, 13 and Clause 19.103 are carried out at an ambient temperature of 43 °C ± 1 °C (109,4 °F ± 1,8 °F).

6.1DV.1 D1 Modification to replace Clause 6.1DV.1 of the Part 1 with the following:

Class 0 and Class 0I appliances are not allowed.

6.101DV D2 Deletion of Clause 6.101 of the Part 2:

This clause of the Part 2 is not applicable.

7.1DV.1 D2 Modification of Clause 7.1 of the Part 2 as follows:

Delete the fourth dashed item of the first paragraph.

7.1DV.2 D2 Modification of Clause 7.1 of the Part 2 by adding the following (US only):

Appliances shall also be marked with the date of manufacture that will enable the product to be identified as being manufactured within a consecutive 3-month period. This information may be in code and shall be located on or near the nameplate. A date code marking shall be such that it does not repeat in less than 10 years.

7.1DV.3 D2 Modification of Clause 7.1 of the Part 2 by adding the following:

If a manufacturer produces appliances at more than one factory, each unit shall have a permanent distinctive marking to identify it as the product of a particular factory.

7.1DV.4 DR Modification of Clause 7.1 of the Part 2 by adding the following:

7.1DV.4.1 The following markings, or the equivalent, shall be provided and shall be permanent when a FLAMMABLE REFRIGERANT is used:

- a) "DANGER – Risk Of Fire Or Explosion. FLAMMABLE REFRIGERANT Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing." This marking shall be located on or near any EVAPORATORS that can be contacted by the user.
- b) "DANGER – Risk Of Fire Or Explosion. FLAMMABLE REFRIGERANT Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing." This marking shall be located near the machine compartment.
- c) "CAUTION – Risk Of Fire Or Explosion. FLAMMABLE REFRIGERANT Used. Consult Repair Manual/Owner's Guide Before Attempting To Service This Product. All Safety Precautions Must be Followed." This marking shall be located near the machine compartment.
- d) "CAUTION – Risk Of Fire Or Explosion. Dispose Of Properly In Accordance With The Applicable Federal Or Local Regulations. FLAMMABLE REFRIGERANT Used." This marking shall be located on the exterior of the refrigerator.
- e) "CAUTION – Risk Of Fire Or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. FLAMMABLE REFRIGERANT Used." This marking shall be located near all exposed refrigerant tubing.

NOTE Wherever the word "CAUTION" is required, it may be substituted with the word "WARNING."

7.1DV.4.2 In the US, the markings of Clause 7.1DV.4.1 shall be in letters no less than 6,4-mm (1/4-in) high.

7.1DV.4.3 In Canada, the markings of Clause 7.1DV.4.1 shall be in letters no less than 3,2-mm (1/8-in) high.

7.1DV.4.4 For COMPRESSION-TYPE APPLIANCES which use FLAMMABLE REFRIGERANTS, the refrigeration tubing or other devices through which the refrigerant is intended to be serviced shall be painted or colored red, Pantone® Matching System (PMS) No. 185. This color shall be present at all places where service puncturing or otherwise creating an opening in the refrigerant circuit might be expected. In the case of a process tube on a compressor, the color mark shall extend at least 2,5 cm (1 in) from the compressor.

7.1DV.5 DR *Modification of Clause 7.1 of the Part 2 by adding the following:*

Permanently connected equipment shall be marked with the individual electrical loads, the minimum circuit ampacity, and the maximum current rating of the supply circuit overcurrent protection. The minimum circuit ampacity is equal to 125% of the highest motor, heater, or compressor current rating plus the sum of all other current ratings of concurrent loads. The maximum overcurrent protection is equal to 225% of the highest motor or compressor current rating plus the sum of all other current ratings of concurrent loads.

7.1DV.6 D2 *Modification of Clause 7.1 of the Part 2 as follows:*

Replace the “symbol “Caution: risk of fire”” with “symbol ISO 7010 W021”

7.102DV D1 *Addition of Clauses 7.102DV.1 and 7.102DV.2 to the Part 2:*

7.102DV.1 A lock key shall be permanently marked with the word “CAUTION” and with the following or equivalent statement: “To Prevent A Child From Being Entrapped, Keep Out Of Reach Of Children And Not In The Vicinity Of Freezer (Or Refrigerator).”

7.102DV.2 A marking calling attention to the notice of Clause 7.102DV.1 shall be placed over the key slot of the lock or immediately adjacent to it. This marking may be removable.

7.103DV D1 *Addition of the following to the Part 2:*

A child entrapment warning statement shall be included in either the operating instructions or in a use and care manual provided with each refrigerator and shall include the following or equivalent wording:

DANGER: Risk of child entrapment. Before you throw away your old refrigerator or freezer:

* Take off the doors.

* Leave the shelves in place so that children may not easily climb inside.

7.104DV D2 *Addition of the following to the Part 2:*

The appliance shall be visibly marked for proper operating CLEARANCES. This marking is not required when the unit has been evaluated and tested with zero CLEARANCES.

10.103DV DR Addition of Clauses 10.103DV.1 and 10.103DV.2 to the Part 2:

10.103DV.1 For a cyclic ICE-MAKER, the marked current shall be based on the input current measured 5 min after the start of the third freezing cycle. With reference to the above, the harvest cycle of some types of ICE-MAKERS imposes a load that is greater than the load measured during the freezing cycle. The harvest cycle load need not be indicated on the nameplate of the ICE-MAKER if it:

- a) Does not exceed 125% of the nameplate rating;
- b) Does not occur more than twice an hour; and
- c) Is not more than 5 min in duration.

10.103DV.2 The harvest cycle shall not exceed the rating of the attachment plug on a cord-connected unit or the minimum circuit ampacity required for a permanently connected unit. For a non-cyclic ICE-MAKER, the marked current shall be based on the input current measured after 1 h of continuous operation.

11.1DV D2 Modification of Clause 11.1 of the Part 2 by adding the following after the last sentence:

Winding temperatures of motor compressors are not required to be measured when the case housing temperature (with a thermocouple at the most unfavorable location) does not exceed 150 °C (302 °F).

11.8DV D2 Modification of Clause 11.8 of the Part 2 by replacing the sixth paragraph with the following:

Temperature rises shall not exceed the values given in Table 3 of the Part 1 reduced by 7 K.

15.106DV D1 Addition of Clause 15.106DV.1 to the Part 2:

15.106DV.1 Component washing test

15.106DV.1.1 A lampholder, switch, or other electrical component shall be located so that leakage current resulting from cleaning in and around food storage compartments of a refrigerator does not exceed 0,5 mA.

15.106DV.1.2 The appliance shall be isolated from the earth ground circuit by disconnecting the PROTECTIVE EARTHING CONDUCTOR. The appliance shall be connected so that the component to be tested is on the ungrounded side of the supply. Control knobs, guards, panels, food storage components, and similar components that are located in the area shall be cleaned, and components that are removable without the use of TOOLS shall be removed. Lamps shall be left in place.

15.106DV.1.3 The refrigerator shall be energized as indicated in Clause 5 and with the refrigeration system not operating. The measurement circuit for leakage current shall be as shown in Clause 13 except that the leakage current is only measured at normal polarity. The meter used for measurement of leakage current shall have the characteristics defined in Clause 13. The meter shall be connected between a metal backing on a cellulose sponge and the grounded conductor of the power supply.

15.106DV.1.4 The sponge shall be 40 mm by 75 mm by 125 mm (1-5/8 by 3 by 5 in), capable of retaining from 75 g to 100 g (2,6 oz to 3,5 oz) of solution, and shall have a metal backing on one of the 75 mm by 125 mm (3 by 5 in) faces.

15.106DV.1.5 The sponge shall be saturated in a solution consisting of 10 ml (2 Tbsp) of sodium bicarbonate and 4,5 g (0,16 oz) of chip soap, in 0,95 L (1 qt) of water at 25 °C (77 °F).

15.106DV.1.6 The saturated sponge shall be wiped six times with a pressure of 8,9 N to 13,4 N (2 to 3 lbf) applied to the metal-backed side, over the exposed mounting surfaces, including any operating devices of the electrical components. The sponge shall be resaturated in the test cleaning solution after the third wipe.

15.106DV.1.7 The test shall be conducted with manually-operable switch contacts, integral to the refrigerator, in the open and closed positions. An equal number of wipes shall be applied at each position of the switch or control such that the total is six (three wipes at each position for a 2-position switch; two wipes at each position for a 3-position switch).

15.107DV D1 *Addition of Clause 15.107DV.1 to the Part 2:*

15.107DV.1 Overflow test

15.107DV.1.1 Condensate disposal means, such as a pan, trough, or the like, shall be constructed and located so that overflow will not wet uninsulated LIVE PARTS or result in a reduction of CLEARANCES and CREEPAGE DISTANCES.

15.107DV.1.2 With reference to Clause 15.107DV.1.1, compliance is checked by the following test. The condensate disposal means, such as a pan, trough, or the like, shall be overflowed at a rate of 30 ml/s for a minimum of 30 s.

15.107DV.1.3 Immediately after the test in Clause 15.107DV.1.2, the appliance shall withstand the electric strength test of Clause 16.3, and inspection shall show that there is no trace of water on insulation which could result in a reduction of CLEARANCES and CREEPAGE DISTANCES below the values specified in Clause 29.

15.107DV.1.4 For appliances which are directly connected to the water supply, a blocked drain shall not result in the wetting of uninsulated LIVE PARTS or in a reduction of CLEARANCES and CREEPAGE DISTANCES.

15.107DV.1.5 With reference to Clause 15.107DV.1.4, compliance is checked by the following test. The drain shall be blocked and be overflowed at a rate of 30 ml/s (1,0 oz/s) for a minimum of 30 s.

15.107DV.1.6 Immediately after the test in Clause 15.107DV.1.5, the appliance shall withstand the electric strength test of Clause 16.3, and inspection shall show that there is no trace of water on insulation which could result in a reduction of CLEARANCES and CREEPAGE DISTANCES below the values specified in Clause 29.

15.107DV.1.7 For appliances which are directly connected to the water supply, any leakage from a water line connection shall not result in the wetting of uninsulated LIVE PARTS or in a reduction of CLEARANCES and CREEPAGE DISTANCES.

15.107DV.1.8 With reference to Clause 15.107DV.1.7, compliance is checked by the following test. The water line connections shall be fully and/or partially disconnected such that the leakage is directed toward electrical components. Flow water through the water tubing for a minimum of 5 min. Water pressure shall be maintained at a gauge pressure of 275 kPa – 415 kPa (40 psi – 60 psi).

15.107DV.1.9 Immediately after the test in Clause 15.107DV.1.8, the appliance shall withstand the electric strength test of Clause 16.3, and inspection shall show that there is no trace of water on insulation which could result in a reduction of CLEARANCES and CREEPAGE DISTANCES below the values specified in Clause 29.

20.2DV.1 D1 *Modification of Clause 20.2 of the Part 1 to add the following after the first paragraph:*

Clause 101.DVA.1 of Annex 101.DVA shall be applied for assessment of mechanical hazards.

20.2DV.2 D1 *Modification of Clause 20.2 of the Part 1 to add the following after the fourth paragraph:*

For openings with a minor dimension equal to or greater than 34,9 mm (1-3/8 in), compliance shall be checked by inspection and by applying the test probes of Annex 101.DVA with a force of 11,1 N (2,5 lb). The probes shall be rotated or angled to any possible position before, during, or after insertion through the opening, and if necessary, the probe configuration shall be changed after the probe has been inserted through the opening.

20.101DV D1 *Modification of Clauses 20.101 – 20.104 by replacing them with Clauses 20.101DV.1 and 20.101DV.2:*

20.101DV.1 A refrigerator shall be stable when tested in accordance with Clause 20.101DV.2. This requirement does not apply to BUILT-IN APPLIANCES and refrigerators where both the width and depth dimensions of the supporting base are greater than the height of the refrigerator.

20.101DV.2 The refrigerator shall be supported by the legs, leveling screws, rollers, or the like, provided in the base of the unit, and installed in accordance with the manufacturer's instructions. Plumbing or conduit connections shall not be relied on for the purpose of the test. The refrigerator shall not overturn under the conditions specified in items (a) and (b):

a) An empty refrigerator, with doors, covers, and panels closed, shall be placed on a plane surface inclined at an angle of 10° from the horizontal. Accessories that are intended for use with the refrigerator shall be installed. Swivel-type casters, if any, shall be oriented so that the tendency to overturn is maximum. The refrigerator shall be restrained if necessary to prevent it from sliding or rolling. Or an empty refrigerator, with accessories installed, that has a mass of 22,7 kg (50 lbs) or more shall be placed on a horizontal surface. If leveling screws are provided, they shall be adjusted equally to raise the refrigerator to the maximum adjustable level, but not more than 25,4 mm (1 in) above floor level. The refrigerator shall be restrained, if necessary, to prevent it from sliding or rolling. The refrigerator shall be loaded with one-third of the total food-storage load determined in accordance with Clause 21.103DV.1.6. This load shall be distributed over each food-supporting component and located approximately at the center of the component. If swivel-type casters are provided, they shall be oriented so that the tendency to overturn is maximum. All doors shall be closed. A force equal to one-fifth the weight of the empty refrigerator, but not more than 222,5 N (50 lbf) shall be applied horizontally at the vertical centerline of any side of the refrigerator at the highest point, not to exceed 1,5 m (5 ft) above floor level; and

b) An empty refrigerator, with accessories installed, that has a mass of 22,7 kg (50 lbs) or more shall be placed on a horizontal surface. If leveling screws are provided, they shall be adjusted equally to raise the refrigerator to the maximum adjustable level, but not more than 25,4 mm (1 in) above floor level. The refrigerator shall be restrained, if necessary, to prevent it from sliding or rolling. The refrigerator shall be loaded with one-third of the total food-storage load determined in accordance with Clause 21.103DV.1.6. This load shall be distributed over each food-supporting component and located approximately at the center of the component. If swivel-type casters are provided, they shall be oriented so that the tendency to overturn is maximum. A force equal to one-fifth the weight of the empty refrigerator, but not more than 222,5 N (50 lbf), shall be applied vertically downward at the edge of the widest exterior door farthest from the hinges, with the door opened at an angle of 90° to the cabinet. All other doors shall be closed. Shelves, drawers, and other food storage components shall be in their normal storage position. This test shall not be conducted on chest-type units.

20.105DV D1 *Addition of the following to the Part 2:*

Ice dispensers shall be designed and constructed such that in normal use pieces are not broken off and dispensed along with the ice. Compliance shall be checked by the tests of Annex 101.DVB.

20.106DV D1 *Addition of the following to the Part 2:*

Horizontally-hinged doors that provide access to the food storage compartment(s) of chest-type units shall be counterweighted, spring loaded, or provided with an automatic latch to retain them in the open position. Action members, such as springs and latches, shall be enclosed or guarded.

20.107DV D1 Addition of the following to the Part 2:

The hinges of a horizontally swinging exterior refrigerator door shall not separate from the cabinet or door when tested in accordance with Annex 101.DVC.

21.1DV.2.1 D1 Modification of Clause 21.1DV.2 of the Part 1 by adding the following:

The impact energy shall be 6,8 J (5 ft-lbf) for enclosures of uninsulated LIVE PARTS that are not protected within the confines of the refrigerator.

21.1DV.2.2 D1 Modification of Clause 21.1DV.2 of the Part 1 by adding the following:

For nonmetallic enclosures used within a freezer compartment, samples shall be subjected to a temperature of minus 18 °C ± 1,4 °C (0 ± 2,5 °F) for a period of 3 h and impacted while still cold.

21.103DV D1 Addition of Clause 21.103DV.1 to the Part 2:**21.103DV.1 Shelf and drawer impact and static load**

21.103DV.1.1 A food storage component shall remain in position and comply with Clause 21.103DV.1.5 after being subjected to three impacts from a spherical shaped bag filled with No. 9 to No. 6 (2 – 2,8 mm diameter) lead or steel shot dropped in the center of the component under the following conditions:

- a) The release from a height of 101,6 mm (4 in) as measured from the bottom of a bag containing lead or steel shot equal to one-half the mass of the test load specified by Clause 21.103DV.1.6 and not exceeding 10 kg (22 lbs); or
- b) When the maximum loading height of the component is less than 254 mm (10 in), the bag of lead or steel shot shall be released from a height equal to the maximum loading height minus 152,4 mm (6 in).

21.103DV.1.2 This requirement does not apply to refrigerators having a storage capacity of 60 l (2,1 ft³) or less.

21.103DV.1.3 This requirement does not apply to food storage components in chest-type units.

21.103DV.1.4 This requirement does not apply to a cover that forms a shelf over a drawer, or a drawer that has a CLEARANCE of 50,8 mm (2 in) or less from a compartment bottom below it.

21.103DV.1.5 A food storage compartment shall remain in position and retain the test load described in Clause 21.103DV.1.6 applied for 1 h.