



UL 60335-2-24

Underwriters Laboratories Inc.

Standard for Safety

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



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UL Standard for Safety for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, UL 60335-2-24

First Edition, Dated August 21, 2006

Summary of Topics

This revision of ANSI/UL 60335-2-24 is being issued to reaffirm approval as an American National Standard. No changes in requirements are involved.

As noted in the Commitment for Amendments statement located on the back side of the title page, UL, CSA, and ANCE are committed to updating this harmonized standard jointly. However, the revision pages dated August 1, 2011 will not be jointly issued by UL, CSA, and ANCE as these revision pages only address UL ANSI approval dates.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

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The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the preface. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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Association of Standardization and Certification
NMX-J-521/2-24-ANCE-2006
Third Edition



Canadian Standards Association
CAN/CSA C22.2 No. 60335-2-24-06
First Edition
(IEC 60335-2-24:2002, MOD)



Underwriters Laboratories Inc.
UL 60335-2-24
First Edition

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

August 21, 2006

This standard is based on IEC 60335-2-24, Sixth Edition.

(Title Page Reprinted: August 1, 2011)



ANSI/UL 60335-2-24-2006 (R2011)

Approved
by
Standards Council
of Canada



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Commitment for Amendments

This Standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (CSA), and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA, or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA, and UL. CSA and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA and UL pages.

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Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

The most recent designation of ANSI/UL 60335-2-24 as a Reaffirmed American National Standard (ANS) occurred on August 1, 2011. The ANSI approval for this standard does not include the Cover Page, Transmittal Pages, Title Page (front and back) or the Preface. The National Difference Page and the IEC Foreword are also excluded from ANSI approval of IEC based standards.

This ANSI/UL Standard for Safety consists of the First Edition is under continuous maintenance, whereby each revision is ANSI approved upon publication. Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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Preface

This is the common ANCE, CSA, and UL standard for particular requirements for refrigerating appliances, ice-cream appliances and ice makers. It is the third edition of NMX-J-521/2-24-ANCE, the first edition of CAN/CSA C22.2 No. 60335-2-24, and the first edition of UL 60335-2-24. It was developed in part from the fourth edition of *Household Refrigerators and Freezers*, CSA C22.2 No. 63-93, the tenth edition of the Standard for *Household Refrigerators and Freezers*, UL 250, and the latest edition of *Safety of Household and Similar Electrical Appliances – Part 2-24: Particular Requirements for Refrigerators, Freezers and Ice-makers*, NMX-J-521/2-24-ANCE. This ANCE edition supersedes the edition published in 2001. This CSA edition supersedes CAN/CSA-E335-2-24-94, *Safety of Household and Similar Electrical Appliances – Part 2: Particular Requirements for Refrigerators, Food-Freezers and Ice-makers*. This Standard is based on the sixth edition of the Standard for *Safety of Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice Makers*, IEC 60335-2-24. At the time of this publication, IEC 60335-2-24:2002 (Edition 6) is available from IEC in English only. CSA will publish the French version when it becomes available from IEC.

This common Standard was prepared by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (CSA), and Underwriters Laboratories Inc. (UL). The efforts and support of the appliance manufacturing industry are gratefully acknowledged.

The present Mexican Standard was developed by the Mexican TC 61 “Safety of household and similar electrical appliances” belonging to CONANCE (ANCE’s Standardization Committee) with the contribution of household appliances manufacturers and users. This Standard was reviewed by the CSA Subcommittee on Household Refrigerators and Freezers, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA/Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This Standard was also reviewed and approved by UL’s Standards Technical Panel for Household Refrigerators and Freezers, STP 250.

This Standard has been approved as a National Standard of Canada by the Standards Council of Canada (SCC) and approved by the American National Standards Institute (ANSI) for publication as an American National Standard.

NOTE – Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

Level of Harmonization

This standard adopts the IEC text with national differences. This standard is published as an equivalent standard for ANCE, CSA and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows:

- a) Technical national differences are allowed for national differences resulting from conflicts in codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate.
- b) Presentation is word for word except for editorial changes that do not alter the technical content of the standard. Examples of editorial changes include:

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- 1) different font sizes, figure sizes, and table sizes;
- 2) minor variations in format, such as indentation and pagination;
- 3) font appearance (including the use of italic or bold text or uppercase or lowercase letters);
- 4) the use of a symbol (e.g., A or %) rather than the word (Ampere or percent), or the word rather than the symbol;
- 5) inclusion of inch-pound units for informational purposes;
- 6) corrections of misprints or typographical errors;
- 7) bilingual column headings or figure captions on a common table or figure in a bilingual edition;
- 8) change from first-angle to third-angle drawing;
- 9) addition of a statement: "This is a first-angle drawing"; and
- 10) substitution of a point (.) for a comma (,) as the decimal marker.

Differences from the IEC are being added in order to address regulatory and safety situations present in the U.S., Canada, and Mexico.

ANCE Effective Date

The effective date for ANCE will be announced through the Diario Oficial de la Federación (Official Gazette) and is indicated in the cover page.

CSA Effective Date

The effective date for CSA International will be announced through CSA Informs or a CSA Certification Notice.

UL Effective Date

As of August 21, 2016, all products Listed or Recognized by UL must comply with the requirements in this Standard.

Between August 21, 2006 and August 21, 2016, new product submittals to UL may be evaluated under all requirements in this Standard or, if requested in writing, evaluated under presently effective requirements only.

The presently effective requirements are contained in the tenth edition of UL 250.

An effective date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved Standard.

NATIONAL DIFFERENCES

In the ANCE, CSA and UL publications of this standard, National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-24, Safety Requirements for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers copyright 2006 are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences based on **safety practices**. These are differences 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 National Differences 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 National Differences based on **editorial comments or corrections**.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on Voting
61C/213/FDIS	61C/216/RVD

Full information on the voting for the approval of this standard can be found in the report of voting indicated in the above table.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-2-24 and its amendments. It was established on the basis of the sixth edition of that standard.

See 1.101DV.

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.

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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 in this standard, the following print types are used:

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

A bilingual version of this publication may be issued at a later date.

DV.1 DE Add the following after the last item in the second note:

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

INTRODUCTION

This part 1 specifies the safety requirements that are generally applicable to all equipment within its scope. For certain types of equipment, these requirements will be supplemented or modified by the special requirements of one, or more than one, particular part 2 of the standard which must be read in conjunction with the part 1 requirements.

SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES

– Part 2: Particular requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

1 Scope

This clause of part 1 is replaced by the following:

This International Standard deals with the safety of the following appliances, their RATED VOLTAGE being not more than 250 V for single-phase appliances, 480 V for other appliances and 24 V d.c. for appliances when battery operated:

- a) REFRIGERATING APPLIANCES for household and similar use;
- b) ICE-MAKERS incorporating a motor-compressor and ice-makers intended to be incorporated in frozen food storage compartments;
- c) REFRIGERATING APPLIANCES and ICE-MAKERS for use in camping, touring caravans and boats for leisure purposes.

These appliances may be operated from the mains, from a separate battery or operated either from the mains or from a separate battery.

This standard also deals with the safety of ICE-CREAM APPLIANCES intended for household use, their RATED VOLTAGE being not more than 250 V for single-phase appliances and 480 V for other appliances.

It also deals with COMPRESSION-TYPE APPLIANCES for household and similar use, which use FLAMMABLE REFRIGERANTS.

This standard does not cover features of the construction and operation of those REFRIGERATING APPLIANCES which are dealt with in ISO standards.

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 which are encountered by all persons in and around the home. However, in general, it does not take into account

- a) the use of appliances by young children or infirm persons without supervision;
- b) playing with the appliance by young children.

NOTE 1 Attention is drawn to the fact that

– 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, the national authorities responsible for transportation.

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NOTE 2 This standard does not apply to

- appliances intended to be used in the open air;
- appliances designed 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);
- appliances incorporating a battery intended as a power supply for the refrigeration function;
- appliances assembled on site by the installer;
- appliances with remote motor-compressors;
- motor-compressors (IEC 60335-2-34);
- commercial dispensing appliances and vending appliances (IEC 60335-2-75);
- commercial ice-cream appliances.

1DV.1 D1 Modification – National Difference in the U.S. Add the following text after “playing with the appliance by young children”:

The articulate probe of figure 12DV of UL 60335-1 shall replace test probe B of IEC 61032 when the product is:

- a) A hand-held product;
- b) A hand-held part of a product;
- c) Used by children;
- d) Accessible to children while the product is operating; or
- e) One that has special concerns for the accessibility of live parts or mechanical hazards.

1DV.2 D1 Modification – National Difference in the U.S. Add the following below note 1:

This standard is applicable to household and similar electrical appliances and equipment which are designed to be installed in accordance with the National Electrical Code (NEC), ANSI/NFPA 70. Annex DVD of Part 1 provides examples of and references for regulatory requirements that may apply to appliances.

1.101DV D1 Addition – National Difference in Canada, Mexico, and the U.S.:

This part 2 is to be used in conjunction with the latest applicable country's edition of 60335-1 and its amendments. It was established on the basis of:

- a) The fourth edition of IEC 60335-1;
- b) The sixth edition of IEC 60335-2-24;

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- c) The fourth edition of UL 60335-1;
- d) The latest edition of NMX-J-521/1-ANCE; and
- e) CAN/CSA E60335-1/4E

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60079 (all parts),
Electrical apparatus for explosive gas atmospheres

IEC 60079-4A,
Electrical apparatus for explosive gas atmospheres – Part 4: Method of test for ignition temperature – First supplement

IEC 60079-15:1987¹⁾,
Electrical apparatus for explosive gas atmospheres – Part 15: Electrical apparatus with type of protection “n”

IEC 60079-20:1996,
Electrical apparatus for explosive gas atmospheres – Part 20: Data for flammable gases and vapours, relating to the use of electrical apparatus

IEC 60335-2-34,
Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors

ISO 817:1974,
Organic refrigerants – Number designation

ISO 3864:1984,
Safety colours and safety signs

ISO 5149:1993,
Mechanical refrigerating systems used for cooling and heating – Safety requirements

¹⁾IEC/TR 60079-15, Ed. 1 (1987) has been superseded by a second edition, IEC 60079-15 (2001), which no longer corresponds to the references to the first edition cited here. It is foreseen that a future edition of IEC 60335-2-24 will make reference to the edition of IEC 60079-15 then current.

2DV D1 Addition – National Difference in Canada, Mexico, and the U.S.:

ANSI/ASHRAE 15,
Safety Code for Mechanical Refrigeration

ANSI Z97.1:1984,
Safety Performance Specifications and Methods of Test for Glazing Materials Used in Buildings

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**ASTM E681:1998,
Standard Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)**

**CSA B52-05,
Mechanical Refrigeration Code**

**CSA C22.2 No. 0.3-01,
Test Methods for Electrical Wires and Cables**

**CSA C22.2 No. 0.15-01,
Adhesive Labels**

**CAN/CSA C22.2 No. 0.17-00,
Evaluation of Properties of Polymeric Materials**

**CSA C22.2 No. 140.3-M1987 (R1999),
Refrigerant Containing Components for Use in Electrical Equipment**

**CSA C22.2 No. 213-M1987 (R1999),
Non-Incendive Electrical Equipment for Use in Class 1, Division 2 Hazardous Locations**

**NMX-J-521/2-24 ANCE,
Safety of Household and Similar Electrical Appliances, Part 2-24, Particular Requirements for Refrigerators, Freezers, Ice Makers and Ice Cream Makers**

**NMX-J-521/2-34-ANCE,
Safety of Household and Similar Electrical Appliances, Part 2-34, Particular Requirements for Motorcompressors**

**Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances,
UL 94**

**Standard for Refrigerant-Containing Components,
UL 207**

**Standard for Test for Surface Burning Characteristics of Building Materials,
UL 723**

**Standard for Short Term Property Evaluations of Polymeric Materials,
UL 746A**

**Standard for Polymeric Material, Use in Electrical Equipment Evaluations,
UL 746C**

**Standard for Marking and Labelling Systems,
UL 969**

**Standard for Electrical Wires, Cables, and Flexible Cords,
UL 1581**

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**Standard for Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations,
UL 1604**

2.101DV DC Addition – National Difference in Canada, Mexico, and the U.S.:

Where reference is made to ANCE, CSA, or UL Standards, such reference shall be considered to refer to the latest edition and all amendments published to that edition up to the time when this Standard was approved.

3 Definitions

This clause of part 1 is applicable except as follows:

3.1.9 Replacement:

NORMAL OPERATION: Operation of the appliance under the following conditions:

3.2.9.101 NORMAL OPERATION OF A REFRIGERATING APPLIANCE: Operation at an ambient temperature in accordance with 5.7, empty, with the doors and lids closed. User-adjustable temperature control devices which control the operation of the motor-compressor in COMPRESSION TYPE APPLIANCES, are short-circuited or otherwise rendered inoperative.

3.2.9.102 NORMAL OPERATION OF AN ICE MAKER: Operation at an ambient temperature in accordance with 5.7, with the supply water at a temperature of $15^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

3.2.9.102DV D2 Modification – National Difference in Mexico:

Replace " $15^{\circ}\text{C} \pm 2^{\circ}\text{C}$ " with " $15^{\circ}\text{C} \pm 5^{\circ}\text{C}$."

3.2.9.103 NORMAL OPERATION OF AN INCORPORATED ICE-MAKERS: Operation at the normal temperature of the frozen food storage compartment, with the supply water at a temperature of $15^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

3.2.9.103DV D2 Modification – National Difference in Mexico:

Replace " $15^{\circ}\text{C} \pm 2^{\circ}\text{C}$ " with " $15^{\circ}\text{C} \pm 5^{\circ}\text{C}$."

3.2.9.104 NORMAL OPERATION OF AN ICE-CREAM APPLIANCE: Operation of the appliance using the maximum quantity of the mixture of ingredients indicated in the instructions; the mixture used being that which gives the most unfavourable results, the mixture being at an initial temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

3.101 REFRIGERATING APPLIANCE: Enclosed thermally insulated appliance of suitable volume for household use, cooled by an incorporated device and having one or more compartments intended for the preservation of foodstuffs.

3.102 COMPRESSION-TYPE APPLIANCE: Appliance in which refrigeration is effected by the vaporization at low pressure in a heat exchanger (EVAPORATOR) of a liquid refrigerant, the vapour thus formed being restored to the liquid state by mechanical compression at a higher pressure and subsequent cooling in another heat exchanger (CONDENSER).

3.103 ICE-MAKER: Appliance in which ice is made by freezing water by a device consuming electrical energy and having a compartment for storing the ice.

3.104 INCORPORATED ICE-MAKER: ICE-MAKER especially designed to be incorporated into a frozen food storage compartment and without independent means for freezing water.

3.105 HEATING SYSTEM: Heating element with associated components such as timers, switches, THERMOSTATS and other controls.

3.106 ABSORPTION-TYPE APPLIANCE: Appliance in which refrigeration is effected by the evaporation in a heat exchanger (EVAPORATOR) of a liquid refrigerant, in the liquid state, the resulting vapour being then absorbed by an absorbent medium from which it is subsequently expelled at a higher partial vapour pressure by heating and liquefied by cooling in another heat exchanger (CONDENSER).

3.107 CONDENSER: Heat exchanger in which, after compression, vaporized refrigerant is liquefied by losing heat to an external cooling medium.

3.108 EVAPORATOR: Heat exchanger in which, after pressure reduction, the liquid refrigerant is vaporized by absorbing heat from the medium to be refrigerated.

3.109 FLAMMABLE REFRIGERANT: Refrigerant with a flammability classification of group 2 or 3 according to ISO 5149.

NOTE – For refrigerant blends which have more than one flammability classification, the most unfavourable classification is taken for the purpose of this definition.

3.109DV DR Modification – National Difference in Mexico, Canada and the U.S.:

For Canada and the U.S. replace “ISO 5149” with “ASHRAE 34 or CSA B52” and for Mexico replace “ISO 5149” with “Annex 24.DVD.”

3.110 ICE-CREAM APPLIANCE: COMPRESSION TYPE APPLIANCE which is used to make ice-cream.

3.111 FREE SPACE: Space with a volume exceeding 60 l where a child can be entrapped and which is accessible after opening any door, lid or drawer and removing any DETACHABLE INTERNAL PART, including shelves, containers or removable drawers which are themselves only accessible after opening any door or lid. In calculating the volume, a space with any single dimension not exceeding 150 mm or any two orthogonal dimensions, each of which do not exceed 200 mm, is ignored.

4 General Requirement

This clause of Part 1 is applicable except as follows.

Addition:

NOTE 101 The use of FLAMMABLE REFRIGERANTS involves additional hazards which are not associated with appliances using non-FLAMMABLE REFRIGERANTS.

This standard addresses the hazards due to ignition of leaked FLAMMABLE REFRIGERANT by potential ignition sources associated with the appliance.

The hazard due to ignition of leaked FLAMMABLE REFRIGERANT by an external potential ignition source associated with the environment in which the appliance is installed is compensated by the low probability of ignition.

5 General Conditions for the Tests

This clause of Part 1 is applicable except as follows.

5.2 Addition:

At least one additional specially prepared sample is required for the tests of 22.107.

NOTE 101 – Unless the motor-compressor conforms to IEC 60335-2-34, at least one additional specialty prepared sample may be required for the test of 19.1.

NOTE 102 – At least one additional sample of the fan motor and its thermal motor protector may be required for the test of 19.1.

NOTE 103 – The test of 22.7 may be carried out on separate samples.

NOTE 104 – Due to the potentially hazardous nature of the tests of 22.107, 22.108, and 22.109, special precautions may need to be taken when performing the tests.

5.3 Addition:

Before starting the tests

– ICE-CREAM APPLIANCES are operated empty at RATED VOLTAGE for 1 h, or the maximum setting of an incorporated timer, whichever is shorter;

– other COMPRESSION-TYPE APPLIANCES shall be operated at RATED VOLTAGE for at least 24 h, then switched off and left to stand for at least 12 h.

The test of 11.102 is carried out immediately after the tests of Clause 13.

The test of 15.105 is carried out immediately after the test of 11.102.

The tests of 15.102, 15.103 and 15.104 are carried out immediately after the test of 15.2.

5.4 Replacement:

Tests are carried out using each source of energy (electricity, gas, or other fuel) in turn. Gas appliances are supplied at the appropriate rated pressure.

Tests are additionally carried out with all combinations of energy sources supplied simultaneously unless this is prevented by interlocking devices.

5.7 Addition:

For ICE-CREAM APPLIANCES, tests specified in Clauses 10, 11 and 13 are carried out at an ambient temperature of $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

For other appliances tests specified in Clauses 10, 11, 13 and subclause 19.103 are carried out at an ambient temperature of

$32^{\circ}\text{C} \pm 1^{\circ}\text{C}$ on appliances of extended temperate (SN) and temperate (N) classes;

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38°C ±1°C on appliances of subtropical (ST) class;

43°C ±1°C on appliances of tropical (T) class.

Before starting these tests, the appliance with the doors or lids open is brought to within 2 K of the ambient temperature specified.

Appliances classified for several climatic classes are tested at the ambient temperature relevant to the highest climatic class.

Other tests are carried out at an ambient temperature of 20°C ±5°C.

NOTE 101 Steady conditions are considered to be established when three successive readings of the temperature, taken at approximately 60 min intervals, at the same point of any operating cycle, do not differ by more than 1 K.

5.7DV D2 Modification – National Difference in Canada, Mexico, and the U.S.:

Revise NOTE 101 to state that the readings may be “taken at the same point of any operating cycle.”

5.8.1 Addition:

Appliances which can be battery operated are tested at the more unfavourable polarity when the supply terminals or terminations for the connection of the battery have no indications for polarity.

5.9 Addition:

Appliances incorporating an ICE-MAKER are tested with the ICE-MAKER operating to give the most unfavourable results.

5.10 Addition:

For the tests of 22.107, 22.108 and 22.109, the appliance is empty and installed as outlined below:

BUILT-IN APPLIANCES are installed in accordance with the instructions for installation.

Other appliances are placed in a test enclosure, the walls enclosing the appliance as near to all its sides and the top of the appliance as possible, unless the manufacturer indicates in the instructions for installation that a free distance shall be observed from the walls or the ceiling, in which case this distance is observed during the test.

NOTE 101 Commonly available fixing hardware, such as screws and bolts, need not be delivered with a fixed appliance.

5.101 Appliances which are constructed so that an ICE-MAKER may be incorporated are tested with the intended ICE-MAKER.

5.102 COMPRESSION-TYPE APPLIANCES with HEATING-SYSTEMS and Peltier-type appliances are tested as COMBINED APPLIANCES.

5.103 COMPRESSION-TYPE APPLIANCES which use FLAMMABLE REFRIGERANTS and which, according to the instructions, may be used with other electrical appliances inside a food storage compartment are tested with such recommended appliances incorporated and being operated as in normal use.

NOTE – Examples of such electrical appliances are ice-cream makers and deodorizers.

6 Classification

This clause of part 1 is applicable except as follows:

6.1DV D1 Modification – National Difference in Canada, Mexico, and the U.S.:

6.1DV.1 In Canada and the U.S., Class 0 and Class 01 appliances do not apply.

6.1DV.2 In Mexico, Class 0 appliances do not apply.

6.101 Appliances, other than ICE-CREAM APPLIANCES, shall be of one or more of the following climatic classes:

- appliances of extended temperate class (SN);
- appliances of temperate class (N);
- appliances of subtropical class (ST);
- appliances of tropical class (T).

Compliance is checked by inspection.

NOTE – The climatic classes are specified in ISO standards.

6.101DV D2 Modification – National Difference in Canada and the U.S.:

Appliances shall be of tropical Class (T).

7 Marking and Instructions

This clause of part 1 is applicable except as follows:

7.1 Modification:

Appliances shall also be marked with:

- the power input, in watts, of HEATING SYSTEMS, if greater than 100 W;
- the defrosting input, in watts, if greater than the input corresponding to the RATED POWER INPUT;
- RATED POWER INPUT in watts or RATED CURRENT in amperes, except that COMPRESSION-TYPE APPLIANCES, other than ICE-CREAM APPLIANCES, shall be marked only with the RATED CURRENT in amperes;
- the maximum rated wattage of lamps, in watts;

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– the total mass of the refrigerant;

NOTE 101 For ABSORPTION-TYPE APPLIANCES using ammonia, the total mass of the refrigerant is considered to be the mass of ammonia used.

– for a single component refrigerant, at least one of the following:

- the chemical name;
- the chemical formula;
- the refrigerant number;

– for a blended refrigerant, at least one of the following:

- the chemical name and nominal proportion of each of the components;
- the chemical formula and nominal proportion of each of the components;
- the refrigerant number and nominal proportion of each of the components
- the refrigerant number of the refrigerant blend.
- the chemical name or refrigerant number of the principal component of the insulation blowing gas.

NOTE 102 Refrigerant numbers are given in ISO 817.

For COMPRESSION-TYPE APPLIANCES, the defrosting power input in watts shall be marked separately if the current corresponding to the defrosting power input is greater than the RATED CURRENT of the appliance.

Appliances which can be mains and battery operated shall be marked with the battery voltage.

Appliances which can be battery operated shall be marked with the type of battery, distinguishing between rechargeable and non-rechargeable batteries, if necessary, unless the type is irrelevant for the operation of the appliance.

The means provided for connection of any additional electrical supply shall be marked with the voltage and nature of the supply.

Appliances designed for incorporating an ICE-MAKER shall be marked with the maximum power input for an INCORPORATED ICE-MAKER, if greater than 100 W.

ICE-MAKERS without automatic water level control shall be marked with the maximum permissible water level.

Appliances shall be marked with details of the source of supply other than electrical, if any.

For COMPRESSION-TYPE REFRIGERATING SYSTEMS, the appliance shall also be marked with the mass of the refrigerant for each separate refrigerant circuit.

COMPRESSION-TYPE APPLIANCES which use FLAMMABLE REFRIGERANTS shall be marked with warning sign B.3.2 from ISO 3864.

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7.1DV D2 Modification – National Difference in Canada, Mexico, and the U.S.:

7.1DV.1 Refrigerators shall be marked with the manufacturing date identification for 3-consecutive month period and year. This information shall not repeat in less than 10 years and when coded shall appear on the serial plate.

NOTE – 7.1DV.1 applies to the U.S. only.

7.1DV.2 An electrical accessory intended for field installation in or on a refrigerator shall be permanently marked with the name or identifying symbol of the manufacturer or private labeler, and with a catalog number or equivalent designation. The identification shall be on the accessory or the carton in which it is shipped. The associated refrigerator shall be marked to indicate the catalog number or equivalent designation of such an accessory and the name of the manufacturer or private labeler of that accessory when other than the refrigerator manufacturer.

7.1DV.3 Climate class markings (SN), (N), (ST), and (T) are not required.

7.1DV.4 Instructions for installing accessories shall be provided on or with each accessory. A statement shall be included in the instructions warning the installer that the refrigerator must be disconnected from the source of electrical supply before attempting the installation and that the accessory is intended for use only with a refrigerator that is marked to indicate such use.

7.1DV.5 When the accessory is designed to be installed by means of receptacles and plug-in connectors that have been investigated to make and break circuits under load, and when such connection or disconnection does not result in exposure of uninsulated live parts, the statement that the appliance must be disconnected from the source of electrical supply is not required to be employed.

7.1DV.6 Refrigerators shall have a permanent distinctive marking to identify it as the product of a particular factory.

NOTE – 7.1DV.6 applies to the U.S. only.

7.1DV.7 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.”
- b) “DANGER – Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.”
- 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.”
- d) “CAUTION – Risk Of Fire Or Explosion. Dispose Of Properly In Accordance With The Applicable Federal Or Local Regulations. Flammable Refrigerant Used.”

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e) **“CAUTION – Risk Of Fire Or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.”**

NOTE – 7.1DV.7 applies to the U.S. and Canada only.

7.1DV.8 The marking described in item (a) shall be provided on or near any evaporators that can be contacted by the consumer. The markings described in items (b) and (c) shall be provided near the machine compartment.

NOTE – 7.1DV.8 applies to the U.S. and Canada only.

7.1DV.9 The marking described in item (d) shall be provided on the exterior of the refrigerator. The marking described in item (e) shall be provided near any and all exposed refrigerant tubing.

NOTE – 7.1DV.9 applies to the U.S. and Canada only.

7.1DV.10 The markings shall be in letters no less than 3,2 mm (1/8 inch) high.

NOTE – 7.1DV.10 applies to the U.S. and Canada only.

7.1DV.11 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 percent 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 percent of the highest motor or compressor current rating plus the sum of all other current ratings of concurrent loads.

NOTE – Wherever the word “CAUTION” is required, it may be substituted with the word “WARNING.”

7.1DV.12 The warning sign B.3.2, from ISO 3864 shall be replaced by the sign in Annex 24.DVB.

7.6 Addition:

The perpendicular height of the triangle containing the warning sign B.3.2 from ISO 3864 shall be at least 15 mm.

7.6DV D2 Modification – National Difference in Canada, Mexico, and the U.S.:

The warning sign B.3.2, from ISO 3864 shall be replaced by the sign in Annex 24.DVB.

7.10 Addition:

NOTE 101 As an alternative, temperature values in degrees Celsius may be indicated on a control scale.

7.12 Addition:

The instructions for REFRIGERATING APPLIANCES and ICE-MAKERS for camping or similar use shall include the substance of the following:

- suitable for camping use;
- the appliance may be connected to more than one source of energy;

NOTE 101 This item is not applicable to appliances which are intended to be supplied by electricity only.

- the appliance shall not be exposed to rain

NOTE 102 This item is not applicable to appliances with a degree of protection against harmful ingress of water of at least IPX4.

The instructions for ICE-MAKERS not intended to be connected to the water supply shall state the substance of the following warning:

WARNING – fill with potable water only.

For COMPRESSION-TYPE APPLIANCES which use FLAMMABLE REFRIGERANTS, the instructions shall include information pertaining to the installation, handling, servicing and disposal of the appliance.

The instructions shall also include the substance of the warnings listed below.

- WARNING: Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction.
- WARNING: Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- WARNING: Do not damage the refrigerant circuit.

NOTE 103 This warning is only applicable to appliances with refrigerating circuits which are accessible to the user.

- WARNING: Do not use electrical appliances inside the food storage compartments of the appliance, unless they are of the type recommended by the manufacturer.

For appliances which use flammable insulation blowing gases, the instructions shall include information regarding disposal of the appliance.

The instruction for ICE-CREAM APPLIANCES shall include the ingredients and maximum quantity of mixtures that can be used in the appliance.

7.12DV D1 Modification – National Difference in Mexico, Canada and the U.S.:

Instructions shall contain the substance of the following:

Do not use extension cords or ungrounded (two prong) adapters.

7.12.1 Addition:

Instructions shall include the method for replacing illuminating lamps.

For appliances designed for incorporating ICE-MAKERS, the instructions shall include the types of ICE-MAKERS which can be incorporated.

The instructions shall include information on the installation of INCORPORATED ICE-MAKERS which are available as optional accessories and intended to be installed by the user. If it is intended that INCORPORATED ICE-MAKERS are to be installed only by the manufacturer or its service agent, this shall be stated.

The instructions for ICE-MAKERS intended to be connected to the water supply shall state:

- the maximum permissible inlet water pressure, in pascals or bars;
- the minimum permissible inlet water pressure, in pascals or bars, if this is necessary for the correct operation of the appliance;
- the substance of the following warning:

WARNING: connect to potable water supply only.

The instructions for FIXED APPLIANCES shall include the substance of the following warning:

WARNING to avoid a hazard due to instability of the appliance, it must be fixed in accordance with the instructions.

7.12.4 Modification:

This subclause is also applicable to FIXED APPLIANCES.

7.15 Addition:

The marking of the maximum rated wattage of illuminating lamps shall be easily discernible while the lamp is being replaced.

For COMPRESSION-TYPE APPLIANCES the marking of the type of FLAMMABLE REFRIGERANT and of the flammable insulation blowing gas, as well as the warning sign B.3.2 from ISO 3864, shall be visible when gaining access to the motor-compressors.

For other appliances the marking of the type of flammable insulation blowing gas shall be on the external enclosure.

7.15DV D2 Modification by replacing the second and third paragraphs with the following – National Difference in Canada, Mexico, and the U.S.:

7.15DV.1 For COMPRESSION-TYPE APPLIANCES the marking of the type of FLAMMABLE REFRIGERANT or of the flammable insulation blowing gas, as well as the warning sign from Annex 24.DVB, shall be 0,64 inches (16,2 mm) minimum in height and permanently marked or embossed on the back panel.

7.15DV.2 Where the above scheme is not feasible, the marking of the type of flammable insulation blowing gas shall be on the external enclosure and the lettering shall be 0,64 inches (16,2 mm) minimum in height.

NOTE – 7.15DV.2 applies to Canada and the U.S. only.

7.101 For appliances which can be battery operated the supply terminals or terminations for connections to the battery shall be clearly indicated by the symbol “+” or the colour red for the positive polarity, and by the symbol “-” or the colour black for the negative polarity, unless the polarity is irrelevant.

Compliance is checked by inspection.

7.102DV D1 Addition – National Difference in Canada and the U.S.:

7.102DV.1 Caution, warning, and danger markings

7.102DV.1.1 Warning markings shall be located so as to be visible before or immediately upon removal of a cover, panel, or similar part, which encloses or protects uninsulated live parts.

7.102DV.1.2 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.1.3 A marking calling attention to the notice above shall be placed over the key slot of the lock or immediately adjacent to it. This marking may be removable.

7.102DV.1.4 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:

* Take off the doors

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

NOTE – 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.