



National Differences For

Household and Similar Electrical Appliances – Safety – Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor

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National Differences For

Household and Similar Electrical Appliances – Safety – Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor

First Edition

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This First edition of ANSI/UL 60335-2-89, the harmonized Standard for Household and Similar Electrical Appliances – Safety – Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor, is based off of Edition 2 of IEC 60335-2-89 and its Amendment No. 1.

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

1DV.1 D2 Modification to replace the second paragraph in Clause 1 with the following:

This Standard specifies safety requirements for electrically operated commercial refrigerating appliances that have an incorporated compressor or that are supplied in two units for assembly as a single appliance in accordance with the manufacturer's instructions (split system) and intended for use in accordance with:

- CSA C22.1, Canadian Electrical Code (CE Code) Part I, in Canada;
- NFPA 70, National Electrical Code (NEC), in the United States.

1DV.2 D2 Modification to add the following after the second paragraph:

This standard also contains the requirements for:

- commercial refrigerators and freezers for use in fuel dispensing facilities (Annex 101.DVD);
- factory assembled walk in coolers (Annex 101.DVE);
- refrigerating units (Annex 101.DVF);
- PARTIAL UNITS (Annex 101.DVG); and
- dispensing units (Annex 101.DVH).

2DV DR Modification of Clause 2 to add the following normative references:

Any reference to International Standards that have been adopted as National Standards of Canada and/or the USA, or are adopted subsequent to the publication of this standard, shall be replaced by the relevant National Standard of Canada and/or the USA.

Where reference is made to CSA Group or UL publications, such reference shall be considered to refer to the latest edition and all amendments published to that edition. This Standard refers to the following publications, and the years shown indicate the latest editions available at the time of printing:

CSA Group

CSA B51,
Boiler, Pressure Vessel, and Pressure Piping Code

CSA B52,
Mechanical Refrigeration Code

CSA C22.1,
Canadian Electrical Code, Part I

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CSA C22.2 No. 94.2,
Enclosures for electrical equipment, environmental considerations

CSA C22.2 No. 120,
Refrigeration Equipment

CSA C22.2 No. 140.3,
Refrigerant-containing components for use in electrical equipment

CAN/CSA-C22.2 No. 60335-1,
Safety of Household and Similar Appliances – Part 1: General Requirements

CAN/CSA-C22.2 No. 60335-2-34,
Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motorcompressors

UL

UL 50E
Enclosures for Electrical Equipment, Environmental Considerations

UL 207
Refrigerant-Containing Components and Accessories, Nonelectrical

UL 471
Commercial Refrigerators and Freezers

UL 60335-1
Household and Similar Electrical Appliances – Safety – Part 1: General Requirements

UL 60335-2-34
Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motorcompressors

ANSI/ASHRAE (American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers)

ANSI/ASHRAE 15,
Safety Standard for Refrigeration Systems

ANSI/ASHRAE 34,
Designation and Safety Classification of Refrigerants

ANSI/NFPA (American National Standards Institute/National Fire Prevention Association)

ANSI/NFPA 30A,
Code for Motor Fuel Dispensing Facilities and Repair Garages

ANSI/NFPA 70,
National Electrical Code

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ASME (American Society of Engineers)

ASME, Unfired Pressure Vessel Code

IEC (International Electrotechnical Commission)

IEC 60068-2-52

Environmental testing Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)

IEC 60335-2-75

Household and similar electrical appliances – Safety – Part 2-75: Particular requirements for commercial dispensing appliances and vending machines

IEC 60695-11-20

Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods

ISO (International Organization for Standardization)

ISO 7010

Graphical symbols – Safety colours and safety signs – Registered safety signs

3.104DV DE Modification by adding the following notes:

NOTE 1DV: In North America, the above described refrigerant unit is referred to as a CONDENSING UNIT. (See Annex 101.DVG).

NOTE 2DV: The term REFRIGERANT UNIT should not be confused with a REFRIGERATING UNIT as described in 3.113DV and Annex 101.DVF.

3.112DV DR Add the following definition to Clause 3 of the Part 2:

PARTIAL UNITS – a remote condensing (or condenser) unit or remote evaporator (or evaporating) unit which is part of a total connected assembly of a commercial refrigeration system where not all assemblies that create the complete refrigeration system are specified by the manufacturer.

NOTE: Partial units are defined and evaluated for safety as stand-alone assemblies per the requirements of Annex 101.DVG.

3.113DV DR Add the following definition to Clause 3 of the Part 2:

REFRIGERATING UNIT – factory assembled unit for performing the complete refrigeration cycle (compressing gas, condensation or gas cooling, and evaporation) comprising refrigerant compressor(s) with motors, condensers or GAS COOLERS, liquid receivers, interconnection pipe work, and ancillary equipment, all mounted on a common base with a single enclosure. A REFRIGERATING UNIT is a packaged system that is mounted on the enclosure to be cooled, such as a factory assembled walk in cooler.

NOTE: The term REFRIGERANT UNIT (3.104) should not be confused with a REFRIGERATING UNIT as described in this clause and Annex 101.DVF.

3.114DV DR Add the following definition to Clause 3 of the Part 2:

LCDI (LEAKAGE CURRENT DETECTION INTERRUPTER) – a device provided in a power supply cord that senses leakage current flowing between or from the integral cord conductors and interrupts the circuit at a predetermined level of leakage current.

3.115DV DR Add the following definition to Clause 3 of the Part 2:

CASCADE SYSTEM – a refrigeration system that incorporates two or more independent vapor-compressor refrigeration cycles in series. This is done to acquire low temperatures that might not be readily achieved with a single refrigeration cycle.

3.116DV DR Add the following definition to Clause 3 of the Part 2:

PRESSURE REGULATING RELIEF VALVE – similar to a pressure relief valve, except specifically intended for use with refrigeration systems utilizing carbon dioxide (R744) as the refrigerant in a secondary loop or **CASCADE SYSTEM**. The pressure relief setting of this valve is always lower than the relief setting of a pressure relief valve. This valve can open and re-close many times during the life of the system.

3.117DV DR Add the following definition to Clause 3 of the Part 2:

START TO DISCHARGE PRESSURE – the pressure at which a relief valve begins to discharge; typically, the pressure where the first bubbles can be seen when a valve is immersed in water.

3.118DV DR Add the following definition to Clause 3 of the Part 2:

PRESSURE VESSEL – a closed vessel, used for containing, storing, distributing, transferring, distilling, processing, or otherwise handling any gas, vapour, or liquid under pressure and as further defined in CSA B52 and ANSI/ASHRAE 15.

3.119DV DR Add the following definition to Clause 3 of the Part 2:

MOTOR FUEL DISPENSING FACILITY – that portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into containers, including all equipment used in connection therewith. The area surrounding a fuel dispenser in an outdoor motor fuel dispensing facility extending up 450 mm (18 in) above grade level and 6 m (20 ft) horizontally in all directions from the dispenser enclosure is considered to be a location where flammable or combustible gas and/or liquids can be present in combustible concentrations as noted in NFPA 30A.

3.120DV DR Add the following definition to Clause 3 of the Part 2:

FACTORY ASSEMBLED WALK-IN COOLER – an enclosed walk-in cabinet that is cooled by a **REFRIGERATING UNIT** or integral refrigerating system that is completely assembled and shipped from the factory as one assembly.

3.121DV DR Add the following definition to Clause 3 of the Part 2:

INTEGRAL REFRIGERATING SYSTEM – the necessary equipment for performing the complete refrigeration cycle (compressing gas, condensation or gas cooling, and evaporation) comprising refrigerant compressor(s) with motors, condensers or **GAS COOLERS**, liquid

receivers, interconnection pipe work, and ancillary equipment. The components needed to perform these functions are incorporated into the design on the walk-in cooler and need not be mounted on a single base plate or within a single enclosure.

3.122DV DR Add the following definition to Clause 3 of the Part 2:

BEVERAGE DISPENSERS – equipment comprising means for performing one or more of the functions of cooling, mixing, carbonating, and dispensing of beverages, and intended to be used in commercial establishments.

6.2DV D1 Modification by adding the following to Clause 6.2 of the Part 1:

Appliances or parts of appliances intended for outdoor use shall be at least IPX4.

NOTE 1DV: Additionally, other standards, CSA C22.2 No. 94.2/UL 50E, may be used for outdoor use as determined by the AHJ.

7.1DV.1 DR Modification of the Part 2 to add the following dashed items after the first dashed item after “Addition”:

- total input current (cord connected appliances)
- manufacturing date or date code and location if the product is produced in more than one location
- refrigerant number in accordance with ANSI/ASHRAE 34 [ISO 817]
- markings for permanently connected appliances:
 - motor ratings (FLA)
 - minimum circuit ampacity (MCA)
 - motor compressor ratings (RLA and LRA)
 - rating of over current protective device
 - branch circuit selection current (BCSC) (if RLA exceeds 64% of MCC)
 - all other individual loads marked in amps

7.1DV.2 DE Modification of the Part 2 by adding the following below the dashed items following “Addition”:

Load markings may be in watts or amps.

See Annex 101.DVB for examples of marking calculations.

“Suitable for Outdoor Use” if required by the AHJ.

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

The markings as outlined in 7.1ADV.1 to 7.1ADV.4, or the equivalent, shall be in letters no less than 6.4 mm (1/4 inch) high and shall be permanently marked on the refrigerator in the indicated locations when a flammable refrigerant is used.

7.1ADV DR Add Clauses 7.1ADV.1 to 7.1ADV.6 to Clause 7 of the Part 2:

7.1ADV.1 “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 provided on or near any evaporators that can be contacted by the user.

7.1ADV.2 For a refrigerator freezer with an incorporated refrigerant unit, the following markings shall be located near the machine compartment. For a remote refrigerator or freezer, the following markings shall be located by the inter-connecting refrigerant tubing connections and by the nameplate:

a) “DANGER – Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing”.

b) “CAUTION – Risk Of Fire Or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner’s Guide Before Attempting To Install or Service This Product. All Safety Precautions Must be Followed”.

7.1ADV.3 “CAUTION – Risk Of Fire Or Explosion. Dispose Of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.” This marking shall be provided on the exterior of the refrigerator.

7.1ADV.4 “CAUTION – Risk Of Fire Or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used”. This marking shall be provided near all exposed refrigerant tubing.

7.1ADV.5 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 inch) from the compressor.

7.1ADV.6 The marking specified in 7.1ADV.2(a) shall also contain the Flammable Material Warning symbol (Fire in a triangle). The color and format of this sign shall be as shown in Symbol W021 in ISO 7010. The perpendicular height of the triangle containing the “Caution, risk of fire” sign shall be at least 15 mm (9/16 in).

7.2DV DR Modification by replacing Clause 7.2 of the Part 1 with the following:

7.2DV.1 STATIONARY APPLIANCES for multiple supplies shall be marked with the substance of the following placed on each point of supply entry:

“Warning: more than one source of electrical supply. Disconnect all sources before servicing.”

Compliance is checked by inspection.

7.2DV.2 A refrigerator intended to utilize carbon dioxide (R744) in a secondary loop, cascade, or a transcritical evaporator and evaporating unit shall be provided with markings which indicate:

- a) That the refrigerator is for use with R744 (carbon dioxide) system components where the design pressure of the refrigerator is not less than the design pressure of the associated components; and
- b) If such a refrigerator contains a pressure vessel within the R744 loop or system but is not provided with any pressure relief or pressure regulating relief valves, a marking shall be located where visible to the installer indicating that the refrigerator is not provided with any pressure relief or pressure regulating relief valves and that a sufficient number of valves having capacity deemed adequate shall be field-installed on the system. The marking should refer to the installation instructions provided by the equipment manufacturer.

7.12DV DR *Modification by adding the following to Clause 7.12 of the Part 2:*

A refrigerator intended to utilize carbon dioxide (R744) in a secondary loop, cascade, or remote transcritical system shall provide instructions indicating that:

- a) If the refrigeration system is de-energized, venting of the R744 through the pressure regulating relief valves on the refrigeration system can occur. In such cases, the system might need to be recharged with R744, but in any case, the pressure regulating relief valve(s) shall not be defeated or capped. The relief setting shall not be altered. (This instruction shall be provided when regulating relief valves are required by Clause 22.103ADV.1).
- b) A sufficient number of pressure relief and pressure regulating relief valves might need to be provided based on the system capacity and located such that no stop valve is provided between the relief valves and the parts or section of the system being protected.
- c) If the refrigerator contains a pressure vessel but is not provided with the pressure regulating or relief valves as permitted by Clause 22.103ADV.2 the instructions shall specify:
 - 1) The method for installing the valves within the fittings; and
 - 2) That the refrigerator shall be provided with an adequate number of pressure regulating and relief valves based on the system capacity and located such that no stop valve(s) are provided between the relief valve(s) and the parts or section of the system being protected.

9DV DR *Modification by adding the following:*

Clause 9DV of the Part 1 is applicable.

11.104DV DR *Add the following clause to Clause 11 of the Part 1:*

During the tests of Clause 11, the pressures shall be monitored continuously. During the test mentioned in Clause 11.8, after stabilization of temperatures and pressures, the unit shall be de-energized and pressures recorded to obtain maximum equalization (standstill)

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pressure values. Maximum pressures obtained shall be used to determine test values for Annex 101.DVJ and compliance with CSA B52 and CSA C22.2 No. 140.3, as applicable, or UL 207. In order to determine the standstill pressure, after de-energizing the unit shall be soaked out for 1 hour.

13.2DV.1 DR Modification by adding the following dashed item to Clause 13.2DV.1 of the Part 1:

– for all cord connected STATIONARY CLASS I 3,5 mA
APPLIANCES equipped with an L-5 through L-15 type plug

16.2DV.1 DR Modification by adding the following dashed item to Clause 16.2DV.1 of the Part 1:

– for all cord connected STATIONARY CLASS I 3,5 mA
APPLIANCES equipped with an L-5 through L-15 type plug

19.7DV D1 Modification to add the following to Clause 19.7 of the Part 1:

High-side refrigerant pressures shall be monitored during the locked condenser fan test in order to determine maximum pressures. The maximum measured pressure shall not exceed 1/3 of the ultimate strength of the subject component as per the test of Clause 101.DVJ.4.2.

19.102DV D1 Modification by adding the following dashed item to NOTE 1:

– loss of heat transfer medium flow, to include the following:

- condenser fan failure;
- evaporator fan failure (if evaporator has defrost heater in accordance with Clause 19.101); and
- cooling water failure (completely shut off and/or partially restricted)

20.1DV D1 Modification by adding the following:

The test is conducted with shelving installed if shipped within the unit.

20.101DV D2 Add the following clause to Clause 20 of the Part 1:

Parts such as covers, panels, or grilles that serve as guards may be removable without tools if a warning marking identifies the guarded moving or hot part, and

- a) The guard is located in an area not exposed to persons using or attending the refrigerator;
- b) The guard is not less than 0.18 m² (2 square feet) in size, is retained in position by gravity, channels, or similar means, is unlikely to be removed by other than an attendant or service personnel, and is not removed for replenishing the product; or

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