

## STANDARD INFORMATION

**Standard:** UL 60335-2-24 / CSA C22.2 No. 60335-2-24

**Standard ID:**

Household and Similar Electrical Appliances - Safety - Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers [UL 60335-2-24:2022 Ed.3]

Household and Similar Electrical Appliances - Safety - Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers [CSA C22.2#60335-2-24:2022 Ed.3]

**Previous Standard ID:**

Safety Requirements for Household and Similar Electrical Appliances - Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers [UL 60335-2-24:2017 Ed.2+R:27Feb2020]

Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-cream Appliances and Ice-makers [CSA C22.2#60335-2-24:2017 Ed.2+U1;U2]

## EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

**Effective Date:** **May 1, 2025**

## IMPACT, OVERVIEW, AND ACTION REQUIRED

**Impact Statement:** Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard. Reports not updated to this version by the effective date above will be withdrawn.

**Overview of Changes:**




- Measurement of the input current of refrigerating appliances using inverter driven motor-compressors is included
- Compatibility tests for winding insulation of motor-compressors used with different types of refrigerants and oils have been introduced
- Requirements for inadvertent contact points between uncoated aluminium pipes and copper pipes have been updated
- Testing of accessible glass panels has been updated
- This new edition includes replacement of the ISO 7010 W021 flammable refrigerant label with the United Nations GHS red diamond flame symbol in all HVAC/R standards.

Specific details of new/ revised requirements are found in table below.

***Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.***



## STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown <del>lined-out</del> below.</i>
7	Info	<b>Marking and instructions</b> <b><i>New clause added;</i></b>  Modification of Clause 7.1 of the Part 2 by adding the following:  7.1DV.6 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.  <b><i>New clause added;</i></b>  D2 Modification of Clause 7.6 of the Part 2 by adding the following:  Replace the ISO 7010-W021 symbol for “Warning; risk of fire/flammable materials” with the United Nations Global Harmonized System (GHS) symbol or a combination of the United Nations GHS and ISO 7010-W021 symbols as shown below:  7.6   or     <small>su4470</small>



CLAUSE	VERDICT	COMMENT
		<b><i>New clause added;</i></b>
7.12DV		D2 Modification of Clause 7.12 of the Part 2 by adding the following:  If the United Nations GHS red diamond flame symbol is used, its meaning shall be explained.
		<b><i>New clause added;</i></b>
7.14DV		D2 Modification of Clause 7.14 of the Part 2 by adding the following:  The height of the United Nations GHS red diamond flame symbol shall be at least 15 mm.
		<b><i>New clause added;</i></b>
7.15DV		D2 Modification of Clause 7.15 of the Part 2 by replacing the second paragraph with the following:  For COMPRESSION-TYPE APPLIANCES, the marking of the type of FLAMMABLE REFRIGERANT and of the flammable insulation blowing gas, as well as the United Nations GHS red diamond flame symbol, shall be visible when gaining access to the motor-compressors.
10	Info	<b>Power input and current</b>
		Modification:  Replace the third dashed item of the first paragraph of the test specification by the following:  – the appliance being operated under NORMAL OPERATION except that user adjustable temperature controls are set to give the lowest temperature. Addition:  <u>For REFRIGERATING APPLIANCES using inverter driven motor-compressors, the appliance shall be operated for a period of 6 h or the maximum setting of an incorporated timer, whichever is shorter. Defrost cycles are excluded, if any.</u> Other appliances are operated for a period of 1 h or the maximum setting of an incorporated timer, whichever is shorter. Excluding starting current, the maximum value of the current averaged over any 5 min period is obtained. The interval between current measurements shall not exceed 30 s.



CLAUSE	VERDICT	COMMENT
10.103DV		<p><b><i>New clause added;</i></b></p> <p>Addition of Clause 10.103DV to the Part 2:</p> <p>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:</p> <ul style="list-style-type: none"><li>a) Does not exceed 125 % of the nameplate rating;</li><li>b) Does not occur more than twice an hour; and</li><li>c) Is not more than 5 min in duration.</li></ul>
22	Info	<p><b>Construction</b></p> <p><b><i>New clause added;</i></b></p> <p>Addition:</p> <p>For the types of refrigerant and types of oil for which the motor-compressor is intended to be used, compliance of winding wire insulation shall be checked by the tests detailed in Annex BB of IEC 60335-2-34:2012/AMD1:2015 or for motor-compressors that do not use oil by test 16 in IEC 60851-4 for resistance to refrigerants. For test 16 in IEC 60851-4, the percentage of extractable matter shall not exceed 0,5 %. The breakdown voltage shall be at least 75 % of the minimum specified value.</p> <p>For the types of refrigerant and types of oil for which the motor-compressor is intended to be used, compliance of tie cords and insulation materials other than winding wire insulation shall be checked by the tests detailed in Annex CC of IEC 60335-2-34:2012/AMD1:2015.</p> <p>The tests are not performed on motor-compressors complying with IEC 60335-2-34.</p>
22.111		<p>In COMPRESSION-TYPE APPLIANCES which use FLAMMABLE REFRIGERANT in their cooling system, all possible inadvertent contact points between uncoated aluminium pipes and copper pipes or similar dissimilar metals shall be prevented from galvanic coupling by positive means such as the use of insulated sleeving or spacers. <u>This requirement is not applicable to the aluminium fins of heat exchangers and other aluminium parts that are in contact with outer surface of copper pipes.</u></p> <p>Compliance is checked by inspection.</p>



CLAUSE	VERDICT	COMMENT
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ACCESSIBLE GLASS PANELS with an area having any two orthogonal dimensions exceeding 75 mm shall be made from

- glass that breaks into small pieces when it fractures; or
- glass that is not released or dropped from its normal position when broken;
- glass that has enhanced mechanical strength.

Compliance is checked by tests a), b) or c) as applicable.

a) For glass that breaks into small pieces when it fractures, compliance is checked by the following test, which is performed on two samples.

Frames or other parts attached to the glass panel to be tested are removed and the glass is placed on a rigid horizontal flat surface.

The sample under test is broken by means of a test punch having a head with a mass of  $75\text{ g} \pm 5\text{ g}$  and a conical tungsten carbide tip with an angle of  $60^\circ \pm 2^\circ$ . The punch shall be positioned approximately 13 mm in from the longest edge of the glass at the midpoint of that edge. The punch is then hit by a hammer so that the glass breaks.

22.116

A transparent mask of 50 mm × 50 mm is placed on the fractured glass except within a peripheral margin of 25 mm from the edge of the sample.

The assessment shall be undertaken on at least two areas of the sample, and the areas chosen shall contain the largest particles.

The number of crack free particles within the mask are counted and for each assessment shall not be less than 40. The particle count shall be made within 5 minutes of the fracture. Each particle wholly contained within the area of the mask shall be counted as one particle and each particle that is partially within the mask shall be counted as a half particle.

b) For glass that is not released or dropped from its normal position when broken, compliance is checked by breaking the glass when mounted in its normal position in the appliance by means of a test punch having a head with a mass of  $75\text{ g} \pm 5\text{ g}$  and a conical tungsten carbide tip with an angle of  $60^\circ \pm 2^\circ$ . The punch shall be positioned approximately 13 mm in from the longest edge of the glass at the midpoint of that edge. The punch is then hit by a hammer so that the glass breaks.

At the conclusion of this test, the glass shall not be broken or cracked in such a manner that pieces are released or dropped from their normal position. Glass that is released within the immediate vicinity of the punch tip as a result of the punch impacting the sample under test is ignored.



CLAUSE	VERDICT	COMMENT
		<p>c) For glass with enhanced mechanical strength, compliance is checked by the pendulum hammer test Eha of IEC 60068-2-75.</p> <p>For the test, the glass panels are supported according to their method of incorporation in the appliance.</p> <p>The test is performed with three blows applied at the most critical point on two samples; the impact energy of each blow shall be 5 J.</p> <p>At the conclusion of the tests, the glass shall not be broken or cracked.</p> <hr/> <p><b><i>New clause added;</i></b></p>
22.116 DV		<p>D2 Modification of Clause 22.116 of the Part 2 by adding the following:</p> <p>If the ACCESSIBLE GLASS PANELS comply with ANSI Z97.1, then Clause 22.116 does not apply</p> <hr/> <p><b><i>New clause added;</i></b></p> <p>In REFRIGERATING APPLIANCES, thermal insulation shall be encased in and be in contact with</p> <ul style="list-style-type: none"><li>– metallic material having a thickness not less than 0,20 mm and having a melting point temperature of not less than 1 000 °C; or</li><li>– a polymeric material classified as 5VA according to IEC 60695-11-20 provided that the test sample used for the classification was no thicker than the relevant part of the appliance; or</li><li>– a single layer non-polymeric material that has been tested in accordance with Annex EE; or</li><li>– a material with multiple layers, at least one of which is non-polymeric, that has been tested in accordance with Annex EE.</li></ul>
22.117		<p>A hole or the combined area of holes within 150 mm of each other shall not exceed 25 cm<sup>2</sup>. The total combined area of the holes shall not exceed 125 cm<sup>2</sup>. Holes up to 3 mm<sup>2</sup> and material that join overlapping metal parts are ignored. The area of holes that have metallic objects such as pipes protruding from them are calculated omitting the area taken up from the metallic material.</p> <p>These requirements are also applicable to material encasing thermal insulation between the compressor compartment and food storage compartments.</p> <p>These requirements are not applicable to:</p> <ul style="list-style-type: none"><li>– parts in food storage compartments such as compartment liner, partition of the cabinet;</li></ul>



CLAUSE	VERDICT	COMMENT
		<ul style="list-style-type: none"><li>– parts providing access to the food storage compartment such as doors, drawers and lids;</li><li>– parts within 150 mm from the top surface of the appliance, the top surface being a horizontal plane from the highest point of the appliance, unless the inlet opening for the SUPPLY CORD is within 150 mm of the exempt area;</li><li>– parts within 50 mm of food storage compartment seals;</li><li>– PORTABLE APPLIANCES with no motor-compressor.</li></ul> <p>Compliance is checked by inspection, measurement and the appropriate tests.</p>
24	Info	<b>Components</b> <i>New clause added;</i>  Capacitors in auxiliary windings of motors shall be marked with their voltage rating and their rated capacitance and shall be used in accordance with these markings.  Compliance is checked by inspection and by the appropriate tests.  For motor running capacitors, the voltage across the capacitor shall not exceed  24.5 <ul style="list-style-type: none"><li>– 95 % of its voltage rating for capacitors of class of operation: class A;</li><li>– 80 % of its voltage rating for capacitors of class of operation: class B;</li></ul> when the appliance is supplied at 1,1 times RATED VOLTAGE under NORMAL OPERATION.  For starting capacitors, the voltage across the capacitors shall not exceed 1,3 times the voltage rating of the capacitor when the appliance is operating at 1,1 times RATED VOLTAGE.  <i>New clause added;</i>  Motor running capacitors shall comply with IEC 60252-1 under the following conditions.  <ul style="list-style-type: none"><li>– class of safety protection: S2;</li><li>– class of operation: class A or class B;</li><li>– damp heat test severity;<ul style="list-style-type: none"><li>• test duration 21 days;</li><li>• temperature 40 °C ± 2 °C at a relative humidity of 93 % ± 3 %.</li></ul></li></ul> Compliance is checked by inspection and the appropriate tests, including the tests in 5.16.3 and 5.16.5 of IEC 60252-1:2010/AMD1:2013 for class of safety protection S2 capacitors. After the destruction tests of 5.16 in IEC 60252-1:2010/AMD1:2013, evaluation of failure is checked according to the 5.16.7 in IEC 60252-1:2010/AMD1:2013.
25.8		



CLAUSE	VERDICT	COMMENT
		<b><i>New clause added;</i></b>
24.8DV		D2 Modification of Clause 24.8 of the Part 2 by adding the following:  Motor running capacitors shall be marked “Internally Protected” or “Protected” according to UL 810.
30	Info	<b>Resistance to heat and fire</b>
		<b><i>New clause added;</i></b>
30.2.1DV		D2 Modification to replace the third paragraph of the Part 1 with the following:  The glow-wire test is also not carried out on parts of material classified at least HB according to UL 94 or CAN/CSA-C22.2 No. 0.17 provided that the test sample used for the classification was no thicker than the relevant part of the appliance.
		<b><i>New clause added;</i></b>
30.101DV		D1 Add the following to Clause 30 of the Part 2:  Appliances must comply with the additional requirements of Annex 101.DVD.
		<b><i>New annex added;</i></b>
		<b>Test for material encasing and in contact with thermal insulation</b>
Annex EE		When testing a material to this annex as required by 22.117, the test is carried out in accordance with the following.  See standard for details.