STANDARDS UPDATE NOTICE (SUN)
ISSUED: December 3, 2024

STANDARD INFORMATION

Amendment 1: See inadvertently missed clauses in blue below.

Standard: UL 60335-2-89 / CSA C22.2 No. 60335-2-89
Standard ID:
Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor [UL 60335-2-89:2021 Ed.2]
Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor [CSA C22.2#60335-2-89:2021 Ed.2]
Previous Standard ID:
Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor [UL 60335-2-89:2017 Ed.1]
Household and Similar Electrical Appliances - Safety - Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor [CSA C22.2#60335-2-89:2017 Ed.1]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **October 27, 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 Reports not updated to this version by the effective date above will be withdrawn.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:

- requirements for commercial ice-makers have been added
- installation of appliances with a remote refrigerant unit or motor-compressor has been clarified
- installation instructions for appliances with a remote refrigerant unit employing R-744 refrigerant in a transcritical refrigeration system have been added
- a pressure test for appliances employing R-744 refrigerant has been added
- additional requirements for appliances with a refrigerant charge exceeding 150 g of flammable refrigerant within each refrigerating circuit have been added
- Annex AA has been modified to cover motors that are supplied at a voltage that is different from the rated voltage of the appliance

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
		Additions to existing requirements are <u>underlined</u> and deletions are shown ~~lined out~~ below.
5	Info	**General conditions for the tests**
5.2DV		***New clause added;*** If the tests of Annex 101.DVP are carried out, at least two additional sensors are needed. If the test of Annex 101.DVM has to be carried out, an additional appliance may be used. The tests of Clauses 15 and 16 may be conducted on a separate sample. The tests shall be carried out in the order of the clauses. However, the tests of Clauses 15 and 16 may be carried out at any time.
5.7		***New clause added;*** For ICE-MAKERS, the tests in accordance with Clauses 10, 11 and 13 are performed at an ambient temperature of 32 °C ± 2 °C For other appliances, tests in accordance with Clauses 10, 11 and 13 are performed at an ambient temperature of – 32 °C ± 2 °C on appliances of test room climatic class 0, 1, 2, 3, 4, 6 or 8; – 43 °C ± 2 °C on appliances of test room climatic class 5 or 7.
5.7DV		***New clause added;*** A laboratory refrigerator or freezer may be tested in an ambient temperature of 27 °C (80.6 °F).
5.10		***New clause added;*** For appliances with a remote REFRIGERANT UNIT, the REFRIGERANT UNIT is connected to the cabinet in accordance with the instructions provided with the appliance before testing. For the tests of 22.111, 22.112 and 22.113, the appliance is empty with doors or lids closed, or roller blinds closed or open, whichever is the more unfavourable, and is installed as follows.

CLAUSE	VERDICT	COMMENT
		Appliances, other than BUILT-IN APPLIANCES, are placed in a test enclosure, the walls of which enclose the appliance as closely as possible to all its sides and top surface, unless the manufacturer indicates in the instructions that a free distance shall be observed from the walls or the ceiling, in which case this distance is observed during the test. If the appliance has a REMOTE REFRIGERANT UNIT or motor-compressor, then only the REFRIGERATED DISPLAY AND STORAGE CABINET is installed in the test enclosure, the remote REFRIGERANT UNIT or motor-compressor is placed on the floor of the test corner away from walls. For appliances incorporating remote REFRIGERANT UNITS or remote motor-compressors, the refrigerant line between the REFRIGERANT UNIT or motor-compressor and the REFRIGERATED DISPLAY AND STORAGE CABINET shall have a length of 5 m to 7,5 m. The refrigerant line shall be installed with thermal insulation applied in accordance with the instructions. If the appliance employs R-744 refrigerant in a TRANSCRITICAL REFRIGERATION SYSTEM, a PRESSURE RELIEF DEVICE shall be installed on the high-pressure side between the motor-compressor and the GAS COOLER unless it is pre-fitted to the motor-compressor.
5.101		***New clause added;*** Appliances that use FLAMMABLE REFRIGERANTS and that, according to the instructions, may be used with other electrical appliances inside a food/ice storage compartment are tested with such recommended appliances incorporated and in operation as they would be in normal use. NOTE An example of such electrical appliances are deodorizers. ICE-MAKERS that use FLAMMABLE REFRIGERANTS and that, according to the instructions, may be used in conjunction with accessories such as ice-bins are tested with such recommended accessories installed and in operation as they would be in normal use
6	Info	**Classification**
6.2DV		***New clause added;*** Appliances or parts of appliances intended for outdoor use shall be at least IPX4 or equivalent UL 50E Type ratings in accordance with NEMA 250, Table A1. NOTE For example, UL 50E Type 3, 3X, 3S, 3SX, 3R, 3RX, 4, 4X, 5, 6, 6P, 12, 12K, and 13 meet the requirements of IPX4. Types 1, 2, and 5 do not meet the requirements of IPX4. Appliances shall be classified according to the accessibility either as APPLIANCE ACCESSIBLE TO THE GENERAL PUBLIC or as APPLIANCE NOT ACCESSIBLE TO THE GENERAL PUBLIC.

CLAUSE	VERDICT	COMMENT
7	Info	**Marking and instructions**
7.1		Appliances that use FLAMMABLE REFRIGERANTS shall be marked with the warning sign ISO 7010-W021 (2011-05). ~~– for incandescent lamps, the maximum rated wattage of the lamp, in watts;~~ ~~– for discharge lamps, the rated wattage of the lamp, in watts;~~ – for lamps, the rated wattage of the lamp, in watts; Appliances having a REFRIGERANT CHARGE exceeding 150 g of FLAMMABLE REFRIGERANTS within any REFRIGERATING CIRCUIT shall be marked with the maximum allowable pressure for which the system is designed to withstand. Appliances having a REFRIGERANT CHARGE within any REFRIGERATING CIRCUIT exceeding 4 times the lower flammability limit (LFL) for refrigerants having a flammability classification of Class A2 or Class A3 and exceeding 6 times the lower flammability limit (LFL) for refrigerants having a flammability classification of Class A2L, shall be marked with symbol IEC 60417-6412 (2019-03). Appliances with a remote REFRIGERANT UNIT employing R-744 refrigerant in a TRANSCRITICAL REFRIGERATION SYSTEM shall be marked with the DESIGN PRESSURE, unless the appliance incorporates a PRESSURE RELIEF DEVICE pre-fitted to the high-pressure side of the motor-compressor. ICE-MAKERS intended to be connected to the water supply shall be marked with symbol IEC 60417-6375 (2017-03) or with the substance of the following warning: WARNING: Connect to potable water supply only.
7.1DV.2		***New clause added;*** See Annex 101.DVA for supplemental marking requirements.
7.1DV.4		***New clause added;*** – for pre-charged pipe sets • refrigerant number in accordance with ISO 817; • the refrigerant charge in the line set; • maximum allowable pressure; • symbol ISO 7010-W021. When a flammable refrigerant is used, the flame symbol ISO 7010-W021 shall be replaced with the appropriate refrigerant symbol described in Clause 7.6.

CLAUSE	VERDICT	COMMENT
7.DV.5.1		***New clause added;*** Refrigerant charge is not required to be marked on partial units that are not factory charged, see Clause 101.DVG.5.1 for marking of design pressure instead.
7.1DV.5.2		***New clause added;*** For field erected units with FLAMMABLE REFRIGERANTS, when addition of charge is required by the manufacturer installation instructions for completing the REFRIGERATING SYSTEM, manufacturers shall provide a label that allows the installer to note the resulting total REFRIGERANT CHARGE for each REFRIGERATING SYSTEM. The label or other marking shall be applied as part of or adjacent to the nameplate of the compressor bearing unit.
7.1DV.6		***New clause added;*** For APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC, the classification according to Clause 6.101 shall be marked as “CAUTION – appliance shall be installed in areas with restricted access or at a level not less than 2,5 m. In Canada, the French translation for the warning in Clause 7.1DV.6 is as follows: « ATTENTION – l'appareil doit être installé dans des endroits dont l'accès est limité et à un niveau d'au moins 2,5 m ».
7.1DV.7		***New clause added;*** The short-circuit current rating (SCCR) as determined in Annex 101.DVB for motor controllers, equipment control panels, overall equipment panels, or industrial control panels when employed with multiple motor load and combination load equipment. The short-circuit current rating of motor controllers, overall equipment panels, equipment control panels, or industrial control panels shall include the following marking or the equivalent as specified for the motor controllers, equipment control panels, overall equipment panels or industrial control panels: "Short-circuit current: ____kA rms symmetrical, ___V maximum.
7.1DV.8		***New clause added;*** Modification of Clause 7.1 of the Part 2 by adding the following dashed items after the first dashed item in the “Addition”: – motor (full load amps (FLA) and horsepower (Hp)) For motors controlled by adjustable speed drive, FLA shall be replaced with either the motor's maximum operating current (MOC) or the rated input current of the power conversion equipment. When there is bypass utilized, the FLA shall be replaced with the largest of the motor's MOC, the rated input current to the power conversion equipment or the FLA of the motor.

CLAUSE	VERDICT	COMMENT
7.1DV.9		***New clause added;*** Appliances using flammable refrigerants shall also comply with Annex 101.DVV.
7.1ADV.1		The following marking shall be provided on or near any evaporators or thermosyphons that can be contacted by the user: "DANGER – Risk Of Fire or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing" In Canada, the French translation for the warning in Clause 7.1ADV.1 is as follows: « DANGER – Risque d'incendie ou d'explosion. Fluide frigorigène inflammable utilisé. Ne pas utiliser des moyens mécaniques pour décongeler le réfrigérateur. Ne pas perforer la conduite de fluide frigorigène ».
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". In Canada, the French translation for the warning in Clause 7.1ADV.2 a) is as follows: « DANGER – Risque d'incendie ou d'explosion. Fluide frigorigène inflammable utilisé. Doit uniquement être réparé par un technicien de service formé. Ne pas perforer la conduite de fluide frigorigène. » 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". In Canada, the French translation for the caution in Clause 7.1ADV.2 b) is as follows: « ATTENTION – Risque d'incendie ou d'explosion. Fluide frigorigène inflammable utilisé. Consulter le guide du propriétaire ou le manuel de réparation avant d'essayer d'installer ou de réparer ce produit. Toutes les précautions de sécurité doivent être prises. »

CLAUSE	VERDICT	COMMENT
7.1ADV.3		The following marking shall be provided on the exterior of the refrigerator: "CAUTION – Risk Of Fire Or Explosion. Dispose Of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used." In Canada, the French translation for the caution in Clause 7.1ADV.3 is as follows: « ATTENTION – Risque d'incendie ou d'explosion. Mettre au rebut conformément aux règlements fédéraux ou locaux. Fluide frigorigène inflammable utilisé. »
7.1ADV.4		The following marking shall be provided near all exposed refrigerant tubing: "CAUTION – Risk Of Fire Or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used". In Canada, the French translation for the caution in Clause 7.1ADV.4 is as follows: « ATTENTION – Risque d'incendie ou d'explosion en cas de perforation d'une canalisation de fluide frigorigène; suivez attentivement les instructions de manutention. Fluide frigorigène inflammable utilisé. »
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." In Canada, the French translation for the warning in Clause 7.2DV.1 is as follows: « Mise en garde : plusieurs sources d'alimentation électrique. Débrancher toutes les sources avant l'entretien. » Compliance is checked by inspection.
7.2DV.3		***New clause added;*** Appliances employing STIRLING REFRIGERATION SYSTEMS shall be provided with markings that indicate: WARNING: Refrigeration unit contains gas under high pressure. Do not tamper with or puncture the system. Service by qualified persons only. In Canada, the French translation for the warning in Clause 7.2DV.3 is as follows: MISE EN GARDE : L'unité de réfrigération contient du gaz sous haute pression. Ne pas trafiquer ni perforer le système. Entretien uniquement par des personnes qualifiées.

CLAUSE	VERDICT	COMMENT
7.6DV.1		***New clause added;*** Modification of Clause 7.6 of the Part 2 by replacing warning sign ISO 7010-W021 with the following:  Refrigerant class per ANSI/ASHRAE 34 The refrigerant class shall be in text not less than 1/3 the height of the symbol.
7.12DV.1		A refrigerator intended to utilize carbon dioxide (R744) in a secondary loop, cascade, or remote transcritical system shall provide instructions indicating the following: 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 22.109ADV.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 22.109ADV.2, the instructions shall specify 1) the method for installing the valves within the fittings; and 2) the refrigeration system 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. Relief valves installed in a liquid line shall be located on the exterior of the building to prevent the formation of dry ice.

CLAUSE	VERDICT	COMMENT
7.12DV.2		***New clause added;*** Appliances employing STIRLING REFRIGERATION SYSTEMS the instructions shall include the substance of the following: WARNING: Refrigeration unit contains gas under high pressure. Do not tamper with or puncture the system. Contact qualified service personnel before disposal. In Canada, the French translation for the warning in Clause 7.12DV.2 is as follows: MISE EN GARDE : L'unité de réfrigération contient du gaz sous haute pression. Ne pas trafiquer ni perforer le système. Entretien uniquement par des personnes qualifiées.
7.12.1		For appliances with a remote REFRIGERANT UNIT employing R-744 refrigerant in a TRANSCRITICAL REFRIGERATION SYSTEM, unless the appliance incorporates a PRESSURE RELIEF DEVICE pre-fitted to the high-pressure side of the motor-compressor, the instructions shall include a statement containing the substance of the following: A pressure relief device shall be installed in the high-pressure side of the refrigeration system between the motor-compressor and the gas cooler. There shall be no shut off devices or other components except piping between the motor-compressor and the pressure relief device that could introduce a pressure drop. The pressure relief device shall be mounted so that any refrigerant released from the system during its operation cannot cause harm to the user of the appliance. The aperture shall be located so that it is unlikely to be obstructed in normal use. The installed pressure relief device shall have no provisions for setting by the end user. The pressure setting of the installed pressure relief device shall be no higher than the design pressure of the high-pressure side. For appliances intended for connection to a water supply for cooling purposes, the instructions shall contain information on the maximum permitted temperature of the inlet water consistent with safe operation of the appliance. If symbol IEC 60417-6375:2017-03 is used, its meaning shall be explained. If symbol IEC 60417-6412:2019-03 is used, its meaning shall be explained.

CLAUSE	VERDICT	COMMENT
		All site made joints in HERMETICALLY SEALED SYSTEMS shall be tested for leaks at a pressure of at least 0,25× maximum allowable pressure using detection equipment with a sensitivity of at least 3 g/year of refrigerant. If other fluid circuits, such as water heat exchangers, are connected to an appliance that uses FLAMMABLE REFRIGERANT, the instructions shall state the substance of the following: Any fluid circuits connected to the appliance shall safely release abnormal pressure. It shall not allow the release of FLAMMABLE REFRIGERANT into areas served by the other circuits if these do not comply with minimum room area limit.
7.12.1DV.2		***New clause added;*** The installation instructions for appliances that use a flammable refrigerant shall indicate the appliance is to be installed in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15. In addition, if the appliance has a refrigerant charge of more than 3 × LFL, the instructions shall indicate the appliance shall not be installed in public corridors or lobbies.
7.12.1DV.3		***New clause added;*** Apply the requirements of Annex 101.DVS to appliances using flammable refrigerants.
7.14		***New clause added;*** The height of the rectangle in symbol IEC 60417-6412:2019-03 shall be at least 40 mm.
7.15		***New clause added;*** Symbol IEC 60417-6412:2019-03 shall be visible after installation of the appliance.
11	Info	**Heating**
11.2		***New clause added;*** BUILT-IN APPLIANCES are installed in accordance with the instructions. Other appliances are placed in a test enclosure with the walls and ceiling enclosing the appliance being as close as possible to all its sides and top surface. If the instructions state that the appliance is to be installed with a free distance between the appliance and the walls or the ceiling, then the appliance is installed in the test enclosure in accordance with these instructions. If the appliance has a remote REFRIGERANT UNIT or motor-compressor, then only the REFRIGERATED DISPLAY and STORAGE CABINET is installed in the test enclosure,

CLAUSE	VERDICT	COMMENT
		the remote REFRIGERANT UNIT or motor-compressor is placed on the floor of the test corner away from walls. Dull black painted plywood approximately 20 mm thick is used for the test corner, the supports and for the installation of BUILT-IN APPLIANCES and the test enclosure for other appliances.
11.2DV		***New clause added;*** NOTE 101DV For evaporating and condensing units, it may not be necessary to operate the refrigeration system during the tests of Clauses 10 and 11 if all of the following apply: – the motor-compressor is in compliance with UL 60335-2-34; – the motor-compressor RLA marked on the appliance is not less than 64 % of the motor-compressor MCC; and – the control box is externally loaded at not less than the marked compressor RLA or MRC and the marked motor rated current or MOC.
11.5		***New clause added;*** The appliance is operated under NORMAL OPERATION but with user adjustable temperature control devices set to give the lowest temperature.
11.6		***New clause added;*** The appliance is operated under NORMAL OPERATION but with user adjustable temperature control devices set to give the lowest temperature.
11.8		***New clause added;*** During the test, PROTECTIVE DEVICES other than self-resetting thermal motor-protectors for motor-compressors shall not operate. When steady conditions are established, thermal motor-protectors for motor-compressors shall not operate. During the test, sealing compound, if any, shall not flow out. During the test, the temperature rises are monitored continuously. For ICE-MAKERS and REFRIGERATED DISPLAY AND STORAGE CABINETS of test room climatic classes 0, 1, 2, 3, 4, 6 or 8, the temperature rises shall not exceed the values given in Table 3. For REFRIGERATED DISPLAY AND STORAGE CABINETS of test room climatic class 5 or 7, the temperature rises shall not exceed the values given in Table 3, reduced by 7 K.

CLAUSE	VERDICT	COMMENT
		Addition: For motor-compressors not conforming to IEC 60335-2-34 (including its Annex AA), the temperatures of – housings of motor-compressors and – windings of motor-compressors shall not exceed the values given in Table 101. For motor-compressors conforming to IEC 60335-2-34 (including its Annex AA), the temperatures of their – housings of motor-compressors, – windings of motor-compressors and – other parts such as its protection system and control system, and all other components that have been tested together with the motor-compressor during the tests of IEC 60335-2-34 and its Annex AA are not measured. The entry in Table 3 relating to the temperature rise of the external enclosure of MOTOR-OPERATED APPLIANCES is applicable to all appliances covered by this standard. However, it is not applicable to those parts of the external enclosure of the appliance, – for BUILT-IN APPLIANCES, that are not ACCESSIBLE PARTS after installation in accordance with the instructions; – for other appliances, that are on that part of the appliance that, according to the instructions, is intended to be placed against a wall with a free distance not exceeding 75 mm. The temperature of ballast windings and their associated wiring shall not exceed the values specified in 12.4 of IEC 60598-1:2008, when measured under the conditions stated. For ICE-MAKERS, the temperature rises shall not exceed the values given in Table 3.

CLAUSE	VERDICT	COMMENT
11.8DV		***New clause added;*** Where IEC 60335-2-34 is specified, the use of CAN/CSA-C22.2 No. 60335-2-34/UL 60335-2-34 shall be applied. Where Annex AA of IEC 60335-2-34 is referenced, the requirements of Annex 101.DVH can be used.
11.103DV		***New clause added;*** For Stirling refrigeration systems, the mean pressure is to be measured.
13.2DV.1		**Clause deleted;** ~~– for all cord connected STATIONARY CLASS I 3,5mA APPLIANCES equipped with an L-5 through L-15 type plug~~
13.2.DV.4		***New clause added;*** The leakage current test does not apply to APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC. The electrical strength test may be completed after testing as required by Clause 15. For APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC, the electric strength tests shall be conducted in accordance with Clause 101.DVR.13.3 of Annex 101.DVR
13.3DV.2		***New clause added;*** A DC potential equivalent to 1,414 times the test voltage specified in Table 4 may be applied.
16.2DV.1		**Clause deleted;** ~~– for all cord connected STATIONARY CLASS I 3,5mA APPLIANCES equipped with an L-5 through L-15 type plug~~
16.3DV.1		***New clause added;*** A DC potential equivalent to 1,414 times the test voltage specified in Table 7 may be applied.
16.3DV.2		***New clause added;*** The leakage current test does not apply to APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC.
17DV		***New clause added;*** The tests of Clause 17 are not required if: a) The transformer is protected in accordance with Table 450.3(B) of NFPA 70 and Rule 26-252 or 26-254 of CSA C22.1; b) The transformer is a Class 2 transformer and complies with UL 5085-1/CSA C22.2 No. 66.1 and UL 5085-3/CSA C22.2 No. 66.3; or

CLAUSE	VERDICT	COMMENT
		c) The transformer is located on an adjustable speed drive where the transformer and drive assembly have been evaluated to UL 61800-5-1 and CSA C22.2 No. 274.
19	Info	**Abnormal operation**
19.7DV.1		***New clause added;*** High-side refrigerant pressures shall be monitored during the locked condenser fan test in order to determine maximum pressures. For Stirling refrigeration systems, the gas pressure shall be monitored by a pressure gauge on the motor enclosure during locked cooling fan test 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.
19.7DV.2		***New clause added;*** If the motors have been previously tested with their protection method in accordance with the one of the following standards, the tests of Clause 19.7 are not required: – UL 1004-2 – Impedance Protected Motors – UL 1004-3 – Thermally Protected Motors – UL 1004-7 – Electronically Protected Motors – CSA C22.2 No. 77 – Motors with inherent overheating protection.
19.7DV.3		***New clause added;*** If safety of the motor depends upon the operation of an adjustable speed drive incorporating a mechanical overload relay or internal solid state motor overload protection that has been evaluated to UL 61800-5-1 and CSA C22.2 No. 274, the adjustable speed drive shall comply with all of the following applicable requirements: a) The adjustable speed drive shall be marked for "Equipment incorporating internal overload protection"; b) The adjustable speed drive shall be utilized on a motor that is within the ratings of the adjustable speed drive; and c) Mechanical overload relay set per Clause 19.7DV.4 In case of doubt, compliance is checked by the test of Clause 19.7. The temperature of the motor windings shall not exceed the limits specified in Clause 19.7.

CLAUSE	VERDICT	COMMENT
19.7DV.4		***New clause added;*** Mechanical overload relay shall be responsive to motor current and rated to set to trip at not more than the percentage of the motor nameplate full-load current rating specified in Table 19.7DV. If the percentage protection specified in Column A of Table 19.7DV does not correspond to the percentage value of an overload relay of a standard size, the device of the next higher size may be used. However, the overload device of the next higher size shall protect against currents exceeding the percentage values specified in Column B of Table 19.7DV.
19.11DV		***New clause added;*** The refrigerant detection system, including activation of the mitigation mechanism, shall be single-fault tolerant. Conditions which result in a failure of the activation of the required mitigation per Annex 101.DVU which render the intended function of the system inoperable and are detectable by the user are not considered to be hazardous failures of the mitigation system (e.g., failure of connected fan coil, electronically commutated motor, or ultimate physical/mechanical failure of fan).
19.11.1DV		***New clause added;*** Testing is not required for adjustable speed drives that have been evaluated to UL 61800-5- 1 and CSA 22.2 No. 274.
19.11.3DV		***New clause added;*** Testing is not required for adjustable speed drives that have been evaluated to UL 61800-5- 1, UL 61800-5-2 and CSA 22.2 No. 274 if the adjustable speed drive PROTECTIVE ELECTRONIC CIRCUIT was evaluated as a safety function in UL 61800-5-2 (SIL2) and CSA C22.2 No. 274.
19.101DV		***New clause added;*** NOTE It might be necessary to short-circuit one or more components which operate during NORMAL OPERATION in order to ensure that the HEATING SYSTEMS are continuously energized. SELF-RESETTING THERMAL CUTOUTS should be short-circuited unless they comply with Clause 24.1.4, the number of cycles of operation being 100 000.
19.102		***New clause added;*** Appliances shall be constructed so that they shall not cause any risk of fire, mechanical hazard or electric shock even in the case of abnormal operation. Compliance is checked by applying any defect which may be expected in normal use, while the appliance is operated under conditions of NORMAL OPERATION

CLAUSE	VERDICT	COMMENT
		at RATED VOLTAGE. Only one fault condition is reproduced at a time. The tests are made consecutively. During the tests, the temperatures of the windings of ICE-MAKERS, shall not exceed the values given in Table 8. During and after the tests, compliance is checked as described in 19.13.
19.102DV.2		***New clause added;*** Thermal controls are not short-circuited;
20	Info	**Stability and mechanical hazards**
20.1DV.2		***New clause added;*** Each horizontally-hinged door that provide access to the refrigerated storage compartments of chest-type units and that may cause injury to persons upon unintentional closing shall be: a) Counterweighted, b) Spring loaded, or c) Provided with an automatic latch to retain them in the open position. Action members, such as springs and latches that may cause injury to persons due to pinching or the like, shall be enclosed or guarded.
21	Info	**Mechanical strength**
21.103		***New clause added;*** For appliances having a REFRIGERANT CHARGE within any REFRIGERATING CIRCUIT exceeding 150 g of FLAMMABLE REFRIGERANT, the refrigerant-containing parts shall be protected and shall not be an ACCESSIBLE PART. Any external surface that is adjacent or in contact with parts containing refrigerant shall have adequate mechanical impact withstand strength. Compliance is checked by inspection and by applying blows to the relevant outer surface in accordance with test Eha of IEC 60068-2-75. The appliance is rigidly supported and three blows, having an impact energy of 5,00 J ± 0,05 J, are applied to points on the surface adjacent to parts containing refrigerant, which are likely to be weak. After the test, the parts containing refrigerant shall remain not ACCESSIBLE PARTS and there shall be no visible deformation of the refrigerant-containing parts.

CLAUSE	VERDICT	COMMENT
		If there is doubt as to whether a defect has occurred by the application of the preceding blow, or the previous tests, this defect is neglected and the group of three blows is repeated to the same place on a new sample which shall then withstand the test.
22	Info	**Construction**
22.7		Appliances, including protective enclosures of a protected cooling system, that use FLAMMABLE REFRIGERANTS shall withstand: – a pressure of 3,5 times the saturated vapour pressure of the refrigerant at 70 °C, or equal to 3,5 times the pressure at the critical temperature if this is lower than 70 °C, the test pressure being rounded up to the next 0,5 MPa (5 bar), for parts exposed to the high side pressure during normal use; – a pressure of 5 times the saturated vapour pressure of the refrigerant at 20 °C, or equal to 2,5 MPa (25 bar), whichever is the greater, the test pressure being rounded up to the next 0,2 MPa (2 bar) for parts exposed only to low side pressure during normal use. Appliances that use R-744 refrigerant in subcritical applications, shall withstand, for parts exposed to the: – high side pressure during normal use, 3,5 times the saturated vapour pressure of the refrigerant at 27 °C, rounded up to the next 0,5 MPa; – low side pressure during normal use, 5 times the saturated vapour pressure of the refrigerant at −6,5 °C rounded up to the next 0,2 MPa; Compliance is checked by the following test. The appropriate part of the appliance under test is subjected to a pressure that is gradually increased hydraulically until the required test pressure is reached. This pressure is maintained for 1 min. The part under test shall show no leakage.
22.46DV		***New clause added;*** Annex R evaluation is not required for adjustable speed drives that have been evaluated to UL 61800-5-1, UL 61800-5-2 and CSA C22.2 No. 274 if the adjustable speed drive PROTECTIVE ELECTRONIC CIRCUIT was evaluated as a safety function in UL 61800-5-2 (SIL2) and CSA C22.2 No. 274.
22.103		***New clause added;*** Glass panels with an area having any two orthogonal dimensions exceeding 75 mm, that are ACCESSIBLE PARTS, shall be made from – glass that breaks in small pieces when it fractures; or – glass that is not released or dropped from its normal position when broken.

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An example of an appliance that could contain glass panels with an area having any two orthogonal dimensions exceeding 75 mm, that are ACCESSIBLE PARTS, is an appliance incorporating one or more swing doors containing glass panels that incorporate glass sheets that are exposed to the user accessible area when the door is placed in the most unfavourable position that may occur in normal use.

The requirement is not applicable to

– for glass panels in stacker doors or sliding doors, the glass sheet that is exposed to refrigerated space;
– for glass panels in doors containing more than two sheets of glass, the glass sheet sandwiched between the glass sheet exposed to the refrigerated space and the glass sheet exposed to the user accessible area.

Compliance is check by tests in a) or b) 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.

NOTE 1 The edges of the sample to be tested are contained within a frame of adhesive tape in such a manner that the broken pieces remain in place after breakage but without hindering expansion of the sample.

The sample under test is broken by means of a test punch having a head with a mass of 75 g ± 5 g and a conical tungsten carbide tip with an angle of 60° ± 2°. 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.

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.

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		NOTE 2 In the case of curved glass, plane pieces of the same material can be used for the test. b) For glass that is not released or dropped from its normal position when broken, compliance is checked by braking 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 g ± 5 g and a conical tungsten carbide tip with an angle of 60°± 2°. 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 way 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.
22.103DV		***New clause added;*** As an alternate to complying with the test of Clause 22.103, glass shall be of a nonshattering or tempered type that when broken complies with the Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used In Buildings, ANSI Z97.1.
22.104 formerly 22.110		***New clause added;*** The interior of compartments, in appliances with a FREE SPACE which is enclosed by sliding doors or sliding lids, shall be visible from the outside with the doors or lids closed. Compliance is checked by inspection.
22.105 formerly 22.111		***New clause added;*** The doors and lids of compartments in appliances with a FREE SPACE shall be capable of being opened from the inside. This requirement is not applicable to sliding doors or lids. Compliance is checked by the following test. The empty appliance is disconnected from the supply, placed on a horizontal support and levelled in accordance with the instructions for installation, with castors and rollers, if any, oriented, adjusted or blocked so as to prevent the appliance from moving. Locks, if any, on doors or lids are left unlocked. Doors and lids are closed for a period of 15 min.

CLAUSE	VERDICT	COMMENT
		A force is then applied to a point, equivalent to an accessible inside point, of each appropriate door or lid of the appliance, at the midpoint of the edge furthest from the hinge axis in the direction perpendicular to the plane of the lid or door. The force shall be applied at a rate not exceeding 15 N/s and the lid or door shall open before the force exceeds 70 N. NOTE 1 The force can be applied by means of a spring balance with the aid of a suction pad if necessary, to the point on the outer surface of the door or lid which corresponds to the accessible inside point. NOTE 2 If the handle of the door or lid is at the mid-point of the edge furthest from the hinge axis, the force can be applied by means of a spring balance to the handle. In this case, the value of the force required to open the door or lid from the inside can be determined by the proportional calculation relating to the distances of the handle and the accessible inside point from the hinge axis.
22.106 formerly 22.112		***New clause added;*** Drawers that are only accessible after opening a door or lid shall not contain a FREE SPACE. Compliance is checked by inspection and measurement.
22.107 formerly 22.113		***New clause added;*** Drawers which are accessible without opening a door or lid and which contain a FREE SPACE shall – have an opening in their rear wall that has a height of at least 250 mm and a width of at least two-thirds of the inner width of the drawer; – be capable of being opened from the inside. Compliance is checked by inspection and measurement and by the following test which is performed with a weight of 23 kg placed inside the drawer. The empty appliance is disconnected from the supply, placed on a horizontal support and levelled in accordance with the instructions, with castors and rollers, if any, oriented, adjusted or blocked so as to prevent the appliance from moving. Locks, if any, on drawers are left unlocked. Drawers shall be maintained closed for a period of 15 min.

CLAUSE	VERDICT	COMMENT
		The opening force is then applied to the drawer of the appliance at the geometrical centre of the front plane of the drawer equivalent to an accessible inside point, in the direction perpendicular to the front plane of the drawer. The force shall be applied at a rate not exceeding 15 N/s. The drawer shall open before the force exceeds 70 N.
22.108		***New clause added;*** Appliances having a REFRIGERANT CHARGE within any REFRIGERATING CIRCUIT exceeding 150 g of FLAMMABLE REFRIGERANT shall be constructed so that their operation does not cause excessive vibration or resonance points in the piping connected to the motor-compressor. Compliance is checked by the following test: The appliance is installed in accordance with the installation instructions. It is supplied at RATED VOLTAGE or at the upper limit of the RATED VOLTAGE RANGE. For motor-compressors, other than variable speed motor-compressors in the appliance, the supply frequency to the motor-compressor is varied in 1 Hz steps between 0,9 times and 1,1 times the RATED FREQUENCY. For variable speed motor-compressors in the appliance, the supply frequency from the inverter to the motor-compressor is increased in 1 Hz steps from minimum frequency to maximum frequency over the speed range in the appliance. The vibration amplitude is measured at points in the piping with a large amplitude. When measured with a low pass filter at 200 Hz, vibrations shall not exceed an acceleration of 0,3 g RMS in the refrigerant containing parts. Care shall be taken that the measurement sensors do not influence the line vibration level.
22.110		***New clause added;*** The REFRIGERANT CHARGE of FLAMMABLE REFRIGERANT in appliances with an incorporated REFRIGERANT UNIT or motor-compressor shall not exceed 13 times the LFL of the FLAMMABLE REFRIGERANT or 1,2 kg in any REFRIGERATING CIRCUIT, whichever is smaller. The LFL is expressed in kg/m3. The LFL values for refrigerants are given in Table 102.

CLAUSE	VERDICT	COMMENT
		The REFRIGERANT CHARGE of FLAMMABLE REFRIGERANT in appliances with a remote REFRIGERANT UNIT or motor-compressor (split system), shall not exceed 150 g in any REFRIGERATING CIRCUIT. The molar mass of the refrigerant in appliances having a REFRIGERANT CHARGE exceeding 150 g of FLAMMABLE REFRIGERANT in any REFRIGERATING CIRCUIT shall not be less than 30 kg/kmol. Compliance is checked by inspection.
22.110DV.1		***New clause added;*** The REFRIGERANT CHARGE of a FLAMMABLE REFRIGERANT in self-contained appliances with an incorporated REFRIGERANT UNIT or motor-compressor shall not exceed 13 m3 × LFL of the FLAMMABLE REFRIGERANT. The LFL is expressed in kg/m3. The LFL values for refrigerants are given in Table 102 and used as WCF values for refrigerant blends.
22.110DV.2		***New clause added;*** With regards to Clause 22.110DV.1, the REFRIGERANT CHARGE of a FLAMMABLE REFRIGERANT in the following self-contained appliances shall not exceed 8 m3 × LFL of the FLAMMABLE REFRIGERANT: a) appliances with doors and/or drawers enclosing one or more refrigerated compartments; and b) packaged refrigerating units. The REFRIGERANT CHARGE of a FLAMMABLE REFRIGERANT in a self-contained appliance used in a public corridor or lobby shall not exceed 3 m3 × LFL.
22.110DV.3		***New clause added;*** Appliances using A2 and A3 FLAMMABLE REFRIGERANTS shall be factory-sealed self-contained units and shall be fully charged at the factory. Appliances using A2L refrigerants may be either self-contained or field-erected and may be factory or field charged.
22.110DV.4		***New clause added;*** Field-erected systems consisting of various partial units employing an A2L refrigerant shall comply with the requirements in Annex 101.DVG and Annex 101.DVU. m1, m2, and m3 are defined as follows: m1 = 13 m3 × LFL except for products with doors or drawers for which the limit is 8 m3 × LFL

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		m2 = 52 m3 × LFL m3 = 260 m3 × LFL where LFL is the lower flammable limit in kg/m3 for the refrigerant used. Note: The constants in the calculations of m1 , m2 , and m3 have the units of m3. For example, if LFL = 0,038 kg/m3, the value of m1 in the above equation would be 0,494 kg.
22.110DV.5		***New clause added;*** Larger systems with factory assembled refrigerating circuits using A2L refrigerants only may exceed 13 m3 × LFL, provided that they are not one of the following equipment types: – appliances containing one or more refrigerated spaces or compartments; – packaged refrigerating units for use on WICF applications; – ice makers. NOTE Examples of larger system types using A2L refrigerants include refrigeration chillers and refrigeration roof top units (RTUs) for use on refrigerated warehouses. These larger systems shall comply with the requirements for partial units using A2L refrigerants, as described in Clause 22.110DV.4. Larger systems that do not directly cool a refrigerated space, such as chillers, shall comply with the requirements for compressor units and condensing units. Larger systems that directly cool a refrigerated space, such as refrigeration RTUs, shall be treated as matched systems consisting of a condensing unit and an evaporator unit installed in a walk-in cooler or freezer.
22.110DV.6		***New clause added;*** The molar mass of the refrigerant in appliances having a refrigerant charge exceeding 150 g of flammable refrigerant in any refrigerating circuit shall not be less than 30 kg/kmol.
22.111.1DV		***New clause added;*** Modify Clause 22.111.1 of the Part 2 by adding the following dashed items and paragraphs after the reference to Annex BB: – electrical components for systems using A2L refrigerants that are in compliance with Annex 101.DVL, as these are not considered a potential ignition source, – electrical components for systems using A2L refrigerants that are located in an

CLAUSE	VERDICT	COMMENT
		enclosure which is in compliance with Annex 101.DVM, as these are not considered a potential ignition source, – switching devices for systems using A2L refrigerants in compliance with all of the following, as these are not considered a potential ignition source: • the device is capable of 100 000 cycles per Clause 24; • the switched electrical load (Le) in kVA is less than or equal to: – Le = 5 × (6,7/Su)4 when breaking all phases; – Le = 2,5 × (6,7/Su)4 when breaking two legs of a three phase load, or when breaking one or two legs of a single phase load Where Le is the switched inductive electrical load in kilovoltamperes (kVA), Su is the burning velocity of a refrigerant in centimetres per second (cm/s). Compliance is checked by measurement. The burning velocity (Su) for the purpose of determining the maximum quenching diameter (dq) in Annex 101.DVL and the maximum allowable electrical load Le according to the above shall take into consideration the effect of humidity on burn velocity (Su). The burning velocity (Su) shall be the highest value of • as specified in ISO 817; or • as measured in humid air at 27 °C ± 0,5 C dew point at 101,3 kPa containing 21,0 ± 0,1 % O2 excluding water vapour determined at the nominal composition as specified in ISO 817. This test can be done at the temperature higher than 27 °C. The required dew point is only for humidity. The burning velocity (Su) at 27 °C dew point may be determined by extrapolation of the measurement at 23 °C and 50 % relative humidity and the burning velocity (Su) as provided by ISO 817. The extrapolation shall be based on the measured value increased by the measurement uncertainty to the burning velocity (Su) at 23 °C and 50 % relative humidity. If the burning velocity (Su) is not measurable at dry condition, the burning velocity shall be measured at 27 °C dew point.
22.112DV		***New clause added;*** Modify Clause 22.112 of the Part 2 by adding the following dashed items and paragraphs after all three instances of “even if they produce arcs or sparks during operation”:

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– electrical components for systems using A2L refrigerants that are in compliance with Annex 101.DVL, as these are not considered a potential ignition source, – electrical components for systems using A2L refrigerants that are located in an enclosure which is in compliance with Annex 101.DVM, as these are not considered a potential ignition source,
– switching devices for systems using A2L refrigerants in compliance with all of the following, as these are not considered a potential ignition source:

- the device is capable of 100 000 cycles per Clause 24;
- the switched electrical load (Le) in kVA is less than or equal to:
  – Le = 5 × (6,7/Su)4 when breaking all phases;
  – Le = 2,5 × (6,7/Su)4 when breaking two legs of a three phase load, or when breaking one or two legs of a single phase load

Where

Le is the switched inductive electrical load in kilovoltamperes (kVA), Su is the burning velocity of a refrigerant in centimetres per second (cm/s).

Compliance is checked by measurement.

The burning velocity (Su) for the purpose of determining the maximum quenching diameter (dq) in Annex 101.DVL and the maximum allowable electrical load Le according to the above shall take into consideration the effect of humidity on burn velocity (Su).

The burning velocity (Su) shall be the highest value of

- as specified in ISO 817; or
- as measured in humid air at 27 °C ± 0,5 C dew point at 101,3 kPa containing 21,0 ± 0,1 % O2 excluding water vapour determined at the nominal composition as specified in ISO 817.

This test can be done at the temperature higher than 27 °C. The required dew point is only for humidity.

The burning velocity (Su) at 27 °C dew point may be determined by extrapolation of the measurement at 23 °C and 50 % relative humidity and the burning velocity (Su) as provided by ISO 817. The extrapolation shall be based on the measured value increased by the measurement uncertainty to the burning velocity (Su) at 23 °C and 50 % relative humidity. If the burning velocity (Su) is not measurable at dry condition, the burning velocity shall be measured at 27 °C dew point.

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22.113DV		***New clause added;*** Modify Clause 22.113 of the Part 2 by adding the following dashed items and paragraphs after “even if they produce arcs or sparks during operation”: – electrical components for systems using A2L refrigerants that are in compliance with Annex 101.DVL, as these are not considered a potential ignition source, – electrical components for systems using A2L refrigerants that are located in an enclosure which is in compliance with Annex 101.DVM, as these are not considered a potential ignition source, – switching devices for systems using A2L refrigerants in compliance with all of the following, as these are not considered a potential ignition source: • the device is capable of 100 000 cycles per Clause 24; • the switched electrical load (Le) in kVA is less than or equal to: – Le = 5 × (6,7/Su)4 when breaking all phases; – Le = 2,5 × (6,7/Su)4 when breaking two legs of a three phase load, or when breaking one or two legs of a single phase load Where Le is the switched inductive electrical load in kilovoltamperes (kVA), Su is the burning velocity of a refrigerant in centimetres per second (cm/s). Compliance is checked by measurement. The burning velocity (Su) for the purpose of determining the maximum quenching diameter (dq) in Annex 101.DVL and the maximum allowable electrical load Le according to the above shall take into consideration the effect of humidity on burn velocity (Su). The burning velocity (Su) shall be the highest value of • as specified in ISO 817; or • as measured in humid air at 27 °C ± 0,5 C dew point at 101,3 kPa containing 21,0 ± 0,1 % O2 excluding water vapour determined at the nominal composition as specified in ISO 817. This test can be done at the temperature higher than 27 °C. The required dew point is only for humidity. The burning velocity (Su) at 27 °C dew point may be determined by extrapolation of the measurement at 23 °C and 50 % relative humidity and the burning velocity (Su) as provided by ISO 817. The extrapolation shall be based on the measured value increased by the measurement uncertainty to the burning velocity (Su) at 23 °C and

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		50 % relative humidity. If the burning velocity (Su) is not measurable at dry condition, the burning velocity shall be measured at 27 °C dew point.
22.114DV		***New clause added;*** **Hot surfaces** Temperatures on surfaces that may be exposed to leakage of FLAMMABLE REFRIGERANTS shall not exceed the maximum allowable surface temperature given in Table 102DV. For FLAMMABLE REFRIGERANTS except A2L REFRIGERANTS not listed in Table 102DV, the maximum allowable surface temperature is determined by auto-ignition temperature reduced by 100 K. For A2L REFRIGERANTS not listed in Table 102DV, the maximum allowable surface temperature is determined by the highest of auto-ignition temperature reduced by 100 K or, if tested per ASTM D8211 or Annex 101.DVO, the HOT SURFACE IGNITION TEMPERATURE reduced by 100 K. Compliance is checked by measuring the appropriate surface temperatures during the tests of Clauses 11 and 19, except those which during the tests of Clause 19 are terminated in a non-self-resetting way. Compliance for A2L REFRIGERANTS is checked by measuring the appropriate surface temperatures during the tests of Clause 11. Surfaces in compliance with this Clause shall not be considered a potential ignition source.
Table 102DV		***New table added;*** Refrigerant flammability parameters
22.115DV		***New clause added;*** When a FLAMMABLE REFRIGERANT is used, all appliances shall be charged with refrigerant at the manufacturing location or charged on site as recommended by the manufacturer. A part of an appliance that is charged on site, which requires brazing or welding in the installation, shall not be shipped with a FLAMMABLE REFRIGERANT CHARGE. Joints made in the installation between parts of the REFRIGERATING SYSTEM, with at least one part charged, shall be made in accordance with the following: a) A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the REFRIGERATING SYSTEM parts. A

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		vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged REFRIGERATING SYSTEM part. b) Mechanical connectors used indoors shall comply with ISO 14903 or UL 207 or CSA C22.2 No.140.3. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated. c) Refrigerant tubing shall be protected or enclosed to avoid damage. Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that might be displaced during NORMAL OPERATION shall be protected against mechanical damage. Compliance is checked according to the installation instructions and a trial installation if necessary.
22.116		***New clause added;*** Appliances having a REFRIGERANT CHARGE exceeding 150 g of FLAMMABLE REFRIGERANT in any REFRIGERATING CIRCUIT shall be constructed such that a leak of refrigerant shall not result in a FLAMMABLE REFRIGERANT concentration surrounding the appliance. In the event of a leak from the appliance while energised, if airflow is required to meet these requirements, the airflow shall be guaranteed. If airflow is not maintained at a level sufficient to comply with the requirements of Annex CC, the motor-compressors and heating elements shall be switched off within 5 minutes and an alarm shall be given. T he motor-compressor and heating elements shall only be capable of restarting after the required airflow level has been reinstated. The airflow shall be produced by components that are part of the appliance. Compliance is checked by inspection and by the tests specified in Annex CC. If compliance relies on the operation of an ELECTRONIC CIRCUIT, the tests in Annex CC are repeated under the following conditions applied separately: – the fault conditions in a) to g) of 19.11.2 applied one at a time to the electronic circuit; – the electromagnetic phenomena tests of 19.11.4.2 and 19.11.4.5 applied to the appliance. If the ELECTRONIC CIRCUIT is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of Annex R.

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22.116DV		***New clause added;*** Partial units shall comply with Annex CC if required in Annex 101.DVG.
22.117		***New clause added;*** In appliances having a REFRIGERANT CHARGE exceeding 150 g of FLAMMABLE REFRIGERANT in any REFRIGERANT CIRCUIT, the refrigerant tubing shall be protected from potential damage during normal use relocation, repositioning and user maintenance. Compliance is checked by inspection.
22.118		***New clause added;*** Low-temperature solder alloys having melting point of less than 450 °C shall not be used for pipe connections in a REFRIGERATING CIRCUIT, if the refrigerant charge exceeds 150 g of FLAMMABLE REFRIGERANT Compliance is checked by inspection and test.
22.119		***New clause added;*** Capped valves and capped service ports fitted to HERMETICALLY SEALED SYSTEMS for the purposes of compliance with the requirements for permanent connections on systems containing FLAMMABLE REFRIGERANTS shall comply with the requirements of ISO 14903, tightness control level A1. Compliance is checked by inspection and the tests in ISO 14903.
22.120		***New clause added;*** Only HERMETICALLY SEALED SYSTEMS shall be used in appliances with FLAMMABLE REFRIGERANT. All the connections in a HERMETICALLY SEALED SYSTEM shall comply with ISO 14903 tightness control level A1. Compliance is checked by inspection and the relevant tests.
22.121		***New clause added;*** If symbol IEC 60417-6412:2019-03 is marked on the appliance, the value of A in the symbol shall be equal to or greater than the largest value of the room floor area limit Alim that is determined from the following: $$A_{lim} = \frac{M}{2{,}2\ x\ (0{,}25\ x\ LFL)}$$

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		where M is the REFRIGERANT CHARGE (kg); LFL is the lower flammability limit of the FLAMMABLE REFRIGERANT (kg/m3); 2,2 is the assumed minimum room height (m); 0,25 coefficient that gives 25 % of LFL Compliance is checked by inspection.
22.124DV.10		***New clause added;*** The pressure relief indicated in Clauses 22.124DV.5 and 22.124DV.6 shall be one of the following: a) a rupture member or pressure relief valve that will relieve the pressure at not more than 40 % of the highest pressure defined in Annex 101.DVJ; or b) a fusible plug, provided that the critical pressure of the refrigerant used does not exceed the relieving pressure specified above, and that the saturation pressure of the refrigerant used, at the temperature marked on the plug, does not exceed the relieving pressure specified above. However, the pressure-relief device required in accordance with Clause 22.124DV.622.124DV.6 shall not be a fusible plug.
22.124DV.11		***New clause added;*** All pressure relief means shall be connected adjacent to or directly to the pressure vessel or parts of the system protected. When installed adjacent, there shall be no means of flow restriction or reduction in cross sectional area of the refrigeration system between the pressure vessel or part and the pressure relief means. Pressure-relief devices shall be connected above the liquid refrigerant level and installed to make them accessible for inspection and repair and to protect them from conditions that could cause them to malfunction.
22.124DV.12		***New clause added;*** An appliance with a pressure vessel having an internal gross volume exceeding 0,28 m3 (10 cubic feet) shall comply with ANSI/ASHRAE 15 and CSA B52.
22.124DV.13		***New clause added;*** If pressure-relief devices discharge into the low pressure side of the system, the low side pressure-relief devices shall have capacity to protect either the pressure vessels that are relieved into the low pressure side of the system, or all pressure vessels on the low side of the system, whichever relieving capacity is the largest.
22.124DV.14		***New clause added;*** A positive displacement compressor operating at pressures exceeding 103 kPa and having a displacement exceeding 0,02 m3/s shall be equipped with a pressure relief device having the capacity and the pressure setting necessary to prevent rupture of the compressor. The pressure-relief device shall be located between

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		the compressor and stop valve on the discharge side. Discharge from the pressure-relief device may be vented to the atmosphere or into the low pressure side of the system.
22.124DV.15		***New clause added;*** Calculation of the discharge capacity of a rupture member or fusible plug shall be in accordance with the applicable refrigeration safety codes.
22.124DV.16		***New clause added;*** The nominal rated rupture pressure of a rupture member or the start-to-discharge pressure of a pressure relief valve shall not exceed: a) the marked maximum working pressure of a pressure vessel being protected; or b) one-third of the ultimate strength of a pressure vessel that is not marked with the maximum working pressure.
22.124DV.17		***New clause added;*** The section of an appliance intended to receive the refrigerant charge during a pump-down shall have the capacity to receive the charge without the liquid occupying more than 90 percent of the volume of the section when the temperature of the refrigerant is 32 °C (90 °F).
22.127DV		***New clause added;*** REFRIGERANT DETECTION SYSTEMS that are required by this Standard for A2L REFRIGERANTS shall comply with Annex 101.DVP. Location of the sensors is checked by inspection and by testing in accordance with Annex 101.DVQ.
23	Info	**Internal wiring**
23.1DV		***New clause added;*** Wiring shall be effectively prevented from coming into contact with moving or vibrating parts.
23.5DV		***New clause added;*** Parallel conductor appliance wiring material of the integral type shall not be ripped more than 76 mm (3,0 in) unless the thickness of conductor insulation after ripping is at least 1,47 mm (0,058 in). If the material has conductor insulation not less than 0,71 mm (0,028 in) after ripping and is within a separate metal enclosure, conduit, electrical metallic tubing, or metal raceway, the length of rip is not limited.
23.101DV		Tapped control circuit conductors that are used on other than extra-low voltage circuits shall:

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		– Be sized 0,82, 1,3, or 2,1 mm2, not exceed 1,2 m in length between points of opposite polarity, and be protected by a 60 A or smaller branch circuit type overcurrent protective device. The refrigerator may be provided without the overcurrent device when, based on the marked rating(s) of the refrigerator, the rating of the branch circuit overcurrent protective device(s) does not exceed the values specified in NEC Table 430.72 (B) – Maximum rating of Overcurrent Protective Device in Amperes; or – Be less than 305 mm in length. The protective earthing path shall be connected to the supply circuit having a capacity in accordance with Table 27DV.3 of CAN/CSA-C22.2 No. 60335-1/UL 60335-1.
23.102DV		***New clause added;*** If it can be determined that the wiring will not be exposed to heat from radiating sources or heated components, and if the ampacity of the conductors is in accordance with Table 23.102DV, the heating tests on the wiring may be waived.
Table 23.102DV		***New table added;*** Wiring materials ampacities
23.103DV		***New clause added;*** Splices and connectors shall comply with a) UL 486A-486B, UL 310, or UL 486C; and b) CAN/CSA-C22.2 No. 65 or CSA C22.2 No. 153.
23.104DV		***New clause added;*** A tapped high-voltage control circuit conductor shall be provided with overcurrent protection. The rating of the overcurrent protective device or devices shall not exceed the applicable value specified in NEC Table 430.72 (B) – Maximum Rating of Overcurrent Protective Device in Amperes.
23.105DV		***New clause added;*** Conductors of hazardous voltage motor circuits having two of more thermal or overcurrent protected motors, or such (one or more) motors in combination with an electric resistance heater for connection to one power supply, shall be tested in accordance with the short circuit test of Clause 27. The short circuit test is not required if at least one of following conditions is met: a) The conductors shall have an ampacity that is greater than 1/3 of the capacity of the supply conductors. b) The conductors shall be 18 AWG or larger, and not more than 1.2 m in length, and the supply circuit shall not be fused at greater than 60 amps.

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		c) The conductor shall be connected between two fixed impedances that reduce the risk of high fault current. d) The conductor shall be a jumper lead between controls and not longer than 76 mm unless the jumper is located inside the control panel. e) The motor circuits shall be sub-fused.
24	Info	**Components**
24.1DV		***New clause added;*** The requirements in Clauses 24.1DV.2 – 24.1DV.7 do not apply.
24.1.4DV.1		***New clause added;*** Modification of Clause 24.1.4 of the Part 2 to add the following dashed item to the list that begins with "Electrical PRESSURE RELIEF DEVICES shall comply with IEC 60730- 2-6 and": – SELF-RESETTING THERMAL CUT-OUTS which may influence the test results of Clause 19.101 and which are not short-circuited during the test of Clause 19.101
24.1ADV.2		***New clause added;*** Pressure-relief and pressure regulating-relief devices shall comply with the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII. Valves of 1/2 inch iron pipe size and larger shall bear the authorized code "UV" symbol together with the set pressure and capacity. Devices of less than 1/2 inch iron pipe size shall be similarly marked. However, where the size does not permit a nameplate, the code symbol may be omitted and the set pressure and capacity may be stamped on the device or on a metal plate attached to it. Manufacturers of devices that do not bear the code symbol shall provide evidence of certification of the device and its pressure and capacity rating by appropriate code authorities.
24.1ADV.3		***New clause added;*** Pressure-relief devices shall be set to start to function at a pressure not to exceed the design pressure of the parts of the system protected.
24.1ADV.4		***New clause added;*** The marked discharge capacity of a pressure regulating-relief device shall be not less than the minimum required discharge capacity as determined from Clause 24.101.
24.1ADV.5		***New clause added;*** Pressure relief devices used to protect pressure vessels and CO2 refrigeration systems, shall not be electrically operated.

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24.7		***New clause added;*** For coupling nuts used with hose-sets marked 25 °C max, the 96-h ageing test is carried out at a temperature of • 32 °C ± 2 °C on hoses sets supplied with appliances of climatic class 0, 1, 2, 3, 4, 6 or 8; • 43 °C ± 2 °C on hoses sets supplied with appliances of climatic class 5 or 7.
24.102DV.1		***New clause added;*** A motor overcurrent protective device or a thermal protective device employed on appliances having more than one motor, or having a motor and supplementary heater, wired for connection to one supply circuit, shall withstand short-circuit conditions in accordance with the limited short-circuit test described in Clause 27.7DV.1.5. The short circuit tests on the protective device may be waived if: a) the thermally protected motor or separately enclosed motor overload protective device is within an outer cabinet of a product or section of a product; b) the motor or device is intended to be protected by the overcurrent protective device as specified on the unit nameplate, or provided as part of the product, and which is acceptable for the branch circuit protection; c) the assembly is constructed so that flame and molten metal will be confined within the cabinet; and d) combustible material, except electrical insulation or an air filter, is not located below the motor.
24.102DV.2		***New clause added;*** Three samples of each component shall be subjected to each test condition, and a new protective device shall be used for each test. The devices shall withstand the short circuit conditions described in Table 27DV.3 when protected by an overcurrent protective device that is suitable for branch-circuit protection and of the type and rating as specified in Clause 27.7DV.1.8. There shall be no damage to conductors or their terminations, no ignition of cheesecloth or cotton surrounding the enclosure housing the components under test, and no arc- over between hazardous voltage and extra-low-voltage circuits.
25	Info	**Supply connection and external flexible cords**
~~27.5DV.1.2~~ 25.7DV.1.2		***New clause added;*** A power supply cord for an outdoor use refrigerator shall be one of the types specified in 25.7DV of the Part 1 and also be suitable for outdoor use. Such cords are identified by the letters “W” or “W-A” following the cord type designation marked on the jacket.

CLAUSE	VERDICT	COMMENT
27	Info	**Provision for earthing**
27.5DV.1.1		***New clause added;*** A minimum current derived from a source having a no-load voltage not exceeding 12 V (a.c. or d.c.) and equal to 2,0 times the rating of the earthed branch circuit, or 60A (whichever is less) shall be passed between the earthing terminal or earthing contact and each of the ACCESSIBLE METAL PARTS in turn.
27.5DV.3		***New clause added;*** If the ground continuity between system components meets the minimum values specified in Clause 27.5, it is considered to meet the requirements without dedicated grounding conductors.
27.6DV.3		***New clause added;*** This requirement does not apply for printed conductors on adjustable speed drives that have been evaluated to UL 61800-5-1 and CSA C22.2 No. 274.
29	Info	**Clearances, creepage distances and solid insulation**
29.101DV.1		***New clause added;*** Unless provided with insulation rated for the maximum required voltage of any conductor involved, insulated conductors of different circuits (internal wiring including wires in a wiring compartment) shall be separated by barriers or shall be segregated, and shall, in any case, be so separated or segregated from uninsulated LIVE PARTS connected to different circuits.
29.101DV.2		***New clause added;*** For APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC, Clause 101.DVR.29 of Annex 101.DVR applies.
30	Info	***Resistance to heat and fire***
30.2.1DV		***New clause added;*** The glow-wire test is not carried out on parts of material classified at least HB according to UL 94 or CAN/CSA-C22.2 No. 0.17 or having a glow-wire ignition temperature according to IEC 60695-2-13 of at least 575 °C, provided that the test sample was no thicker than the relevant part of the appliance.
31	Info	***Resistance to rusting***
31.101DV.3		***New clause added;*** As an alternative to Clauses 31.101DV.1 and 31.101DV.2, sheet steel structural parts, such as cabinets and enclosures that are intended for outdoor use, with material thicknesses greater than 1,35 mm (0,053 in), may be protected against corrosion with a coating designation of G60, or by other metallic or non-metallic coatings that provide equivalent protection.

CLAUSE	VERDICT	COMMENT
Annex A		***New annex added;*** **Routine tests** See standard for details.
Annex R		***New annex added;*** **Software evaluation**
R.2.2.5		For PROGRAMMABLE ELECTRONIC CIRCUITS with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1, detection of a fault/error shall occur before compliance with Clause 19 and 22.116 is impaired.
R.2.2.9		The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19 and 22.116 is impaired.
Annex AA		**Locked-rotor test of fan motors** The winding of a fan motor shall not reach excessive temperatures if the motor locks or fails to start. Compliance is checked by the following test. The fan and its motor are mounted on wood or similar material. The motor's rotor is locked. Fan blades and motor brackets are not removed. The motors are supplied at their supplied voltage when the appliance is supplied at RATED VOLTAGE or at the upper limit of the RATED VOLTAGE RANGE. The supply circuit is given in Figure AA.1. The assembly is to operate under these conditions for 15 days (360 h) unless the PROTECTIVE DEVICE, if any, permanently open circuits prior to the expiration of that time. In this case, the test is discontinued. If the temperature of motor windings stays lower than 90 °C, the test is discontinued when steady conditions are established. Temperatures are measured under conditions specified in 11.3. During the test, winding temperatures shall not exceed the values given in Table 8. After a period of 72 h from the beginning of the test, the motor shall withstand the electric strength test of 16.3.

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		For other than DC motors, a residual current device with a rated residual current of 30 mA is connected so as to disconnect the supply in the event of an excessive earth leakage current. At the end of the test, the leakage current is measured between windings and the body at a voltage equal to twice the RATED VOLTAGE; its value shall not exceed 2 mA.
Annex CC		***New annex added;*** **Test method for determining gas concentration beyond the boundary of the appliance** The appliance is installed according to the instructions empty with doors or lids closed, or roller blinds closed or open, whichever is the more unfavourable and energized if necessary. Positioning of the appliance shall be against the centre of the shortest wall within the test room at a distance from the wall of the distance specified in the instructions or 50 mm whichever is greater. If the appliance can be fitted with any accessories, they shall be used or arranged in a manner that gives the most unfavourable result. See standard for details.
Annex 101.DVA	Info	**Supplemental requirements**
Annex 101.DVA 7		***New section added;*** **Marking and instructions** See standard for details.
Annex 101.DVB	Info	**MCA, MOP, Code markings, and conduit openings**
Annex 101.DVB.1		***New section added;*** **Determination of short-circuit current ratings** See standard for details.
Annex 101.DVF	Info	**Packaged refrigerating units**
Annex 101.DVF.5		***New section added;*** **PACKAGED REFRIGERATING UNITS employing a FLAMMABLE REFRIGERANT for walk-in cooler or freezer (WICF) applications** See standard for details.

CLAUSE	VERDICT	COMMENT
Annex 101.DVF.6		***New clause added;*** **Motor controllers** In reference to Clause 22.40 of the Part 1, a motor controller(s) shall be provided for all refrigerating units incorporating a) two or more motors; or b) a motor and other load(s) intended for connection to the same power supply. A controller shall not be required for any supply circuit of a refrigerating unit which supplies two or more motors or a motor(s) and other load(s) when: i) the marked maximum size of the supply circuit overcurrent protection device for that circuit does not exceed 20 amperes at 125 volts or less or 15 amperes at 600 volts or less; and ii) the rating of any motor in the circuit does not exceed 746 W (1 horsepower) output and six full load amperes.
Annex 101.DVG	Info	**Evaluation of partial systems**
Annex 101.DVG.6.3		***New clause added;*** When the compressor input is determined by testing the compressor as an individual component, it can be measured by conducting the Annex AA testing or MCC test of CAN/CSA-C22.2 No. 60335-2-34/UL 60335-2-34. When the MCC test is conducted, the MCC shall be multiplied by 0,64 to determine the compressor Rated Load Amperage (RLA). When the Annex AA testing is conducted, the current measured during the Annex AA test should be multiplied by 0,64.
Annex 101.DVG.10		***New section added;*** **Allowable refrigerant charge and requirements for partial units interconnected to field-erected systems employing an A2L refrigerant** See standard for details.
Annex 101.DVH	Info	**Dispensing units**
Annex 101.DVH.3		***New section added;*** **Beverage product system** See standard for details.

CLAUSE	VERDICT	COMMENT
Annex 101.DVJ	Info	**Pressure and fatigue test requirements**
Annex 101.DVJ.1		**General** All refrigerating system parts shall withstand the maximum pressure expected in normal operation, abnormal operation, and standstill. Systems employing R744 refrigerant shall be tested to the following: 1) for R-744 non-transcritical refrigeration systems: a) subject to high-side pressure, a minimum of 3 times the marked design pressure; b) subject to low-side pressure, a test pressure that is equal to 3 times the start-to-discharge value of the pressure relief valve. Note: Carbon dioxide (R744) used in a cascade or remote transcritical system, used as a secondary coolant, or used as intermediate pressure of a transcritical system, is considered to be at low-side pressure. 2) for R-744 transcritical refrigeration systems, refrigerant containing parts which are: a) exposed only to high-side pressure shall be subjected to a test pressure that is equal to the highest of 3 times the design pressure; b) exposed only to low-side pressure shall be subjected to a test pressure that is equal to 3 times the start-to-discharge value of the pressure relief valve. c) exposed only to intermediate pressure shall be subjected to a test pressure that is equal to 3 times the design pressure. 3) Pressure vessels employed in refrigeration systems shall be tested to Clause 101.DVJ.4.2 or shall comply with UL 207 for vessels less than 150 mm (6 in) in diameter or shall be required to meet requirements set in ASME Boiler Pressure Vessel Code Section VIII or CSA B51 for vessels equal to or greater than 150 mm (6 in) and need not be additionally tested.
101.DVJ.2		**Pressure test value determined under testing carried out in Clause 11** A refrigerating system component that is exposed to pressure shall be subjected to measurement of the maximum pressure developed in the refrigerating system when tested under the conditions specified in Clause 11 including Clause 11.103DV. The pressure test value shall be at least three times the maximum pressure developed during operation under Clause 11 including Clause 11.103DV. For STIRLING REFRIGERATION SYSTEMS, the maximum pressure shall be 3 times the mean pressure measured during the test of Clause 11.103DV.

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101.DVJ.4	Info	**Pressure test value determined under testing carried out under standstill conditions**
101.DVJ. 4.1.1		***New clause added;*** Thermosiphons shall have a pressure test value not less than one and one half times the vapor pressure of the refrigerant at 60 °C (140 °F).
101.DVJ. 4.1.2		The pressure test shall be carried out on three samples of each component. The test samples shall be filled with a liquid, such as water, to exclude air and shall be connected in a hydraulic pump system. The pressure shall be raised gradually until the required test pressure is reached. The pressure shall be maintained for at least 1 min, during which time the sample shall not leak. Where gaskets are employed for sealing parts under pressure, leakage at gaskets is acceptable, provided that the leakage only occurs at a value greater than 120 % of the maximum allowable pressure and the test pressure is still reached for the specified time. Additional sealing measures, such as an "O" ring, for pressure testing may be provided. <u>For Stirling engine systems, using refrigerants classified as A1 in accordance with the Standard for the Designation and Safety Classification of Refrigerants, ANSI/ASHRAE 34 in amounts less than 100 g (3.53 oz), leakage is permitted provided that the test pressure can be maintained for 1 minute. The component shall not rupture at the required strength test pressure even though leakage has been detected.</u>
101.DVJ.5	Info	**Fatigue test option for Clauses 101.DVJ.1 and 101.DVJ.4.2**
101.DVJ. 5.1.1		***New clause added;*** For refrigerators intended to utilize carbon dioxide (R744) in a secondary loop or cascade system, the pressure shall be two times the start-to-discharge pressure of the pressure relief valve.
~~101.DVJ. 5.5.1~~		~~***New clause added;***~~ ~~For refrigerators intended to utilize carbon dioxide (R744) in a secondary loop or cascade system, the pressure for the first cycle shall be the start-to-discharge value of the pressure relief valve.~~
101.DVJ. 5.5.2		***New clause added;*** For refrigerators utilizing a transcritical refrigeration system, the pressure for the first cycle shall be 1/3 the value determined in Clause 101.DVJ.1.
101.DVJ. 5.5.7		The pressure for the remainder of the test cycles shall be as follows: a) For components subject to high side pressures, the upper pressure value shall not be less than the saturated vapour pressure of the refrigerant at 50 °C, and the

CLAUSE	VERDICT	COMMENT
		lower pressure value shall not be greater than the saturated vapour pressure of the refrigerant at 5 °C. b) For components subjected to only low side pressures, the upper pressure value shall be not less than the saturated vapour pressure of the refrigerant at 30 °C, and the lower pressure value shall be between 0 bar and the greater of 4,0 bar or the saturated vapour pressure of the refrigerant at –13 °C. c) For components used in refrigerators intended to utilize carbon dioxide (R744) in a secondary loop, cascade, or remote transcritical system, the upper pressure value shall not be less than the start-to-discharge value of the pressure regulating relief valve. The lower pressure shall be not more than 100 psig. d) For high-side or intermediate stage parts of a transcritical system, the upper pressure for the remaining cycles shall be not less than 95 percent of the higher of the values specified in Clause 101.DVJ.5.5. The lower pressure for all cycles shall not be greater than the saturated vapor pressure of the refrigerant at 4,4 °C (40 °F). For R744, this value is 3.8 MPa (553 psig).
Annex 101.DVL		***New annex added;*** **Allowable opening of relays and similar components to prevent ignition of A2L refrigerants** This Annex is applicable to electric components or devices of appliances using A2L refrigerants. See standard for details.
Annex 101.DVM		***New annex added;*** **Flame arrest enclosure verification test for A2L refrigerants** This Annex is applicable to appliances using A2L refrigerants. See standard for details.
Annex 101.DVN		***New annex added;*** **Automatic commercial ice-making units** This Annex shall be used for the evaluation of commercial ice makers (see Clause 3.8.113DV). See standard for details.
Annex 101.DVO		***New section added;*** **Test method for hot surface ignition temperature for A2L** See standard for details.

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Annex 101.DVP		***New section added;*** **Refrigerant detection systems for A2L refrigerants** This Annex applies to REFRIGERANT DETECTION SYSTEMS for use with appliances using A2L refrigerant only. See standard for details.
Annex 101.DVQ		***New section added;*** **Refrigerant sensor location confirmation test** This test is applicable to appliances with REFRIGERANT DETECTION SYSTEMS other than remote detection. See standard for details.
Annex 101.DVR		***New section added;*** **Requirements for APPLIANCES NOT ACCESSIBLE TO THE GENERAL PUBLIC** See standard for details.
Annex 101.DVS		***New section added;*** **Requirements for operation, service and installation manuals of appliances using flammable refrigerants** See standard for details.
Annex 101.DVT		***New section added;*** **Competence of service personnel** See standard for details.
Annex 101.DVU		***New section added;*** **A2L Refrigerant Requirements** See standard for details.
Annex 101.DVV		***New section added;*** **Additional markings** See standard for details.