STANDARDS UPDATE NOTICE (SUN)
ISSUED: December 13, 2019

STANDARD INFORMATION

Standard Number: UL 412
Standard Name: Refrigeration Unit Coolers
Standard Edition and Issue Date: 5th Edition Dated August 22, 2011
Date of Revision: August 28, 2018
Date of Previous Revision of Standard: January 9, 2017

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **August 28, 2020**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revised requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

Overview of Changes:

- Revisions to Controls Requirements
- Revisions to Include Switch Mode Power Supply Units
- Revisions to Marking Requirements

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

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).

Client Action:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised requirements do not apply to your product (s).

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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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.
19	Info	**Capacitors**
19.7		***New clause added;*** In reference to 19.5, a capacitor shall consist of a single Class Y1 capacitor or two Class Y2 capacitors connected in series if it is connected between: a) Two line conductors in a primary circuit; b) One line conductor and the neutral conductor; c) Primary and accessible secondary circuits; or d) The primary circuit and protective earth (equipment grounding conductor connection).
24	Info	**Motor Overload Protection**
24.2	Info	**Protection of single-phase motors**
24.2.1		All single-phase motors shall be protected by one or more of the following: a) A separate device responsive to motor current and rated or set to trip at not more than the percentage of the motor nameplate full-load current rating as specified in Table 24.1. b) A separate overload device which combines the functions of overload and overcurrent protection and is responsive to motor current. Such a device shall be set at values not greater than the percentages of the motor nameplate full-load current rating as specified in Table 24.1. ~~c) A thermal protective device or impedance protection complying with the Standard for Overheating Protection for Motors, UL 2111. If a motor protective electronic circuit relies on software as a protective component, that part of the software providing the required motor protection shall comply with software Class 1 in the Standard for Software in Programmable Components, UL 1998, or software Class B in Annex H of the Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1.~~ d) Impedance protection complying with the Standard for Impedance Protected Motors, UL 1004-2. e) A protective device integral with the motor that complies with the Standard for Thermally Protected Motors, UL 1004-3. A motor intended to move air only, by means of an air-moving fan that is integrally attached, keyed, or otherwise fixed to the motor, is required to have locked-rotor protection only. f) Protective electronic circuits integral to the motor that comply with the Standard for Electronically Protected Motors, UL 1004-7. g) Protective electronic circuits that comply with 24.2.3. h) Other protection that is shown by test to be equivalent to the protection specified in (a) to (g).

CLAUSE	VERDICT	COMMENT
Table 24.2		**Factors to be considered when evaluating protective electronic circuits** **No.** | **Factor** 6 | Radio-frequency electromagnetic field immunity: A. To conducted disturbances – test level 3 B. To radiated electromagnetic fields – ~~field strength of 3 V/m~~ Evaluate in accordance with 70A.3.4 and 70A.3.2 11 | Voltage Dips and Interruptions: Evaluate in accordance with 70A.3.8 and 70A.3.2. 12 | Harmonics and Interharmonics: Evaluate in accordance with 70A.3.9 and 70A.3.2. 13 | Calibration (deviation and drift): Evaluate in accordance with 25.11.5 for a temperature protective control or 25.11.6 for a pressure protective control.
25	Info	**Switches and Controllers**
25.10		Defrost cycle and temperature-limiting controls for an electric defrost heater or any other protective controls except for motor protective controls shall comply with one of the following: a) ~~Standard for Temperature-Indicating and Regulating Equipment, UL 873.~~ b) Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1; and the Standard for Automatic Electrical Controls – Part 2-9: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9. c) Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1, and the Standard for Automatic Electrical Controls – Part 2-6: Particular Requirements for Automatic Electrical Pressure Sensing Controls Including Mechanical Requirements, UL 60730-2-6. d) ~~Standard for Limit Controls, UL 353.~~ e) Standard for Switches for Appliances – Part 1: General Requirements, UL 61058-1. f) Standard for Clock-Operated Switches, UL 917. g) Standard for Industrial Control Equipment, UL 508. h) 25.21 and the protective electronic circuits tests in Section 70A.
25.17		An operating control that complies with 25.14 shall also comply with the following: a) For electronic controls – Installation Class 2 for electromagnetic Compatibility (EMC) shall be in accordance with the voltage surge testing in 70A.3.6 and comply with the results specified in 70A.3.2; ~~Electromagnetic Compatibility (EMC) – Part 4-5: Testing and Measurement Techniques – Surge Immunity Test, IEC 61000-4-5;~~ b) Category II shall be the overvoltage category; c) Insulating materials shall have a minimum comparative tracking index (CTI) of 100 (Material Group III); d) The applicable pollution degree shall be as specified in 40A.3 (a) – (d); and, e) The endurance cycle requirements specified by either: 1) Table CC.2 of the Standard for Automatic Electrical Controls – Part 2-9: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9, with the operating control (limiters) endurance cycle requirements being applied; or, 2) The Overload and Endurance Test – Switching Devices, Section 60A.

CLAUSE	VERDICT	COMMENT
25.18		If an operating control complying with 25.14 indirectly controls a load through a switching device, the switching device endurance cycle requirements shall be as specified in: a) 56.1.2(a) if the switching device controls a motor-compressor; or b) 25.17(e) if the switching device controls a load other than a motor-compressor.
35	Info	**Optical Isolators and Semiconductor Devices**
35.1.1		***New clause added;*** In addition to complying with 35.1, an optical isolator relied upon to provide feedback between primary and secondary circuits of a switch mode power supply unit shall have a minimum isolation voltage of 1500V.
35.2		A power switching semiconductor device that is relied upon to provide isolation to ground shall comply with the Standard for Electrically Isolated Semiconductor Devices, UL 1557. If the switching semiconductor is used as part of a switch mode power supply unit, it shall have a minimum isolation voltage of 1500V.
37	Info	**Power Supplies**
37.1		A power supply shall comply with one of the following: a) For a Class 2 Power Supply: 1) Standard for Class 2 Power Units, UL 1310; or 2) Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 and with the Class 2 or limited power source requirements. b) For a power supply that is other than Class 2: 1) Standard for Power Units Other Than Class 2, UL 1012; or 2) Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1. c) For a switch mode power supply unit not complying with (a) or (b), the relevant requirements in this Standard, including the Switch Mode Power Supply Units – Overload Test, Section 61A, shall be applied.
60A	Info	**Overload and Endurance Test – Switching Devices**
60A.6		A switching device shall be subjected to an endurance test at the ambient temperature for which it is intended. The endurance test voltage shall be as specified in 47.1.1 and the current shall be 100 percent of the total connected load current. The endurance test cycling shall consist of making and breaking the connected load for: a) 6000 cycles of operation with 1 second ON and 9 seconds OFF for a switching device other than one used to control a motor-compressor; or b) 24,000 cycles of operation with 1 second ON and 9 seconds OFF followed by 6,000 cycles of operation with 1 second ON and 59 seconds OFF for a switching device used to control a motor-compressor.

CLAUSE	VERDICT	COMMENT
61A		***New section added;*** **Switch Mode Power Supply Units – Overload Test** The test applies to switch mode power supply units as specified in 37.1(c) (see standard for details).
70A	Info	**Protective Electronic Circuit Tests**
70A.3	Info	**Electromagnetic Compatibility (EMC) Tests**
70A.3.4		Radiated fields shall be applied in accordance with IEC 61000-4-3, Standard for Electromagnetic Compatibility (EMC) – Part 4-3: Testing and Measurement Techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test. The frequency ranges tested shall be 80 MHz to 1000 MHz, test level 3; 1.4 GHz to 2.0 GHz, test level 3; and 2.0 GHz to 2.7 GHz, test level 2. The dwell time for each frequency shall be sufficient to observe a possible malfunction of the protective electronic circuit.
	Info	**MARKING**
73	Info	**General**
73.1.1		***New clause added;*** In reference to 73.1 and except as specified in 73.1.2, for markings complying with the Marking Label Adhesion Tests, Section 68, the indoor use, exposure to high humidity and occasional exposure to water at air ambient temperatures of lower than 32°F (0°C) shall be applied.
73.1.2		***New clause added;*** A unit cooler provided with markings not complying with the air ambient temperature specified in 73.1.1 shall be intended for ambient temperatures of 32°F (0°C) or higher and be provided with a marking complying with the requirements for air ambient temperatures of 32°F (0°C) or higher.
		CUSTOMERS PLEASE NOTE: This Table and column "Verdict" can be used in determining how your current or future production is or will be in compliance with new/revised requirements.