

Subject 399

March 30, 2018

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Drinking-Water Coolers, UL 399, are being proposed:

- 1. Revisions to Controls Requirements***
- 2. Alternate Sheet Metal Thickness Requirements***
- 3. Revisions to Include Switch Mode Power Supply Units***
- 4. Water Coolers Having Two Supply Cords***
- 5. Nonmetallic Materials Used as Water Pressurized Parts***
- 6. Clarification to Marking Requirements***
- 7. Additional Option for Ignition Protection Test***
- 8. Editorial Corrections***

STP BALLOTS AND ALL COMMENTS DUE: MAY 14th, 2018

UL's goal is to have no interest category comprise more than one-third of the STP membership balance. To improve the current balance for STP 399, UL is looking for participants in the AHJ, Commercial/Industrial User, Consumer, General, Government, or Supply Chain interest categories. Definitions for these interest categories are available on the Standards STP Internet site:

<http://ulstandards.ul.com/develop-standards/participation/interest-categories/>

If you are interested in applying for STP @399 membership or are aware of potential candidates for this STP, please contact the STP Project Manager, Julio.Morales@UL.com.

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Revisions to Controls Requirements

RATIONALE

Proposal submitted by: Barry Karnes, UL

After October 2018, UL 353 (Standard for Safety for Limit Controls) and UL 873 (Standard for Safety for Temperature-Indicating and -Regulating Equipment) will be withdrawn and replaced by the UL 60730 series of standards (Standard for Safety for Automatic Electrical Controls for Household and Similar Use).

The proposal below reflects the deletion of the option to use controls certified to UL 353 and UL 873. It also removes the references to UL 991 (Standard for Safety for Tests for Safety-Related Controls Employing Solid-State Devices) and UL 1998 (Standard for Safety for Software in Programmable Components), since UL 60730 and the UL 60335-1 based circuit requirements presently within UL 399 include the relevant requirements for electronic circuits and software.

In the proposed revisions to Table 24.2, the 3 V/m field strength value for radiated electromagnetic fields was chosen years ago because UL 60730-1, 3rd edition required this value and it was also the default value in UL 991. Over the years, enhanced technology used in communication circuits and for common household appliances (such as cellular telephones and wireless devices) have pushed the need for higher levels. Therefore, safety standards such as UL 60730-1 and UL 60335-1 have revised their requirements to consider different values based on a wider range of frequencies that are presently in use. Likewise, a proposal to update Paragraph 83.3.4 is being made for this same reason.

This proposal is intended to align the requirements in UL 399 with those in UL 60730-1 and UL 60335-1, accordingly.

A proposal to revise Table 24.2 is also being made to document the calibration requirements for motor protective electronic circuits.

Revisions to Paragraphs 21.25, 21.26 and 74.6 are being proposed to clarify the intent of these requirements. A new 21.26.1 is being proposed to clarify 21.26.

The proposed revisions reflect present practice.

PROPOSAL

21.13 A protective control, other than a motor or motor-compressor overload protective device (covered in Section 24), shall comply with one of the following::

- a) ~~Deleted Standard for Temperature-Indicating and Regulating Equipment, UL 873. The control shall comply with the endurance cycle requirements for safety controls in Table 46.1 of UL 873.~~
- b) Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Automatic Electrical Pressure Sensing Controls Including Mechanical Requirements, UL 60730-2-6. The endurance cycle requirements in Table AA.1DV of UL 60730-2-6 for cut-outs shall be applied.
- c) Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9. The endurance cycle requirements in Table CC.2 of UL 60730-2-9 for cut-outs shall be applied.
- d) ~~Deleted Standard for Limit Controls, UL 353.~~
- e) Standard for Industrial Control Equipment, UL 508.

- f) Standard for Switches for Appliances – Part 1 General Requirements, UL 61058-1; or
- g) Paragraph 21.32 and the protective electronic circuits tests in Section 83.

21.19 A water heater temperature protective control shall comply with the calibration requirements specified by one of the following:

- a) ~~Deleted Section 44 (Calibration Verification Test) of UL 873 with the water heater temperature limiting control requirements being applied;~~
- b) Table AADV.1 of UL 60730-2-9 with the storage water heater thermal cut-out requirements being applied; or
- c) Water Heating Protective Controls Calibration Test in 73.2 such that the protective control:
 - 1) Opens within $\pm 5^{\circ}\text{F}$ ($\pm 3^{\circ}\text{C}$) of the control set-point temperature as declared by the manufacturer; and
 - 2) Does not vary from the control initial (as-received) opening temperature by more than 10°F (6°C) or 5 percent, whichever is greater, following the Water Heating Protective Controls Endurance Tests in 73.1.

21.25 An operating control complying with 21.23 shall also comply with the following:

- a) For electronic controls – Installation class 2 for electromagnetic compatibility (EMC) shall be in accordance with ~~IEC 61000-4-5~~ the voltage surge testing in 83.3.6 and comply with the results specified in 83.3.2;
- 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 48.3, sub-items (a) – (d); and
- e) The endurance cycle requirements specified by either of the following:
 - 1) Table CC.2 of UL 60730-2-9 with the operating control (limiters) endurance cycle requirements being applied; or
 - 2) The Overload and Endurance Test for Operating Controls, Section 74.

21.26 If an operating control complying with 21.23 indirectly controls ~~at~~ the load through a switching device, the switching device endurance cycle requirements ~~in 21.25(e) shall be as specified in;~~ applied to the switching device.

- a) 21.24(b) if the switching device controls a motor-compressor; or
- b) 21.25(e) if the switching device controls a load other than a motor-compressor.

21.26.1 If an operating control referenced by 21.24 indirectly controls a motor-compressor through a switching device, the switching device endurance cycle requirements shall comply with 21.24(b).

24.5.1 A protective electronic circuit providing motor protection in accordance with 24.2, 24.3 or 24.4 shall comply with one of the following:

a) ~~Standard for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991;~~

a) Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 as well as the specific applicable Part 2;

c) Paragraph 21.32 and the protective electronic circuits tests in Section 83; or

b) Not create any risk of fire, electric shock or injury to persons under abnormal conditions with the protective electronic circuit rendered ineffective (open or short-circuited), e.g. use of a redundant circuit or control.

24.5.2 In reference to 24.5.1, software in a protective electronic circuit required as part of a motor protective device or system shall comply with one of the following:

a) ~~Standard for Software in Programmable Components, UL 1998 and be software Class 1;~~

b) Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 as well as the specific applicable Part 2 and be software Class B;

c) Annex R of the Standard for Safety of Household and Similar Electrical Appliances, Part 1: General Requirements, UL 60335-1 and be software Class B; or

c) Not create any risk of fire, electric shock or injury to persons under abnormal conditions with the software rendered ineffective, e.g. use of independent redundant protective devices.

Table 24.2
Factors for judging protective electronic circuits

1	Conducting failure-mode and effect analysis (FMEA) for the protective circuits and functions.
2	Electrical supervision of critical components resulting in the control becoming permanently inoperative and disconnecting power.
3	Temperature ranges as follows: Indoor Equipment 32.0 ±3.6°F (0.0 ±2°C) and 104 ±3.6°F (40.0 ±2°C) Outdoor Equipment minus 31.0 ±3.6°F (minus 35.0 ±2°C) and 104 ±3.6°F (40.0 ±2°C)
4	Cycling test duration: 14 days
5	Endurance test duration: 100,000 cycles
6	Radio-frequency electromagnetic field immunity: A. To conducted disturbances ^a – test level 3 B. To radiated electromagnetic fields – <u>Evaluate in accordance with 83.3.4 and 83.3.2.</u> field strength of 3 V/m
7	Humidity exposure: Indoor Equipment 70 – 80°F (21.1 – 26.7°C) and minimum 50 percent relative humidity Outdoor Equipment Same as indoor equipment except minimum 98 percent relative humidity
8	Electrical fast transient/burst immunity: Outdoor Equipment Test level 4 All Other Equipment Test level 3
9	Surge immunity ^a : Outdoor Equipment Installation Class 4 All Other Equipment Installation Class 3
10	Electrostatic Discharge ^a with a Severity Level of 3 having contact discharge at 6 kV to accessible metal parts and Air discharge at 8 kV to accessible parts of insulating material.
11	<u>Voltage Dips and Interruptions: Evaluate in accordance with 83.3.8 and 83.3.2.</u>
12	<u>Harmonics and Interharmonics: Evaluate in accordance with 83.3.9 and 83.3.2.</u>
13	<u>Calibration (deviation and drift): Evaluate in accordance with 21.21 for a temperature protective control or 21.22 for a pressure protective control.</u>
^a The noted factors are exempt from being considered when requirements from the Standard for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991, are applied	

53.1 A pressure-limiting device designed to automatically stop the operation of the compressor shall:

- a) Be installed on all water coolers with a system containing more than 22 pounds-mass (10 kg) of refrigerant; and.
- b) Comply with 21.13, 21.14 and 21.22. ~~Be able to withstand not less than 100,000 cycles of operation under load; and~~

c) Comply with the refrigeration pressure-limiting controls requirements in the Standard for Temperature-Indicating and Regulating Equipment, UL 873 pertaining to the calibration of pressure-limiting controls.

Exception: In reference to 53.1(c), pressure-limiting controls are not required to comply with UL 873 if they comply with the Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 as well as the specific applicable Part 2.

74.6 A switching device shall be subjected to an endurance test at the ambient temperature for which it is intended. The endurance test voltage shall consist of making and breaking the connected load for 6000 cycles of operation, with 1 second ON and 9 seconds OFF. The voltage shall be as specified in 59.1 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.

83.3.4 Radiated fields shall be applied in accordance with IEC 61000-4-3, the Standard for Electromagnetic compatibility (EMC) – Part 4-3: Testing and Measurement Techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test, test level 3 being applicable. The frequency ranges tested shall be 80 MHz to 1000 MHz, test level 3; and 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.

A24.5.2 The need for software to comply with ~~UL 1998~~ or UL 60730-1 can be based on the actual construction and operation of the motor within the water cooler. This could include a consideration of the protective electronic circuit being provided with independent redundant protective devices.

2. Alternate Sheet Metal Thickness Requirements

RATIONALE

Proposal submitted by: Barry Karnes, UL

Requirements are being proposed to enable sheet metal cabinets or enclosures to be thinner than that presently allowed by the Standard. Under this proposal, such products would need to comply with the new Cabinet/Enclosure Static Load and Impact Tests. These requirements are based on similar requirements in other UL Standards.

The proposed revisions do not change the intent of any requirements presently in UL 399 and reflect present practice.

PROPOSAL

12.1.11 A sheet metal cabinet or enclosure is shall be evaluated with respect to its size, shape, metal thickness and use in the particular application. Sheet steel shall have a thickness of not less than 0.026 inch (0.66 mm) if uncoated or 0.029 inch (0.74 mm) if galvanized. Nonferrous sheet metal shall have a thickness of not less than 0.036 inch (0.91 mm). Except as specified in 12.1.11.1, a sheet metal cabinet or enclosure shall have a thickness of not less than:

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