

Subject 1042 (1278, 2021)

July 14, 2006

SUMMARY OF TOPICS

The following topics were discussed at the meeting:

- 1. Opening of All Ungrounded Conductors (Temperature-Regulating Controls) (UL 1042, 1278, 2021)**
- 2. Normal Operation and Temperature-Limiting Devices (UL 1042, 1278, 2021)**
- 3. Elimination of Automatic Reset Type Temperature Limiting Controls (UL 1042, 1278, 2021)**
- 4. Additional Manufacturing and Production Line Test Under QA Audit Program (UL 1042, 1278)**
- 5. Power Supply Cord Task Group (UL 1042, 1278, 2021)**
- 6. Instructions for Use and Care and Separate Installation and Operation Instructions (UL 1042, 2021)**
- 7. Added Cleaning Instructions (UL 1042, 2021)**
- 8. Labels - Heat Resistant or Located Where Not Subjected to Excessive Heat (UL 1042, 2021)**
- 9. Revisions to Scope (UL 1042)**
- 10. Increase the Electrical Wiring Endurance Cycles from 100,000 to 750,000 (UL 1278)**
- 11. Manufacturing and Production Tests on Oil Filled Air Heaters (UL 1278)**
- 12. Need for Reliable Ground Means (UL 2021)**
- 13. Dust Exposure Test (UL 2021)**
- 14. Receptacles**
- 15. Issues With Fire Indicators**

COMMENTS DUE: AUGUST 14, 2006

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A meeting of the UL Standards Technical Panel for Electric Room Heaters, STP 1042, was held on June 13 & 14, 2006 at UL's Research Triangle Park office. The purpose of the meeting was to discuss proposals and other issues related to the Standards for Electric Baseboard Heating Equipment, UL 1042; Movable and Wall- or Ceiling-Hung Electric Room Heaters, UL 1278; and Fixed and Location-Dedicated Electric Room Heaters, UL 2021.

CALL TO ORDER, ANNOUNCEMENTS, INTRODUCTION OF MEETING ATTENDEES

Joe Musso, Chair of STP 1042, welcomed the Standards Technical Panel (STP) members, guests, and public participants to the meeting.

ANNOUNCEMENTS AND REPORTS FROM THE STP PROJECT MANAGER

Tim Lupo, Project Manager for STP 1042, reminded attendees that UL's Patent Policy is available on the internet and can be accessed at <http://ulstandardsinfo.net.ul.com/stp/patentpolicy.html>.

The current balance of the STP was also discussed, and is shown in the following table:

Interest Category	Number of Members
Producers	6
Users	6
General Interest	5

UL's goal is to have no interest category comprise more than one-third of the STP membership.

FUTURE MEETING SCHEDULE

The next meeting of STP 1042 is tentatively planned for late first quarter or early second quarter 2007.

REPORT FROM TASK GROUPS

Surface Temperatures Task Group

An STP task group had previously been assigned to review the issue of whether or not surface temperature requirements should be warranted for portable electric heaters covered under UL 1278.

Carl Radcliffe, chair of the task group, provided a status update on this activity. The group determined that since the issues are not related to combustibles, and are not related to fixed, in-wall heaters, and no known incidents of contact injuries exist, additional requirements for surface temperatures are not warranted at this time. Accordingly, the task group has been disbanded as of July 2004.

Flux Density Task Group

An STP task group had previously been assigned to: (1) review the rationale for current requirements in UL 1278 and UL 2021; (2) determine the need to develop revised requirements to address the risk of fire; and (3) explore whether it would be appropriate to proceed with development of requirements related to the use of radiant flux measurements.

Carl Radcliffe, chair of the task group, provided a status update on this activity. Several of the possible applications were explained in which flux measurements may potentially be used, as well as some of the perceived benefits. In addition, some of the unknowns were described in this discussion, such as the relationship between results of current abnormal test requirements versus potential data obtained

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via measured radiant flux, and what an established maximum flux (limit) value might be. The scope of the future work of the task group was outlined. The STP will be made aware of any plans to develop specific proposals related to this activity.

Power Supply Cord Task Group

NOTE: This item was discussed in detail as meeting agenda Topic 5

AGENDA TOPICS

1. Opening of All Ungrounded Conductors (Temperature-Regulating Controls) (UL 1042, 1278, 2021)

BACKGROUND

UL 1042, 1278 and 2021 currently require that for air heaters having open-type heating elements or series-connected sheathed heating elements, a temperature limiting control or switch with a marked "off" position shall interrupt power to all ungrounded supply conductors if the thermal cutoff or the control contacts in one side of the supply circuit could be rendered ineffective by faults such as shorting of the heating element or its connecting wire to metal parts that are or may become grounded. Abnormal overheating conditions can result in the activation of temperature limiting devices. Some abnormal conditions involve low impedance circumstances that can lead to high currents (but not high enough to activate a circuit breaker) and localized hot spots. Hot spots could result in insulation breakdown or ignition of combustibles. For heaters rated greater than 208 V, disconnecting a single ungrounded conductor may not remove power from the low impedance connection, and may not address the hazard. Certain failure modes that do not immediately trip circuit breakers and involve excessive current and power may lead to a fire. Sections of air heaters, which are rated greater than 208 V may remain energized under conditions of mid-element short circuits even if a temperature limiting control activates. Heaters with sheathed heating elements should have this fault condition covered. The type of the heating element is not a sufficient reason to leave electrical power connected to a heater, under detected over temperature conditions.

At the June 17, 2003 STP Meeting there was general agreement that a switch with or without a marked "off" position, shall disconnect all ungrounded supply conductors. There was also general agreement that a temperature limiting control shall disconnect all ungrounded supply conductors in a heater. However, UL noted that in a 240 V (2 - pole) heater a limiting control that is a thermal cutoff or a single operation device (SOD) would be required for each ungrounded conductor.

DISCUSSION

At the June 13 & 14, 2006 STP Meeting there was additional discussion on this topic, including related to the voltage rating of products to which this requirement would be applicable, and whether other standards include similar requirements for products rated greater than 208 V. . Agreement could not be reached regarding specific proposed revisions. A task group was formed to narrow the focus of the requirement and to develop specific proposal text. A list of task group members is provided in the STP Task Group formation summary at the end of this meeting report.

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2. Normal Operation and Temperature-Limiting Devices (UL 1042, 1278, 2021)

BACKGROUND

A temperature limiting control, which is intended to operate during the abnormal operation tests, shall not function during the normal temperature test. UL 1278 and UL 2021 provide details of how to consider the various controls that may be provided in an air heater. However, it has been brought to UL's attention that the requirements in UL 1278 and UL 2021 are not as explicit as the following requirement in paragraph 33.2.1 of UL 1042: "The limit control of a heater shall not function when the heater is operated under the conditions of the Continuous Operation Test, in a room ambient temperature of $25 \pm 2^{\circ}\text{C}$ ($77 \pm 3.6^{\circ}\text{F}$) except that the room ambient temperature may be higher if the control does not function." UL intends to propose similar requirements for UL 1278 and 2021.

At the June 17, 2003 STP meeting several STP members and industry representatives questioned the need for such a statement or felt the statement to be very confusing. UL noted that the intent is simply that the limit control of a heater shall not function when the heater is operated under the conditions of the Continuous Operation Test, in a normal (about 25°C) room ambient temperature, and that only for the purposes of that test, the test can be conducted at a higher temperature if the limit control does not function.

DISCUSSION

At the June 13 & 14, 2006 STP Meeting there was additional discussion on this topic. There was general agreement among attendees on the specific verbiage for the proposed revisions. The agreed-upon verbiage is indicated below for informational purposes only. Comments are not being solicited at this time, but rather the proposals will be issued for ballot and comment in a subsequent separate work area in CSDS.

PROPOSALS

Proposal for UL 1042

(REVISED)

33.2.1 The limit control of a heater shall not function when the heater is operated under the conditions of the Continuous Operation Test, ~~in a at room ambient temperature, of $25 \pm 2^{\circ}\text{C}$ ($77 \pm 3.6^{\circ}\text{F}$) except that the room ambient temperature may be higher if the~~ A room ambient temperature of 25°C (77°F) is assumed. The test may be conducted at a higher ambient temperature provided the limit control does not function operate (open circuit).

Proposal for UL 1278

(NEW)

39.2.1.1 The temperature limiting control of a heater shall not function when the heater is operated under the Normal Temperature Test, at room ambient temperature. A room ambient temperature of 25°C (77°F) is assumed, but the test may be conducted at a higher ambient temperature provided the temperature limiting control does not operate (open circuit).

Proposal for UL 2021

(NEW)

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38.2.1 The temperature limiting control of a heater shall not function when the heater is operated under the Normal Temperature Test, at room ambient temperature. A room ambient temperature of 25°C (77°F) is assumed, but the test may be conducted at a higher ambient temperature provided the temperature limiting control does not operate (open circuit).

3. Elimination of Automatic Reset Type Temperature Limiting Controls (UL 1042, 1278, 2021)

DISCUSSION

UL 1278 paragraph 28.1 and UL 2021 paragraph 25.1 permit as an Exception the use of an automatic reset type temperature limiting control provided an audible or visual alarm is included to alert to the user that the control is functioning. The alarm requirement was implemented when it was determined that heaters had been operating for extended periods of time at abnormal/normal conditions while the automatic reset temperature limiting control had been cycling. While appearing to be in a typical operating condition, the heater had actually been used at conditions that were other than as intended. Incidents of fire and electric shock were reported. The standards were revised to include a manual reset type or thermal cutoff type control as the required temperature limiting control, with the automatic reset type device and alarm as an exception. UL has received a proposal to require a back-up manual safety control or thermal cutoff when the electric heating appliance is provided with an automatic cycling temperature limiting control. The intent is to avoid unintentional cycling of the temperature limiting control in situations where there is an abnormal use condition of the appliance. Air heaters are for unattended use and the provision of alarms, visual or audible, may serve the purpose only with an attended appliance. Even in an attended situation a visual alarm by itself may have a wrong interpretation for the ordinary user. The acceptability of the automatic cycling temperature limiting control, while providing some degree of protection, mainly avoids nuisance service calls in the event of temporary air blockage. If these devices continue to operate, unnoticed, they can achieve an end of life sooner than expected and not provide the level of safety as required.

UL has also received a proposal to eliminate the provision for an automatic reset temperature limiting control. Based on NFPA statistical data, one of the largest causes of fires caused by built-in and movable electric space heaters has been combustibles placed too close to the heat source. The substantial portion of combustibles ignited have been mattresses or bedding and upholstered furniture. Such materials would be subject to prolonged heating should an automatic reset temperature limiting control be operating while these combustibles are placed too close to the air heater. The presence of an alarm, even if audible, may not alert a user to the abnormal condition - especially while sleeping or when not present during heater operation. Since the risk of fire death for portable electric space heaters, relative to the number of households using the devices, was much higher in 1997 than in 1987-8, due to both falling usage and rising death tolls, UL discussed two alternatives:

- a. Elimination of the provision for automatic reset type temperature limiting controls.
- b. Require a back-up manual safety control or thermal cutoff when an automatic reset type temperature limiting control is provided, and replace the alarm with a temperature rise on components and materials of not more than the rise given in the maximum temperature rises table (except that an additional 30°C (54°F) rise is permissible during the first hour of each abnormal test).

At the June 17, 2003 STP Meeting UL expressed the view that the heater should not be cycling on its temperature limiting control regardless of whether a visual or audible alarm is provided. UL noted that an automatic reset limit control is intended to function during a true abnormal situation and should not function as a regulating control. UL noted that it is possible for a heater to operate on its auto-reset

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limiting control for years resulting in accelerated aging of the control and then its premature failure, possibly resulting in fire and/or shock when called upon to operate in an abnormal situation. An STP member noted that UL had looked into a similar situation with regard to clothes dryers and found no accelerating aging of the limiting control as a result of continuous operation. However, he noted that these same products require a back-up limiting control, and expressed the view that continuous operation of the automatic reset limiting control is probably not a good idea. Another STP member expressed the view that there is a great deal of difference between an audible alarm and a visual alarm. He noted that while visual signal may easily be hidden or ignored even if seen, this is unlikely to be the case for an audible signal. Other STP members and industry representatives present agreed and expressed the view that an audible alarm is a valid means of alerting the consumer that the heater is not operating as intended. The representative from the Consumer Product Safety Commission (CPSC) noted that all heaters are considered unattended products and thus questioned whether any alarm is a valid means of alerting a consumer who may not be present.

At the June 13 & 14, 2006 STP Meeting there was additional discussion on this topic. Due to issues related to end of product life and the potential fire hazard of adjacent material, STP members expressed concern regarding the elimination of thermal limiting controls. Agreement could not be reached regarding specific proposed revisions. Therefore, a task group was formed to further discuss this topic and develop specific proposal text. A list of task group members is provided in the STP Task Group formation summary at the end of this meeting report.

4. Additional Manufacturing and Production Line Test Under QA Audit Program (UL 1042, 1278)

DISCUSSION

Failed wiring connections have been the cause of many fire incidents. To reduce the frequency of poor quality in electrical connections, the variability associated with today's manufacturing processes must be reduced. Problems with wiring connectors exist, and can lead to overheating conditions. Assurance is needed that units in manufacturing are being assembled with good quality connections. Testing during assembly can be used to monitor the quality of the electrical connectors and reduce the variability of the connector manufacturing process to a point where there is a high probability of good internal electrical connections in every assembly. UL previously considered proposing either inclusion of additional manufacturing and production line tests or the QA program presently in UL 1278 for inclusion in UL 1042 and 2021. In addition, UL considered proposing that the requirements for splices, which were adopted into UL 2021 on December 26, 2002, be included in UL 1042 and 1278 as well.

At the June 17, 2003 STP Meeting an STP member expressed concerns about the adoption of the QA program presently in UL 1278 for inclusion in UL 1042 and 2021 noting what he felt was inequalities in the program as implemented in different manufacturing locations. An industry representative expressed the view that the QA program for UL 1278 is not really effective for maintaining quality electrical connections within the product. An STP member also expressed the view that manufacturing and production line tests would only be of limited use to determine quality electrical connections within the product. Industry representatives expressed no disagreement with the idea that the new requirements for splices adopted into UL 2021 on December 26, 2002 be included in UL 1042 and 1278 as well.

At the June 13 & 14, 2006 STP Meeting there was additional discussion on this topic. There was also discussion on the issue of ensuring consistency among component connector manufacturers, and variables such as the thickness of the male part relative to subsequent connection to the female part. In conclusion, there was general agreement among attendees on the specific verbiage for the proposed revisions. The agreed-upon verbiage is indicated below for informational purposes only. Comments are

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