UL 1261

STANDARD FOR SAFETY

Electric Water Heaters for Pools and Tubs

UL Standard for Safety for Electric Water Heaters for Pools and Tubs, UL 1261

Sixth Edition, Dated September 2, 2016

Summary of Topics

This revision of ANSI/UL 1261 dated August 24, 2022 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated July 8, 2022.

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UL 1261

Standard for Electric Water Heaters for Pools and Tubs

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This ANSI/UL Standard for Safety consists of the Sixth Edition including revisions through August 24, 2022.

The most recent designation of ANSI/UL 1261 as a Reaffirmed American National Standard (ANS) occurred on August 24, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MANUFACTURING AND PRODUCTION-LINE TEST

RATINGS

MARKINGS

INSTRUCTIONS

SUPPLEMENT SA – REQUIREMENTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

SUPPLEMENT SB – CONTROLS EVALUATED TO UL 508 AND UL 873

INTRODUCTION

CONSTRUCTION

No Text on This Page

INTRODUCTION

1 Scope

1.1 These requirements cover permanently installed electric water heaters, rated 600 volts or less, for heating the water supplied through plumbing to separately heated public or private pools or tubs, in which swimming, wading, bathing, or partial or total immersion of persons, may be involved. Equipment covered may or may not be intended for use with external water circulating equipment, and is intended for installation in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements do not cover household storage tank water heaters or other equipment covered by individual requirements.

2 Glossary

2.1 For the purpose of this standard the following definitions apply.

2.2 ACTUATION – Movement of the actuating member of the control by the user, by hand, by foot, or by any other human activity.

2.3 CONTROL, AUTOMATIC ACTION – A device in which the transmission and operation of at least one function is produced by initiation which is not the result of manual actuation.

2.4 CONTROL, LIMITING – A control intended to limit the operation of the heater to a water temperature of 70°C (158°F) under all conditions, including breakdown of any or all operating controls.

2.5 CONTROL, MANUAL – A device that requires direct human interaction to activate or test the control.

2.6 CONTROL, OPERATING – A device that starts or regulates the operation of an appliance during normal operation. The failure of an operational control generally causes the operation of a protective control. An example of an operating control is a temperature regulating control – a control that maintains the temperature of the spa water to a user-determined level.

2.7 CONTROL, PROTECTIVE – A device, the operation of which is intended to reduce the risk of electric shock, fire, or injury to persons during normal or abnormal operation of the appliance. During the evaluation of the protective control / circuit, the protective functions are verified under normal and single-fault conditions of the control.

2.8 CONTROL, TYPE 2 ACTION – The actuation of an automatic control (see 2.3) for which the manufacturing deviation and the drift of its operating value, operating time, or operating sequence have been declared and tested under the Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1.

2.9 CONTROL, TYPE 2.D.H ACTION – This action is applicable to manual controls (see 2.5). The automatic action (i.e. tripping of the control) is independent of the manipulation or position of the manual reset/adjustment mechanism. The manipulation of the manual adjustment means will not allow for the reverse operation (resetting of a "tripped" control), even momentarily, while the excess or fault condition persists. This action is also referred to as trip-free action. The action of the control is such that the reverse operation (resetting) is possible if the manual reset mechanism is held in the reset position – i.e. the control will function as an automatic control if the reset button is held in the reset position. The control shall not reset automatically at any temperature above -35°C (-31°F) with the reset mechanism in the normal position.

2.10 CONTROL, TYPE 2.D.J ACTION – This action is applicable to manual controls (see 2.5). The automatic action (i.e. tripping of the control) is independent of the manipulation or position of the manual reset/adjustment mechanism. The manipulation of the manual adjustment means will not allow for the reverse operation (resetting of the control), even momentarily, while the excess or fault condition persists. This action is also referred to as trip-free action.

2.11 CONTROLLED ENVIRONMENT – An environment that is relatively free from conductive contaminants, such as dust and carbon particles, and that is protected against humidity and condensation. A controlled environment may be provided by a hermetically sealed enclosure, encapsulation, or a conformal coating.

2.12 HOT TUB – A tub intended for partial or total immersion of persons in heated water.

2.13 LOW-VOLTAGE CIRCUITS – A low-voltage circuit is one involving a potential of not more than 30 volts rms (42.4 volts peak) supplied by a primary battery, by a standard Class 2 transformer, or by a combination of a transformer and a fixed impedance that, as a unit, complies with all of the performance requirements for a Class 2 transformer. A circuit derived from a source of supply at line voltage by connecting resistance in series with the supply as a means of limiting the voltage and current is not considered to be a low-voltage circuit.

2.14 OPERATING TEMPERATURE VALUE – Value of temperature at which the temperature sensing control operates on a rise or fall of the temperature.

2.15 SAFETY CRITICAL FUNCTION – Control, protection and monitoring functions which are being relied upon to reduce the risk of fire, electric shock or casualty hazards.

2.16 TEMPERATURE SETTING BY THE USER – Any selection of an operating temperature value by actuation performed by the user.

3 Safety Critical Functions

3.1 Any function involved in the control, protection, and monitoring of safety-related attributes of a unit whereby a loss/malfunction of its functionality would represent an unacceptable risk of fire, electric shock, or casualty hazards would be considered a Safety Critical Function.

3.2 Electronic circuits that manage a Safety Critical Function shall be:

a) Reliable as defined as being able to maintain the Safety Critical Function in the event of single defined component faults and

b) Not susceptible to electromagnetic environmental stresses encountered in the anticipated environments of the appliance.

3.3 Electronic circuits managing Safety Critical Functions shall comply with:

a) Supplement SA; or

b) The Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1 and its Part 2s as specified in this standard. The function shall be considered Class B; or

c) The Standard for Temperature-Indicating and -Regulating Equipment, UL 873, and the Standard for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991, requirements specified in Supplement SB.

3.4 Functions specified in Table 3.1 represent the common safety critical circuit functions of units. It is not intended to represent all possible Safety Critical Functions.

Table 3.1
Safety Critical Functions

Function (see 3.1)	Hazard	Location of parameters and tests
Temperature regulating control	Scalding	Section 19
Temperature limiting control	Scalding	Section 20

CONSTRUCTION

4 Component Specifications

4.1 General

4.1.1 Except as indicated in 4.1.2, a component of a product covered by this standard shall comply with the requirements for that component as indicated in this Section.

4.1.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard,

b) Is superseded by a requirement in this standard, or

c) Is separately investigated when forming part of another component, provided the component is used within its established ratings and limitations.

4.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

4.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

4.1.5 Components shall be suitable for the intended use and installation environment. This suitability shall assume the following installation parameters.

a) Outdoor, Pollution Degree III installations.

b) Overvoltage Category II as specified in the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840.

4.1.6 Components not anticipated by the requirements of this Standard, not specifically covered by a component standard of Component Specifications, Section 4, and which pose a potential risk of electric shock, fire or casualty hazard shall be additionally investigated. Reference to other product standards is appropriate where those standards anticipate normal and abnormal use conditions consistent with the application of this Standard

4.2 Quick-connect wire connectors

4.2.1 Quick-connect type wire connectors shall be suitable for the wire size, type (solid or stranded), conductor material (copper or aluminum) and the number of conductors terminated. If insulated, they shall be rated for the voltage and temperature of the intended use. They shall be applied per the installation instructions of the wire connector manufacturer.

4.2.2 Quick-connect type wire connectors shall comply with the Standard for Electrical Quick-Connect Terminals, UL 310.

4.3 Terminal blocks

4.3.1 Terminal blocks shall comply with:

a) The Standard for Terminal Blocks, UL 1059, or

b) The Standard for Low-Voltage Switchgear and Controlgear – Part 7-1: Ancillary Equipment – Terminal Blocks for Copper Conductors, UL 60947-7-1, or

c) The Standard for Low-Voltage Switchgear and Controlgear – Part 7-2: Ancillary Equipment – Protective Conductor Terminal Blocks for Copper Conductors, UL 60947-7-2, or

d) The Standard for Low-Voltage Switchgear and Controlgear – Part 7-3: Ancillary Equipment – Safety Requirements for Fuse Terminal Blocks, UL 60947-7-3.

4.3.2 The UL 60947-7-x Standards are used in conjunction with the Standard for Low-Voltage Switchgear and Controlgear – Part 1: General Rules, UL 60947-1.

4.3.3 Terminal blocks shall be suitable for the number of conductors per termination, wire size, type (solid or stranded), conductor material (copper or aluminum), voltage and current of the intended use.

4.4 Wire connectors

4.4.1 Wire connectors shall be suitable for the wire size, type (solid or stranded), conductor material (copper or aluminum) and the number of conductors terminated. If insulated they shall be suitable for the voltage and current of the intended use. They shall be applied per the installation instructions of the wire connector manufacturer.

4.4.2 Wire connectors shall comply with the Standard for Wire Connectors, UL 486A-486B, or the Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors, UL 486E.

4.5 Boxes and raceways

4.5.1 Electrical boxes and the associated bushings and fittings, and raceways, of the types specified in Chapter 3, Wiring Methods and Materials, of the National Electrical Code, ANSI/NFPA 70, and that comply with the relevant UL standard (such as the Standard for Metallic Outlet Boxes, UL 514A, the Standard for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, UL 514C, the Standard for Cover Plates for Flush-Mounted Wiring Devices, UL 514D) are considered to comply with the requirements of this end product standard.

4.6 Overcurrent protection

4.6.1 Fuses shall comply with the Standard for Low-Voltage Fuses – Part 1: General Requirements, UL 248-1; and the applicable Part 2 (e.g. UL 248-5). Defined use fuses that comply with UL 248-1 and another applicable UL standard for fuses are considered to comply with this requirement.

4.6.2 Fuseholders shall comply with the Standard for Fuseholders – Part 1: General Requirements, UL 4248-1, and the applicable Part 2 (e.g. UL 4248-9).

4.6.3 Circuit breakers shall comply with the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489.

Exception: Circuit breakers used in telecommunications circuitry that comply with the Standard for Circuit Breakers For Use in Communications Equipment, UL 489A, need not comply with the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489.

4.6.4 Circuit breakers having integral ground fault circuit interrupter capability for protection against electrical shock shall additionally comply with the Standard for Ground-Fault Circuit-Interrupters, UL 943.

4.6.5 Supplementary protectors shall comply with the Standard for Supplementary Protectors for Use in Electrical Equipment, UL 1077.

4.7 Switches

4.7.1 Switches shall comply with one of the following, as applicable:

a) The Standard for Switches for Appliances – Part 1: General Requirements, UL 61058-1;

b) The Standard for General-Use Snap Switches, UL 20; or

c) The Standard for Nonindustrial Photoelectric Switches for Lighting Control, UL 773A.

Exception: Switching devices that comply with the applicable UL standard for specialty applications (e.g. transfer switch equipment), industrial use (e.g. contactors, relays, auxiliary devices), or are integral to another component (e.g. switched lampholder) need not comply.

4.7.2 A clock-operated switch, in which the switching contacts are actuated by a clock-work, by a gear-train, by electrically-wound spring motors, by electric clock-type motors, or by equivalent arrangements shall comply with one of the following:

a) The Standard for Clock-Operated Switches, UL 917; or

b) The Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1, and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Timers and Time Switches, UL 60730-2-7.

4.7.3 A timer or time switch, incorporating electronic timing circuits or switching circuits, with or without separable contacts, shall comply with the requirements for an operating control with Type 1 action for 6,000 cycles of operation, or as a manual control for 5,000 cycles of operation, in accordance with the following:

a) The Standard for Solid-State Controls for Appliances, UL 244A; or