



UL 696

STANDARD FOR SAFETY

Electric Toys

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UL Standard for Safety for Electric Toys, UL 696

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Summary of Topics

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INTRODUCTION

1 Scope

1.1 These requirements cover electrically-operated toys including miniatures of full-sized appliances that may not necessarily perform the expected function of the copied appliance and that are intended to be used on nominal 120-volt branch circuits. The package for the toy, including packaging material if intended to be used with the toy, is considered to be a part of the toy and is covered by these requirements. An electric product is considered a toy if it is designed, manufactured, or marketed as a plaything for children over the age of 3.

1.2 For a toy that mimics the form or function of an established general-use appliance, the established requirements applicable to the general-use appliance shall be considered in defining the particular requirements applicable to the toy. Among the considerations that may be applicable are normal and abnormal test conditions. The requirements of the standard covering the general-use appliance shall not reduce the level of requirements addressed by this standard, but shall supplement the content of this standard as appropriate.

1.3 These requirements do not cover toys for outdoor use, sewing machines, flatirons, toys that operate with water, toys that operate with a gas or liquid under pressure (such as a steam engine), toy transformers, or toys intended to operate from the secondary of a toy transformer at a potential of 30 volts rms (42.4 volts peak) or less.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

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- b) Is superseded by a requirement in this standard.

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

2.4 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.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of this standard, the following definitions shall apply:

5.2 TOOL – Commonly available household implements, such as flat-bladed or cross-head recessed (Philips type) screwdrivers, wrenches, and pliers, that are suitable for installing or removing fasteners.

CONSTRUCTION

6 General

6.1 Materials used in the construction of a toy shall not result in a risk of injury to persons, fire, or electric shock as specified in the Standard.

6.2 Construction is not limited to any particular material which is evaluated with respect to its intended use. An example of such a material would be a plastic compound that complies with the requirements of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

7 Mechanical Assembly

7.1 General

7.1.1 A toy shall be formed and assembled so that it will have the strength and rigidity required to resist the abuses to which it will be subjected without producing or increasing the risk of fire, electric shock, or injury to persons due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious conditions.

7.1.2 A switch, lampholder, attachment-plug receptacle, motor-attachment plug, or similar component shall be mounted securely and prevented from turning.

Exception No. 1: A plunger or other type of nontoggle switch that does not tend to rotate when operated, and that is intended to be operated by mechanical means rather than by direct contact by persons, need not be prevented from turning if both of the following conditions are met:

- a) The means by which the switch is mounted makes it unlikely that it can loosen as a result of being operated.*
- b) Rotation of an intentionally loosened switch does not reduce spacings below the minimum required values.*

Exception No. 2: A lampholder of a type in which the lamp cannot be replaced (such as a neon pilot or indicator light in which the lamp is sealed in by a nonremovable jewel) need not be prevented from turning if rotation cannot reduce spacings below the minimum required values or produce stress on a connector.

7.1.3 The means for preventing the turning specified in 7.1.2 is to consist of more than friction between surfaces – for example, a lock washer, properly applied, is capable of being used as the means of preventing turning of a device having a single-hole mounting means.

7.1.4 A toy shall be assembled so that the vibration of usual operation will not affect it adversely.

7.1.5 A current-carrying component of a heating element shall be completely and individually enclosed in nonorganic material and shall be supported within this enclosure in an acceptable manner. Breakage of a heating element at any point shall not result in the element contacting a dead-metal part.

7.1.6 A toy intended to be used with food shall be constructed to exclude water from any electrical area that could present any risk of fire, electric shock, or injury to persons.

7.1.7 An electric toy also operated by batteries shall conform to the Battery Operated Toys guidelines given in the Standard Consumer Safety Specification for Toy Safety, ASTM F963, in addition to the requirements of this Standard.

7.2 Use of water

7.2.1 A toy shall not be used in water. An electric toy shall not be intended to be immersed in water or have a shape or construction (such as a boat) that suggests use in water.

8 Enclosures

8.1 General

8.1.1 A toy shall be provided with an enclosure of material intended for the particular application that shall enclose all electrical parts that can present the risk of fire, electric shock, or injury to persons under any conditions of use.

8.2 Polymeric enclosures

8.2.1 Enclosures of polymeric material shall comply with the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

8.3 Enclosure of live parts

8.3.1 An enclosure containing a wire, splice, brush cap, connection, or electrical component at a potential of more than 30 volts rms (42.4 V peak) to any other part or to ground shall:

- a) Be assembled by welding, riveting, the use of special screws that are not removable with a tool used in the intended manner, or the equivalent and
- b) Have no opening that will permit entry of a straight rod 1/4 inch (6.4 mm) in diameter.

Exception: These requirements do not apply to the electrodes of a replaceable incandescent lamp and its lampholder contacts if the contacts are located in an insulating husk or the equivalent.

8.3.2 With respect to 8.3.1(a), cross-notch-head screws, spring clips, bent tabs, and similar fasteners are removable with tools, such as pliers and flat-bladed screwdrivers.

Exception: Bent tabs may be used if, by virtue of metal thickness or other factors, they successfully resist attempts to open them with a tool.

8.3.3 An enclosure containing an uninsulated live part at a potential of more than 30 V rms (42.4 V peak) to any other part or to ground shall have no opening through which a 0.010 inch (0.25 mm) diameter wire can be inserted to contact the live part.

Exception: This requirement does not apply to the electrodes of a replaceable incandescent lamp and its lampholder contacts if the contacts are located in an insulating husk or the equivalent.

8.4 Cast and sheet metal

8.4.1 For unreinforced, flat surfaces in general, cast metal shall not be less than 1/8 inch (3.2 mm) thick.

Exception No. 1: Malleable iron shall not be less than 3/32 inch (2.4 mm) thick and die-cast metal shall not be less than 5/64 inch (2.0 mm) thick.

Exception No. 2: For a curved, ribbed, or otherwise reinforced surface, or if the shape, size, or both, of the surface is such that mechanical strength is provided, cast metal in general shall not be less than 3/32 inch (2.4 mm) thick, malleable iron shall not be less than 1/16 inch (1.6 mm) thick, and die-cast metal shall not be less than 3/64 inch (1.2 mm) thick.

8.4.2 An enclosure of sheet metal shall be evaluated with regard to its size, shape, thickness of metal, and its acceptability for the particular application, considering the intended use of the complete toy. Sheet steel thinner than 0.026 inch (0.66 mm) is capable of being used only for relatively small areas or for surfaces that are curved or otherwise reinforced.

8.5 Exposed live parts

8.5.1 An exposed live part in a toy shall not have a potential to any other part or to ground greater than 30 volts rms (42.4 volts peak).

Exception: An electrode of a replaceable incandescent lamp and its lampholder contacts need not comply with this requirement if the contacts are located in an insulating husk or the equivalent.

8.5.2 A toy provided with one or more lampholders shall be constructed so that no live part other than lampholder contacts are exposed to contact by persons removing or replacing lamps.

8.6 Lamps and lampholders

8.6.1 An enclosure containing a lamp shall protect it from breakage.

8.6.2 A replaceable incandescent lamp having a voltage between any of its electrodes or lampholder contacts greater than 30 volts rms (42.4 volts peak) and any other part or ground shall be located inside an enclosure that has at least one door or cover permitting access to the lamp. Opening any such door or cover shall require release of a latch or other fastening means (bent tabs are not to be used), and the door or cover shall be captive to the toy, or its closed position shall be essential to the operation of the toy. With all access doors and covers closed there shall be no opening in the enclosure that will permit the entry of a 6-inch (152-mm) long straight rod 1/4 inch (6.4 mm) in diameter that can contact an uninsulated live part when the lamp bulb is either removed or in place. The lamp is to be spaced away from any edge of any opening a distance at least two times the minor diameter of the opening. Release of the latch or other fastening means shall be by use of the keys or specific purpose tools but shall not be by the use of the hand or fingers alone, or by the use of a tool.

8.6.3 The screw shells of all lampholders for incandescent lamps shall be at the same potential.

8.6.4 If a contact of a lampholder for a replaceable incandescent lamp involves a potential to any other part or to ground greater than 30 volts (42.4 volts peak), one or both of the lampholder contacts shall be in the bottom of the lampholder body, or within an insulating husk, or the equivalent.

8.6.5 The screw shell of an Edison-base lampholder shall be connected to the terminal or lead that is intended to be connected to the grounded conductor of the power supply cord. Table 21.1 specifies the identification of the power supply cord conductor intended to be grounded.

9 Protection Against Corrosion

9.1 An iron or steel part shall be protected against corrosion by galvanizing, plating, enameling, or other means determined to be equivalent if the malfunction of such an unprotected part will result in a risk of fire, electric shock, or injury to persons.

Exception No. 1: Bearing or laminations to minor parts of iron and steel – such as washers, screws, and the like need not be protected.

Exception No. 2: Toys in which the oxidation of iron or steel due to the exposure of metal to air and moisture will not be appreciable – the thickness of metal and temperature being factors – need not have surfaces of sheet-steel and cast-iron parts within an enclosure protected against corrosion.

10 Coatings and Platings

10.1 An accessible liquid coating material (such as paint, enamel, lacquer, ink, and the like) applied to a toy shall not contain compounds of lead, antimony, arsenic, barium, cadmium, chromium, mercury, or selenium exceeding amounts specified in the Standard Consumer Safety Specification for Toy Safety, ASTM F963. A liquid coating material is considered to be accessible if it can be contacted by persons before or after compliance with the performance requirements described in Abuse Tests, Section 25.

Exception: The requirements for a liquid coating material do not apply to ink applied to a container or packing material.

10.2 A toy cooking appliance or other toy intended for use with or in the presence of food shall not have a plating that contains cadmium or lead.

10.3 If a plating is applied to a toy intended for use with or in the presence of food, such plating shall not flake or peel, and shall conform to the toxicology guidelines given in 4.3 of the Standard Consumer Safety Specification on Toy Safety, ASTM F963.

11 Insulating Material

11.1 Material for the mounting of any insulated live part shall be porcelain, phenolic composition, cold-molded composition, or other material that is intended for the particular application, for the voltage involved, and that has capable aging characteristics; see the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, for description of tests to evaluate thermal aging.

11.2 Material used to insulate a heating element shall be capable of being used for the purpose. Asbestos shall not be used in any part of the toy.

11.3 Hard fiber is to be used as an insulating bushing, a washer, a separator, or a barrier, but not as the sole support of any uninsulated live part.

12 Switches and Power-On Indication

12.1 A switch or other control device shall be intended for the application and shall have a rating not less than that of the load it controls.

Exception: A motor control shall comply with the Switch Overload Test, Section 32.

12.2 A switch that controls a replaceable incandescent lamp, any electrode or lampholder contact of which is at a potential of more than 30 V rms (42.4 V peak) to any other part or to ground, shall simultaneously open both sides of the lamp circuit and shall have a marked "off" position.

12.3 A switch subjected to a temperature higher than 50°C (122°F) shall be evaluated with regard to the temperature limits of the materials used.

12.4 A switch employed on a toy shall be located or protected so that it is not subjected to damage during expected use or as a result of abuse.

12.4 effective June 3, 2011

12.5 A through-cord switch shall be subjected to the enclosure tests described in 25.1.1 – 25.4.3 and, with all terminal connections and through-cord individual leads severed, shall withstand the strain relief tests as described in 28.1.1 – 28.2.2.

Exception: The drop test requirements in 28.2.1 and 28.2.2 do not apply to the switch on a toy weighing more than 10 pounds (4.54 kg).

12.6 A toy shall not use a mercury switch or incorporate a wooden handle or other combustible material unless enclosed in metal or insulating material.

12.6 effective June 3, 2011

12.7 A toy shall be provided with a power-on indicator and shall be readily visible and distinguishable from any "off" position indicator. The power-on indicator shall clearly indicate that the toy is "on". The power-on indicator may be an illuminated switch. The power-on indicator shall remain "on" during any operating condition (including cycling of the thermostat) of the toy.

Exception: A momentary contact switch which is normally in the "OFF" position is not required to comply with this requirement. The switch activator shall be recessed or guarded so that it will not be unintentionally actuated to the "on" position.

12.7 effective June 3, 2011