UL 961

STANDARD FOR SAFETY

Electric Hobby and Sports Equipment

UL Standard for Safety for Electric Hobby and Sports Equipment, UL 961

Fifth Edition, Dated December 5, 2014

Summary of Topics

This revision of ANSI/UL 961 dated April 7, 2020 is 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 January 24, 2020.

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UL 961

Standard for Electric Hobby and Sports Equipment

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Second Edition – May, 1990
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Fourth Edition – August, 2000

Fifth Edition

December 5, 2014

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through April 7, 2020.

The most recent designation of ANSI/UL 961 as a Reaffirmed American National Standard (ANS) occurred on March 11, 2020. 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.

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INTRODUCTION

1 Scope

1.1 These requirements cover electrically-powered hobby and sports equipment rated 250 volts or less for use in ordinary locations in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements cover equipment intended for the home entertainment and amusement of adults.

1.3 These requirements do not cover toys and games intended to be used by children, amusement machines, photographic equipment, or other products that are covered by separate requirements.

1.4 In the following text, a requirement that does not apply to all of the types of products covered by this standard is identified by a specific reference in that requirement to the type or types of product involved. Absence of such specific reference or use of the term product indicates that the requirement applies to all types of products unless the context indicates otherwise.

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 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.

3.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are root-mean-square (rms).

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 apply.

5.2 LINE-VOLTAGE CIRCUIT – A circuit involving a potential of not more than 250 volts and having circuit characteristics in excess of those of a low-voltage circuit.

5.3 LOW-VOLTAGE CIRCUIT – A circuit involving a peak open-circuit potential of not more than 42.4 volts supplied by:

a) A primary battery;

b) A Class 2 transformer; or

c) A combination of a transformer and a fixed impedance that, as a unit, complies with all performance requirements for a Class 2 transformer.

A circuit derived from a line-voltage circuit by connecting a resistance in series with the supply circuit as a means of limiting the voltage and current is not considered a low-voltage circuit.

CONSTRUCTION

6 Enclosure

6.1 A product shall have the strength and rigidity necessary to resist the abuses to which it may be subjected, without increasing the risk of fire, electric shock, or injury to persons due to total or partial collapse of the enclosure and resulting reduction of spacing, loosening or displacement of a part, or other malfunction.

6.2 Among the factors taken into consideration when an enclosure is evaluated are its:

a) Mechanical strength;

b) Resistance to impact;

c) Resistance to corrosion;

d) Resistance to distortion at temperatures to which the enclosure may be subjected under conditions of normal or abnormal use; and

e) Dielectric properties, insulation resistance, and resistance to arc tracking.

6.3 Cast- and sheet-metal portions of the enclosure shall not be thinner than the applicable value specified in Table 6.1 unless the enclosure is determined to be acceptable when evaluated under the considerations specified in 6.2.

Table 6.1
Thickness of metal enclosure

Metal	Minimum thickness			
	At small, flat unreinforced surfaces and at surfaces that are reinforced by curving, ribbing, and the like		At relatively large unreinforced flat surfaces	
	inch	(mm)	inch	(mm)
Die-cast metal	3/64	(1.2)	5/64	(2.0)
Cast malleable iron	1/16	(1.6)	3/32	(2.4)
Other cast metal	3/32	(2.4)	1/8	(3.2)
Uncoated sheet steel	0.026	(0.66)	0.026	(0.66)
Galvanized sheet steel	0.029	(0.74)	0.029	(0.74)
Nonferrous sheet metal	0.036	(0.91)	0.036	(0.91)

6.4 A nonmetallic enclosure shall comply with the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

7 Accessibility of Parts

7.1 To reduce the likelihood of unintentional contact that may involve a risk of electric shock from uninsulated live parts and film-coated wire and contact that may involve a risk of injury to persons from a moving part, an opening in an enclosure of a product or in a motor shall be investigated as described in (a) or (b).

a) For an opening that has a minor dimension (see 7.4) less than 1 inch (25.4 mm), such a part or wire shall not be contacted by the probe illustrated in Figure 7.1.

b) For an opening that has a minor dimension of 1 inch or more:

1) A moving part shall be spaced from the opening as specified in Table 7.1, and

2) Neither an uninsulated live part nor film-coated wire shall be within:

i) X inches of the perimeter of the opening; or

ii) The volume generated by projecting the perimeter X inches normal to its plane. X equals five times the minor dimension of the opening, but not less than 6-1/16 inches (154 mm) – see Figure 7.2.

Exception No. 1: A motor other than one used in either a hand-held product or a hand-supported portion of a product need not comply with these requirements if it complies with the requirements in 7.2.

Exception No. 2: An opening necessary for intended operation of a product need not comply with this requirement.

7.2 With reference to the requirements in 7.1, in the enclosure of a motor:

a) An opening that has a minor dimension (see 7.4) less than 3/4 inch (19.1 mm) is acceptable if:

1) A moving part cannot be contacted by the probe illustrated in Figure 7.3;

2) Film-coated wire cannot be contacted by the probe illustrated in Figure 7.4;

3) In a directly accessible motor, an uninsulated live part cannot be contacted by the probe illustrated in Figure 7.5; and

4) In an indirectly accessible motor (see 7.5), an uninsulated live part cannot be contacted by the probe illustrated in Figure 7.3.

b) An opening that has a minor dimension of 3/4 inch or more is acceptable if:

1) A moving part is spaced from the opening as specified in Table 7.1; and

2) An uninsulated live part or film-coated wire is not within:

i) X inches of the perimeter of the opening; or

ii) The volume generated by projecting the perimeter X inches normal to its plane (see Figure 7.2). X equals five times the minor dimension of the opening, but not less than 3-5/32 inches (80 mm) for contact with an uninsulated live part through an opening in the enclosure of a directly accessible motor, and 4 inches (102 mm) for all other openings.