UL 1564

STANDARD FOR SAFETY

Industrial Battery Chargers

UL Standard for Safety for Industrial Battery Chargers, UL 1564

Fifth Edition, Dated February 13, 2024

Summary of Topics

This new edition of ANSI/UL 1564 dated February 13, 2024 includes the following:

- ***Addition of NOTE to to Align with the Dielectric Voltage-Withstand Test of Section 32***

- ***Editorial Updates: 2.1, 2.2, 2.3, 2.4, and Section 4***

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated December 15, 2023.

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UL 1564

Standard for Industrial Battery Chargers

Prior to the first edition, the requirements for the products covered by this standard were included in the Standard for Electric Battery Chargers, UL 1236.

Prior to the third edition, the requirements for Outdoor-Use Industrial Battery Chargers were included in the Outline of Investigation for Outdoor-Use Industrial Battery Chargers, UL 1564A.

First Edition – December, 1982
Second Edition – November, 1993
Third Edition – August, 2006
Fourth Edition – May, 2015

Fifth Edition

February 13, 2024

This ANSI/UL Standard for Safety consists of the Fifth Edition.

The most recent designation of ANSI/UL 1564 as an American National Standard (ANSI) occurred on February 13, 2024. 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 ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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GENERAL

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INTRODUCTION

1 Scope

1.1 These requirements cover battery chargers rated 600 volts or less. They are intended to be used in accordance with the National Electrical Code, NFPA 70, to charge industrial storage batteries which are used to provide power for material handling trucks, tractors, personnel carriers, and similar motive equipment. These chargers may be either cord and plug connected or permanently connected.

1.2 A battery charger that is not a complete assembly and depends upon installation in an end product for compliance with the requirements in this Standard is investigated under the requirements of this Standard and the standard for the end product.

1.3 These requirements do not cover:

a) Battery chargers for use in a marina, boatyard, or other marine application;

b) Battery chargers for fire protection signaling service;

c) Household battery chargers;

d) Automotive battery chargers;

e) Battery chargers for use with an internal combustion engine driving a centrifugal fire pump; or

f) Appliances or systems in which a battery charger is used.

2 Components

2.1 A component of a product covered by this Standard shall:

a) Comply with the requirements for that component as specified in this Standard;

b) Be used in accordance with its rating(s) established for the intended conditions of use; and

c) Be used within its established use limitations or conditions of acceptability.

2.2 A component of a product covered by this Standard is not required to comply with a specific component requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product;

b) Is superseded by a requirement in this Standard; or

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

2.3 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.

2.4 A component that is also intended to perform other functions such as overcurrent protection, ground-fault circuit-interruption, surge suppression, any other similar functions, or any combination thereof, shall comply additionally with the requirements of the applicable standard(s) that cover devices that provide those functions.

3 Units of Measurement

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

4 Referenced Publications

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.

4.2 The following publications are referenced in this Standard:

ASTM A653/A653M, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized), or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process*

ASTM D412, *Standard Test Method for Rubber Properties in Tension*

ASTM E28, *Standard Test Method for Softening Point by Ring-And Ball Apparatus*

ASTM E230, *Standard Specification and Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples*

UL 50E, *Enclosure for Electrical Equipment, Environmental Considerations*

UL 94, *Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*

UL 224, *Extruded Insulating Tubing*

UL 310, *Electrical Quick-Connect Terminals*

UL 486A-486B, *Wire Connectors*

UL 510, *Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape*

UL 514B, *Conduit, Tubing, and Cable Fittings*

UL 746C, *Polymeric Materials*

UL 796, *Printed-Wiring Boards*

UL 840, *Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment*

UL 969, *Marking and Labeling Systems*

UL 1004-2, *Impedance Protected Motors*

UL 1004-3, *Thermally Protected Motors*

UL 1236, *Electric Battery Chargers*

UL 1310, *Class 2 Power Units*

UL 1332, *Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment*

UL 1437, *Electrical Analog Instruments – Panel Board Types*

UL 1977, *Component Connectors for Use in Data, Signal, Control and Power Applications*

UL 2251, *Plugs, Receptacles, and Couplers for Electric Vehicles*

UL 2353, *Single- and Multi-Layer Insulated Winding Wire*

UL 5085-1, *Low Voltage Transformers – Part 1: General Requirements*

UL 5085-3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

UL 60691, *Thermal-Links – Requirements and Application Guide*

5 Glossary

5.1 In the following text, the term "product" is used to mean an industrial battery charger.

5.2 For the purpose of this standard, the following definitions apply.

5.3 CLASS 2 TRANSFORMER – A step-down transformer complying with the applicable requirements in UL 5085-1 and UL 5085-3, or UL 1310.

5.4 INDUSTRIAL BATTERY – A battery that is intended for cycling service and is rated in number of cells and in ampere-hours delivered at the 6-hour discharge rate.

5.5 LIMITED-ENERGY CIRCUIT – An ac or dc circuit having a voltage not exceeding 1000 volts and the energy limited to 100 volt-amperes by either a secondary winding of a transformer, one or more resistors complying with 24.4.10 and 24.4.11, or a regulating network complying with 24.4.1.

5.6 LOW-VOLTAGE, LIMITED-ENERGY (LVLE) CIRCUIT – A circuit involving an alternating current voltage of not more than 30 volts, rms (42.4 volts peak), or a direct current voltage of not more than 60 volts and supplied by either of the following:

a) An inherently limited Class 2 transformer or power unit or a not inherently limited Class 2 transformer or power unit and an overcurrent protective device that is:

1) Not of the automatic reclosing type;

2) Trip-free from the reclosing mechanism; and

3) Either not readily interchangeable with a device of a different rating or a marking in accordance with 48.5 is provided.

b) A combination of an isolated transformer secondary winding and one or more resistors or a regulating network complying with 24.4.10 that complies with all the performance requirements for an inherently limited Class 2 transformer or power source.

CONSTRUCTION

6 Frame and Enclosure

6.1 A product shall be formed and assembled so that it has the strength and rigidity necessary to resist the abuses to which it is subjected, without increasing the risk of fire, electric shock, or injury to persons due to a total or partial collapse resulting in a reduction of spacings, loosening or displacement of parts, or other serious defects.

6.2 A product that complies with the requirements in 6.3 – 6.8 is considered to comply with the requirements in 6.1.

6.3 A product shall be provided with an enclosure that shall house all parts – other than the power-supply cord or primary connector and the output leads or terminals – that present a risk of fire, electric shock, or injury to persons under any condition of use.

6.4 The thickness of a sheet-metal enclosure shall not be less than that specified in Table 6.1 and Table 6.2, except that uncoated steel shall not be less than 0.032 inch (0.81 mm) thick, zinc-coated steel shall not be less than 0.034 inch (0.86 mm) thick, and nonferrous metal shall not be less than 0.045 inch (1.14 mm) thick at points at which a wiring system is to be connected.

Table 6.1
Thickness of Sheet Metal for Enclosures – Carbon Steel or Stainless Steel

Without supporting frame[a]				With supporting frame or equivalent reinforcing[a]				Minimum thickness, inch (mm)			
Maximum width[b]		Maximum length[c]		Maximum width[b]		Maximum length[c]					
inches	(cm)	inches	(cm)	inches	(cm)	inches	(cm)	Uncoated		Zinc coated	
4.0	(10.2)	Not limited		6.25	(15.9)	Not limited		0.020	(0.51)	0.023	(0.58)
4.75	(12.1)	5.75	(14.6)	6.75	(17.1)	8.25	(21.0)				
6.0	(15.2)	Not limited		9.5	(24.1)	Not limited		0.026	(0.66)	0.029	(0.74)
7.0	(17.8)	8.75	(22.2)	10.0	(25.4)	12.5	(31.8)				
8.0	(20.3)	Not limited		12.0	(30.5)	Not limited		0.032	(0.81)	0.034	(0.86)
9.0	(22.9)	11.5	(29.2)	13.0	(33.0)	16.0	(40.6)				
12.5	(31.8)	Not limited		19.5	(49.5)	Not limited		0.042	(1.07)	0.045	(1.14)
14.0	(35.6)	18.0	(45.7)	21.0	(53.3)	25.0	(63.5)				
18.0	(45.7)	Not limited		27.0	(68.6)	Not limited		0.053	(1.35)	0.056	(1.42)
20.0	(50.8)	25.0	(63.5)	29.0	(73.7)	36.0	(91.4)				
22.0	(55.9)	Not limited		33.0	(83.8)	Not limited		0.060	(1.52)	0.063	(1.60)
25.0	(63.5)	31.0	(78.7)	35.0	(88.9)	43.0	(109.2)	43.0	(109.2)		
25.0	(63.5)	Not limited		39.0	(99.1)	Not limited		0.067	(1.70)	0.070	(1.78)
29.0	(73.7)	36.0	(91.4)	41.0	(104.1)	51.0	(129.5)				
33.0	(83.8)	Not limited		51.0	(129.5)	Not limited		0.080	(2.03)	0.084	(2.13)
38.0	(96.5)	47.0	(119.4)	54.0	(137.2)	66.0	(167.6)				
42.0	(106.7)	Not limited		64.0	(162.6)	Not limited		0.093	(2.36)	0.097	(2.46)
47.0	(119.4)	59.0	(149.9)	68.0	(172.7)	84.0	(213.4)				
52.0	(132.1)	Not limited		80.0	(203.2)	Not limited		0.108	(2.74)	0.111	(2.82)

Table 6.1 Continued on Next Page

Table 6.1 Continued

Without supporting frame[a]				With supporting frame or equivalent reinforcing[a]				Minimum thickness, inch (mm)			
Maximum width[b]		Maximum length[c]		Maximum width[b]		Maximum length[c]					
inches	(cm)	inches	(cm)	inches	(cm)	inches	(cm)	Uncoated		Zinc coated	
60.0	(152.4)	74.0	(188.0)	84.0	(213.4)	103.0	(261.6)				
63.0	(160.0)	Not limited		97.0	(246.4)	Not limited		0.123	(3.12)	0.126	(3.20)
73.0	(185.4)	90.0	(228.6)	103.0	(261.6)	127.0	(322.6)				

[a] See 6.5.

[b] The width is the smaller dimension of a rectangular piece of sheet metal that is part of an enclosure. Adjacent surfaces of an enclosure may have supports in common and be made of a single sheet.

[c] Not limited applies only if the edge of the surface is flanged at least 1/2 inch (12.7 mm) or is fastened to an adjacent surface not normally removed in use.

Table 6.2
Thickness of Sheet Metal for Enclosures – Aluminum, Copper, or Brass

Without supporting frame[a]				With supporting frame or equivalent reinforcing[a]				Minimum thickness, inch (mm)
Maximum width[b]		Maximum length[c]		Maximum width[b]		Maximum length[c]		
inches	(cm)	inches	(cm)	inches	(cm)	inches	(cm)	
3.0	(7.6)	Not limited		7.0	(17.8)	Not limited		0.023
3.5	(8.9)	4.0	(10.2)	8.5	(21.6)	9.5	(24.1)	(0.58)
4.0	(10.2)	Not limited		10.0	(25.4)	Not limited		0.029
5.0	(12.7)	6.0	(15.2)	10.5	(26.7)	13.5	(34.3)	(0.74)
6.0	(15.2)	Not limited		14.0	(35.6)	Not limited		0.036
6.5	(16.5)	8.0	(20.3)	15.0	(38.1)	18.0	(45.7)	(0.91)
8.0	(20.3)	Not limited		19.0	(48.3)	Not limited		0.045
9.5	(24.1)	11.5	(29.2)	21.0	(53.3)	25.0	(63.5)	(1.14)
12.0	(30.5)	Not limited		28.0	(71.1)	Not limited		0.058
14.0	(35.6)	16.0	(40.6)	30.0	(76.2)	37.0	(94.0)	(1.47)
18.0	(45.7)	Not limited		42.0	(106.7)	Not limited		0.075
20.0	(50.8)	25.0	(63.5)	45.0	(114.3)	55.0	(139.7)	(1.91)
25.0	(63.5)	Not limited		60.0	(152.4)	Not limited		0.095
29.0	(73.7)	36.0	(91.4)	64.0	(162.6)	78.0	(198.1)	(2.41)
37.0	(94.0)	Not limited		87.0	(221.0)	Not limited		0.122
42.0	(106.7)	53.0	(134.6)	93.0	(236.2)	114.0	(289.6)	(3.10)
52.0	(132.1)	Not limited		123.0	(312.4)	Not limited		0.153
60.0	(152.4)	74.0	(188.0)	130.0	(330.2)	160.0	(406.4)	(3.89)

[a] See 6.5.

[b] The width is the smaller dimension of a rectangular piece of sheet metal that is part of an enclosure. Adjacent surfaces of an enclosure may have supports in common and be made of a single sheet.

[c] Not limited applies only if the edge of the surface is flanged at least 1/2 inch (12.7 mm) or is fastened to an adjacent surface not normally removed in use.

6.5 With reference to Table 6.1 and Table 6.2, a supporting frame is a structure of angle, channel, or a folded rigid section of sheet metal, that is rigidly attached to and has essentially the same outside dimensions as the enclosure surface and that has sufficient torsional rigidity to resist the bending