ANSI/CAN/UL 2743:2023

JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

Portable Power Packs

Approved American National Standard
ANSI
ANSI/UL 2743-2023

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SCC FOREWORD

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UL Standard for Safety for Portable Power Packs, ANSI/CAN/UL 2743

Second Edition, Dated July 3, 2018

Summary of Topics

This revision of ANSI/CAN/UL 2743 dated April 14, 2023 includes the following changes:

– Clarification to definition of hazardous voltage level; 5.21

– Addition of definition of "portable or moveable"; 1.7, Table 1.1, 4.3, 5.29A

– Alignment of requirements for sub-enclosures with UL 746C; 7.3.2

– Receptacle output not supplied by AC mains; 12.3.1, 12.3.1A, 17.5, 70.24, 72.3, 4.3

– Increase the vehicle adapter voltage rating; 11.1.2

– Replacement of UL 60950-1 with UL 62368-1 for external charger standard; 11.3.2, 4.3

– Double insulated products with functional earthing; 5.18A, 14.2 – 14.6

– Alternative cell standard for Lithium and Lead Acid batteries; 28.2.1, 28.3.1, 4.3

– Addition of alternative standard for inverters in the power pack; 30.1, 4.3

– Addition of mass limitation for stability test; 37.1

– Addition of the induction output and energy hazard measurement test; 12.1.2, 12.1.3, 12.4.3, 12.5.3, Section 12.6, Section 47A

– Addition of LVLE circuit requirements and test; 5.27, 12.1.4, Section 12A, Section 47B

– Clarification of Leakage Current Test with hazardous voltage circuits; 46.1, 49.1

– Option of single fault condition in control circuit besides functional safety evaluation; 40.1, 50.1.7

– Clarification of the short circuit resistance for output short circuit test; 50.2.2, 50.2.3

– Charging current for Overcharging Test; 50.9.2

– Additional requirements for large energy storage systems (ESS); 28.3.7, 32.4, Section 50.11, 70.23

– Strain relief test for interconnecting cable; 11.2.2.1, 11.2.2.3, Section 54.1

– Updates to the Impact Test and Drop Test; 55.1.2, 55.2.1, 55.3.1, 55.3.2

– Clarification of the compliance criteria for the Rain Test; 5.15, 5.31A, 5.31B, 60.2, 60.2A, 60.3, 60.3A, 60.4, 69.1

– Power Pack Ampacity Test and booster ampacity rating marking; 65.1, 69.1

– Addition of UL 969A requirements for flag labels; 69.3, 4.3

– Revisions to Markings and Instructions; 70.11, 70.12, 72.3

– Addition of instruction for booster cable connection and disconnection to battery; 72.3

– Clarification to Annex A as Normative or Informative

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

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 8, 2022 and December 2, 2022.

ANSI/UL 2743-2023

JULY 3, 2018
(Title Page Reprinted: April 14, 2023)

ANSI/CAN/UL 2743:2023

Standard for Portable Power Packs

First Edition – October, 2016

Second Edition

July 3, 2018

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through April 14, 2023.

The most recent designation of ANSI/UL 2743 as an American National Standard (ANSI) occurred on April 14, 2023. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface, or SCC Foreword.

This standard has been designated as a National Standard of Canada (NSC) on April 14, 2023.

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Preface

This is the Second Edition of ANSI/CAN/UL 2743, the Standard for Safety for Portable Power Packs.

ULSE is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Annex A is identified as Normative for Canada and Informative for the US. Informative text is for informational purposes only, and Normative text is considered to be mandatory.

This ANSI/CAN/UL 2743 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

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

This Edition of the Standard has been formally approved by the Technical Committee (TC) for Portable Power Packs, TC 2743.

This list represents the TC 2743 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

TC 2743 Membership

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International Classification for Standards (ICS): 97.180

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE.

INTRODUCTION

1 Scope

1.1 These requirements cover portable and movable power packs provided with one or more batteries, electrochemical capacitors, or electrochemical capacitor modules. If provided with a battery, the battery shall be either a lead acid or lithium ion battery. The power packs are provided with one or more inputs and one or more outputs. For power packs provided with a booster function, the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 24 V dc maximum, to provide emergency starting power.

1.2 These requirements cover power packs suitable for outdoor use, temporary outdoor use, or indoor use only. Outdoor use packs are intended to be used outdoors with no restrictions. Temporary outdoor use packs are intended to be used outdoors in limited wet conditions and always stored indoors. Indoor use only packs are intended to be stored indoors and used indoors and are not intended to be used outdoors at any time. A power pack with a booster function is not considered indoor use only under any conditions.

1.3 These requirements cover power packs provided with additional systems such as an air compressor (tankless type) for inflating tires or other inflatable items, or with a light to act as warning lights to oncoming traffic, as a flashlight, or the like. These functions are also powered by the internal battery.

1.4 These requirements cover the power pack options such as lights, voltmeters, internal air compressor assemblies, associated gauges, inverters, vehicle adapters, and internal batteries, as well as the charging of the internal batteries, when these options are integral to the power pack.

1.5 These requirements do not cover wiring or cabling used in the recharging function of electric vehicle recharging equipment.

1.6 These requirements do not cover power banks which are covered in the Outline of Investigation for Power Banks, UL 2056.

1.7 These requirements do not cover power packs having a capacity exceeding the limits specified in Table 1.1 which are covered by the Standard for Energy Storage Systems and Equipment, UL 9540.

Table 1.1
Portable Power Pack Threshold Quantities

Portable power pack technology	Aggregate capacity	
	kWh	MJ
Lead-acid, all types	70	252
Lithium-ion, all types	20	72
Electrochemical Capacitors	3	10.8

2 Units of Measurement

2.1 The values given in SI (metric) units shall be normative. Any other values are for information only.

2.2 Values stated without parentheses are the requirement. Values within parentheses are considered explanatory or approximate information.

3 Components

3.1 Except as indicated in 3.2, a component of a product covered by this Standard shall comply with the requirements for that component.

3.2 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.

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

3.4 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 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 Products covered by this Standard shall comply with the referenced installation codes and standards noted in this Section as appropriate for the country where the product is to be used. When the product is intended for use in more than one country, the product shall comply with the installation codes and standards for all countries where it is intended to be used.

4.3 The following publications are referenced in this Standard:

ASTM A90, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

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

ASTM E376, Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods

ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

ASTM B568, Standard Test Method for Measurement of Coating Thickness by X-Ray Spectrometry

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

CSA C22.2 No. 0.15, Adhesive Labels

CAN/CSA C22.2 No. 0.17, Evaluation of Properties of Polymeric Mate

CAN/CSA C22.2 No. 0.2, Insulation Coordination

CSA C22.2 No. 42, General Use Receptacles, Attachment Plugs, and Similar Wiring Devices

CAN/CSA C22.2 No. 66.1, Low Voltage Transformers – Part 1: General Requirements

CAN/CSA C22.2 No. 66.2, Low Voltage Transformers – Part 2: General Purpose Transformers

CAN/CSA C22.2 No. 66.3, Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers

CAN/CSA C22.2 No. 68, Motor Operated Appliances (Household and Commercial)

CAN/CSA C22.2 No. 77, Motors With Inherent Overheating Protection

CSA C22.2 No. 107.1, Power Conversion Equipment

CSA C22.2 No. 107.2, Battery Chargers

CAN/CSA C22.2 No. 182.3, Special Use Attachment Plugs, Receptacles, and Connectors

CAN/CSA C22.2 No. 197, PVC Insulating Tape

CAN/CSA C22.2 No. 127, Equipment and Lead Wires

CAN/CSA C22.2 No. 210, Appliance Wiring Material Products

CSA C22.2 No. 223, Power Supplies With Extra Low Voltage Class 2 Outputs

CSA C22.2 No. 60335-2-29, Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers

CSA C22.2 E60730-1, Automatic Electrical Controls – Part 1: General Requirements

CSA C22.2 No. 60950-1, Information Technology Equipment – Safety – Part 1: General Requirements

CSA C22.2 No. 62133-2, Secondary Cells and Batteries Containing Alkaline and Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made From Them, for Use in Portable Applications – Part 2: Lithium Systems

CSA C22.2 No. 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements

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

UL 101, Leakage Current for Appliances

UL 498, Attachment Plugs and Receptacles

UL 506, Specialty Transformers

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

UL 635, Insulating Bushings

UL 746C, Polymeric Materials – Use in Electrical Equipment Evaluations

UL 758, Appliance Wiring Material

UL 796, Printed-Wiring Boards

UL 810A, Electrochemical Capacitors

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

UL 943, Ground-Fault Circuit Interrupters

UL 969, Marking and Labeling Systems

UL 969A, Marking and Labeling Systems – Flag Labels, Flag Tags, Wrap-Around Labels and Related Products

UL 1004-3, Thermally Protected Motors

UL 1012, Power Units Other Than Class 2

UL 1097, Double Insulation Systems for Use in Electrical Equipment

UL 1236, Battery Chargers for Charging Engine-Starter Batteries

UL 1310, Class 2 Power Units

UL 1437, Electrical Analog Instruments – Panel Board Types

UL 1450, Motor-Operated Air Compressors, Vacuum Pumps, and Painting Equipment

UL 1561, Dry-Type General Purpose and Power Transformers

UL 1581, Reference Standard for Electrical Wires, Cables, and Flexible Cords

UL 1642, Lithium Batteries

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources

UL 1839, Automotive Battery Booster Cables

UL 1973, Batteries for Use in Stationary and Motive Auxiliary Power Applications

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

UL 1989, Standby Batteries

UL 2089, Vehicle Battery Adapters

UL/ULC 2580, Batteries for Use In Electric Vehicles

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

UL 5085-2, Low Voltage Transformers – Part 2: General Purpose Transformers

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

UL 9540, Energy Storage Systems and Equipment

UL 60335-2-29, Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers

UL 60730-1, Automatic Electrical Controls – Part 1: General Requirements

UL 60950-1, Information Technology Equipment – Safety – Part 1: General Requirements

UL 62109-1, Power Converters for Use in Photovoltaic Power Systems – Part 1: General Requirements

UL 62133-2, Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made From Them, for Use in Portable Applications – Part 2: Lithium Systems

UL 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements

5 Glossary

5.1 For the purpose of this Standard, the following definitions apply:

5.2 ACCESSIBLE – Able to be contacted by an accessibility probe.

5.3 BATTERY – An electrical storage unit consisting of two or more cells.

5.4 BOOSTER CABLE – The conductors that originate at the power pack's internal battery and terminate at the clamps that are intended to be temporarily connected to the land vehicle's battery. If the cable is connected through a switch and therefore does not have a continuous path to the exterior of the power pack's enclosure, then the definition shall apply to the portion of cable that exits the power pack's enclosure.

5.5 BOOSTER FUNCTION – When the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 24 V maximum, to provide emergency starting power.

5.6 CAPACITOR MODULE – A single or multiple series and/or parallel-connected, electrochemical capacitors with associated circuitry.

5.7 CHARGING SYSTEM – Combination of circuitry intended to charge, balance, and/or maintain the state of charge of the battery.

5.8 CLAMP – Devices located at the ends of the power pack's booster cables, and which contain the jaw ends, connectors, and handle ends, which are used to make the temporary connections to the land vehicles battery.

5.9 CLAMP CONNECTORS – Portion of the clamp that contacts the battery terminals.