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JOINT CANADA-UNITED STATES
NATIONAL STANDARD

ANSI/CAN/UL/ULC 2271:2023

STANDARD FOR SAFETY

Batteries for Use In Light Electric Vehicle (LEV) Applications

Approved American National Standard
ANSI

ANSI/UL 2271-2023

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UL Standard for Safety for Batteries for Use In Light Electric Vehicle (LEV) Applications, ANSI/CAN/UL/ULC 2271

Third Edition, Dated September 14, 2023

Summary of Topics

This new edition of ANSI/CAN/UL/ULC 2271, Standard for Batteries for Use In Light Electric Vehicle (LEV) Applications, dated September 14, 2023 includes the following changes:

– Modification of the normal operation conditions and cycle number during Temperature Test; 5.2, 33.1, and Table 33.1

– Clarification of the scope to better distinguish what is covered under UL/ULC 2271 versus UL/ULC 2580; 1.1, 1.4, 5.2, 6.1, 6.2, 6.14, 6.25, 6.29, 6.32, 6.40, 16.2, 16.3, and 16.8

– Updates to Functional Safety criteria; 6.34, 6.35, 6.36 and Section 15

– Additional guidance on protection of corrosion between dissimilar metals; 5.2, 8.1, 8.2, 8.4, Annex B, B1, and Table B.1

– Addition of requirements for when repurposed batteries are used; 5.2, Section 16, 16.8, Section 46, Annex C, and Table C.1

– Addition of a High Rate Charge Test that evaluates the safety when charging at a rate higher than the specified maximum level, Table 18.1, Section 21, 21.2, Table 21.1, and Section 24

– Addition of the Overload Under Discharge Test to replace the "soft short" in the Short Circuit Test; 6.32, Table 18.1, 21.1, 21.2 and Section 26

– Addition of a Single Cell Failure Design Tolerance Test for large size batteries; Table 18.1 section Table 21.1 and Section 45.

– Replaced reference to UL 60950-1 with UL 62368-1 throughout the Standard.

– Replaced reference to ISO 12405-1 with ISO 6469-1 throughout the Standard.

– Corrections to Manufacturing and Production Line Testing and inclusion of a 100% check on active controls relied upon for safety; 17.2, 17.4.

– Addition of a normal operation limit check in Overcharge and Overdischarge Test; 23.3, 23.6, 27.2 and 27.5

– Addition of a grounding continuity test; Section 14 and Section 32

– Editorial revisions throughout the Standard.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated April 7, 2023 and July 14, 2023.

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ANSI/UL 2271-2023

SEPTEMBER 14, 2023



ANSI/CAN/UL/ULC 2271:2023

Standard for Batteries for Use In Light Electric Vehicle (LEV) Applications

First Edition – December, 2013
Second Edition – September, 2018

Third Edition

September 14, 2023

This ANSI/CAN/UL/ULC Safety Standard consists of the Third Edition.

The most recent designation of ANSI/UL 2271 as an American National Standard (ANSI) occurred on September 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 September 14, 2023.

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CONTENTS

Preface 5

INTRODUCTION

1 Scope 9
2 Components 9
3 Units of Measurement 10
4 Undated References 10
5 Referenced Publications 10
6 Glossary 12

CONSTRUCTION

7 Non-Metallic Materials 16
8 Metallic Parts Resistance to Corrosion 17
9 Enclosures 17
10 Wiring and Terminals 18
11 Fuses 20
12 Handles 20
13 Electrical Spacings and Separation of Circuits 20
14 Insulation Levels and Protective Grounding 21
15 Safety Analysis 22
15.1 General 22
15.2 Protective circuits and controls 23
16 Cells, Electrochemical Capacitors, and Repurposed Cells and Batteries 24
17 Manufacturing and Production Line Testing 25

PERFORMANCE

18 General 26
19 Combustible Concentrations 28
20 Measurement Equipment Accuracy 28
21 Post Test Cycle 28
22 Results Criteria 29

ELECTRICAL TESTS

23 Overcharge Test 29
24 High Rate Charge Test 30
25 Short Circuit Test 31
26 Overload Under Discharge Test 32
27 Overdischarge Test 34
28 Temperature Test 35
29 Imbalanced Charging Test 37
30 Dielectric Voltage Withstand Test 37
31 Isolation Resistance Test 39
31.1 Isolation resistance method for systems rated 120 V and above 39
31.2 Isolation resistance method for systems rated below 120 V (insulation resistance method) 39
32 Grounding Continuity Test 40

MECHANICAL TESTS

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33 Vibration Endurance Test 40
34 Shock Test 42
35 Crush Test 43
36 Drop Test 44
36.1 Drop test for EESAs intended to be removable by the user 44
36.2 Drop test for EESAs intended for service handling only 45
37 Mold Stress Relief Test 45
38 Handle Loading Test 46
39 Roll Over Test 46
40 Strain Relief Tests (Cord Anchorages) 47
40.1 General 47
40.2 Strain relief pull test 47
40.3 Push-back test 47

ENVIRONMENTAL TESTS

41 Immersion Test 48
42 Water Exposure Test (IP Code Rating) 48
43 Thermal Cycling Test 49
44 Label Permanence Test 50

TOLERANCE TO INTERNAL CELL FAILURE TESTS

45 Single Cell Failure Design Tolerance Test 50

MARKINGS

46 General 51

INSTRUCTIONS

47 General 52

ANNEX A (INFORMATIVE)

A1 Component Standards 53

ANNEX B (NORMATIVE) Metal Compatibility

B1 General 55

Annex C – Safety Marking Translations (Normative for Canada and Informative for the US)

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Preface

This is the Third Edition of ANSI/CAN/UL/ULC 2271, Standard for Batteries for Use In Light Electric Vehicle (LEV) Applications.

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

This ANSI/CAN/UL/ULC 2271 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.

Annex B, and Annex C are identified as Normative, as such, form mandatory parts of this Standard.

Annexes A and C are identified as Informative for the United States.

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.

This joint American National Standard and National Standard of Canada is based on, and now supersedes, the Second Edition of UL/ULC 2271.

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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This Edition of the Standard has been formally approved by the Technical Committee (TC) for Batteries for Use in Electric Vehicles, TC 2580.

This list represents the TC 2580 membership when the final text in this Standard was balloted. Since that time, changes in the membership may have occurred.

TC 2580 Membership

Name	Representing	Interest Category	Region
Bender, Curtis	Tennant Co	Supply Chain	USA
Bowman, Rebecca		Consumer	USA
Buoniconti, Ralph	SABIC	Supply Chain	USA
Byczek, Rich	Intertek	Testing and Standards	USA

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Leber, Jody	CSA Group	Testing and Standards	Ontario, Canada
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Ressler, Galen	General Motors Co	Producer	USA
Richard, Robert	Hazmat Safety Consulting LLC	General	USA
Said, Ahmed	Lucid Motors	Producer	USA
Shih, Guan-Ting	Automotive Research Testing Center	General Interest	Taiwan
Spataru, Alex	ADEPT Group, Inc.	Commercial/Industrial User	USA
Stankes, David	3M Austin Center	Supply Chain	USA
Stroetzel, Merten	Efoil Efoil.Builders Public Usergroup	Consumer	USA
Sudler III, Samuel	SEA Ltd	General	USA
Tsen, Maoee	Phoenix Battery Corp	Producer	Taiwan
Van, Doan Thi Thanh	Vietnam Standards And Quality Institute	International Delegate	Vietnam
Van Heirseele, Megan	UL Standards & Engagement	TC Project Manager (Non-voting)	USA
Warner, Nicholas	Energy Storage Response Group	General	USA
Weidner, Gary	GW Technical Services	General Interest	USA
Wu, Donald P.H.		Producer	Taiwan
Xiao, Jerry	SGS-CSTC Standards Technical Services Co Ltd	Testing and Standards	China
Xu, Hongbin	Guangzhou MCM Certification and Testing Co Ltd	Testing and Standards	China
Yu, Kihoon	SK On Co Ltd / SK Battery America Inc	Producer	Korea
Yun, Yonghee	Samsung SDI	Producer	Korea
Yunzheng, Zhu	ZHEJIANG LAB/Intelligent Robot Research Center	General	China

International Classification for Standards (ICS): 29.220; 43.120

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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.

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INTRODUCTION

1 Scope

1.1 These requirements cover electrical energy storage assemblies (EESAs) such as battery packs and combination battery pack-electrochemical capacitor assemblies and the subassembly/modules that make up these assemblies for use in light electric-powered vehicles (LEVs) as defined in this Standard. This Standard also covers a battery management system (BMS) that provides protection and control for the EESA.

1.2 This Standard does not evaluate the performance or reliability of these devices.

1.3 This Standard does not include requirements for the evaluation of EESAs intended for use in electric vehicles, such as on-road passenger vehicles and motorcycles intended for use on public roadways including highways, and starter batteries and heavy duty off road vehicles such as battery powered ride-on industrial trucks, earth moving or construction equipment, which are covered under the Standard for Batteries for Use in Electric Vehicles, UL/ULC 2580.

1.4 This Standard does not include requirements for evaluation of EESAs intended for use in stationary and motive auxiliary power applications, which are covered under the Standard for Batteries for Use in Stationary and Motive Auxiliary Power Applications, UL 1973.

1.5 These requirements do not cover equipment for use in hazardous locations as defined in the National Electrical Code, NFPA 70.

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.

NOTE: See Annex A for a list of Standards covering components generally used in the products covered by this Standard.

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 investigated 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

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