



UL 1642

STANDARD FOR SAFETY Lithium Batteries

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL**



Documents
Document Sharing Hub

UL Standard for Safety for Lithium Batteries, UL 1642

Fifth Edition, Dated March 13, 2012

Summary of Topics

Revisions have been issued to the Standard for Lithium Batteries, UL 1642, to incorporate the following:

- **Revised the Impact Test by adding an Exception to 14.2.**

The revised requirements are substantially in accordance with Proposal(s) on this subject dated March 6, 2015.

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.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

No Text on This Page

*UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL*



Documents

Document Sharing Hub

MARCH 13, 2012

(Title Page Reprinted: June 23, 2015)

1

UL 1642

Standard for Lithium Batteries

First Edition – October, 1985

Second Edition – November, 1992

Third Edition – April, 1995

Fourth Edition – September, 2005

Fifth Edition

March 13, 2012

This UL Standard for Safety consists of the Fifth Edition including revisions through June 23, 2015.

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 <http://csds.ul.com>.

UL's Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

COPYRIGHT © 2015 UNDERWRITERS LABORATORIES INC.

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL**



Documents
Document Sharing Hub

No Text on This Page

*UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL*



Documents

Document Sharing Hub

CONTENTS

INTRODUCTION

1 Scope	5
2 General	6
2.1 Units of measurement	6
2.2 Terminology	6
2.3 Components	6
3 Glossary	6

CONSTRUCTION

4 General	8
4.1 Casing	8
4.2 Electrolyte	9
4.3 Use	9

PERFORMANCE

5 General	9
5.1 Technician-replaceable batteries	9
5.2 User-replaceable batteries	10
5.3 Multicell installations	10
6 Samples	10
7 Conditioning of Samples	13
7.1 Discharge	13
7.2 Charge-discharge cycling	14
8 Important Test Considerations	14
9 Temperature Measurements	14

TESTS FOR TECHNICIAN-REPLACEABLE AND USER-REPLACEABLE BATTERIES

ELECTRICAL TESTS

10 Short-Circuit Test	14
11 Abnormal Charging Test	15
12 Forced-Discharge Test	16

MECHANICAL TESTS

13 Crush Test	17
14 Impact Test	17
15 Shock Test	19
16 Vibration Test	19

ENVIRONMENTAL TESTS

17 Heating Test	19
18 Temperature Cycling Test	20
19 Low Pressure (Altitude Simulation) Test	20

**UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL**



Documents

Document Sharing Hub

FIRE EXPOSURE TEST

20 Projectile Test 20

MARKING

21 General 21
22 Primary Batteries 22

APPENDIX A

Standards for Components..... A1

INTRODUCTION

1 Scope

1.1 These requirements cover primary (nonrechargeable) and secondary (rechargeable) lithium batteries for use as power sources in products. These batteries contain metallic lithium, or a lithium alloy, or a lithium ion, and may consist of a single electrochemical cell or two or more cells connected in series, parallel, or both, that convert chemical energy into electrical energy by an irreversible or reversible chemical reaction.

1.2 These requirements cover lithium batteries intended for use in technician-replaceable or user-replaceable applications.

1.3 These requirements are intended to reduce the risk of fire or explosion when lithium batteries are used in a product. The final acceptability of these batteries is dependent on their use in a complete product that complies with the requirements applicable to such product.

1.4 These requirements are also intended to reduce the risk of injury to persons due to fire or explosion when user-replaceable lithium batteries are removed from a product and discarded.

1.5 These requirements cover technician-replaceable lithium batteries that contain 5.0 g (0.18 oz) or less of metallic lithium. A battery containing more than 5.0 g (0.18 oz) of lithium is judged on the basis of compliance with the requirements in this standard, insofar as they are applicable, and further examination and test to determine whether the battery is acceptable for its intended uses.

1.6 These requirements cover user-replaceable lithium batteries that contain 4.0 g (0.13 oz) or less of metallic lithium with not more than 1.0 g (0.04 oz) of metallic lithium in each electrochemical cell. A battery containing more than 4.0 g (0.13 oz) or a cell containing more than 1.0 g (0.04 oz) lithium may require further examination and test to determine whether the cells or batteries are acceptable for their intended uses.

1.7 These requirements do not cover the toxicity risk that may result from the ingestion of a lithium battery or its contents, nor the risk of injury to persons that may occur if a battery is cut open to provide access to the metallic lithium.