ANSI C18.5M, Part 1-2020

American National Standard for Portable Lithium Rechargeable Cells and Batteries— General and Specifications

Secretariat:

National Electrical Manufacturers Association
1300 N 17th St., Suite 900
Rosslyn, VA 22209

Approved: July 24, 2020

American National Standards Institute, Inc.

NOTICE AND DISCLAIMER

The information in this publication was considered technically sound by the consensus of persons engaged in the development and approval of the document at the time it was developed. Consensus does not necessarily mean that there is unanimous agreement among every person participating in the development of this document.

ANSI Standards, of which the document contained herein is one, are developed through a voluntary consensus Standards development process. This process brings together volunteers and/or seeks out the views of persons who have an interest in the topic covered by this publication. As Secretary of the ANSI Accredited Standards Committee, NEMA administers the process in accordance with the procedures of the American National Standards Institute to promote fairness in the development of consensus. As a publisher of this document, NEMA does not write the document and it does not independently test, evaluate or verify the accuracy or completeness of any information or the soundness of any judgments contained in its Standards and guideline publications.

NEMA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, application, or reliance on this document. NEMA disclaims and makes no guaranty or warranty, express or implied, as to the accuracy or completeness of any information published herein, and disclaims and makes no warranty that the information in this document will fulfill any of your particular purposes or needs. NEMA does not undertake to guarantee the performance of any individual manufacturer's or seller's products or services by virtue of this Standard or guide.

In publishing and making this document available, NEMA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is NEMA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. Information and other Standards on the topic covered by this publication may be available from other sources, which the user may wish to consult for additional views or information not covered by this publication.

NEMA has no power, nor does it undertake to police or enforce compliance with the contents of this document. NEMA does not certify, test or inspect products, designs or installations for safety or health purposes. Any certification or other statement of compliance with any health or safety–related information in this document shall not be attributable to NEMA and is solely the responsibility of the certifier or maker of the statement.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the Standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the Standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the Standards.

The American National Standards Institute does not develop Standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this Standard.

Caution Notice: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this Standard. Purchasers of American National Standards may receive current information on all Standards by calling or writing the American National Standards Institute.

Published by

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, VA 22209

Printed in the United States of America.

< This page intentionally left blank. >

CONTENTS

Tables

Figures

Foreword

In 1912, a committee of the American Electrochemical Society recommended Standard methods to be used in testing dry cells. Their recommendations were followed five years later when the National Bureau of Standards prepared specifications that included cell sizes, arrangement of cells within batteries, service tests, and required performance.

The need for continued revision to the specification led to the authorization by the American Engineering Standards committee of a permanent sectional committee on dry cells, now portable cells. This Committee, C18, representing battery users, manufacturers, and government agencies, has remained active since that time.

This Standard is a revision of ANSI C18.2M, Part 1-2007*American National Standard for Portable Rechargeable Cells and Batteries—General and Specifications*. This current revision seeks to separate out the rechargeable lithium cells and batteries and improve upon performance and other requirements that are unique to rechargeable lithium with harmonization to the IEC 61960 Standards for rechargeable lithium where applicable. Harmonization with the other ANSI C18 Standards was implemented where applicable.

The basic philosophical approach used in developing this Standard was that of setting forth uniform test procedures that permit manufacturers' self-declaration with regard to the performance levels of their products, or, in some cases, establishing minimum acceptable performance levels.

In April 1996, the then ANSI Accredited Standards Committee C18 on Specifications for Dry Cells and Batteries established a new general format for the publication of its Standards, dividing this Standard into two parts. Part 1 of this American National Standard for Portable Rechargeable Cells and Batteries contains two basic sections. The first section has general requirements and information, such as the scope, applicable definitions, general descriptions of battery dimensions, terminal requirements, marking requirements, general design conditions, test requirements, etc. Section 2 of Part 1 is comprised of specification sheets for various types of cells and batteries. Part 2 of the Standard, a separate document, contains safety requirements.

Suggestions for the improvement of this Standard will be welcome. They should be sent to:

National Electrical Manufacturers Association
1300 North 17th Street, Suite 900
Rosslyn, VA 22209.
Attention: Secretary ANSI ASC C18

This Standard was processed and approved for submittal to ANSI by the American National Standards Committee C18 on Portable Cells and Batteries. Committee approval of this Standard does not necessarily imply that all committee Members voted for its approval. When Committee C18 approved this Standard, it had the following Members:

Steven Wicelinski, Chairperson
Marcus Boolish, Vice Chairperson
Khaled Masri, Secretary

Organization Represented:	Name of Representative(s):		Voting Status:
Batteries Plus Bulbs	Heather	Peterson	Voting
	Jason	Fladhammer	Alt. Voting
Bureau Veritas Consumer Product Services	David	Grandin	Voting
Consumer Product Integrity Consulting, LLC	Robert	Coughlin	Voting

Energizer Brands, LLC	Marcus	Boolish	Voting
	Carin	Stuart	Alt. Voting
Fisher-Price	Douglas	Golde	Voting
Intertek	Thomas	O'Hara	Voting
Micropower Battery Co.	Jeff	Becker	Voting
Panasonic Corporation of North America	Charles	Monahan	Voting
SGS	Rodney	Grimes	Voting
	Rich	Byczek	Alt. Voting
UL LLC	Laurie	Florence	Voting
ZPower, LLC	Jeff	Ortega	Voting
CSA Group	Jody	Leber	Voting
Duracell, Inc.	Steven	Wicelinski	Voting
	Christopher	Brown	Alt. Voting
Kimberly-Clark Corporation	Cary	Costello	Voting
Landsdowne Labs	Melissa	Fensterstock,	Voting

The Members of Subcommittee C18-5 on Portable Rechargeable Lithium Batteries who contributed to the development of this Standard are:

Laurie Florence, Chairman
Heather Peterson, Vice Chairman
Khaled Masri, Secretary

John Hadley
Jody Leber
Steven Wicelinski

Others who contributed to the development of this document are:

Akinori Awano	Battery Association of Japan
Hirotaka Shima	Hitachi Maxell, Ltd.

1 General

Note*:* Part 1 does not include safety requirements, which can be found in Part 2.

1.1 Scope and Objectives

1.1.1 Scope

This publication applies to portable rechargeable, or secondary, lithium cells and batteries[1].

This document covers secondary lithium cells and batteries with a range of chemistries. Each electrochemical couple has a characteristic voltage range over which it releases its electrical capacity, a characteristic nominal voltage, and a characteristic final voltage during discharge. See Table 1 for further details of the electrochemical systems included in the scope of this Standard.

This document defines a minimum required level of performance and a Standardized methodology by which testing is performed, and the results of this testing reported to the user.

Users will be able to establish the viability of commercially available cells and batteries via the declared specification and thus be able to select the cell or battery best suited for their intended application.

Part 2 of this Standard describes all safety tests and requirements.