NEMA Standards Publication

ANSI/NEMA C18.3M, Part 2-2017

American National Standard for Portable Lithium Primary Cells and Batteries —Safety Standard

National Electrical Manufacturers Association

National Electrical Manufacturers Association
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ANSI C18.3M, Part 2-2017

American National Standard for Portable Lithium Primary Cells and Batteries—Safety Standard

Secretariat:

National Electrical Manufacturers Association

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American National Standards Institute

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Foreword (This foreword is not part of American National Standard C18.3M, Part 2)

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.

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 the standard into two parts. Part 1 of this American National Standard for Portable Lithium Primary 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, and test conditions. Section 2 of Part 1 is composed of specification sheets for various types of cells and batteries. This Part 2 of the standard, a separate document, contains safety requirements.

The ANSI Committee C18 on Portable Cells and Batteries completed what is in effect the first edition of this specification on safety requirements in 1999 under the sponsorship of the National Electrical Manufacturers Association (NEMA). The purpose of the first edition was to harmonize with the International Electrotechnical Commission (IEC) Publication 60086-4: *Product Safety Standard for Primary Lithium Batteries*. This second edition was undertaken to update the safety tests and keep them current with the best possible practices.

This latest edition continues to consider and take into account the *United Nations Recommendations on the Transport of Dangerous Goods*. The current *Model Regulations* include lithium battery test recommendations in the *Manual of Tests and Criteria*. Additional consideration was given to IEC 62281 ed.1 *Safety of primary and secondary lithium cells and batteries during transport*. The purpose of these considerations was to harmonize test procedures, where appropriate, and prevent the proliferation of unnecessary or redundant tests.

Suggestions for the improvement of this standard are welcome. They should be sent to the National Electrical Manufacturers Association, 1300 N. 17th Street, Suite 900, Rosslyn, VA 22209, Attention: Secretary ANSI ASC C18.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee C18 on Portable Cells and Batteries. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the C18 committee had the following members:

Steven Wicelinski, Chairperson
Marcus Bodish, Vice-chairperson
Khaled Masri, Secretary

Name of Representative:	Organization Represented:
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David Grandin	Bureau Veritas Consumer Product Services

S. Keel Kelly	Consultant
Robert Coughlin	Consumer Product Integrity Consulting, LLC
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Marcus Boolish	Energizer Brands, LLC
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Jeff Ortega
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Steven Wicelinski

1 Introduction

The concept of safety is closely related to safeguarding the integrity of people and property. This standard defines tests and requirements for primary lithium cells and batteries to ensure their safe operation under normal use and reasonably foreseeable misuse.

Safety is a balance between freedom from risk of harm and other demands to be met by the product. There can be no absolute safety. Even at the highest level of safety, the product can only be relatively safe. In this respect, decision-making is based on risk evaluation and safety judgment.

As safety will pose different problems, it is impossible to provide a set of precise provisions and recommendations that will apply in every case. However, this standard, when followed on a judicious “use when applicable” basis, will provide reasonably consistent standards for safety.

2 Scope

This American National Standard specifies tests and requirements for portable primary lithium cells and batteries, both the chemical systems and the types covered in ANSI C18.3M, Part 1, to ensure their safe operation under normal use and reasonably foreseeable misuse. For reference, the chemical systems standardized in ANSI C18.3M, Part 1 are:

Lithium carbon monofluoride
Lithium manganese dioxide
Lithium iron disulfide

3 Normative References

The following standard contains provisions that, through reference in this text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ANSI C18.3M, Part 1, *American National Standard for Portable Lithium Primary Cells and Batteries—General and Specifications*

ANSI C18.4M, American National Standard for Portable Cells and Batteries – Environmental

4 Definitions

For the purposes of this American National Standard, the following definitions apply.

4.1 **battery:** One or more cells, including case, terminals, and marking.

4.2 **battery, coin:** Small round lithium battery, in which the overall height is less than the diameter.

Note: The term “battery, button” is defined in ANSI C18.1M Part 1 as a small round non-lithium battery, in which the overall height is less than the diameter.

4.3 **battery, cylindrical:** A battery with cylindrical geometry, where the overall height is equal to or greater than the diameter.