NEMA Standards Publication

ANSI/NEMA C18.1M, Part 2-2017

American National Standard for Portable Primary Cells and Batteries with Aqueous Electrolyte—Safety Standard

National Electrical Manufacturers Association

National Electrical Manufacturers Association
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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 C18.1M, 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 (currently the National Institute of Standards and Testing) 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. This committee, C18, representing battery users, manufacturers, and government agencies, has remained active since that time. Committee C18 prepared ANSI Standard C18.1M, Part 2, upon which this document is originally based under the sponsorship of the National Electrical Manufacturers Association (NEMA).

ANSI Standard C18.1M, Part 2 was created in parallel with the International Electrotechnical Commission (IEC) project to develop a product safety standard for primary batteries with aqueous electrolyte (IEC Publication 60086-5). This revision was undertaken to update the safety tests and content in ANSI Standard C18.1M, Part 2 and to keep them current with the best possible practices.

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 Boolish, Vice-chairperson
Khaled Masri, Secretary

Name of Representative:		Organization Represented:
Heather	Peterson	Batteries Plus Bulbs
David	Grandin	Bureau Veritas Consumer Product Services
S. Keel	Kelly	Consultant
Robert	Coughlin	Consumer Product Integrity Consulting, LLC
Steven	Wicelinski	Duracell, Inc.
Marcus	Boolish	Energizer Brands, LLC
Carin	Stuart	Energizer Brands, LLC (Alt.)
Douglas	Golde	Fisher-Price
Thomas	O'Hara	Intertek
Rich	Byczek	Intertek (Alt.)
Charles	Monahan	Panasonic Corporation of North America
Jody	Leber	SGS North America
John	Hadley	Spectrum Brands, Inc.
Denis	Carpenter	Spectrum Brands, Inc. (Alt.)

Andy	Roszkowski	Spectrum Brands, Inc. (Alt.)
Laurie	Florence	UL LLC
Jeff	Ortega	ZPower, LLC
Tim	Powers	ZPower, LLC (Alt.)

The members of Subcommittee C18-5 on Safety Standards who contributed to the development of this standard are:

Carin Stuart, Chairperson
Tom O'Hara, Vice-chairperson
Khaled Masri, Secretary

Jeff	Becker
Marcus	Boolish
Rich	Byczek
Denis	Carpenter
Robert	Coughlin
Laurie	Florence
Douglas	Golde
David	Grandin
John	Hadley
Ray	Iveson
S. Keel	Kelly
Jody	Leber
Charles	Monahan
Thomas	O'Hara
Jeff	Ortega
Tim	Powers
Andy	Roszkowski
John	Rotondo
Carin	Stuart
Steven	Wicelinski

1 Introduction

The concept of safety is closely related to safeguarding the integrity of people and property. This standard defines performance requirements for primary batteries with aqueous electrolyte 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. This may be particularly true for button type batteries. 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 batteries with aqueous electrolyte and zinc anode (non-lithium) to ensure their safe operation under normal use and reasonably foreseeable misuse. For reference, the chemical systems standardized in ANSI C18.1M, Part 1 are:

a. Carbon Zinc (Leclanché and Zinc Chloride types);
b. Alkaline Manganese Dioxide;
c. Silver Oxide;
d. Zinc air;
e. Nickel Oxy-Hydroxide.

3 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. 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 editions of the standards indicated below.

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

4 Definitions

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

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

battery, button: Small round battery, where the overall height is less than the diameter.

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

battery, portable: A battery that is easily hand carried.

battery, prismatic: A battery with non-round geometry.

cell, primary: A source of electrical energy obtained by the direct conversion of chemical energy that is not designed to be charged by any other electrical source.