NEMA Standards Publication

ANSI/NEMA C18.1M, Part 1-2009

American National Standard for Portable Primary Cells and Batteries with Aqueous Electrolyte-General and Specifications

National Electrical Manufacturers Association

National Electrical Manufacturers Association
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ANSI C18.1M, Part 1-2009

American National Standard

for Portable Primary Cells and Batteries with Aqueous Electrolyte—

General and Specifications

ANSI C18.1M, Part 1-2009
Revision of ANSI C18.1M, Part 1-2005
(Incorporates 10/2009 Errata)

American National Standard

For Portable Primary Cells and Batteries With Aqueous Electrolyte— General and Specifications

Secretariat: Eric Schweitzer, ANSI ASC C18

National Electrical Manufacturers Association

Approved January 15, 2009

American National Standards Institute, Inc.

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Published by

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

Printed in the United States of America

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Contents

Figures

Annexes

Foreword (This Foreword is not part of American National Standard C18.1M, Part 1-2009.)

This edition of an American National Standard for Portable Primary Cells and Batteries with Aqueous Electrolyte is based in part on the previous American National Standard for Dry Cells and Batteries—Specifications, ANSI C18.1M, Part 1-2005, and recognizes the work of the International Electrotechnical Commission (refer to IEC Publications 60086-1 and 60086-2) in establishing world-wide standard requirements for portable primary batteries. As with the previous edition, this edition includes the following chemistries:

Carbon zinc (LeClanché and zinc chloride types);
Alkaline manganese dioxide;
Silver oxide;
Zinc air;
Nickel oxyhydroxide.

Previous editions of ANSI C18.1M, Part 1 have included the terms HIF and LIF, which described specific time periods, i.e., on/off cycles, for load application in portable lighting tests. HIF was an acronym for "Heavy Industrial Flashlight" and LIF was an acronym for "Light Industrial Flashlight." Starting with the 2005 edition of C18.1M, Part 1, the HIF and LIF terms were removed and replaced with the actual duty cycle for each test. The term "4 minutes per 15 minutes, 8 hours per day" replaces HIF and the term "4 minutes per hour, 8 hours per day" replaces LIF.

With new battery powered devices coming on the market, new test schemes have been included in this edition for ANSI 13 (D), 14 (C), 15 (AA), 24 (AAA), 25 (AAAA), and 1604 (9-volt) battery types. There is also the addition of new specification sheets for the ANSI 936, 1159, and 7004 batteries.

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 Primary Cells and Batteries with Aqueous Electrolyte 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 conditions, etc. Section 2 of Part 1 is composed 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 are welcome. They should be sent to the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, 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. At the time Committee C18 approved this standard, it had the following members:

Michael H. Babiak, Chairperson
Steven Wicelinski, Vice Chairperson
Eric Schweitzer, Secretary

Organization Represented:	*Name of Representative:*
BAE Systems	Andrew J. Markow Ed Samuels (Alternate)
Bureau Veritas, Consumer Product Services	Thomas M. Heckmann

Consultant	Albert Himy
Defense Supply Center Richmond	John M. Thompson
Duracell	Steven Wicelinski S. Keel Kelly (Alternate)
Eastman Kodak Company	James C. DeJager
Energizer Battery Manufacturing, Inc.	Michael H. Babiak Marc K. Boolish (Alternate)
Fisher Price / Mattel	Robert J. Coughlin Douglas G. Golde
Intertek ETL SEMKO	Terence J. O'Beirne
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Panasonic Battery Corporation of America	Charles P. Monahan
Spectrum Brands, Inc.	John L. Hadley Denis Carpenter (Alternate)
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The members of Subcommittee C18-1 for Portable Primary Cells and Batteries who contributed to the development of this standard are:

Steven Wicelinski, Chairperson
John Hadley, Vice Chairperson
Eric Schweitzer, Secretary

Michael Babiak
Marc Boolish
Denis Carpenter
Robert Coughlin
James DeJager
James Gucinski
Thomas Heckmann
Albert Himy
S. Keel Kelly
David Linden
Andrew Markow
Charles Monahan
Terence O'Beirne
Dan Radzykewycz
Ramesh Shah

For Portable Primary Cells and Batteries with Aqueous Electrolyte— General and Specifications

1 General

NOTE—Part 1 does not include safety requirements. Safety requirements can be found in Part 2.

1.1 Scope and purpose

1.1.1 Scope

This standard applies to portable primary cells and batteries with aqueous electrolyte and a zinc anode (non-lithium). This edition includes the following electrochemical systems:

a) Carbon zinc (LeClanché and zinc chloride types);
b) Alkaline manganese dioxide;
c) Silver oxide;
d) Zinc air;
e) Nickel oxyhydroxide.

1.1.2 Purpose

The purpose of this publication is:

a) To ensure the electrical and physical interchangeability of products from different manufacturers;
b) To minimize proliferation of cell and battery types;
c) To define a standard of performance and provide guidance for its assessment;
d) To provide guidance to consumers, manufacturers, and designers.

This is achieved by specifying nomenclature, dimensions, polarity, terminals, marking, test conditions, and procedures.

1.2 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 most recent editions of the standards indicated below.

ANSI/ASME Y14.5, *Dimensioning and tolerancing*

ANSI C18.1M Part 2, *Portable primary cells and batteries with aqueous electrolyte—safety standard*