ANSI 18.3M, Part 2-2024

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

Secretariat

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Foreword (This foreword is not part of American National Standard ANSI C18.3M, Part 2-2019)

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 specifications 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, what was then called 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 the American National Standard for Portable Lithium Primary Cells and Batteries contains two sections. The first section contains 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. Part 2 of the standard, a separate document, contains safety requirements.

In 1999, ANSI Committee C18 on Portable Cells and Batteries completed what is in effect the first edition of this specification on safety requirements, under the sponsorship of the National Electrical Manufacturers Association (NEMA). The purpose of the first edition was to harmonize with International Electrotechnical Commission (IEC) Publication 60086-4, *Product Safety Standard for Primary Lithium Batteries*. The 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 document also contains new marking and packaging requirements to address accidental lithium coin cell ingestion.

Additionally, this revision improves the harmonization to the requirements of IEC 60086-4 *Primary batteries – Safety of Lithium Batteries*.

The closed circuit voltage and insulation resistance tests were removed as pre-test conditions, and the mold stress test was deleted.

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 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:

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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. This standard, when following 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 **cylindrical (cell or battery):** round cell or battery in which the overall height is equal to or greater than the diameter

4.4 **battery, portable:** A battery that is easily hand-carried.

4.5 **battery, primary lithium:** A battery that has metallic lithium or lithium alloy as its anode, and that is not designed to be charged.