



BSI Standards Publication

Space engineering — Li-ion battery testing handbook

National foreword

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Space engineering - Li-ion battery testing handbook

Ingénierie spatiale - Manuel de tests des batteries Li-ion

Raumfahrttechnik - Handbuch zum Testen von Li-Ionen-Akkus

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European Foreword

This document (CEN/CLC/TR 17603-20-02:2021) has been prepared by Technical Committee CEN/CLC/JTC 5 "Space", the secretariat of which is held by DIN.

It is highlighted that this technical report does not contain any requirement but only collection of data or descriptions and guidelines about how to organize and perform the work in support of EN 16603-20.

This Technical report (CEN/CLC/TR 17603-20-02:2021) originates from ECSS-E-HB-20-02A.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any TR covering the same scope but with a wider domain of applicability (e.g.: aerospace).

Introduction

Energy storage is required aboard almost all spacecraft. Batteries are the most common energy storage device. Batteries provide electrical power when power from solar arrays is temporarily unavailable or insufficient due to eclipses, payload peak loads, before solar panels are deployed or in case of emergencies or special manoeuvres. Batteries are tested in order to assess their performance and their suitability to meet mission requirements. This issue of the document does not include the battery management subsystem testing.

In order for a new cell or battery system to be accepted for a spacecraft mission, it is essential not only to have hardware which is qualified for a good beginning of life performance but also to have hardware whose performance changes with cycle life are well understood and predictable by appropriate models. For this reason the availability of comprehensive test data is very important.

The present handbook aims at providing practical and helpful guidelines for Li-ion cell and battery testing (testing conditions, required information, reporting) during the development and qualification of space equipment and systems. This document has been derived from requirements from ECSS-E-ST-20C and its purpose is to support the use of ECSS-E-ST-20C.

This Handbook gathers battery testing experience, know-how and lessons-learnt from the European Space Community.

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Scope

This Handbook establishes support the testing of Li-ion battery and associated generation of test related documentation.

This handbook sets out to:

- summarize most relevant characterisation tests
- provide guidelines for Li-ion battery testing
- provide guidelines for documentation associated with Li-ion cell or battery testing
- give an overview of appropriate test methods
- provide best practices