RTCA, Inc.
1828 L Street, NW, Suite 805
Washington, DC 20036-5133 USA

Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems

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Prepared by: SC-211

Copies of this document may be obtained from

RTCA, Inc.

Telephone: 202-833-9339
Facsimile: 202-833-9434
Internet: www.rtca.org

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FOREWORD

This document was prepared by RTCA Special Committee 211 (SC-211). It was approved by the RTCA Program Management Committee (PMC) on March 13, 2008.

RTCA, Incorporated is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions as a Federal Advisory Committee and develops consensus based recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

- Coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;

- Analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;

- Developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and

- Assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

Since RTCA is not an official agency of the United States Government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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Table of Contents

Table of Tables

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1 INTRODUCTION

Rechargeable lithium batteries and battery protective system (from now on called "rechargeable lithium battery systems") of various chemical compositions, sizes, and construction details are being widely promoted for aircraft applications. Among their desirable characteristics are high energy content per unit weight, relatively constant voltage during discharge, the ability to accurately indicate state of charge, and long cycle life. Rechargeable lithium battery systems provide power for aircraft engine or Auxiliary Power Unit (APU) starting and other equipment including avionics, emergency and standby systems. Because of their high energy density and potential thermal instability, they can present hazards if improperly designed, tested, used, or stored

1.1 Purpose

The purpose of this document is to provide guidance on the design, certification, production and use of rechargeable lithium battery systems that are permanently installed on aircraft.

This guidance is provided to the designers and manufacturers of rechargeable lithium batteries systems, aircraft designers and manufacturers, and users within the aviation community. This document contains minimum operational performance standards for rechargeable lithium battery systems to be used as power sources on aircraft.

Compliance with these standards is recommended as a means of assuring that the battery will perform its intended function(s) safely, under conditions normally encountered in aeronautical operations. Note that the conditions in the preceding sentence may not be sufficient for all approved aircraft operating conditions. Therefore, it is imperative that the battery manufacturer, aeronautical equipment manufacturer and aircraft manufacturer thoroughly understand the aircraft performance requirements and the battery's capabilities and limitations to ensure safe operation of the battery and/or aeronautical equipment on the aircraft. Any regulatory application of this document is the sole responsibility of the applicable government agency.

These standards apply to the chemical composition, cell size, cell construction, cell interconnection methods within batteries, venting provisions, operational and storage environments, packaging, handling, test, storage and disposal of rechargeable Lithium batteries, installed separately or in avionics equipment aboard aircraft. The further purpose of this document is to provide aircraft designers, and aircraft equipment designers with information on the performance characteristics and operating and environmental limitations of rechargeable Lithium batteries, and battery protective systems throughout the life of the battery systems.

It is the responsibility of the aircraft and equipment designers and manufacturers to insure that the batteries and battery protective systems operating environmental limits defined in this document will not be exceeded during the intended use of the batteries and equipment on the aircraft.

1.2 References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this Standard. For dated references, subsequent amendments