



BSI Standards Publication

Space environment (natural and artificial) — Cosmic ray and solar energetic particle penetration inward the magnetosphere — Method of determination of the effective vertical cut-off rigidity

National foreword

This British Standard is the UK implementation of ISO 17520:2016.

The UK participation in its preparation was entrusted to Technical Committee ACE/68, Space systems and operations.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.
Published by BSI Standards Limited 2016

ISBN 978 0 580 84644 1

ICS 49.140

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2016.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

INTERNATIONAL STANDARD

ISO
17520

First edition
2016-04-01

Space environment (natural and artificial) — Cosmic ray and solar energetic particle penetration inward the magnetosphere — Method of determination of the effective vertical cut-off rigidity

Systèmes spatiaux (naturel et artificiel) — Rayons cosmiques et pénétration de particule énergétique solaire dans la magnétosphère — Méthode de détermination de la rigidité de coupure verticale effective



Reference number
ISO 17520:2016(E)
Documents
Document Sharing Hub
© ISO 2016



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Terms and definitions	1
3 General concepts and assumptions	3
3.1 Determination of effective vertical cut-off rigidity	3
3.2 Models of the employed geomagnetic field.....	3
3.3 Effective vertical cut-off rigidity databases (libraries).....	4
3.4 Method for effective vertical cut-off data generalization	4
4 Model requirements	4
4.1 General.....	4
4.2 Parameterization.....	4
Annex A (informative) Effective vertical cut-off determination procedure	5
Annex B (informative) Presentation of the results	6
Annex C (informative) Method for effective vertical cut-off data generalization for different conditions	7
Bibliography	11

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

Introduction

This International Standard describes principal requirements for determination of the effective vertical cut-off rigidity of penetration of charged particles inward the Earth's magnetosphere. This International Standard establishes procedure for calculation of the effective vertical cut-off rigidities for altitude, geographical coordinates (latitude and longitude), and for conditions of geomagnetic disturbances described by the Kp -index, as well as for local time. The model that satisfies these requirements is described in the Annex through a series of examples. This International Standard is intended for estimation of penetration into the Earth's magnetosphere by charged particle fluxes from interplanetary space, which is important for developing and testing of influence to hardware and biological objects onboard spacecraft and orbital stations. Procedures for performing simplified calculations of rigidities are proposed.