ISO 20785-2:2020 (E)

Dosimetry for exposures to cosmic radiation in civilian aircraft — Part 2: Characterization of instrument response

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

3.1 General terms
3.2 Terms related to quantities and units
3.3 Atmospheric radiation field

4 General considerations

4.1 The cosmic radiation field in the atmosphere
4.2 General considerations for the dosimetry of the cosmic radiation field in aircraft and requirements for the characterization of instrument response
4.3 General considerations for measurements at aviation altitudes

5 Calibration fields and procedures

5.1 General considerations
5.2 Characterization of an instrument
5.2.1 Determination of the dosimetric characteristics of an instrument
5.2.2 Reference radiation fields
5.2.3 Scattered radiation
5.2.4 Effect of other types of radiation
5.2.5 Requirements for characterization in non-reference conditions
5.2.5.1 General
5.2.5.2 Dose and dose rate response
5.2.5.3 Energy and angle dependence of response
5.2.5.4 Air pressure response
5.2.6 Use of numerical simulations
5.3 Instrument-related software
5.3.1 Software development procedures
5.3.2 Software testing
5.3.3 Data analysis using spreadsheets

6 Uncertainties

7 Remarks on performance tests

Annex A (informative) Representative particle fluence energy distributions for the cosmic radiation field at flight altitudes for solar minimum and maximum conditions and for minimum and maximum vertical cut-off rigidity

Annex B (informative) Radiation fields recommended for use in calibrations

B.1 Photon fields
B.2 Neutron fields
B.2.1 Radionuclide and mono-energetic neutron fields with E < 20 MeV
B.2.2 High-energy neutron fields, E > 20 MeV
B.2.2.1 General
B.2.2.2 iThemba LABS
B.2.2.3 Facilities in Japan

B.3 Charged particles
B.3.1 Electrons, muons and pions
B.3.2 Protons
B.3.3 Heavy charged particles
B.4 Simulated workplace fields
B.5 Natural fields

Annex C (informative) Comparison measurements

C.1 In-flight comparison with reference instruments
C.2 Intercomparisons

Annex D (informative) Charged-particle irradiation facilities

Page count: 36