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Space environment (natural and artificial) — Process for determining solar irradiances

Environnement spatial (naturel et artificiel) — Procédé de détermination des irradiances solaires



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 21348 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

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Introduction

This International Standard provides guidelines for specifying the process of determining solar irradiances. Solar irradiances are reported through products such as measurement sets, reference spectra, empirical models, theoretical models and solar irradiance proxies or indices. These products are used in scientific and engineering applications to characterize within the natural space environment solar irradiances that are relevant to space systems and materials.

Examples of applications using input solar irradiance energy include the determination of atmospheric densities for spacecraft orbit determination, attitude control and re-entry calculations, as well as for debris mitigation and collision avoidance activity. Direct and indirect pressure from solar irradiance upon spacecraft surfaces also affects attitude control separately from atmospheric density effects.

Solar irradiances are used to provide inputs for

- a) calculations of ionospheric parameters,
- b) photon-induced radiation effects, and
- c) radiative transfer modelling of planetary atmospheres.

Input solar irradiance energy is used to characterize material properties related to spacecraft thermal control, including surface temperatures, reflectivity, absorption and degradation. Solar energy applications requiring a standard process for determining solar irradiance energy include

- solar cell power simulation,
- material degradation, and
- the development of lamps and filters for terrestrial solar simulators.

A solar irradiance product certifies compliance with this process-based standard by following compliance criteria that are described in this International Standard. The compliance criteria in Clause 7 are based upon solar irradiance product types that are described in Clause 5 and solar irradiance spectral categories described in Clause 6. The method for certifying compliance of a solar irradiance product with this International Standard is provided in Clause 8.