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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Process for determining solar irradiances

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to ISO 21348.2007 "Space Environment (Natural and Artificial) Solar Irradiance Determination Process".

This standard has made the following editorial changes.

--- Change the standard name to "General Requirements for Solar Irradiance Determination Process".

This standard is proposed and managed by the National Aerospace Technology and its Application Standardization Technical Committee (SAC/TC425).

This standard was drafted. Beijing Satellite Environmental Engineering Research Institute, China Aerospace Standardization Institute, Harbin Institute of Technology, Beijing Tiangong Branch

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1 Scope

This standard specifies the general requirements for the solar irradiance determination process.

This standard applies to solar irradiance products that provide some or all of the solar electromagnetic spectrum, including solar irradiance measurement data sets, references.

Spectral, empirical models, theoretical models, and solar irradiance substitution values or indices.

The purpose of this standard is to provide a standard method for aerospace systems and aerospace material users to regulate solar irradiance.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1

Astronomical unit

Ua

AU

The average distance between the Earth and the Sun, the current accepted value is (149,597,870,691 +/- 3) m.

See references [1] and references [2].

Note. The distance between objects in the solar system is usually expressed in ua. Ua or AU is a unit of non-international unit system (hereinafter referred to as SI), but in the country

In general, this value is obtained experimentally in units of SI. This value is used when describing the motion of objects in the solar system, and the gravitational constant is

(0.01720209895) 2ua3.d-2, here one day (1d) = 86400s (see reference [3]).

1AU is slightly less than the average distance between the Earth and the Sun, because AU is based on the point mass of the Kepler elliptical orbital radius,

In the unit of 2pi/k orbital period, k is the Gaussian gravitational constant and is (0.01720209895 AU3.d-2) 1/2. Latest published authority

The value of 1ua is found in reference [2].

2.2

Solar irradiance solararirance

It can be seen that the solar radiation in the sun is expressed by the power per unit area, and the international unit is watts per square meter (W.m-2).

Note. In general, the "visible day" contains all the solar radiation from various regions of the sun, such as the chromosphere, the transition zone and the corona.

Photo. Some users refer to these combined exposures as "visible daylight." A more accurate synonym for solar irradiance is "total solar irradiance" due to spectroscopic

Solar radiation is an irradiation consisting of different wavelengths, which can be expressed in SI units W.m-3, or in SI fraction units W.m-2.nm-1

Show. It can also be supplemented by a mixed spectrophotometric solar irradiance unit (eg, quantum number cm-2.s-1.nm-1, photon number cm-2.s-1.A-1 and

The grid cm-2.s-1.nm-1), however, the mixed unit cannot be substituted for the SI unit in the report.

This standard does not currently specify solar irradiance or burst energy from a local surface, unless solar irradiance is used for full-day

The face (referred to as visible hemisphere) integral representation. In order to calibrate ground-based instruments (solar calorimeters) that measure total solar irradiance, World Gas in 1980

The organization uses the world's radiation measurement benchmark as the main criterion to ensure the worldwide compliance of solar radiation measurements. World radiation measurement

The volume reference is established and maintained by the world standard radiometer group using data measured by an absolute cavity radiometer. The world standard radiometer group is located in Rui.

World Radiation Center of the St. Walters Physical Meteorological Observatory. The uncertainty of the world radiation measurement benchmark is 0.3%. In two scales

Uncertainty, the world's radiation measurement benchmark is consistent with the measurement of the low temperature radiometer and the radiometric measurement in SI scale (see ginseng)

Test paper [4] and reference [5]). World radiation measurement benchmarks have been used in aerospace, but due to changes in solar constants, the sun often

The uncertainty of the number is large, so a non-mandatory spatial absolute radiation benchmark is proposed (see Reference [6]).