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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 19565-2017

Replacing GB/T 19565-2004

Pyranometers

总辐射表

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1 Scope

China's national standard for pyranometers - the instruments that measure global solar radiation on a horizontal surface. It specifies the composition of the instrument, the technical requirements, the general inspection and the performance tests, the inspection rules, the marking, packaging, transport and storage, and the instrument set, with normative annexes on the performance requirements for the indoor test equipment and temperature chamber and on the indoor method for determining sensitivity, and an informative annex on the calculation of solar elevation angle. It applies to the development, production and acceptance of pyranometers. Solar radiation data underpins both meteorology and the solar energy industry, and a pyranometer is the instrument that produces it. It must integrate radiation arriving from the whole hemisphere across the solar spectrum, which sounds simple and is not: the response has to be independent of the direction the radiation comes from, and the deviation from that ideal - the directional or cosine response error - is the dominant source of error at low sun angles, which is exactly when a large part of a day's total is accumulated. Beyond that, the response has to be flat across the spectrum, stable with temperature, linear with irradiance, and fast enough to follow cloud transients, and the dome has to keep out weather without introducing errors of its own. The standard therefore sets the classes and the limits on each of those characteristics - directional response, spectral selectivity, temperature response, non-linearity, response time, zero offsets, tilt response and long-term stability - and specifies how each is tested. The normative annexes matter because comparing pyranometers outdoors takes months, so an indoor method for sensitivity and a specification for the test equipment is what makes routine calibration feasible. Issued on 12 May 2017 and in force since 1 December 2017, it replaces GB/T 19565-2004.

This standard specifies the composition, technical requirements, test methods, inspection rules, and inspection rules of the total heat radiation table (referred to as the total radiation

table) Knowledge, packaging, transportation, storage and package. This standard applies to the development of the total radiation table, production, acceptance.

2 Normative reference documents

The following documents are indispensable for the application of this document. For dated references, only the dated edition applies to this article Pieces. For undated references, the latest edition (including all modifications) applies to this document.

GB/T 2423.1 Environmental testing for electric and electronic products - Part 2. Test methods - Test A. Low temperature

GB/T 2423.2 Environmental testing for electric and electronic products - Part 2. Test methods - Test B. High temperature

GB/T 2423.4 Environmental testing for electric and electronic products - Part 2. Test methods - Test Db. alternating hot and humid (12h 12h ring)

GB/T 2423.17-2008 Environmental testing for electric and electronic products - Part 2. Test methods Test Ka. Salt mist

GB/T 2423.37 Environmental testing for electric and electronic products - Part 2. Test methods - Test L. Dust test Electromagnetic compatibility - Test and measurement techniques - Electrostatic discharge immunity test GB/T Terminology of solar energy resources GB/T 31163-2014

JB/T 9329 instrumentation transportation transportation and storage basic environmental conditions and test methods JJG458 total radiation table verification procedures

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Total radiation global solar radiation Total shot The sum of the direct radiation and the scattered radiation received by the horizontal plane from the upper 2π solid angle range. [GB/T 31163-2014, definition 5.15]

3.2 Radiation [illuminated] illuminance irradiance Objects in the unit time, the unit area to receive the radiation energy.

Note. Radiation [radio] illumination measurement unit for tile [special] per square meter ($W \cdot m^{-2}$). [GB/T 31163-2014, definition 6.3]

3.3 Sun height angle solar altitude angle The height of the center of the sun.

Note. from the observation point of the horizon along the sun where the level of the circle to the center of the corner of the distance.

8 Inspection rules

9 identification, packaging, transportation, storage 12 10 sets of products

13 Appendix A (informative) Solar height angle calculation

14 Appendix B (normative) Performance requirements for indoor testing equipment and temperature chamber

17 References 19

This standard is drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 19565-2004 "Total Radiation Table", compared with GB/T 19565-2004 main technical changes are as follows:

--- Added "Introduction"; - the terms "cosine response" and "azimuth response" are deleted (see

3.7 of the.2004 edition); - the term "directional response" has been added (see 3.6); - the term "zero offset" is added (see 3.10); - the performance indicators "cosine response error" and "azimuth response error" have been removed (see.2004,

5.2.6 and 5.2.7); - the "annual stability" (see.2004 edition 5.2.10); - Removal of the use of environmental conditions "transport" (see.2004 edition 5.3.3);

--- Increased performance indicators "Directional response error" (see 5.2);

--- Increased performance index "zero offset" (see 5.2); - increased use of environmental conditions "dust" (see 5.3.3); - increased use of environmental conditions "salt spray corrosion" (see 5.3.4); - increased use of environmental conditions "electromagnetic compatibility" (see 5.3.5); - increased performance test "directional response error" (see 7.6);

--- Added performance test "zero offset" (see 7.8); - increased environmental conditions test "dust test" (see 7.10.4); - Added environmental conditions test "Salt spray test" (see 7.10.5); - an increase in the environmental conditions test "electrostatic discharge immunity test" (see 7.10.6); - removed the performance test "year stability" (see.2004 edition 6.4.10); - Removal of environmental conditions test "transport test" (see.2004 edition 6.5.4); - Removal of the "transport inspection" in Table 1 of the test items (see.2004 edition 7.3); - Added "dust test", "salt spray test" and "electrostatic discharge immunity test" in Table 2 of the test items (see 8.3). This standard is proposed and centralized by the National Standardization Technical Committee for Meteorological Instruments and Observation Methods (SAC/TC507). The drafting of this standard. China Meteorological Bureau Meteorological Detection Center, Jiangsu Radio Science Research Institute Co., Ltd., Hubei Meteorological Information And technical support center. The main drafters of this standard.

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The total radiation table (also known as the total day of the table, the sky radiation table) is used to measure the sun radiation equipment. It is a special recorder or electrical measuring instrument. Connected, according to the total radiation table installation status can be measured separately the total solar radiation, reflected radiation, with the aid of light shielding device to measure scattered radiation. GB/T 19565-2004 "total radiation table" since the release has been implemented for more than a decade. Period, with the development of science and technology, total radiation Table manufacturing technology has also undergone great changes. In order to adapt to the World Meteorological Organization "Guideto Meteorological Instruments andMethodsofObservation (WMO,.2008) "Related technical requirements for total radiation observations, better guidance Radiation table design, production, manufacture and testing, to improve the accuracy of the total solar radiation measurement, especially to be revised. Total radiation table