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

**GB/T 12085.9-2022**

Replacing GB/T 12085.9-2010

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**Optics and photonics - Environmental test methods - Part 9:  
Solar radiation and weathering**

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### foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents" drafted.

This document is part 9 of GB/T 12085 "Environmental test methods for optics and photonics". GB/T 12085 has been released to the next part.

- Part 1. Terminology, test scope;
- Part 2. Low temperature, high temperature, damp heat;
- Part 3. Mechanical forces;
- Part 4. Salt spray;
- Part 6. Sand and dust;
- Part 7. Dripping water and rain;
- Part 8. High internal pressure, low internal pressure, immersion;
- Part 9. Solar radiation and weathering;
- Part 11. Mildew;
- Part 12. Pollution;
- Part 14. Dew, frost, ice;
- Part 17. Comprehensive test of pollution and solar radiation;
- Part 20. Moist air containing sulfur dioxide and hydrogen sulfide;

--- Part 22.Comprehensive test of low temperature, high temperature or temperature change and impact or random vibration;

--- Part 23.Comprehensive test of low pressure and low temperature, atmospheric temperature, high temperature or damp heat.

This document replaces GB/T 12085.9-2010 "Environmental test methods for optics and optical instruments - Part 9.Solar radiation". and

Compared with GB/T 12085.9-2010, in addition to structural adjustment and editorial changes, the main technical changes are as follows.

--- Change "optical instruments" in the full text to "optical and photonics instruments";

--- Changed the applicable boundaries of "scope" (see Chapter 1, Chapter 1 of the.2010 edition);

--- In the test conditions and test procedures, GB/T 2423.24 is used instead of GB/T 2424.14 (see 4.3, 6.1, see the.2010 edition

3.3, 5.1);

--- Added Note 1 of 5.1 "This part of GB/T 12085 does not cover wavelengths below 280 nm" (see 5.1);

--- Added the content of 5.2 "Condition Test Method 21.Laboratory Weathering" (see 5.2);

--- Changed the content of the environmental test mark (see Chapter 7, Chapter 6 of the.2010 edition).

This document is modified using ISO 9022-9.2016 "Environmental test methods for optics and photonics - Part 9.Solar radiation and weathering".

This document has the following structural adjustments compared to ISO 9022-9.2016.

--- Added "Terms and Definitions" chapter;

--- Added the article numbering in Chapter 4.

The technical differences between this document and ISO 9022-9.2016 and their reasons are as follows.

--- Change "optical instrument" in the full text to "optical and photonics instrument" to meet the requirements of the application field of the optical industry;

--- Replaced ISO 4892-1.1999 (see 5.2), GB/T 12085.1 with the normatively cited GB/T 16422.1-2019

ISO 9022-1 (see 6.1, Chapter 7) has been adopted to adapt to my country's technical conditions and improve operability;

--- Delete the footnote e and description in Table 3 and Table 4 of the international standard (see 4.2) to conform to the geographical situation of our country.

The following editorial changes have been made to this document.

--- In Chapter 7, ISO 9022 is replaced by GB/T 12085 (all parts) cited for information.

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

## Introduction

Optical and photonic instruments are widely used in various fields of national economy and international science and technology, due to the very complex environmental conditions of their use and transportation.

There are various environmental conditions, such as physical, chemical, biological, climatic and electrical, which will make optical and photonic instruments

The performance of the device has changed and it cannot function properly.

In view of the above reasons, in order to ensure the quality of optical and photonics instrument products, it is necessary to simulate a variety of complex changes in environmental conditions.

It is necessary to conduct tests on optical and photonics instrument products to assess their ability to withstand harsh environmental conditions, so GB/T 12085 includes test conditions,

Conditional tests, test procedures, environmental test markings, etc. At the same time, since there are many environmental conditions and they belong to different types, in order to facilitate the

For the implementation of the standard, GB/T 12085 is to be divided into 15 parts according to the type of environmental conditions.

--- Part 1. Terminology, test scope. The purpose is to unify the terms and definitions of environmental test methods, test procedures and environmental tests mark.

--- Part 2. Low temperature, high temperature, damp heat. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) of the sample The degree to which properties such as these are affected by temperature and humidity.

--- Part 3. Mechanical forces. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) properties of the sample.

The degree to which sexuality is affected by mechanical forces.

--- Part 4.Salt spray. The purpose is to evaluate the ability of the instrument surface and protective coating (plating) to resist salt spray.

--- Part 6.Sand and dust. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) properties of the sample by

The degree of variation in the effects of sand and dust.

--- Part 7.dripping, raining. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) properties of the sample

The degree of change affected by dripping water and rain.

--- Part 8.High internal pressure, low internal pressure, immersion. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including static

The degree to which properties such as electricity are affected by high pressure, low pressure, or immersion in the ambient gas.

--- Part 9.Solar radiation and weathering. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) of the sample

The degree to which properties such as these are affected by solar radiation or wind energy (solar exposure, damp heat).

--- Part 11.Mildew. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) properties of the sample by

The degree of influence of mold growth, and evaluation of mold metabolites (such as enzymes or acids) cause corrosion of parts or cause

Severity of circuit board short circuit, etc.

--- Part 12.Pollution. The purpose is to study instruments, especially instrument surfaces, coatings or composite materials exposed to short-term exposure to

Resistance in reagents.

--- Part 14.Dew, frost, ice. The purpose is to study the optical, climatic, mechanical, chemical and electrical (including electrostatic) properties of the sample

Degree of exposure to dew, frost, and ice.

--- Part 17.Pollution, solar radiation comprehensive test. The purpose is to study the instrument, especially the surface, coating or composite material of the instrument

The material is resistant to corrosion by reagents and solar radiation in a short time.

--- Part 20.Moist air containing sulfur dioxide and hydrogen sulfide. The purpose is to study the optical, climatic, mechanical, chemical and electrical properties of the sample