



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

GB/T 3511-2018

**Rubber, vulcanized or thermoplastic -- Resistance to
weathering**

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 3511-2008 Rubber, Vulcanized or Thermoplastic - Resistance to Weathering. Compared with GB/T 3511-2008, this Standard has the major technical changes as follows.

--- Modify the term and definition of "control" (see 3.1 of this Edition; 3.1 of 2008 Edition);

--- Add the clause "it is recommended to use one or more weathering aging reference materials mentioned in Annex A as the control in the exposure test" (see Clauses 5, 6);

--- Add normative reference "ISO 18314-1 Analytical Colorimetry - Part 1. Practical Color Measurement" (see Clause 2 of this Edition).

--- Add Annex A; adjust the Annex A in 2008 Edition into Annex B of this Edition;

--- Add "compression deformation" test item in Annex B;

--- Add "Bibliography";

--- Delete Normative References "GB/T 11186.1, GB/T 11186.2 and GB/T 11186.3" (see Clause 2 of this Edition; Clause 2 of 2008 Edition).

This Standard uses the translation method to equivalently adopt ISO 4665.2016 Rubber, Vulcanized or Thermoplastic - Resistance to Weathering.

The Chinese documents that have a consistent correspondence with the international

documents quoted in the Normative Reference of this Standard are as follows.

- GB/T 250-2008 Textiles - Tests for Color Fastness - Part A02.Grey Scale for Assessing Change in Color (ISO 105-A02.1993, IDT);
- GB/T 2941-2006 Rubber - General Procedures for Preparing and Conditioning Test Pieces for Physical Test Methods (ISO 23529.2004, IDT);
- GB/T 7762-2014 Rubber, Vulcanized or Thermoplastic - Resistance to Ozone Cracking - Part 1.Static Strain Testing (ISO 1431-1.2004, NEQ);
- GB/T 13642-2015 Rubber, Vulcanized or Thermoplastic - Resistance to Ozone Cracking - Part 1.Dynamic Strain Testing (ISO 1431-1.2004, NEQ);
- GB/T 16422.1-2006 Plastics - Methods of Exposure to Laboratory Light Sources - Part 1.General Guidance (ISO 4892-1.1999, IDT);
- GB/T 16422.2-2014 Plastics - Methods of Exposure to Laboratory Light Sources - Part 2.Xenon-Arc Lamps (ISO 4892-2.2006, IDT);
- GB/T 16422.3-2014 Plastics - Methods of Exposure to Laboratory Light Sources - Part 3.Fluorescent UV Lamps (ISO 4892-3.2006, IDT);
- GB/T 16422.4-2014 Plastics - Methods of Exposure to Laboratory Light Sources - Part 4.Open-Flame Carbon-Arc Lamps (ISO 4892-4.2004, IDT).

This Standard was proposed by China Petroleum and Chemical Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Rubber and Rubber Products (SAC/TC 35).

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The historical editions replaced by this Standard are as follows.

- GB/T 12831-1991;

- GB/T 14835-1993;
- GB/T 16996-1997;
- GB/T 3511-2001, GB/T 3511-2008.

1 Scope

This Standard specifies test methods for the exposure of vulcanized or thermoplastic rubbers to natural or artificial weathering and test methods for the determination of changes in color, appearance, and physical properties resulting from exposure.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

3 Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO 877 and ISO

4892 and the following apply.

Reference material whose weathering degradation properties are well documented and repeatable when exposed to identical conditions.

4 Principle

Test pieces are exposed to natural or artificial weathering and the resulting changes in color, appearance, and selected physical properties are determined.

5 Exposure to Direct Weathering, to Weathering Using Glass-Filtered Daylight or to Intensified Weathering by

Daylight Using Fresnel Mirrors

Carry out the exposure in accordance with the relevant method of ISO 877, with the following additions and modifications.

6 Exposure to Laboratory Light Sources

Carry out the exposure in accordance with ISO 4892-1 and, as relevant, ISO 4892-2, ISO 4892-3, or ISO 4892-4, with the following additions and modifications.

7 Changes in Color

The choice of instrumental or visual assessment of color change shall be made by agreement between the interested parties.

Compare the contrast rating of the exposed test piece and an unexposed file test piece, and if required, a masked area, after each exposure stage, in accordance with the procedure given in ISO 105-A02.

8 Changes in Other Appearance Properties

Examine each test piece visually after each exposure stage for changes in appearance using, if appropriate, the procedure given in a relevant International Standard. Some examples of parameters used to assess change in appearance are listed in Annex B. Ozone cracking shall be assessed in accordance with ISO 1431-1.

9 Changes in Physical Properties

Condition the test pieces and carry out the property determination in accordance with the procedure given in the relevant International Standard. Determine the initial properties on unexposed test pieces and the properties of exposed test pieces after each exposure stage. If required, also determine the properties of file test pieces or masked areas.

10 Expression of Results

Record the contrast rating of the test pieces which have been compared. If the observed contrast lies between two ratings on the grey scale, record an intermediate rating. For example, a rating of 3-4 signifies that the contrast is greater than 3 but less than 4.

11 Test Report

The test report shall include the following information.