Translated English of Chinese Standard: GB/T7141-2008

www.ChineseStandard.net → Buy True-PDF → Auto-delivery.

Sales@ChineseStandard.net

GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 83.080;83.080.01

G 31

GB/T 7141-2008

Replacing GB/T 7141-1992

Plastics - Methods of heat aging

塑料热老化试验方法

Issued on: August 14, 2008 **Implemented on: April 01, 2009**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;

Standardization Administration of the People's Republic of China.

Table of Contents

Plastics - Methods of heat aging

1 Scope

1.1 This Standard specifies the exposure conditions when plastics are only exposed to hot air at different temperatures for a long time. This Standard only specifies the method of heat exposure, but does not specify the test method or specimen. The influence of heat on any properties of plastics can be determined by selecting suitable test methods and specimens. This Standard recommends the use of ASTM D3826 standard to determine the end point of embrittlement. The end point of embrittlement means that at an initial strain rate of 0.1 mm/min, when 75% of the tested specimens have an elongation at break of 5% or less, the material reaches its end point of embrittlement.

1.2 This Standard gives guidelines for comparing the heat aging properties of materials. These properties are measured by changes in certain related properties (that is, the embrittlement properties are measured by the decrease in elongation). This Standard applies to the evaluation of plastics that are easily oxidized during use.

1.3 The results obtained in accordance with this Standard are affected by the type of heat aging test chamber used. The user can choose one of two methods to conduct heat aging test chamber exposure. The results based on these two methods shall not be confused with each other.

1.3.1 Method A: Gravity convection heat aging test box – It is recommended for thin specimens with a nominal thickness of not more than 0.25mm.

1.3.2 Method B: Forced ventilation heat aging test chamber – It is recommended for specimens with a nominal thickness greater than 0.25mm.

1.4 This Standard introduces methods to compare the heat aging properties of materials at a single temperature. This Standard also describes the method for determining the heat aging properties of materials at a series of temperatures, so as to estimate the time required for the material to change its properties at a lower temperature. This Standard does not predict the heat aging performance when factors such as stress, environment, temperature and time control failure interact.

1.5 This Standard does not involve relevant safety instructions. Even if there is, it is only related to its application. It is the responsibility of users of this Standard to establish applicable safety and health regulations and to determine applicable regulatory limits before use.

NOTE: There is no ISO standard equivalent to this Standard.

2 Normative references

The following documents contain the provisions which, through reference in this Standard, become the provisions of this Standard. For dated references, their subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 2035, *Terms and definitions for plastics* (GB/T 2035-2008, ISO 472:1999, IDT)

GB/T 2918, *Plastics - Standard atmospheres for conditioning and testing* (GB/T 2918-1998 idt ISO 291:1997)

GB/T 7142, *Determination of time-temperature limits of plastics after exposure to prolonged action of heat* (GB/T 7142-2002, ISO 2578:1993, MOD)

GB/T 11026.4-1999, *Guide for the determination of thermal endurance properties of electrical insulating materials - Part 4: Ageing ovens - Single-chamber ovens* (idt IEC 60216-4-1:1990)

ISO 16014-2, *Plastics - Determination of average molecular weight and molecular weight distribution of polymers using size-exclusion chromatography - Part 2: Universal calibration method*

ASTM D3826:1998 (2002), *Standard Practice for Determining Degradation End Point in Degradable Polyethylene and Polypropylene Using a Tensile Test*

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 2035 apply.

4 Meaning and application

4.1 Since the correlation between the results obtained according to this Standard and the actual use environment has not been determined, these results are only used for comparison and rating.

taken when using the results obtained from this Standard. When selecting materials, users must also consider the influence of other factors such as moisture, soil, and mechanical forces that are consistent with the actual application.

4.9 In fact, there may be multiple temperature values. Each failure criterion corresponds to a temperature value. Therefore, to ensure the validity of the temperature value in any application, the heat aging procedure must be exactly the same as the intended exposure conditions of the final product. If the final use of the material is not evaluated by the aging procedure, then the resulting temperature index is not suitable for this application of the material.

4.10 In some cases, the material can be exposed to a temperature for a specific period, followed by exposure to another temperature for a specific period. This Standard is suitable for these applications. After getting the thermal aging curve of the first temperature, the heat aging curve at the second temperature can be obtained by exposing the sample after exposure to the first temperature.

4.11 When an Arrhenius curve or equation based on test data at a series of temperatures is used to estimate the time to reach a specified performance change at a lower temperature, there may be a very large error. The estimated time to reach the specified performance change or failure shall always be within the 95% confidence interval.

5 Equipment

5.1 Environmental conditions

The environmental conditions of the equipment shall provide environmental state adjustment.

5.2 Heat aging test chamber

5.2.1 Method A: Gravity convection heat aging test box - It is recommended to use specimens with a nominal thickness of not more than 0.25mm. The heat aging test box device shall be consistent with GB/T 11026.4-1999 (without forced air circulation).

5.2.2 Method B: Forced ventilation heat aging test chamber - It is recommended to use specimens with a nominal thickness greater than 0.25mm. The heat aging test box device shall be consistent with GB/T 11026.4-1999 (with forced air circulation). Adopt (50±10) times/h of air exchange rate and keep uniform test temperature in the box. It is recommended to use a recording instrument that monitors exposure temperature and humidity.

5.3 Specimen holder

The design of the specimen holder shall ensure the air circulation around the specimen.

5.4 Test equipment

It is used to determine the selected performance or multiple performances according to the corresponding national standards.

6 Specimens

6.1 The number and type of specimens required shall meet the requirements of the corresponding national standards for testing specific properties. This requirement shall be met at each selected cycle and temperature. Expose at least three parallel specimens of each material at each selected period and temperature, unless otherwise specified or otherwise agreed by all relevant parties.

6.2 The thickness of the specimen shall be equivalent to but not greater than the minimum thickness in the intended application.

6.3 The method of making the specimen shall be the same as that used in the intended application.

6.4 All test specimens for a series of temperatures shall be the same batch.

7 State adjustment

7.1 According to the regulations of GB/T 2918, the initial test is carried out in a standard laboratory environment. The specimen shall be adjusted according to the requirements of the performance test method specified by the national standard.

7.2 If it is required to adjust the specimen after high temperature exposure and before the test, it shall be in accordance with the provisions of GB/T 2918, unless otherwise specified.

8 Test steps

8.1 Choose Method A or B according to the applicable heat aging test chamber type in item 5.2.

8.2 When testing at a single temperature, all materials shall be exposed simultaneously in the same device. The number of parallel specimens for each material in each exposure period shall be enough, so as to ensure that the test

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. https://www.ChineseStandard.us

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. https://www.ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - https://www.ChineseStandard.us).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading…): https://www.chinesestandard.net/AboutUs.aspx

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: https://www.linkedin.com/in/waynezhengwenrui/

------ The End ------