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GB/T 9640-2008 / ISO 2440:1997

Replacing GB/T 9640-1988

Flexible and rigid cellular polymeric materials -Accelerated ageing tests

软质和硬质泡沫聚合材料 加速老化试验方法

(ISO 2440:1997, IDT)

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Foreword

This Standard is identical to the International Standard ISO 2440:1997 *Flexible and rigid cellular polymeric materials - Accelerated ageing tests*. The technical content and standard structure are exactly the same, with only minor editorial modifications.

This Standard replaces GB/T 9640-1988, *Polymeric materials, Cellular flexible - Accelerated ageing tests*.

Compared with GB/T 9640-1988, the main changes of this Standard are as follows:

- In this Standard, add "and rigid" to the title, add "rigid cellular polymeric materials" to the scope of Clause 1, and apply to "closed-cell polyurethane foams, closed-cell polyolefin foams" at the same time;
- In Clause 2 "Normative references", change the state conditioning environment standard from citing GB 2918 to directly citing ISO 741:1995;
- Add Clause 3 “Apparatus”.

This Standard was proposed by China National Light Industry Council.

This Standard shall be under the jurisdiction of National Technical Committee 48 on Plastic Products of Standardization Administration of China.

Drafting organizations of this Standard: Jiangsu Institute of Product Quality Supervision and Inspection, Beijing Technology and Business University, National Engineering Composite Materials Product Quality Supervision and Inspection Center.

Main drafters of this Standard: Wang Yan, Zhu Yuhong, Chen Qian, Zheng Wei.

The previous version replaced by this Standard is:

- GB/T 9640-1988.

Flexible and rigid cellular polymeric materials -Accelerated ageing tests

1 Scope

This Standard specifies, for flexible and rigid cellular polymeric materials, laboratory procedures which are intended to imitate the effects of naturally occurring reactions such as oxidation or hydrolysis by humidity. The physical properties of interest are measured before and after the application of the specified treatments.

Test conditions are only given for open cellular latex, both open- and closed-ceil polyurethane foams, and closed-cell polyolefin foams. Conditions for other materials will be added as required.

Note: The effect of the ageing procedures on any of the physical properties of the material may be examined, but those normally tested are either the elongation and tensile properties, or the compression or indentation hardness properties. These tests do not necessarily correlate either with service behaviour or with ageing by exposure to light.

2 Normative reference

The terms in the following documents become the terms of this Standard by reference to this Standard. For dated references, all subsequent amendments (not including errata content) or revisions do not apply to this standard. However, parties to agreements that are based on this Standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest edition applies to this Standard.

GB/T 2941-2006, Rubber - General procedures for preparing and conditioning test pieces for physical test methods (ISO 23529:2004, IDT)

3 Apparatus

3.1 For heat ageing

3.1.1 Oven, with forced circulation, capable of maintaining the required temperature to within ±1℃.

Note: It is recommended that a device be used to record the temperature, preferably continuously.

Tolerance on temperature: ±2 ℃

Tolerance on duration of ageing: ±5 % but not more than ±2 h, the time being measured from the time when the air in the vessel has been replaced by water vapour (or steam).

Note: in this test for resistance to hydrolysis, the use of the non-standard temperatures of 105 ℃ and 120 ℃ is included for the following technical reasons: 105 ℃ is used because this temperature requires the use of a closed vessel so that control of the conditions is better than at the alternative of 100 ℃; 120 ℃ is used because much experimental evidence has been accumulated at this temperature, but little or none at the alternative of 125℃. Until these background data are collected it is not considered possible to change to 125℃.

5.4 Reconditioning

After exposure to the ageing conditions, test pieces undergoing humidity ageing shall be dried at 70 ℃± 2 ℃ for 3 h per 25 mm of thickness, subject to a minimum of 3 h. The humidity-aged test pieces shall then be reconditioned in the atmosphere specified in 4.2 for 3 h per 25 mm of thickness. Dry-heat-aged test pieces shall merely undergo the reconditioning procedure.

After reconditioning, the properties of the aged test pieces shall be tested.

6 Calculation and expression of results

6.1 Calculation

The percentage change in the property being examined is given by Formula (1):

$$\frac{\overline{X}_a - \overline{X}_0}{\overline{X}_0} \times 100\% \qquad \cdots\cdots(1)$$

Where:

$\overline{X}_0$ – the average value of the property before ageing,

$\overline{X}_a$ – the average value of the property after ageing.

6.2 Expression of results

The value of the percentage change shall be stated, followed by the test condition in parentheses, in order time, temperature and method.

Example: Value (%) (16 h, 70 °C, dry heat).

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