



Procedures of Test for Cellular and Related Materials Determination of Resistance to Heat Aging

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. The object of this test method is to determine the resistance of cellular and related materials to heat aging. Deterioration of the material is observed by measurements of physical properties prior to and after heat aging.

1.2 Applicability. Cellular materials.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ISO 1856

ISO 3386-1

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Heating oven with forced circulation, capable of maintaining the required temperature within ± 3 °C.

For rubber-based materials, the rate of air changes in the oven shall be three (3) changes per hour to ten (10) changes per hour. The air shall be pre-heated.

It should be possible to store the test pieces in the oven to ensure full exposure to the hot air.

3.2.2 Test equipment for the performance of the appropriate physical property tests.

3.3 Test Vehicle/Test Piece. Test pieces shall comply with the appropriate requirements for the test procedure to which physical property tests shall be performed (e.g., tensile strength, compression set, etc.)

3.4 Test Time. Reference the lab test procedure(s) in Section 4 for timing details.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Per laboratory accreditation requirements.

4 Procedure

4.1 Preparation. Not applicable.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Test Temperature. See Table 1.

Table 1: Test Temperature

Coding	Test Temperature in °C (± 3 °C)	Typical Materials Tested
A	Specially Defined	
B	+70	Polyethylene and Natural Rubber Latex
C	+100	Synthetic Lattices and Polyvinyl Chloride (PVC)
D	+140	Polyurethanes

4.3.2 Test Period. See Table 2.

Table 2: Test Period

Coding	Test Period in Hours (± 5%)
1	Specially Defined
2	16
3	22
4	72
5	168
6	240

4.3.3 Procedure.

4.3.3.1 The initial property A_0 (i.e., tensile strength) is to be determined on the required number of test pieces.

4.3.3.2 The remaining test pieces shall be stored in the heating oven and exposed for the required time at the required temperature (see Table 1 and Table 2).

4.3.3.3 After the appropriate test period (see Table 2), the test pieces shall be removed and the appropriate physical properties after heat aging (A_1) determined according to the appropriate test procedure. Where such test procedure requires conditioning at $+70\text{ °C} \pm 3\text{ °C}$, this may be omitted.

Note: Only materials of similar chemical composition shall be tested at the same time in the same oven.

5 Data

5.1 Calculations.

The percentage change in property after heat aging shall be calculated as follows:

$$\text{Change} = \frac{A_1 - A_0}{A_0} \times 100 \text{ in percent (\%)}$$