



Procedures of Test for Cellular and Related Materials Determination of Resistance to Humidity 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. This test method shall be used to determine the effects of humidity aging on cellular materials. The test attempts, by the use of water vapor at elevated temperature, to simulate the naturally occurring effects of oxidation and hydrolysis. Deterioration of the material is observed by measurements of physical properties prior to and after 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 A steam autoclave or similar vessel capable of maintaining the required temperature to within ± 1 °C and of withstanding pressures up to 1.5 bar (150 kPa) above atmospheric pressure (i.e., 2.5 bar absolute). The test vessel shall be equipped with means of venting at completion of the test so as to prevent undue frothing of water when the vessel is opened.

3.2.2 Alternatively, for aging at temperatures below +100 °C:

3.2.2.1 A glass vessel with a suitable closure.

3.2.2.2 A water bath or drying oven for heating the vessel, capable of maintaining the required temperature to within ± 1 °C.

3.2.3 During the test, sample supports shall be used that prevent test pieces from coming into contact with one another, the sides of the vessel or the water. Minimal contact with the supports shall also be ensured. No additional pressure on the test pieces is permissible.

3.2.4 Test equipment for performance of the appropriate physical property.

3.3 Test Vehicle/Test Piece. Test pieces shall comply with the appropriate requirements for the test procedure to which physical property tests are to be conducted (i.e., 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.

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 and Test Period. See Table 1.

Table 1: Test Conditions

Coding	Test Temperature, °C (± 3 °C)	Test Period, h (± 5 h)	Typical Materials Tested
A	Specially Defined		
B	70	20	Cellular Polyethylene
C	85	20	Cellular Polyester Polyurethane
D	105	3	Cellular Polyester Polyurethane
E	120	5	Cellular Polyether Polyurethane

4.3.2 Procedure.

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

4.3.2.2 Sufficient water shall be added to the test vessel dependent upon its volume, the support rack inserted and test pieces placed on the rack (Paragraph 3.2.3).

4.3.2.3 The vessel shall be tightly closed and subjected to the test conditions specified (see 4.3.1). Timing shall commence when the air in the vessel has been replaced by water vapor or steam (i.e., when steam is issuing from the autoclave and the valve is closed).

4.3.2.4 After the appropriate test period (see Table 1), the test vessel shall be vented and opened and the test pieces removed within 1 minute. At that time, determine the appropriate physical properties after humidity aging (A_1), including conditioning, according to the appropriate test procedure.

5 Data

5.1 Calculations. The percentage change in property after humidity aging (exception, see 5.3.1) is calculated as follows: