ASTM D 1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature / Testing Machine

Description

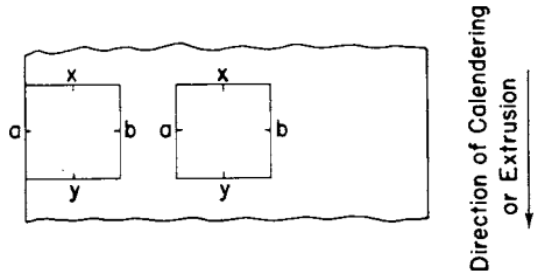
1. Scope*
   1.1 This test method covers the measurement of changes in linear dimensions of nonrigid thermoplastic sheeting or film that result from exposure of the material to specified conditions of elevated temperature and time.
   1.2 The values stated in SI units are to be regarded as the standard.
   1.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. NOTE 1â€”This test method and ISO 11501 address the same matter, but differ in technical content (and results cannot be directly compared between the two methods).

5. Apparatus
   5.1 Ovenâ€”A mechanical convection oven capable of maintaining a temperature of 100 +- 1Â°C.
   5.2 Scale, graduated in 0.25-mm (0.01-in.) divisions, 30 cm (12 in.) or more in length.
   5.3 Thermometer, graduated in 1Â°C divisions, with a range suitable for the test temperature used.
   5.4 Timer, graduated in minutes.
   5.5 Template, 25 by 25 cm (10 by 10 in.), for cutting test specimens.
   5.6 Heavy Paper Sheets, approximately 40 by 40 cm (15 by 15 in.), with smooth, wrinkle- and crease-free surfaces.
   5.7 Talc, finely ground

6. Test Specimens
   6.1 The test specimens shall be two pieces of the sheeting or film 25 by 25 cm (10 by 10 in.), cut with the aid of the template, one from either of the two transverse edges and one from the center of the sheet as shown in Fig. 1. Each specimen shall be marked to show the direction of calendering or extrusion. The midpoint of each edge shall be marked for use as a reference point when final measurements are made.
7. Conditioning
   7.1 Conditioningâ€”Condition the test specimens at 23 +- 2Â°C (73.4 +- 3.6Â°F) and 50 +- 10 % relative humidity for not less than 40 h prior to test in accordance with Procedure A of Practice D 618 unless otherwise specified by agreement or the relevant ASTM material specification. In cases of disagreement, the tolerances shall be 61Â°C (61.8Â°F) and 65 % relative humidity.
8. Procedure
   8.1 Place each specimen on the heavy paper that has been lightly dusted with talc, and cover with a second piece of dusted paper. Fasten the papers together with paper clips. NOTE 2â€”The paper should be well dusted, and the specimens should not be restricted either by the paper or the clips. It is imperative that the specimens be free to change shape as strains are relieved

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during the period of test.



Points *a*, *b* and *x*, *y* are reference marks at midpoint of test specimen edges.

FIG. 1 Method of Cutting Test Specimens from Sample

8.2 Place the paper-plastic sandwiches horizontally in the oven at the temperature and for the length of time applicable to the material being tested. Sandwiches must not be stacked, as this may restrict movement of the plastic between the papers.
8.3 At the end of the oven-exposure period, recondition the specimens a minimum of 1 h at the temperature and humidity used for the initial conditioning. Remove the papers and measure the distance between the opposite edges of the specimens at the reference marks to the nearest 0.25 mm (0.01 in.). Shorter reconditioning times may be used if it can be shown that equivalent results are obtained.

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9. Calculations
   9.1 Calculate the linear dimensional change as follows:

$$\text{Linear change, } \% = [(D_f - D_o)/D_o] \times 100 \qquad (1)$$

where:
D_f = final length (or width) of specimen, mm (or in.) after test, and
D_o = original length (or width) of specimen, mm (or in.).

A negative value denotes shrinkage, and a positive value indicates expansion.
9.2 Average the values obtained for each direction

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