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## Test Method for Determining Dimensional Stability of Automotive Textile Materials

1. **Scope**—This test method can be used to determine the dimensional stability of textile materials and vinyl-coated fabrics when subjected to conditions which cause changes in the moisture content of the materials.
2. **References**—There are no referenced publications specified herein.
3. **Test Specimens**—A test specimen 300 mm x 300 mm shall be cut from the material to be tested with one direction parallel to the machine direction (MD) and the other direction parallel to the across machine direction (AMD).
4. **Conditioning**—The test specimen shall be conditioned for a minimum of 24 h at  $21\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  and  $50\% \pm 5\%$  relative humidity.
5. **Procedure**
  - 5.1 Mark off accurately a 250 mm x 250 mm square concentric with the square outline of the specimen. This can be done with indelible ink, indelible pencil, or other suitable method, on whichever side of the material is more markable. Also, mark an arrow to indicate the MD of the specimen.
  - 5.2 Place the specimen face side up flat without wrinkles on a 4 mesh screen surface measuring a minimum of 330 mm x 330 mm. Position a similar screen over the specimen using spacers at the corners of the two screens, so that the top screen is not in contact with the top surface of the test specimen. To test more than one specimen at one time, use additional spacers and screens as required.
  - 5.3 Immerse the specimen(s) and screens in a pan or tank of clean tap water containing 1 mL of alkylarylsulfonate synthetic detergent<sup>1</sup> per 21 mL of water at  $21\text{ }^{\circ}\text{C}$  for 1 h or as otherwise specified.
  - 5.4 Remove the specimen(s) and screens from the water and allow to drip dry in an atmosphere having a temperature of  $21\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  and a relative humidity of  $50\% \pm 5\%$  for 30 min. If more than one specimen is being tested, separate the screens so that no specimen will drip on any other specimen.
  - 5.5 Lay the specimen(s) flat on a table top. Measure the original 250 mm square with a scale calibrated in 1.0mm. Make three measurements in both the MD and AMD directions. The measurements shall be made along the centerlines of the square and along lines parallel to and 50 mm in from each side.

1. Alkylarylsulfonate type of synthetic detergent is available under various trade names from manufacturers of detergents.

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- 5.6** Average the three measurements in each direction and substitute in Equations 1 and 2:

$$D_{MD_1} = \frac{MD_1 - 250}{250} \times 100 \quad (\text{Eq. 1})$$

where:

$D_{MD_1}$  = Machine Direction

$MD_1$  = Machine Direction measurement wet

$$D_{AMD_1} = \frac{AMD_1 - 250}{250} \times 100 \quad (\text{Eq. 2})$$

where:

$D_{AMD_1}$  = Across Machine Direction stability

$AMD_1$  = Across Machine Direction measurement wet

A plus result indicates expansion and a minus result indicates shrinkage.

- 5.7** Replace the test specimen(s) on the screens and place the specimen(s) and screens in an air-circulating oven maintained at  $80^\circ\text{C} \pm 2^\circ\text{C}$  for 24 h.

- 5.8** Remove the specimen and screen from the oven and allow to cool in the standard atmosphere described in 5.4 for 10 min. After cooling, place the specimen on a flat table top and remeasure as described in 5.5.

- 5.9** Average the three measurements in each direction and substitute in Equations 3 and 4:

$$D_{MD_2} = \frac{MD_2 - 250}{250} \times 100 \quad (\text{Eq. 3})$$

where:

$D_{MD_2}$  = Machine Direction stability

$MD_2$  = Machine Direction measurement after drying

$$D_{AMD_2} = \frac{AMD_2 - 250}{250} \times 100 \quad (\text{Eq. 4})$$

where:

$D_{AMD_2}$  = Across Machine Direction stability

$AMD_2$  = Across Machine Direction measurement after drying

A plus result indicates expansion and a minus result indicates shrinkage.

## 6. Notes

- 6.1 Marginal Indicia**—The change bar (|) located in the left margin is for the convenience of the user in locating areas where revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.