Designation: F1087 – 02(Reapproved 2009)

Standard Test Method for Linear Dimensional Stability of a Gasket Material to Moisture[1]

This standard is issued under the fixed designation F1087; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers a procedure to determine the stability of a gasket material to linear dimensional change due to hygroscopic expansion and contraction. It subjects a sample to extremes, that is, oven drying and complete immersion in water, that have shown good correlation to low and high relative humidities.[2]

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

2. Summary of Test Method

2.1 A series of samples are preconditioned to a stable starting point, measured, and then conditioned to a second exposure condition, either wet or dry. These changes are then determined and recorded, and the results presented as percent change.

3. Significance and Use

3.1 Gasket materials undergo several processing steps from point of manufacture to installation in a flange. Many applications require close control of dimensional change. An accurate test method for determining the relative stability of various materials is needed for design and quality assurance purposes. This test method is useful towards that end. It simulates the extreme storage conditions that a material may undergo prior to installation. Samples are allowed unrestricted expansion or contraction, and so this test method should not be used to predict behavior clamped in a flange or other applications, or during specific processing steps.

3.2 This test method measures linear change, and may need to be modified if the test specimen is not flat, homogeneous, or free of voids.

4. Apparatus

4.1 This test method allows individual laboratories to select measuring devices of their own choice, but requires that the device be able to measure with a precision of ±0.025 mm (0.001 in.).

5. Sampling

5.1 At least six test specimens should be taken for each sample material, three for the high humidity and three for the low humidity tests. The samples should be cut 2.54 cm (1.00 in.) wide, and between 20 and 30 cm (8 and 12 in.) in length. The long direction should be in the direction that experiences the greatest dimensional change, generally the cross machine or against the grain direction. If there is doubt, both directions should be sampled, and the results of the direction with the greatest change reported.

6. Conditioning

6.1 Test specimens should be preconditioned at least 20 h in a controlled environment maintained between 21 to 30°C (70 to 85°F) and 50 to 55 % relative humidity.

7. Procedure

7.1 Measure test specimens to ±0.025 mm (±0.001 in.) and record values as initial readings. If the test specimen is marked for identification or measurement, be certain that the mark is easily visible and will withstand exposure to heat and immersion in water.

7.2 *Testing for Dimensional Stability to Low Humidity*—Expose three prepared specimens in a forced hot-air oven set at 100 ± 2°C (212 ± 4°F) for 5 h. Remove specimens and allow to cool between 21 to 30°C (70 to 85°F) in a desiccator containing anhydrous-calcium chloride or suitable desiccant material. Remeasure and record measurements as final readings.

[1] This test method is under the jurisdiction of ASTM Committee F03 on Gaskets and is the direct responsibility of Subcommittee F03.20 on Mechanical Test Methods.

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[2] Since this test method takes a "worst case" approach, actual dimensional change due to atmospheric conditions would be expected to be less.