Designation: D6909 – 10 (Reapproved 2016)

Standard Specification for High Temperature and Acid-Resistant Fluorocarbon Terpolymer Elastomer[1]

This standard is issued under the fixed designation D6909; 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 specification covers requirements for the fluorocarbon terpolymer elastomer used in the manufacture of expansion joints for use in coal-fired utilities and other high temperature industrial applications in which corrosive flue gases are present.

1.2 This specification is intended as a reference procedure for evaluating the performance of these vulcanizates and can also be used for quality assurance testing before release of a lot based on agreement between supplier and purchaser.

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

1.4 *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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D297 Test Methods for Rubber Products—Chemical Analysis

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D471 Test Method for Rubber Property—Effect of Liquids

D573 Test Method for Rubber—Deterioration in an Air Oven

D1765 Classification System for Carbon Blacks Used in Rubber Products

D2240 Test Method for Rubber Property—Durometer Hardness

3. Ordering Information

3.1 The seller shall mention this specification number in all quotations and when acknowledging purchase order.

4. Materials and Manufacture

4.1 Material shall be based on 100 % virgin fluoroelastomer terpolymer of at least 68 % by weight of fluorine content. The compound shall contain no less than 70 % by weight of fluoroelastomer. The remaining 30 % by weight shall be comprised of Medium Thermal (MT) carbon black, Classification N 990 (in Classification D1765), as reinforcing filler. No mineral fillers shall be used. The fluoroelastomer curative shall be of the bisphenol (dihydroxy), or peroxide types. No amount of reprocessed fluoroelastomer scrap or nonfluoroelastomer polymer is acceptable.

4.2 As-received virgin fluroelastomer sampled in accordance with Section 6 shall be fully press-cured, typically for 20 min at 150°C (302°F), but not post-cured. Other time/temperature conditions are acceptable providing they produce vulcanizates that meet the property requirements.

5. Physical Properties

5.1 The mean value of the individual samples shall meet the physical and chemical property requirements shown in Table 1.

5.2 A sample shall be exposed to 260 ± 3°C (500 ± 5°F) for 70 ± 0.5 h per Test Method D573 and conform with the following property change requirements to determine dry heat resistance:

Hardness Change	±10 points
Tensile Strength Change	+50 % max
Elongation Ultimate	225 % min
Weight Change	±7 % max

5.3 The material color shall be black.

6. Sampling

6.1 Sampling and testing shall be as follows:

6.1.1 For acceptance tests, sufficient product shall be taken at random from each lot to perform all required tests. The number of samples tested per lot shall be no less than three.

[1] This specification is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.37 on Coated Fabrics, Rubber Threads and Seals. This specification was developed in cooperation with the Fluid Sealing Assocation (Specification FSA-DSJ-401-09).

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Properties

Property	Requirement	Test Methods
Hardness, Durometer Shore "A" or equivalent	77 ± 5	D2240
Tensile strength, min	7.0 MPa (1015 psi)	D412
Elongation, min	275 %	D412
Specific gravity	1.86 ± 0.04	D297
Volume Swell - Methanol	30 % max	D471 70 ± 0.5 h at 23 ± 3°C
Volume Swell - Toluene	10 % max	D471 70 ± 0.5 h at 23 ± 3°C

6.1.2 ASTM International test specimens shall be prepared from the same batch of polymer/compound as the material being supplied and shall be fully press-cured as specified in 4.2.

6.1.3 A lot is all compound processed in one continuous run and presented to the purchaser at one time.

6.1.4 A batch is the quantity of compound run through a mill or mixer at one time.

6.1.5 The seller shall use ingredients and manufacturing processes on specification test samples that are essentially the same as those on the approved product.

7. Number of Test and Retests

7.1 *Acceptance Tests*—The seller of the expansion joint shall be responsible for checking the batch sample test results, confirming that the results are in accordance with this specification, and preparing the "Batch Test Certification" report. The buyer reserves the right to perform confirmatory tests as deemed necessary to ensure that the product conforms to the "Batch Test Certification" and the full requirements of this specification.

7.1.1 Acceptance tests shall cover the following properties:

7.1.1.1 Hardness, as received (see Table 1);

7.1.1.2 Tensile strength, as received (see Table 1);

7.1.1.3 Elongation, as received (see Table 1);

7.1.1.4 Specific gravity, as received (see Table 1);

7.1.1.5 Volume Swell – Methanol (see Table 1);

7.1.1.6 Volume Swell – Toluene (see Table 1); and

7.1.1.7 Heat aging, as received (see 5.2).

7.1.2 Shipments and certification with test values from acceptance tests in 7.1.1 shall include traceability back to polymers, grade, and lot number.

7.2 *Preproduction Tests*—Tests for all technical requirements are preproduction tests and shall be performed initially and just prior to shipment of the expansion joints to the buyer, or when a change of ingredients or processing or both requires reapproval or when the buyer deems confirmatory testing is required.

8. Inspection

8.1 The seller of the expansion joints shall be responsible for preparation of all batch test samples, conducting all the required specification tests, and providing the test data. The buyer reserves the right to obtain additional batch samples and perform all confirmatory testing necessary to ensure the product conforms to the full requirements of this specification.

9. Certification

9.1 The seller shall furnish with each shipment a report showing the test results on each lot so that conformance to acceptance requirements can be determined. Documentation must include traceability back to polymer type, supplier, and supplier's lot number.

10. Quality Assurance

10.1 The product, as received, shall be uniform in quality and condition, smooth, as free from foreign materials as commercially practical, and free from imperfections detrimental to use as intended.

11. Keywords

11.1 expansion joints; fluorocarbon terpolymer elastomer; fluoroelastomer