

U.S. Fire Administration / National Fire Academy

*Coffee Break Training***Topic: Flame Treatments for Tents, Canopies, and Membrane Structures**

Learning objective: The student shall be able to cite the standard tests for fire tests of textiles and films.

The horrific 1944 Ringling Brothers circus tent fire in Hartford, Connecticut killed 168 persons. The tent had been waterproofed by a mixture of paraffin and gasoline, a common technique of the era.

Nowadays, though, we are much more cognizant of the fire risks associated with tents, canopies, and membrane structures, and the model fire codes establish minimum flame-resistance standards for these fabric structures.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, is referenced in the model codes as the means for measuring fabric fire-retardant performance. NFPA 701 provides two test protocols and should be referenced for complete details of test apparatus, conditions, and outcomes. These tests should be performed by qualified, competent persons, and fire code officials should request test certificates to verify the fabric's fire-retardant characteristics.

Test Method 1

Ten 15-3/4-inch (400 mm) fabric samples are suspended in a controlled test chamber and ignited. Any specimen fragments or residues that fall to the test chamber floor may not continue to burn for more than an average of 2 seconds per specimen for all 10 specimens. The average weight loss of the 10 specimens in a sample cannot exceed 40 percent.

Test Method 2

In this test, 47-1/4-inch (1200 mm) long strips are suspended and ignited. One configuration bunches the samples into folds similar to draperies. When the char length on any individual folded specimen exceeds 41-1/3 inches (1050 mm), the material has failed the test. When the char length of any single flat specimen exceeds 17-1/10-inches (435 mm), the material has failed the test.

The material also fails this test if any portions or residues break or drip from the specimen, fall to the floor, and continue burning for more than 2 seconds.

For additional information, refer to NFPA 1, *Uniform Fire Code*[™], Chapter 25; NFPA 101[®], *Life Safety Code*[®], Chapter 10; or the *International Fire Code*[®], Chapter 24.

