UNDERSTANDING FIRE RETARDANTS, FIRE CODES, and TEST PROCEDURES
Information provided by Rosco

The wide variety of scenic materials used in modern scenery, props and costuming make compliance with fire regulations much more difficult today. In an effort to simplify and clarify the treatment of all these different substrates and fabrics, Rosco has develop six new Flamex products suited to a very wide range of materials.

But adding to this challenge of these various goods to be treated is the fact that fire code regulations vary from state to state, and in some cases, city to city. You should always consult with your local Fire Department. Recognizing that the jurisdictions of New York City and California State are among the strictest in the US, Rosco Flamex products have been tested and certified for use by these Fire Departments. Our experience is that most other municipalities will recognize and accept these certifications but, your local Fire Marshall has jurisdiction and complete discretion.

What is flame retardant
Nothing is flame *proof*, anything will burn if it gets hot enough. Most fire retardants - Rosco Flamex products included - do not prevent a material from igniting and burning. *The goal of fire retardant treatment is to retard ignition and slow the spread of fire.* Flamex works in two ways to achieve this - lowering the ignition temperature of the treated material and retarding the production of flame. When burned, materials treated with Flamex produces inert gases which starve the fire of oxygen and also develop a non-combustible char. Properly flame treated fabrics may ignite, but will self-extinguish within two seconds after the flame has been withdrawn.

Using flame retardants
The chemicals used in Flamex can only be effective when applied properly, and in sufficient quantities. Adequate treatment requires an application of sufficient Flamex to increase the fully dried weight of the sample by approximately 10-20%. While 10-20% is a typical add-on, the amount required for good flame retardance will vary with the composition of the material being treated. Its crucial to test a sample to insure that your goods have been effectively treated.

Flamex products are water soluble and are easily removed by laundering and exposure to water. The flame retardants are not soluble in most dry cleaning solvents however so materials treated with Flamex will not be altered by dry cleaning - provided of course that the solvent is free of moisture and other detergents. Always retest your fabrics after dry cleaning.

TESTING FOR EFFECTIVE FIRE RETARDANT TREATMENT

Fabrics and soft materials like paper and cardboard can be tested for proper flame retardance using a simple field test, likely the same one that the Fire Marshall will perform during an inspection. The following steps are taken from the National Fire Prevention Association (NFPA) test "NFPA 705 Recommended Practices for a Field Flame Test for Fabrics and Films."

4.1 Materials

4.1.1 Specimens should be samples removed from the existing materials.

4.1.2 Speciments should be dry and should be a minimum of 1/2 in x 4 in (12.7mm x 101.6mm)

4.2 Open Flame. The fire exposure should be from a common wood kitchen match or source with equivalent flame properties.

4.2.1 Flame should be applied for 12 seconds.

4.3 Method

4.3.1 The test should be performed in a draft-free and safe location free of other combustibles.

4.3.2 The sample should be suspended (preferably by means of a spring clip, tongs, or similar device) with the long axis vertical, the flame supplied to the center of the bottom edge, and the bottom edge 1/2 in (12.7mm) above the bottom of the flame.

4.3.3 After 12 seconds of exposure, the match is to be removed gently away from the sample.

4.4 Requirements

4.4.1 There should not be more than 2 seconds of afterflame

4.4.2 Materials that break or drip flaming particles should be rejected if the materials continue to burn after they reach the floor.

You should test multiple samples from your scenery and props materials. In the case of a painted backdrop where it would be difficult to cut samples, the painter should maintain a small 24 x 24 canvas side by side with the larger drop during painting. With each step in the paint process, paint the 24in mini-drop with the same materials and techniques. In this manner, with your completed painted drop you will have an equivalent small canvas from which to cut flame test samples.

Hard materials and dimensional scenery can be difficult or impossible to accurately test for fire retardance. The nature of attempting to test burn such large, solid pieces is often logistically difficult and fails to adequately determine the effectiveness of the treatment. Flamex products have been tested in large scale apparatuses designed for this purpose therefore it is especially important to use the correct Flamex product for the substrate being used and to apply it in strict accordance with these guidelines.

One well accepted test for hard scenery is "ASTM E-84 Standard Test Method for Surface Burning Characteristics of Building Materials." While this test was designed to meet building codes for durable places of public assembly - not scenery constructed for temporary venues - the rating of flame spread and smoke development is often requested by the Fire Marshall or other agency with local jurisdiction. Both Flamex WD and Flamex PA were designed for hard surfaces and have been appropriately tested according to this standard. There is no field test that accurately reproduces the results of ASTM E84.

IMPORTANT: If your treated material successfully withstands your flammability test, you have effected a flame retardant treatment. Rosco can only insure the quality of this product, not your application thereof.

Note: Fire regulations vary widely. Be sure the treated materials meet the standard which applies to your theatre. For further testing methods see, for example, Underwriters Laboratories test #214 or ASTM D626-55T, NFPA 701, NFPA 705, ASTM E-84, or consult your local Fire Marshall directly.