



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
[www.atomicdesign.tv](http://www.atomicdesign.tv)

## **FLAME RETARDANCY**

Atomic Design, Inc. has long been committed to Flame Retardancy issues and compliance. Although all ATOMIC DESIGN, INC. products meet the NFPA 701 Small Scale test standard, we believe that this is only a minimum standard that everyone must comply with.

ATOMIC DESIGN, INC. knows what it takes both in the laboratory and out on location, to ensure that only properly manufactured and/or treated products are used and done so according to best practice standards in mind, therefore, we develop and manufacture our products to meet more rigorous test procedures and work to maintain their maximum Flame Retardant performance.

### **Issues**

Whether you are utilizing fabric for stage drapes or digitally-printed or painted backdrops, trade show booth panels or special event décor, you should be sure that the fabric and products you choose meets all applicable flame retardancy regulations, requirements and standards. This can be a complicated issue to understand. Should you choose fabric or product that is FR or IFR? What does "NFPA 701" mean? How do you find out about the flame retardancy requirements in your area?

To help you better understand this complex issue, Atomic Design, Inc. has compiled information on a wide variety of topics related to flame retardant fabric and drapery. Please scroll through this information and should you still have questions, please feel free to contact us.

### **Flame Retardancy Terms & Definitions**

#### **FR – Fire Retardant (aka...Flame Retardant or Flamproofed)**

Fabric that is certified as "FR" has been typically treated in an immersion process with a chemical fire retardant after the fabric has been woven. All cottons and other natural fibers certified as flame retardant are "FR" typically treated. Some synthetic fabrics are also typically treated. Because the treatment is topical, it will wear out in time, and repeated cleanings will cause the flame retardancy to dissolve sooner. Most flameproofing chemicals are water soluble and will also dissipate through dry cleaning. Draperies made from FR fabrics should be re-tested periodically for flame retardancy, as retreatment may be required. For this reason, "FR" flame retardancy is certified for only one year. A Certificate of Flame Retardancy is furnished to customers upon request.

#### **IFR – Inherently Fire Retardant (aka...Inherently Flame Resistant)**

A Flame Retardant additive is added to the fiber to give the fabric Permanent Flame Resistance. A topical finish is often added in fabric dyeing and finishing insuring in fabric formation the FR properties are maintained. Although there will be no degradation from washing or dry cleaning, the same factors of environment, use of added components and further processing may compromise its flame resistance. Retesting every few years and re-flameproofing may still be required.

#### **PFR – Permanently Fire Retardant (aka...Permanently Flame Retardant)**

Fabric that has been certified as "IFR" or "PFR" has been woven from fibers that are noncombustible for the life of the fabric. For this reason, the fire retardancy of "IFR" and "PFR" fabrics will last for the life of the fabric and will not dissipate after cleaning. A Certificate of Fire Retardancy is furnished upon request.

#### **NFR – Not Fire Retardant**



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
[www.atomicdesign.tv](http://www.atomicdesign.tv)

The product is simply not fire retardant.

**CBFR - Can Be Made Fire Retardant**  
and

**CNFR – Cannot Be Made Fire Retardant**

If “CBFR” is indicated for a fabric, that fabric can be treated for fire retardancy. Such treatment would include topical treatment in an immersion process, making the fabric “FR.” Some synthetics can be made fire retardant. IF “CBFR” is indicated for a fabric, that fabric cannot be treated for fire retardancy and, as such, should not be used in public venues. Among the types of fabrics that cannot be made fire retardant are certain synthetic and/or metallic fabrics.

**What is the NFPA 701 Test?**

Fabrics used in most public spaces (including schools, churches, auditoriums, theatres, and more.) is required by law in many states and cities to be certified as flame retardant, according to standards developed by the National Fire Protection Association (NFPA). NFPA has various standards depending on how the fabric will be used. In the case of draperies, curtains, and similar hanging textiles, the standard that applies is NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films. This test measures the flammability of a fabric when it is exposed to specific sources of ignition.

NFPA 701 (Small Scale) testing measures the ignition resistance of a fabric after it is exposed to a flame for 12 seconds. The flame, char length, and flaming residue are recorded. The fabric will pass the test if all samples meet the following criteria:

1. An after flame of less than 2.0 seconds
2. a char length of less than 6.5”
3. the specimen does not continue to flame after reaching the floor of the test chamber

Fabric certified as flame retardant is certified to have been tested and passed the NFPA 701 test.

**Fabric Flammability**

Fabric flammability is an important issue to consider, especially for drapery that will be used in a public space such as a school, theatre or special event venue, since federal regulations require that drapery fabrics used in such spaces be certified as fire retardant. Although all fabric will burn, some are naturally more resistant to fire than others. Those that are more flammable can have their fire resistance drastically improved by treatment with flame retardant chemicals.

Certain synthetic fibers are extremely flame resistant, including glass fibers and modacrylic. Other synthetics, including certain polyesters, are slow to ignite and may even self-extinguish. However, once synthetic fabrics ignite, they will melt rather than flame. The resulting substance can lead to severe burns if it comes into contact with the skin.

Natural fibers typically do not melt. Wool and silk burn slowly, are difficult to ignite, and may self-extinguish. th other untreated natural fabrics, such as cotton and linen, the fabric can ignite quickly, resulting in a fast moving flame spread. Fabrics that include a combination of natural and synthetic fibers, such as polyester-cotton blends, can be particularly troublesome, as they combine the fast ignition and flame spread of the natural fiber with the melting aspect of the synthetic fiber.

The ignition and burn factors of fabric are also affected by the weight and weave of the fabric. Lightweight, loose weave fabrics will burn more quickly than heavier fabrics with a tight weave. In addition, fabric flammability can also be affected by the fabric’s surface texture, with napped fabrics (such as velvets and velours) igniting more easily than fabrics with a smooth surface.



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
[www.atomicdesign.tv](http://www.atomicdesign.tv)

## **Fire Retardancy of Fabrics**

The good news is that the flammability of fabric can be drastically reduced through the use of fire retardants. Many natural fibers, including cotton, can be topically treated with a chemical that reduces the fabric's flammability to the extent that it becomes nearly non-combustible. During a fire, the chemical reacts with the gases and tars generated naturally by the fabric, converting the gases and tars to carbon char, thus drastically slowing the fabric's burning rate.

Some polyester fabrics are considered permanently flame retardant. This is because the fabrics are manufactured utilizing fibers for which the flame retardant properties are built directly into the molecular structure of the fibers. Fabrics manufactured utilizing Trevira™ and Avora™ polyester fibers are considered inherently or permanently fire retardant. Other synthetic fabrics may be considered durably fire retardant, fire retardant, or non-fire retardant. "Durably fire retardant" refers to a process in which polyesters are chemically treated during the manufacturing process with a non-water soluble chemical. In other cases, synthetic fabrics may be topically treated with chemicals after the manufacturing process (in the same manner as natural fibers such as cotton), or may be untreated (or untreatable) and therefore considered non-flame retardant. When a fabric is designated as "inherently flame retardant," "permanently flame retardant," or "durably flame retardant," the flame retardancy will last for the life of the fabric. The drapery can be laundered or dry-cleaned as recommended by the drapery manufacturer. In the case of fabrics that are designated as "flame retardant," that have been topically treated with chemicals, the flame retardancy of the fabric will dissipate over time, particularly with repeated cleaning. These fabrics must be dry-cleaned with a non-liquid cleaning agent. Typically, the flame retardancy of topically treated fabric is certified for one year, though the actual length of time in which the treatment remains effective will vary based on the number of times the drapery is dry-cleaned and the environmental conditions in the location in which the drapery is used. It is recommended that topically treated drapery be re-tested for flame retardancy on an annual basis, and re-treated by a qualified professional as needed.

## **Navigating Flame Retardancy Regulations in the United States**

Although the average person is probably unaware of flame retardancy standards and regulations in the United States, this is an area that is of increasing concern for theatre staff, touring show personnel, special event planners, and even trade show exhibitors. Ensuring the safety of the public means that anyone utilizing drapery fabrics in a public space, such as for stage drapery, theater curtains, exhibit booth design, and special event décor, needs to be aware of the potential for fire -- and take steps to reduce that risk to the greatest extent possible.

### **National Standards**

Unfortunately, it is not easy to navigate the maze of standards, regulations and requirements regarding this issue. Surprisingly, there are no "official" federal regulations regarding flame retardancy of drapery fabrics used in public spaces. However, there is a national standard developed by the National Fire Protection Association (NFPA), titled NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films. Under NFPA 701, drapery fabric is tested by burning a small sample and measuring the flame, char length and flaming residue. If a fabric meets the NFPA 701 standards in these three areas, the fabric is considered flame retardant.

### **State and Local Regulations**

Though NFPA 701 is the national standard, it is not a law or regulation in itself. Authority to make and enforce laws and regulations in this area is granted to state and local governments. Many state and local governments have not developed their own standards. Instead, they require that draperies used in public spaces meet the NFPA 701 standard. The 2005 Florida Fire Prevention



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
[www.atomicdesign.tv](http://www.atomicdesign.tv)

Code, for example, specifies in Chapter 20 that fabric used in places of assembly must meet NFPA 701 standards.

Some states and cities, however, have developed their own standards and/or procedures. In California, for example, drapery used in public spaces must be made of fabric that has been registered with the State Fire Marshal, documenting compliance with Title 19 (Division 1, Chapter 8) of the California Code of Regulations. These requirements are separate and distinct from NFPA 701 standards. While the State of New York and the Commonwealth of Massachusetts both accept NFPA 701 certification, New York City requires certification that fabrics meet requirements outlined in Title 27 (Chapters 1 and 4) of the New York Administrative Code, while the City of Boston requires that end users submit an application for a use permit, in advance, for each fabric to be used in a public space.

### **Venue Requirements**

Even specific venues have developed their own requirements for drapery to be utilized within the venue. Radio City Music Hall, in addition to requiring that all fabrics be certified compliant with New York City regulations, also requires the Certificate of Flame Retardancy include not just basic information on the fabric utilized, but specific information about each sewn drapery piece, including quantity and size.

### **Think about where the drapery will be used**

Will it be utilized in a public school? If so, the local school district may have information about the flame retardancy requirements in your area.

Will it be used in an outside venue, such as a convention center or hotel ballroom? If so, venue staff may be able to advise you on the regulations in the city/state/venue. Often, they will even have a packet available outlining all the requirements!

### **Contact the local fire department or city or state fire marshal's office**

Ask about the flame retardancy regulations in the city and/or state in which the fabric will be used. Ask if the city and/or state accepts certification of compliance with NFPA 701 standards, or if you must provide proof of compliance with other regulations or standards specific to your city and/or state. If the city and/or state requires certification of compliance with specific regulations or standards other than NFPA 701, ask the fire department or city or state fire marshal's office what the process is to certify compliance. Does the specific fabric have to be registered or can you submit a permit application for a specific installation?

### **Discuss your flame retardancy needs with your fabric supplier or soft goods manufacturer**

If your city or state accepts NFPA 701 standards, the fabric supplier or drapery manufacturer can recommend appropriate flame retardant fabrics that meet NFPA 701 standards.

Consider flame retardancy before choosing your fabric! Don't get your heart set on a particular fabric, only to discover that it is not flame retardant according to your needs. While some non-flame retardant fabrics can be chemically treated for flame retardancy upon request, such treatment will add to the cost of the fabric and/or drapery and may take up to two weeks (not including time needed to manufacture drapery or to ship the fabric or drapery to you).

### **Confirm that your fabric/soft goods supplier or drapery manufacturer will supply a Certificate of Flame Retardancy**

Some fabric suppliers will provide test results demonstrating compliance with NFPA 701 standards, but not a Certificate of Flame Retardancy. Even when a fabric supplier or drapery manufacturer does provide a Certificate of Flame Retardancy, the vendor may not automatically provide a Certificate of Flame Retardancy for all orders. Make sure that, at the time you place an order, you request a Certificate of Flame Retardancy for all flame retardant fabrics and/or draperies specified on the order. Typically, the Certificate(s) of Flame Retardancy will be provided to you with your order, not in advance.



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
www.atomicdesign.tv

### **What About Multiple Locations?**

These are all tips that can help you in determining regulations when drapery will be used in a single location. In some cases, however, drapery will be used in multiple locations. Here are a few examples:

- \* Trade Show Circuit. Perhaps you are purchasing drapery to use in your trade show booth. You plan to exhibit at six different trade shows in the upcoming year, in six different states throughout the country.

- \* Touring Shows. Maybe you are the manager of an up and coming rock band that is planning a summer tour of nightclubs throughout the Mid-West. Or you are the production manager of a touring revival of "Hair," scheduled for small theatres along the Eastern seaboard.

- \* Traveling Worship Services. Perhaps your church reaches out to people in more than one community, by "taking the show on the road" and offering worship services in rented or leased space (such as hotel ballrooms and conference centers) in multiple cities or states throughout the country.

- \* Sales & Marketing Presentations. Is your company planning to offer presentations to potential customers in various sales regions? Perhaps you will be using the drapery in one location in the Northeast, one location in the South, one in the Midwest, and one in the West.

When the drapery will be used in multiple locations, the job of ensuring that the drapery meets flame retardancy requirements becomes much bigger. Instead of researching the requirements of just one area, you are now faced with researching the requirements of multiple areas. And the more locations in which the drapery will be used, the more research you have to do. Unfortunately, there is no way to easily verify that your drapery will comply with all flame retardancy regulations, standards, and requirements throughout the country. Your best bet in this case? Allow yourself plenty of time to do your research and get the facts!

### **More Information on Flame Retardancy**

The issue of drapery fabric flame retardancy regulations is a complex one, too much to cover in this one article, and so I encourage you to continue your research by reading the specific standards and regulations yourself. Within the article above, I have inserted hyperlinks to the websites covering the flame retardancy regulations of many of the cities and states mentioned. We have also provided information on other aspects of the flame retardancy issue here on our website. For more information, feel free to browse the other articles in this Flame Retardancy section of our website.

### **Information on Atomic Design, Inc. Certificate of Flame Retardancy ("Fire Cert")**

Upon request, Atomic Design, Inc. will provide a Certificate of Flame Retardancy for any fabrics and/or sewn goods sold or rented as flame retardant. This includes fabrics designated as "FR," "DFR," "IFR," and "PFR." The Certificate of Flame Retardancy is valid for one year.

Fabrics that have been topically treated for flame retardancy (such as FR Cotton Velour) are designated as "FR." These fabrics (or sewn goods manufactured from these fabrics) are eligible for a 1 year certificate. Our responsibility as a vendor of the materials ends at the time of the certificate expiration. Each year after certificate expiration, an onsite NFPA 705 Field Test by a certified tester is recommended by Atomic Design, Inc. and may be required by the end user's State or Local Fire Marshal to update the certificate. The FR treatment is typically good for 5 years, at which time the NFPA 705 Field Test may result in a required "re-spray" by a certified flame retardancy applicator. Laundering or repeated dry-cleaning may result in loss of flame retardancy in a shorter time frame and is therefore not recommended.



Atomic Design, Inc.  
10 Wnfield Drive  
Lititz, PA 17543

P 717.626.8301  
F 717.627.7736  
[www.atomicdesign.tv](http://www.atomicdesign.tv)

Fabrics that are durably, inherently, or permanently flame retardant are designated as “DFR,” “IFR,” or “PFR.” This includes many polyester fabrics, such as Encore Velour. These fabrics (or sewn goods manufactured from these fabrics) are eligible for a 1 year certificate. Our responsibility as a vendor of the materials ends at the time of the certificate expiration. Each year after certificate expiration, an onsite NFPA 705 Field Test by a certified tester is recommended by Atomic Design, Inc. and may be required by a State or Local Fire Marshal to update the certificate. The DFR/IFR/PFR content in the fabric fiber is such that the IFR quality usually will be maintained for the life of the fabric (dependant on use / abuse) and therefore the NFPA 705 Field Test will typically not require a "re-spray". Laundering or dry-cleaning will generally have no effect on DFR/IFR/PFR fabrics, but heavy dust build-up and other extreme environmental conditions could do so.

Costs and coordination of annual NFPA 705 Field Test and any resulting re-spray application of flame retardancy chemicals are the responsibility of the end user.

Proper care of your fabric and drapery can help extend the flame retardancy of your fabric and drapery as well as its long term usability. For more information on proper care and cleaning, please review our Drapery Care and Cleaning FAQs.

The Atomic Design, Inc. Certificate of Flame Retardancy is designed to certify compliance with NFPA 701 standards and, in the case of certain fabrics, with regulations in the State of Pennsylvania and/or New York. Regulations and procedures vary according to the specific location in which the fabric will be used, and not all cities, states, and venues accept NFPA 701 certification. For more information on how to determine the flame retardancy regulations and requirements in your area, please read our article Navigating Flame Retardancy Requirements in the United States.