

# SPECIFYING UPHOLSTERED FURNITURE FIRE BARRIERS

## Introduction

Upholstered furniture is the leading item to ignite in residential fires that result in death. Studies conducted by key research organizations have shown that the use of a barrier between the cover fabric and the foam cushion of a chair or sofa can significantly lower fire hazards (including peak heat release rates, temperature, smoke, carbon monoxide, and hydrogen cyanide), ultimately reducing the human health and property risks associated with residential fires. Moreover, a fire barrier eliminates the need for flame retardant chemicals which have been found to be carcinogenic or associated with other health concerns like thyroid disruption, delayed mental and physical development, obesity, advanced puberty, reduced fertility, and decreased lung function.

## Fire Barriers Provide Significant Fire Resistance Without the Use of Flame Retardants.

### What is a Fire Barrier?

A fire barrier is a protective layer designed to prevent or delay a flaming ignition of the cushioning material used in furniture.

### How does a fire barrier work?

During a fire, the cushion acts as the main fuel source. A fire barrier completely encapsulates the cushioning, like a sock or a wrapper, to prevent ignition and reduce both fire growth rate and fire size.

### How is a fire barrier installed?

The barrier material can either be installed over the cushion before the installation of the cover material or laminated to the cover material and installed at the same time. See this [video](#) for a quick application demonstration.

### Can you feel a fire barrier when you sit on it?

When a proper material is specified and installed, the barrier does not impact the final look or feel of the furniture.

### How does a fire barrier compare to other flame-resistant strategies?

In studies, when compared to chairs both with and without flame retardants, chairs with fire barriers are significantly more effective in preventing or delaying fire ignition and ultimately delaying room flashover. If a room flashover occurs, occupants are unlikely to survive. A fire barrier can delay room flashover (from 2-6 minutes to 20-30 minutes), providing valuable time for occupants to evacuate and for first responders to arrive and extinguish the fire. See this [video](#) to see how a chair with a fire barrier performs in an open flame test.

Visit [www.chemicalinsights.org/FFHH](http://www.chemicalinsights.org/FFHH) for additional information on fire barrier research.

### Why is passing both TB 117-2013 and an open flame test important?

The U.S. Consumer Product Safety Commission (CPSC) requires that upholstered furniture be tested for smoldering resistance according to the test method CA TB117-2013 (a cigarette smoldering test). Testing to this standard meets a minimum bar regarding fire safety and does not address protection from open flame hazards. According to NFPA, 95% of fire deaths occur in the presence of flaming — when fire spreads beyond the upholstered furniture item. This implies that flaming sources are significant and even in smoldering ignited fires, most fire deaths occur after transition from smoldering to flaming.

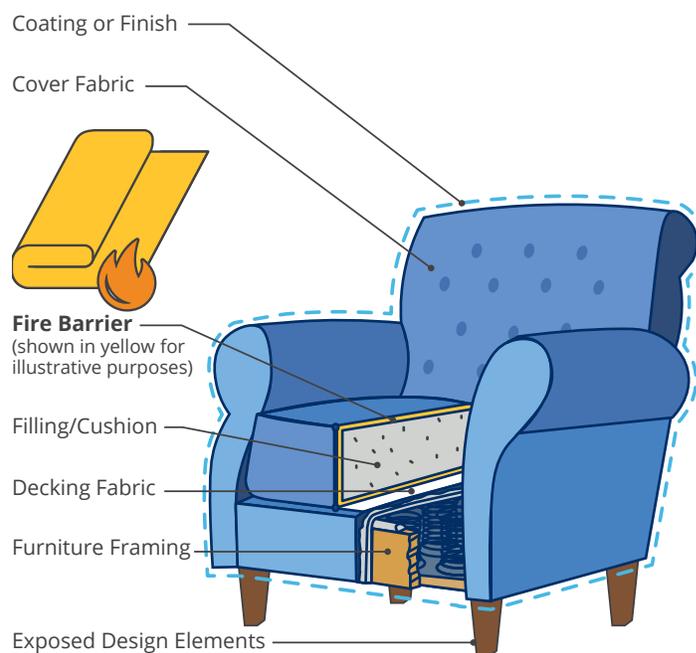


Figure 1. Diagram of an upholstered chair with a fire barrier.

## The Evidence

Studies on the availability and effectiveness of fire barriers used in upholstered furniture have been conducted by the following research and regulatory organizations:

- The National Institute of Standards and Technology (NIST)
- The State of California Department of Consumer Affairs Bureau of Household Goods and Services (BHGS)
- Chemical Insights Research Institute (CIRI) of Underwriters Laboratories, Inc.

### NIST

Studies found a couch with a fire barrier extended flashover to 21 minutes compared to 6 or 7 minutes for two couches without a barrier. They evaluated different fire barriers and found four that performed well to reduce ignition to open flame.

### BHGS

Studies compared 25 commercially available fire barriers and found that 23 were resistant to an open flame challenge. Five of those were tested in a full-scale burn and four were found to significantly delay the onset of flames.

### CIRI

Studies found that a chair with a fire barrier never fully ignited compared to other chair types with various flame retardant technologies that engulfed in flames at 7 minutes on average after ignition (flashover at approximately 14 minutes).

*Although the research identified the availability of many barrier materials in the marketplace, these three examples were specifically identified.*

- Preferred Finishing, K-800: Cotton fiberglass knit with an intumescent coating
- Preferred Finishing, K-408: A glass/modacrylic/rayon blend with a urethane film laminated to the fabric
- Hanes Companies, Unigard #33025: A plain woven fiberglass

For more information on these studies, see [“A Summary Report: Research Data on Upholstered Furniture Fire Barriers.”](#)

## Specifying A Fire Barrier

Numerous fire barriers are commercially available for use in furniture construction and have been used in research. Barriers are made from a variety of inherently flame-resistant fibers (including carbons, polyesters, and fiberglass). Their structures often include common knits, coated knits, plain wovens, high-loft non-wovens, and composite non-wovens. As you approach selecting and specifying a barrier material, be sure it adheres to the following performance criteria:



It is free of flame retardants and/or other hazardous chemicals.



It meets the TB117-2013 smolder test.

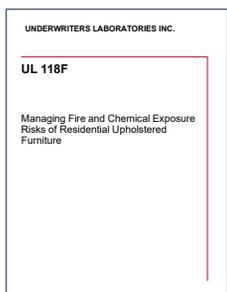


It meets an open flame resistance test.



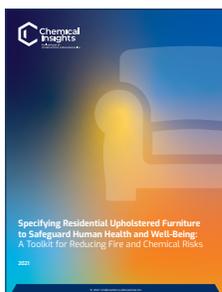
It can be functionally used in chair design without sacrificing aesthetics or comfort.

## See These Additional Resources



### [UL 118F: Managing Fire and Chemical Exposure Risks of Residential Upholstered Furniture](#)

This thorough guidance document, developed by CIRI and an expert Furniture Flammability and Human Health Taskforce, compiles scientific resources, key facts, and action steps.



### [Specifying Residential Upholstered Furniture to Safeguard Human Health and Well-Being](#)

This visual toolkit, based on UL 118F, was designed to provide interior designers with at-a-glance information on fire barriers and how to specify safer residential upholstered furniture.