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# MEETING LOG

## UPHOLSTERED FURNITURE

CPSC/AFMA  
 EVENT

APR 20 A 8:30

**Meeting Between:** CPSC staff and members of the American Furniture Manufacturers Association (AFMA)

**Date of Meeting:** March 31, 1998

**Site of Meeting:** Greensboro Marriott Hotel, Greensboro, NC

**Meeting Topic:** AFMA 9th Annual Flammability Workshop

**Log Entry By:** Dale R. Ray, EC *DR*  
 Project Mgr., Upholstered Furniture

**Participants:** AFMA: Joseph Ziolkowski, AFMA Executive VP and UFAC Executive Director (moderator), plus about 200 AFMA member manufacturers, suppliers, retailers and others.

**Speakers:** Dale Ray, CPSC  
 Frank McGarry, NASFM  
 Hugh Talley, AFMA Technical Consultant  
 Bart deTurck, UEA (European UFAC)  
 Handley Fincher, Drexel Heritage  
 David Bell, Culp Fabrics

### Summary:

CPSC was invited to participate in the annual AFMA/UFAC Flammability Workshop, at which several speakers presented papers or talks related to upholstered furniture flammability. The approximately 200 attendees included furniture manufacturers, fabric and component suppliers, wholesale buyers, retailers and other interested organizations. One newspaper reporter, Christopher Schwarzen of the High Point (NC) Enterprise, was also present and asked a few basic questions about CPSC's activity.

Mr. Ray presented an update on CPSC's work on small open flame ignited furniture fires, with an emphasis on the material contained in the October, 1997 staff briefing package. He summarized the Commission's March 2, 1998 decision to defer regulatory action and hold a public hearing to gather additional information on the potential toxicity of flame retardant chemicals that could be used to meet a standard. A copy of the presentation slides is attached. Mr. Ray reiterated the staff's desire to obtain additional data on the toxicity, exposure and bioavailability of FR chemicals, and discussed various aspects of the staff's preliminary toxicity review and laboratory testing activities. He answered a number of questions from the audience about CPSC's fire hazard data, technical approach, laboratory test results, and economic analysis. Many attendees expressed



their views about the direction of the agency's future activities, and voiced either support for or opposition to further small open flame safety improvements. Mr. Ray also gave a brief summary of recent activities on mattresses and bedding.

Mr. McGarry spoke about the mission and philosophy of NASFM, and stated his organization's support for fire safe cigarette legislation as well as flammability standards for upholstered furniture and other products (e.g., countertop appliances). He advised the group of his intent to pursue political as well as substantive efforts to improve furniture fire safety.

Mr. Talley spoke about his work on an ASTM voluntary test method development work group, related primarily to fire risks associated with stacking chairs. He noted that most fire tests were "notoriously poor" in precision and bias (i.e., measures of repeatability and reproducibility), and that results of California TB-133 tests--and, by inference, other test--were very difficult to replicate.

Mr. de Turck provided a European regulatory activities update. He noted that there are no European Union-wide regulations on upholstered furniture, though the U.K. regulations have been in place for several years and the French government has recently issued a standard with cigarette, (optional) small open flame, and smoke toxicity requirements, based on an existing CEN voluntary standard. He also discussed the "growing" European public perception that chemicals, including FR chemicals, are generally undesirable, despite a lack of scientific evidence in the area; this translates into a reluctance among European furniture manufacturers (outside the U.K.) to incorporate FR chemicals into fabrics or filling materials.

Mr. Fincher gave a talk on retailing and furniture marketing. His presentation did not focus on technical flammability issues.

Mr. Bell discussed his firm's experience with fabric backcoating techniques, including FR applications. He noted that FR treatments can be applied at the same time as soil release agents or other chemicals in latex backcoatings. He also stated that in some fabrics, latex backcoatings can reduce permeability and pliability of fabrics, thereby adversely affecting the comfort of the finished article of furniture. He was generally opposed to the universal use of backcoatings, and suggested that other means of fabric or filling treatment be considered by manufacturers seeking to improve flammability performance.

Mr. Ziolkowski gave a brief summary of the latest fire statistics, and reiterated AFMA's commitment to avoiding mandatory rules affecting the upholstered furniture industry. He highlighted the achievements of the UFAC voluntary program, and recommended that CPSC consider the potential impact of any regulatory actions on UFAC's voluntary guidelines.



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## Upholstered Furniture Fire Hazards

- Smoldering Ignition
  - Smoking Materials, Chiefly Cigarettes
- Small Open Flame Ignition
  - Lighters, Matches, Candles

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## CPSC Action

- Defer Regulatory Action
- Public Hearing on FR Chemical Toxicity Issues

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## Overview

- NASFM Petition -- requested California Standards
- Standards Development: Small Open Flame Ignition
- Performance/Conformance Evaluation: Cigarette Ignition
- Staff briefing December 18, 1997

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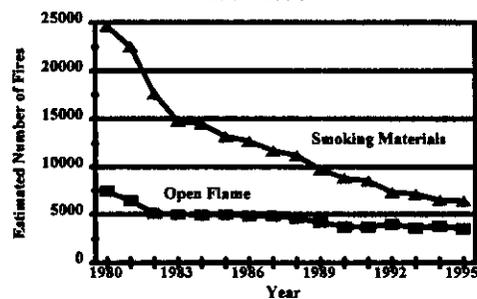
## 1995 Estimated Fire Loss Estimates for Upholstered Furniture

IGNITION SOURCE	FIRES	DEATHS	INJURIES	PROPERTY LOSS \$MM
ALL SOURCES	13,600	670	1,710	\$244.1
SMOKING MATERIALS	6,400	500	880	\$110.9
SMALL OPEN FLAMES	3,500	90	490	\$62.0
OTHER / UNKNOWN	3,700	80	340	\$72.1

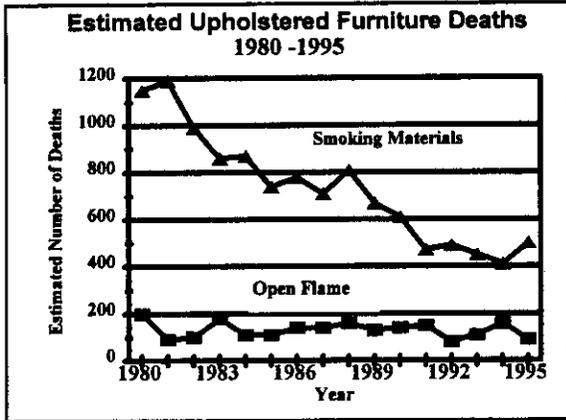
Total Societal Cost = \$4 billion

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Estimated Upholstered Furniture Fires 1980-1995



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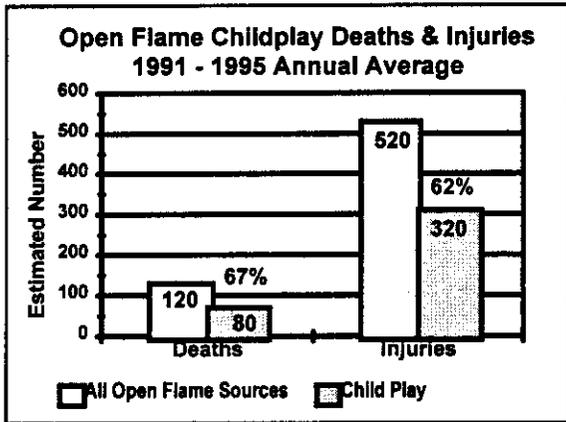
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### Small Open Flame Fire Losses 1991-1995 Annual Average

	Small Open Flame* Losses 1991-95	Avg. % total Open Flame 1991-95
Fires	3,000	81
Deaths	100	83
Injuries	450	87
Prop. Damage	\$48 mil.	81

\*Matches, lighters & candles

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- ### SUMMARY
- #### National Fire Loss Estimates
- Upholstered Furniture Fires - More Fire Deaths than any other Consumer Product
  - No Significant Decline in Open Flame Deaths
  - Most Open Flame Fire Losses Resulted from Matches, Lighters, and Candles
  - Over 50 % of Open Flame Deaths and Injuries Resulted from Child Play

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- ### CPSC Lighter Rule
- Effective July 1994
  - Disposable & Novelty Lighters
  - Reduces Risk of Fires Started by Children < 5
  - Prevents some but not all small open flame losses
  - Avoids 25 of 100 small open flame furniture deaths

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- ### ANPR -- Small Open Flame
- Possible unreasonable risk
  - CPSC to consider possible voluntary or mandatory standard
  - Alternatives solicited

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### Staff Activities -- Small Open Flame

- Fire Investigation Study
- Laboratory Testing
- Standards Development & Analysis

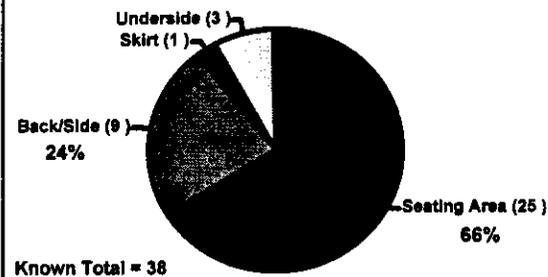
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### Small Open Flame Upholstered Furniture Fire Investigation Study

- Portion of the Furniture First Ignited
- Age of Person Involved in Ignition of Furniture
- Source of Small Open Flame Involved in Ignition
- Total of 76 Fire Investigations

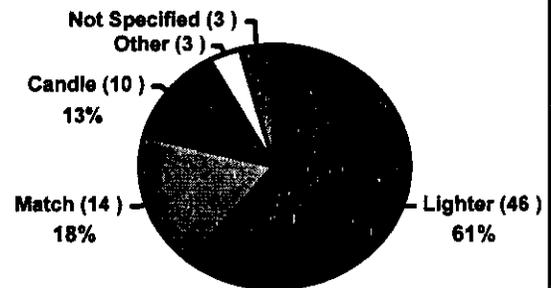
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### Area First Ignited



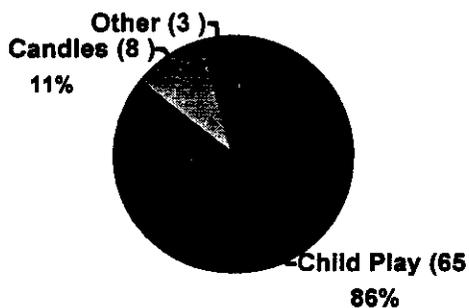
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### Source of Ignition



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### Probable Cause of Fire



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### Fire Losses in Fire Study

- 39 Deaths and 45 Injuries
- Smoke Inhalation and Thermal Burns
- 42 of 76 Fires Involved Either a Death or Injury
- 19 Deaths and 15 Injuries Involved Victims Under 5

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### **Fire Investigation Study Conclusions**

- Source of Ignition in 46 of 76 Fires - Lighter
- Area Ignited in 25 of 38 Fires - Seating Area
- Probable Cause In 65 of 76 Fires - Child Play
- Children Under 5 Years of Age Involved in 44 of 65 Child Play Fires

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### **Small Open Flame Technical Research**

- CPSC Laboratory Testing
- Test Method Development

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### **CPSC Laboratory Test Program**

- Study small open flame performance
- Examine the relationship of open flame & cigarette ignition
- Support the development of a possible standard

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### **Small Open Flame Test Program**

- Full scale furniture
- Component/composite
- Bench scale
- Interlaboratory evaluation

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### **Full Scale Tests on Finished Chairs**

- 27 Chairs tested:
  - 9 UFAC, 9 CA, 9 UK
- 3 locations tested:
  - dust cover, skirt, seating crevice

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### **Results by Chair Location**

- Dust cover fabrics
  - 22 ignited, 5 did not ignite
- Skirt fabrics
  - all ignited
- Seating crevice
  - all ignited

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### **Component/Composite Test Results**

- **Components :**  
**Fabrics/filling materials tested to Cal 117**
- **Composite:**  
**Mockups tested to BS 5852**

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### **Conclusions**

- **Upholstery fabric primary determinant of ignition**
- **Interliners did not prevent ignition**
- **Composite test more predictive of chair ignitions**

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### **Bench Scale Test Protocol**

- **Specimens conditioned**
- **Mockup & component assemblies**
- **20 second butane flame application**
- **Observations recorded**

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### **Materials Tested (FR & non-FR)**

- **Fabrics**
- **Barriers**
- **Filling materials**
- **Dust covers**

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### **Fabrics that Ignited/Burned at 20 Seconds**

- **Cellulosic (19 of 21)**
- **Thermoplastic (10 of 11)**
- **Blends (11 of 11)**
- **Other (19 of 31)**

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### **Fabrics that Did Not Ignite/ Self-Extinguished at 20 Seconds**

- **Wool (1)**
- **Nylon w/wo fire blocker (2)**
- **Heavy wt. Cellulosic (2)**
- **FR treatments (13)**

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### **Filling Material Results**

- **No difference in ignition times between non-FR and FR foam, or with polyester batting**

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### **Dust Cover Test Results**

- **Cotton/polyester blend ignited**
- **Polypropylene melted away**
- **Aramids did not ignite**

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### **Conclusions**

- **Bench scale protocol suitable to evaluate ignition performance**
- **Most current upholstery fabrics ignite**
- **FR treatments effective**
- **Types of filling material less important**

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### **Flame Retardants: Potential Health Effects**

- **Will flame retardant chemicals in upholstered furniture present a hazard due to toxicity?**

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### **Under the FHSA, CPSC must consider:**

- **Toxicity -- Acute and Chronic**
- **Exposure**
- **Bioavailability**

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### **Fire Retardants that are not “toxic” under the FHSA:**

- **Decabromodiphenyl Oxide (DBDPO)**
- **Hexabromocyclodecane (HBCD)**
- **Dimethyl (3-((hydroxymethyl) amino)-3-oxopropyl) Phosphonate (Pyrovatex™)**
- **Urea**
- **Phenyl Isopropylated Phosphate (PIP)**
- **Triphenyl Phosphate**
- **Melamine**

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**Fire Retardants with limited toxicity data, low bioavailability:**

- O-(4-(aminosulfonyl)phenyl) O, O-Dimethyl Phosphorothioate (Proban™)
- Ammonium Polyphosphate
- Tetrakis (Hydroxymethyl) Phosphonium Chloride compound with Urea

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**Fire Retardants that are "toxic," with low exposure or bioavailability:**

- Boric Acid
- Ammonium Bromide
- Antimony Trioxide (AT)
- Tris(1,3-dichloroisopropyl)phosphate (TDCP, Fyrol FR-2)
- Tris(2-chloroethyl)phosphate (TRCP)

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**Fire Retardant that is "toxic," with no bioavailability data:**

- Ammonium Sulfamate

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**Conclusions: Toxicity Hazards**

- Based on available data, a number of FR chemicals could be used in upholstered furniture without presenting a hazard to consumers
- Additional information on the potential for exposure is needed

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**Combustion Toxicity**

- Will smoke from flame retarded products be more harmful than smoke from non-FR products?

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- All materials produce CO when burned
- The contribution of fire-retardant chemicals to smoke toxicity is small

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## Conclusion

- Based on limited data, the smoke from most FR-products is no more harmful than smoke from non-FR products.

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## CPSC Draft Small Open Flame Standard Development

Approach - Prevent sustained combustion

- Unlikely to ignite combustibles/generate toxic smoke
- Proven Approach

Alternative - Heat release

- Toxic smoke still a concern
- Cost considerations

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## Test Method

- Seating Area Test
- Dust Cover Test
- No Skirt Test

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## Test Method - Ignition Source

- 35 mm butane flame
- Heat output similar to typical small open flames sources
- Same as BS 5852

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## Flame Exposure Time

- 20 second flame exposure time
  - Demarcates fabric performance
  - Avoid adverse effects on cigarette ignition
  - Supported by childplay information

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## Performance Requirements

- Cease combustion within 2 minutes
- No flame progression to sample edges

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### **Effect on Cigarette Ignition**

- **CPSC Testing:**
  - No significant adverse effect
  - Probable substantial cigarette ignition reduction benefits
- **European Testing**
  - Many materials that resist both small open flames & cigarettes

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### **Economic Considerations**

- **Costs to meet small open flame standard**
  - Seating area; Dust Cover
- **Potential benefits**
  - Small open flame fires
  - Cigarette ignited fires
- **Other**
  - Small business impacts

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### **Probable Effects on Fabric Producers**

- **Apply FR treatments**
- **Test fabrics**
- **Certify to standard**

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### **Probable Effects on Furniture Manufacturers**

- **Higher cost of upholstery fabric: \$1.00-\$1.25 per linear yd.**
- **Dust cover effects: cost of barrier or FR treatment**

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### **Costs to Consumers**

- **Average cost increase of \$23 - \$30 for each affected living room/family room unit of furniture**
- **About \$5 for each dining chair or unit of home office furniture**
- **Total annual estimated cost: about \$590 million**

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### **Benefits to Consumers (Small Open Flame Standard)**

- **Each year's production would avoid about 60 deaths from small open flame fires**
- **Compliance with open flame standard would avert about 140 deaths from cigarette ignited fires**
- **Total annual estimated benefit: \$890 million**

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## Net Benefits to Consumers

**Benefits = \$890 million**

**Costs = \$590 million**

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**Net Benefits = \$300 million**

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## Voluntary Activities

- **ASTM E5.15 Work Group**
  - Existing Test Method Review
  - CPSC Technical Information
  - Possible New Performance Test
- **UFAC Voluntary Guidelines**
- **ASTM Voluntary Standard**

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## Laboratory Test Program: Cigarette Ignition

- Evaluate full scale performance
- Evaluate UFAC conformance

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## Test Protocols

- **CPSC/NIST Full Scale**
- **UFAC Component Mockup**

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## Conclusions from Full Scale Results

- **83% of chairs would resist ignition**
- **92% of individual cigarettes would not result in ignition**

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## UFAC Conformance

- **86% of chairs conformed**
- **Both conforming and non-conforming chairs resisted ignition in full scale tests**
- **UFAC conformance does not assure full scale ignition resistance**

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### **Conclusions: Open Flame**

- **Standard feasible, highly effective in reducing risk (including cigarette ignition risk)**
- **Substantial net benefits**
- **Incomplete FR toxic hazard data**
- **Voluntary action possible**

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### **Conclusions: Cigarette Ignition**

- **Ignition resistance & UFAC conformance both high**
- **Significant, addressable risk for readily ignitable materials**
- **Potential benefits dependent on small open flame action**

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### **AFMA Comments**

December 15, 1997

- **FR Chemical Toxicity**
- **1995 Fire Data**
- **Fire Investigation Study**
- **Test Method/Technical Issues**
- **Economic Impacts**

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### **AFMA Comments**

February 26, 1998

- **Deny NASFM petition re: cigarette ignition**
- **Comprehensive FR chemical review**

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### **Commission Decision March 2, 1998**

- **Defer Regulatory Action**
  - FR Toxicity Public Hearing
  - Additional Testing/Analysis
- **Staff to Report in 5 Months**

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### **Flammability Standard:**

**protects public against unreasonable risk of death, injury, or significant property damage due to fire.**

**15 U.S.C. § 1193(a).**

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**Standard must also be:**

- Reasonable
- Technologically practicable
- Appropriate
- Limited to unreasonable risk
- Stated in objective terms

15 U.S.C. § 1193(b)

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**For Notice of  
Proposed Rulemaking:**

- Text of proposed rule
- Preliminary regulatory analysis

15 U.S.C. § 1193(i)

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**For a Final Rule, Commission  
must make findings about:**

- Applicable voluntary standards
- Relationship between costs and benefits
- Burden of requirements

15 U.S.C. § 1193(j)(2)

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**For Further Information:**

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