Status Update: CPSC Activities on Upholstered Furniture Flammability*

AHFA Flammability Workshop
April 25, 2007

*This information was prepared by the CPSC staff; it has not been reviewed or approved by, and does not necessarily represent the views of, the Commission.

This document is in the public domain and may be freely copied or reprinted.
CPSC Fire Hazard Program

Strategic Goal:

Reduce the rate of death from residential fire-related causes by 20 percent from 1998 to 2013
Upholstered Furniture Flammability Standards Development Project

- CPSC Staff Revised Draft Standard - December 2005

- FY 2007 Performance Goals:
  - Continue research and publish reports
  - Maintain coordination with stakeholders in government, industry and the fire safety community
Background

- Current CSPC staff standards development activities pursuant to October 2003 ANPR
- 2003 ANPR expanded CPSC proceeding to cover ignition from both smoldering and open flame sources
- Latest version of CPSC staff’s revised draft standard presented in January 2006 briefing package*

*see http://www.cpsc.gov/library/foia/foia06/brief/briefing.html
January 2006 Briefing Package

- Updated fire hazard data
- CPSC staff lab testing data and other technical research
- Review of 2005 stakeholder input
- CPSC staff’s 2005 revised draft standard
- Preliminary regulatory analysis of revised draft standard & significant alternatives
- Preliminary health risk & environmental assessments of FR chemicals in foam
Addressable Upholstered Furniture

Fire Losses

- Average annual national estimates, 2001-2003 residential fires in which upholstered furniture was 1st item ignited:
  - 4,000 non-intentional fires
  - 330 civilian deaths
  - 580 civilian injuries
  - $115 million property damage

- Annual average societal costs of addressable fire losses = $1.9 billion

- 88% of deaths and 65% of injuries resulted from smoking material-ignited fires
Regulatory Options in January 2006 Briefing Package

- CPSC staff’s 2005 revised draft std
- Previous (2001) staff draft small open flame std
- 2004 AHFA / industry-recommended standard
- Variations on the CPSC staff’s 2005 draft:
  - Smoldering provisions only
  - Without loose fill open flame provisions
  - With cover fabric open flame provisions
- No action

Net Benefits of Various Alternatives ($million per year’s complying production)
Summary of CPSC Staff’s 2005 Draft Standard

- Residential (including home office, dormitory use) upholstered furniture with contiguous upholstered seats & backs
- Tests for smoldering and open flame resistance of seating area materials
  - Maximum allowable mass loss over time
  - Cover fabrics
  - Resilient, fibrous and loose filling materials
  - Fire barriers (optional)
- Bench scale performance composite tests using standard test materials
- Test methods & apparatus similar to Calif., U.K., ASTM/UFAC
- Four compliance options to reduce costs and preserve material choices
2005 CPSC Staff Draft Standard: Smoldering Resistance Tests

- For cover fabrics, filling materials & fire barriers
- Modified (3” thick) ASTM / UFAC mock-up with standard materials, standard cigarette ignition source
- Max 10% filling material mass loss in 30 minutes
2005 CPSC Staff Draft Standard: Open Flame Resistance Tests

- BS-5852 seating mockup, standard materials & ignition sources
- For filling materials & cover fire barriers: 35 mm flame, 20 sec.
- For interior barriers: 240 mm flame, 70 sec.
- Max 20% filling material mass loss in 45 minutes
Fire Barriers

- **Type I**: Interior barriers - qualify for use with both non-complying cover fabrics and non-complying fillings
  - High-loft batting, interior fabrics, etc.

- **Type II**: Cover barriers – qualify for use with non-complying fillings
  - Some leather, wool, vinyl, FR cover fabrics
Conventional materials can ignite quickly & burn intensely
(example: mid-weight cotton twill over untreated polyurethane foam)
Interior fire barriers protect fillings
(example: rayon/poly/cotton fabric over PAN fiber interior barrier over untreated polyurethane foam)

- Good performing alternatives to FR fillings
- High-loft drop-in replacement for batting / cushion wrap
Open Flame Ignition-Prone Fabric with Conventional Fillings vs. Interior Barrier

Time = 2:20 after ignition
2006 – 2007 Activity Overview

- Continued testing & standards development
- Peer review of technical reports
- Review / evaluation of stakeholder comments & recommendations
November 2006 Status Report*

Update on CPSC staff technical research

- Standard test materials and qualifying methods
- Public comments on statistical and economic issues related to estimated benefits & costs of a standard and alternatives

*see http://www.cpsc.gov/library/foia/foia07/brief/briefing.html
Standard Test Materials

- Non-FR foam; FR foam; cover fabric
- 2005 CPSC staff tests indicated consistent smoldering & open flame performance; inconsistencies observed in subsequent CPSC staff & industry open flame tests
  - Variability in cotton velvet fabric
  - Fabric / foam interdependency
- Potential qualification test revisions
  - Non-FR foam: bare foam tests (no change)
  - Cover fabric: over standard non-FR foam only
  - FR foam: bare foam open flame test; with standard fabric for smoldering only
Smoldering Test
Draft-Limiting Enclosure

- CPSC staff draft uses ASTM / UFAC seating area mockup and enclosure
- Public comments:
  - Smoldering artificially limited
  - Difficult to load / unload 3 mockups
  - Potential for heavy smoke / flare-up at end of test
- Testing showed increased average mass loss without enclosure, but no reversals
- No flare-ups observed
2006 industry-sponsored report by CRA International

- Criticized CPSC staff’s National Fire Loss Estimates methodology; recommended two alternative methods to reduce estimated losses
- Criticized CPSC staff’s Preliminary Regulatory Analysis; recommended changes to reduce estimated benefits, increase estimated costs

CPSC staff met with CRA & AHFA to discuss comments & recommendations
Fire Loss Estimates
Methodology Issues

- Data ‘raking’ procedure to allocate deaths & injuries from fires with unknown causes
- CPSC / NFIRS / NFPA method to estimate deaths per furniture fire
Benefit / Cost Analysis
Methodology Issues

- Effectiveness rates
- Projected declines in smoking fire deaths
- Risk to households containing furniture with smolder-prone fabrics
- Discount rates / statistical value of life
- Cost estimates
- Sensitivity analysis
December 2006 Status Report*

Peer-reviewed CPSC staff technical reports
(per OMB Bulletin M-05-03)

- Preliminary Regulatory Analysis:
  benefits & costs of regulatory options
- Preliminary Health Risk Assessment:
  FR chemicals in urethane foam fillings

*see http://www.cpsc.gov/library/foia/foia07/brief/briefing.html
Preliminary Regulatory Analysis

- Analysis describes potential benefits & costs of various alternatives, several with significant net benefits to the public
- Interagency Economic Peer Review Group (IEPR) – 2 reviewers
- Revised report reflects reviewers’ (and public) comments & recommendations

![Graph showing benefits and costs of various alternatives](image-url)

Benefits & Costs of Various Alternatives
($million per year's complying production)
Preliminary Health Risk Assessment

- Described potential health effects associated with 3 foam FRs:
  - Melamine: not considered toxic
  - Firemaster 550™: principal components unlikely to pose significant risk but additional toxicity and inhalation exposure data needed
  - TDCP: may be hazardous, additional inhalation exposure data needed

- Independent experts in toxicology and risk assessment – 2 reviewers

- Revised report reflects reviewers’ (and public) comments & recommendations
Fire Barrier FRs

- 2006 CPSC staff risk assessment of selected mattress barrier FRs:
  - Antimony trioxide
  - Boric acid
  - Decabromodiphenyl oxide
  - Vinylidene chloride
  - Ammonium polyphosphate
  - Melamine

- Conclusion: FR mattress barriers are available that would not pose appreciable health risks
- Conclusions likely to apply to furniture barriers
Industry Stakeholders’ Recent Technical Comments

- **Smoldering Ignition**
  - Uncertain effect of filling material FR loading on smolder resistance
  - Mass loss vs. char length acceptance criteria

- **Open Flame Ignition**
  - Effect of variability in cotton velvet fabric (2006 PFA interlab study)
  - Impact of Calif. AB-706 proposing state ban on bromine & chlorine FRs
  - High-loft barriers & interliners as more effective substitutes for FR foam & loose fillings
Stakeholder Recommendations

- **AHFA / PFA / NCC / NTA / DFA**: Federal standard for smoldering ignition, based on ASTM / UFAC voluntary method, continue open flame research

- **AHFA / PFA**: Suspend Cal. TB-117 open flame requirements pending development of new combustion modification technologies (in view of Cal. AB-706)

- **AFSC**: Federal standard for both smoldering & open flame ignition, based on TB-117+, but consider impact on low-density foam
  - One member recommended existing TB-117 rather than TB-117+

- **NASFM**: Federal standard based on TB-117+
Next Steps

- Continue research on standard materials & test methods
- Initiate Low-IP cigarette evaluation to compare ignition hazard to traditional cigarettes
- Continue working with government, industry & fire community stakeholders on technical issues
- Continue cooperation with EPA & monitor regulatory developments on FR chemical issues
CPSC Quorum Status

- Chairman Hal Stratton left CPSC July 2006
- Temporary quorum of 2 Commissioners expired January 2007
- Vice Chairman Nancy Nord is Acting Chairman until a new Chairman is nominated & confirmed
- President nominated Michael E. Baroody March 2007
U.S. Consumer Product Safety Commission

Status Update: CPSC Activities on Upholstered Furniture Flammability

For further information contact
Dale Ray, Project Manager
301-504-7704 <dray@cpsc.gov>