



U.S. Consumer Product Safety Commission Log of Meeting

SUBJECT: Underwriter's Laboratories (UL) Presentation to CPSC Staff on Furniture Flammability Research

DATE OF MEETING: November 18, 2013

LOG ENTRY SOURCE: Rik Khanna, Office of Hazard Identification and Reduction

DATE OF LOG ENTRY: November 26, 2013

LOCATION: CPSC National Product Testing and Evaluation Center, Rockville, MD

CPSC ATTENDEE(S) and NON-CPSC ATTENDEE(S): (see attached Meeting Attendance Record)

SUMMARY OF MEETING:

The meeting was called to order at 1:00 pm by Rik Khanna, who welcomed UL's Dr. Thomas Fabian and meeting observers. After self-introductions were made, Dr. Fabian presented an overview of UL's recently completed project on Residential Upholstered Furniture Flammability in which experiments were conducted to explore if commercially available fire resistance technologies can retard and/or reduce fire growth of residential upholstered furniture. These technologies were assessed in fire retardant (FR) foam complying with California TB-117 and in fire barriers of different chemistries and physical form. The experiments were conducted in three stages: 1) material level, 2) mock-up level, and 3) full furniture level. The research approach consisted of six tasks:

- Task 1 – Select and procure sample materials
- Task 2 – Characterization of sample materials
- Task 3 – Material combination combustibility experiments
- Task 4 – Mock-up assembly combustibility experiments
- Task 5 – Full-scale furniture combustibility experiments
- Task 6 – Develop technical report

Material Level Combustibility Experiments Findings

All approaches exhibited some degree of reduced ignitability/flammability.

1. FR foam usage showed slightly shorter burn duration than non-FR foam.
2. High-loft barrier usage prolonged time to ignition by 9 to 21 seconds and extended burn duration by 174 to 355 seconds. The Peak Heat Release Rate (PHRR) was modestly reduced but 180 second Average Heat Release Rate (AHRR) was significantly reduced. The total heat release (THR) values were 6 to 13 % lower.
3. Flat barrier usage prolonged time to ignition up to two times longer. Para-aramid blends extended burn duration by 106 and 868 seconds; others were 415 to 433 seconds shorter. The PHRR was reduced up to 34 % and 180 seconds. AHRR was significantly reduced (58 to 91 %). THR for para-aramid blends was 9 and 42 % lower; others were 80 to 95 % lower.

Mock-up Combustibility Experiments Findings

The mock-up construction was critical and impacted combustion behavior.

All approaches exhibited some degree of reduced ignitability/flammability.

1. FR foam usage reduced PHRR about 45 %.
2. High-loft barrier usage extended survivable ignition exposure durations. PHRR was reduced 40 to 66 % and total heat releases tended to be greater
3. Flat barrier usage extended survivable ignition exposure durations with 4 of 6 barriers surviving 300 seconds. Two para-aramid blends that did not survive 300 second exposure still exhibited 59 and 76 % reduction in PHRR, respectively.

All approaches extended burn duration except non-para-aramid flat barriers.

Furniture Combustibility Experiments Findings: Ignition Location

Ignition location was found to have an effect on furniture level combustion behavior.

1. Ignition at the interior corner propagated slightly quicker but had a lower PHRR than the seat/back location.
2. The back bottom was more difficult to ignite than the cushion area as the fire propagated more slowly and self-extinguished in one case. When fire propagated to involve the cushions, the PHRR was greater.

Furniture Combustibility Experiments Findings: Material Influence

All approaches exhibited some level of reduced ignitability/flammability.

1. Approach 1: TB 117 FR foam substitution for non-FR foam reduced PHRR when cushions were ignited (1.3 vs. 1.1 MW). They both had comparable PHRR when back was ignited (1.3+ MW) and the time to PHRR was comparable.
2. Approach 2: High-loft FR barrier in place of polyester wrap reduced PHRR by ~3X to 400 kW and the time to PHRR was extended when cushions were ignited.
3. Approach 3: Approach 2 + flat barrier covered sides further reduced PHRR by ~50 % to 200 kW and ignition of back of the samples did not propagate and self-extinguished.

After the presentation, CPSC staff asked questions to Dr. Fabian on his study and questions were opened to the observers. The full webcast and Dr. Fabian's presentation slides are posted on the CPSC website for the record.

Attachments

1. Meeting Attendance Record
2. Residential Upholstered Furniture Flammability Presentation Slides



MEETING ATTENDANCE RECORD

Please note that information you provide on this form may be publicly released

Date: 11/18/2013

Project: UL-CPSC Furniture Rulemaking Meeting

Location: SRP

Purpose: Briefing to Staff on UL Furniture Flammability Research

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