

LOG OF MEETING

DIRECTORATE FOR ENGINEERING SCIENCES

CP
12/28/05
JPC
CONF PARTIALS

SUBJECT: D.I. 2 Technologies fire barrier product(s) for use in mattresses and bed clothing.

DATE OF MEETING: October 25, 2005

SOURCE OF LOG ENTRY: Patricia J. Prior, ESFS

LOCATION: Room 714, CPSC Headquarters, Bethesda, MD

CPSC ATTENDEES: See attached list of attendees.

NON-CPSC ATTENDEES: William E. Younts, III, D.I. 2 Technologies

SUMMARY OF MEETING: Mr. Younts requested the meeting to describe D.I. 2 barrier products now being used in mattresses produced to meet California TB 603. (Attached is a summary of his remarks.) The D.I. 2 barriers, made with modified acrylic fibers (incorporating an antimony synergist), render many mattress/barrier combinations self-extinguishing, and smoke generation is thus minimized. They do not see fiber degradation in carding/garneting of product. While accelerated life-testing of mechanical properties have been conducted, no tests of exposure from airborne flame retardant materials or aqueous (sweat or urine) extraction have been done with these barriers.

This barrier product has the best features of both sheet and high-loft types. It is relatively thin and provides thermal insulation. It can be a direct substitute for the foam layer in a quilt panel. In high end mattresses, this would be an added layer. Their barriers are cost-effective, marketable solutions for the TB 603 and CPSC proposed 1633 flammability standards. Some D.I. 2 products could also have applications in bedclothing designed to meet California's draft TB604.

D.I.2 has incorporated their barrier technology in the most challenging designs from a number of California manufacturers, consistently producing maximum peak rates of heat release (PHRR) well below 50 kW. This low PHRR is good measure of robustness of design solution and gives the mattress producer significant additional confidence in the performance of their mattress. The thermal insulating layer of the barrier maintains its integrity so breaches do not occur. This is especially an issue on side panels of foundations.

Mr. Younts described the mattress industry as having different segments. Tier I producers, the largest manufacturers, have their own sophisticated technical staff and related resources for designing and producing mattresses with precisely engineered fire

performance. The D.I. 2 barrier is good for smaller Tier II & III manufacturers who produce approximately 1,000 pieces/day. These producers are better served by a single solution for all of their mattress models. Tier IV companies buy top and side panels from contract quilters and just do the mattress assembly. To reach Tier IV producers, D.I.2 or other barrier producers would need to work through the contract panel quilters using the pooling provisions of the CPSC proposed standard.

A portion of the meeting was CLOSED to the public because of the proprietary information discussed.

October 21, 2005

Margaret L. Neily
Consumer Product Safety Commission
Washington, D.C. 20207-0001

MEETING SUMMARY – Data Pertinent to CFR 1633 Fire Safety of Mattresses

Dear Margaret:

This letter provides a summary of topics and data pertinent to CFR 1633 Fire Safety of Mattresses.

1. “Inherent” versus “Post-treated” Ingredient Fibers / Fabrics and Fitness for Use

- a. Inherent has come to mean fiber that has the FR chemistry added prior to fiber formation with an implication these are more durable and resistant to migration. Post-treated has come to mean fire retardancy is added after fiber formation and is thus not durable or not fit for use. There are inherent FR fibers which are not resistant to migration and post-treated fibers which are resistant enough to meet home laundering requirements.
- b. Migration, exposure and durability concerns have and continue to be addressed via marketplace product liability and product warranty processes which are well established in this industry. The benchmark should be fitness for intended use over the useful life of the product versus arbitrary terminology.

2. Physical stability of antimony filled, modified acrylic

- a. Modified acrylic is an important ingredient fiber for fire barriers due to its ability to actively extinguish open flames during fire insult.
- b. Antimony compounds are added as a synergist to the fiber prior to spinning to greatly improve performance.
- c. Data is provided on boiling water extraction which shows that only 16 ppm antimony is extracted in 2 hours indicating a very stable, inert material with deminimus exposure potential.
- d. Additional qualitative information is provided in that attempts to analyze modacrylic fibers for chlorine and antimony by digesting the fiber in boiling nitric acid to remove the polymer matrix have proven unsuccessful.

- e. Modified acrylics render many mattress / barrier combinations self-extinguishing giving a significant improvement in risk at a cost not achieved by other commercially available materials. Smoke generation is thus minimized.

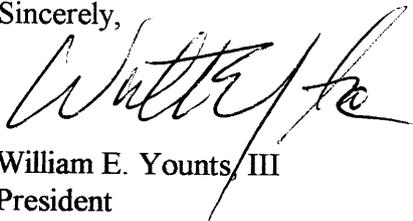
3. Interpretation of Burn Test Results:

- a. Time of Occurrence of the Peak Heat Release (PHR) is an important indicator in mattress fire safety performance.
- b. When the PHR occurs in the first 1 to 2 minutes, this indicates a robust design and gives the mattress producer significant additional confidence. This indicates that the residual fire is shrinking as time moves forward and in the best case the set of bedding will be self-extinguishing.
- c. Conversely, if the PHR occurs late in the test, i.e. at 30 minutes, this indicates that the residual fire is increasing as time moves forward. This generally indicates thermal breakdown of foam and other comfort materials and combustion of the decomposition gasses. These feed and increase the magnitude of the residual fire, potentially auto-catalytically leading to eventual failure.
- d. If the PHR is approaching 150 - 200 kW late in the 30 minute test, this is referred to in the trade as a "photo finish" leading to concerns about marginal performance.
- e. The prototyping requirement in the proposed standard is strongly supported and cause mattress producers to institute robust solutions with adequate safety margins.

4. Confidential – Performance Testing of Commercial and Experimental Mattresses Under TB-603 Featuring DI 2 Technologies LLC Fibers

- a. Provided under separate cover.

Sincerely,



William E. Younts, III
President

Attachment I – Lab Test Report of Heavy Metals Analysis of Leachate

Sample of modified acrylic fiber was boiled in distilled water for 2 hours and the leachate analyzed for heavy metals using ICP and AAA.

TEST REPORT

HEAVY METAL ANALYSIS

WITH REFERENCE TO DIN 38406. BY INDUCTIVELY COUPLED ARGON PLASMA (ICP) AND ATOMIC ABSORPTION SPECTROPHOTOMETRIC (AAS) ANALYSIS.

<u>ELEMENT</u>	<u>RESULT (ppm)</u>	<u>REQUIREMENT (ppm)</u> <u>(GENERAL)</u>
SOL. ANTIMONY (Sb)	16.0	30.0
SOL. ARSENIC (As)	<0.3	1.0
SOL. LEAD (Pb)	<0.3	1.0
SOL. CADMIUM (Cd)	<0.03	0.1
SOL. MERCURY (Hg)	<0.01	0.02
SOL. COPPER (Cu)	5.2	50.0
SOL. CHROMIUM (Cr-TOTAL)	<0.5	2.0
SOL. CHROMIUM VI (CrVI)	ND(<0.5)	ND
SOL. COBALT (Co)	<1	4.0
SOL. NICKEL (Ni)	<1	4.0

REMARK : SOL. = SOLUBLE
 < = LESS THAN
 ND = NOT DETECTED
 ppm = PARTS PER MILJION = mg/kg
 DETECTION LIMIT FOR Cr(VI) : 0.5 ppm

DATE SAMPLE RECEIVED : NOV.26, 2003
 TESTING PERIOD : NOV.26, 2003 TO DEC.1, 2003

END OF REPORT