

**STATUS OF THE CALIFORNIA TECHNICAL BULLETIN ON
FLAMMABILITY OF UPHOLSTERY, MATTRESSES AND BEDDING**

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Abstract

California has long been at the forefront of flammability regulations for upholstered furniture, mattresses and now, bedding materials. This paper will discuss the status of the various California Technical Bulletins (TB), which cover these areas. Also discussed will be the Consumer Protection Safety Commission's (CPSC) efforts in these same areas.

Upholstered Fabrics

Fires caused by ignition of upholstered furniture have long been a concern. In the 1970's, the CPSC began to investigate the number of deaths that occurred through the accidental ignition of upholstered furniture. The main cause of ignition was found to be smoldering cigarettes. The CPSC drafted a proposed cigarette ignition standard. However, in 1977, the Upholstered Furniture Action Council (UFAC), an industry group, established a voluntary standard as an alternative to the CPSC draft standard. This voluntary standard has been in use, with some later amendments, in the upholstered furniture business since that time.

About the time that the CPSC was drafting its proposed standard, California passed its own regulation, TB-117, which set open flame requirements for upholstered furniture sold in the State. This Technical Bulletin also offers a high degree of resistance to smoldering cigarettes. In 2002, the California Bureau of Home Furnishings and Thermal Insulation (BHFTI), proposed a new updated draft of TB-117 designed to incorporate the benefits of new technologies and materials to improve the flame resistance of upholstered furniture. The new draft also specifically addresses the smoldering issue. Further work on this draft has been delayed while the Bureau concentrates on the mattress and bedding standards, which were mandated by law. The current draft does not specifically refer to barrier fabrics but we are assured, based on both the current mattress and bedding drafts, that barrier fabrics will be included.

TB-117 draft standard includes composite testing for the upholstery fabric and other items of fabrication (barrier fabric, fire-retarded polyurethane foam), which are arranged in a small-scale mock-up of an upholstered chair. The dust cover material is tested by itself as a horizontal sheet over an open flame. Any fiber filling materials are also tested in a similar manner as the dust cover except that the filling material is laid over cotton sheeting material. Any resilient cellular foam is tested in the same small-scale mock-up apparatus as the upholstery fabric except that it is tested without a cover material.

The upholstery fabric passes when it is exposed to an open flame for 20 seconds and self-extinguishes or loses less than 4% of its total weight. The resilient cellular foam passes if it self-extinguishes before 10 minutes and loses less than 4% of its weight. The dust cover and filling materials are subjected to an open flame for 20 seconds. The dust cover passes if it doesn't burn beyond the 6-inch hole in its supporting metal mesh and the filling material passes if the flame does not penetrate through the top layer of the filling material.

The draft also includes a smoldering test for fiber battings, pads and loose fill. This procedure is similar to the voluntary standard adopted by UFAC and also similar to ASTM D5238-98, Standard Test Method for Smoldering Combustion Potential of Cotton Based Batting. TB-117 draft is still a work in progress. The Bureau has been focusing its efforts on the mattress and bedding standards and TB-117 has been placed on the back burner.

Meanwhile, in October 2003, the CPSC published an Advance Notice of Proposed Rulemaking (ANPR) to draft a national standard for upholstered furniture, which would include both resistance to open flame and smoldering cigarettes. This ANPR expands on a previous CPSC draft (1994), which only addressed resistance to a small open flame. From an industry perspective, it is imperative that CPSC and California work closely in order to arrive at a single standard.

Mattresses

In 1992, California developed the first open flame standard for mattresses. This standard, TB-129, was focused on institutional mattresses such as those used in prisons, hospitals and dormitories. TB-129 later became the reference for ASTM E-1950.

Until TB-129 came into being, the only standard in force for flammability of mattresses was Federal standard 16 C.F.R. 1632. This standard only focused on the ignition resistance of mattresses to a smoldering cigarette. However, studies showed that most mattress fires were started either by matches or cigarette lighters (40%), or by smoldering cigarettes (36%).

Young children started the majority of open flame mattress fires. There obviously was a need to address the flammability issues of mattresses to open flame.

In 2001, the California Legislature mandated by law that new flammability standards for mattresses and bedding materials be developed by BHFTI. These standards would require that both mattresses and bedding materials pass an open flame test. The law also mandated that these standards be enforced by January 1, 2004. The Bureau focused its attention to developing an open flame mattress standard. The first draft of TB-603, Requirements and Test Procedure for Resistance of Mattress and Box Spring Set to Large Open Flame, was issued for comment in early 2003. The Bureau invited interested parties to comment on the original draft and to present suggestions on test criteria. Participants were also encouraged to submit sample materials for evaluation. Based on all this feedback and further testing, the Bureau issued a revised final draft in the fall of 2003.

TB-603 uses two "T" shaped propane burners that were developed by the National Institute of Standards and Technology (NIST). One burner is used to flame the top of the mattress and the second burner flames the side where the mattress and foundation interface. These are full-scale tests that are conducted in one of three configurations – an open calorimeter or two different sized hooded rooms. The test is designed to last 30 minutes and captures the total heat release over this time frame. A mattress passes the test if the total rate of heat release does not exceed 200 kW and the total heat released in the first 10 minutes does not exceed 25 mega joules. The regulation TB-603 is now due to go into effect January 1, 2005. There has been a question as to whether TB-603 would be pre-empted by 16 CFR 1632. The Bureau has made a case to the CPSC that each standard addresses different sources of mattress fires – TB-603 open flame and 16 CFR 1632 smoldering cigarettes. At this time, this is still unresolved. However, in an ANPR in October 2001 and a subsequent ANPR in August 2003, the CPSC has announced its interest in adoption of a Federal open flame flammability standard for mattresses. Again, it would be in the best interest of the Industry and the country as a whole to have one standard for mattress flammability. The Bureau has proposed to CPSC that it should adopt TB-603 as the Federal Standards. We all await the results.

Bedding

When it comes to bed fires, the mattress is only a portion of the story. In a majority of the cases, the fire starts in the bed clothing. The California Legislature recognized this fact and mandated that the BHFTI set a standard for bed clothing if it corroborates these facts. The BHFTI found that in 67% of the cases of mattress fires, the bedding was first involved. Of these cases, the large majority was started from a small open flame like matches or cigarette lighter. Therefore, after the Mattress Standard, TB-603 was completed the Bureau turned its attention to a Bedding Standard, called TB-604. Draft Standard TB-604 addresses filled bedding components such as mattress pads, pillows and comforters. Again the Bureau called upon Industry and interested parties to submit samples of various filling materials, including fire retarded polyurethane foam for testing. The Bureau conducted many full-scale tests similar to those of TB-603 but including various combinations of bedding products and fillings. An inert mattress made of fiberglass was used so that the true heat release of the bedding materials could be captured. In addition to the full-scale tests, which are costly, the Bureau is developing a small bench scale test for filling material that would correlate with the full-scale tests of the same components. Results from initial work were inconclusive. Changes were made in the composition of the cover fabrics (50/50 cotton/polyester vs. 100% cotton) to be more representative of what is in the marketplace. The results were better but more work needs to be done. INDA's Flammability Task Force is working closely with the Bureau in this area.

Draft standard TB-604 calls for testing of bedding materials either as a component or a composite. As a component, a 3-½ inch to 4-½ inch sample of the actual filling material is placed within a 15" x 15" pillow constructed of washed, unretarded 50/50 cotton/poly material. The sample is then placed on a 14" x 14" x ¼" cement board on an electronic weighing scale. The sample is then subjected to a small open flame at the corner for 20 seconds and the weight loss is recorded every 15 seconds. The test continues until all flaming and smoldering has ceased. As a composite, the same procedure is used except that the cover material would be the same material used in the actual product. The test procedure for pillow filling materials is conducted in a similar fashion and all tests are done in triplicate. A material passes the test if the weight loss of the total sample is under 20% at 6 minutes.

TB-604 is still in draft stage and is open to comment and suggestions. The Bureau intends to have a final standard by early 2004.

Conclusions

- California has been aggressive in setting standards for upholstered furniture, mattresses and bedding materials -- more so than the Federal government.
- The CPSC and California are working closely on an upholstery standard that would be compatible and hopefully, the same. Both will include open flame and smoldering requirements.
- There is a possibility that the California standard for mattresses, TB-603, could become the new Federal Standard, if politics doesn't get in the way.

- The mattress standard, TB-603, does appear to have the support of the Industry and its representative groups.
- Draft standard TB-604 will become the first standard to regulate the flammability of bed clothing, including pillows and padded headboards.
- Considering the contribution of bed clothing to mattress fires, TB-604 should be considered for a Federal standard.

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