



U.S. CONSUMER PRODUCT SAFETY COMMISSION
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TRANSMITTED VIA EMAIL

Mr. Jonathan Lee
ASTM Subcommittee Chair of F15.66 on Crib Mattresses
100 Barr Harbor Dr.
West Conshohocken, PA 19428-2959

Re: Crib mattress standard

Dear Mr. Lee:

At the F15.66 crib mattress subcommittee meeting in May 2018, CPSC staff¹ presented the results of our preliminary evaluation of the crib mattress standard and the crib mattress-related incidents. Based on this review, staff recommended that the subcommittee consider the following four issues:

- Firmness
- Cyclic testing
- Clarifications to the standard
- Compression

Firmness

Although CPSC staff understands that the task group decided to table the firmness issue for now, CPSC staff urges the task group to remain active and continue to evaluate the need for performance requirements for mattress firmness. After considering the issue further, CPSC staff is particularly concerned about memory foam mattresses. Memory foam, a viscoelastic-foam product that is sensitive to pressure and temperature, is used in mattresses because it molds to the shape of an individual's body. Because of its properties, staff concludes that memory foam is inappropriate for infant sleep. Staff's view is supported by published guidance from the

¹ The views or opinions expressed in this letter are solely those of the staff, and these views and opinions do not necessarily represent those of the Commission.

American Academy of Pediatrics (AAP): “A soft sleeping surface (*e.g.*, memory foam) can increase the risk of rebreathing or suffocation”²; and “Soft mattresses, including those made from memory foam, could create a pocket (or indentation) and increase the chance of rebreathing or suffocation if the infant is placed in or rolls over to the prone position.”³ Staff’s concern is that if an infant rolls over, a soft surface that conforms to the face could create a suffocation risk. For this reason, staff believes that memory foam should not be used in crib mattresses, unless and until the subcommittee develops a firmness test to address the hazard of a mattress conforming to the face.

Cyclic testing

Staff understands that the task group is developing cyclic testing methods. Staff looks forward to reviewing the task group’s recommendations. This task group has been making progress, and staff encourages the task group to finalize their recommendations and ballot a proposal for subcommittee consideration at the January 2020 subcommittee meeting.

Clarifications in the standard

CPSC staff recommended several clarifications to incorporate into the standard, shown in Appendix A of our ballot comment letter on ASTM ballot F15 (19-04). These recommendations included incorporating the *ad hoc wording task group* recommendations for warning label format and some other minor clarifications in the standard. This task group is making progress, and we look forward to seeing the changes balloted in the near future.

Compression

At recent subcommittee and task group meetings, CPSC staff discussed incident reports involving mattresses that compress and leave gaps along the edges of the mattresses when the mattresses are covered (*e.g.*, by sheets). The last data set staff shared with the subcommittee (October 2017) contained at least six consumer complaints of mattress compression. Staff is aware of reports from consumers of corner gaps, including one report of head entrapment, and reports of mattresses being compressed by crib mattress sheets/lining. For example, one consumer specified that the gap between the mattress and the crib side grew by approximately 2.5 inches once a fitted sheet was placed on the mattress.⁴

Staff recently completed the additional testing requested by the task group on the mattress discussed in our letter on ballot F15 (19-04). CPSC staff examined a full-size crib mattress and crib,⁵ which the owner claimed had noticeable side and corner gaps (pictured in the F15 (19-04) letter). Staff observed the following:

- Crib and uncompressed crib mattress meet the dimensional requirements of F2933.

² <https://www.aafp.org/afp/2017/0615/p806.html>

³ <https://pediatrics.aappublications.org/content/138/5/e20162938#ref-19>

⁴ Examples of reports of mattress compression: I1280690A, I1340423A, H1380151A, I1280163B, H1340215A, and I1460446A.

⁵ The mattress is composed of natural latex foam with wool, and does not have springs. The crib has a wood frame with a metal, spring-supported base. Both products were purchased new in 2012.

- Crib internal dimensions: 52 1/8" L x 28 3/8" W
- Mattress dimensions: 52" L x 28 3/4" W
- Maximum side and corner gaps varied, based on mattress cover and mattress placement.⁶
 - Maximum side gap varied between 1/2" and 2 1/4".
 - Maximum corner gap varied between 3" and 3 3/8".
 - Maximum side and corner gaps varied depending on whether the mattress was pushed fully to opposing corner versus dropped into the opposing corner, as well as if and how mattress covers were placed onto the mattress (halfway down versus fully around).

Crib Mattress Measurements (inches)						
	No Cover		Cover Halfway		Cover Full	
	Mattress Pushed	Mattress Dropped	Mattress Pushed	Mattress Dropped	Mattress Pushed	Mattress Dropped
Maximum Side Gap	0.5	1	2	2.25	0.75	1.25
Maximum Corner Gap	3	3.125	3.25	3.25	3.375	3.375
<p>"No Cover" - no mattress cover used.</p> <p>"Cover Halfway" - mattress cover went halfway down mattress sides.</p> <p>"Cover Full" - mattress cover fully encompassed mattress sides and corners.</p> <p>"Mattress Pushed" - mattress pushed fully to opposite side or corner of crib from side or corner being measured.</p> <p>"Mattress Dropped" - mattress dropped/slid over crib railing into opposite side or corner of crib from side or corner being measured.</p> <p>Note: Due to flexibility of mattress filling material, mattress dimensions varied based on placement of mattress and placement of sheets. Measurements taken from the crib sides to first point of contact on mattress.</p>						

- Mattress compression from cover was similar to compression per F2933 section 6.2, and the compressed mattress was slightly below the requirement of 5.7.1.1 (51 5/8").
 - Mattress compressed by sheet (halfway): 51 3/8" L x 28 1/8" W
 - Mattress compressed based on F2933 section 6.2: 51 1/2" L x 28 1/2" W

Regarding mattress compression, the subcommittee should consider increasing the amount of force applied per F2933 section 6.2, to account for mattress compression from sheets, whether ill-placed or ill-fitted (e.g., sheets shrunk in the dryer). Staff observed that these forces seemed

⁶ "Maximum gap" refers to the largest space measured between the mattress side or corner and the crib side or corner, respectively, when the mattress rests fully against the opposing side or corner of the crib (i.e., positioning the mattress against the crib side(s) opposite the side(s) being measured). Testing included measuring the maximum side and corner gaps based on the following variables: mattress cover placement (no cover, cover halfway down mattress sides, and cover fully around mattress sides) and mattress placement (mattress pushed fully to opposing side(s) of crib versus mattress dropped/slid over crib railing into opposing side(s) of the crib). Testing was based, in part, on how the owner's housekeepers prepared the crib.

adequate to compress the ticking around the mattress, but we are concerned that the forces do not account for potential compression of foam mattresses. Additionally, staff is concerned that current testing does not account for corner gaps; *i.e.*, current dimensional requirements neglect rounded edges. Staff is aware of reports from consumers about crib mattresses with corner gaps, including one report of head entrapment.⁷

The photo to the right is a re-creation of the entrapment in IDI 100302HCC3396. The subcommittee could consider a probe test, such as the one under consideration by ISO, to identify potentially hazardous corner gaps.



Sincerely,

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for Crib Mattress 104 team

CC: Patricia L. Edwards, CPSC Voluntary Standards Coordinator
Meredith Birkhead, Juvenile Products Manufacturers Association (JPMA)
Molly Lynyak, ASTM International

⁷ IDI 100302HCC3396 - head entrapment in the corner of a crib.