**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MD 20814**

This document has been electronically approved and signed.

**DATE:** September 22, 2021

**BALLOT VOTE SHEET**

**TO:** The Commission
Alberta E. Mills, Secretary

**THROUGH:** Jennifer Sultan, Acting General Counsel
Mary T. Boyle, Executive Director

**FROM:** Daniel R. Vice, Assistant General Counsel, Regulatory Affairs
Mary A. House, Attorney

**SUBJECT:** Final Rule: Safety Standard for Crib Mattresses

BALLOT VOTE DUE Tuesday, September 28, 2021

Staff is forwarding a briefing package to the Commission, recommending that the Commission publish in the *Federal Register* the attached draft final rule to establish a consumer product safety standard for crib mattresses. Pursuant to section 104 of the Consumer Product Safety Improvement Act of 2008 (CPSIA), the draft final rule incorporates by reference the most recent voluntary standard, ASTM F2933-21, *Standard Consumer Safety Specification for Crib Mattresses*, as the mandatory federal safety standard for crib mattresses that fall within the scope of ASTM F2933-21, including full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs. Staff recommends that the final rule include modifications to the voluntary standard to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses.

The draft final rule also amends the consumer registration rule, 16 CFR part 1130, to identify "crib mattresses" as a category of "durable infant or toddler products" subject to part 1130. Finally, the draft final rule amends the Commission's regulation at 16 CFR part 1112 to add "crib mattresses" to the list of products that require third party testing. The Office of the General Counsel is providing the attached draft final rule for the Commission's consideration.

Please indicate your vote on the following options:

I. Approve publication of the attached document in the *Federal Register,* as drafted.

_____ _____
(Signature) (Date)



THIS DOCUMENT HAS NOT BEEN REVIEWED OR ACCEPTED BY THE COMMISSION

CLEARED FOR PUBLIC RELEASE UNDER CPSA 6(b)(1)

II. Approve publication of the attached document in the *Federal Register,* with the specified changes:

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_____ _____

(Signature) (Date)

III. Do not approve publication of the attached document in the *Federal Register*.

_____ _____

(Signature) (Date)

IV. Take other action specified below:

_____

_____

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_____ _____

(Signature) (Date)

Attachment: Draft *Federal Register* Notice: Final Rule to Establish a Safety Standard for Crib Mattresses



THIS DOCUMENT HAS NOT BEEN REVIEWED OR ACCEPTED BY THE COMMISSION

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**Billing Code 6355-01-P**

**CONSUMER PRODUCT SAFETY COMMISSION**

**16 CFR Parts 1112, 1130, and 1241**

**[CPSC Docket No. 2020-0023]**

**Safety Standard for Crib Mattresses**

**AGENCY:** Consumer Product Safety Commission.

**ACTION:** Final rule.

**SUMMARY:** Pursuant to the Consumer Product Safety Improvement Act of 2008 (CPSIA), the U.S. Consumer Product Safety Commission (CPSC) is issuing this final rule establishing a safety standard for crib mattresses, which includes full-size and non-full-size crib mattresses, as well as after-market mattresses for play yards and non-full-size cribs. CPSC is also finalizing an amendment to its regulations regarding third party conformity assessment bodies, to include the safety standard for crib mattresses in the list of notices of requirements (NORs) along with an amendment to the consumer registration rule, to identify crib mattresses as a durable infant or toddler product subject to consumer registration requirements.

**DATES:** This rule will become effective [INSERT DATE 6 MONTHS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. The incorporation by reference of the publication listed in this rule is approved by the Director of the Federal Register as of [INSERT DATE 6 MONTHS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**FOR FURTHER INFORMATION CONTACT**: Justin Jirgl, Compliance Officer, U.S. Consumer Product Safety Commission, 4330 East West Highway, Bethesda, MD 20814; telephone: (301) 504-7814; email: jjirgl@cpsc.gov.

**SUPPLEMENTARY INFORMATION:**

## I. Background and Statutory Authority

### *A. Background*

On June 16, 2015, the president of Keeping Babies Safe (KBS) and the mother of a child who died in an incident involving an after-market play yard mattress, petitioned the CPSC, requesting a ban on supplemental mattresses for play yards with non-rigid sides (petition CP 15-2: Petition Requesting Rulemaking on Supplemental Mattresses for Play Yards with Non-Rigid Sides). The petitioner alleged that "thicker mattresses create a suffocation hazard because they create a gap between the mattress pad sides and the side of the portable crib where a baby can suffocate when the baby's head falls in such gap while lying in the prone position." Petitioner asserted that "no feasible consumer product safety standard would adequately protect babies from the unreasonable risk of injury and death associated with the product."

CPSC staff prepared a briefing package for the petition, recommending that the Commission defer action on the petition, so that staff could work on voluntary standards for crib mattresses and play yards to address the hazards identified in the petition. Staff noted that any work on the play yard voluntary standard could become a mandatory standard through the Pub. L. No. 112-28 update process, because the Commission has an existing mandatory standard for play yards (16 CFR part 1221); however, any changes to the crib mattress voluntary standard would remain a voluntary standard, because the Commission does not have a mandatory rule for crib mattresses.

On May 25, 2017, in response to the petition request and staff's recommendation to defer the petition, the Commission voted[1] (3-2) to "take other action" and granted the petition, directing staff to: (1) initiate a rulemaking under section 104 of the CPSIA for a mandatory consumer product safety standard that will address the risk of injury associated with the use of crib mattresses; (2)

[1] https://www.cpsc.gov/s3fs-public/RCA-Petition_CP_15-2_Requesting_Ban_on_Supplemental_Mattresses_for_Play_Yards_with_Non-Rigid_Sides_052517.pdf

include "supplemental and aftermarket mattresses used in play yards and portable cribs" [2] within the scope of the crib mattress rulemaking; and (3) update the product registration card rule (16 CFR part 1130) to include "crib mattresses" in the list of durable infant or toddler products subject to the rule.

On October 26, 2020, the Commission issued a notice of proposed rulemaking (NPR) under section 104 of the CPSIA, proposing a mandatory consumer product safety standard for crib mattresses, based on ASTM F2933-19, *Standard Consumer Safety Specification for Crib Mattresses* (ASTM F2933-19), with five modifications, to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses.[3] 85 FR 67906. The Commission is finalizing the rule by incorporating by reference the most recent voluntary standard for crib mattresses, ASTM F2933-21, with modifications substantially as proposed in the NPR, to further reduce the risk of injury to children associated with crib mattresses.

*B. Statutory Authority*

Section 104(b) of the CPSIA requires the Commission to: (1) examine and assess the effectiveness of voluntary consumer product safety standards for durable infant or toddler products, in consultation with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts; and (2) promulgate consumer product safety standards for durable infant or toddler products. 15 U.S.C. 2056a(b). Standards issued under

[2] Although the petitioner used the term "supplemental mattress," ASTM F2933-21 uses and defines the term "after-market" mattress. Both terms refer to a mattress that is bought separately from a play yard or non-full-size crib. Like the NPR, the final rule will use the defined term "after-market" mattress. Section 3.1.1 of ASTM F2933-21 defines an "after-market mattress for a play yard or non-full-size crib" as "a mattress sold or distributed for a play yard or non-full-sized crib." Section 3.1.1.1 of ASTM F2933-21 states that the definition does not include a replacement mattress sold by an original equipment manufacturer as a replacement, if it is equivalent to the mattress originally provided with the product.

[3] Previously, on November 21, 2016, the Commission issued an NPR for a Safety Standard for Portable Generators, proposing to codify the standard at 16 CFR part 1241. 81 FR 83556. The Commission is reusing part 1241 for this final rule for a Safety Standard for Crib Mattresses, to keep all regulations for durable infant or toddler products in one section of the Code of Federal Regulations (CFR). The Commission intends to renumber the CFR citation for portable generators when that rulemaking is finalized.

section 104 are to be "substantially the same as" the applicable voluntary standards, or more stringent than the voluntary standard, if the Commission determines that more stringent requirements would further reduce the risk of injury associated with the product. *Id*. at 2056a(b)(1)(B).

Regarding the consultation requirement in section 104(b)(1) of the CPSIA, CPSC staff regularly participates in the juvenile products subcommittee meetings of ASTM International (ASTM). ASTM subcommittees consist of members who represent producers, users, consumers, government, and academia.[4] The consultation process for the crib mattresses rulemaking commenced during the ASTM subcommittee meeting in May 2018, when CPSC staff presented initial recommendations for updating the crib mattress voluntary standard to address the incident data. Since then, staff has actively participated with the ASTM F15.66 subcommittee for Crib Mattresses in revising ASTM F2933, *Standard Consumer Safety Specification for Crib Mattresses*, to address the associated hazards.[5]

Section 104(d) of the CPSIA requires manufacturers of durable infant or toddler products to establish a product registration program and comply with CPSC's implementing rule, 16 CFR part 1130. Any product defined as a "durable infant or toddler product" in part 1130 must comply with the product registration requirements, as well as testing and certification requirements for children's products, as codified in 16 CFR parts 1107 and 1109. Section 104(f)(1) of the CPSIA defines a "durable infant or toddler product" as a "durable product intended for use, or that may be reasonably expected to be used, by children under the age of 5 years." 15 U.S.C. 2056a(f)(1). Section 104(f)(2) of the CPSIA includes a list of categories of products that are durable infant or

[4] ASTM International website: www.astm.org, About ASTM International.
[5] The docket for this rulemaking on Regulations.gov contains meeting logs for all CPSC staff-attended ASTM meetings related to the crib mattresses voluntary standard that occurred between issuance of the NPR and completing this final rule. CPSC's Division of the Secretariat maintains all other CPSC staff-attended meetings with outside stakeholders related to crib mattresses.

toddler products, including products used for infant sleep, such as cribs (full-size and non-full-size), toddler beds, bassinets and cradles, and play yards. *Id*. 2056a(f)(2).

Although crib mattresses are used with products for infant sleep, crib mattresses are not included in the statutory list of durable infant or toddler products. This final rule amends part 1130 to include "crib mattresses" within the scope of ASTM F2933 as durable infant or toddler products, as proposed in the NPR, because: (1) they are intended for use, and may be reasonably expected to be used, by children under the age of 5 years; (2) they are products similar to the products listed in section 104(f)(2) of the CPSIA; (3) they are used in conjunction with other durable infant or toddler products used for infant sleep, such as cribs and play yards; and (4) CPSC cannot fully address the risk of injury associated with products for infant sleep without addressing the hazards associated with the use of crib mattresses.

Finally, products subject to a consumer product safety rule under the CPSA must be certified as complying with all applicable CPSC-enforced requirements, based on testing conducted by a CPSC-accepted third party conformity assessment body. 15 U.S.C. 2063(a). The Commission must publish an NOR for the accreditation of third party conformity assessment bodies to assess conformity with a children's product safety rule to which a children's product is subject. *Id.* 2063(a)(3). Accordingly, we now finalize an amendment to part 1112, as proposed in the NPR, to add the new *Safety Standard for Crib Mattresses*, 16 CFR part 1241, to the list of NORs for children's product safety rules. The amendment allows test laboratories applying for CPSC acceptance to seek accreditation to test crib mattresses within the scope of the rule.

*C. NPR*[6]

On October 26, 2020, the Commission issued an NPR under section 104 of the CPSIA, proposing a mandatory consumer product safety standard for crib mattresses, based on ASTM F2933-19, *Standard Consumer Safety Specification for Crib Mattresses* (ASTM F2933-19), with five modifications, to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses. 85 FR 67906. The scope of the NPR included "crib mattresses" within the scope of the voluntary standard for crib mattresses: full-size crib mattresses, non-full-size mattresses, and after-market mattresses for play yards and non-full-size crib mattresses.

The five proposed modifications to the voluntary standard in the NPR addressed the following hazards: (1) suffocation hazards associated with crib mattresses, due to overly soft mattresses, by adding a test for mattress firmness based on sections 6 and 8 of A*S/NZS 8811.1:2013 – Methods of testing infant products – Method 1: Sleep Surfaces – Test* (AS/NZS 8811.1); (2) entrapment hazards associated with full-size crib mattresses, due to poor mattress fit from compression by sheets, by repeating the dimensional conformity test and measuring for corner gaps, after installing a shrunken (by washing twice) cotton sheet; (3) entrapment hazards associated with after-market, non-full-size crib mattresses, due to lack of dimensional requirements for rectangular-shaped products, by extending the dimensional requirements in ASTM F2933-19 section 5.7.2 to all non-full-size crib mattresses, regardless of mattress shape, and regardless of whether the mattress is sold with a non-full-size crib or as an after-market mattress; (4) laceration hazards associated with coils and springs breaking and poking through mattresses, by adding a cyclic impact test for mattresses that use coils and springs; and (5) the risks of SIDS and suffocation related to infant

[6] The NPR was based on information provided in the September 30, 2020, Staff Briefing Package: Draft Notice of Proposed Rulemaking for Crib Mattresses Under the Danny Keysar Child Product Safety Notification Act (Staff's NPR Briefing Package), available at: https://www.cpsc.gov/s3fs-public/Notice-of-Proposed-Rulemaking-Safety-Standard-for-Crib-Mattresses.pdf?mDLf.MBLutFluwt6QFjeZRhYdNLFRR.J. This final rule also relies on information in Staff's NPR Briefing Package.

positioning, soft bedding, and gap entrapment, by improving the labeling and instructional literature requirements to communicate risks better to consumers, and to clarify requirements for manufacturers and test labs.

In the NPR, the Commission also proposed to amend the consumer registration rule, part 1130, to identify "crib mattresses" as a category of "durable infant or toddler products" subject to the consumer registration rule and testing and certification as a children's product. Finally, the Commission proposed to amend its regulation at 16 CFR part 1112 to add "crib mattresses" to the list of products that require third party testing as a basis for certification.

*D. Update to ASTM F2933*

Since the publication of the NPR, ASTM revised F2933-19 and published ASTM F2933-21. Like ASTM F2933-19, ASTM F2933-21 provides performance and labeling standards for "crib mattresses" intended for full-size cribs, non-full-size cribs, after-market mattresses for play yards, and after-market mattresses for non-full-size cribs. ASTM F2933-21 updates the requirements for after-market play yard and non-full-size crib mattresses as follows:

- Replaces requirement that "aftermarket mattresses for soft-sided and non-rectangular, rigid-sided products shall have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace" with: (1) a requirement to test to specific sections in ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards*, including: *Stability*; *Cord/Strap Length*; *Mattress*; *Mattresses for Rigid-Sided Products*; *Crib Side Height*; *Height of Sides*; *Floor Strength*; and *Mattress Vertical Displacement*, when tested in the product it was designed for or intended to fit; (2) a requirement that the after-market mattress must be at least the same size as the original equipment mattress, so long as it lays flat on the support structure; and (3) a requirement that the after-market mattress floor support structure be at least as thick as the original equipment mattress floor support structure. These revisions allow play yard mattresses that

may be thicker than what is provided by the original equipment manufacturer, but still limit such mattresses to a maximum of 1-½ inches, as required by ASTM F406.

- Adds requirement specifying that after-market mattresses must have equivalent storage accommodations for instructions as the original equipment mattress.

We assess the revisions to the voluntary standard in section V.B of this preamble. Although the revisions in ASTM F2933-21 improve the safety of crib mattresses, by improving requirements for after-market mattresses for play yards and non-full-size cribs, ASTM's revised voluntary standard does not address all of the hazards identified in the NPR.[7]

*E. Final Rule Overview*

The Commission is finalizing the rule for crib mattresses by incorporating by reference the most recent version of the voluntary standard, ASTM F2933-21, with the five modifications described in section I.C of this preamble, to make the standard more stringent. However, based on comments on the NPR, and staff's continued work with the ASTM subcommittee on crib mattresses, the final rule contains the following clarifications from the NPR:

- Fitted Sheet Test Procedure for Full-Size Crib Mattresses – The final rule improves the test method proposed in the NPR for the fitted sheet test, by measuring corner gaps from a projected crib corner, to accommodate crib mattresses with larger dimensions while maintaining test veracity;

- Cyclic Impact Test Procedure – The final rule clarifies the test method, by requiring the use of two different mattresses for testing each side of a mattress sleep surface, to address the potential for testing to be destructive; and

[7] *See* Tab C of Staff's Final Rule Briefing Package.

- Safety Information – The final rule modifies the requirements for on-product and package labeling, to include important clarifications, and to communicate better to consumers the risks and preventative actions related to SIDS and suffocation.[8]

Section VI of this preamble contains additional discussion and assessment of the revisions to the voluntary standard, and section VIII of this preamble describes the final rule in more detail. This final rule is based on information provided in the September 29, 2021, Draft Final Rule for Crib Mattresses Under the Danny Keysar Child Product Safety Notification Act (Staff's Final Rule Briefing Package), available at: [insert URL].

## II. Product Description

### *A. Scope of Products Within the Final Rule*[9]

The scope of the final rule includes all crib mattresses[10] within the scope of ASTM F2933-21, which addresses three types of crib mattresses:

*1. Full-size crib mattresses* – Full-size crib mattresses within the scope of the final rule are typically sold separately from the crib in which they are intended to be used. Industry refers to full-size crib mattresses as "standard" crib mattresses. Full-size crib mattresses are also used for toddler beds, meaning that one full-size crib mattress may be used from birth through the toddler years. The fit of a crib mattress inside of a crib is key to preventing infants from becoming trapped between the side of the crib and the mattress, and suffocating. Accordingly, section 5.7 of ASTM F2933-21 requires that the dimensions of a full-size crib mattress shall measure at least 27-¼ in. wide and 51-5/8 in. long. The interior dimensions of full-size cribs are 28 ± 5⁄8 in. (710 ± 16 mm)

[8] *See* Tab D, Appendix A of Staff's Final Rule Briefing Package.
[9] *See* Staff's Final Rule Briefing Package at Tab C for additional information on the scope of ASTM F2933-21.
[10] Section 3.1.4 of ASTM F2933-21 defines a "crib" as a "bed that is designed to provide sleeping accommodations for an infant which have specific interior dimensions as determined by it being either a full size or non-full size crib." Section 3.1.5 of ASTM F2933-21 defines a "mattress" as "ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping on it."

wide and 52 3⁄8 ± 5⁄8 in. (1330 ± 16 mm) long. Full-size crib mattresses come in a variety of designs and are made of a broad array of materials. Full-size crib mattresses typically have a fabric or vinyl ticking, which covers innerspring coils or foam. Innerspring mattresses often have a layer of foam or batting between the springs and the ticking.

2. *Non-full-size crib mattresses* – Non-full-size cribs are cribs that differ in dimension or shape from "standard" full-size cribs. The final rule addresses all non-full-size crib mattresses, regardless of whether they are sold separately (after-market), or are sold with a non-full-size crib (referred to as "original equipment manufactured mattresses" or "OEM" mattresses), and regardless of whether they are rectangular or non-rectangular in shape.[11] Because non-full-size cribs do not come in a standard size, non-full-size crib mattresses do not have defined dimensions. Rather, each non-full-size crib is required to be sold with a properly fitting OEM mattress that meets the performance requirements in ASTM F406. Accordingly, for mattresses that are sold separately from the product and meant to replace OEM mattresses (after-market mattresses), ASTM F2933-21 sets a minimum effective crib-side height for non-full-size cribs and a maximum gap between the mattress edge and the crib side.[12] Section 5.7.2.1 of ASTM F2933-21 requires that the dimensions of a mattress supplied with a non-full-size baby crib shall be such that the mattress, when inserted in the center of the crib, in a non-compressed state, shall not leave a gap of more than ½ in. at any point between the perimeter of the mattress and the perimeter of the crib. Currently, section 5.9 of ASTM F2933-21 requires that after-market, non-rectangular, non-full-size crib mattresses meet the same performance requirements in ASTM F406 as the non-full-size crib mattresses they are

[11] We note that OEM non-full-size crib mattresses are also addressed in the Commission's mandatory rule for non-full-size cribs, 16 CFR part 1220, which incorporates by reference ASTM F406. The requirements in F406 for OEM non-full-size crib mattresses are the same requirements that appear in ASTM F2933 section 5.7.

[12] The most common rectangular, non-full-size crib mattress available for sale in the U.S. crib mattress market is the "mini" crib mattress. The mini crib mattress is smaller than the so-called "standard" or full-size crib mattress. The typical size of a "mini" crib mattress is 24" wide and 38" long. The depth of a "mini" crib mattress varies, but typically ranges from 1" to 6."

intended to replace; and furthermore, section 5.9 requires after-market, non-rectangular, non-full-size crib mattresses to have labeling identifying the "brand(s) and Model(s) numbers of products in which it is intended to be used," but only requires warning labels regarding dimensions on after-market, rectangular-shaped, non-full-size crib mattresses. The final rule extends the ASTM F406 performance requirements for mattresses sold with a non-full-size crib to all non-full-size crib mattresses, including OEMs, after-market, non-rectangular, and rectangular non-full-size crib mattresses.

*3. After-market mattresses for play yards* – After-market mattresses are products sold separately from a play yard,[2] and that are not sold by the OEM as a replacement mattress for their product. Pursuant to CPSC's mandatory rule for play yards, part 1221, which incorporates by reference ASTM F406-19, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards* (ASTM F406), all play yards must be sold with a mattress that is specifically designed to fit that product. Part 1221 regulates OEM play yard mattresses, but does not address after-market play yard mattresses. The final rule for crib mattresses addresses after-market mattresses for play yards, as set forth in ASTM F2933-21 section 5.9, by requiring that they meet the same specifications and performance requirements for OEM play yard mattresses in ASTM F406, as well as additional requirements for the after-market mattress fit, support structure, and instruction storage accommodations. Additionally, the final rule requires that after-market mattresses intended for use in the bassinet of a play yard with a bassinet attachment must also meet the specifications in ASTM F2194, *Consumer Safety Specifications for Bassinets and Cradles*.

*B. Market Description*[13]

Crib mattresses are designed to be used with products, such as full-size cribs, non-full-size cribs, bassinets and cradles, and play yards, intended to provide sleeping accommodations for an infant. According to estimates published by Statista-Grand View Research, the size of the U.S. market for standard and portable cribs was $86.8 million in 2018.[14] Currently, staff estimates that there are more than 300 crib mattress models available in the market.[15] According to data collected by staff, approximately 75 percent of crib mattresses available for sale in the United States are standard (full-size) crib mattresses. Crib mattresses range in price from $20 to $500, with the more expensive crib mattresses typically being full-size crib mattresses with a firm coil or high-end foam core. The average cost of a crib mattress available for sale in the United States is $150.[16] For consumers with limited income, smaller, less-expensive crib mattresses may appear to be a suitable alternative to higher-priced, full-size crib mattresses.

CPSC staff estimates that there are currently at least 32 domestic manufacturers or importers supplying crib mattresses to the U.S. market; 19 are domestic manufacturers, and 13 are domestic importers. In addition, six foreign companies distribute crib mattresses to the United States.[17] Among the 38 firms identified, roughly half are members of the Juvenile Products Manufacturers Association (JPMA), the major U.S. trade association that represents juvenile product manufacturers and importers. Many domestic suppliers of crib mattress are also members of ASTM. The typical manufacturer or importer of crib mattresses carries on average 10 mattress models. While some manufacturers produce a large variety of crib mattress models, others produce only a small selection of one or two models. The majority of domestic manufacturers of crib

[13] *See* Staff's Final Rule Briefing Package at Tab E for additional information on the marketing and use of crib mattresses.
[14] November 2019 Statista estimates, Grand View Research.
[15] Based on staff's compiled search results of data available on the internet, April-June 2021.
[16] Price estimated from data available on the internet, collected between April-June 2021.
[17] Determinations were made using information from Dun & Bradstreet, as well as from websites.

mattresses are considered small businesses, according to U.S. Small Business Administration (SBA) guidelines, and many of these small firms are JPMA or ASTM members.

This mandatory rule for crib mattresses will require not only third party testing for conformance to the new crib mattress rule, 16 CFR part 1241, but also a certificate of compliance. Crib mattresses already require third party testing and certification, because crib mattresses are already defined as "children's products," and are currently subject to various other federal safety rules, such as mattress flammability, lead, and phthalate testing. Accordingly, a final rule for crib mattresses will incrementally increase the amount of crib mattress testing and certification requirements already in place.

### *C. Crib Mattress Use*[14]

Based on information from the 2013 CPSC Durable Nursery Products Exposure Survey (DNPES) of U.S. households with children under 6 years old, an estimated 9.2 million cribs were in use in households with young children in 2013.[18] This represented about 73 percent of the estimated 12.6 million total cribs owned by households (*i.e.*, about 3.4 million cribs were owned, but not in use). Cribs, for the purposes of the DNPES, included both full-size and non-full-size cribs, which are designed to be used with a crib mattress. Therefore, staff estimates at least 9.2 million (full-size and non-full-size) crib mattresses were in use in 2013.[19] According to DNPES results, 84 percent of respondents indicated they used a fitted sheet on the crib mattresses, and 50 percent indicated they used a mattress pad. Six percent of respondents indicated that nothing was

[18] Respondents were asked to include in their count of cribs owned, cribs that had been converted into toddler beds; but they were instructed to include only the time used in the product *as a crib,* in response to use questions.
[19] In addition to the products in use in households with young children, as estimated from the survey, cribs and crib mattresses are probably in use in some households without young children (*e.g.*, un-surveyed homes of older adults providing care for grandchildren).

placed under the child in the crib, other than the intended mattress, indicating that the crib mattress was used bare.

According to the same survey, an estimated 5.8 million play yards were in use in households with young children. This represented about 54 percent of the estimated 10.9 million total play yards owned by households (*i.e.*, about 5.1 million play yards were owned, but not in use). Most play yards are designed to be used with a play yard mattress; therefore, staff estimates at least 5.8 million play yard mattresses were in use in 2013. Twenty-five percent of respondents indicated that nothing was placed under the child in the play yard, other than the intended mattress; 12 percent indicated they used a mattress pad, but no respondents indicated that they used a fitted sheet.

The DNPES did not cover child care facilities. One child care industry group's 2018 directory[20] lists more than 115,000 licensed child care centers and more than 137,000 home daycare providers, some of which may use crib or play yard mattresses. Furthermore, the survey did not cover hotels or other commercial lodging establishments. The U.S. Bureau of Labor Statistics (BLS) reports that there are about 70,000 lodging establishments in the accommodation industry sector, North American Industry Classification System (NAICS) code 721.[21] Based on the Commission's contacts with child care and lodging facilities, crib, play yard, and crib mattresses are commonly used in such establishments.[22]

## III. Incident Data and Hazard Patterns[23]

In the NPR, the Commission discussed a total of 439 incidents associated with crib mattresses, including 116 reported fatalities and 323 reported nonfatal incidents or concerns, occurring from January 1, 2010 to March 31, 2020. Since that data extraction, CPSC staff

[20] Child Care Center estimate of entire United States (2018, April 27). http://childcarecener.us/.
[21] U.S. Bureau of Labor Statistics, "Quarterly Census of Employment and Wages," April 2018. http://www.bls.gov/iag/tgs/iag721.htm.
[22] Staff contacts included phone inquiries with day care and hotel establishments.
[23] *See* Staff's Final Rule Briefing Package at Tab B, for additional information on staff's review of crib mattress incidents.

identified an additional 55 incidents entered into the CPSRMS and the NEISS databases from April 1, 2020 to April 30, 2021, including 23 reported fatalities and 32 reported nonfatal incidents or concerns associated with crib mattresses. Accordingly, for the final rule, the Commission is aware of 494 reports associated with a crib mattress, including 139 fatalities and 355 nonfatalities reported from January 1, 2010 through April 30, 2021.[24]

CPSC staff identified 21 NEISS cases associated with a crib mattress in the NPR, and zero NEISS cases received during the update between April 1, 2020 and April 30, 2021. Because the data did not meet the minimum criteria for reporting an estimate,[25] the Commission includes the 19 NEISS injuries and two NEISS fatalities with the rest of the reported incident data described in this final rule.

Table 1 presents hazard categories for all incidents reported from January 1, 2010 through April 30, 2021. Since the NPR, CPSC received 11 reported fatalities[26] involving crib mattress fit issues, and 19 reports of nonfatal incidents involving mattresses that are considered too soft.[27] Generally, the cause of death in reports describing a fatal incident stated the death to be caused by asphyxia, suffocation, or SIDS. CPSC staff categorized the fatal and nonfatal reports into hazard scenarios based on the best available information.

[24] Of the 494 reports, 21 were from the NEISS.
[25] NEISS estimates are reportable, provided the sample count is greater than 20, the national estimate is 1,200 or greater, and the coefficient of variation (CV) is less than 0.33.
[26] None of the fatal incident reports stated that the fatality had a witness. Thus, each case involves some degree of speculation as to how the incident occurred. Incident details are often vague concerning how the infant was positioned when initially found and what additional items present in the crib environment may have contributed to the fatality. Some incidents have conflicting reports from multiple sources describing the details of the incident.
[27] Staff initially extracted incident reports and NEISS injury cases using nine product codes, with no other restrictions on the extraction criteria. Staff then reviewed each record to determine whether a report was associated with a crib mattress. Staff searched the following product codes: *playpens and play yards* (1513), *portable cribs* (1529), *bassinets or cradles* (1537), *baby mattresses or pads* (1542), *cribs, nonportable* (1543), *cribs, not specified* (1545), *mattresses, not specified* (4010*), toddler beds* (4082), and a catch-all product code 9101. As in the data extraction for the NPR, some of the nonfatal reports described concerns about potential hazards associated with a crib mattress, without an actual incident occurring.

**Table 1: Fatal and Nonfatal Reports Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 (Reported Incidents in the NPR) | | April 1, 2020 – April 30, 2021 (Reported Incidents since the NPR) | | January 1, 2010 – April 30, 2021 |
|---|---|---|---|---|---|
| Hazard Category | Fatal Reports | Nonfatal Reports | Fatal Reports | Nonfatal Reports | **Total Reports** |
| Chemical/Flammability | 0 | 23 | 0 | 3 | **26** |
| Coil or Spring | 0 | 124 | 0 | 4 | **128** |
| Crib Mattress Used in a Play Yard | 2 | 1 | 0 | 1 | **4** |
| Expand or Inflate | 0 | 6 | 0 | 0 | **6** |
| Face in Mattress | 13 | 1 | 3 | 0 | **17** |
| Fit Issues | 20 | 88 | 11 | 3 | **122** |
| Found Prone | 66 | 3 | 9 | 0 | **78** |
| Mattress Falls Apart | 0 | 18 | 0 | 0 | **18** |
| Softness | 0 | 36 | 0 | 19 | **55** |
| Multiple Contributing Factors (MCF) | 15 | 17 | 0 | 2 | **34** |
| Other | 0 | 6 | 0 | 0 | **6** |
| **Total Reports** | **116** | **323** | **23** | **32** | **494** |

*Source:* CPSRMS and NEISS databases. Reporting is ongoing; so 2019–2021 data are incomplete.

Table 2 presents the year of incident or death of the reported cases, for the incidents reported in the NPR and incidents reported since the NPR. Since the NPR, deaths continue to be reported in the most recent years, 2018 and 2019, even when there is typically an approximate 2-year time lag in complete reporting of deaths to CPSC. The NPR stated that 13 deaths were reported to have occurred in 2018, and 4 deaths in 2019. Since the NPR, 15 and 17 deaths were reported to have occurred in the years 2018 and 2019, respectively.

**Table 2: Reports Associated with Crib Mattresses by Year of Incident and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 (Reported Incidents in the NPR) | | April 1, 2020 – April 30, 2021 (Reported Incidents since the NPR) | | January 1, 2010 – April 30, 2021 (Total Reports) | |
|---|---|---|---|---|---|---|
| Year of Incident or Death | Fatal Reports | Nonfatal Reports | Fatal Reports[28] | Nonfatal Reports | **Total Fatal Reports** | **Total Nonfatal** |
| 2010 | 20 | 43 | 0 | 0 | **20** | **43** |
| 2011 | 11 | 19 | 0 | 0 | **11** | **19** |
| 2012 | 4 | 27 | 0 | 0 | **4** | **27** |
| 2013 | 7 | 31 | 0 | 0 | **7** | **31** |
| 2014 | 13 | 28 | 0 | 0 | **13** | **28** |
| 2015 | 11 | 34 | 0 | 0 | **11** | **34** |
| 2016 | 8 | 40 | 1 | 0 | **9** | **40** |
| 2017 | 25 | 48 | 0 | 0 | **25** | **48** |
| 2018 | 13 | 33 | 2 | 0 | **15** | **33** |
| 2019 | 4 | 18 | 13 | 2 | **17** | **20** |
| 2020 | 0 | 2 | 6 | 19 | **6** | **21** |
| 2021 | 0 | 0 | 1 | 11 | **1** | **11** |
| **Total Reports** | **116** | **323** | **23** | **32** | **139** | **355** |

*Source:* CPSRMS and NEISS databases. Reporting is ongoing; so 2019–2021 data are incomplete.

### *A. Fatal Reports*

CPSC is aware of 139 reported deaths associated with crib mattresses that were reported to have occurred between January 1, 2010 and April 30, 2021. Table 3 presents hazard categories for these reported fatalities.

**Table 3: Reported Fatalities Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 | April 1, 2020 – April 30, 2021 | January 1, 2010 – April 30, 2021 |
|---|---|---|---|
| Hazard Category | Reported Incidents in the NPR | Reported Incidents since the NPR | **Total Fatal Reports** |
| Crib Mattress Used in a Play Yard | 2 | 0 | **2** |
| Face in Mattress | 13 | 3 | **16** |
| Fit Issues | 20 | 11 | **31** |
| Found Prone | 66 | 9 | **75** |
| Multiple Contributing Factors (MCF) | 15 | 0 | **15** |
| **Total Reports** | **116** | **23** | **139** |

*Source:* CPSRMS and NEISS databases. Reporting is ongoing; so 2019–2021 data are incomplete.

[28] CPSC received a death certificate for one fatality in September 2017, and subsequently, CPSC investigated this incident. However, staff did not receive the investigation information until November 2020.

Below, we describe the hazard patterns involving a fatality associated with a crib mattress.

1. *Crib Mattress Used in a Play Yard*: One percent of the fatalities involved use of a crib mattress in a play yard (2 out of 139). Reports state that infants were found wedged between the crib mattress and the mesh of the play yard, due to the crib mattress not fitting snugly in the play yard.

2. *Face in Mattress*: Twelve percent (16 out of 139) of fatalities were associated with the face of an infant, when found, reportedly in contact with a crib mattress or crib sheet covering the crib mattress. Based on the available information about each fatality, bedding was present in the sleeping environment in some of these reports. However, bedding was not touching the infant, nor did staff determine that the bedding was a contributing factor in the death.

3. *Fit Issues*: Twenty-two percent (31 out of 139) of fatalities involved issues with the fit of a crib mattress in the sleeping environment. In all of these fatalities, the infants became wedged in gaps between at least one of the sides of a crib mattress and the crib rails or play yard mesh.

4. *Found Prone*: Fifty-four percent (75 out of 139) of fatalities involved an infant found in a prone position with no mention of whether the face of the child was in contact with the crib mattress or crib sheet, and no mention of the face being obstructed by other crib bedding, or other items in the sleep environment. Given the available information about each fatality, bedding was present in the sleeping environment in some of these reports, but staff was unable to determine that bedding was a contributing factor in the deaths.

5. *Multiple Contributing Factors (MCF)*: Eleven percent (15 out of 139) of fatalities involved multiple factors that potentially played a role in the fatality, and the crib mattress was likely one of the contributing factors. Examples of other contributing factors are entrapment between the mattress and bumper pads, entrapment between the mattress and a crib rail with limb entrapment, usage of a swaddle, sharing of the sleep environment with another infant, and

congenital or recent health conditions.

The oldest fatalities were: two, 3-year-old, and two, 2-year-old children. CPSC observed considerably more reported prone fatalities between the ages of 1-month-old and 5-months-old, and most of the deaths in the fit, face in mattress, and MCF hazard categories involved infants between the ages of 1-month-old and 8-months-old, compared to other ages. Among the 23 deaths reported since the NPR, 19 were to infants 8 months old or younger, and the remainder included one 11-month-old, one 12-month-old, one 21-month-old, and one 38-month-old.

*B. Reported Nonfatal Incidents and Concerns*

CPSC is aware of 355 reported nonfatal incidents and concerns associated with crib mattresses that were reported to have occurred between January 1, 2010 and April 30, 2021. Table 4 presents the hazard categories associated with these reported nonfatal crib mattress incidents.

**Table 4: Nonfatal Reports Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010 – April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 | April 1, 2020 – April 30, 2021 | January 1, 2010 – April 30, 2021 |
|---|---|---|---|
| Hazard Category | Reported Incidents in the NPR | Reported Incidents since the NPR | **Total Nonfatal Reports** |
| Chemical/Flammability | 23 | 3 | **26** |
| Coil or Spring | 124 | 4 | **128** |
| Crib Mattress Used in a Play Yard | 1 | 1 | **2** |
| Expand or Inflate | 6 | 0 | **6** |
| Face in Mattress | 1 | 0 | **1** |
| Fit Issues | 88 | 3 | **91** |
| Found Prone | 3 | 0 | **3** |
| Mattress Falls Apart | 18 | 0 | **18** |
| Softness | 36 | 19 | **55** |
| Multiple Contributing Factors (MCF) | 17 | 2 | **19** |
| Other | 6 | 0 | **6** |
| **Total Reports** | **323** | **32** | **355** |

*Source:* CPSRMS and NEISS databases. Reporting is ongoing; so 2019–2021 data are incomplete.

1. *Chemical/Flammability*: Seven percent (26 out of 355) of the nonfatal incidents reported a crib mattress having a chemical odor (6), causing rashes (8), developing severe allergies (1), or not meeting mandatory federal flammability standards (11). Three of these 26 incidents were

reported between April 1, 2020 and April 30, 2021. Among these three incidents, two involved emergency department treatment from rashes or allergy symptoms, and one incident mentions headaches from foul odor with unspecified severity.

2. *Coil or Spring*: Thirty-six percent (128 out of 355) of nonfatal incidents involved a coil or spring found protruding through the crib mattress. Four of these 128 incidents were reported between April 1, 2020 and April 30, 2021. Among these four incidents, one involved a knee laceration with the level of care not known, and the other three incidents reported an incident with no injury.

3. *Crib Mattress Used in a Play Yard*: One percent (2 out of 355) of nonfatal incidents involved a crib mattress being used in a play yard. One of these two incidents was reported between April 1, 2020 and April 30, 2021. In the one new incident, a child had an arm become entrapped on the side or under the mattress.

4. *Expand or Inflate*: Two percent (6 out of 355) of nonfatal incidents involved a crib mattress that failed to expand or inflate properly. None of these six incidents were reported between April 1, 2020 and April 30, 2021. CPSC identified related hazards, including fit issues with gaps appearing around the crib mattress causing entrapment or wedging, and an uneven crib mattress that may cause an infant to roll over.

5. *Face in Mattress*: Less than 1 percent (1 out of 355) of nonfatal incidents involved an infant found limp, pale, and with blue around the lips while face down in contact with a crib mattress. CPSC staff found no other details about the sleep environment in this incident involving a 1-month-old infant who was admitted to the hospital. This incident was reported in the NPR data set.

6. *Fit Issue*: Twenty-six percent (91 out of 355) of nonfatal incidents involved issues with the fit of a crib mattress in the sleeping environment, three of which were reported between

April 1, 2020 and April 30, 2021. Among these three incidents, one child was treated in the emergency department after falling out of the crib due to a mattress that was too thick; one child received marks on the face due to entrapment issues with an unknown level of treatment; and one incident occurred with no injury reported. In all of these reports, staff determined that gaps were present on one or more sides around the perimeter of a crib mattress, creating wedging or entrapment hazard between the crib mattress and the crib rails or play yard mesh.

7. *Found Prone*: One percent (3 out of 355) of nonfatal incidents involved an infant found in a prone position without any mention of the face being in contact with the mattress or crib sheet, and no mention of the face being obstructed by other crib bedding or other items in the sleep environment. Staff found no other details about the sleep environment in any of these three reported incidents. None of these three incidents were reported between April 1, 2020 and April 30, 2021.

8. *Mattress Falls Apart*: Five percent (18 out of 355) of nonfatal incidents involved part of a crib mattress coming apart. In most of these reports, the seams of the mattress unraveled, causing: a strangulation hazard due to the stitching of the mattress being exposed; and a choking or ingestion hazard due to the inner filling coming out of the mattress in small pieces and into the sleep environment. Examples of reported small pieces of a crib mattress filling that came apart are fibers, string, or wool. Staff found that in six incidents, string from crib mattress seams or piping was found wrapped around the neck of the infant, which could have led to a serious outcome if the child was not found in time. One incident involved an infant choking on a plastic piece of "shredded" crib mattress, and one incident involved a child who was treated and released from the hospital emergency department due to ingesting plastic pieces of a crib mattress. None of these 18 incidents were reported between April 1, 2020 and April 30, 2021.

9. *Softness*: Fifteen percent (55 out of 355) of nonfatal incidents involved a crib mattress inner cushioning that was reportedly too soft. CPSC staff found 33 reports of depressions

or indentations in the crib mattress, accompanied by the following descriptions: "bunches up/squishy," "dent/depression/dips/indentation/sags/sinks in/smashed/sunken," and "deflates/like an air mattress not fully inflated." Twelve reports describe a crib sheet being placed on a crib mattress and causing the mattress to bend or bow, resulting in a gap or fit issue between the mattress and crib rails, creating an entrapment hazard. Four reports claim that a crib mattress is not breathable. Six reports allege that a crib mattress is too thin and that the inner cushioning is too soft. Of these 55 incidents, 19 were reported between April 1, 2020 and April 30, 2021. All 19 of these incidents involved an incident with no injury reported.

10. *Multiple Contributing Factors (MCF)*: Five percent (19 out of 355) of nonfatal incidents involved multiple factors that played a role, of which the crib mattress was likely one factor. Two of these 19 incidents were reported between April 1, 2020 and April 30, 2021. One incident involved a mattress that was reported to be too firm and a child who broke out in rashes, with a level of care not known; and one incident involved a slat entrapment hazard, with no injury reported.

11. *Other*: Two percent (6 out of 355) of nonfatal incidents involved miscellaneous other issues associated with a crib mattress. None of these six incidents were reported between April 1, 2020 and April 30, 2021. Reports in this category included: a blade found in a crib mattress; an infant's arm was "tangled in a crib mattress"; an infant "slipped on a crib mattress," causing a slat entrapment; an infant's arm became "stuck on a crib mattress"; a crib mattress had a loose plastic bag for a cover; and a concern about crib mattresses not having proper warning labels to direct caregivers to place infants on their backs when putting them down in a crib.

The hazard categories with the most reported nonfatal incidents associated with crib mattresses are issues with coils or springs, and crib mattresses that do not fit properly in the sleep environment. In the most recent years, from January 2018 to April 2021, CPSC staff observed

fewer nonfatal reports of coil or spring issues associated with crib mattresses, compared to years 2014 through 2017. Eighty-six percent (78 out of 91 nonfatal reports) of nonfatal reports involving fit issues occurred between 2010 and 2015.

### *C. Explanation of Hazards Associated with Crib Mattress Use*[29]

After reviewing the incident data, CPSC staff identified various mattress-use factors associated with deaths and serious injuries related to sudden and unexpected infant death (SUID), including, but not limited to, prone positioning of sleeping infants, soft bedding added to sleep areas, and gaps/pockets between mattresses and infant product sides.[30,31,32] Physiologically, infants experiencing a compromised airflow are likely to undergo a cycle of decreased heart and respiration rate, resulting eventually in fatal cessation of breathing. Numerous public awareness campaigns have aimed to educate caregivers regarding the identified hazards; these campaigns include: "Back to Sleep" (Moon *et al*., 2016, as cited in Fors Marsh Group, 2019), the *"*ABCs of Safe Sleep" (alone (no bed sharing), back-sleeping, and crib uncluttered),[33] and "Safe Sleep/Bare is Best."[34,35] Health

[29] Staff's NPR Briefing Package at Tabs C and E contain more detailed analysis of incidents and hazards associated with crib mattress use.
[30] The Centers for Disease Control and Prevention (CDC) defines "SUID" as the sudden and unexpected death of a baby less than 1-year-old, in which the cause was not obvious before investigation. See https://www.cdc.gov/sids/about/index.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fsids%2FAboutSUIDandSIDS.htm; accessed July 20, 2020.
[31] The American Academy of Pediatrics (AAP, 2016) explains that SUID, also known as "sudden unexpected death in infancy" (SUDI), includes explained and unexplained deaths, and it can be attributed to suffocation, asphyxia, entrapment, infection, ingestions, metabolic diseases, arrhythmia-associated cardiac channelopathies, and trauma. See: https://pediatrics.aappublications.org/content/pediatrics/138/5/e20162938.full.pdf; accessed May 5, 2020.
[32] Sudden infant death syndrome (SIDS) is a subcategory of SUID that refers to infant deaths that cannot be explained after a thorough case investigation. The terms SUID and SIDS are used interchangeably, as SIDS commonly is used to refer to SUID in warning labels and articles and given that consumers are more familiar with the term SIDS as opposed to SUID.
[33] See https://www.aappublications.org/news/2016/10/24/SIDS102416; accessed May 7, 2020.
[34] See https://www.cpsc.gov/Safety-Education/Neighborhood-Safety-Network/Posters/Safe-Sleep-for-Babies; accessed May 6, 2020.
[35] See https://www.cpsc.gov/safety-education/safety-guides/kids-and-babies-cribs/safe-sleepbare-best and https://www.nationwidechildrens.org/family-resources-education/health-wellness-and-safety-resources/helping-hands/safe-sleep-practices-for-babies; accessed May 11, 2020.

and safety advocates, including the AAP, CDC,[36] CPSC, and Kids in Danger (KID)[37] support these efforts.

To make infant sleep environments more comfortable, caregivers commonly use soft bedding and after-market mattresses, instead of, or in addition to, an OEM mattress. Infants can maneuver themselves into vulnerable positions in a sleep environment, from which they cannot free themselves:

> Infants in the age range associated with fatal incidents, *i.e.*, between 2 and 6 months, develop new skills, such as rolling over and crawling, in stages. According to Bayley (1969), several developmental milestones occur within the first 6 months of life; some notable motor skills typically achieved are turning from side to back (average age: 1.8 months old), turning from back to side (average age: 4.4 months old), and turning from back to stomach (average age: 6.4 months old). Children as young as 8 to 12 weeks are likely to move around a play yard, including moving to the edge and possibly moving into vulnerable situations. However, children may not be able to remove themselves by reversing their actions because they may not have developed the skill.[38]

Infants can become trapped in a gap between a crib mattress and the side wall(s) of their sleep environment, with their nose and mouth pressed against the mattress or side wall, experiencing compromised airflow. Gap entrapment is a hazard associated with ill-fitting mattresses in full-size cribs, play yards, and non-full-size cribs. To minimize the risk for entrapment in a gap, a full-size crib and full-size crib mattress that meet the applicable standards would allow a maximum side gap of $1\,^{3}/_{8}$ inches.[39] Given non-flexible sides and infant head dimensions,[40] requirements in these standards work in tandem to help prevent head entrapment and

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[36] See https://www.cdc.gov/vitalsigns/safesleep/index.html; accessed May 2, 2020.
[37] See https://kidsindanger.org/protect-your-child/sleep/; accessed May 6, 2020.
[38] See page 5, https://www.cpsc.gov/s3fs-public/Petition%20CP%2015-2%20-%20Petition%20Requesting%20Ban%20on%20Supplemental%20Mattress%20for%20Play%20Yards%20with%20Non-Rigid%20Sides%20-%20May%2010%202017_3.pdf; accessed September 14, 2020.
[39] Per 16 CFR part 1219, and by reference ASTM F1169-1919, a full-size crib must have interior dimensions of 28 $\pm^{5}/_{8}$ inches wide by $52\,^{3}/_{8} \pm^{5}/_{8}$ inches long. Per the existing voluntary standard for crib mattresses, ASTM F2933-21, a full-size crib mattress shall measure at least $27\,^{1}/_{4}$ inches wide by $51\,^{5}/_{8}$ inches long by 6 inches thick.
[40] According to Snyder (1975), the 5th percentile head breadth, *i.e.,* the maximum breadth of the head above and behind the ears, of children 0 to 3 months old is approximately $3\,^{3}/_{10}$ inches, which is more than twice as wide as the maximum

suffocation between the mattress and crib sides, even though a full-size crib manufacturer is not required to provide the mattress.[41] Still, incidents of gap entrapment involving these products continue to occur, including when the full-size crib and *non-compressed* full-size crib mattress measure the appropriate dimensions. For example, gaps involving full-size crib mattresses can develop if the mattresses are too soft, such as when the mattress is compressed by mattress sheets.

Gaps between the infant's mattress and sleep product sides are especially hazardous when after-market mattresses with thicker depth dimensions than the OEM mattress are used in products with flexible (*e.g.*, mesh or fabric) sides, such as play yards and non-rigid-sided portable cribs. The side walls of these products typically expand more towards the center of the side wall, and consequently, as the thickness of mattresses used in these products increases, the risk of gap entrapment often increases as well.

*D. Product Recalls*[42]

In the NPR, CPSC stated that from June 1, 2010 to June 1, 2020, CPSC negotiated five consumer-level recalls involving crib mattresses to mitigate against risks of flammability and suffocation. Four recalls involved non-compliance with mandatory federal flammability requirements. These four recalls included approximately 80,000 units in total. The Commission cannot provide an exact number of units because of a lack of differentiation between crib and adult mattress populations in recalls that included both. The fifth recall of crib mattresses involved a dimensional issue, where the crib mattress models were ill-fitting, presenting an entrapment hazard.

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allowable side gap between full-size cribs and full-size crib mattresses. ESHF staff selected head "breadth," as opposed to length or height, to err on the side of caution, as head breadth is the smallest of these three head dimensions that could cause a fatal entrapment. Similarly, staff selected the 5th percentile measurement for 0-to-3-month-old infants to reduce the likelihood of death or serious injury to those most vulnerable to the identified hazards.

[41] See https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/Full-Size-Baby-Cribs/, accessed May 1, 2020.

[42] *See* Briefing Memorandum, Staff's Final Rule Briefing Package.

This recall included approximately 300,000 units. CPSC has not announced any crib mattress recalls since the NPR.

## IV. International Standards for Crib Mattresses[43]

As stated in the NPR, the Commission is aware of two international voluntary standards pertaining to crib mattresses:[44]

- BS EN 16890:2017 - Children's Furniture – Mattresses for cots and cribs – Safety requirements and test methods (BS EN 16890); and
- Australian/New Zealand Standard 8811.1:2013 – Methods of testing infant products (AS/NZS 8811.1).

In the NPR, the Commission compared ASTM F2933 – 19 to the international standards AS/NZS 8811.1 and EN 16890, and determined that the ASTM standard is equivalent or more stringent than these standards to address most incidents associated with the use of crib mattresses in the United States. 85 FR at 67913-14. This assessment is applicable to ASTM F2933-21 as well.[45]

Each of these international standards includes a mattress firmness test, while the ASTM standard does not. To address this issue, the final rule includes a mattress firmness test, as proposed in the NPR, based on the mattress firmness test in the AS/NZS standard. With the exception of mattress firmness, the Commission concludes that ASTM F2933-21 is equivalent to, or more stringent than, AS/NZS 8811.1 or EN 16890, because it more fully addresses the hazard patterns identified by CPSC staff in the reported incident data. Compared to these international standards, ASTM F2933-21 is more comprehensive because it also addresses non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs. Furthermore, the Commission notes

[43] *See* Staff's NPR Briefing Package at Tab B.
[44] The Commission is also aware of a draft, unpublished, standard, ISO 23767 *Children's furniture – Mattresses for cots and cribs – Safety requirements and test methods*. Although this draft ISO standard is not yet an official standard, CPSC staff reviewed it for relevancy and found that it is nearly identical to BS EN 16890.
[45] *See* Staff's Final Rule Briefing Package at Tab C.

that like ASTM F2933-19, ASTM F2933-21 was developed through collaboration between CPSC staff and stakeholders. The voluntary standard has been revised four times to address incident data provided by CPSC staff. Therefore, the Commission concludes that ASTM F2933-21, when modified to include a test for mattress firmness based on sections 6 and 8 of AS/NZS 8811.1:2013, is more appropriate than AS/NZS 8811.1:2013 or EN 16890 to address hazard patterns associated with crib mattresses.

## V. Voluntary Standard–ASTM F2933[46]

### *A. History of ASTM F2933*

The ASTM Committee F15 on Consumer Products first published the voluntary standard for crib mattresses in 2013, as ASTM F2933-13, *Standard Consumer Safety Specification for Crib Mattresses.* The first publication established requirements for the standard and addressed the following issues:

- Sharp points and sharp edges,[47]
- Small parts,
- Lead and other toxic substances in paints,
- Finger entrapment,
- Mattress dimension conformity,
- Mattress thickness, and
- Marking and labeling.

Since 2013, ASTM has revised and updated the voluntary standard four times to address safety issues, as outlined below:

[46] *See* Staff's NPR Briefing Package at Tab B for additional information about the history and performance requirements up through the 2019 version of ASTM F2933. Tab C of Staff's Final Rule Briefing Package contains information about the revisions in ASTM F2933-21.

[47] Tapered ends that do not meet the requirements of 16 CFR § 1500.48 and metal or glass tapered surfaces that do not meet the requirements of 16 CFR § 1500.49.

ASTM F2933-16 (approved on 12/1/2016):

- Revised warning label permanency requirements in 5.6.1, to include requirement that "[n]on-coated paper warning label shall not be applied on either side of sleeping surface." Added a note under this section, stating that non-coated paper label may absorb water and can deteriorate.

ASTM F2933-18 (approved 8/15/2018):

- Revised scope to include a new section 1.5, stating the standard was developed in accordance with internationally recognized principles on standardization;
- Added definition of "after-market mattress for play yard or non-full-size crib," to section 3, Terminology;
- Added a new requirement for after-market mattresses for play yards and non-full-size crib mattresses in section 5, General Requirements, stating that after-market mattresses for soft-sided and non-rectangular, rigid-sided products shall have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace and shall meet the specifications of Mattress Vertical Displacement test from ASTM F406-19, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards;*
- Added additional marking and labeling requirements for after-market mattresses in sections 7.5 through 7.7. To comply with these sections, after-market mattresses and their retail packaging shall include specified suffocation warning language related to hazardous gaps and stacked mattresses. Sections 7.5 and 7.6 have additional requirements that distinguish between types of products. Section 7.5 has requirements specific to mesh/fabric-sided and rigid-sided, non-rectangular products, including as follows: after-market mattresses shall have all the warnings that the original manufacturer had and provide instructions that are on the original mattress, and both the after-market mattress and the retail packaging shall identify the brand and model numbers of products in which it is intended to be used. Section 7.6 contains requirements specific to rigid sided

rectangular products including as follows: after-market mattresses and their retail packaging shall have a specified statement regarding mattress dimensions and fit.

ASTM F2933-19 (approved on 6/15/2019):

- Added a new requirement for mattress seam stitching in section 5, General Requirements, requiring that all seam stitching that is accessible to the occupant be lock stitching.

ASTM F2933-21 (approved on 6/15/2021):

- Replaced requirement that "aftermarket mattresses for soft-sided and non-rectangular, rigid-sided products shall have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace" with: (1) a requirement that aftermarket mattresses meet all applicable listed requirements of ASTM F406 *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards* for the OEM mattresses that they are intended to replace; (2) requirements that the after-market mattress must be at least the same size as the original equipment mattress, so long as it lays flat on the support structure; and (3) requirements that the after-market mattress floor support structure be at least as thick as the original equipment mattress floor support structure. Accordingly, play yard mattresses may be thicker than that provided by the original equipment manufacturer, but are still limited to a maximum of 1 ½ inches, as required by ASTM F406.
- Adds requirement specifying that after-market mattresses must have equivalent storage accommodations for instructions as the original equipment mattress.

*B. Assessment of ASTM F2933-21*[48]

ASTM published ASTM F2933 – 21 in July 2021, to address requirements for after-market mattresses for non-full-size cribs and play yards. Beginning with ASTM F2933-18, after-market

[48] *See* Tab C of Staff's Final Rule Briefing Package for the full assessment of ASTM F2933-21.

mattresses were required to meet the same requirements of OEM mattresses for play yards. ASTM members believed that, as written, the requirements for after-market mattresses were design restrictive. Accordingly, the rationale for the 2021 revisions for after-market mattress requirements was to be less design restrictive, by more directly relying on performance requirements under the appropriate product standard, including additional references to requirements in the voluntary standard for play yards and non-full-size cribs, ASTM F406.

The purpose of having after-market mattresses meet the same requirements as OEM mattresses is to reduce the risk of infant entrapment and suffocation associated with after-market mattresses that are too thick, or do not fit correctly, or attach to a play yard or non-full-size crib. ASTM developed the latest requirements for after-market mattresses, published in ASTM F2933-21, in collaboration with CPSC staff, the ASTM Play Yard Vertical Displacement Task Group, the Play Yard Mattress Fit and Thickness Task Group, and the ASTM Non-Segmented Mattress Task Group. Below we summarize and assess changes to ASTM F2933-21 that occurred after publication of the NPR.

1. In section 5.9 of ASTM F2933-21, "Product" was clarified to refer to the play yard or non-full-size crib, rather than the mattress. Other clarifications of the mattress and the product were made throughout this section. These term clarifications are appropriate and adequate to clarify which requirements in the standard apply to which products. However, the final rule removes non-full-size cribs from this section, to be consistent with changes to section 5.7.2 regarding non-full-size mattress size and thickness.

2. In section 5.9.1.1 of ASTM F2933-21, the requirement was removed that the after-market mattress have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace. The thickness and floor support structure requirements were replaced in ASTM F2933-21, as described in paragraphs 5 and 6 below. The final rule adopts these

new requirements for after-market mattresses in ASTM F2933-21, as written. Before this change, an after-market mattress for a play yard could meet the requirements of ASTM F406 when tested with the product it is intended to be used with, but still not meet the requirements of this section, due to having a different mattress thickness or different floor support structure design as the OEM mattress. For example, non-segmented, *i.e.*, non-folding, after-market mattresses for products that included a segmented mattress would not be allowed. Similarly, if the OEM play yard mattress was 3/8-inches thick, an after-market mattress with a thickness of 7/8-inches, and that would otherwise meet the requirements of an OEM mattress, would not be allowed.

ASTM removed the requirement that after-market mattresses be exactly the same as the OEM mattress, and instead, requires that after-market mattresses be tested to the same requirements as OEM mattresses (see 3 below). Moreover, after-market mattresses must meet additional requirements regarding size, floor support structure, and instruction storage (5, 6, and 7 below, respectively). Based on this change, the two examples described above would be allowed, so long as they meet all of the requirements for after-market mattresses. A 3-inch thick, after-market play yard mattress would not be allowed, however, due to it having a greater thickness than allowed for OEM mattresses in ASTM F406. Because after-market mattresses must meet the same dimension and performance requirements as OEM mattresses, as well as additional requirements, this change will not reduce the safety of after-market mattresses.

3. In the new section 5.9.1.1 of ASTM F2933-21, ASTM added the following list of requirements from ASTM F406: *Stability*; *Cord/Strap Length*; *Crib Side Height*; *Height of Sides*; and *Floor Strength.* The following requirements from ASTM F406 were already listed: *Mattress*; *Mattresses for Rigid-Sided Products*; *Mattress Vertical Displacement*. The requirements in ASTM F406 applicable to play yard mattresses are those for *Mattress, Stability, Cord/Strap Length, Height of Sides, Floor Strength*, and *Mattress Vertical Displacement*. ASTM F2933-21 now includes all of

these listed requirements. The final rule, however, removes *Mattresses for Rigid-Sided Products* and *Crib Side Height* from this section, because these requirements apply to non-full-size cribs, which are addressed in the final rule in section 5.7.2.

4. In the new section 5.9.1.2 of ASTM F2933-21, ASTM replaced the term "replacement mattress" with "aftermarket mattress." The final rule includes this modification, and it is consistent with modifications proposed in the NPR.

5. ASTM added the following requirement in a new section 5.9.1.3 in ASTM F2933-21: "The aftermarket mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the play yard mattress support structure." Some OEM play yard mattresses are made particularly thin, contributing to the consumer perception that play yard mattresses are uncomfortable, and potentially resulting in consumers placing additional soft bedding in infant sleep environments. With this change, after-market mattresses can be the same size or larger (thicker and/or wider) than the OEM mattress, so long as they lay flat and meet the other applicable dimension and test requirements for play yard mattresses, including maximum dimension requirements. This allows after-market play yard mattresses, which are thicker than OEM mattresses, but continue to meet maximum dimension requirements (*e.g.,* an after-market mattress with foam 7/8-inches thick may be acceptable, but foam more than 1-inch thick, would not be acceptable). The final rule adopts this change as part of ASTM F2933-21, because it is unlikely to reduce safety, and may improve safety by allowing appropriately sized, after-market mattresses that could combat the consumer perception of uncomfortable play yard mattresses. This change, therefore, is an adequate replacement for the mattress size requirements originally in section 5.9.1.1.

6. ASTM added the following requirement in section 5.9.1.4 of ASTM F2933-21: "If the original equipment mattress includes a floor support structure, the aftermarket mattress must

include a floor support structure that is at least as thick as the original equipment mattress floor support structure." This change allows for after-market mattresses with a different floor support structure than the OEM mattress (*e.g.* an after-market non-segmented mattress in place of an OEM segmented mattress), so long as the floor support structure is at least as thick as the original, and the mattress meets the other applicable requirements for play yard mattresses. This change, along with the requirement that the mattress must lay flat on the play yard support structure, will have no effect on safety, because it ensures that after-market play yard mattresses with a different support structure than the OEM mattress will still have a similar level of support. The final rule adopts this change as part of ASTM F2933-21, because it is an adequate replacement for the floor support structure requirements originally in section 5.9.1.1.

7. ASTM added the following requirement in section 5.9.1.5 of ASTM F2933-21: "If the original equipment mattress includes storage accommodations for the product instruction manual, the aftermarket mattress shall provide equivalent storage accommodations for the product instruction manual." This is a new requirement for after-market mattresses to have equivalent storage accommodations for instructions as the OEM mattress. The final rule adopts this change as part of ASTM F2933-21, because it improves safety by increasing the likelihood of consumers keeping the product's instruction manual, which may have important safety information, readily accessible.

Based on the foregoing, the final rule incorporates by reference ASTM F2933-21, and adopts these seven changes, except where a change conflicts with the separation of requirements for play yards from the requirements for non-full-size crib mattresses, as noted in this section. Appendix A to Tab C of Staff's Final Rule Briefing Package outlines the changes to section 5.9 of ASTM F2933-21.

*C. Description of Performance Requirements in ASTM F2933-21*

In addition to the general requirements typically found in other ASTM juvenile product standards, such as requirements for openings, label permanency, and the prohibition of sharp points/edges, small parts, and lead in paints, section 5 of ASTM F2933-21 contains the following four additional requirements that apply specifically to mattresses for cribs, non-full-size-cribs, and to after-market mattresses for non-full-size cribs and play yards:

- *§ 5.7 Mattress Dimensions*: This section describes the dimensional requirements for full-size crib mattresses, and for non-full-size crib mattresses that are supplied with a non-full-size crib, to prevent an infant from becoming wedged in a gap caused by a too-small crib mattress. To ensure that the crib mattress dimensions are within the allowable range, the test requires a mattress to be placed in a test box and pushed against the side of the box with a force prescribed in the test method.

- *§ 5.7.2.2 Mattress Thickness*: This requirement applies to non-full-size crib mattresses supplied with a non-full-size crib, to prevent occupants from falling out of the product (and extends to after-market mattresses for non-rectangular, non-full-size cribs, as described below for *§ 5.9)*. The requirement states that a mattress supplied with a non-full-size crib shall have a thickness that will provide a minimum effective crib-side height dimension of at least 20 inches when the crib side is in its highest adjustable position and the mattress support is in its lowest adjustable position. Additionally, the mattress shall have a thickness that will provide a minimum effective crib-side height dimension of at least 3 inches when the crib side is in its lowest adjustable position, and the mattress support is in its highest adjustable position.

- *§ 5.8 Mattress Seam Stitching*: This requirement applies to all crib mattresses within the scope of the standard and states that all seam stitching that is accessible to the occupant shall be

lock stitching to prevent accessible stitching from becoming loose and creating a small part or strangulation hazard.

- *§ 5.9 After-Market Mattress for Play Yards and Non-Full-Size Cribs*: This requirement is for after-market mattresses for play yards and non-full-size cribs, and states that after-market mattresses for soft-sided and non-rectangular, rigid-sided products must meet the following applicable requirements from ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards*: *Stability; Cord/Strap Length; Mattress; Mattresses for Rigid sided products; Crib Side Height; Height of Sides; Floor Strength;* and *Mattress Vertical Displacement*. Additionally, the after-market mattress and floor support structure must be at least the same size as the original equipment mattress; it must lay flat on the play yard support structure or floor; and must include equivalent storage accommodations for the instruction manual. Accordingly, these after-market mattresses must meet the same requirements as the OEM mattress. Requirements for OEM mattresses sold with play yards and non-full-size cribs are codified at 16 CFR parts 1220 (non-full-size cribs) and 1221 (play yards), which incorporate by reference ASTM F406. Finally, if the after-market mattress is also intended to be used in a bassinet, it must also meet the requirements in the following sections of ASTM F2194, *Standard Consumer Safety Specification for Bassinets and Cradles*, when tested with each brand and model of product for which it is intended to replace the mattress: *Pad Thickness for Fabric or Mesh-Sided Products; Pad dimensions; Side Height;* and *Bassinets with Segmented Mattresses*.

## VI. Adequacy of the Voluntary Standard to Address Crib Mattress Hazards

### *A. Adequacy of Performance Requirements*[49]

ASTM developed ASTM F2933 to mitigate the risk of injury associated with the use of crib mattresses. Hazard-mitigation strategies include performance requirements and instructions and on-product warnings to help inform caretakers of the primary hazards during use of the product. Based on CPSC staff's Engineering, Human Factors, and Health Sciences assessments, Tabs B, C, and E, respectively, of Staff's NPR Briefing Package, and Tabs C and D of Staff's Final Rule Briefing Package, the requirements in the voluntary standard, ASTM F2933-21, adequately address the hazard patterns related to expanding or inflating crib mattresses, mattresses falling apart, and most hazards associated with multiple contributing factors, or other hazards.

However, ASTM F2933-21 does not adequately address the most prevalent or severe identified hazards associated with the use of crib mattresses, such as coil spring issues, face in mattress, fit issues, infants found prone, and mattress softness. The warning labeling for hazard patterns that are within the multiple contributing factors category (*i.e.*, face in mattress, found prone, and softness) are also inadequate. Accordingly, the Commission will finalize the rule with additional requirements, as proposed in the NPR, to make the standard more stringent, to further reduce the risks of death and injury from these hazard patterns. Table 5, based on the final rule incident data, summarizes the staff-identified hazard patterns and states how ASTM F2933 – 21 addresses each hazard pattern.

[49] Staff's NPR Briefing Package at Tab B contains additional details on the CPSC staff's analysis of ASTM F2933-19 and its ability to address identified hazards.

**Table 5. Assessment of ASTM F2933 – 21 to Address Identified Hazard Patterns**

| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Adequacy Assessment | Comments |
|---|---|---|---|---|
| Chemical/ Flammability Hazards (odors, rash) | All | 16 CFR part 1303 Ban of Lead-Containing Paint 16 CFR part 1500 Hazardous Substances Act Regulations (Sections 5.1 and 5.4) 16 CFR part 1632 Standard for the Flammability of Mattresses and Mattress Pads 16 CFR part 1633 Standard for the Flammability (Open Flame) of Mattress Sets | Adequate | Assessed as adequate in NPR. No change in standard. |
| Coil or Spring (laceration) | Coil or spring mattresses (primarily full-size) | Prohibition of sharp points (Section 5.2) | Inadequate | Final rule includes additional cyclic testing to identify potential for springs to break through surface during foreseeable use and misuse. |
| Crib Mattress Used in a Play Yard (suffocation due to ill-fitting mattress) | Aftermarket play yard mattresses | Labeling requirements, requirements for after-market mattresses. Testing requirements harmonized with ASTM F406. (Sections 5.9 and 7.5) | Adequate | Section VI.A.3 of the preamble assesses the revised requirements for after-market mattresses. |
| Expand or Inflate (suffocation due to ill-fitting mattress that does not expand or inflate properly) | Foam products, typically full-size and shipped as "bed in a box" | Dimensional conformity, mattress thickness, and labeling requirements (Section 5.7) | Adequate | Hazard is adequately addressed with F2933's dimensional conformity and mattress thickness. |

| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Adequacy Assessment | Comments |
|---|---|---|---|---|
| Face in Mattress (suffocation) | All | Labeling requirements (Section 7.3) | Inadequate See also ESHF[50] memo (Tab D) | Final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1 and revised labeling. |
| Fit Issues (suffocation due to ill-fitting mattress) | All | Dimensional conformity and after-market mattress requirements (Sections 5.7 and 5.9) | Inadequate | Final rule contains additional fitted sheet compression test for full-size mattresses and extends dimensional requirements in section 5.7 to all after-market non-full-size crib mattresses. |
| Found Prone (suffocation due to prone position) | All | Labeling requirements (Section 7.3) | Inadequate See also ESHF memo (Tab D) | Final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1 and revised labeling. |
| Mattress Falls Apart (choking/ingestion) | All | Mattress seam stitching requirement and small parts prohibition (Sections 5.3 and 5.8) | Adequate | Assessed as adequate in NPR. No change in standard. |
| Softness (suffocation due to soft surface) | All | Not addressed | Inadequate | Final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1. |
| Multiple Contributing Factors (MCF) (*e.g.*, entrapment in bumper pads, limb entrapment, crib sharing with another infant, existing health condition) | All | General requirements and warning labels (Sections 5 and 7) | Inadequate | Some of these contributing factors are addressed by additional requirements in the final rule described above, while others are related to another product use or other factor out of the scope of the crib mattresses standard. |

[50] CPSC's Directorate for Engineering Sciences, Division of Human Factors (ESHF).

| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Adequacy Assessment | Comments |
|---|---|---|---|---|
| Other | All | General requirements and warning labels (Sections 5 and 7) | Adequate | This category includes hazards which are out of scope of the ASTM standard or for which the cause is unclear. |

*1. Hazard Pattern – Chemical/Flammability Hazards*

Seven percent (26 out of 355) of the nonfatal incidents, including 3 incidents identified since the NPR, reported a crib mattress having a chemical odor (6), causing rashes (8), causing severe allergies (1), or mattresses not meeting mandatory federal flammability standards (11). Reports describe infants suffering from rashes, upper respiratory issues, and headaches. The ASTM F2933-21 general requirements section addresses these hazards with the inclusion of 16 CFR part 1632, *Standard for the Flammability of Mattresses and Mattress Pads*, 16 CFR part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets,* and 16 CFR part 1303, *Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint*.

*2. Hazard Pattern – Coil or Spring*

Potential laceration hazards due to an exposed coil or spring account for 36 percent (128 out of 355) of the nonfatal incident reports, including four incidents identified since the NPR. ASTM F2933-21 addresses this hazard by prohibiting sharp points. Due to the high proportion of reported nonfatal incidents, the final rule strengthens the standard with a cyclic impact test, as proposed in the NPR, which entails dropping a 30-pound test mass 250 times in four locations on a test mattress.

Since publication of the NPR, CPSC staff has continued working with the crib mattress cyclic testing task group to refine test requirements that will address the hazard of potential lacerations to infants from an exposed coil or spring. The test was discussed at subcommittee and task group meetings on November 10, 2020, December 9, 2020, and February 16, 2021. During these meetings, ASTM members discussed points they felt needed clarification if the voluntary

standard is revised, including the desire for a means to prevent the mattress from moving around during testing. ASTM members stated, for example, that the standard should clarify that the test only applies to coil spring mattresses, and that two mattresses should be required to test both sides of a mattress, because of the potential for destruction of the sample during testing. Accordingly, the final rule includes a modification to the test method, to require two mattresses for testing each side of a mattress.

CPSC staff has typically been in alignment with ASTM members of the Crib Mattress Cyclic Testing task group on how to conduct testing to address the hazard of potential lacerations to infants caused by exposed coils or springs. Public comments were also generally supportive of the test proposed by staff; and the comments encouraged staff to continue working with ASTM to develop the test. Although ASTM informed staff at a subcommittee meeting on June 10, 2021, that a new draft of the ASTM test method had been developed, and members were shown a drawing that appeared to depict a revised test location, ASTM has not yet distributed this revised draft to CPSC staff or to other task group members, and there has not been a ballot. Therefore, for the final rule, the Commission clarifies the test procedure and the need for two mattresses, but does not make any additional changes.

*3. Hazard Pattern – Crib Mattress Used in a Play Yard*

One percent (2 out of 139) of fatal incidents and one percent (2 out of 355) of nonfatal incidents, including one nonfatal incident identified since the NPR, are associated with using a crib mattress in a play yard. The incidents were associated with the use of a crib mattress that did not fit properly in a play yard. ASTM F2933-21 addresses this hazard with warning label requirements, and additionally, newer requirements specifying that after-market play yard mattresses must meet the same requirements as OEM mattresses. These revisions will increase the availability of properly fitting after-market mattresses, and will reduce the likelihood of caregivers using an ill-

fitting crib mattress in a play yard. For the final rule, the Commission incorporates by reference ASTM F2933-21, to include these revisions.

One nonfatal incident involved scratches on an infant's back, caused by protruding coils or springs of the crib mattress. The final rule addresses the coil or spring hazard, as described in section VI.A.2, above.

*4. Hazard Pattern – Expand or Inflate*

In two percent (6 out of 355) of reported nonfatal incidents, a crib mattress failed to expand or inflate properly. All of these incidents were reported in the NPR. This hazard can occur when a mattress is tightly rolled for shipping or packaging purposes, and then does not completely decompress. Related hazards include fit issues with gaps appearing around the crib mattress, causing entrapment or wedging, and an uneven crib mattress that may cause an infant to roll over. Although this hazard is adequately addressed with ASTM F2933's dimensional conformity and mattress thickness requirements, the additional proposed mattress compression test, detailed in section VI.A.6 of this preamble, will strengthen the proposed standard and further reduce injuries associated with the failure of a mattress to expand or inflate fully to prevent hazardous gaps.

*5. Hazard Pattern – Face in Mattress*

Twelve percent (16 out of 139) of fatal incidents and less than 1 percent (1 out of 355) of nonfatal incidents, including three fatal incidents identified since the NPR, are associated with an infant found face down on a crib mattress. ASTM F2933 does not address this hazard pattern. The Human Factors assessment in the Staff's NPR and Final Rule Briefing Packages provides strengthened warning label recommendations to address this hazard pattern. As proposed in the NPR, the Commission is finalizing the rule with revised warning labels to address this hazard.

*6. Hazard Pattern – Fit Issues*

Twenty-two percent (31 out of 139) of fatal incidents and 26 percent (91 out of 355) nonfatal incidents, including 11 fatal incidents and three nonfatal incidents identified since the NPR, were associated with the fit of a crib mattress in the sleeping environment.[51] In these reports, gaps between the crib mattress and the crib rail or play yard mesh, on one or more sides around the perimeter of a crib mattress, created a wedging or entrapment hazard. ASTM F2933-21 contains a mattress dimensional conformity test intended to address this hazard. However, staff found from visual inspection and measurement of mattresses tested, that tight-fitting sheets over crib mattresses can create gaps between the corners of the mattress and the interior corner of the crib, creating an entrapment hazard, as seen in Photo 1. Accordingly, ASTM F2933-21 does not adequately address entrapment hazards between the crib mattress and the side of a crib or play yard.

*a. Mattress Compression*

To strengthen the standard, the Commission is finalizing the rule with the sheet compression test, as proposed in the NPR, with modifications to address the fit issues caused by a tight-fitting sheet.

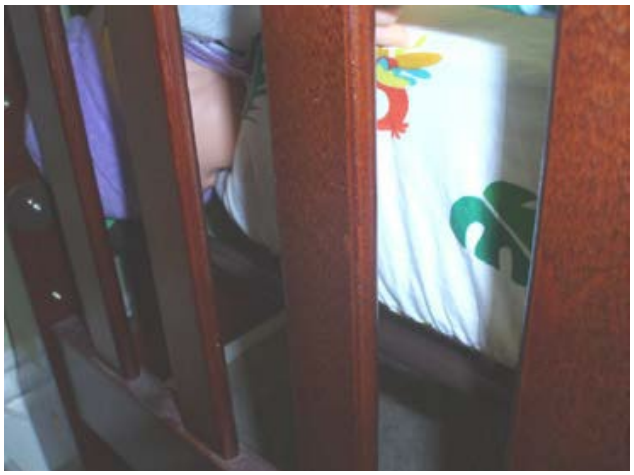

Photo 1. Reenactment of a head entrapment in a corner gap.
Source: CPSC in-depth investigation

[51] Nearly half (11 out of 23) of fatal incidents identified since the NPR are associated with fit issues.

The NPR proposed a test method to address the hazard associated with tight-fitting sheets that compressed a crib mattress to create potentially hazardous gaps. The test method had a conditioned fitted sheet placed on a full-size crib mattress. The mattress with the sheet was required to meet all dimensional requirements in ASTM F2933-19.[52] In addition, measured corner gaps were required to be less than 2.25 inches in length, based on the fifth percentile head breadth of 0- to 3-month-old infants,[53] the already-allowed maximum gap of 1 inch between the sides of the crib mattress and the sides of the crib, and a 0.5-inch margin of safety.

After publication of the NPR, ASTM members discussed the NPR test methods during ASTM crib mattress subcommittee and task group meetings on November 10, 2020, December 3, 2020, and February 16, 2021. At these meetings, ASTM members expressed that for the ASTM voluntary standard, they were not in favor of the test method proposed by CPSC in the NPR. Members stated that crib mattress sheets can vary widely in quality and size; and that by assuming the maximum gap of 1 inch between the sides of the crib mattress and the sides of the crib, the test method unfairly penalized larger mattresses. Additionally, ASTM members pointed out that the dimension measurement method in ASTM F2933 was established with soft materials in mind, and that the NPR-proposed test method was overly restrictive for mattresses, by compressing them twice, due to the requirement that this measurement be conducted with the sheet installed.

The ASTM task group decided to develop an alternative test method, presented during meetings on February 25, 2021, and June 9, 2021. In this test method, the maximum allowable 1-inch gap is applied to the minimum allowable mattress dimensions of 51.625 inches x 27.25 inches, to create a rectangle measuring 52.625 inches x 28.25 inches. This rectangle is the projected crib

[52] The dimensional requirements are unchanged in ASTM F2933-21.
[53] The 5th percentile head breadth, *i.e.*, the maximum breadth of the head above and behind the ears, of children 0 to 3 months old is approximately 3.66 inches; Snyder, R.G., Schneider, L.W., Owings, C.L., Reynolds, H.M., Golomb, D.H., & Schork, M.A. (1977). Anthropometry of Infants, Children and Youths to Age 18 for Product Safety Design (Report No. UM-HSRI-77-17). Prepared for the U.S. Consumer Product Safety Commission, Washington, D.C.

interior. Then, using the head breadth dimension proposed by staff (3.66 inches) minus a 0.51-inch margin of safety, a line is marked 3.15 inches away from the projected crib interior corner, at an angle of 45 degrees to each of the projected crib sides. A 6-inch-high x 6-inch-wide wood block is then used to apply a 2-pound force to the corner of the mattress to recreate the compression force of a fitted sheet. If the front of the block moves beyond the marked line, then the mattress fails. The test is repeated in each corner. ASTM has not balloted the proposed test method.

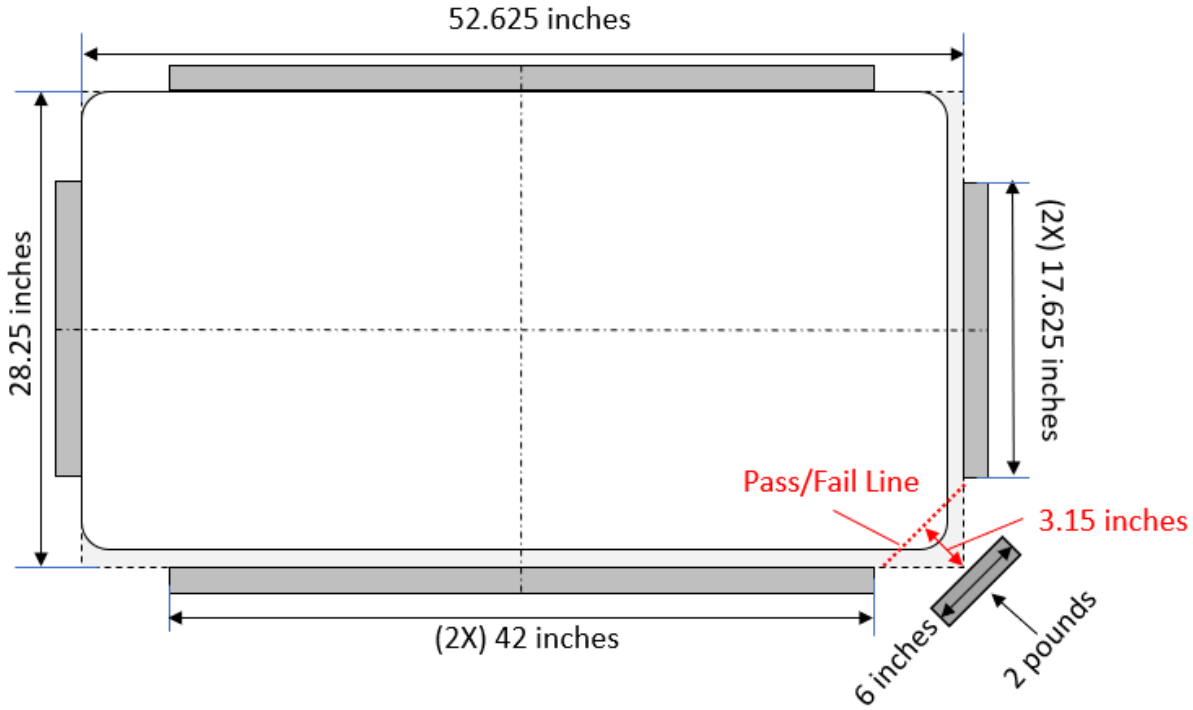


Figure 1. Test fixture proposed by ASTM, as interpreted by CPSC staff.

ASTM members expressed two primary reasons against the test method proposed in the NPR. First, ASTM members stated that crib mattress sheets can vary widely in quality and size. Some public comments agree with this point, suggesting fitted sheets should have separate performance requirements addressed by the ASTM infant bedding subcommittee. CPSC staff has engaged with members of the ASTM Infant Bedding Task Group to reduce the risk of ill-fitting crib mattress fitted sheets and improve sheet performance. Regardless, a crib mattress should not allow a poorly fitted sheet to adjust its dimensions and create a hazardous gap. Staff will continue

working with ASTM's Infant Bedding Task Group to address quality concerns regarding fitted sheets intended for crib mattresses, and thereafter, will work with the ASTM Crib Mattress subcommittee to refer to these requirements, as applicable. However, for the final rule, test laboratories can determine the most appropriate sheet for the test, meaning a crib mattress sheet that fits the crib mattress snugly and can be wrapped around the four corners. The Commission did not receive comments that suggested additional methods to improve the sheet selection process. Accordingly, based on available data, the test method proposed in the NPR is the most accurate test method to test for hazardous gaps caused by sheet compression.

Second, ASTM members stated that the proposed test has the potential to be overly restrictive towards mattresses that are larger than the minimum allowable size. Some public comments make the same point. CPSC agrees with ASTM members and public comments on this point.[54] The proposal in the NPR assumed that every mattress would have the 1-inch maximum allowable gap between the crib and the crib mattress, regardless of size. This assumption is overly restrictive towards mattresses that were designed to fill the space between the crib and crib mattress. The final rule improves the test method to address this point, by incorporating projected crib dimensions that consider the maximum allowable crib interior dimensions of 53 inches x 28 $\frac{5}{8}$ inches to be an appropriate position, because a crib with the maximum interior dimensions will be the worst-case product to consider hazardous corner gaps. Accordingly, the final rule incorporates changes to the measurement method, such that the corner gap is measured from the projected corner of a crib, as described in section VIII of this preamble.

Additionally, ASTM members commented that the mattress measurement method described in section 6.2 was established with concerns about foam compression in mind. As mentioned in the

[54] Staff notes that of the 11 mattresses tested for the NPR, all of which were larger than the minimum size, none failed the draft proposed test method.

appendix of ASTM F2933-21, the rationale for using a dynamic measuring box was "to provide a more repeatable measurement that would take away the variability caused by soft materials." The test method proposed in the NPR would have repeated these measurements with the fitted sheet on the mattress, essentially compressing the mattress twice when taking dimension measurements. In response to these comments, the final rule removes the requirement that the mattress with the fitted sheet must meet the same dimension requirements as the mattress without the fitted sheet. Instead, the final rule requires the corner gap measurement to be taken separately from the dimension measurements.

*b. After-Market Mattresses for Play Yards and Non-Rectangular, Non-Full-Size Cribs*

ASTM F2933-21 also includes provisions to address fit issues with after-market mattresses for play yards and non-rectangular, non-full-size cribs. These provisions require that after-market mattresses meet the same requirements as OEM play yard and non-full-size crib mattresses, as specified in ASTM F406. The dimensional requirements for after-market non-full-size crib mattresses in section 5.9 of ASTM F2933-21 currently only apply to non-rectangular, non-full-size crib mattresses, and the dimensional requirements in section 5.7 of the standard only apply to OEM non-full-size crib mattresses. This is consistent with staff's assessment of ASTM F2933-19 in the NPR. Although labeling requirements in section 7 of the standard apply to all non-full-size crib mattresses, regardless of shape, or whether they are after-market or OEM, ASTM F2933-21 contains no dimensional requirements that apply to after-market, rectangular, non-full-size crib mattresses. To address this gap in the standard, the final rule modifies section 5.7 of ASTM F2933, as proposed, to apply the dimensional requirements to all non-full-size crib mattresses, regardless of shape or whether they are provided with the crib or sold after-market. The Commission is also finalizing the modification to section 5.9 of ASTM F2933, as proposed, to remove non-full-size cribs from that section and to clarify requirements for after-market play yard mattresses.

*7. Hazard Pattern – Found Prone*

Fifty-four percent (75 out of 139) of fatal and 1 percent (3 out of 355) of nonfatal incidents, including nine fatal incidents identified since the NPR, are associated with infants found in a prone position on a crib mattress, without any mention of the face being in contact with the mattress or crib sheet, and no mention of the face being obstructed by other crib bedding or other items in the sleep environment. ASTM F2933-21 does not address this hazard pattern with a performance test; however, it does address it with warning labels. The Human Factors assessment in Tab D of Staff's Final Rule Briefing Package provides warning label recommendations to strengthen the standard to address this hazard pattern. The Commission will finalize the rule, as proposed, with revised warning labels to address this hazard.

*8. Hazard Pattern – Mattress Falling Apart*

Five percent (18 out of 355) of nonfatal incidents are associated with mattresses falling apart. Staff did not identify any new incidents since the NPR. In most of these reports, the seams of the mattresses unraveled, causing a strangulation hazard because the thread or cord used for stitching the mattress was exposed. This failure also resulted in a choking or ingestion hazard because the inner filling came out of the mattress in small pieces and into the sleep environment of the crib. ASTM F2933-21 adequately addresses this hazard with a mattress seam-stitching requirement and small parts prohibition.

*9. Hazard Pattern– Softness*

Fifteen percent (55 out of 355) of nonfatal incidents, including 19 incidents identified since the NPR, are associated with mattress softness. Mattress softness hazards include depressions or indentations found in the crib mattress that could increase the risk of asphyxia. Twelve of these 55 incidents relate to bending, buckling, or mattress compression occurring when a crib sheet was placed on a mattress, shrinking the mattress, and creating an entrapment hazard. ASTM F2933-21

does not address firmness or softness hazards; nor does it address mattress buckling. However, other international standards, Australian/New Zealand Standard (AS/NZS) 8811.1:2013, and EN 16890:2017, *Children's Furniture – Mattresses for Cots and Cribs – Safety Requirements and Test Methods*, both address mattress firmness.

The NPR proposed a firmness test method based on the AS/NZS 8811.1:2013 test method for firmness. After the Commission issued the NPR, CPSC staff continued to engage with ASTM to address the hazard pattern created by soft crib mattresses in the ASTM standard. ASTM members discussed this firmness test at ASTM crib mattress subcommittee and task group meetings on November 10, 2020, December 3, 2020, and February 16, 2021. At these meetings, ASTM members agreed that a firmness test was needed in the standard, but debated whether the AS/NZS 8811.1 protocol or the EN 16890 protocol would be more appropriate. Some members agreed with CPSC staff's assessment that the AS/NZS 8811.1 protocol was more appropriate, and found that test results using the EN 16890 protocol could be difficult to interpret. Other ASTM members disagreed, stating that the AS/NZS 8811.1 protocol did not produce consistent results and the EN 16890 protocol was more appropriate. ASTM members did not provide supporting evidence for this conclusion. ASTM members agreed to test and compare results using both protocols after the February 16, 2021 meeting.

At a June 10, 2021 subcommittee meeting, several ASTM members reported that they had conducted testing using one or both of the firmness protocols, and they repeated the assertion that the EN 16890 protocol should be favored. One member stated that the AS/NZS 8811.1 protocol results could be inconsistent if the test was not conducted on a flat surface.[55] ASTM members provided no detailed test results, and none were discussed at this meeting.

[55] Stitching patterns often contribute to uneven surfaces on crib mattresses.

For the NPR, staff compared the AS/NZS 8811.1:2013 and EN 16890, section 8.2.3 test protocols for firmness, and they found that the AS/NZS 8811.1:2013 test method was more stringent.[56] CPSC staff came to this conclusion after comparing test results obtained using each protocol on 11 full-size crib mattresses. Only one mattress failed the firmness tests outlined in each standard. The mattress was a two-stage mattress, indicating it had a firmer side intended for infants and a softer side intended for toddlers. Both sides of the mattress failed the AS/NZS protocol. The mattress failed the EN 16890 protocol only on the "toddler" side, which is intentionally made softer.

Additionally, for the NPR staff found that the AS/NZS 8811.1:2013 test protocol is more repeatable and is easier to discern when a mattress does not meet the performance requirements, as compared to the EN16980 method. Some ASTM members and public comments stated that the AS/NZS 8811.1:2013 test protocol does not provide consistent test results, but they have not provided evidence to support this conclusion. Staff's testing has not indicated any such issues. Some ASTM members agreed with staff's assessment of AS/NZS 8811.1:2013, and some public comments, reviewed in section VII of this preamble, supported the use of AS/NZS 8811.1:2013 to determine whether a mattress was too soft. Accordingly, to address mattresses that are too soft, for the draft final rule, the Commission will finalize the rule, as proposed, by adding a test for mattress firmness for all crib mattresses within the scope of the standard, based on sections 6 and 8 in the AS/NZS 8811.1 mattress firmness test.

*10. Hazard Pattern – Multiple Contributing Factors*

Multiple contributing factors accounted for 11 percent (15 out of 139) of fatal and 5 percent (19 out of 355) nonfatal incidents, including two nonfatal incidents identified since the NPR. Examples of contributing factors are: entrapment between the mattress and crib bumper pads, limb entrapment between the mattress and a crib rail, crib occupant usage of a swaddle, sharing of the

[56] *See* NPR at 85 FR 67913-14 and 67918 for a discussion of the AS/NZ 8811.1:2013 test for mattress firmness.

crib with another infant, and congenital or recent health conditions of infants. ASTM F2933-21 adequately addresses these hazards in the general requirements sections. ASTM F2933-21 also addresses these hazards with safety information requirements, but these requirements are inadequate. Tab D of Staff's Final Rule Briefing Package, and section VI.B of this preamble, outline the human factors assessment of the ASTM F2933-21 requirements for safety information and the modifications required in this final rule. As proposed in the NPR, the Commission is finalizing the rule with revised safety information to address this hazard.

*11. Hazard Pattern – Other*

Two percent (6 out of 355) of nonfatal incidents involved miscellaneous other issues associated with a crib mattress. Staff did not identify any new incidents since the NPR. Reports include: a blade found in a crib mattress; an infant's arm "tangled in a crib mattress"; an infant "slipped on a crib mattress," causing a slat entrapment; an infant's arm "stuck on a crib mattress"; a crib mattress is too thick; a crib mattress had a loose plastic bag for a cover; and a concern about crib mattresses not having proper warning labels to direct caregivers to place infants on their backs when putting them down in a crib. Foreign objects are generally not addressable in product standards. For three of these incidents, staff could not determine the exact cause of the incident, or whether ASTM F2933-21 was the appropriate standard to address the hazard. ASTM F2933-21 warning label requirements include a statement that says to place infants on their backs to sleep, and to "only use sheets and mattress pads designed specifically for crib mattresses."

*B. Adequacy of Marking, Labeling, and Instructions*[57]

Universally, labeling experts view warning about a hazard as less effective at addressing hazards than designing the hazard out of a product, or guarding the consumer from the hazard. The

[57] The NPR contained an explanation of the proposed modifications to the warnings associated with crib mattresses. 85 FR 67918-21. Staff's NPR Briefing Package at Tab F contains additional details on the basis for the Commission's

use of warnings is lower in the hazard-control hierarchy than design-based approaches, because the effectiveness of the warning depends on persuading consumers to alter their behavior in some way to avoid hazards, rather than eliminating hazards or inhibiting exposure to hazards. Therefore, when a standard relies on warnings to address a hazard, warning statements must be as strong as possible; *i.e*., the warnings must be noticeable, understandable, and motivating. The primary U.S. voluntary consensus standard for product safety signs and labels, ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*, recommends that on-product warnings include content that addresses the following three elements:[58]

- a description of the hazard;
- information about the consequences of exposure to the hazard; and
- instructions regarding appropriate hazard-avoidance behaviors.

Section 7 of ASTM F2933 specifies requirements for marking and labeling for full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs. In the NPR, the Commission stated that, based on CPSC staff's examination of literature, incident data, and consumer feedback, the crib mattress warnings specified in ASTM F2933-19 did not adequately address these warning elements regarding the identified hazards. Although the standard contained warnings pertaining to infant positioning, soft bedding, and gap entrapment, the wording and formatting of the warning message needed to be improved to communicate the hazards effectively.[59] The Commission's NPR recommended the following changes to the safety information requirements specified in ASTM F2933-19:

- Clarifying the definition of "conspicuous" in section 3, *Terminology;*

proposed modifications to the marking, labeling, and instructional literature requirements for crib mattresses. Staff's Final Rule Briefing Package at Tab D explains the clarifications made in the final rule, compared to the NPR.

[58] All three elements may not be necessary in some cases, such as if certain information is open and obvious or can be readily inferred by consumers. However, people often overestimate the obviousness of such information to consumers.

[59] The NPR discusses safety information inadequacies at 85 FR 67918-21.

- Improving marking and labeling requirements in section 7, *Marking and Labeling;* and
- Adding instructional literature requirements in a new section 8, *Instructional Literature*.

The NPR explained that CPSC staff considered incident data,[60] results from survey[61] and focus group research,[62] relevant literature,[63] requirements in ANZI Z535.4,[64] recommendations from the ASTM Ad Hoc Language Task Group,[65] and suggestions from other stakeholders participating in the ASTM F15.66 subcommittee on crib mattresses and the greater ASTM F15 committee on consumer products.[66] Since the NPR published, CPSC received comments from the public pertaining to the NPR's safety information requirements. Section VII of this preamble contains comment summaries and the Commission's responses. Two of the comments requested that staff continue collaborative efforts with ASTM to address weaknesses in safety information requirements for crib mattresses. Below we describe warnings-related ASTM activities and changes in the final rule intended to further improve the safety of crib mattresses. Appendix A to

[60] The ESHF memorandum in CPSC staff's NPR briefing package details staff's findings regarding the prevalence in incident data of infant prone positioning, soft bedding, and mattress size/corner gaps.
[61] The 2014 "Durable Nursery Products Exposure Survey (DNPES): Final Summary Report," by Westat, details the findings of a survey conducted in 2013, which collected information about durable infant and toddler products.
[62] The 2019 "Consumer Product Safety Commission (CPSC): Caregiver Perceptions and Reactions to Safety Messaging Final Report" (Safety Messaging Report) by Fors Marsh Group, summarizes focus group research and a literature review pertaining to safe sleep practices in various products, including cribs and play yards.
[63] For example, Joyner et al. (2009) as cited in the Safety Messaging Report, posited that caregivers are likely to trust implicitly the safety of products under the misconception that if a product is sold to the public, then it is likely safe to use. Staff finds this common misconception particularly likely with regards to infant products; the greater vulnerability of infants to product hazards is likely to support the expectation of caregivers that infant products are designed to be safe.
[64] ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*, is the primary U.S. voluntary consensus standard for product safety signs and labels.
[65] ASTM juvenile products standards have begun adopting "Ad Hoc" recommendations since 2016, to increase the consistency of on-product warning design among juvenile products, and to address numerous warning format issues related to capturing consumer attention, improving readability, and increasing hazard perception and avoidance behavior.
[66] Since May 2018, CPSC staff has been participating in ASTM F15.66 to address the identified hazards. Subcommittee members include manufacturers, safety and health advocacy groups, and other critical stakeholders. Changes to ASTM F2933 proposed by ASTM F15.66 have been balloted by ASTM F15 (see discussion of ASTM Ballot F15 (21-02), below).

Tab D of Staff's Final Rule Briefing Package contains a side-by-side comparison of the NPR, ASTM's latest recommendations, and the final rule.

1. ASTM Subcommittee Activities and ASTM F2933

After the NPR published, staff continued to work with ASTM F15.66 to address deficiencies in the safety information requirements in ASTM F2933. ASTM F15 balloted revised sections of the standard, closing on April 12, 2021. The ballot, F15 (21-02), addressed safety information requirements in item 13, *Revision of F2933-2019 Consumer Safety Specification for Crib Mattresses WK72077*. The ballot item received three negative votes, two of which were administrative. One negative vote, submitted by CPSC staff on April 6, 2021, included a letter identifying deviations from the NPR.[67] On June 9, 2021, ASTM F15.66 reviewed staff's letter, and voted on whether the letter was persuasive. Several attendees shared rationales for some of the substantive deviations from the NPR, which we discuss below.

ASTM members stated that the NPR includes SIDS (Sudden Infant Death Syndrome) in the hazard identifier (*i.e.,* "SIDS AND SUFFOCATION HAZARDS"), which in the balloted version reads: "SUFFOCATION HAZARD." In addition to requesting rationale for this incongruity, staff asked ASTM F15.66 to discuss a public comment on the NPR, which recommends making the hazard identifier active; *i.e.,* "Help Prevent SIDS and Suffocation." Several ASTM members argued that the hazard identifier should remain as balloted to keep the focus on the suffocation hazard, which they believed to be the most important message. ASTM members also claimed that SIDS is already well known, and therefore, it does not need to be included in the hazard identifier. As discussed in Staff's NPR Briefing Package and staff's ballot letter, the Commission agrees with staff that it is important to include "SIDS" in the hazard identifier for numerous reasons, including the following: (1) SIDS, in addition to suffocation, is cited frequently in reports of fatal incidents;

[67] *See* Appendix B to Staff's Final Rule Briefing Package.

(2) several statements in the warning label address the SIDS hazard; and (3) SIDS, by definition, is a poorly understood hazard, and consumers are more likely to read the warning message if they know it includes actions by which to limit the risk of SIDS.[68]

The NPR prioritized the prone sleep message, "**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation," directly after the hazard identifier. In ASTM's balloted version, this message appears much lower in the warning label. Several ASTM members argued that addressing the suffocation hazard involving soft bedding needs to be the primary thrust of the warnings, and that the prone sleep message should be lower in the warning. The Commission's prioritization of the prone sleep message, which is supported by a public comment, is important for communicating to consumers the most common hazardous use pattern that staff observed in fatal crib mattress incidents. As detailed in Tab B of Staff's Final Rule Briefing Package, and Tab A of Staff's NPR Briefing Package, the majority of the deaths involved prone positioning, often with no other known contributing factors. The prone sleep message needs to be communicated foremost, and the likelihood that consumers will see this critical message will be improved by placing it at the top of the warning label. Prioritizing the prone sleep message will not make it less likely that consumers will read and follow the messages pertaining to suffocation from soft bedding, which are emphasized in the label, because the prone sleep message is followed by a suffocation-specific heading (*i.e.,* "Babies have suffocated") and several statements, including bulleted points, about soft bedding. The arrangement of warnings in the final rule increases the likelihood that consumers will be made aware of the SIDS and suffocation hazards in the event that they read only the first half of the label.

The NPR included the following additional requirements for after-market mattresses for

[68] Detailed in the NPR package, SIDS is a subcategory of SUID that refers to infant deaths that cannot be explained after a thorough case investigation.

rigid-sided, rectangular, non-full-size cribs: (1) All warnings added by the original manufacturer in addition to those required by this standard; (2) assembly/attachment instructions that were provided on the original mattress; and (3) the brand(s) and model(s) number(s) of the product(s) in which the mattress is intended to be used. In ASTM's balloted version, these requirements apply only to mesh/fabric-sided products and rigid-sided non-rectangular products. Several ASTM members argued that these warnings are not suitable for after-market mattresses for rigid-sided, rectangular products, claiming that there are standard sizes for rigid-sided rectangular products. CPSC staff advises that this claim is not factual; excluding full-size cribs, there are no official standardized interior dimensions of rigid-sided, rectangular non-full-size cribs. ASTM F406-19, the applicable mandatory standard, requires only that the interior length dimension is either greater than 55 in. (139.7 cm) or smaller than 49-3⁄4 in. (126.3 cm), and/or the interior width dimension is greater than 30 5⁄8 in. (77.7 cm) or smaller than 25-3⁄8 in. (64.3 cm). Considering that this subsection of the rule excludes full-size cribs, the final rule includes the NPR-proposed language, thereby ensuring that consumers see the additional information for after-market mattresses for rigid-sided, rectangular, non-full-size cribs.

The NPR included requirements for instructional literature. These requirements are consistent with recommendations from the ASTM Ad Hoc Language Task Group. Several ASTM members argued that instructions are unnecessary for crib mattresses, alleging use of the products is intuitive and that relevant information is provided in the on-product labels. In addition to aligning with Ad Hoc recommendations, given the significance of the hazards, it is important to incorporate another medium, *i.e.,* instructional literature, by which to communicate the SIDS and suffocation hazards to consumers. The NPR demonstrated through incident data and research involving surveys and focus groups that consumers continue to use crib mattresses in ways contrary to the proposed safety information. Given the inherent limitations of safety information, which depends on

persuading consumers to behave differently and perhaps inconveniently (such as repositioning a sleeping infant), multiple mediums are critical to communicate hazard-avoidance behaviors to consumers to motivate consumer actions.

In a June 9, 2021 ASTM meeting, staff raised additional concerns, including the following: (1) the word "product" was used in the ASTM balloted item to refer to both crib mattresses and structures (cribs, non-full-size cribs, and play yards); and (2) the ASTM balloted item used "should" instead of "shall" in reference to required labeling specifying maximum gaps between the mattress and product sides, and that the reference was made in a "Note," which, by definition, is not mandatory.[69] The ASTM subcommittee agreed that these additional concerns were valid, but determined that the ballot should not be delayed, and that further improvements would be considered in the future. Subcommittee voting members voted on whether CPSC staff's negative was non-persuasive, and the motion passed with 11 affirmatives, one negative, and six abstentions. The full F15 committee upheld the subcommittee's non-persuasive finding on August 2, 2021 (ballot F15 (21-05), item 8). Therefore, a further revision of ASTM F2933 – 21 was approved on September 1, 2021, and CPSC expects the revision will be published around the end of September 2021. However, this future revision will remain inconsistent with the final rule, and for the reasons detailed in this preamble and Tab D of Staff's Final Rule Briefing Package, the Commission will not include ASTM's revision in the final rule.

ASTM included the following additional deviations in the ballot (F15 (21-02), item 13), which were not sufficiently discussed in the June 9, 2021 meeting, and the Commission did not receive direct comments on the NPR pertaining to these deviations. However, consistent with comments on the NPR, which requested that CPSC consider ongoing ASTM activities, we assessed whether these deviations added to the safety of crib mattresses. One such deviation was placement

[69] *See* Ballot F15 (21-02), item 13, note 7 in Appendix A to Tab D of Staff's Final Rule Briefing Package.

of the following warning message lower in the label than in the NPR: "DO NOT cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS." Staff advises that this important warning should not appear towards the bottom of the label, located below a detailed explanation of how to identify hazardous gaps. The label already includes a warning pertaining to gaps above this warning about overheating, and staff reiterates the importance of addressing the hazardous uses early on in the label, as text lower in the label is less likely to be read. Additionally, the warning label layout proposed in the NPR positions the gap measurement message directly above the related interior dimensions message for cribs, and closer to other required statements pertaining to product size.

ASTM's balloted item also deviated from the NPR regarding the packaging requirements. The NPR-proposed packaging requirements incorporated recommendations from the ASTM Ad Hoc Language Task Group. The ASTM-balloted packaging requirements expand on these Ad Hoc recommendations, including product-specific clarifications and incorporating formatting requirements from section 7.4 of ASTM F2933-21. After further consideration, CPSC agrees that some of these changes may further improve the safety of crib mattresses, while other changes are merely editorial and do not add to the safety of crib mattresses. Accordingly, the final rule continues to align with the ASTM Ad Hoc committee's recommendations for packaging requirements.

2. Final Rule Warnings Clarifications

As requested in comments on the NPR, staff continued efforts with ASTM to further improve the safety information requirements for crib mattresses. Based on these communications and ASTM F15's balloted changes to safety information to be incorporated into ASTM F2933-21, the final rule includes modifications to safety information, to further reduce the risks of death and

serious injury associated with crib mattresses. Appendix A to Tab D of Staff's Final Rule Briefing Package contains a redline of all modifications in the final rule.

- In section 3.1.2, changed "conspicuous*,* adj—visible while the mattress is being placed in its intended use position," to "conspicuous, adj — visible when the mattress is being handled by a consumer placing the mattress in its intended use position in a product." This change aligns with the latest consensus ballot by ASTM F15, and clarifies the intended meaning of "conspicuous" in the NPR-proposed language, that the warning should be conspicuous to the consumer.
- In section 7.4.6.2, changed "The text in each column needs to be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points," to "The text in each column should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points." This change, from the mandatory language of "needs to" to the recommended language of "should," aligns with the latest recommendations from Ad Hoc and the consensus ballot by ASTM F15. This change recognizes the importance of providing manufacturers with flexibility in arranging the bulleted hazard avoidance statements based on mattress-specific requirements, where appropriate.
- In section 7.5, changed "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 ⅜ in. (3.5 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses," to "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 ½ in. (3.8 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses." This change for full-size crib mattresses from 1 ⅜ inches to 1 ½ inches aligns with the latest consensus ballot by ASTM F15. This change results in a minor conflict between the warning message and the maximum gap afforded by

the performance requirements (*i.e.,* a conflict of $^{1}/_{8}$ in.); however, CPSC agrees with ASTM F15.66, which determined by consensus the following: the difference of $^{1}/_{8}$ inch is unlikely to reduce the safety of full-size crib mattresses, the conflict is unlikely to confuse consumers (they are unlikely to be familiar with the requirements in the standard), and the new measurement (1 ½ in.) is more tangible for consumers to estimate, thereby, increasing the likelihood of consumers attempting to measure, and accurately measuring, gaps between the full-size crib mattress and side walls of the full-size crib.

- In section 7.5.3, changed "Manufacturers are permitted to include additional warnings between the warnings specified in 7.5 and 7.6 if desired," to "Additional manufacturer warnings are permitted between the warnings specified in 7.5 and 7.6, if desired." This editorial change clarifies further the allowance in the rule, and it is consistent with the latest consensus ballot by ASTM F15.
- Section 7.8 includes several changes to the requirements for retail packaging, as specified in Appendix A to Tab D of Staff's Final Rule Briefing Package. These changes take into consideration the latest consensus ballot by ASTM F15, and further improve the safety of crib mattresses by: (1) incorporating formatting requirements from section 7.4, and (2) clarifying the warnings and statements required for specific mattress types.
- Renumber Figures 7 – 10 to Figures 8 – 11. This shift in numbering accounts for an additional figure added to ASTM F2933-21, Section 6, as part of the final rule, as discussed in Tab C of Staff's Final Rule Briefing Package.
- For Figure 10, now renumbered as Figure 11, changed the caption from "Example of Warning Label for After-Market Mattress for Rigid-Sided Rectangular Products. Items italicized in brackets are to be added as appropriate. The blanks are to be filled in as appropriate," to "Example of Warning Label for After-Market Mattress for Rigid-Sided,

Rectangular, Non-Full-Size Cribs. Items italicized in brackets are to be added as appropriate." This change provides an important clarification that the example is not for full-size crib mattresses; full-size crib mattresses have a different warning label than these products.

To illustrate the changes to the warning labels, Figure 3 below shows a comparison of warning label examples from the NPR-proposed label, the latest consensus ballot label to be incorporated into ASTM F2933-21, and final rule warning labels for full-size crib mattresses.[70]

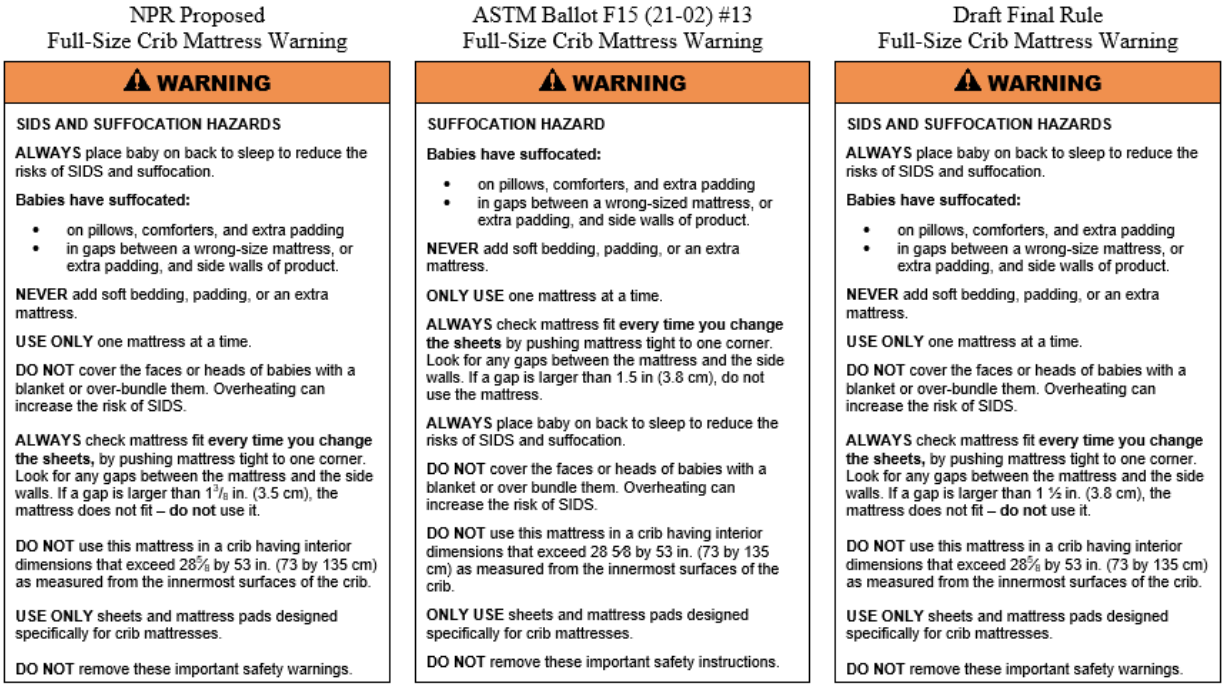


***Figure 3.*** Examples of NPR-proposed (left), ASTM-balloted (middle), and draft final rule (right) warning labels for full-size crib mattresses. These labels are not shown in actual size.

## VII. Response to Comments

The Commission received 13 comments on the NPR before the comment period closed on January 11, 2021, and two late-filed comments, in July and September 2021. You can access comments by searching for docket number CPSC-2020-0023 at http://www.regulations.gov. The

[70] *See* Appendix A to Tab D of Staff's Final Rule Briefing Package, Figures 10 and 11, for examples of the draft final rule warnings for non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs.

comments fell into several broad categories: (1) testing requirements and modifications; (2) after-market mattress fit for play yards; (3) improving communication to caregivers; and (4) procedure. Below we summarize and respond to the comments by topic.

*A. Testing Requirements and Modifications*

**Comment 1**: Commenters generally supported requirements for cyclic testing of full-size coil spring mattresses, but they encouraged continued work with ASTM to address outstanding issues.

**Response 1**: Requirements in the final rule for cyclic testing of full-size coil spring mattresses are based on staff's work with the ASTM cyclic testing task group before the NPR. Since the NPR published, staff continued to work with the task group to develop this test. The task group last met on December 9, 2020. Public comments specifically refer to ASTM work to further define requirements for support of the plywood/oriented strand board (OSB) mattress support board, and to further clarify how the test method can allow for dual-sided mattresses. Staff advises that they generally agree with these comments. However, the task group's work has not been balloted, and any updates to the test procedure since the December 2020 meeting have not been made available to staff for review. Therefore, for the final rule, the Commission is updating the cyclic test method by clarifying that the test method should be performed on each side of the mattress, using different mattresses, to address how the test should proceed with dual-sided mattresses. The Commission does not have enough information to proceed with any changes to the mattress support board. Should ASTM propose any updates to the test method in the future, the update process under Pub. L. No. 112-28 provides a method for the Commission to consider whether a revised test method improves the safety of crib mattresses.

**Comment 2**: The CPSC received several comments related to the proposed corner gap test using a twice-washed fitted sheet, including: (1) that there should be a shrinkage performance

requirement for a sheet, in lieu of testing mattresses with a shrunken sheet; and (2) that each mattress corner should be subjected to a certain, unspecified force or pressure before measuring the subsequent gap, instead of using a shrunken sheet. One commenter suggested that issues with sheets not fitting appropriately are better addressed by the ASTM infant bedding subcommittee. A commenter stated that as currently written, the test methodology may result in inconsistent, variable test results across testing labs and settings, because sheets can vary in quality and sizing. The same commenter also said the testing methodology may penalize full-size crib mattresses designed with greater-than-nominal dimensions.

**Response 2**: Staff advises that issues with sheets shrinking or not fitting full-size-crib mattresses are appropriate for the infant bedding subcommittee. The ASTM infant bedding subcommittee has formed a task group, which held its initial meeting on March 22, 2021. CPSC staff is a member of the task group and participated in the initial meeting. CPSC staff will continue working with the ASTM infant bedding subcommittee to develop appropriate performance requirements for fitted sheets. Once that work is complete, staff can work with the ASTM crib mattress subcommittee to refer to new requirements for sheets, if appropriate. Staff's work with the ASTM infant bedding subcommittee will also help resolve concerns about inconsistent test results due to variability in sheet quality and sizing. The Commission encourages test laboratories to identify cotton sheets that are the appropriate size for the mattress to be tested.

Addressing the fact that sheets shrink, however, does not address the issue of mattresses that do not hold their shape when sheets are applied. Therefore, the final rule contains a test for potentially hazardous gaps created when sheets are placed on a crib mattress. Staff advises that the ASTM subcommittee created a task group to work on creating a test that uses an appropriate force to apply to crib mattress corners, to simulate sheets, which could create a more repeatable test and more consistent results. However, CPSC received no comments or test data to support a test

protocol, or an appropriate force. As noted in the NPR, foam mattresses and innerspring mattresses have different compressive behavior when a sheet is placed on them, resulting in inconsistent forces to replicate sheet behavior. Staff will continue to work with the ASTM subcommittee and task group, and if ASTM should publish a voluntary standard with a revised compression test, CPSC can evaluate the updated voluntary standard under the revision process pursuant to Pub .L. No. 112-28.

For the final rule, in response to comments, the Commission will revise the method of measuring for the compression test. Staff advises that the methodology proposed in the NPR may be overly restrictive for full-size crib mattresses designed to be greater-than-nominal dimensions, because the test method assumed that every mattress would have the 1-inch maximum allowable gap between the crib and the crib mattress, regardless of size. Commenters state that this assumption is overly restrictive for mattresses that were designed to fill the space between the crib and crib mattress. Accordingly, to address this comment, the final rule modifies the measurement method in the test procedure, such that the corner gap is measured from a projected crib corner.

**Comment 3**: Several commenters expressed opinions regarding the mattress firmness test proposed in the NPR. Overall, it appeared that industry prefers the mattress firmness test in the ISO 23767 standard, *Children's furniture – Mattresses for cots and cribs – Safety requirements and test methods,* over the proposed mattress firmness test based on the AS/NZS 8811.1:2013 standard, *Methods of testing infant products – Method 1: Sleep Surfaces – Test.* Consumer groups expressed support for the test based on AS/NZS 8811.1:2013. One consumer group submitted an undergraduate engineering report describing a potential new test fixture for consideration, but the submission did not include additional information, such as test protocols and performance criteria.

**Response 3**: The Commission agrees with commenters who support a firmness test that would address the suffocation hazard associated with excessively soft mattresses. Although several commenters expressed support for specific tests, none of the commenters provided testing data to

support the use of one test protocol over another. In the NPR, CPSC compared the AS/NZS 8811.1:2013 and the ISO 23767 test protocols[71] for measuring mattress firmness, and found that the AS/NZS 8811.1:2013 test method was more stringent because it resulted in failures on more test surfaces. Additionally, although the Commission appreciates the work to develop a test fixture that can be used to compare mattress firmness, the undergraduate engineering report offers no performance criteria by which to judge the results.

Accordingly, based on the available data, the Commission will finalize the crib mattress rule, as proposed, by requiring use of a firmness test based on the requirements in AS/NZS 8811.1:2013 test for mattress firmness. CPSC staff continues to work with the ASTM subcommittee to investigate firmness requirements, as discussed in section VI.A of this preamble and Tab C of the Staff Final Rule Briefing Package. If ASTM updates the voluntary standard to include a different mattress firmness test, and the revision is based on supporting data, ASTM can provide to the Commission the updated standard and supporting data for evaluation through the update process, pursuant to Pub. L. No. 112-28.

*B. After-Market Mattress Fit for Play Yards*

**Comment 4**: One commenter stated that having standard-sized play yards and mattresses could help to address mattress fit issues, similar to the method employed by full-size cribs and full-size crib mattresses.

**Response 4**: The play yard and non-full-size cribs voluntary standard (ASTM F406 – 19, incorporated by reference into 16 CFR parts 1220 and 1221) currently does not contain provisions requiring the products to be of a standard size. We further note that the commenter did not provide a proposal for a specific size or range of sizes that would be necessary for such a requirement, and

[71] The ISO 23767 test protocol is the same as the EN 16890:2017, *Children's Furniture – Mattresses for Cots and Cribs – Safety Requirements and Test Methods*, section 8.2.3 firmness test protocol.

the NPR did not discuss standardizing sizes for play yard mattresses; nor did it solicit comment on the issue. Therefore, changes to play yard mattresses in 16 CFR part 1220 are outside the scope of this specific rulemaking on crib mattresses. The commenter should pursue this idea with the ASTM F15.18 subcommittee on play yards.

**Comment 5**: A commenter requested that the Commission set a minimum thickness for play yard mattresses to reduce the likelihood consumers would find a mattress too thin and add hazardous padding. The same commenter requested that the Commission delay finalizing the rule until a task group organized by the ASTM play yard subcommittee, the play yard mattress fit and thickness task group, completes their work.

**Response 5**: Regarding the request that the Commission set a minimum thickness for play yard mattresses, we note that CPSC staff expressed similar concerns with consumer perception of mattress thickness/comfort in the briefing package on Petition CP 15-2, stating, "Because incident data demonstrate that consumers perceive play yard mattresses to be uncomfortable, and then place additional soft bedding in infant sleep environments, CPSC staff does not recommend banning supplemental mattresses." However, based on staff's advice, we believe that setting a minimum mattress thickness would not address the resilience of a mattress, which is not based on thickness alone, but also on the density of underlaying foam. For example, staff advises that they are aware of bassinet mattresses that meet the thickness limit, but are dense enough not to "bottom out" on the hard backer-board, which supports that a denser foam pad could also address consumer complaints.

Regarding the work of the play yard fit and thickness task group, this work is ongoing and has neither reached consensus in the task group, nor been balloted. Staff has also voiced concern that this task group is focused on identifying the gap size between the mattress and the flexible play yard side while the play yard side is in a resting position, while staff believes the focus should be on

a test that accounts for the flexible nature of play yard sides to create a three-dimensional pocket from the existing gap. Staff remains engaged in efforts to address mattress thickness.

Work on the play yard standard is outside the scope of this rulemaking, and therefore, that work should not delay the current rulemaking for crib mattresses. If, in the future, F406 is updated to address the work of the fit and thickness task group, then ASTM can notify the Commission under the provision in Pub. L. No. 112-28, and the Commission will evaluate the potential effect on the safety of play yard mattresses.

**Comment 6**: Some commenters who manufacture crib mattresses objected to allowing after-market mattresses for play yards because all play yards are sold with a mattress designed for use with the play yard. One manufacturer questioned the safety and necessity of after-market mattresses.

**Response 6:** In 2015, the Commission docketed a petition to ban supplemental mattresses for play yards. In response to that petition, the Commission directed staff to address hazards associated with supplemental play yard mattresses, as well as crib mattresses, through rulemaking under section 104. Staff's petition package stated: "[b]ecause incident data demonstrate that consumers perceive play yard mattresses to be uncomfortable, and then place additional soft bedding in infant sleep environments, CPSC staff does not recommend banning supplemental mattresses." Although the Commission understands the concerns with after-market mattresses that can be used to supplement an existing play yard mattress, the Commission can address the hazard better, by directing CPSC staff to continue working through the voluntary standards committees to address the hazards associated with the use of after-market mattresses, and thereafter, incorporate the voluntary standard into a mandatory standard, to address both the safety of after-market mattress and consumers' perceived need for after-market mattresses.

**Comment 7**: Commenters raised concerns that manufacturers make numerous, frequent changes in names and model numbers of play yards, rendering any list of compatible play yard models for after-market play yard mattresses "out of date as or soon after it is printed." One commenter stated that the proposed rule would endorse misuse and, in effect, contradict the mandatory warning stipulated in 16 CFR § 1221.2(b)(5)(i) that only the OEM mattress should be used with the play yard.

**Response 7**: Although some type of certificate of compatibility could address issues with mattress fit and manufacturer concerns with third party manufacturers claiming compatibility, CPSC does not have the authority to regulate inter-business arrangements, such as certificates of compatibility. However, this final rule will require after-market mattresses to be "tested with each brand and model of product"[72] in which they are intended to be used. In addition, the final rule will require each mattress to "specifically identify the brand(s) and Model(s) numbers of products in which it is intended to be used."[73] Accordingly, through the requirement in section 14 of the CPSC, as set forth in 16 CFR parts 1107 and 1110, an after-market mattress that complies with this rule will have third party certification that it meets the requirements for play yard mattresses in 16 CFR part 1221, incorporating ASTM F406.

Because the final rule will require that an after-market mattress meet the same dimension and test requirements as the mattress supplied with the product, and must be tested and certified to the same standard, CSPC concludes that there is likely no safety concern for consumers, because the testing and certification require labeling that accomplishes the same goal. Additionally, because the labeling may create some confusion between ASTM F406, section 9.4.2.10 ("Use ONLY

[72] ASTM F2933 – 21, section 5.8.1.2.
[73] ASTM F2933 – 21, section 7.5.3.1.

mattress/pad provided by manufacturer"), and 16 CFR § 1221.2(b)(5)(i), the ASTM F15.18 task group on ad hoc warnings is actively working to revise this message.

**Comment 8**: Several commenters stated that after-market mattresses should have to meet the same requirements as OEM mattresses. Another commenter stated that staff should continue working with ASTM to include more performance-based testing for after-market mattresses. Several commenters supported the revised requirements for after-market mattresses developed by the ASTM non-segmented mattress task group, which were approved (and now published) in ASTM F2933-21. A commenter also requested that the final rule wait until the play yard fit and thickness task group completes work.

**Response 8**: The Commission agrees that after-market play yard and non-full-size crib mattresses should meet the same requirements as OEM mattresses. The Commission addressed these points in the NPR, by proposing that after-market, non-full-size crib mattresses meet the same requirements listed for these products in ASTM F406 section 5.17, *Mattress for Rigid Sided Products*, and by proposing that after-market play yard mattresses meet the ASTM F2933-19 requirement to have the same "thickness, floor support structure and attachment method as the mattress it is intended to replace." The revisions in ASTM F2933-21 replace the design requirement for after-market mattresses with the performance requirements that they are tested to, such that after-market mattresses must meet the same performance requirements as OEM mattresses. Additionally, ASTM F2933-21 requires that after-market mattresses be "at least the same size," and the floor support structure must be "at least as thick," as the OEM mattress. CPSC staff advises that they support these changes to the standard, which appear to be in line with comments CPSC received on the NPR. Accordingly, for the final rule, the Commission will incorporate by reference ASTM's newly revised voluntary standard, ASTM F2933-21. The Commission will not delay this final rule to wait until work is completed in the play yard

subcommittee on mattress fit and thickness. Although staff remains engaged on the play yard task group for fit and thickness, changes to the play yard standard are out of scope for this specific rulemaking on crib mattresses.

Moreover, although the commenter implied that the play yard fit and thickness work was nearing completion, staff advises that the task group is focused on measuring the gap between the play yard side and mattress only along the plane of the top of the mattress, without accounting for the flexible nature of fabric or mesh sides. As described in the briefing package on the supplemental mattress petition, a gap alone may not create a hazard if a three-dimensional pocket cannot form to entrap an infant. Staff informs that the task group is generally resistant to using a probe to identify hazardous gaps, and instead, is focused on measuring a gap alone. The figure below was included in the staff briefing package on Petition CP 15-2, illustrating that a one-dimensional measurement may not achieve the desired hazard identification.

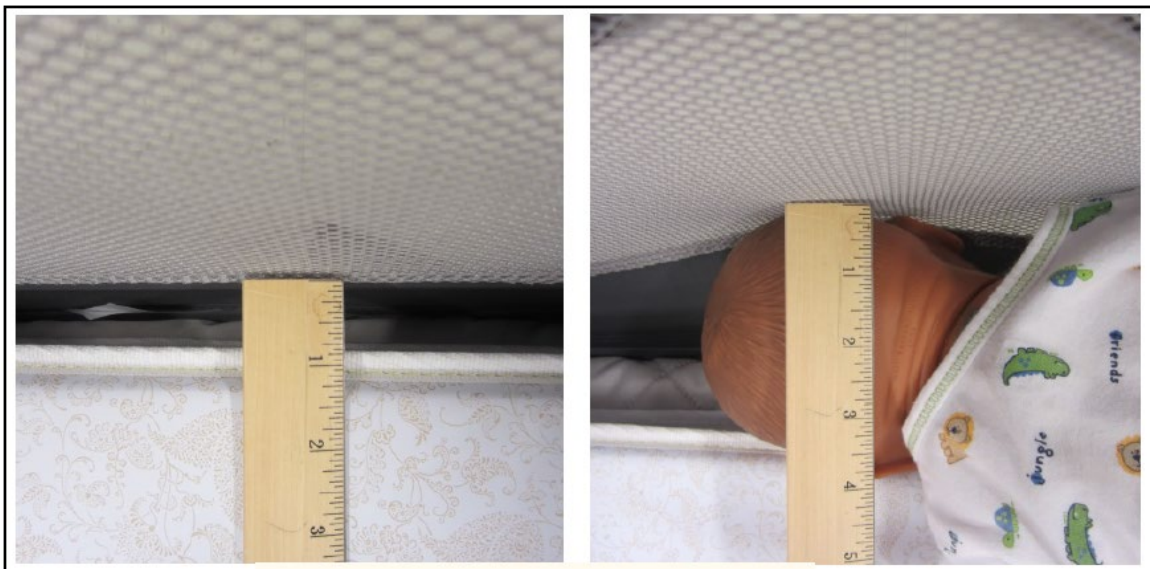

**Figure 4. Illustration of Gap Expansion**

*C. Improving Communication to Caregivers*

**Comment 9**: One commenter recommended that the Commission engage with child safety advocates and other interested parties to undertake a coordinated campaign to communicate to consumers appropriate behaviors that will enhance the safety of infant sleep.

**Response 9**: The Commission agrees that a coordinated campaign to communicate to consumers the importance of placing an infant on their back to sleep without any covering beyond a light blanket would promote safe infant sleep behaviors for caregivers. However, the Commission acknowledges that a warning label statement on a consumer product cannot guarantee that consumers will read, understand, or heed the warning regarding the hazard.

**Comment 10**: A commenter recommended a maximum of three warning statements on the product, and provided the suggested language below (verbatim):

1. Place your baby on his/her back only.
2. Do not add soft bedding (blankets, pillows, etc) *under or over* your baby, or anywhere in play yard. Instead, dress baby in a wearable blanket or sleep sack to keep them warm.
3. Use mattress and sheets that fit this product – Use play yard mattress only. If mattress is too small, your baby can roll into gap and suffocate.

For more information, go to www.cpsc.com/sleepsafety

Save this warning!

[Link above is a placeholder for a functioning link to more information.]

**Response 10**: Consistent with the NPR, CPSC agrees with several points raised by the commenter, including that: (1) consumers are less likely to read lengthy text warnings on familiar products; (2) it is critical to communicate successfully to consumers the hazards related to prone positioning, soft bedding, and gaps created by ill-fitting mattresses; and (3) the prone positioning

message needs to be prioritized. While, in general, staff advises that warning labels should be as concise as possible, circumstances specific to these products and hazards warrant more information on the labels, and consumers may not check a website identified on the label. Hazardous use patterns associated with products for infant sleep are common and are likely to be misunderstood by consumers. Consumers may not find short warning statements for crib mattresses convincing, absent elaboration and repetition with rephrasing, especially if the statements contradict the consumers' knowledge, expectations, and experiences. The warning labels in the final rule begin with clear and concise statements pertaining to the typical use patterns involved in SIDS and suffocation incidents, beginning with the prone positioning message. These statements are organized and worded such that they are more likely to be seen and understood, and act as reminders, even if the consumer does not read the rest of the label. The rest of the messaging reiterates, rephrases, and explains the hazards. For example, consumers must consider and understand what it means for a mattress to be ill-fitting. As discussed in Staff's Final Rule Briefing Package, a mattress in an uncompressed state may not visually produce worrisome gaps; yet, various factors can cause a compressed mattress to form hazardous gaps. With few exceptions, including placing the prone positioning warning foremost in the label, the final rule warning label is consistent with recommendations from ASTM F15. Tab D of Staff's Final Rule Briefing Package, and section VI.B of this preamble, outline other exceptions.

**Comment 11**: A commenter recommended modifying the proposed hazard identifier from "SIDS and SUFFOCATION HAZARDS" to "Help Prevent SIDS and Suffocation."

**Response 11**: The Commission declines to adopt the modifications to the warning label as set forth by the commenter. Among other concerns, the comment-proposed hazard identifier may confuse the consumer viewing the warning label. The viewer of the label may infer that the statement, "Help Prevent SIDS and Suffocation," is a standalone statement, unrelated to the rest of

the warning message. Use of "Help," although accurate, may soften the language, and perhaps, demotivate the reader. ASTM subcommittee members do not support the commenter's warning approach. During the ASTM F15.66 subcommittee meeting on June 9, 2021, attendees stated that such a change would dilute the warning message, and opined that the hazard identifier should remain as balloted in F15 (21-02) (*i.e.,* "SUFFOCATION HAZARDS"). The hazard identifier and ballot are discussed further in Tab D of Staff's Final Rule Briefing Package and section VI.B of this preamble.

**Comment 12**: A commenter advised against all-caps lettering to emphasize words that "lack concrete meaning," such as "DO NOT" and "USE ONLY." A commenter posited that this capitalization will be inferred by the consumer to mean the adjacent text is not as important, and therefore, the adjacent text, which pertains to hazardous use, will not be read by the consumer.

**Response 12**: The Commission declines to follow the commenter's suggestion. Based on staff's advice, we conclude that the all-caps lettering used in the final rule warning label plays an important role in attracting a consumer's attention to the hazardous-use warnings. Recent regulations use capitalization in this manner[74]: all-caps lettering is used in the recommendations from the Ad Hoc Language Task Group; and all-caps lettering pertaining to crib mattresses has been supported in ASTM F15.66 and balloted by ASTM F15 without objection. For more information on this ballot, see Tab D of Staff's Final Rule Briefing Package and section VI.B of this preamble.

**Comment 13**: A commenter advised the Commission to eliminate warning statements that can and should be addressed through performance standards. The commenter's point is provided in the context of a recommendation to standardize sizes of play yards and play yard mattress sheets.

**Response 13**: The Commission agrees that performance requirements should be used

[74] For example, see the Commission Briefing Package: Final Rule – Safety Standard for Gates and Enclosures: https://cpsc.gov/s3fs-public/Final%20Rule%20-%20Safety%20Standard%20for%20Gates%20and%20Enclosures.pdf?lHExt6trsEuD56jiQTi7Ab0TjzdVQ_HH.

instead of warning statements, where feasible, and that warning statements should be omitted if they do not contribute to the safety of the product. Warnings are inherently limited in effectiveness, because they depend fallibly on persuading consumers to alter their behaviors in ways to avoid hazards. In contrast, performance requirements attempt to reduce or eliminate access to the hazards. The Commission's approach is to make warnings as motivating as possible, given their inherent fallibility, and particularly when they must be used instead of performance requirements, or when they are used in a supporting role to performance requirements that minimize, rather than eliminate, exposure to hazards.

The commenter is referring to a separate standard, ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards* (incorporated into 16 CFR part 1221), and ongoing activity by the ASTM F15.18 subcommittee contributing to that effort, which is out of scope for the current rulemaking. However, the Commission encourages the ASTM F15.18 subcommittee to develop more effective performance requirements to reduce the reliance on warnings.

**Comment 14**: A commenter stated that to support the crib mattress warnings, CPSC should develop pictograms and evaluate comprehension of pictograms using the methods outlined in ANSI Z535.3.

**Response 14**: Well-designed graphics may be able to supplement the crib mattress warnings, such as by increasing the noticeability of the warnings. Graphics are also helpful for consumers with limited or no English literacy. However, the design of effective graphics is a complicated matter that requires comprehension testing with the target audience. A poorly designed graphic may have limited or no effectiveness, and may even elicit the opposite effect than intended; *i.e.,* a "critical confusion," in which the reader infers that s/he should take the prohibited action to avoid the hazard. Although CPSC is not opposed to considering suitable graphics pertaining to crib

mattress warnings, the agency will not delay the final rule until suitable graphics are developed.

**Comment 15**: A commenter recommended revising the play yard mattress warning language, as set forth in the comment, in part, because the Flesch-Kincaid readability assessment tool in MS Word indicated the message required only a "5.9 grade reading level."

**Response 15**: For consistency and comparison purposes, staff used the Flesch-Kincaid readability assessment tool in MS Word (Microsoft Office Professional Plus 2019) on the play yard mattress warning set forth by the commenter and the final rule label for after-market mattresses for mesh/fabric-sided products.[75] Staff found that the play yard mattress warning urged by the commenter returned a 5.4 Flesch-Kincaid Grade Level with a reading ease of 77.1. The final rule after-market mattress for mesh/fabric-sided products warning returned a 3.4 Flesch-Kincaid Grade Level with a reading ease of 80.8. However, the rating for the final rule label, as proposed in the NPR, does not include the product-specific information to be added:

> *[All warnings added by the original manufacturer which are in addition to those required by this standard.] [Assembly/attachment instructions that were provided on the original mattress.] [The specific brand(s) and model(s) number(s) of the product(s) in which the mattress is intended to be used]*.

Therefore, staff also tested the reading level for the final rule warning label for full-size crib mattresses,[76] and found it had a 3.8 Flesch-Kincaid Grade Level with a reading ease of 77.7. A reading ease score of 70 to 80 is considered U.S. 7th grade school level, and a score of 80 to 90 is considered U.S. 6th grade school level. In general, the Commission prefers for warnings to be at the 6th grade level or lower, consistent with literature from Leonard, Otani, and Wogalter (1999)[77];

[75] Figure 9 in the Appendix of the ESHF memorandum of the Commission NPR Briefing Package on Crib Mattresses.
[76] Figure 8 in the Appendix of the ESHF memorandum of Staff's NPR Briefing Package.
[77] Leonard, S.D., Otani, H., & Wogalter, M.S. (1999). Comprehension and memory. In M.S. Wogalter, D.M. DeJoy, & K.R. Laughery (Eds.), *Warnings and risk communication* (pp. 149–187). Philadelphia: Taylor & Francis.

however, the 8th grade level is considered "plain English." Notably, the Flesch-Kincaid tool provides an imperfect assessment of readability, because it considers only the number of words, sentences, and syllables, meaning that text with low reading-level thresholds are not necessarily more meaningful or understandable. With few exceptions, the final rule language is consistent with recommendations from ASTM F15 (regarding the exceptions, see Tab D of Staff's Final Rule Briefing Package).

**Comment 16**: A commenter stated that CPSC should determine whether it is appropriate to add warnings content regarding fall or strangulation.

**Response 16**: Based on staff's advice, the Commission does not find it appropriate to add to the crib mattress warnings content regarding fall or strangulation. Warnings pertaining to these hazards are addressed by other standards, including ASTM F1169, *Standard Consumer Safety Specification for Full-Size Baby Cribs* (incorporated into 16 CFR part 1219), and ASTM F406 (incorporated into 16 CFR parts 1220 and 1221). As discussed by the commenter, adding more information to the final rule warnings may dilute the message, resulting in some consumers being less likely to read the warnings. Furthermore, ASTM F15 did not find it appropriate to include warning content regarding falls or strangulations. Staff will continue to monitor the data for evidence that these additional warnings should be added.

**Comment 17**: A commenter stated that the warnings proposed in the NPR are incompatible with the warnings in ASTM F406, because the requirements in the NPR allow after-market mattresses in play yards, which are not from the OEM; whereas, ASTM F406 includes warnings to use only the mattress provided by the manufacturer.

**Response 17**: The Commission is aware of the warning labels required by the separate rules. Although modifications to warnings in F406 are outside the scope of this rulemaking for crib mattresses, we note that the play yard subcommittee, ASTM F15.18, has an active task group

working to update the warning section of ASTM F406 to include the ad-hoc warning recommendation and to address other issues. This play yard task group is actively discussing how to update[78] this warning message. If the play yard voluntary standard is revised, the CPSC will evaluate the revision for inclusion in the mandatory standard for play yards through the Pub. L. No. 112-28 update process.

**Comment 18**: A commenter stated that CPSC should consider the developments to safety information requirements discussed in the crib mattress ASTM task group and subcommittee in the period between the NPR and final rule.

**Response 18**: After the NPR was published, staff continued to work with ASTM to address deficiencies in the safety information requirements in ASTM F2933. The final rule includes some of the safety information recommendations from ASTM task groups and subcommittees, including subcommittee F15.66, such as the maximum side gap between a full-size crib mattress and full-size crib. The final rule does not incorporate other suggestions from ASTM members, such as excluding "SIDS" from the hazard identifier, and presenting the prone positioning warning lower in the warning labels. Tab D of Staff's Final Rule Briefing Package contains additional information.

*D. Procedural comments*

**Comment 19**: Commenters both supported and opposed the proposed 6-month effective date for the final rule. Some commenters urged the effective date of a final rule to be as soon as possible, because additional time for the rule to become effective would put infants at risk. Other commenters requested an indefinite delay of the rulemaking, until ASTM completes changes and updates to the voluntary standard for crib mattresses (ASTM F2933), and the standard associated with play yards (ASTM F406).

[78] https://www.cpsc.gov/s3fs-public/2021-07-08-ASTM-Play-Yard-Ad-hoc-language-meeting.pdf

**Response 19**: For the final rule, the Commission will retain the proposed 6-month effective date. Crib mattress suppliers have had lead time to prepare for the final rule since the NPR was published on October 26, 2020. Many crib mattresses within the scope of the final rule require no change in design to achieve compliance with the final rule. Furthermore, 6 months from the change in a voluntary standard is the time frame that JPMA uses for its certification program. Consequently, compliant manufacturers are used to this time frame to comply with a modified standard. Additionally, the Commission will not wait for completion of work in the ASTM F406 standard to finalize this crib mattress rule, because modifications to ASTM F406 are out of the scope of this proceeding.

**Comment 20**: A commenter states that the NPR is unconstitutional because CPSC proposed to incorporate by a reference a voluntary standard, instead of publishing all of the regulatory text for the crib mattress rule in the *Federal Register*. The commenter asserted that the CPSC forces the public to pay for access to the law, thereby offending "our constitutional structure, due process, the First Amendment, and equal protection." The commenter, in support of their contention that incorporation by reference (IBR) is unconstitutional, stated:

- No one can own the law, privatizing the law is not in accordance with our form of constitutional government and grants ASTM a monopoly ownership over the law;
- Due process under the Fifth Amendment requires the public to have free access to the laws that regulate people or entities, and the NPR allegedly violates due process by failing to provide the public with fair notice of the standard because the commenter contends that to view the content of the voluntary standard, the NPR requires the public to pay ASTM or to travel to Bethesda, MD, to see a copy at CPSC headquarters;
- CPSC is creating a monopoly for ASTM and forcing the public "to rely on the whims of ASTM," whom the commenter states is a private company that is incentivized to

increase the prices of its standards, and which harms consumers more than businesses because it creates a financial barrier to accessing product safety standards;

- IBR violates the First Amendment because it does not allow free dissemination of the law and discussion of its contents; and
- IBR violates equal protection of the laws under the Fifth Amendment because it gives ASTM members a preference over non-members, because ASTM members have access to the voluntary standard as it is being developed and during the comment period, while non-members do not. The commenter believes that ASTM only makes the voluntary standard available to view for free after the public comment period closes.

**Response 20**: We disagree that the regulatory text is behind a paywall and that the draft final rule is unconstitutional. As set forth in more detail below, the commenter's factual premise is inaccurate, because the regulatory text for every CPSC-proposed rule is printed in the *Federal Register*. Additionally, the content of the law is available to the public, both before and after the voluntary standard is incorporated by reference, because the text of the voluntary standard is described in detail in the staff's proposed rule briefing package, draft final rule briefing package, and in the proposed and final rulemaking notices printed in the *Federal Register*. Stakeholders also have access to the text of the voluntary standard online, for free, both during the comment period (https://www.astm.org/CPSC.htm), and after the rule becomes final (at https://www.astm.org/READINGLIBRARY/). Any person can "disseminate" the proposed rule by citing the *Federal Register*, providing a link, or providing a copy of the notice. Additionally, anyone can "disseminate" the content of the voluntary standard by providing a link to ASTM's website. Finally, anyone can participate in ASTM meetings to develop the voluntary standard, and CPSC encourages the public to participate. Although only ASTM members can vote on a voluntary

standard, ASTM provides discounts on membership for certain members of the public, such as students. Please contact ASTM for more information.

Section 104 of the CPSIA directs the Commission to issue standards for durable infant or toddler products that are "substantially the same as," or more stringent than, applicable voluntary standards, if the Commission determines that more stringent requirements would further reduce the risk of injury. In this case, the final rule would incorporate by reference ASTM F2933-21, with modifications to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses. Staff notes that staff's proposed rule and draft final rule briefing packages contain a description of the performance and labeling requirements in the ASTM standard, including a side-by-side chart showing regulatory text and the changes made by the rule.

With regard to IBR procedures, we note that ASTM's voluntary standards are protected by copyright, which the Commission (and the federal government generally) must observe. The United States may be held liable for copyright infringement. 28 U.S.C. § 1498. Accordingly, the Commission cannot violate copyright law by publishing ASTM's voluntary standards in the CFR. The Office of the Federal Register (OFR) has established procedures for incorporation by reference that seek to balance the interests of copyright protection and public accessibility of material. 1 CFR part 51. OFR's regulations are based on Freedom of Information Act provisions that require materials to be "reasonably available" when incorporated by reference with approval of the Director of the Federal Register. 5 U.S.C. § 552(a)(1). Under the OFR's requirements, an agency may incorporate by reference specific publications, including standards, if they are "reasonably available to and usable by the class of persons affected." 1 CFR § 51.7. To ensure the material is "reasonably available," an agency must summarize the material it will incorporate by reference and discuss in the *Federal Register* notice how that material is available to interested parties. *Id*. §§ 51.3(a), 51.5(a).

The Commission complies with the requirement that publications, including standards, are "reasonably available to and usable by the class of persons affected," whenever incorporating material by reference. For example, when the Commission proposes a rule under section 104 of the CPSIA, the Commission describes and summarizes the requirements of the rule, including the voluntary standard, in the preamble of the rule printed in the *Federal Register*, and explains that ASTM's copyrighted voluntary standards are available to review online for free during the comment period at https://www.astm.org/CPSC.htm. Once a rule becomes effective, ASTM provides a read-only copy of the standard for review on the ASTM website at: https://www.astm.org/READINGLIBRARY/. As always, any person can purchase a voluntary standard from ASTM, or may schedule a time to review a voluntary standard (for free) at the Commission's headquarters in Bethesda, MD, or at the National Archives and Records Administration (NARA). Accordingly, citizens who are interested in the content of the law have unimpeded access to the regulation, and have several avenues for free access to the text of voluntary standards incorporated by reference into a mandatory CPSC standard for a durable infant or toddler product.

**Comment 21**: A commenter stated that they intend their comment to be a significant adverse comment that requires CPSC to withdraw the NPR, citing eight previous times the commenter has submitted a similar comment on CPSC's IBR process for rules updating a section 104 standard.

**Response 21**: The commenter is referencing previous comments made regarding the Commission's direct final rules to update durable infant or toddler product rules that have already been issued under section 104 of the CPSIA. The Commission did not find similar comments on those updates to be a significant adverse comment. In this case, the Commission issued a proposed rule, and is now issuing a final rule, to establish a consumer product safety standard for crib

mattresses, and is not updating an existing rule using a direct final rule. Accordingly, the "significant adverse comment" designation is inapplicable to the current rulemaking. In any event, the Commission declines to withdraw the proposed rule based on the inaccurate factual premise regarding IBR procedure contained in this comment.

**Comment 22**: A commenter asserted that section 9 of the CPSA requires the CPSC to publish the text of a proposed consumer product safety rule in the *Federal Register*. Because section 104 rules are considered consumer product safety rules under the CPSA, the commenter argued that CPSC is required to published the text of the regulation in the *Federal Register*, and the CPSC did not meet this requirement in the NPR for crib mattresses.

**Response 22**: The Commission publishes the text of proposed rules under section 104 of the CPSIA in the *Federal Register*. However, the rulemaking procedure described in section 9 of the CPSA, cited by the commenter, is inapplicable to rules issued under section 104 of the CPSIA. Section 104 of the CPSIA contains a different rulemaking authority and different rulemaking procedures. For example, 15 U.S.C. 2058(c), cited by the commenter, also requires a preliminary regulatory analysis that is inapplicable to rules issued under section 104.

**Comment 23**: A commenter stated that the Freedom of Information Act (FOIA) requires agencies to publish the text of its substantive rules in the *Federal Register*, citing 5 U.S.C. § 552(a)(1)(D). The commenter stated that § 552(a) creates an exception to this requirement for agencies that incorporate by reference a provision that is "reasonably available to the class of persons affected thereby . . . with the approval of the Director of the Federal Register." The commenter asserted that the CPSA, which allegedly requires publishing the text of a proposed rule in the *Federal Register*, and the FOIA are in conflict, and that CPSC must follow the CPSA because it is a more specific, later-enacted, requirement and presents a "clear congressional imperative for CPSC to follow the text of the [CPSA]," citing 15 U.S.C. 2058(c). The commenter asserted that

based on the CPSA, the Commission must publish the text of the NPR and cannot direct the public to buy a copy of the regulatory text from someone else.

**Response 23**: As stated in response to the preceding comments, stakeholders do not need to purchase a copy of the voluntary standard to comment on the rule, and the Commission publishes the text of proposed rules under section 104 of the CPSIA in the *Federal Register*. A summary of the regulatory text is available for free in the staff briefing package and the proposed rule. A free copy of the voluntary standard is available through ASTM's website, NARA, and at the Commission's headquarters in Bethesda, MD, as described in response to preceding comments. Additionally, section 104 of the CPSIA contains a different rulemaking authority and procedures than the statutory provision cited by the commenter for CPSA section 7 and 9 rules. The statute cited by the commenter is inapplicable to section 104 rules. Finally, CPSC follows the OFR's requirements for incorporation by reference, including the exception in 5 U.S.C. § 552(a), which allows incorporation by reference when the material is "reasonably available to the class of persons affected thereby . . . with the approval of the Director of the Federal Register."

**Comment 24**: A commenter contended that the CPSC should not rely on the Office of the Federal Register's interpretation of the exception for IBR materials in 1 CFR § 51.5, and should instead publish the text of the voluntary standard.

**Response 24**: We disagree. The OFR's interpretation of the exception is consistent with the statute, has not been struck down by any court, and the CPSC declines to potentially infringe a copyright. Additionally, as reviewed in response to preceding comments, stakeholders have free access to the content of the proposed and final rules, including the regulatory text and the voluntary standards upon which the standards are based.

**Comment 25**: A commenter alleged that CPSC's proposal to IBR the crib mattress voluntary standard, rather than set forth the text of the regulation in the OFR, is procedurally

deficient because the rule allegedly only allows access to the text of the voluntary standard after a rule is in effect, and because it leaves access to the law up to the "whims" of ASTM. The commenter alleged that ASTM can raise the cost of the voluntary standard, and can "renege" on its promise to keep the standard available in a reading room.

**Response 25**: The text of the proposed rule, and a summary of the voluntary standard, are available for free on the Commission's website in the staff's briefing packages and in the draft rules, which are also available, when published, in the *Federal Register*. Moreover, the text of the voluntary standard is available for free both before and after the comment period, as described in response to preceding comments. Finally, stakeholders can view the rule for free by contacting NARA and by coming to view the standard at the Commission's headquarters in Bethesda, MD.

## VIII. Mandatory Standard for Crib Mattresses

The final mandatory standard for crib mattresses incorporates by reference the most recent voluntary standard for crib mattresses, ASTM F2933-21, with modifications, largely as proposed in the NPR, to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses. Below we summarize modifications made to the voluntary standard in the final rule.

### *A. Cyclic Test for Coil or Spring Lacerations*

To further reduce the risk of infant lacerations from exposed coils and springs, the Commission will require a cyclic loading test for all crib mattresses that use coils and springs, as follows:

1. Mattress shall be tested in an enclosed frame measuring 29 inches x 53 inches (737 mm x 1346 mm) for the purpose of restricting mattress movement. A crib meeting the requirements of ASTM F1169 – 19 would suffice.

2. The mattress can be placed on top of a ¾-inch piece of plywood or oriented strand board (OSB), which is rigidly supported along the perimeter.

3. An impactor with the dimensions of the vertical impactor of ASTM F1169 – 19 weighing 30 lbs. shall be dropped from a height of 6 inches from the top of the mattress surface to the bottom of the impactor, 250 times in four locations (specified in Figure 5), for a total of 1,000 cycles. Cyclic loading rate shall be one drop every 4 ± 1 seconds.

4. At the conclusion of the cyclic loading test, the mattress shall be removed from the test enclosure and visually inspected for exposed wires or coil springs.

5. The coil spring test shall be repeated on each sleep surface of the mattress. The test shall not be repeated using a mattress that has been previously tested with the coil spring test.

The final rule clarifies that two mattresses are required for cyclic load testing, one mattress for each side of the mattress being tested, because testing can be destructive to the test sample.

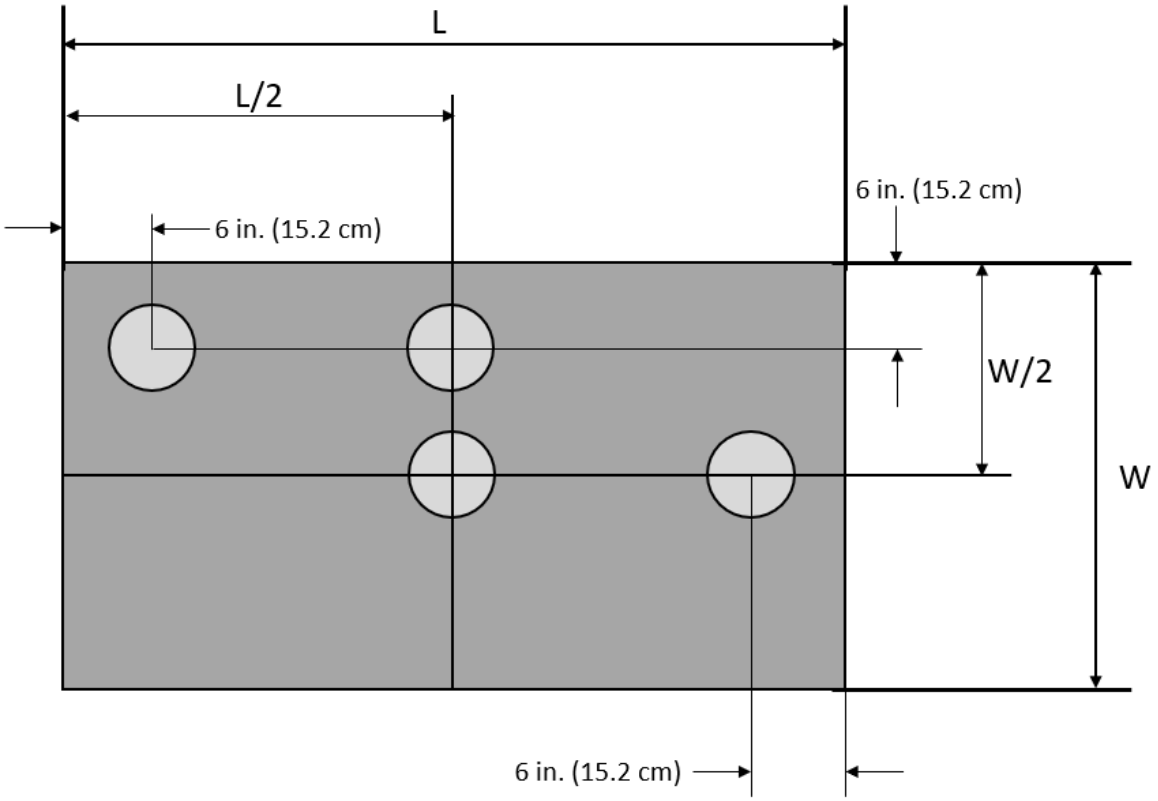


**Figure 5. Impact test locations**.

*B. Test for Mattress Compression from Fitted Sheets*

To further reduce the risk of injury associated with corner gap entrapment from compression by fitted sheets, the final rule requires a new test for full-size crib mattresses:

1. To condition the sheet for compression testing, a store-bought, fitted mattress sheet, intended for the tested mattress size, consisting of 100 percent cotton, shall be washed in hot water (50° C [122° F] or higher), and dried a minimum of two times on the highest setting, using household textile laundering units.

2. The shrunken fitted sheet shall be placed fully on the mattress, such that each sheet edge is wrapped fully around and under the mattress.

3. The mattress, with the shrunken sheet, shall be positioned in the corner, following section 6.2.2.1 of ASTM F2933 – 21.

4. After positioning, while no force is being applied, measure the gap from the projected crib corner, located 53 in. from Wall C and 28⅝ in. from Wall D, and the crib mattress. See Figure 6 for illustration. The gap shall not exceed 3.15 in.

5. Rotate the mattress 180,° and repeat steps 3 and 4.

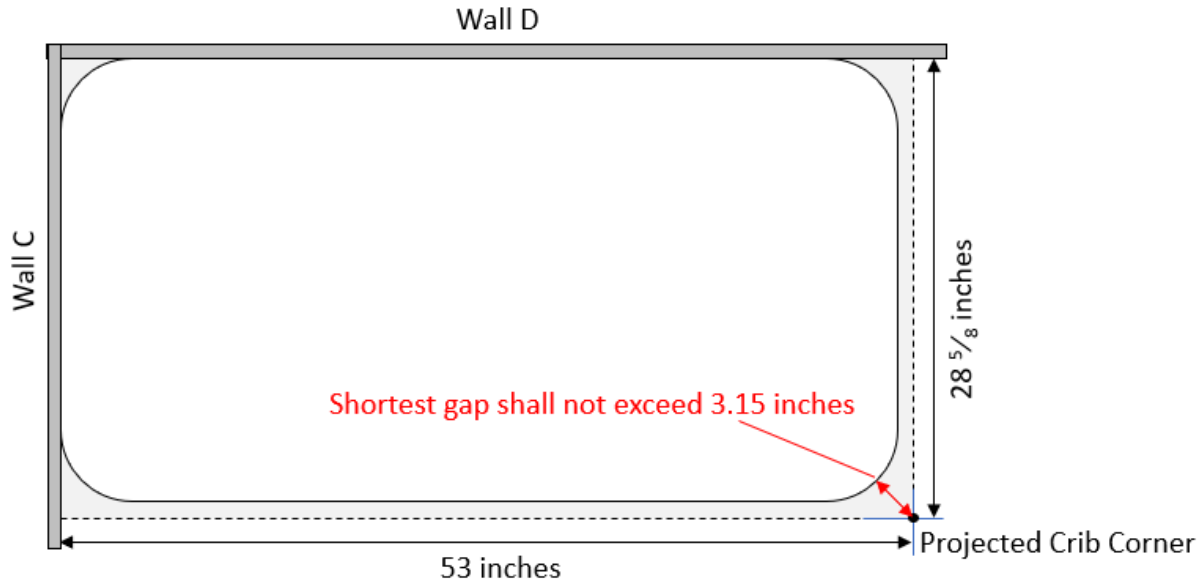


**Figure 6. Staff's proposed location of the projected crib corner, from which the corner gap is measured.**

The Commission is not aware of incidents related to non-full-size crib mattresses compressing when sheets are installed, and received no comments on the issue. Therefore, at this time, the final rule does not require a similar sheet compression test for non-full-size crib mattresses. However, the final rule modifies the test procedure to accommodate larger crib mattresses, by requiring the corner gap to be measured from a projected crib corner.

*C. Dimension Requirements for After-Market Non-Full-Size Crib Mattresses*

To further reduce the risk of injury associated with after-market, non-full-size crib mattresses, the final rule requires a dimensional performance requirement for all non-full-size crib mattresses. The *Stability*; *Cord/Strap Length*; and *Crib-Side Height* requirements in F406 are also applicable to non-full-size crib mattresses, but the requirements were not referenced in ASTM F2933 – 19, or by modifications in the NPR. The newly published ASTM F2933 – 21 added a reference to these requirements in section 5.9 of the standard. The final rule adds a reference to *Crib-Side Height* to the list of F406 requirements referred to in section 5.7.2 of ASTM F2933 – 21, and removes this reference from section 5.9, because it does not apply to play yard mattresses. Accordingly, the final rule references the F406 requirements for *Stability* and *Cord/Strap Length* in section 5.7.2 and section 5.9 of ASTM F2933 – 21, because these are general requirements applicable to non-full-size crib and play yard mattresses. This change is consistent with the changes proposed in the NPR, to ensure that all after-market, non-full-size crib mattresses are subject to the same requirements as OEM non-full-size crib mattresses.

ASTM F2933 – 21 includes additional requirements for after-market non-rectangular non-full-size crib mattresses, which ensure the after-market mattress maintains the proper fit, support, and instruction storage accommodations. The final rule extends these requirements to all after-market, non-full-size crib mattresses, to be consistent with the NPR proposal to extend requirements to all non-full-size crib mattresses, regardless of shape.

Appendix A to Tab C of Staff's Final Rule Briefing Package contains a redline of changes in the final rule to section 5.7.2 of ASTM F2933 – 21.

*D. Corrections to Section 5.9 of ASTM F2933-21*

To accommodate the modification for non-full-size cribs in section 5.7, the final rule removes references to after-market, non-full-size crib mattresses from section 5.9 of ASTM F2933-21, such that section 5.9 focuses solely upon performance requirements for after-market play yard mattresses.

The NPR proposed to replace the term "replacement mattress" in ASTM F2933-19 section 5.9.1.3, with the term "after-market" mattresses. ASTM F2933-21 made this revision, and thus, the final rule does not require this revision, if the Commission incorporates by reference ASTM F2933-21.

*E. Mattress Firmness Test*

To further reduce the risk of infant suffocation associated with surface softness in crib mattresses, the final rule requires a mattress firmness test for all crib mattresses within the scope of the standard, based on a test for mattress firmness in section 8 of AS/NZS 8811.1:2013:

1. Mark three equidistant points along the longitudinal center line, with one at the center, and the other two equidistantly between the center and the edge of the mattress. Choose one more "worst-case" scenario test location(s) where an infant's head might lay in a particularly soft spot, or an infant's nose or mouth might contact a protrusion above the sleep surface.

2. Hold the test fixture with its base horizontally, and rotate it so the feeler arm is aligned with the center line of the sleep surface, and pointing in the same direction for each test; then gently set down the fixture on one of the test locations, ensuring that the edge of the bottom disk does not extend beyond the edge of the sleep surface.

3. If the level indicates that the feeler arm is approximately level when the fixture is resting on the sleep surface, observe whether the feeler arm makes any contact with the top of the sleep surface or cover. If the feeler arm is not level, decompress the mattress, allow it to settle, and start again. If the feeler arm contacts the sleep surface even when the test fixture is tilted back so as to raise the feeler arm, assume that such contact would occur had the fixture come to rest horizontally.

4. Repeat steps at remaining locations.

*F. Modifications to Safety Information*

As detailed in Tab D, Appendix A, of Staff's Final Rule Briefing Package, the final rule includes a redline of the modifications to the requirements for the safety information that accompanies crib mattresses, as proposed in the NPR, including warning labels, packaging, and instructions. Labeling modifications include the following:

- Improved definition of "conspicuous" to clarify that the warning label's placement must make it visible to someone who positions the mattress for use;
- Updated the general marking and labeling requirements;
- Improved warning labels and examples;
- Re-organized and clarified the marking and labeling requirements for manufacturers, test labs, and other viewers of the standard;
- Added warning requirements for full-size crib mattress packaging and improved the warning requirements for packaging of after-market mattresses for play yards and non-full-size cribs; and
- Added a new section on instructional literature, which provides an additional medium by which to communicate safe-use information.

These modifications are intended to further reduce the risk of death and serious injury associated with crib mattresses, such as SUID related to prone positioning of infants, soft bedding in sleep areas, and hazardous gaps between crib mattresses and product sides. The majority of the modifications incorporate recommendations from stakeholders participating in ASTM F15, with several deviations based on CPSC staff's further consideration of the available data. While safety information is unlikely to effectively address the identified hazards, these modifications are likely to

support the effectiveness of the performance requirements, increase the likelihood of consumers understanding the hazards, and clarify the requirements for manufacturers, test labs, and other viewers of the standard. Section VI.B of this preamble, and Tab D of Staff's Final Rule Briefing Package contains a detailed list of the final rule modifications.

## IX. Amendment to 16 CFR Part 1112 to Include NOR for Crib Mattresses

The CPSA establishes certain requirements for product certification and testing. Products subject to a consumer product safety rule under the CPSA, or to a similar rule, ban, standard or regulation under any other act enforced by the Commission, must be certified as complying with all applicable CPSC-enforced requirements. 15 U.S.C. 2063(a). Certification of children's products subject to a children's product safety rule must be based on testing conducted by a CPSC-accepted third party conformity assessment body. *Id*. 2063(a)(2). The Commission must publish an NOR for the accreditation of third party conformity assessment bodies to assess conformity with a children's product safety rule to which a children's product is subject. *Id.* 2063(a)(3). The final rule, to be codified as 16 CFR part 1241, *Standard Consumer Safety Specification for Crib Mattresses*, is a children's product safety rule that requires the issuance of an NOR.

The Commission published a final rule, *Requirements Pertaining to Third Party Conformity Assessment Bodies*, 78 FR 15836 (March 12, 2013), codified at 16 CFR part 1112 ("part 1112") and effective on June 10, 2013, which establishes requirements for accreditation of third party conformity assessment bodies to test for conformity with a children's product safety rule in accordance with section 14(a)(2) of the CPSA. Part 1112 also codifies all of the NORs issued previously by the Commission. All new NORs for new children's product safety rules, such as the crib mattress standard, require an amendment to part 1112. Accordingly, in the NPR, the Commission proposed to amend part 1112 to add part 1241, *Safety Standard for Crib Mattresses*, in the list of NORs.

Test laboratories applying for acceptance as a CPSC-accepted third party conformity assessment body to test to the new standard for crib mattresses are required to meet the third party conformity assessment body accreditation requirements in part 1112. When a laboratory meets the requirements as a CPSC-accepted third party conformity assessment body, the laboratory can apply to the CPSC to have 16 CFR part 1241, *Standard Consumer Safety Specification for Crib Mattresses*, included in the laboratory's scope of accreditation of CPSC safety rules listed for the laboratory on the CPSC website at: www.cpsc.gov/labsearch.

## X. Amendment to Definitions in Consumer Registration Rule

The statutory definition of "durable infant or toddler product" in section 104(f) applies to all of section 104 of the CPSIA. In addition to requiring the Commission to issue safety standards for durable infant or toddler products, section 104 of the CPSIA also directed the Commission to issue a rule requiring that manufacturers of durable infant or toddler products establish a program for consumer registration of those products. Pub. L. No. 110-314, section 104(d).

Section 104(f) of the CPSIA defines the term "durable infant or toddler product" and lists examples of such products:

> (f) DEFINITION OF DURABLE INFANT OR TODDLER PRODUCT. As used in this section, the term "durable infant or toddler product" –
>
> (1) means a durable product intended for use, or that may be reasonably expected to be used, by children under the age of 5 years; and
>
> (2) includes –
>
> (A) full-size cribs and non-full-size cribs;
>
> (B) toddler beds;
>
> (C) high chairs; booster chairs, and hook-on-chairs;
>
> (D) bath seats;

(E) gates and other enclosures for confining a child;

(F) play yards;

(G) stationary activity centers;

(H) infant carriers;

(I) strollers;

(J) walkers;

(K) swings; and

(L) bassinets and cradles.

Pub. L. No. 110-314, section 104(f).

The product categories listed in section 104(f)(2) of the CPSIA represent a non-exhaustive list of durable infant or toddler product categories, including products for infant sleep, such as cribs (full-size and non-full-size), toddler beds, bassinets and cradles, and play yards. *Id*. 2056a(f)(2). Although crib mattresses are used with infant sleep products, crib mattresses are not included in the statutory list of durable infant or toddler products.

In 2009, the Commission issued a rule implementing the consumer registration requirement. 16 CFR part 1130. As the CPSIA directs, the consumer registration rule requires each manufacturer of a durable infant or toddler product to: provide a postage-paid consumer registration form with each product; keep records of consumers who register their products with the manufacturer; and permanently place the manufacturer's name and certain other identifying information on the product. When the Commission issued the consumer registration rule, the Commission identified six additional products as "durable infant or toddler products":

- children's folding chairs,
- changing tables,
- infant bouncers,

- infant bathtubs,
- bed rails, and
- infant slings.

16 CFR 1130.2. The Commission stated that the specified statutory categories were not exclusive, but that the Commission should explicitly identify the product categories that are covered. The preamble to the 2009 final consumer registration rule states: "Because the statute has a broad definition of a durable infant or toddler product but also includes 12 specific product categories, additional items can and should be included in the definition, but should also be specifically listed in the rule." 74 FR 68668, 68669 (Dec. 29, 2009).

In the NPR, the Commission proposed to amend part 1130 to include "crib mattresses," as defined in ASTM F2933, including full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs, as durable infant or toddler products. 85 FR at 67923. The Commission proposed to include "crib mattresses" as a "durable infant or toddler product" because: (1) they are intended for use, and may be reasonably expected to be used, by children under the age of 5 years; (2) they are products similar to the products listed in section 104(f)(2) of the CPSIA; (3) they are used in conjunction with other durable infant or toddler products used for unattended infant sleep, such as cribs, bassinets, and play yards; and (4) CPSC cannot fully address the risk of injury associated with such infant sleep products without addressing the hazards associated with the use of crib mattresses in these infant sleep products. *Id*. The Commission received no comments on this proposal, and now finalizes the amendment to part 1130 to add "crib mattresses" to the list of durable infant or toddler products.

## XI. Incorporation by Reference

Section 1241.2(a) of the final rule provides that each crib mattress must comply with applicable provisions of ASTM F2933-21. The Office of the Federal Register (OFR) has

regulations concerning incorporation by reference. 1 CFR part 51. For a final rule, agencies must discuss in the preamble to the rule the way in which materials that the agency incorporates by reference are reasonably available to interested persons, and how interested parties can obtain the materials. Additionally, the preamble to the rule must summarize the material. 1 CFR 51.5(b).

In accordance with the OFR's requirements, sections V, VI, and VIII of this preamble summarize the provisions of ASTM F2933-21 that the Commission is incorporating by reference. ASTM F2933-21 is copyrighted. Before the effective date of this rule, you can view a copy of ASTM F2933-21 at: https://www.astm.org/cpsc.htm. Once the rule becomes effective, ASTM F2933-21 can be viewed free of charge as a read-only document at: https://www.astm.org/READINGLIBRARY/. To download or print the standard, interested persons can purchase a copy of ASTM F2933-21 from ASTM, through its website (http://www.astm.org), or by mail from ASTM International, 100 Bar Harbor Drive, P.O. Box 0700, West Conshohocken, PA 19428; http://www.astm.org. Alternatively, interested parties can inspect a copy of the standard free of charge by contacting Alberta E. Mills, Division of the Secretariat, U.S. Consumer Product Safety Commission, 4330 East West Highway, Bethesda, MD 20814; telephone: 301-504-7479; e-mail: cpsc-os@cpsc.gov.

## XII. Effective Date

The Administrative Procedure Act (APA) generally requires that the effective date of a rule be at least 30 days after publication of the final rule. 5 U.S.C. 553(d). The NPR proposed a 6-month effective date for the final rule. Commenters both supported and opposed the 6-month effective date. Some commenters urged the effective date be as soon as possible, indicating that additional time for the rule to become effective would put infants at risk. Other commenters requested an indefinite delay of the rulemakings until ASTM completes changes and updates to the voluntary standard, and those associated with crib mattresses.

After considering the comments, the Commission now finalizes the rule with a 6-month effective date, because 6 months typically is sufficient time for suppliers to come into compliance with a new standard; typical for other CPSIA section 104 rules; and usually is the period that JPMA allows for products in their certification program to shift to a new standard, once that new standard is published. Accordingly, juvenile product manufacturers are accustomed to adjusting to new standards within 6 months, and suppliers have now had lead time to prepare for this rule since the NPR was published on October 26, 2020. Finally, many crib mattresses within the scope of the final rule require no change in design to achieve compliance with the final rule.

## XIII. Regulatory Flexibility Act[79]

### *A. Introduction*

The Regulatory Flexibility Act (RFA), 5 U.S.C. 601-612, requires that agencies review a proposed rule and a final rule for the rule's potential economic impact on small entities, including small businesses. Section 604 of the RFA generally requires that agencies prepare a final regulatory flexibility analysis (FRFA) when promulgating final rules, unless the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Staff prepared a FRFA that is available at Tab E of Staff's Final Rule Briefing Package. An FRFA is required to describe the impact of the rule on small entities and identify any alternatives that may reduce the impact. Based on staff's analysis, the Commission anticipates a possible significant economic impact for one small domestic importer and two small domestic manufacturers that supply crib mattress products to the U.S. market.

### *B. Final Rule Objectives, Legal Basis, Product Description, and Market*

The objective of the final rule is to reduce the risk of injury and death associated with full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and

[79] *See* Tab E of Staff's Final Rule Briefing Package for additional information on the RFA.

non-full-size cribs (collectively referred to as "crib mattresses"). A detailed analysis of the objectives and statutory basis for the rule are set forth in section I of the preamble. Section II.A of this preamble describes the products subject to this final rule, section II.B describes the market for crib mattresses, and section II.C describes consumer use of crib mattresses.

*C. Small Entities to Which the Draft Proposed Rule Would Apply*

Manufacturers of crib mattresses are typically categorized under the NAICS category 337910 (Mattress Manufacturing). The Small Business Administration (SBA) guidelines consider mattress manufacturing establishments to be small if they have fewer than 1,000 employees.[80] Importers of crib mattresses are typically categorized under NAICS code 423210 (Furniture Merchant Wholesalers) and SBA guidelines would consider them small if they have fewer than 100 employees.

Staff estimates that approximately 32 domestic firms supply crib mattresses to the U.S. market. Following SBA size guidelines, 27 are small firms—14 domestic manufacturers and 13 domestic importers. The five remaining domestic firms are large manufacturers. The expected impact of the draft final rule on small manufacturers and importers of crib mattresses will differ based on whether their crib mattresses are already compliant with ASTM F2933-21, the size-type of crib mattress the firm supplies to the market, and the materials used in the crib mattresses. Staff estimates that approximately 75 percent of crib mattresses on the market are full-size crib mattresses; approximately 40 percent of full-size crib mattresses are coil/innerspring mattresses; and the remaining majority are foam-core mattresses.[81] Staff identified at least 15 small firms that only produce foam-core mattresses, while many small entities produce a combination of both coil and foam-core crib mattresses.

[80] The size guidelines are established by the SBA.
[81] Based on staff's compiled search results of data available on the internet, April-June 2021.

Section VIII of this preamble describes the requirements of the final rule. Firms whose crib mattresses do not already comply with the rule will need to evaluate their products, determine what changes would be required to meet the standard, and decide how to proceed. Noncompliant products would need to be removed from the U.S. market, modified to meet the mandatory standard, or remarketed for purposes other than use as crib mattresses. New crib mattress products introduced to the market would also need to comply with the standard.

Crib mattresses will be subject to the third party testing and certification requirements under the CPSA, as codified in 16 CFR part 1107 (children's product testing rule) and 16 CFR part 1110 (certificate rule), which require that manufacturers and importers certify that their products comply with the applicable children's product safety standards, based on third party testing, and subject their products to third party testing periodically. Third party testing costs are in addition to the costs of modifying the crib mattresses to meet the standard. For crib mattresses, the third party testing costs are expected to be about $950 per testing cycle per model. This is an increase in the costs as estimated in the IRFA in the 2020 NPR, which estimated a cost of $325 per sample.

*D. Impact of Draft Proposed Rule on Small Manufacturers and Importers*

Of the 27 small manufacturers and importers identified by staff, 14 (9 manufacturers and 5 importers) are members of the JPMA, but staff cannot determine how many crib mattresses are currently certified to ASTM F2933-21. Many of the firms that would be subject to the final rule are known to produce a variety of children's products that are already subject to a children's product safety rule, and therefore, are familiar with such requirements.[82] Additionally, two firms that are not known to be JPMA members, are members of ASTM.

[82] Crib mattresses listed for sale on a variety of online retail websites often include product descriptions indicating that the crib mattress product meets CPSC general safety standards, while not referencing any one specific CPSC safety standard.

As required by section 14 of the CPSA and its implementing regulations, manufacturers and importers of crib mattresses would be required to certify that their crib mattresses comply with the requirements of the draft final rule, based on the results of third party testing by a CPSC-accepted third party conformity assessment body (*i.e.*, testing laboratory). However, crib mattresses are also already subject to third party testing requirements, and therefore, firms that supply crib mattresses to the U.S. market are already familiar with third party testing requirements.[83,84] Crib mattresses must already comply with two federal mattress flammability standards: 16 CFR parts 1632 and 1633. Firms that supply crib mattresses that are designed or intended primarily for children age 12 or under need to prepare a Children's Product Certification (CPC) that references parts 1632 and/or part 1633, when applicable. At this time, CPSC staff is not aware of any small domestic firms that supply crib mattresses to the U.S. market that are not compliant with CPSC's mattress flammability standards. Additionally, crib mattresses are subject to lead testing, unless exempt, phthalate testing for certain child care articles, and small parts testing and small parts labeling, as applicable. The final rule will augment these existing requirements.

As part of the 2020 NPR, the Commission requested comments from small firms on the number of crib mattress models they would typically certify to the ASTM standard annually. However, the Commission did not receive any comments on the request. Some small manufacturers and importers of crib mattresses to the U.S. market would not be subject to all the tests proposed in the final rule, because the firm may only supply foam-core and/or non-full-size crib mattress products to the market.

[83] Manufacturers and importers of children's products must certify compliance with applicable federal safety requirements in a Children's Product Certificate (CPC). Testing by a third party CPSC-Accepted Laboratory must serve as the basis for the production of the CPC.

[84] Mattresses intended for children must be tested at a third-party test laboratory or a fire-walled internal laboratory: https://cpsc.gov/s3fs-public/pdfs/blk_media_mattress.pdf. In either case, the lab would need to be CPSC-accepted to test to the standards since crib mattresses are considered to be primarily intended for children 12 and under.

1. Costs Associated with Modifying Products

The majority of crib mattresses tested by staff already meet the performance requirements of the final rule, and they will not require any modification to comply. Although we do not know the exact costs of modifying crib mattresses to comply with the final rule, we do know that such costs would vary by product model. During the public comment period, CPSC did not receive any comments related to one-time costs of redesigning a product to meet the standard, as proposed. Nonetheless, it is possible that some manufacturers of noncomplying mattresses might choose to drop the model, rather than incur the expense associated with modifying it.[85] Therefore, a possibility exists that the final rule could result in the removal of one or more crib mattress models from commerce.

Changes to marking and labeling will be necessary on crib mattress products. Generally, costs associated marking and labeling, as well as providing instructional materials, are low on a per-unit basis. Many crib mattress suppliers already provide instructions with their crib products, but firms will need to ensure that the content and formatting of the instructions required for crib mattresses meet the requirements of the draft final rule.[86] Likewise, the cost of warning labels is generally low, especially if some warning labels are already present, and the product does not need to be modified to accommodate new labels.

2. Third Party Testing Costs

The final rule will require all manufacturers and importers of crib mattresses to meet additional third party testing requirements under section 14 of the CPSA. As allowed by the

[85] Costs associated with modification of a crib mattress might include, but are not limited to, costs of skilled labor for the modification or redesign; costs associated with finding and changing to a new materials supplier, if necessary; flammability testing costs for the modified model if new ticking materials are used; and additional testing costs prescribed in ASTM F2933 and those of the final rule.

[86] Instructions required shall be provided with the mattress and shall be easy to read and understand, and shall be in the English language, at a minimum. These instructions shall include information on assembly, maintenance, cleaning, and use, where applicable.

component part testing rule (16 CFR 1109), importers can rely upon third party tests obtained by their suppliers, which could reduce the impact on importers. In addition, businesses selling products covered by this rule were already required to certify compliance to general children's product rules for lead, phthalates, and small parts with third party testing. Accordingly, those third party testing costs would not be considered new costs of compliance with this rule.

Although CPSC did not receive any comments on the NPR cost estimates provided in the IRFA, ongoing discussions with suppliers through ASTM indicate third party testing bodies will need to develop protocols for the testing proposed in the draft final rule, as well as establish prices for the prescribed testing. Based on information from a testing laboratory, the cost of testing to the current version of ASTM F2933 is $200 to $250 per sample. However, the cost of testing varies, based on the type of crib mattress and the number of samples tested. Furthermore, testing rates may have changed by accredited labs. According to new information provided by one crib mattress supplier, the price charged to test to ASTM F2933 for suppliers with very few models may be as high as $400 per model tested.[87] Costs for additional testing required by the final rule could increase the cost of testing substantially, although not all crib mattresses would be subject to all of the testing requirements.

Staff estimates that for a manufacturer or importer with 10 crib mattress models that require only one test per model to provide a high degree of assurance, the full cost of third party testing will be approximately $4,000, plus $2,000 in costs for compression testing, plus $1,000 for the cost of possible cyclic load testing, plus $2,500 for required firmness testing, for a total of $9,500 in third party testing costs or an average of $950 per model.[88]

[87] Information provided by the crib mattress supplier included quotes received from two prominent testing laboratories.
[88] The estimated costs of $950 per model for testing in the FRFA is an increase over the amount estimated in the IFRA. The cost for third party testing was estimated to be $250 to $325, per sample, in the IRFA.

3. Summary of Impacts

Generally, based on SBA guidelines, CPSC considers impacts that exceed 1 percent of a firm's revenue to be *potentially* significant. The lowest reported annual revenue for any small domestic firm producing crib mattress models was $1.07 million. One percent of annual revenue for the firm is $10,700 ($1,070,000 x 0.01). Consequently, if the costs of modifying their mattresses to comply with the standard exceeds $10,700, the rule should be considered to have a significant impact for the firm. This would include the costs of modifying noncompliant mattresses to comply with the requirements, the loss of revenue that results from removing noncompliant mattresses from their product line, and the cost of third party testing. For manufacturers or importers with greater revenue, the impact of the draft proposed rule would have to be higher than this for the impact to be considered significant.

Given that a substantial number of crib mattresses already comply with the requirements of the final rule and some of the testing costs are already being borne by firms that certify to the current voluntary standard, it seems unlikely that the rule would have a significant impact on a substantial number of small entities. Furthermore, CPSC did not receive any public comments on the costs of the proposed rule, or impediments to modifying existing crib mattress products to conform to the rule, especially those that would result in the removal of the mattress product from the market. Likewise, CPSC did not receive any other comments on possible impacts the rule might have on small domestic manufacturers or importers. Nevertheless, to the extent that a crib mattress supplier would need to remove a crib mattress model from commerce because it will not meet the standards of the draft final rule, or the product cannot be modified in a cost-efficient manner, a few small firms could potentially consider the costs of adopting the final rule to be significant. Based on limited data available for small private firms serving this market, staff identified three small

domestic firms—two small domestic manufacturers and one small domestic importer who might consider the impact significant and might drop one or more crib mattress models from their line.

*E. Other Federal Rules that May Duplicate, Overlap, or Conflict with the Final Rule*

CPSC staff has not identified any other federal rules that duplicate, overlap, or conflict with the final rule.

*F. Alternatives Considered to Reduce the Impact on Small Entities*

CPSC attempted to minimize the impact of the final rule on small entities as discussed below:

1. Requesting Public Comments

CPSC published an NPR in the *Federal Register* on October 26, 2020 (85 FR 67906) and requested comments on any alternatives to the proposed rule that could reduce the burden on small entities. Among others, these proposed alternatives included adopting the ASTM standard, without modification, and delaying the effective date of the requirements. None of the comments CPSC received mentioned a burden or impact on small entities, nor expressed any concern that the final rule might impose on small entities. Additionally, CPSC did not receive comments raising significant issues in response to the IRFA. CPSC did not receive any comments from the SBA.

2. Delay the Effective Date of the Requirements

The APA generally requires that the effective date of the rule be at least 30 days after publication of the final rule. 5 U.S.C. 553 (d). CPSC generally considers 6 months to be sufficient time for suppliers of durable infant or toddler products to come into compliance with a new standard under section 104 of the CPSIA. Six months is also the period that JPMA typically allows for products in the JPMA certification program to transition to a new standard once that standard is published. The NPR proposed a 6-month effective date after publication of the final rule, for products manufactured or imported on or after that date. Commenters both supported and opposed

the 6-month effective date. Some commenters urged the effective date to be as soon as possible, indicating that additional time for the rule to become effective would put infants at risk. Other commenters requested an indefinite delay of the rulemakings, until ASTM completes changes and updates to the voluntary standard, and those associated with crib mattresses.

For the final rule, the Commission will retain the proposed 6-month effective date for the final rule, because suppliers have had lead time to prepare for this rule since the NPR was published on October 26, 2020. Many crib mattresses within the scope of the final rule require no change in design to achieve compliance with the final rule. Furthermore, 6 months from the change in a voluntary standard is the time frame that JPMA uses for its certification program. Consequently, compliant manufacturers are accustomed to this time frame to comply with a modified standard.

Because some manufacturers of crib mattresses may experience some kind of economic impact as a result of the final rule, providing a 6-month effective date should mitigate the effects of the rule on small businesses. A 6-month effective date will provide manufacturers and importers time to spread the impact of the rule over a 6-month period, to reduce any sudden economic impact of the draft final rule. For businesses that would choose to exit the crib mattress market, or discontinue certain crib mattress models currently in production (rather than produce conforming products), such a delay might provide them with time to adjust marketing towards other product offerings, sell inventory, or consider alternative business opportunities.

3. Consultation with ASTM

CPSC staff has worked extensively with ASTM in the continued development and improvement of voluntary safety standards for crib mattresses referenced in the final rule. Members of ASTM include small domestic manufacturers and importers of products to which the draft final rule would apply. Small entities to whom the final rule will apply have taken part in discussions and engaged in product testing during the development of the standard. Feedback from these entities

was considered by ASTM and CPSC in developing the revised voluntary standard and final rule, respectively.

## XIV. Environmental Considerations

The Commission's regulations address whether the agency is required to prepare an environmental assessment or an environmental impact statement. Under these regulations, certain categories of CPSC actions normally have "little or no potential for affecting the human environment," and therefore, they do not require an environmental assessment or an environmental impact statement. Safety standards providing requirements for products come under this categorical exclusion. 16 CFR 1021.5(c)(1). The final rule for crib mattresses falls within the categorical exclusion.

## XV. Paperwork Reduction Act

This final rule for crib mattresses contains information collection requirements that are subject to public comment and review by the Office of Management and Budget ("OMB") under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3521). In this document, pursuant to 44 U.S.C. 3507(a)(1)(D), we set forth:

- a title for the collection of information;
- a summary of the collection of information;
- a brief description of the need for the information, and the proposed use of the information;
- a description of the likely respondents and proposed frequency of response to the collection of information;
- an estimate of the burden that shall result from the collection of information; and
- notice that comments may be submitted to the OMB.

The preamble to the NPR (85 FR 67927-28) discussed the information collection burden of the proposed rule and specifically requested comments on the accuracy of our estimates. The OMB assigned control number 3041-0185 for this information collection. We did not receive any comment regarding the information collection burden of the proposal in the NPR. For the final rule, we update the estimated number of crib mattress manufacturers, from 26 to 28, and the estimated average number of models per manufacturer, from 12 to 10, which alters the estimated total burden, as described below. In accordance with PRA requirements, the Commission provides the following information:

*Title*: Safety Standard for Crib Mattresses

*Description*: The final rule requires each crib mattress within the scope of the rule to comply with ASTM F2933-21, *Standard Consumer Safety Specification for Crib Mattresses*, including the additional requirements summarized in section VIII of this preamble. Section 7 of ASTM F2933-21, and a new section 8 in the final rule, contain requirements for marking, labeling, and instructional literature. These requirements fall within the definition of "collection of information," as defined in 44 U.S.C. 3502(3).

*Description of Respondents*: Persons who manufacture or import crib mattresses.

*Estimated Burden*: We estimate the burden of this collection of information as follows:

**Table 8 – Estimated Annual Reporting Burden**

| 16 CFR Section | Number of Respondents | Frequency of Responses | Total Annual Responses | Hours per Response | Total Burden Hours |
|---|---|---|---|---|---|
| 1241.2(a), (b) | 38 | 10 | 380 | 1 | 380 |

Our estimate is based on the following:

The Commission is finalizing the proposal in the NPR to modify several sections of the voluntary standard for crib mattresses, ASTM F2933, but is now making these modifications to the

newly revised ASTM F2933-21. As proposed, the Commission is modifying section 7 of ASTM F2933 and adding a new section 8 on instructional literature, to bring the standard into alignment with other safety standards for durable infant or toddler products. For example, in addition to improved warning format and content, modifications to section 7.1.1 of ASTM F2933-21 will require that the name and the place of business (city, state, and mailing address, including zip code) or telephone number of the manufacturer, distributor, or seller be marked clearly and legibly on each product and its retail package. Modifications to section 7.1.2 of ASTM F2933 also require a code mark or other means that identifies the date (month and year, as a minimum) of manufacture. Modifications to section 7.2 of ASTM F2933 require marking and labeling on the product to be permanent.

For the final rule, we update the number of known entities supplying crib mattresses in the U.S. market from 26 to 38. To comply with the final rule, these entities may need to make some modifications to existing product labels. We estimate that the time required to make these modifications is about 1 hour per model. Based on an evaluation of supplier product lines, for the final rule, we have also revised the average number of crib mattress models for each manufacturer from 12 to 10.[89] The revised estimated burden associated with labels for the final rule is 1 hour per model x 38 entities x 10 models per entity = 380 hours. The updated estimate of the hourly compensation for the time required to create and update labels is $33.78 (U.S. Bureau of Labor Statistics, "Employer Costs for Employee Compensation," March 2021, total compensation for all sales and office workers in goods-producing private industries: http://www.bls.gov/ncs/). Therefore, for the final rule, our estimated annual cost to industry associated with the labeling

[89] This number was derived during the market research phase of the initial regulatory flexibility analysis by dividing the total number of crib mattresses supplied by all crib mattress suppliers by the total number of crib mattress suppliers.

requirements is $12,836.40 ($33.78 per hour x 380 hours = $12,836.40). No operating, maintenance, or capital costs are associated with the collection.

As proposed, the final rule also adds a new section 8 that requires instructions to be supplied with the crib mattress. The instructions are required to: (a) be easy to read and understand; (b) include information regarding assembly, maintenance, cleaning, and use, where applicable; and (c) address the same warning and safety-related statements that must appear on the product, with similar formatting requirements, but without the need to be in color. Under the OMB's regulations (5 CFR 1320.3(b)(2)), the time, effort, and financial resources necessary to comply with a collection of information that would be incurred by persons in the "normal course of their activities" are excluded from a burden estimate, where an agency demonstrates that the disclosure activities required to comply are "usual and customary." Based on staff's review of product information online, approximately 76 percent of firms that supply cribs to the crib mattress market already provide instructional literature to consumers for products intended for use by children. All of the firms that supply crib mattresses already provide customer support for use of their children's products. Therefore, we estimate that no burden hours are associated with the addition of section 8 to ASTM F2933-21 in the final rule, because any burden associated with supplying instructions with crib mattresses are "usual and customary" and not within the definition of "burden" under the OMB's regulations.

Based on this analysis, the mandatory standard for crib mattresses will impose a burden to industry of 380 hours at a cost of $12,836.40 annually. In compliance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), we have submitted the information collection requirements of this final rule to the OMB.

## XVI. Preemption

Section 26(a) of the CPSA, 15 U.S.C. 2075(a), states that when a consumer product safety standard is in effect and applies to a product, no state or political subdivision of a state may either establish or continue in effect a standard or regulation that prescribes requirements for the performance, composition, contents, design, finish, construction, packaging, or labeling of such product dealing with the same risk of injury unless the state requirement is identical to the federal standard. Section 26(c) of the CPSA also provides that states or political subdivisions of states may apply to the Commission for an exemption from this preemption under certain circumstances. Section 104(b) of the CPSIA refers to the rules to be issued under that section as "consumer product safety rules." Therefore, once this final rule for crib mattresses issued under section 104 of the CPSIA takes effect, the rule will preempt in accordance with section 26(a) of the CPSA.

## XVII. Congressional Review Act

The Congressional Review Act (CRA; 5 U.S.C. §§ 801-808) states that, before a rule may take effect, the agency issuing the rule must submit the rule, and certain related information, to each House of Congress and the Comptroller General. 5 U.S.C. § 801(a)(1). The submission must indicate whether the rule is a "major rule." The CRA states that the Office of Information and Regulatory Affairs ("OIRA") determines whether a rule qualifies as a "major rule." Pursuant to the CRA, OIRA designated this rule as not a "major rule," as defined in 5 U.S.C. § 804(2). A "major rule" is one that the Administrator of OIRA finds has resulted in, or is likely to result in: (A) an annual effect on the economy of $100,000,000 or more; (B) a major increase in costs or prices for consumers, individual industries, federal, state, or local government agencies, or geographic regions; or (C) a significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based

enterprises in domestic and export markets. 5 U.S.C. § 804(2). To comply with the CRA, CPSC will submit the required information to each House of Congress and the Comptroller General.

**List of Subjects**

**16 CFR Part 1112**

Administrative practice and procedure, Audit, Consumer protection, Reporting and recordkeeping requirements, Third party conformity assessment body.

**16 CFR Part 1130**

Administrative practice and procedure, Business and industry, Consumer protection, Reporting and recordkeeping requirements.

**16 CFR Part 1241**

Consumer protection, Imports, Incorporation by reference, Infants and children, Labeling, Law enforcement, and Mattresses.

For the reasons discussed in the preamble, the Commission amends Title 16 of the Code of Federal Regulations as follows:

**PART 1112—REQUIREMENTS PERTAINING TO THIRD PARTY CONFORMITY ASSESSMENT BODIES**

1. The authority citation for part 1112 continues to read as follows:

   **Authority:** 15 U.S.C. 2063; Pub. L. 110-314, section 3, 122 Stat. 3016, 3017 (2008).

2. Amend § 1112.15 by adding paragraph (b)(51) to read as follows:

**§ 1112.15 When can a third party conformity assessment body apply for CPSC acceptance for a particular CPSC rule and/or test method?**

* * * * *

(b) * * *

(51) 16 CFR part 1241, Safety Standard for Crib Mattresses.

* * * * *

3. The authority citation for part 1130 continues to read as follows:

**Authority**: 15 U.S.C. 2056a, 2056(b).

4. Amend § 1130.2 by:

a. Revising paragraphs (a)(16) and (a)(17), and

b. Adding paragraph (a)(18) to read as follows:

**PART 1130—REQUIREMENTS FOR CONSUMER REGISTRATION OF DURABLE INFANT OR TODDLER PRODUCTS**

**§ 1130.2 Definitions.**

* * * * *

(a) * * *

(16) Infant bathtubs;

(17) Bed rails;

(18) Crib mattresses; and

* * * * *

5. Add part 1241 to read as follows:

**PART 1241-SAFETY STANDARD FOR CRIB MATTRESSES**

Sec.

1241.1 Scope.

1241.2 Requirements for crib mattresses.

**Authority**: Sec. 104, Pub. L. 110-314, 122 Stat. 3016 (15 U.S.C. 2056a); Sec. 3, Pub. L. 112-28, 125 Stat. 273.

**§ 1241.1 Scope.**

This part establishes a consumer product safety standard for crib mattresses. The scope of this standard for crib mattresses includes all crib mattresses within the scope of ASTM F2933, *Standard Consumer Safety Specification for Crib Mattresses*, including: full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs.

**§ 1241.2 Requirements for crib mattresses.**

(a) Except as provided in paragraph (b) of this section, each crib mattress must comply with all applicable provisions of ASTM F2933-21, Standard Consumer Safety Specification for Crib Mattresses (approved on June 15, 2021). The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy from ASTM International, 100 Bar Harbor Drive, P.O. Box 0700, West Conshohocken, PA 19428; http://www.astm.org/cpsc.htm. Once incorporated by reference, you may review a read-only copy of ASTM F2933-21 at http://www.astm.org/READINGROOM/. You may also inspect a copy at the Division of the Secretariat, U.S. Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814, telephone 301-504-7923, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, email fr.inspection@nara.gov, or go to:

http://www.archives.gov/federal_register/code_of_federal regulations/ibr_locations.html.

(b) Comply with ASTM F2933-21 with the following additions or exclusions:

(1) Instead of complying with section 3.1.2 of ASTM F2933-21, comply with the following:

(i) 3.1.2 *conspicuous, adj*— visible when the mattress is being handled by a consumer placing the mattress in its intended use position in a product.

(ii) [Reserved]

(2) Add the following paragraph to section 3.1 of ASTM F2933-21:

(i) 3.1.11 *sleep surface, n*— The product component, or group of components, providing the horizontal plane, or nearly horizontal plane (≤ 10°), intended to support an infant during sleep.

(ii) [Reserved]

(3) Instead of complying with section 5.7.1.1 of ASTM F2933-21, comply with the following:

(i) 5.7.1.1 *Mattress Size*— The dimensions of a full-size crib mattress shall measure at least 27¼ in. (690 mm) wide and 51 ⅝ in. (1310 mm) long. When the mattress with the test mattress sheet is placed against the perimeter and in the corner of the crib, the corner gap shall not exceed 3.15 in. (80.0 mm). Dimensions shall be tested in accordance with 6.2.

(ii) [Reserved]

(4) Instead of complying with section 5.7.2 through 5.7.2.2 of ASTM F2933-21, comply with the following:

(i) 5.7.2 *Non-Full-Size Crib Mattresses*— For the purposes of this section, the term product refers to a non-full-size crib.

(ii) 5.7.2.1 *Mattress supplied with a non-full-size crib*: shall meet the specifications of *Stability*; *Cord/Strap Length*; *Mattresses for Rigid sided products*; and *Crib Side Height* of 16 CFR part 1220, Safety Standard for Non-Full-Size Baby Cribs, when tested with the product with which it is supplied.

(iii) 5.7.2.2 *After-market mattresses for non-full-size cribs:* shall be treated as though the mattresses were "the mattress supplied with a non-full-size crib" and shall meet the specifications of *Stability*; *Cord/Strap Length*; *Mattresses for Rigid sided products*; and *Crib Side Height* in 16 CFR part 1220, Safety Standard for Non-Full-Size Baby Cribs, when tested to the equivalent interior dimension of the product for which it is intended to be used.

(iv) 5.7.2.3 The after-market mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the product mattress support structure.

(v) 5.7.2.4 If the original equipment mattress includes a floor support structure, the after-market mattress must include a floor support structure that is at least as thick as the original equipment mattress floor support structure.

(vi) 5.7.2.5 If the original equipment mattress includes storage accommodations for the product instruction manual, the after-market mattress shall provide equivalent storage accommodations for the product instruction manual.

(5) Instead of complying with section 5.9 through 5.9.1.2 of ASTM F2933-21, comply with the following:

(i) 5.9 *After-Market Mattress for Play Yard*—For the purposes of this section, the term "product" refers to a play yard.

(ii) 5.9.1 *For Mesh/Fabric Sided Play Yard Products:*

(iii) 5.9.1.1 The after-market mattress and product it is tested in shall meet the applicable requirements of the following sections of 16 CFR part 1221, Safety Standard for Play Yards, when tested with each brand and model of product for which it is intended to replace the mattress: *Stability*; *Cord/Strap Length*; *Mattress; Height of Sides; Floor Strength; Mattress Vertical Displacement*.

(iv) 5.9.1.2 If the aftermarket mattress is intended to be used in the bassinet of a play yard with a bassinet attachment, the mattress shall also meet the specifications of the following sections of 16 CFR part 1218, Safety Standard for Bassinets and Cradles, when tested with each brand and model for which it is intended to replace the mattress: *Pad Thickness for Fabric or Mesh Sided Products; Pad dimensions; Side Height; Bassinets with Segmented Mattresses*. This section applies

only to a play yard mattress that is interchangeably used as a play yard mattress and as a bassinet mattress/pad.

(6) Add the following paragraphs to section 5 of ASTM F2933-21:

(i) 5.10 Mattress Firmness.

(ii) 5.10.1 All crib mattresses within the scope of this standard, when tested in accordance with 6.3, the feeler arm shall not contact the sleep surface of the crib mattress.

(iii) 5.11 Coil Springs. The requirements in this section only pertain to crib mattresses with coil springs.

(iv) 5.11.1 When tested in accordance with 6.4, there shall be no exposed coil springs or metal wires.

(7) Renumber section 6.2.2 of ASTM F2933-21 to section 6.2.3.

(8) Renumber section 6.2.2.1 of ASTM F2933-21 to section 6.2.3.1.

(9) Renumber section 6.2.2.2 of ASTM F2933-21 to section 6.2.3.2.

(10) Renumber section 6.2.2.3 of ASTM F2933-21 to section 6.2.3.3.

(11) Renumber section 6.2.2.4 of ASTM F2933021 to section 6.2.3.4.

(12) Add the following paragraphs to section 6.2.3 of ASTM F2933021:

(i) 6.2.3.5 The test mattress sheet shall be placed on the mattress such that each sheet edge is wrapped fully around and under the mattress.

(ii) 6.2.3.6 Repeat step 6.2.3.2. Then measure the shortest gap between the mattress and the projected crib corner after the dimensions of the mattress have been recorded. The projected crib corner is located 53 in. ± ⅛ in. (1346 mm ± 3.2 mm) from Wall C and 28⅝ in. ± ⅛ in. (727 mm ± 3.2 mm) from Wall D, as shown in Fig. 2. The mattress shall not be moved during measurement. This shall be the corner gap measurement.

(iii) 6.2.3.7 Rotate the mattress 180° such that the opposing corner is adjacent to Walls C and D, then repeat 6.2.3.6.

(13) Instead of complying with section 6.2.2 of ASTM F2933-21, comply with the following:

(i) 6.2.2 *Test Equipment-Mattress Sheet:*

(ii) 6.2.2.1 The mattress sheet shall be 100% cotton and fitted for the mattress to be tested.

(iii) 6.2.2.2 The mattress sheet shall be washed in hot water (50° C [122° F] or higher) and dried a minimum of two times on the highest setting using household textile laundering units. This shall be the test mattress sheet.

(14) Add the following paragraphs as section 6.3 of ASTM F2933-21.

(i) 6.3 Mattress Firmness.

(ii) 6.3.1 *Test Fixture:*

(iii) 6.3.1.1 The fixture, as shown in Fig. 3, shall be a rigid, robust object with a round footprint of diameter 203 mm ± 1 mm, and an overall mass of 5200 g ± 20 g. The lower edge of the fixture shall have a radius not larger than 1 mm. Overhanging the footprint by 40 mm ± 2 mm shall be a flexible, flat bar of width 12 mm ± 0.2 mm with square-cut ends. This bar may be fashioned from a shortened hacksaw blade. The bar shall rest parallel to the bottom surface of the fixture and shall be positioned at a height of 15 mm ± 0.2 mm above the bottom surface of the fixture. The bar shall lay directly over a radial axis of the footprint (i.e. such that a longitudinal centerline of the bar would pass over the center of the footprint).

(iv) 6.3.1.2 Included on the fixture, but not overhanging the footprint, shall be a linear level that is positioned on a plane parallel to the bar, and in a direction parallel to the bar.

(v) 6.3.1.3 Other parts of the fixture, including any handle arrangement and any clamping arrangement for the bar, shall not comprise more that 30% of the total mass of the fixture, and shall be mounted as concentric and as low as possible.

(vi) 6.3.2 *Test Method:*

(vii) 6.3.2.1 Mattresses that are supplied with a product shall be tested when positioned on that product. Mattresses sold independent of a product, shall be tested on a flat, rigid, horizontal support. After-market mattresses for play yards and non-full-size cribs shall be tested with each brand and model of product it is intended to replace.

(viii) 6.3.2.2 Where a user of a mattress could possibly position either side face up, even if this is not an intended use, then both sides of the mattress shall be tested.

(ix) 6.3.2.3 Before testing each mattress, the following steps shall be followed:

(A) Verify there is no excess moisture in the mattress, beyond reasonable laboratory humidity levels.

(B) Allow sufficient time per the manufacturer's instructions to fully inflate, if shipped in a vacuum sealed package.

(C) Shake and or agitate the mattress in order to fully aerate and distribute all internal components evenly.

(D) Place the mattress in the manufacturer's recommended use position if there is one, in the supplied product, or on a flat, rigid, horizontal support.

(E) Let the mattress rest for at least 5 minutes.

(F) Mark a longitudinal centerline on the mattress sleep surface, and divide this line in half. This point will be the first test location. Then further divide the two lines on either side of the first test location into halves. These will be the second and third test locations.

(x) 6.3.2.4. Position the test fixture on each of the test locations, with the footprint of the fixture centered on the location, with the bar extending over the centerline and always pointing at the same end of the mattress sleep surface.

(A) At each test location in turn, rotate the bar to point in the required direction, and gently set the fixture down on the mattress sleep surface, ensuring that the footprint of the fixture does not extend beyond the edge of the mattress. The fixture shall be placed as horizontal as possible, using the level to verify. If the bar makes contact with the top of the mattress sleep surface, even slightly, the mattress is considered to have failed the test.

(B) Repeat Step (A) at the remaining locations identified in 6.3.2.3(F).

(C) Repeat Step (A) at a location away from the centerline most likely to fail (e.g. a very soft spot on the sleep surface or at a raised portion of the sleep surface). In the case of testing a raised portion of a sleep surface, position center of the fixture such that the bar is over the raised portion, to simulate the position of an infant's nose.

(D) In the event that the fixture is not resting in a nearly horizontal orientation, repeat the test procedure at that location by beginning again from paragraph (b)(14)(x)(A). However, if the test produces a fail even with the device tilted back away from the bar so as to raise it, then a fail can be recorded.

(15) Add the following paragraphs as section 6.4 of ASTM F2933-21:

(i) 6.4 Coil Spring Test.

(ii) 6.4.1 General—This test consists of dropping a specified weight repeatedly onto the mattress. The test assists in evaluating the structural integrity of a mattress with coil springs.

(iii) 6.4.2 Test Fixture:

(iv) 6.4.2.1 A guided free-fall impacting system machine (which keeps the upper surface of the impact mass parallel to the horizontal surface on which the crib is secured) (See Fig. 4).

(v) 6.4.2.2 A 30-lb (13.6-kg) impact mass (see Fig. 5 and Fig. 6).

(vi) 6.4.2.3 A 6-in. (150-mm) long gauge.

(vii) 6.4.2.4 An enclosed frame measuring 29 inches by 53 inches (737 mm by 1346 mm) for the purpose of restricting mattress movement. When testing full-size mattresses, a full-size crib meeting the requirements of ASTM F1169-19 would suffice.

(viii) 6.4.2.5 a ¾" piece of plywood or oriented strand board (OSB) that is rigidly supported along the perimeter.

(ix) 6.4.3 *Test Method*:

(x) 6.4.3.1 Place the mattress on the wooden support and inside the enclosed frame.

(xi) 6.4.3.2 Position geometric center of the impact mass above the geometric center of the test mattress.

(xii) 6.4.3.3 Adjust the distance between the top surface of the mattress and bottom surface of the impact mass to 6 in. (150 mm) (using the 6-in. (150-mm) long gauge, per 6.4.2.3) when the impact mass is in its highest position. Lock the impactor mechanism at this height and do not adjust the height during impacting to compensate for any change in distance as a result of the mattress compressing or the mattress support deforming or moving during impacting.

(xiii) 6.4.3.4 Allow the 30-lb (13.6-kg) impact mass to fall freely 250 times at the rate of one impact every 4 s. Load retraction shall not begin until at least 2 s after the start of the drop.

(xiv) 6.4.3.5 Repeat the step described in 6.4.3.4 at the other test locations shown in Fig. 7.

(xv) 6.4.4 The coil spring test shall be repeated on each surface of the mattress. The test shall not be repeated using a mattress that has been previously tested with the coil spring test.

(16) Add the following Figures to section 6 of ASTM F2933-21:

(i) Figure 2.

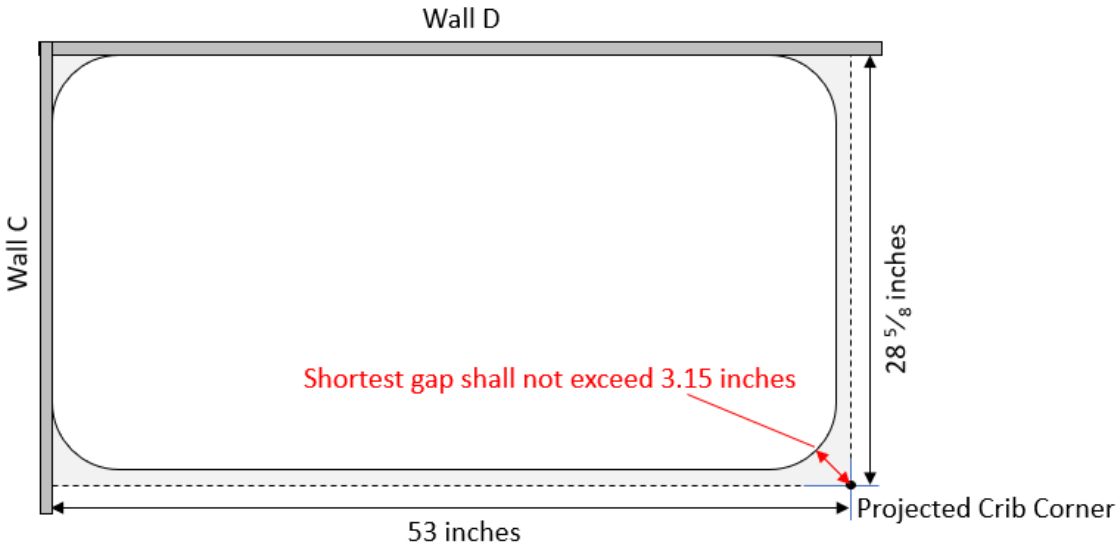


**Figure 2. Projected crib corner and corner gap measurement location**

(ii) Figure 3.

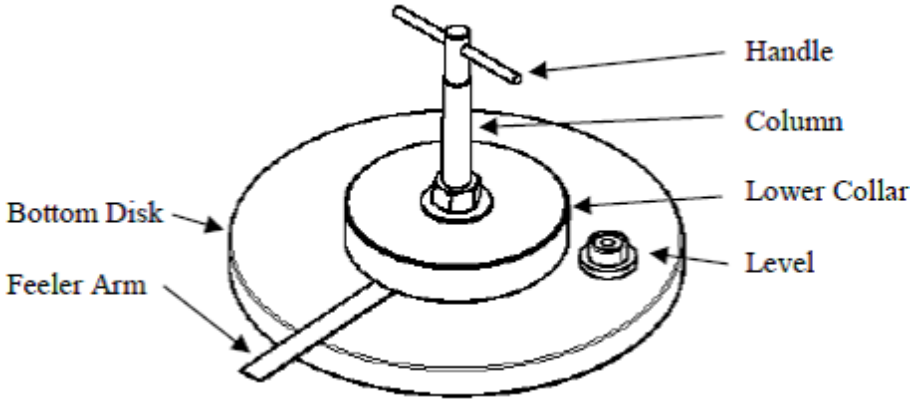


**Figure 3. Mattress Firmness Test Fixture**

(iii) Figure 4.

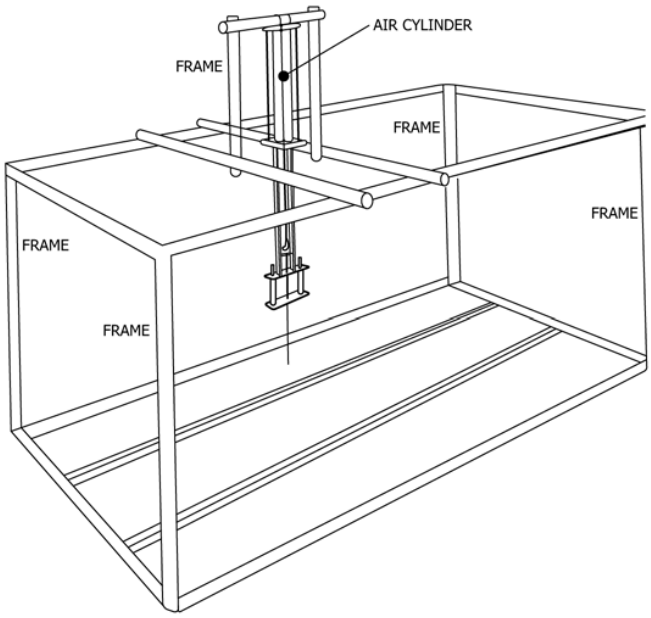


**Figure 4. Typical free fall impacting system[90]**

(iv) Figure 5.

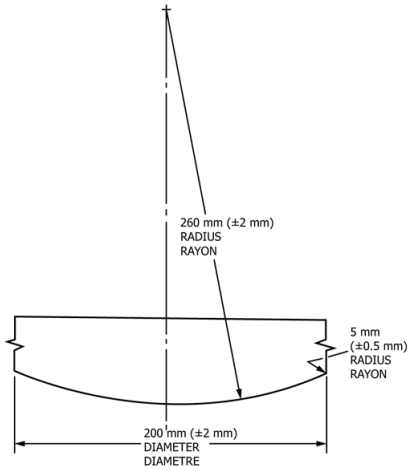


**Figure 5. Profile of Impact mass[90]**

[90] Reprinted, with permission, from ASTM F1169-19 Standard Consumer Safety Specification for Full-Size Baby Cribs, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

(v) Figure 6.

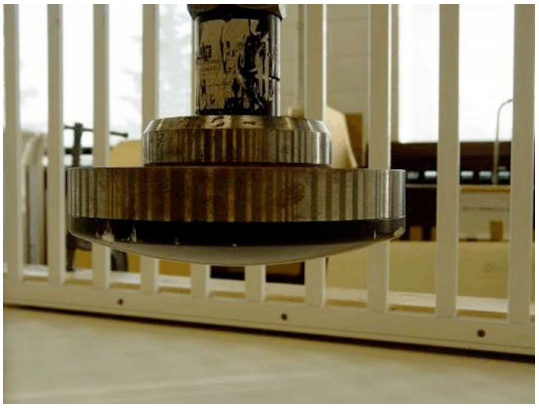

**Figure 6. Photo of typical impact mass[90]**

(vi) Figure 7.

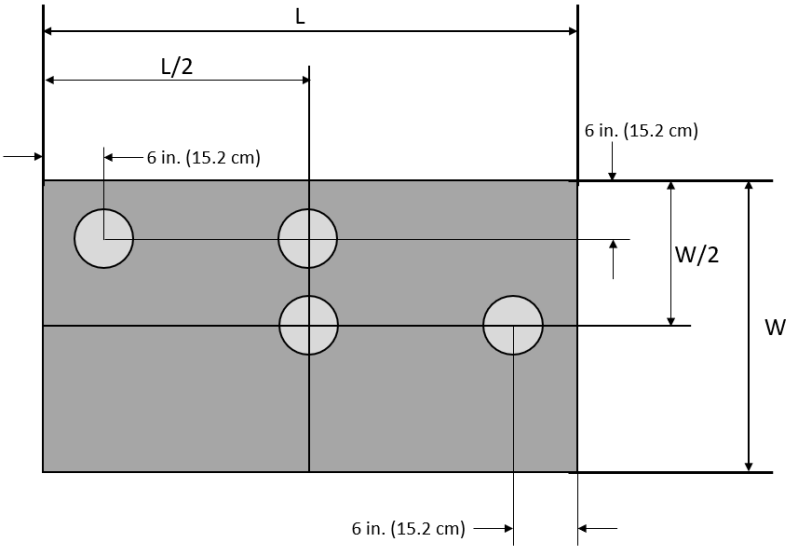


**Figure 7. Impact test locations**

(17) Instead of complying with sections 7.1 and 7.2 of ASTM F2933-21, comply with the following:

(i) 7.1 Each mattress and its retail package shall be marked or labeled clearly and legibly to indicate the following:

(ii) 7.1.1 The name, place of business (city, state, and mailing address, including zip code), and telephone number of the manufacturer, distributor, or seller.

(iii) 7.1.2 A code mark or other means that identifies the date (month and year at a minimum) of manufacture.

(iv) 7.2 The marking and labeling on the product shall be permanent.

(18) Do not comply with sections 7.2.1, 7.2.2, 7.2.2.1, 7.2.2.2, and 7.2.2.3 of ASTM F2933-21.

(19) Instead of complying with sections 7.3, 7.3.1, 7.3.2, and 7.3.3 of ASTM F2933-21, comply with the following:

(i) 7.3 Any upholstery labeling required by law shall not be used to meet the requirements of this section.

(ii) [Reserved]

(20) Instead of complying with sections 7.4 and 7.4.1 of ASTM F2933-21, comply with the following:

(i) *7.4 Warning Design for Mattresses:*

(ii) 7.4.1 The warnings shall be easy to read and understand and be in the English language at a minimum.

(iii) 7.4.2 Any marking or labeling provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.

(iv) 7.4.3 The warnings shall be conspicuous and permanent.

(v) 7.4.4 The warnings shall conform to ANSI Z535.4 – 2011, American National Standard for Product Safety Signs and Labels, sections 6.1-6.4, 7.2-7.6.3, and 8.1, with the following changes.

(vi) 7.4.4.1 In sections 6.2.2, 7.3, 7.5, and 8.1.2, replace “should” with “shall.”

(vii) 7.4.4.2 In section 7.6.3, replace “should (when feasible)” with “shall.”

(viii) 7.4.4.3 Strike the word “safety” when used immediately before a color (*e.g.,* replace “safety white” with “white”).

(ix) NOTE 3—For reference, ANSI Z535.1 provides a system for specifying safety colors.

(x) 7.4.5 The safety alert symbol "[Safety Alert Symbol]" and the signal word “WARNING” shall be at least 0.2 in. (5 mm) high. The remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm), except where otherwise specified.

(xi) NOTE 4—For improved warning readability, typefaces with large height-to-width ratios, which are commonly identified as “condensed,” “compressed,” “narrow,” or similar should be avoided.

(xii) 7.4.6 *Message Panel Text Layout:*

(xiii) 7.4.6.1 The text shall be left aligned, ragged right for all but one-line text messages, which can be left aligned or centered.

(xiv) NOTE 5—Left aligned means that the text is aligned along the left margin, and, in the case of multiple columns of text, along the left side of each individual column. Please see FIG. 8 for examples of left aligned text.

(xv) 7.4.6.2 The text in each column should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points. Multiple precautionary statements shall be separated by bullet points if paragraph formatting is used.

(xvi) 7.4.7 Example warnings in the format described in this section are shown in FIGS. 9, 10, and 11.

(21) Instead of complying with sections 7.5, 7.5.1, 7.5.2, 7.5.3, 7.5.3.1, and 7.5.3.2 of ASTM F2933-21, comply with the following:

(i) 7.5 Warning Statements - Each mattress shall have warning statements to address the following, at a minimum, unless otherwise specified. The blank in the mattress fit statement

beginning with "If a gap is larger than," needs to be filled with "1 ½ in. (3.8 cm)" for full-size crib mattresses and "1 in. (2.5 cm)" for all other mattresses.

(ii) NOTE 6—Address means that verbiage other than what is shown can be used as long as the meaning is the same or information that is product-specific is presented.

**SIDS AND SUFFOCATION HAZARDS**

**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation.

**Babies have suffocated:**

• on pillows, comforters, and extra padding

• in gaps between a wrong-size mattress, or extra padding, and side walls of product.

**NEVER** add soft bedding, padding, or an extra mattress.

**USE ONLY** one mattress at a time.

**DO NOT** cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS.

**ALWAYS** check mattress fit **every time you change the sheets,** by pushing mattress tight to one corner. Look for any gaps between the mattress and the side walls. If a gap is larger than ___, the mattress does not fit – **do not** use it.

(iii) Renumber section 7.3.1 of ASTM F2933-21 to section 7.5.1.

(iv) In section 7.5.1, replace the reference to "7.3" with a reference to "7.5."

(v) In section 7.5.1, replace the term "Only use" with the term "**USE ONLY**."

(vi) Renumber section 7.3.2 of ASTM F2933-21 to section 7.5.2.

(vii) In section 7.5.2, replace the term "For non-full-size crib mattresses" with the term "For non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs."

(viii) In section 7.5.2, replace the reference to "7.3" with a reference to "7.5."

(ix) In section 7.5.2, replace the term "Only use" with the term "**USE ONLY**."

(x) Renumber section 7.3.3 of ASTM F2933-21 to section 7.5.3.

(xi) In section 7.5.3, replace the term "may be included" with "are permitted, and replace the term "7.3 and 7.4" with "7.5 and 7.6".

(22) Instead of complying with sections 7.6, 7.6.1, 7.6.1.1, 7.6.1.2, or 7.7 of ASTM F2933-21, comply with the following:

(i) 7.6 The following warning statement shall be included exactly as stated in this paragraph (b)(22)(i) and shall be located at the bottom of the warnings on each mattress:

**DO NOT** remove these important safety warnings.

(ii) 7.7 *Additional Marking and Warnings for After-Market Mattresses for Play Yards and Non-Full-Size Cribs*—The mattress shall have:

(iii) 7.7.1 All warnings added by the original manufacturer which are in addition to those required by this standard.

(iv) 7.7.2 Assembly/attachment instructions that were provided on the original mattress.

(v) 7.7.3 The specific brand(s) and model(s) number(s) of the product(s) in which it is intended to be used.

(vi) 7.7.4 *For Rigid Sided Rectangular Products*—the following statement shall appear exactly as stated in this paragraph (b)(22)(vi) (the blanks are to be filled in as appropriate).

This mattress measures _____ long, _____ wide, and _____ thick when measured from seam to seam.

(23) Add the following paragraphs as section 7.8 of ASTM F2933-21:

(i) 7.8 Warning Design for Retail Packages.

(ii) 7.8.1 The warnings and statements are not required on the retail package if they are on the mattress and are visible in their entirety through the retail package. Cartons and other materials used exclusively for shipping the mattress are not considered retail packaging.

(iii) 7.8.2 Warning Statements—Each mattress' retail package shall have statements to address the following, at a minimum, and as specified in 7.4.1, 7.4.2, and 7.4.4-7.4.6.

(iv) 7.8.2.1 For full-size crib mattresses, each mattress' retail package shall be labeled with the warnings and statements specified in 7.5 and 7.5.1.

(v) 7.8.2.2 For non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs, each mattress' retail package shall be labeled with the warnings and statements specified in 7.5, 7.5.2, 7.7.1-7.7.4, as applicable.

(24) Add the following figures to section 7 of ASTM F2933-21:

(i) Figure 8.

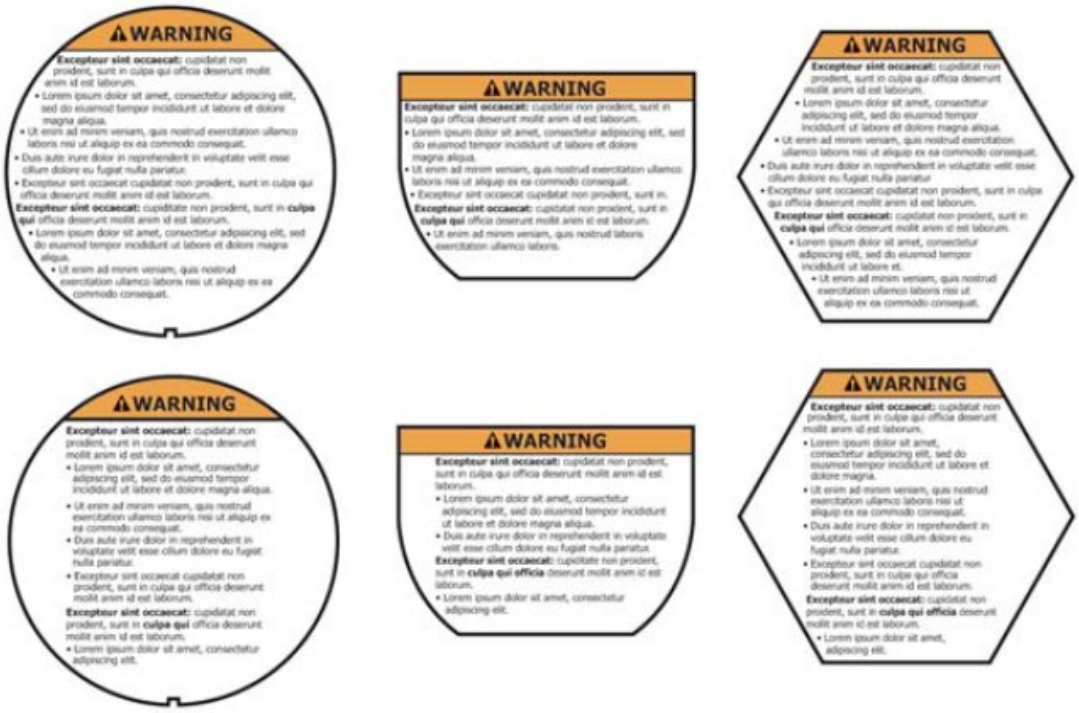


**FIG. 8 Examples of Left Aligned Text.**
This figure is not shown in actual size.

(ii) Figure 9.

**FIG. 9 Example of warning label for Full-Size Crib Mattress.**
This figure is not shown in actual size.

(iii) Figure 10.

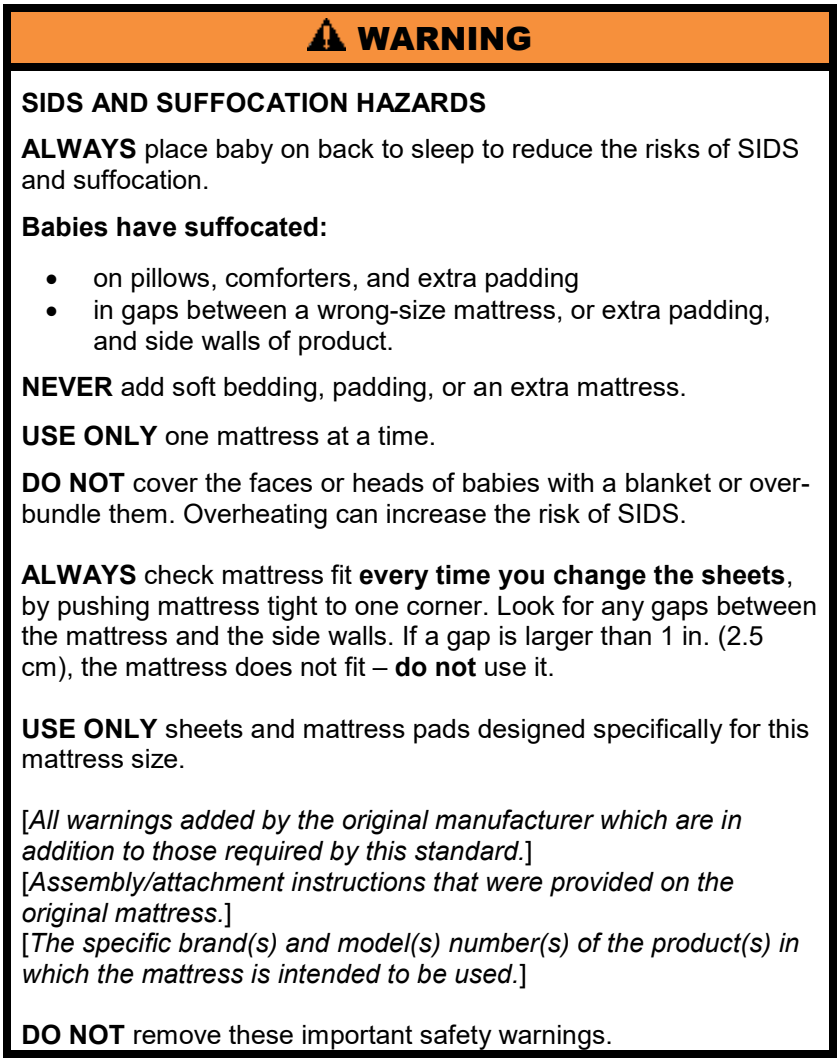


**FIG. 10 Example of warning label for After-Market Mattress for Mesh/Fabric Sided Products and Rigid Sided Non-Rectangular Products.**
Items italicized in brackets are to be added as appropriate.
This figure is not shown in actual size.

(iv) Figure 11.

**⚠ WARNING**

**SIDS AND SUFFOCATION HAZARDS**

**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation.

**Babies have suffocated:**

- on pillows, comforters, and extra padding
- in gaps between a wrong-size mattress, or extra padding, and side walls of product.

**NEVER** add soft bedding, padding, or an extra mattress.

**USE ONLY** one mattress at a time.

**DO NOT** cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS.

**ALWAYS** check mattress fit **every time you change the sheets**, by pushing mattress tight to one corner. Look for any gaps between the mattress and the side walls. If a gap is larger than 1 in. (2.5 cm), the mattress does not fit – **do not** use it.

**USE ONLY** sheets and mattress pads designed specifically for this mattress size.

[*All warnings added by the original manufacturer which are in addition to those required by this standard.*]
[*Assembly/attachment instructions that were provided on the original mattress.*]
[*The specific brand(s) and model(s) number(s) of the product(s) in which the mattress is intended to be used.*]

This mattress measures __ long, __ wide, and __ thick when measured from seam to seam. [*Fill in blanks as appropriate.*]

**DO NOT** remove these important safety warnings.

**FIG. 11 Example of warning label for After-Market Mattress for Rigid Sided Rectangular Non-Full-Size Cribs.**

Items italicized in brackets are to be added as appropriate. The blanks are to be filled in as appropriate. This figure is not shown in actual size.

(25) Renumber section 8 of ASTM F2933-21 to section 9.

(26) Add the following paragraphs to section 8 of ASTM F2933-21:

(i) **8. Instructional Literature.**

(ii) 8.1 Instructions shall be provided with the mattress and shall be easy to read and understand, and shall be in the English language, at a minimum. These instructions shall include information on assembly, maintenance, cleaning, and use, where applicable.

(iii) 8.2 The instructions shall have statements to address the following, at a minimum.

(iv) 8.2.1 All warnings included in section 7.5, as applicable.

(v) 8.2.2 All additional markings and warnings included in section 7.7, as applicable.

(vi) 8.3 The warnings in the instructions shall meet the requirements specified in 7.4.4, 7.4.5, and 7.4.6, except that sections 6.4 and 7.2—7.6.3 of ANSI Z535.4 need not be applied. However, the signal word and safety alert symbol shall contrast with the background of the signal word panel, and the cautions and warnings shall contrast with the background of the instructional literature.

(vii) NOTE 7—For example, the signal word, safety alert symbol, and the warnings may be black letters on a white background, white letters on a black background, navy blue letters on an off-white background, or some other high-contrast combination.

(viii) 8.4 Any instructions provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.

(ix) NOTE 8—For additional guidance on the design of warnings for instructional literature, please refer to ANSI Z535.6, *American National Standard: Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials*.

_____

Alberta E. Mills,
Secretary, Consumer Product Safety Commission

# Staff Briefing Package

Draft Final Rule for Crib Mattresses[1] Under the Danny Keysar Child Product Safety Notification Act

September 22, 2021

[1] As well as supplemental and after-market mattresses used in play yards and portable cribs.



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# Briefing Memorandum



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UNDER CPSA 6(b)(1)

**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MARYLAND 20814**

This document has been electronically approved and signed.

**Memorandum** September 22, 2019

TO: The Commission
Alberta E. Mills, Secretary

THROUGH: Jennifer Sultan, Acting General Counsel

Mary T. Boyle, Executive Director

DeWane Ray, Deputy Executive Director for Safety Operations

FROM: Duane E. Boniface, Assistant Executive Director
Office of Hazard Identification and Reduction

Hope E J. Nesteruk, Children's Program Manager
Division of Mechanical and Combustion Engineering
Directorate for Engineering Sciences

SUBJECT: Staff's Draft Final Rule for Crib Mattresses Under the Danny Keysar Child Product Safety Notification Act

# I. Introduction

The Danny Keysar Child Product Safety Notification Act, *i.e.*, section 104 of the Consumer Product Safety Improvement Act of 2008 (CPSIA), requires the U.S. Consumer Product Safety Commission (CPSC) to (1) examine and assess voluntary safety standards for durable infant or toddler products, and (2) promulgate mandatory consumer product safety standards that are substantially the same as or more stringent than the voluntary standards if the Commission determines that more stringent standards would further reduce the risk of injury associated with these products. Section 104(f) of the CPSIA defines "durable infant or toddler product" as a "durable product intended for use, or that may be reasonably expected to be used, by children under the age of 5 years." Section 104(f)(2) sets forth a non-exhaustive list of durable infant or toddler products to which the Commission may add products. The list of products in section 104(f)(2) does not include crib mattresses, but it does include infant sleep products that are used with crib mattresses, such as full-size cribs, non-full-size cribs, and play yards.

On June 16, 2015, the president of Keeping Babies Safe (KBS), and the mother of a child who died in a play yard incident involving an after-market mattress (a mattress that was not sold with the play yard), petitioned the CPSC requesting a ban on supplemental mattresses for play yards with nonrigid sides (petition CP 15-2). The petitioner alleged that "thicker mattresses create a



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suffocation hazard because they create a gap between the mattress pad sides and the side of the portable crib where a baby can suffocate when the baby's head falls in such gap while lying in the prone position." Furthermore, the petitioner concluded that "no feasible consumer product safety standard would adequately protect babies from the unreasonable risk of injury and death associated with the product."

In response to this petition, the Commission voted[2] (3-2) to "take other action," granting the petition and directing the staff to initiate a rulemaking under section 104 of the CPSA to promulgate a mandatory consumer product safety standard to address the risk of injury associated with the use of crib mattresses. The Commission directed that the scope of the rule shall include crib mattresses, as well as supplemental and after-market mattresses used in play yards and portable cribs. The Commission further directed staff to amend the product registration card rule, 16 CFR part 1130, to add "crib mattresses" to the list of "durable infant or toddler products" that require a registration card.

Based on staff's recommendations, the Commission published a notice of proposed rulemaking (NPR) for crib mattresses on October 26, 2020, proposing to incorporate by reference ASTM F2933 – 19, *Standard Consumer Safety Specification for Crib Mattresses,* with modifications to make the standard more stringent and further reduce the risk of injury associated with crib mattresses in four areas: suffocation, entrapment, laceration hazards, and hazard communication. The scope of the NPR included full-size and non-full-size crib mattresses, as well as after-market[3] mattresses for play yards and non-full-size cribs. The NPR also proposed to amend CPSC's consumer registration requirements to identify crib mattresses within the scope of the NPR as durable infant or toddler products, and proposed to amend CPSC's list of notice of requirements (NORs) to include such crib mattresses. The Commission requested comment on the NPR and received 13 comments during the comment period, and two late-filed comments.

Since the publication of the NPR, ASTM revised F2933 – 19 to F2933 – 21. Staff assesses that the revisions in ASTM F2933 – 21 improve requirements for after-market mattresses over ASTM F2933 – 19, but do not address fully the four hazard patterns addressed by the modifications proposed in the NPR. Accordingly, based on staff's review and consideration of the comments, updated incident data, and continued participation on the ASTM voluntary standard, this staff briefing package recommends that the Commission issue a final rule to create a mandatory standard for crib mattresses that would address the hazards associated with full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-

[2] https://www.cpsc.gov/s3fs-public/RCA-Petition_CP_15-2_Requesting_Ban_on_Supplemental_Mattresses_for_Play_Yards_with_Non-Rigid_Sides_052517.pdf

[3] As discussed in the briefing package for petition CP 15-2, "supplemental mattress" is a term that invites confusion. The term refers to the use-pattern of a product, which could be "supplementing" an existing mattress or "supplementing" the play yard itself. Staff believes that "supplemental" is more descriptive of the use-pattern; whereas, "after-market" is more descriptive of how the mattress is sold, *i.e.*, independent of the play yard or crib in which it is used. In addition, cribs can be either full-size or non-full-size, and either size could be made portable. Therefore, staff concludes that the term "after-market mattress" more clearly indicates any mattress sold independently from a play yard or crib that can be used as a sleeping surface inside the play yard or crib, whether used alone or with the original mattress. In addition, "after-market mattress" is the term defined in ASTM F2933 to include mattresses that are sold independently of play yards or non-full-size cribs.



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full-size cribs, incorporating by reference ASTM F2933 – 21, with the additional requirements, largely as proposed in the NPR, to make the standard more stringent and to further reduce the risk of injury associated with crib mattresses.

The draft final rule would create a new mandatory standard for crib mattresses, update part 1130 to add "crib mattresses" to the list of durable infant or toddler products that require a product registration card, and amend part 1112 to create an NOR for third party labs to become accredited to test crib mattresses.[4]

This briefing package: (1) reviews incident data reported since the data reviewed for the NPR; (2) responds to public comments on the NPR; (3) assesses the effectiveness of the current ASTM voluntary standard for crib mattresses; (4) summarizes staff's work with the ASTM voluntary standards committee since the NPR; (5) discusses the impact of the draft final rule on small businesses; and (6) provides staff's recommendations for a draft final rule on crib mattresses to the Commission.

# II. Background

## A. Overview of the NPR

Section 104 of the CPSIA also requires the Commission to consult with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts to examine and assess the effectiveness of the relevant voluntary standards. CPSC staff regularly participates in the juvenile products subcommittee meetings of ASTM International (ASTM). ASTM subcommittees consist of members who represent producers, users, consumers, government, and academia.[5] The consultation process for this crib mattress rulemaking commenced during the ASTM subcommittee meeting in May 2018, when staff presented their initial recommendations for updating the crib mattress voluntary standard to address the incident data. Since then, staff has actively participated with the ASTM F15.66 subcommittee for Crib Mattresses in revising ASTM F2933, *Standard Consumer Safety Specification for Crib Mattresses*, to address the associated hazards.

The NPR proposed to incorporate by reference, ASTM F2933 – 19, with modifications to address the following four hazards:

[4] CPSC already has a mandatory standard for play yards, codified at 16 CFR part 1221, which regulates play yard mattresses sold with the product. The play yard standard, which is based on ASTM's voluntary standard F406, currently requires mattresses sold with a play yard to be no more than 1.5 inches thick, to prevent infants from suffocating in a hazardous gap between the play yard mattress and the side or bottom of a play yard. Staff actively participates with F15.18, the subcommittee for play yards. The F15.18 subcommittee is currently considering the safety of allowing thicker mattresses for play yards, to address perceived comfort issues that may lead caregivers to use an after-market mattress. Should ASTM F406 be revised to address play yard mattresses greater than 1.5 inches, the update provisions of Pub. L. No. 112-28 require ASTM to notify the Commission of the revision, and allows the Commission to evaluate the safety of the proposed revision, before such revision would become part of the mandatory standard for play yards.

[5] ASTM International website: www.astm.org, About ASTM International.



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1. Suffocation hazards – due to overly soft crib mattresses, by adding a test for mattress firmness based on sections 6 and 8 of A*S/NZS 8811.1:2013 – Methods of testing infant products – Method 1: Sleep Surfaces – Test* (AS/NZS 8811.1);
2. Entrapment hazards –
    - Full-size crib mattresses – due to poor mattress fit from compression by sheets, by repeating the dimensional conformity test and measuring for corner gaps, after installing a shrunken (by washing twice) cotton sheet;
    - After-market non-full-size crib mattresses – due to lack of dimensional requirements for rectangular-shaped products, by extending the dimensional requirements in ASTM F2933 – 19 section 5.7.2 to include all non-full-size crib mattresses, regardless of mattress shape, and regardless of whether the mattress is sold with a non-full-size crib or as an after-market mattress;
3. Laceration hazards – due to coils and springs breaking and poking through mattresses, by adding a cyclic impact test for mattresses that use coil springs; and
4. SIDS (Sudden Infant Death Syndrome) and suffocation related to infant positioning, soft bedding, and gap entrapment – due to consumer behavior, by improving marking, labeling, and instructional literature to clarify for manufacturers and test labs, and to communicate the risks to consumers better.

Staff also recommended updating 16 CFR part 1130 to include "crib mattresses" as a durable infant or toddler product that requires a product registration card, and updating 16 CFR part 1112 to include a notice of requirements (NOR) for crib mattresses.

### B. ASTM publications after NPR

Since publication of the NPR, ASTM revised F2933 – 19 to F2933 – 21. Like ASTM F2933 – 19, ASTM F2933 – 21 provides performance and labeling standards for mattresses intended for full-size cribs, non-full-size cribs, after-market mattresses for play yards, and after-market mattresses for non-full-size cribs. However, this revised standard does not address the four additional hazards addressed in the NPR. Instead, ASTM F2933 – 21 updates the requirements for after-market play yard and non-full-size crib mattresses, as follows:

- Replaces requirement that "aftermarket mattresses for soft-sided and non-rectangular, rigid-sided products shall have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace" with: (1) direct references to requirements in ASTM F406 *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards*; (2) requirements that the after-market mattress must be at least the same size as the original equipment mattress, so long as it lays flat on the support structure; and (3) requirements that the after-market mattress floor support structure be at least as thick as the original equipment mattress floor support structure. This allows play yard mattresses that may be thicker than what is provided by the original equipment manufacturer, but is still limited to a maximum of 1 ½ inches, as required by ASTM F406.
- Adds requirement specifying that after-market mattresses must have equivalent storage accommodations for instructions as the original equipment mattress.



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Like ASTM F2933 – 19, section 5.7 of ASTM F2933 – 21 states that the dimensions of a full-size crib mattress shall measure at least 27 ¼ in. wide and 51 ⅝ in. long. The interior dimensions of full-size cribs are 28 in. ± ⅝ in. (710 mm ± 16 mm) wide and 52 ⅜ in. ± ⅝ in. (1330 mm ± 16 mm) long. Non-full-size crib mattresses do not have defined dimensions, except for the minimum effective crib-side height and side-gap requirement when the mattress is in the crib. ASTM F2933 – 21 requires that the dimensions of a mattress supplied with a non-full-size crib shall be such that the mattress, when inserted in the center of the crib, in a non-compressed state, shall not leave a gap of more than ½ in. at any point between the perimeter of the mattress and the perimeter of the crib. Additionally, the voluntary standard requires that the mattress supplied "shall, in a non-compressed state, have a thickness that will provide a minimum effective crib-side height dimension of at least 20 in. (508 mm) as measured from the upper surface of the crib side or end panel."

Section 5.9 of ASTM F2933 – 19 contained the requirements for after-market mattresses. This section was updated in ASTM F2933 – 21 to require that after-market mattresses for play yards and non-rectangular non-full-size cribs meet the following requirements in ASTM F406 – 19: *Stability*; *Cord/Strap Length*; *Mattress*; *Mattresses for Rigid-Sided Products*; *Crib Side Height*; *Height of Sides*; *Floor Strength*; and *Mattress Vertical Displacement*, when tested in the product it was designed for or intended to fit. Additionally, an after-market mattress must be the same size or larger than the original equipment mattress, so long as it lays flat on the support structure; the after-market mattress floor support structure must be at least as thick as the original equipment mattress floor support structure; and the after-market mattress must have equivalent storage accommodations for product instruction manuals as the original equipment mattress.

### C. Public Comments, Response, and Deviations from NPR (Tab A)

The Commission's NPR published on October 26, 2020, with comments on due January 11, 2021. The comments can be found in docket number CPSC-2020-0023 at: http://www.regulations.gov. During the public comment period, CPSC received 13 comments. Generally, comments favored the promulgation of a mandatory standard for crib mattresses, and provided comments suggesting non-specific feedback on the test methods, specific changes to the hazard communication requirements, and feedback suggesting other provisions thought to be beneficial. One comment objected to the rule because of the incorporation by reference of a commercial voluntary standard. On July 2, 2021, CPSC's Acting Chair and several staff members received a letter regarding the proposed rule, requesting that the updates in ASTM F2933 – 21 be considered for the final rule, because the revised ASTM standard addresses the needs of after-market mattress manufacturers better. The letter also requested that the final rule be delayed until the Play Yard Fit and Thickness task group completes work, part of the ASTM F406 subcommittee's work. This letter was treated as a late-filed public comment, and staff posted the letter to the docket on July 8, 2021. The letter was resubmitted on September 3, 2021 along with an email with similar content, which was added to the docket on September 2021.

Tab A contains staff's summary and responses to the comments. After reviewing and considering the comments, staff recommends making the following clarifications in the draft final rule:



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- Cyclic Impact Test Procedure - clarify the test method to require the use of different mattresses for testing each surface because of the potential for testing to be destructive;
- Fitted Sheet Test Procedure - modify the fitted sheet test to focus on corner gap measurements from a projected crib corner, incorporating the direction ASTM is taking to address the hazard pattern;
- Safety Information - modify the requirements for on-product and package labeling to include important clarifications and to communicate better to consumers the risks and preventative actions related to SIDS and suffocation (see Tab D, Appendix A); and
- Incorporate by reference ASTM F2933 – 21, with modifications, because staff assesses that this revised standard improves the safety of crib mattresses by improving requirements for after-market mattresses for play yards and non-full-size cribs, but does not fully address the hazard patterns addressed in the NPR.

### D. Product Review

ASTM F2933 – 21 defines "mattress" as "ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping on it," and the standard defines an "after-market mattress for play yard or non-full-size crib" as "a mattress sold or distributed for a play yard or non-full-sized crib" (§ 3.1.5 and 3.1.1, respectively). In addition, "crib" is defined as a "bed that is designed to provide sleeping accommodations for an infant which has specific interior dimensions as determined by it being either a full-size or non-full-size crib" (§ 3.1.4).

Full-size cribs are typically sold separately from crib mattresses. Full-size crib mattresses generally are referred to by industry as "standard" crib mattresses. Full-size crib mattresses are also used for toddler beds, meaning that one crib mattress may be used from birth through the toddler years. Crib mattresses for full-size cribs come in a variety of designs and are made of a broad array of materials. Crib mattresses typically have a fabric or vinyl ticking, which covers inner-spring coils or foam. Inner-spring mattresses often have a layer of foam or batting between the springs and the ticking.



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**Figure 1. Full-size crib and full-size crib mattress**

Non-full-size cribs are cribs that differ in dimension or shape from full-size cribs, that is, non-full-size cribs can be rigid products smaller or larger than full-size cribs or non-rectangular in shape. The draft NPR defined "crib mattresses" consistent with the ASTM standard, to include full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs, and consistent with Commission direction to include "crib mattresses, as well as after-market mattresses for play yards and portable cribs."

After-market mattresses for play yards and portable cribs are available for sale as play yard mattresses and mini crib mattresses, respectively. Play yard mattresses are sometimes called "trifold," "foldable," or "portable" play yard mattresses, while mini crib mattresses are also considered portable crib mattresses. Some consumers may also refer to a play yard as a "portable crib." Play yards have non-rigid, fabric or mesh sides. "Mini crib" is a term that is used colloquially to refer to a product that would generally fall under the non-full-size crib category. Mini cribs are smaller than full-size cribs and have rigid sides. Portable cribs, play yards, and mini cribs come in a range of sizes, as do after-market mattresses.



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## E. Incident Data (Tab B)

### 1. NPR Incident Data Summary

In the NPR, staff identified 439 total reported incidents, including 21 incidents reported through the National Electronic Injury Surveillance System (NEISS) and 418 incidents reported in Consumer Product Safety Risk Management System[6] (CPSRMS) for the period January 1, 2010 through March 31, 2020. Table 1 contains staff-identified hazard categories associated with these incidents, with fatalities identified in ***bold.***

**Table 1. Fatal and Nonfatal Reports Associated with Crib Mattresses by Hazard Category, January 1, 2010 – March 31, 2020**

| Hazard Category | Fatal Reports | Nonfatal Reports | Total Reports |
|---|---|---|---|
| Chemical/Flammability | 0 | 23 | 23 |
| Coil or Spring | 0 | 124 | 124 |
| ***Crib Mattress Used in a Play Yard*** | ***2*** | ***1*** | ***3*** |
| Expand or Inflate | 0 | 6 | 6 |
| ***Face in Mattress*** | ***13*** | ***1*** | ***14*** |
| ***Fit Issues*** | ***20*** | ***88*** | ***108*** |
| ***Found Prone*** | ***66*** | ***3*** | ***69*** |
| Mattress Falls Apart | 0 | 18 | 18 |
| Softness | 0 | 36 | 36 |
| ***Multiple Contributing Factors*** | ***15*** | ***17*** | ***32*** |
| Other | 0 | 6 | 6 |
| Total | 116 | 323 | 439 |

*Source: CPSRMS and NEISS databases*
*Reporting is ongoing. Staff considers 2018–2020 incomplete.*

### 2. Injury Estimates (NEISS)

In the NPR, CPSC staff found 21 NEISS cases, including 19 injuries and 2 fatalities, associated with a crib mattress (meaning full-size, non-full-size, play yard, and after-market crib mattresses) from January 1, 2010 through March 31, 2020. Because the data did not meet the minimum criteria for reporting an estimate,[7] staff included these cases with the rest of the reported incidents. Since the NPR, staff has not identified any new incidents in the NEISS database. Therefore, staff still cannot develop national injury estimates for crib mattresses.

[6] CPSRMS is the epidemiological database that houses all anecdotal reports of incidents received by CPSC, "external cause"-based death certificates purchased by CPSC, all in-depth investigations of these anecdotal reports, as well as investigations of select NEISS injuries. Examples of documents in CPSRMS are: hotline reports, Internet reports, news reports, medical examiner's reports, death certificates, retailer/manufacturer reports, and documents sent by state/local authorities, among others.

[7] NEISS estimates are reportable, provided the sample count is greater than 20, the national estimate is 1,200, or greater, and the coefficient of variation (CV) is less than 0.33.



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### 3. Incident Data Since the NPR

Table 2 shows the incident data for the period January 1, 2010 through April 31, 2021, with categories involving fatalities identified in ***bold***. Since the NPR (April 1 2020 – April 31 2021), CPSC staff identified 55 new incidents related to crib mattresses. The identified hazard pattern categories in the new incidents were the same as those staff identified in the NPR. Although some hazard categories, such as *Fit Issues,* appear to have a disproportionate increase in incidents, staff did not identify any particular factor that contributed to this phenomenon. Additionally, some incidents occurred during the period covered in the NPR (January 1, 2010 – March 31, 2020), but were not reported to CPSC until after April 1, 2020, which may also contribute to apparent increases in incidents.

**Table 2. Fatal and Nonfatal Reports Associated with Crib Mattresses by Hazard Category, January 1, 2010 – April 31, 2021**

| | **January 1, 2010 – March 31, 2020** | | **April 1 2020 – April 31 2021** | | **1/1/2010 – 4/31/2021** |
|---|---|---|---|---|---|
| **Hazard Category** | **Fatal Reports** | **Nonfatal Reports** | **Fatal Reports** | **Nonfatal Reports** | **Total Reports** |
| Chemical/Flammability | 0 | 23 | 0 | 3 | 26 |
| Coil or Spring | 0 | 124 | 0 | 4 | 128 |
| ***Crib Mattress Used in a Play Yard*** | ***2*** | ***1*** | ***0*** | ***1*** | ***4*** |
| Expand or Inflate | 0 | 6 | 0 | 0 | 6 |
| ***Face in Mattress*** | ***13*** | ***1*** | ***3*** | ***0*** | ***17*** |
| ***Fit Issues*** | ***20*** | ***88*** | ***11*** | ***3*** | ***122*** |
| ***Found Prone*** | ***66*** | ***3*** | ***9*** | ***0*** | ***78*** |
| Mattress Falls Apart | 0 | 18 | 0 | 0 | 18 |
| Softness | 0 | 36 | 0 | 19 | 55 |
| ***Multiple Contributing Factors*** | ***15*** | ***17*** | ***0*** | ***2*** | ***34*** |
| Other | 0 | 6 | 0 | 0 | 6 |
| Total | 116 | 323 | 23 | 32 | 494 |

*Source: CPSRMS and NEISS databases*
*Reporting is ongoing. Staff considers 2019–2021 incomplete.*

### F. History and Description of ASTM F2933 – 21 (Tabs C and D)

The ASTM Committee F15 on Consumer Products first published the voluntary standard for crib mattresses in 2013, as ASTM F2933 – 13, *Standard Consumer Safety Specification for Crib Mattresses.* Since 2013, ASTM has revised and updated the voluntary standard three times to address safety issues.



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ASTM F2933 – 21 addresses numerous hazards with several general requirements, most of which are also found in the other ASTM juvenile product standards. ASTM F2933 – 21 includes general requirements addressing:

- Sharp points,
- Small parts,
- Lead and other toxic substances in paints,
- Finger entrapment,
- Mattress dimension conformity,
- Mattress thickness, and
- Marking and labeling.

In addition to the general requirements listed above, ASTM F2933 – 21 contains performance requirements and test methods specific to crib mattresses, including requirements pertaining to:

- After-market mattresses for play yards and non-full-size cribs, and
- Seam stitching.

The subcommittee developed requirements for after-market mattresses for play yard and non-full-size cribs, with the full participation of CPSC staff, in response to the 2015 petition on supplemental mattresses. ASTM included these requirements in ASTM F2933 – 19, which the Commission proposed adopting in the NPR, and ASTM further updated the requirements in ASTM F2933 – 21. A full discussion of the provisions in the voluntary standard can be found in Tabs C and D.

### G. ASTM Work Since NPR (Tabs C and D)

The consultation process for this rulemaking commenced during the ASTM subcommittee meeting in May 2018, when staff presented their initial recommendations for updating the crib mattress voluntary standard to address the incident data, and ASTM formed task groups to address cyclic testing, mattress firmness, hazard communication, and other concerns raised by CPSC staff. ASTM has continued to work with task groups to address the additional requirements proposed in the NPR, as detailed below.

#### 4. Suffocation Hazards

In the NPR, the Commission proposed adding a test for mattress firmness based on sections 6 and 8 of A*S/NZS 8811.1:2013 – Methods of testing infant products – Method 1: Sleep Surfaces – Test* (AS/NZS 8811.1). After the NPR, CPSC staff continued to engage with ASTM regarding methods to address the hazard pattern created by soft crib mattresses. The ASTM crib mattress subcommittee and task group discussed the NPR-proposed mattress firmness test at meetings on November 10, 2020, December 3, 2020, and February 16, 2021. At these meetings, ASTM members agreed that the ASTM standard should contain a firmness test, but debated whether the AS/NZS 8811.1 protocol, or the protocol specified in EN 16890:2017, *Children's Furniture – Mattresses for Cots and Cribs – Safety Requirements and Test Methods*, was more appropriate. Some members agreed with CPSC staff's assessment that the AS/NZS 8811.1 protocol was more



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appropriate, because test results using the EN 16890 protocol could be difficult to interpret due to the interaction of the spherical weight and the disc-shaped template as mattresses approach failure. Other ASTM members disagreed, stating that the EN 16890 protocol was more appropriate because the AS/NZS 8811.1 protocol did not produce consistent results. ASTM members did not provide supporting evidence for this conclusion. ASTM members agreed to test and compare results using both protocols after the February 16, 2021 meeting.

At a June 10, 2021 subcommittee meeting, several ASTM members reported they had tested using one or both of the firmness protocols, and repeated the assertion that the EN 16890 protocol should be favored. One member stated that the AS/NZS 8811.1 protocol results could be inconsistent if the test was not conducted on a flat surface. ASTM members did not provide or discuss any detailed test results to support their position. Staff notes that the test procedure, as proposed, specifies performing the test on a flat, level surface, and the fixture contains a level to verify it remains flat.

Staff received public comments that generally mirrored the debate within the ASTM task group, but also provided no data. The comments and staff's response are described in more detail in Tab A.

For the final rule, discussed in more detail in section III A below, and in Tab C, staff recommends proceeding with the firmness test as proposed in the NPR.

### 5. Entrapment Hazards from Compression

*a. Full-size crib mattresses*

In the NPR, the Commission proposed repeating the dimensional conformity test and measuring for corner gaps, after installing a shrunken (by washing twice) cotton sheet. After publication of the NPR, ASTM crib mattress subcommittee and task group meeting attendees discussed test methods proposed in the NPR on November 10, 2020, December 3, 2020, February 16, 2021, February 25, 2021, and June 9, 2021. At these meetings, ASTM members expressed that they were not in favor of the test method proposed by the Commission in the NPR. The stated reasons were that crib mattress sheets can vary widely in quality and size; and that by assuming the maximum gap of 1 inch between the sides of the crib mattress and the sides of the crib, the test method was overly restrictive for larger mattresses. As discussed in Tabs A and C, staff has modified the test method in a way that should not be overly restrictive for larger mattresses, and staff has engaged with the ASTM Infant Bedding Subcommittee's task group on sheet shrinkage to address poorly fitting sheets. However, staff remains convinced that a poorly fitting sheet should not compress a crib mattress such that the mattresses dimensions change and hazardous gaps can form.

The task group decided to develop an alternative test method, presented during a task group meeting on February 25, 2021 and at a subcommittee meeting on June 9, 2021. In this test method, the maximum allowable 1-inch gap is added to the minimum allowable mattress dimensions of 51.625 inches by 27.25 inches, to create a rectangle measuring 52.625 inches by 28.25 inches. This rectangle is within the expected size range of a full-size crib interior. Then, using the head breadth dimension proposed by staff (3.66 inches), minus a 0.51-inch margin of



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safety, the test proposes marking a line 3.15 inches away from the projected crib interior corner, at an angle of 45 degrees to each of the projected crib sides. A 6-inch-high by 6-inch-wide wood block would then be used to apply a 2-pound force to the corner of the mattress, to recreate the compression force of a fitted sheet. The ASTM task group did not provide data supporting the 2-pound force. If the front of the block moves beyond the marked line, then the corner is viewed to compress too far, and the mattress fails. The test is repeated for each corner. Several manufacturers agreed to evaluate the proposed method after the task group meeting on February 25, 2021, but ASTM has not held a task group meeting since then. CPSC staff believes the method proposed by ASTM has potential to be more consistent than the method proposed by staff in the NPR. However, staff has not been provided with, nor has staff been able to produce, evidence to support the proposed 2-pound force as equivalent to the compression force of a fitted sheet. ASTM has not yet balloted the proposed test.

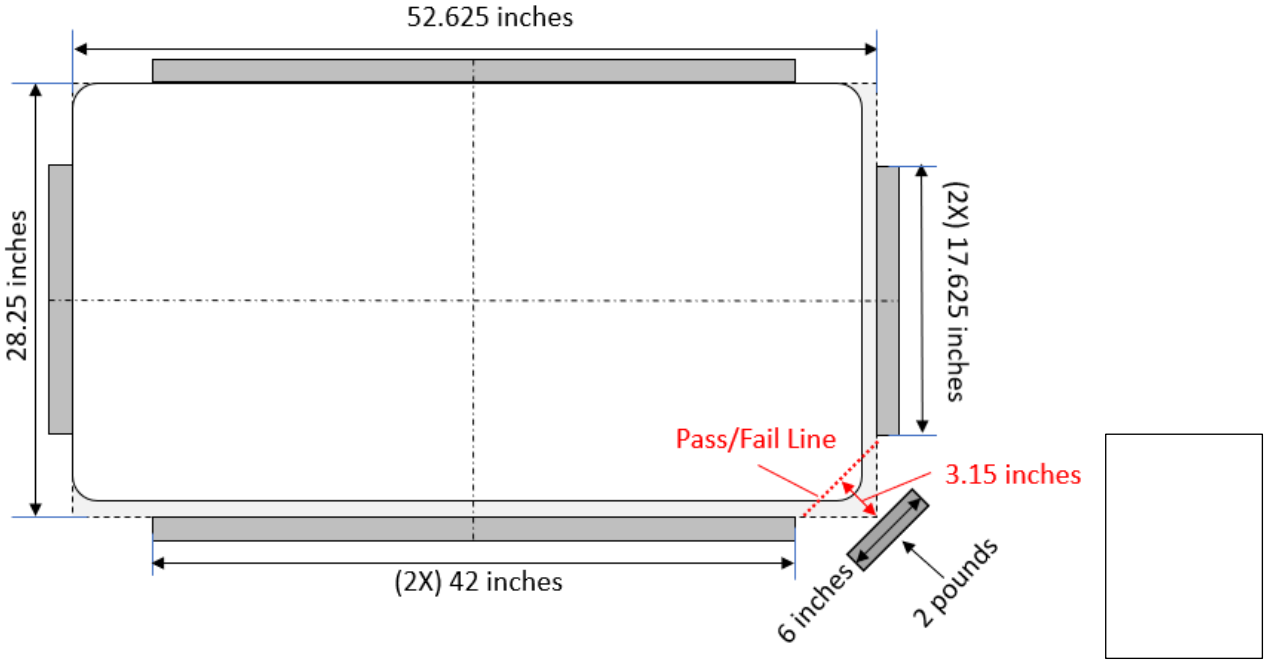


**Figure 2. Draft corner compression test proposal from ASTM**

Although some comments were generally supportive of a corner gap test, CPSC received several comments opposed to the staff-proposed test method, but did not receive any specific alternative test in the public comments, such as using a specific force. Generally, staff understands that ASTM is moving in the direction of using a force instead of a sheet, and staff will remain engaged in ASTM's work. Additional details and staff's response can be found in Tab A.

Because ASTM's draft test method has not been fully vetted and finalized, staff recommends finalizing the fitted-sheet test proposed in the NPR, with modifications to use the maximum full-size crib interior dimensions when taking corner gap measurements. This modification will remove the potential difficulty with larger crib mattresses, which was mentioned in public comments. Staff will continue to work with ASTM, and should ASTM finalize a different and



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acceptable corner compression test method, the Commission could consider it under the provisions of Pub. L. No. 112-28.

*b. After-market non-full-size crib mattresses*

In the NPR, the Commission proposed extending the dimensional requirements in ASTM F2933 – 19 section 5.7.2 to all non-full-size crib mattresses, regardless of mattress shape, and regardless of whether the mattress is sold with a non-full-size crib or as an after-market mattress. The standard did not have specific requirements for rectangular after-market non-full-size crib mattresses. Staff determined that all non-full-size crib mattresses should be subject to the same dimensional requirements to prevent entrapment hazards resulting from poor-fitting mattresses. ASTM did not form a task group or address this issue. ASTM members did not consider the lack of requirements for after-market rectangular non-full-size crib mattresses to be problematic, although the subcommittee chair did agree to address it in a task group meeting[8] when CPSC staff raised the issue. ASTM F2933 – 21 updated the requirements for after-market non-rectangular non-full-size crib mattresses, but did not address CPSC staff's proposals in the NPR to extend these requirements to all non-full-size crib mattresses.

Although CPSC staff received general comments supporting the incorporation of dimensional requirements for after-market non-full-size crib mattresses, no comments specifically addressed staff's proposal to extend the requirements in ASTM F2933 to all non-full-size crib mattresses.

For the final rule, discussed in more detail in section III A below, and in Tab C, staff recommends proceeding with the changes to section 5.7.2 as proposed in the NPR, while incorporating the applicable requirements from the updates in ASTM F2933 – 21 for all after-market non-full-size crib mattresses.

### 6. Laceration Hazards from Exposed Coil Springs

In the NPR, the Commission proposed adding a cyclic impact test for mattresses that use coil springs. Since publication of the NPR, CPSC staff has continued working with the Crib Mattress Cyclic Testing task group to refine test requirements to address the hazard of potential lacerations to infants from an exposed coil or spring. ASTM subcommittee and task groups discussed the proposed test at meetings on November 10, 2020, December 9, 2020, and February 16, 2021. During these meetings, ASTM members discussed points that required clarification and a means to prevent the mattress from moving around during testing. Among the clarifications suggested were that the test would only apply to coil spring mattresses, and that two mattresses would be required to test both sides of the mattress, because testing could be destructive. Staff's draft final rule includes ASTM members' suggested clarifications to the test method to address the members' comments and concerns.[9]

[8] https://www.regulations.gov/document/CPSC-2020-0023-0024

[9] At the subcommittee meeting on June 10, 2021, ASTM members also briefly discussed changing the test locations. However, this proposal is in early stages and has not been vetted with the task group.



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Public comments generally supported staff's proposed requirements for cyclic testing coil spring mattresses, but the comments encouraged continued work with ASTM to address outstanding issues. Staff's response to these comments can be found in Tab A.

For the final rule, discussed in more detail in section III A below and in Tab C, staff recommends proceeding with the cyclic impact test as proposed in the NPR, with clarifications to the test procedure to require two mattresses, to address the potential destruction of a mattress during testing. Should ASTM finalize a different and acceptable cyclic impact test method, the Commission could consider it under the provisions of Pub. L. No. 112-28.

### 7. Marking, labeling, and instructional literature improvements

In the NPR, the Commission proposed significant revisions to the marking and labeling requirements specified in ASTM F2933 – 19, and added requirements for instructional literature, to clarify for manufacturers and test labs, and to communicate better to consumers the risks of SIDS and suffocation related to infant positioning, soft bedding, and gap entrapment. After the NPR was published, CPSC staff continued to work with ASTM F15.66 subcommittee for Crib Mattresses to address deficiencies in the safety information requirements in ASTM F2933 – 19. ASTM balloted revisions to the voluntary standard, which closed on April 12, 2021.

The ballot, F15 (21-02) item 13, addressed safety information requirements, *Revision of F2933-2019 Consumer Safety Specification for Crib Mattresses WK72077*. The ballot item received three negative votes, two of which were administrative. One negative vote, submitted by CPSC staff on April 6, 2021, included a letter identifying deviations from the NPR (described in Tab D with letter provided as Appendix B). The subcommittee decided that the revision should not be delayed, and that further improvements would be considered in the future.

The full F15 subcommittee voted and found staff's vote non-persuasive, and the full F15 committee upheld the F15.66, Crib Mattresses, subcommittee's non-persuasive vote on August 2, 2012. Therefore, a further revision of ASTM F2933 – 21 was approved on September 1, 2021 with publication estimated around the end of September. However, this future revision will remain inconsistent with the Commission's published NPR, and for the reasons detailed in Tab D, staff does not recommend including this revision in the draft final rule. As discussed below and in Tab D, staff considered the subcommittee's position, along with public comments on warnings when developing the recommendations contained in the draft final rule.

### 8. After-market mattresses

ASTM F2933 – 19 required after-market mattresses for play yards and non-rectangular non-full-size cribs to "have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace." Ongoing work within task groups and subcommittees resulted in a ballot to replace this language, which was approved on June 15, 2021, and published in ASTM F2933 – 21 in July 2021. The new requirements reference the performance requirements for mattresses in the non-full-size crib and play yard standard, ASTM F406 – 19, *Stability*; *Cord/Strap Length*; *Mattress*; *Mattresses for Rigid-sided Products*; *Crib Side Height*; *Height of Sides*; *Floor Strength*; and *Mattress Vertical Displacement*, when tested in the play yard the



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mattress was designed to fit[10]; and there are additional requirements for the mattress and floor support structure size. Requirements for after-market play yard mattresses were changed to allow for after-market mattresses with a solid support (*i.e.* non-segmented mattresses) that can be used in lieu of an original mattress that was designed to fold to wrap around a play yard for storage (*i.e.* segmented mattresses). Staff assessed that the revised requirements for after-market mattresses are equivalent to or better than those in ASTM F2933 – 19, because the requirements allow a greater variety of after-market mattress designs (such as non-segmented mattresses to replace segmented original equipment manufacturer (OEM) mattresses), and allows play yard mattresses up to 1 ½ inch thick, provided that the mattresses meet the appropriate specifications.

# III. Discussion

## A. Adequacy of ASTM 2933 – 21 Requirements (Tabs C and D) and Staff's Draft Final Rule Recommendations

In the NPR, the Commission proposed adopting ASTM F2933 – 19 with modification to further reduce the risk of injury from suffocation, entrapment, and laceration hazards, and to improve hazard communication information. ASTM updated F2933 – 19 to F2933 – 21 in July 2021. ASTM developed the voluntary standard to mitigate the risk of injury by addressing the hazard patterns associated with the use of crib mattresses, and updated the voluntary standard to address hazard patterns associated with after-market mattresses for play yards and non-full-size cribs, a category that includes supplemental mattresses for play yards and portable cribs. The standard includes on-product warnings to help inform caretakers of the primary hazards during use of the product.

Based on the engineering assessment (see Tab C) and human factors assessment (see Tab D), staff concludes that the requirements contained in the current voluntary standard, ASTM F2933 – 21, adequately address some, but not all, staff-identified hazards associated with the use of crib mattresses. CPSC staff concludes that additional requirements would strengthen the standard to further reduce the risk of injury associated with the use of crib mattresses and after-market mattresses for play yards and non-full-size cribs.

### 1. Hazard Patterns

**Table 3. Adequacy of ASTM F2933 – 21 in Addressing the Hazard Patterns**

| Identified Hazard Pattern (potential injury) | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff Assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| Chemical/Flammability Hazards (odors, rash) | All | 16 CFR part 1303 Ban of Lead-Containing Paint<br>16 CFR part 1500 Hazardous Substances Act | Adequate | See ESMC memo (Tab C). |

[10] The requirements in ASTM F406 for *Mattress*; *Mattresses for Rigid-Sided Products*; and *Mattress Vertical Displacement* were also referenced in ASTM F2933 – 19.



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| Identified Hazard Pattern (potential injury) | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff Assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| | | Regulations (Sections 5.1 and 5.4)<br>16 CFR part 1632 Standard for the Flammability of Mattresses and Mattress Pads<br>16 CFR part 1633 Standard for the Flammability (Open Flame) of Mattress Sets | | |
| Coil or Spring (laceration) | Coil or spring mattresses (primarily full-size) | Prohibition of sharp points (Section 5.2) | Inadequate | Draft final rule includes additional cyclic testing to identify potential for springs to break through surface during foreseeable use and misuse. See also ESMC memo (Tab C). |
| Crib Mattress Used in a Play Yard (suffocation due to ill-fitting mattress) | Aftermarket play yard mattresses | Labeling requirements, requirements for after-market mattresses. Testing requirements harmonized with ASTM F406. (Sections 5.9 and 7.5) | Adequate | See ESMC & ESHF memo (Tabs C & D). |
| Expand or Inflate (suffocation due to ill-fitting mattress that does not expand or inflate properly) | Foam products, typically full-size and shipped as "bed in a box" | Dimensional conformity, mattress thickness, and labeling requirements (Section 5.7) | Adequate | See ESMC memo (Tab C). |
| Face in Mattress (suffocation) | All | Labeling requirements (Section 7.3) | Inadequate | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1. See also ESHF memo (Tab D). |
| Fit Issues (suffocation due to ill-fitting mattress) | All | Dimensional conformity and after-market mattress requirements | Inadequate | Draft final rule contains additional fitted sheet compression test for full-size crib mattresses and extends dimensional requirements in |



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| Identified Hazard Pattern (potential injury) | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff Assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| | | (Sections 5.7 and 5.9) | | section 5.7 to all after-market, non-full-size crib mattresses. See also ESMC memo (Tab C). |
| Found Prone (suffocation due to prone position) | All | Labeling requirements (Section 7.3) | Inadequate | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1 and strengthening warning label requirements. See ESMC memo (Tab C) and ESHF memo (Tab D). |
| Mattress Falls Apart (choking/ingestion) | All | Mattress seam stitching requirement and small parts prohibition (Sections 5.3 and 5.8) | Adequate | See ESMC memo (Tab C). |
| Softness (suffocation due to soft surface) | All | Not addressed | Inadequate | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1. See also ESMC memo (Tab C) |
| Multiple Contributing Factors (*e.g.*, entrapment in bumper pads, limb entrapment, crib sharing with another infant, existing health condition) | All | General requirements and warning labels (Sections 5 and 7) | Inadequate | Some of these contributing factors are addressed by additional requirements in the draft final rule described above, while others are related to another product use or other factors out of the scope of the crib mattresses standard. |
| Other | All | General requirements and warning labels (Sections 5 and 7) | Adequate | This category includes hazards which are out of scope of the ASTM standard or for which the cause is unclear. |

### 2. Warnings and Instructions

Upon further consideration of the hazard communication and safety requirements in the NPR, including rationales provided in public comments on the NPR, and by the ASTM F15.66 subcommittee, staff's recommended final rule includes the following clarifications from the NPR, to increase consumer understanding of safety information to further reduce the risks of death and serious injury associated with crib mattresses. See Tab D, especially Appendix A, for more information.

- In section 3.1.2, change "conspicuous, adj—visible while the mattress is being placed in its intended use position," to "conspicuous, adj — visible when the mattress is



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being handled by a consumer placing the mattress in its intended use position in a product." This change aligns with the latest consensus ballot by ASTM F15, and clarifies the intended meaning of "conspicuous" in the NPR-proposed language in that the warning is conspicuous to the consumer handling the product.

- In section 7.4.6.2, change "The text in each column needs to be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points," to "The text in each column should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points." This change, from the mandatory language of "needs to" to the recommended language of "should," aligns with the latest recommendations from ASTM Ad Hoc Wording Task Group[11] and the consensus ballot by ASTM F15, and it is important to provide manufacturers with flexibility in arranging the bulleted hazard avoidance statements based on mattress-specific requirements, where appropriate.

- In section 7.5, change "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 $^{3}/_{8}$ in. (3.5 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses," to "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 ½ in. (3.8 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses." This change for full-size crib mattresses from 1 $^{3}/_{8}$ inches to 1 ½ inches aligns with the latest consensus ballot by ASTM F15. This change results in a minor conflict between the warning message and the maximum gap afforded by the performance requirements (*i.e.,* a conflict of $^{1}/_{8}$ in.); however, staff agrees with ASTM F15.66, which determined by consensus the following: the difference of $^{1}/_{8}$ inch is unlikely to reduce the safety of full-size crib mattresses, the conflict is unlikely to confuse consumers (they are unlikely to be familiar with the requirements in the standard), and the new measurement (1 ½ in.) is more tangible for consumers to estimate, thereby increasing the likelihood of consumers attempting to measure, and accurately measuring, gaps between the full-size crib mattress and side walls of the full-size crib.

- In section 7.5.3, change "Manufacturers are permitted to include additional warnings between the warnings specified in 7.5 and 7.6 if desired," to "Additional manufacturer warnings are permitted between the warnings specified in 7.5 and 7.6 if desired." This editorial change clarifies further the allowance in the rule, and it is consistent with the latest consensus ballot by ASTM F15.

- Section 7.8 includes several changes to the requirements for retail packaging, as specified in Tab D, Appendix A. These changes take into consideration the latest consensus ballot by ASTM F15, and further improve the safety of crib mattresses by doing the following: (1) incorporating formatting requirements from section 7.4, and (2) clarifying the warnings and statements required for specific mattress types.

[11] ASTM Ad Hoc Wording Task Group purpose is to develop recommended wording for sections of the ASTM standards that are common to multiple standards. CPSC Human Factors staff participate in this group.



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- Renumber Figures 7 – 10 to Figures 8 – 11. This shift in numbering accounts for an additional figure that staff recommends adding to ASTM F2933 – 21, Section 6, as part of the final rule (see Tab C).

- For NPR Figure 10, now recommended as Figure 11, change the caption from "Example of warning label for After-Market Mattress for Rigid Sided Rectangular Products. Items italicized in brackets are to be added as appropriate. The blanks are to be filled in as appropriate," to "Example of warning label for After-Market Mattress for Rigid-Sided, Rectangular, Non-Full-Size Cribs. Items italicized in brackets are to be added as appropriate." This change clarifies that the example is not for full-size crib mattresses.

### 3. Additional requirements to further reduce the risk of injury

*a. Suffocation on excessively soft mattresses*

After consideration of the public comments and ASTM subcommittee work, staff recommends finalizing the mattress firmness test as proposed in the NPR. Although the ISO test[12] that some ASTM subcommittee members appear to prefer seems to produce similar results, at the present time, staff does not have enough test data to conclude that the two test methods are interchangeable and would produce consistent test results. Staff considered requiring *either* the NPR test or the ISO test method. However, such a recommendation would require significant empirical test data to prove the tests were equivalent for compliance purposes. This is because staff testing during NPR development found at least one mattress location that passed the ISO test, but failed the NPR test, demonstrating different test results between the two test methods in some situations. CPSC staff will continue to work with the task group on mattress firmness. The Commission can evaluate the adequacy of any future ASTM revision to the mattress firmness test through the Pub. L. No. 112-28 update process.

*b. Entrapment in corner gaps*

After consideration of the public comments and ASTM subcommittee work, staff recommends finalizing the corner gap test using the fitted sheet test, with minor revisions in the measurement method from what we proposed in the NPR. Although the ASTM task group has made progress in developing an alternative test method using a 2-lb. force to test for corner gaps rather than a fitted sheet, at the present time, the ASTM proposal has not been finalized or reached consensus in the task group. CPSC staff will continue to work with the task group. The Commission can consider any future ASTM revision to a corner gap test through the Pub. L. No. 112-28 update process.

[12] The mattress firmness test in ISO 23767 and EN 16980 consists of placing a square template, which has a circular hole in the center, on the mattress surface. A weighted sphere, whose diameter is slightly larger than that of the circular hole, is then placed in the center of the hole, as shown in Photo 2. After 5 minutes, the sphere/template is observed to see whether the sphere has sufficiently sunk into the mattress, such that it is resting on the template.



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*c. Laceration hazards (cyclic testing)*

After consideration of the public comments and ASTM subcommittee work, staff recommends finalizing the cyclic test as proposed in the NPR, but we also recommend including a new provision that would require a different mattress to be used for testing each surface of the mattress, to address the potential for mattress damage during testing. Although the task group has made progress in developing a similar cyclic test, the ASTM proposal has not been finalized. CPSC staff will continue to work with the task group. The Commission can evaluate any future ASTM revision to a cyclic test through the Pub. L. No. 112-28 update process.

*d. After-market non-full-size crib and play yard mattresses*

In the NPR, staff recommended that the current performance requirements for after-market non-full-size crib mattresses in ASTM F2933 – 19 be separated from the requirements for after-market play yard requirements; and staff further recommended that the requirements for OEM non-full-size crib mattresses also be applied to after-market mattresses, regardless of the shape of the mattress.

Since the publication of the NPR, ASTM F2933 was updated to require after-market non-rectangular non-full-size crib and play yard mattresses to meet the same performance requirements as OEM mattresses, as specified in ASTM F406 – 19 *Non-Full-Size Cribs/Play Yards* (rather than requiring after-market mattresses be identical in dimension to OEM mattresses). The update also included additional requirements to ensure after-market mattresses have the proper fit, support, and instruction storage accommodations. The net effect allows different after-market designs (such as non-segmented mattresses to replace segmented OEM mattresses) as long as they meet OEM specifications, and allows play yard mattresses up to 1 ½ inch thick, provided that the mattress meets the appropriate specifications in ASTM F406 – 19.

After consideration of public comments and the revisions in ASTM F2933 – 21, staff recommends incorporating by reference ASTM F2933 – 21 in the draft final rule, while continuing to separate after-market non-full-size crib mattress requirements from after-market play yard requirements; and extending the requirements for OEM non-full-size crib mattresses to all non-full-size crib mattresses, to remain consistent with staff's proposal in the NPR. In addition, staff recommends including the requirements for after-market mattresses that were added by ASTM.

## B. International Standards

In the NPR, CPSC staff concluded that that the ASTM standard is equivalent or more stringent than other international standards in most areas and addresses the hazard patterns seen in the incident data reported to the CPSC. The NPR also stated that ASTM F2933 was developed through collaboration between CPSC staff and stakeholders since the inception of the voluntary standard. No comments were received to the NPR on this evaluation. For the final rule, staff maintains that ASTM F2933, with the proposed modifications, is more appropriate than other international standards, to address the hazards associated with crib mattresses.

## C. Compliance Recalls



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For the NPR, staff reviewed the recalls of crib mattresses that occurred from June 1, 2010 to June 1, 2020. During that period, CPSC's Office of Compliance negotiated five consumer-level recalls involving crib mattresses. Crib mattress recalls were conducted to mitigate against risks of flammability (4 recalls, approximately 80,000 units) and suffocation (1 recall, approximately 300,000 units). CPSC has not announced any crib mattress recalls since the NPR. However, there may be action in the near future in the area of flammability under mattress flammability regulations.

### D. Assessment of Small Business Impact of the Draft Proposed Rule (Tab E)

Of the 27 small manufacturers and importers identified by staff, 14 (9 manufacturers and 5 importers) are members of the Juvenile Products Manufacturers Association (JPMA), but staff cannot determine how many crib mattresses are currently certified to ASTM F2933 – 21. Many of the firms that would be subject to the draft final rule are known to produce a variety of children's products that are already subject to CPSC children's product safety rules, and therefore, are familiar with such requirements.[13] Additionally, two small firms that are not known to be JPMA members, are members of ASTM. As part of the 2020 NPR, staff requested comments from small firms on the number of crib mattress models they would typically certify to the ASTM standard annually, but did not receive any comments on the request.[14] Still, staff notes that some small manufacturers and importers of crib mattresses to the U.S. market would not be subject to all the tests proposed in the draft final rule, because the firm may only supply foam-core and/or non-innerspring, non-full-size crib mattress products to the market.

As described in Tab E, given that a substantial number of mattresses already comply with the requirements of the draft final rule, and some of the testing costs are already being borne by firms that certify to the current voluntary standard, it seems unlikely that the rule would have a significant impact on a substantial number of small entities. Furthermore, CPSC did not receive comments on the costs of the proposed rule, or impediments to modifying existing crib mattress products to conform to the proposed rule, especially those that would result in the removal of the mattress product from the market, or other comments on possible impacts the rule might have on small domestic manufacturers or importers, during the public comment period. However, to the extent that a crib mattress supplier will need to remove a crib mattress model from commerce, because it will not meet the requirements of the draft final rule and cannot modify the product in a cost-efficient manner, staff cannot rule out the possibility of the draft final rule being significant for three small domestic firms—two small domestic manufacturers, and one small domestic importer.

## IV. Notice of Requirements

[13] Crib mattresses listed for sale on a variety of online retail websites often include product descriptions indicating that the crib mattress product meets CPSC general safety standards, while not referencing any one specific CPSC safety standard.

[14] One commenter asserted that more than 1 million after-market mattresses are sold annually in the United States, but they did not provide estimates specific to small businesses.



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Section 14(a) of the CPSA requires that any children's product subject to a consumer product safety rule under the CPSA must be certified as complying with all applicable CPSC-enforced requirements. The children's product certification must be based on testing conducted by a CPSC-accepted third party conformity assessment body (test laboratory). The CPSA requires the Commission to publish a notice of requirements (NOR) for the accreditation of third party test laboratories to determine compliance with a children's product safety rule to which a children's product is subject. This final rule for crib mattresses is a children's product safety rule that requires the issuance of an NOR.

The Commission published a final rule, Requirements Pertaining to Third Party Conformity Assessment Bodies. 16 CFR part 1112 (78 Fed. Reg. 15836 (March 12, 2013)) (referred to here as part 1112). This rule took effect on June 10, 2013. Part 1112 establishes the requirements for accreditation of third party testing laboratories to test for compliance with a children's product safety rule. Part 1112 codifies all of the NORs that the CPSC has published, to date, for children's product safety rules. The NPR for crib mattresses proposed to amend part 1112 to add an NOR to allow for third party testing of crib mattresses. Therefore, staff recommends that for the final rule, the Commission finalize the amendment to part 1112 to include crib mattresses in the list of children's product safety rules for which the CPSC has issued NORs.

## V. Effective Date

The Administrative Procedure Act (APA) generally requires that the effective date of a rule be at least 30 days after publication of the final rule (5 U.S.C 553(d)). In the NPR, staff recommended a 6-month effective date. The NPR requested comments regarding the effective date, because staff was concerned that the additional test requirement, amid the global COVID-19 pandemic, may have affected supply chains. No comments requested a later effective date, other than one comment seeking an indefinite delay in finalizing the rule, for reasons related to ongoing ASTM work. Therefore, for the final rule, staff continues to recommend a 6-month effective date.

## VI. Product Registration Rule

In the NPR, the Commission proposed adding "crib mattresses," which includes all mattresses within the scope of ASTM F2933, including after-market mattresses for play yards and non-full-size cribs, as a durable infant or toddler product listed in part 1130. Products listed in part 1130 must comply with the product registration rule, and they must be tested and certified as children's products.[15] CPSC received no comments on this matter. For the final rule, staff recommends finalizing the addition of "crib mattresses" as a durable infant or toddler product in part 1130.

## VII. Staff Conclusion and Recommendations

For the reasons discussed above, staff recommends that the Commission issue a final rule for crib mattresses, consistent with the NPR, incorporating by reference ASTM F2933 – 21,

[15] Firms that supply crib mattresses that are designed or intended primarily for children age 12 or less already must prepare a Children's Product Certification (CPC) that references parts 1632 and/or part 1633, when applicable.



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*Standard Consumer Safety Specification for Crib Mattresses,* with the following modifications to further reduce the risk of injury:

1. Suffocation hazards - due to overly soft crib mattresses, by adding a test for mattress firmness based on sections 6 and 8 of A*S/NZS 8811.1:2013 – Methods of testing infant products – Method 1: Sleep Surfaces – Test* (AS/NZS 8811.1);
2. Entrapment hazards –
    - Full-size crib mattresses - due to poor mattress fit from compression by sheets, by repeating the dimensional conformity test and measuring for corner gaps, after installing a shrunken (by washing twice) cotton sheet;
    - After-market non-full-size crib mattresses – due to lack of requirements for rectangular-shaped products, by extending the applicable requirements for non-full-size crib mattresses in ASTM F406, referenced in ASTM F2933 – 21 section 5.9.1.1, to include all non-full-size crib mattresses, regardless of mattress shape, and regardless of whether the mattress is sold with a non-full-size crib or as an after-market mattress;
3. Laceration hazards – due to coils and springs breaking and poking through mattresses, by adding a cyclic impact test for full-size crib mattresses that use coil springs; and
4. Marking, labeling, and instructional literature improvements - to clarify for manufacturers and test labs, and to communicate better to consumers the risks of SIDS and suffocation related to infant positioning, soft bedding, and gap entrapment.

All of these modifications were proposed in the NPR; however, staff's recommendation contains minor clarifications and modifications based on public comments received and ASTM work, to date. Staff also recommends:

- an effective date 6 months after publication of the final rule to allow time for crib mattress manufacturers to bring their products into compliance and to arrange for third party testing,
- amending part 1112 to include "crib mattresses" in the list of children's product safety rules for which the CPSC has issued notices of requirements (NORs), and
- amending part 1130 to include "crib mattresses" in the list of children's products that require consumer registration.



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## TAB A: Public Comment Summary and Staff Responses

TAB A



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**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MARYLAND 20814**

Date: September 21, 2021

TO: Hope E J. Nesteruk
Crib Mattress 104 Project Manager
Directorate for Engineering Sciences

THROUGH: Mark E. Kumagai, Associate Executive Director Directorate for Engineering Sciences

Robert L. Franklin, Acting Associate Executive Director Directorate for Economic Analysis

FROM: Cynthia Gillham, Economist, Directorate for Economic Analysis

Stephen Harsanyi, Engineering Psychologist, Division of Human Factors, Directorate for Engineering Sciences

Daniel Taxier, Mechanical Engineer, Division of Mechanical and Combustion Engineering, Directorate for Engineering Sciences

SUBJECT: Draft Final Rule for Crib Mattresses: Summary of Comments on the Proposed Rule and Staff's Responses

# I. Introduction

During the public comment period, which closed on January 11, 2021, CPSC received 13 comments. The Commission received several late-filed comment in July and September 2021, which we also included and considered. The comments can be found in docket number CPSC-2020-0023 at: http://www.regulations.gov. Comments fell into several broad categories: (1) comments on the testing requirements and the tests the Commission proposed adding as modifications to ASTM F2933 – 19; (2) comments about the fit of after-market mattresses for play yards; (3) comments about how to improve communication to caregivers; and (4) comments on procedure. This memo summarizes the comments, and provides staff's responses to the comments.

# II. Comment Topics and Responses

## 1. Testing requirements, including proposed modifications

*a. Comment topic – Cyclic testing.* Commenters generally supported requirements for cyclic testing of full-size coil spring mattresses, but encouraged continued work with ASTM to address outstanding issues.

**Staff Response:** Staff's proposed requirements for cyclic testing of full-size coil spring mattresses are based on work with the ASTM cyclic testing task group prior to the NPR. Staff



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has continued working with the task group to develop this test. The task group last met on December 9, 2020. Public comments specifically refer to ASTM work to further define requirements for support of the plywood/oriented strand board (OSB) mattress support board, and to further clarify how the test method can allow for dual-sided mattresses. Staff agrees with these comments. However, the task group's work has not been balloted, and any updates since the previous meeting have not been made available to staff for review. For the draft final rule, staff recommends updating the proposed test method by clarifying that the test method should be performed on each side of the mattress, using different mattresses, to address how the test should proceed with dual-sided mattresses. Staff does not have enough information to proceed with any changes to the support of the mattress support board. Should ASTM propose any updates to the test method, the update process under Pub. L. No. 112-28 provides a method for staff to evaluate, and the Commission to consider, a revised test method.

*b. Comment topic – Corner Gap/Sheet Test.* The CPSC received several comments related to the proposed corner gap testing using a twice-washed fitted sheet, including: (1) that there should be a shrinkage performance requirement for a sheet in lieu of testing mattresses with a shrunken sheet; and (2) that each mattress corner should be subjected to a certain, unspecified force or pressure before measuring the subsequent gap, instead of using a shrunken sheet. One commenter suggested that issues with sheets not fitting appropriately are better addressed by the ASTM infant bedding subcommittee. A commenter stated that as currently written, the test methodology may result in inconsistent, variable test results across testing labs and settings because sheets can vary in quality and sizing. The same commenter also said the testing methodology may penalize full-size crib mattresses designed with greater-than-nominal dimensions.

**Staff Response:** Staff agrees that issues with sheets shrinking or not fitting full-size-crib mattresses are appropriate for the infant bedding subcommittee, and we note that the infant bedding subcommittee has formed a task group, which held its initial meeting on March 22, 2021. CPSC staff is a member of the task group and participated in the meeting. However, addressing the fact that sheets shrink will not address the issue of mattresses that do not hold their shape when sheets are applied. Therefore, staff continues to recommend that the final rule contain a test for potentially hazardous gaps created when sheets are applied to a crib mattress. Staff will continue working with the ASTM infant bedding subcommittee to develop appropriate performance requirements for fitted sheets, and we will then work with the ASTM crib mattress subcommittee to refer to the requirements, if appropriate. Staff's work with the ASTM infant bedding subcommittee will also help resolve concerns about inconsistent test results due to variability in sheet quality and sizing. Meanwhile, staff encourages test laboratories to identify cotton sheets that are the appropriate size for the mattress to be tested.

In addition, staff agrees that applying a certain force or pressure to the corner of a mattress to simulate the compressive force of a sheet has the potential to produce more repeatable test results. However, CPSC received no comments or test data to support a test protocol or an appropriate force. As staff noted in the NPR, foam mattresses and innerspring mattresses have different compressive behavior when a sheet is placed on them, resulting in inconsistent forces to replicate sheet behavior. The ASTM subcommittee has formed a task group that is working on such a test; the subcommittee last met on February 25, 2021. Staff will continue to work with



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the subcommittee and task group, and should ASTM publish a voluntary standard with a revised compression test, CPSC can evaluate the updated voluntary standard under the revision process pursuant to Pub. L. No. 112-28. Meanwhile, staff encourages test laboratories to identify cotton sheets that perform consistently when appropriately fitted around the corners of the mattress to be tested.

Staff agrees with comments stating that the methodology proposed in the NPR may be overly restrictive for full-size crib mattresses designed to be greater-than-nominal dimensions. The proposal in the NPR assumed every mattress would have the 1-inch maximum allowable gap between the crib and the crib mattress, regardless of size. This assumption was overly restrictive for mattresses that were designed to fill the space between the crib and crib mattress. Accordingly, to address this comment, the draft final rule incorporates changes to the measurement method in the test procedure, such that the corner gap is measured from a projected crib corner.

c. *Comments topic – Proposed firmness test.* Several commenters expressed opinions regarding the proposed firmness test. Overall, it appears that industry prefers the mattress firmness test in the ISO 23767 standard, *Children's furniture – Mattresses for cots and cribs – Safety requirements and test methods,* over the mattress firmness test based on the AS/NZS 8811.1:2013 standard, *Methods of testing infant products – Method 1: Sleep Surfaces – Test,* while consumer groups expressed support for the test based on AS/NZS 8811.1:2013. In addition, one consumer group submitted an undergraduate engineering report describing a potential new test fixture for consideration, but the submission did not include additional information, such as test protocols and performance criteria.

**Staff Response:** Staff agrees with commenters who support a firmness test, which would address the suffocation hazard associated with excessively soft mattresses. Although several commenters expressed support for specific tests, none of the commenters provided testing data to support using one test protocol over another. Staff compared in the NPR the AS/NZS 8811.1:2013 and the ISO 23767 test protocols[16] for firmness and found that the AS/NZS 8811.1:2013 test method was more stringent because it resulted in failures on more test surfaces. Additionally, although staff appreciates the work to develop a test fixture that can be used to compare mattress firmness, the report offers no performance criteria to judge the results. Staff has continued working with ASTM to investigate firmness requirements, as discussed in Tab C Section V, but no additional data have been made available to staff at these meetings. Based on the available data, staff recommends finalizing the crib mattress rule as proposed, by requiring use of a firmness test based on the requirements in AS/NZS 8811.1:2013 test for mattress firmness. If ASTM updates the voluntary standard to include a different mattress firmness test, and the revision is based on supporting data, ASTM can provide the updated standard and supporting data to the Commission, for evaluation through the update process, pursuant to Pub. L. No. 112-28.

[16] The ISO 23767 test protocol is the same as the EN 16890:2017, *Children's Furniture – Mattresses for Cots and Cribs – Safety Requirements and Test Methods*, section 8.2.3 firmness test protocol.



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**2. After-market play yard mattress and play yard-mattress fit**

*a. Comment topic – Standardize the size of play yards.* One comment expressed that having standard-sized play yards and mattresses could help to address mattress fit issues, similar to the method employed by full-size cribs and full-size crib mattresses.

**Staff Response:** The play yard and non-full-size cribs voluntary standard (ASTM F406 – 19, incorporated by reference in 16 CFR parts 1220 and 1221) currently does not contain provisions requiring the products to be of a standard size; and changes to 16 CFR part 1220 are outside the scope of this rulemaking on crib mattresses. Additionally, the commenter did not contain a proposal for a specific size or range of sizes, which would be necessary for such a requirement; nor did the NPR discuss standardizing sizes as an option for consideration. Therefore, work in this area would be out of the scope of the NPR. Staff encourages the commenter to pursue this idea with the ASTM F15.18 subcommittee on play yards.

*b. Comment topic – Mattress Thickness.* A commenter requested that the Commission set a minimum thickness for play yard mattresses to reduce the likelihood consumers would find a mattress too thin and add hazardous padding. The same commenter requested that the Commission delay finalizing the rule until the Play Yard Mattress Fit and Thickness task group completes their work.

**Staff Response:** Regarding the request that the Commission set a minimum thickness for play yard mattresses, staff expressed similar concerns with consumer perception of mattress thickness/comfort in the briefing package on Petition CP 15-2, stating, "Because incident data demonstrate that consumers perceive play yard mattresses to be uncomfortable, and then place additional soft bedding in infant sleep environments, CPSC staff does not recommend banning supplemental mattresses." However, setting a minimum mattress thickness would not address that the resilience of a mattress is not based on thickness alone, but also on the density of underlaying foam. For example, staff is aware of bassinet mattresses that meet the thickness limit, but are dense enough not to "bottom out" on the hard backer-board, which supports that a denser foam pad could also address consumer complaints. Regarding the work in the Fit and Thickness task group, this work is ongoing, and it has neither reached consensus in the task group, nor been balloted. Staff also remains concerned that the task group direction is focused on identifying the gap size between the mattress and the flexible play yard side while the play yard side is in a resting position, rather than a test that accounts for the flexible nature of play yard sides to create a three-dimensional pocket from the existing gap.

Staff does not recommend delaying the final rule for crib mattresses to wait on completion of this task group work, because it would delay codification of the important safety requirements for crib mattresses. Additionally, modifications to ASTM F406 are outside the scope of this rulemaking for crib mattresses, although staff remains engaged in efforts to address mattress thickness. If, in the future, F406 is updated to address the work of the Fit and Thickness task group, then ASTM can notify the Commission under the provision in Pub. L. No. 112-28, and staff will evaluate the potential effect on the safety of play yard mattresses.

*c. Comment topic – General objection to allowing after-market mattresses.* Some manufacturers objected to the idea of allowing after-market mattresses on the market



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because all play yards are sold with a mattress designed for use with the play yard. One manufacturer questioned the safety and necessity of after-market mattresses.

**Staff Response:** In 2015, the Commission was petitioned to ban supplemental mattresses for play yards. In response to that petition, staff issued a briefing package in May 2017. Staff concluded that "[b]ecause incident data demonstrate that consumers perceive play yard mattresses to be uncomfortable, and then place additional soft bedding in infant sleep environments, CPSC staff does not recommend banning supplemental mattresses." Although staff understands the concerns with after-market mattresses, which can be used to supplement an existing play yard mattress, staff continues to believe that working through the voluntary standard committee to address the hazards associated with the use of after-market mattresses, and incorporating the voluntary standard into a mandatory standard, addresses both safety and consumer-perceived need for after-market mattresses.

d. *Comment topic – Require after-market mattress manufacturers to obtain a certificate of compatibility from corresponding play yard manufacturers.* Commenters raised concerns that manufacturers make numerous, frequent changes in names and model numbers, rendering any list of compatible models "out of date as or soon after it is printed." One commenter stated that the proposed rule would endorse misuse and, in effect, contradict the mandatory warning stipulated in 16 CFR section 1221.2(b)(5)(i).

**Staff Response:** Although some type of certificate of compatibility could address issues with mattress fit and manufacturer concerns with third party manufacturers claiming compatibility, CPSC does not have the authority to regulate inter-business arrangements, such as certificates of compatibility. However, this final rule will require after-market mattresses to be "tested with each brand and model of product"[17] in which it is intended to be used. In addition, the final rule would require each mattress to "specifically identify the brand(s) and Model(s) numbers of products in which it is intended to be used."[18] Therefore, an after-market mattress that complies with this rule will have third party certification that it meets the requirements of 16 CFR 1221/ASTM F406. Because the final rule will require that an after-market mattress meet the same dimension and test requirements as the mattress supplied with the product, and must be tested and certified to the same standard, CSPC staff concludes that there is likely no safety concern for consumers because the testing and certification requires labeling that accomplishes the same goal. Additionally, because the labeling may create some confusion, between ASTM F406, section 9.4.2.10 ("Use ONLY mattress/pad provided by manufacturer"), and 16 CFR section 1221.2(b)(5)(i), the ASTM F15.18 task group on ad hoc warnings is actively working to revise this message.

*Comments topic – Requirements for after-market play yard and non-full-size crib mattresses*. Several commenters stated that after-market mattresses should have to meet the same requirements as OEM mattresses. Another commenter stated that staff should continue working with ASTM to include more performance-based testing for after-market mattresses. Several commenters supported the revised requirements for after-market mattresses developed by the ASTM Non-Segmented Mattress Task Group, which were approved (and are now published) in

[17] ASTM F2933 – 21, section 5.8.1.2.
[18] ASTM F2933 – 21, section 7.5.3.1.



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ASTM F2933 – 21. A commenter also requested that the final rule wait until the Play Yard Fit & Thickness task group completes work.

**Staff Response:** Staff agrees with comments that after-market play yard and non-full-size crib mattresses should meet the same requirements as OEM mattresses. Staff addressed these points in the NPR by requiring after-market non-full-size crib mattresses to meet the same requirements listed for these products in ASTM F406 section 5.17, *Mattress for Rigid Sided Products*; and by requiring after-market play yard mattresses to meet the ASTM F2933 – 19 requirement to have the same "thickness, floor support structure and attachment method as the mattress it is intended to replace." The revisions in ASTM F2933 – 21 replace the design requirement for after-market mattresses with the performance requirements that they are tested to, such that after-market mattresses must meet the same performance requirements as OEM mattresses. Additionally, after-market mattresses must be "at least the same size," and the floor support structure must be "at least as thick," as the OEM mattress. These changes to the standard, which appear to be in line with comments CPSC received on the NPR, are supported by CPSC staff, as described in Tab C, and have been incorporated into the draft final rule, because the final rule will incorporate by reference ASTM's newly revised voluntary standard, ASTM F2933 – 21.

As for the request to wait until work is completed in the play yard subcommittee on mattress fit and thickness, staff remains engaged on the play yard task group for fit and thickness, but disagrees with delaying this final rule because changes to the play yard standard are out of scope for this specific rulemaking on crib mattresses. Additionally, although the commenter implied that the play yard fit and thickness work was nearing completion, staff remains concerned that the task group is focusing on measuring the gap between the play yard side and mattress only along the plane of the top of the mattress and without accounting for the flexible nature of fabric or mesh sides. As described in the briefing package on the supplemental mattress petition, a gap alone may not create a hazard if a three-dimensional pocket cannot form to entrap an infant. Staff has found the task group is generally resistant to using a probe to identify hazardous gaps, and instead, the group is focused on measuring a gap alone. The figure below was included in



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the staff briefing package on Petition CP 15-2, illustrating that a one-dimensional measurement may not achieve the desired hazard identification.

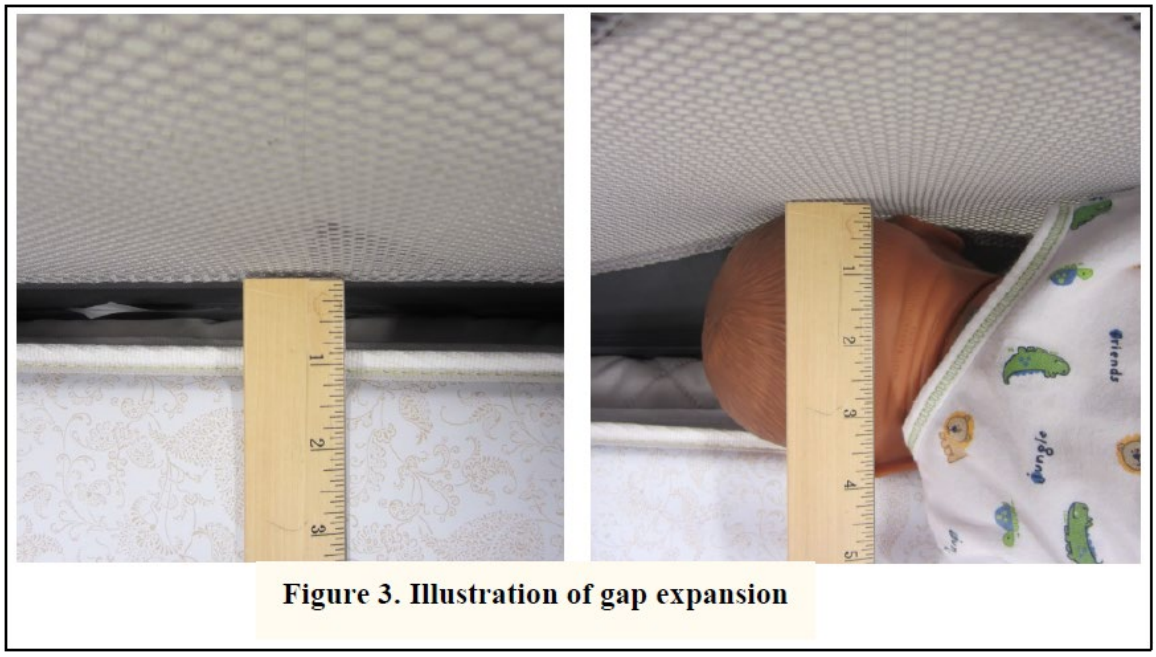

**Figure 3. Illustration of gap expansion**

**3. Communication to Caregivers**

*a. Comments topic – Partnering with child safety advocates and others, such as play yard manufacturers.* One commenter recommended that the Commission engage with child safety advocates and other interested parties to undertake a coordinated campaign to communicate to consumers appropriate behaviors that will enhance the safety of infant sleep.

**Staff Response**: Staff agrees that a coordinated campaign to communicate to consumers the importance of placing an infant on their back to sleep without any covering beyond a light blanket would promote safe infant sleep behaviors. Staff acknowledges that a warning label statement on a consumer product cannot guarantee the consumer will read, understand, or heed the hazard.

*b. Comments topic –Recommended shortening further the warning label for play yards*. Specifically, a commenter recommended a maximum of three warning statements, and provided the suggested language below:

"1. Place your baby on his/her back only.

2. Do not add soft bedding (blankets, pillows, etc) *under or over* your baby, or anywhere in play yard. Instead, dress baby in a wearable blanket or sleep sack to keep them warm.

3. Use mattress and sheets that fit this product – Use play yard mattress only. If mattress



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is too small, your baby can roll into gap and suffocate.

For more information, go to www.cpsc.com/sleepsafety
Save this warning!
[Link above is a placeholder for a functioning link to more information.]"

**Staff Response***:* Consistent with the NPR package, staff agrees with several points raised in the comment, including (1) consumers are less likely to read lengthy text warnings on familiar products; (2) it is critical to communicate successfully to consumers the hazards related to prone positioning, soft bedding, and gaps created by ill-fitting mattresses; and (3) the prone positioning message needs to be prioritized. While, in general, staff prefers for warning labels to be as concise as possible, circumstances specific to these products and hazards warrant more information on the labels, and consumers may not check a website identified on the label. These hazardous-use patterns are common and are likely to be misunderstood by consumers. Consumers may not find short warning statements for crib mattresses convincing, absent elaboration and repetition with rephrasing, especially if the statements contradict the consumers' knowledge, expectations, and experiences. The warning labels proposed in the NPR begin with clear and concise statements pertaining to the typical use patterns involved in SIDS and suffocation incidents, beginning with the prone positioning message. These statements are organized and worded such that they are more likely to be seen and understood and act as reminders, even if the consumer does not read the rest of the label. The rest of the messaging reiterates, rephrases, and explains the hazards. For example, consumers must consider and understand what it means for a mattress to be ill-fitting. As discussed in the NPR package, a mattress in an uncompressed state may not visually produce worrisome gaps, yet various factors can cause a compressed mattress to form hazardous gaps. With few exceptions, including placing the prone positioning warning foremost in the label, the NPR-proposed warning is consistent with recommendations from ASTM F15. Tab D outlines other exceptions.

*c. Comments topic –Recommended modifying the proposed hazard identifier from "SIDS and SUFFOCATION HAZARDS" to "Help Prevent SIDS and Suffocation."*

**Staff Response:** Staff agrees with the comment that there are benefits of making the hazard identifier an active statement, as exemplified in the comment, as opposed to a passive statement. However, when considering the rest of the warning message in the NPR-proposed label, which varies significantly from the warning message in the comment-proposed label, staff does not find it appropriate to change the NPR-proposed hazard identifier. Among other concerns, the comment-proposed hazard identifier may confuse the consumer viewing the warning label. The viewer of the label may infer that the statement, "Help Prevent SIDS and Suffocation," is a standalone statement, unrelated to the rest of the warning message. Use of "Help," although accurate, may soften the language, and be somewhat demotivating to the reader. During the ASTM F15.66 subcommittee meeting on June 9, 2021, staff asked the rest of the subcommittee to discuss whether they felt it was appropriate to modify the hazard identifier consistent with the



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public comment. The attendees who responded stated that such a change would dilute the warning message, and they further opined that the hazard identifier should remain as balloted in F15 (21-02) (*i.e.,* "SUFFOCATION HAZARDS"). The hazard identifier and ballot are discussed further in Tab D.

d. *Comments topic – Advised against all-caps lettering to emphasize words that "lack concrete meaning," such as "DO NOT" and "USE ONLY."* A comment posited that this capitalization will be inferred by the consumer to mean the adjacent text is not as important, and therefore, the adjacent text, which pertains to hazardous use, will not be read by the consumer.

**Staff Response:** Staff appreciates this comment; however, staff finds the all-caps lettering used in the proposed warning labels plays an important role in attracting the user's attention to the hazardous use warnings. Recent regulations use capitalization in this manner,[19] all-caps lettering is used in the recommendations from the Ad Hoc Language Task Group, and all-caps lettering pertaining to crib mattresses has been supported in ASTM F15.66 and balloted by ASTM F15 without objection. For more information on this ballot, see Tab D.

e. *Comments topic – Advised eliminating warning statements that can and should be addressed through performance standards*. This point is provided in the context of a recommendation to standardize sizes of play yards and play yard mattress sheets.

**Staff Response:** Staff agrees that performance requirements should be used instead of warning statements, where feasible, and that warning statements should be omitted if they do not contribute to the safety of the product. Warnings are inherently limited in effectiveness, because they depend fallibly on persuading consumers to alter their behaviors in ways to avoid hazards. In contrast, performance requirements attempt to reduce or eliminate access to the hazards. Staff recommends making warnings as motivating as possible, given their inherent fallibility, and particularly when they must be used instead of performance requirements, or when they are used in a supporting role to performance requirements that minimize, rather than eliminate, exposure to hazards. The context provided in the comment refers to a separate standard, ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards* (incorporated into 16 CFR part 1221), and ongoing activity by the ASTM F15.18 subcommittee contributing to that effort.

Staff encourages the ASTM F15.18 subcommittee to develop more effective performance requirements to reduce the reliance on warnings. Depending on the progress of these efforts,

[19] For example, see the Commission Briefing Package: Final Rule – Safety Standard for Gates and Enclosures: https://cpsc.gov/s3fs-public/Final%20Rule%20-%20Safety%20Standard%20for%20Gates%20and%20Enclosures.pdf?lHExt6trsEuD56jiQTi7Ab0TjzdVQ_HH.



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staff will reconsider warnings that are no longer appropriate for the labels.

*f. Comments topic – To support the crib mattress warnings, pictograms should be developed and comprehension-evaluated using the methods outlined in ANSI Z535.3.*

**Staff Response:** Staff agrees that well-designed graphics may be able to supplement the crib mattress warnings, by increasing the noticeability of the warnings, for example. Graphics are also helpful for consumers with limited or no English literacy. However, the design of effective graphics is a complicated matter that requires comprehension testing with the target audience. A poorly designed graphic may have limited or no effectiveness, and may even elicit the opposite effect of what is intended; *i.e.,* "critical confusion," in which the reader infers that s/he should take the prohibited action to avoid the hazard. Staff supports further consideration of suitable graphics pertaining to crib mattress warnings; however, staff does not recommend delaying the final rule until suitable graphics can be developed.

*g. Comments topic – Recommended the play yard mattress warning language proposed in the comment, in part, because the Flesh-Kincaid readability assessment tool in Word indicated the message required only a "5.9 grade reading level."*

**Staff Response:** For consistency and comparison purposes, staff used the Flesch-Kincaid readability assessment tool in Word (Microsoft Office Professional Plus 2019) using both the play yard mattress warning proposed in the comment and the after-market mattress for mesh/fabric sided products warning proposed in the NPR.[20] Staff found that the play yard mattress warning proposed in the comment returned a 5.4 Flesch-Kincaid Grade Level with a reading ease of 77.1. The after-market mattress for mesh/fabric sided products warning proposed in the NPR returned a 3.4 Flesch-Kincaid Grade Level with a reading ease of 80.8. However, the rating for the label proposed in the NPR does not include the product-specific information to be added:

> *[All warnings added by the original manufacturer which are in addition to those required by this standard.] [Assembly/attachment instructions that were provided on the original mattress.] [The specific brand(s) and model(s) number(s) of the product(s) in which the mattress is intended to be used].*

Therefore, staff also tested the reading level for the NPR-proposed warning label for full-size crib mattresses,[21] and found it had a 3.8 Flesch-Kincaid Grade Level with a reading ease of 77.7.

[20] Figure 9 in the Appendix of the ESHF memorandum of the Commission NPR Briefing Package on Crib Mattresses.
[21] Figure 8 in the Appendix of the ESHF memorandum of the Commission NPR Briefing Package on Crib Mattresses.


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A reading ease score of 70 to 80 is considered U.S. 7th grade school level, and a score of 80 to 90 is considered U.S. 6th grade school level. In general, staff prefers for warnings to be at the 6th grade level or lower, consistent with literature from Leonard, Otani, and Wogalter (1999)[22]; however, the 8th grade level is considered "plain English." Notably, the Flesch-Kincaid tool provides an imperfect assessment of readability, because it considers only the number of words, sentences, and syllables, meaning that text with low-reading-level thresholds are not necessarily more meaningful or understandable. With few exceptions, the NPR-proposed language is consistent with recommendations from ASTM F15 (regarding the exceptions, see Tab D).

*h. Comments topic – Determine if it is appropriate to add to the warnings content regarding fall or strangulation.*

**Staff Response:** At this time, staff does not find it appropriate to add content regarding falls or strangulation to the crib mattress warnings. Warnings pertaining to these hazards are addressed by other standards, including ASTM F1169, *Standard Consumer Safety Specification for Full-Size Baby Cribs* (incorporated into 16 CFR part 1219), and ASTM F406 (incorporated into 16 CFR parts 1220 and 1221). As discussed in the comment, adding more information to the warnings proposed in the NPR may dilute the message, resulting in some consumers being less likely to read the warnings. Furthermore, ASTM F15 did not find it appropriate to include warning content regarding falls or strangulations. Staff will continue to monitor the data for evidence that these additional warnings should be added.

*i. Comments topic – The warnings proposed in the NPR are incompatible with the warnings in ASTM F406; specifically, the comment indicated that the requirements in the NPR allow after-market mattresses in play yards, which are not from the original equipment manufacturer (OEM); whereas, ASTM F406 includes warnings to use only the mattress provided by the manufacturer.*

**Staff Response:** Staff appreciates this concern about conflicts in warning labels required by the separate rules. Modifications to warnings in F406 are outside the scope of this rulemaking for crib mattresses. However, staff is aware of this issue, and ASTM F15.18 has an active task group working to update the warning section of ASTM F406 to include the ad-hoc warning recommendation and address other issues. This task group is actively discussing how to update[23] this warning message, as discussed above in 2.d.

*j. Comment: CPSC staff should consider the developments pertaining to safety information requirements discussed in the ASTM task group and subcommittee in the period between the NPR and final rule.*

**Staff Response:** After the NPR was published, staff continued to work with ASTM to address deficiencies in the safety information requirements in ASTM F2933. In this draft final rule, staff has incorporated some of the safety information recommendations from ASTM task groups and

[22] Leonard, S.D., Otani, H., & Wogalter, M.S. (1999). Comprehension and memory. In M.S. Wogalter, D.M. DeJoy, & K.R. Laughery (Eds.), *Warnings and risk communication* (pp. 149–187). Philadelphia: Taylor & Francis.
[23] https://www.cpsc.gov/s3fs-public/2021-07-08-ASTM-Play-Yard-Ad-hoc-language-meeting.pdf


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subcommittees, including subcommittee F15.66, regarding the maximum side gap between a full-size crib mattress and full-size crib. Staff did not incorporate other suggestions from ASTM members, such as excluding "SIDS" from the hazard identifier, and presenting the prone positioning warning lower in the warning labels. (See Tab D for more information.)

**4. Procedural comments**

*a. Comments topic – Effective date.* Commenters on the 2020 NPR both supported and opposed the 6-month effective date. Some commenters urged the effective date be as soon as possible, indicating additional time for the rule to become effective would put infants at risk. Other commenters requested an indefinite delay of the rulemaking, until ASTM completes changes and updates to the voluntary standard for crib mattresses (ASTM F2933), and the standard associated with play yards (ASTM F406).

**Staff Response:** For the final rule, staff recommends maintaining the proposed 6-month effective date because suppliers have had lead time to prepare for this rule since the NPR was published on October 26, 2020. Many crib mattresses within the scope of the draft final rule require no change in design to achieve compliance with the final rule. Furthermore, 6 months from the change in a voluntary standard is the timeframe that JPMA uses for its certification program; so compliant manufacturers are used to this timeframe to comply with a modified standard. Additionally, staff does not recommend waiting for completion of work in the ASTM F406 standard to finalize this crib mattress rule, because modifications to ASTM F406 are out of scope for this proceeding.

*b. Comment topic – Incorporation by Reference:* A commenter stated that the NPR is unconstitutional because CPSC proposes to incorporate by reference a voluntary standard, instead of publishing all of the regulatory text for the Crib Mattress rule in the *Federal Register*. The commenter alleges that the CPSC forces the public to pay for access to the law, thereby offending "our constitutional structure, due process, the First Amendment, and equal protection." The commenter, in support of their contention that incorporation by reference is unconstitutional, stated:

- No one can own the law, privatizing the law is not in accordance with our form of constitutional government and grants ASTM a monopoly ownership over the law;
- Due process under the Fifth Amendment requires the public to have free access to the laws that regulate people or entities, and the NPR allegedly violates due process by failing to provide the public with fair notice of the standard because the commenter contends that to view the content of the voluntary standard, the NPR requires the public to pay ASTM or to travel to Bethesda, Maryland to see a copy at CPSC headquarters;
- CPSC is creating a monopoly for ASTM and forcing the public "to rely on the whims of ASTM," whom the commenter states is a private company that is incentivized to increase the prices of its standards, and which harms consumers more than businesses because it creates a financial barrier to accessing product safety standards;
- IBR violates the First Amendment because it does not allow free dissemination of the law and discussion of its contents; and



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- IBR violates equal protection of the laws under the Fifth Amendment because it gives ASTM members a preference over non-members, because ASTM members have access to the voluntary standard as it is being developed and during the comment period while non-members do not. The commenter believes that ASTM only makes the voluntary standard available to view for free after the public comment period closes.

**Staff Response**: We disagree that the regulatory text is allegedly behind a paywall and that the draft final rule is unconstitutional. As set forth in more detail below, the commenter's factual premise is inaccurate, because the regulatory text for every CPSC-proposed rule is printed in the *Federal Register*. Additionally, the content of the law is available to the public, both before and after the voluntary standard is incorporated by reference, because the text of the voluntary standard is described in detail in the staff's proposed rule briefing package, draft final rule briefing package, and in the proposed and final rulemaking notices printed in the *Federal Register*. Stakeholders also have access to the text of the voluntary standard online, for free, both during the comment period (at: https://www.astm.org/CPSC.htm) and after the rule becomes final (at: https://www.astm.org/READINGLIBRARY/). Moreover, any person can "disseminate" the proposed rule by citing the *Federal Register*, providing a link, or providing a copy of the notice. Additionally, anyone can "disseminate" the content of the voluntary standard by providing a link to ASTM's website. Finally, anyone can participate in ASTM meetings to develop the voluntary standard, and CPSC encourages the public to participate. Although only ASTM members can vote on a voluntary standard, ASTM provides discounts on membership for certain members of the public, such as students. Please contact ASTM for more information.

Section 104 of the CPSIA directs the Commission to issue standards for durable infant or toddler products that are "substantially the same as," or more stringent than, applicable voluntary standards, if the Commission determines that more stringent requirements would further reduce the risk of injury. In this case, the final rule would incorporate by reference ASTM F2933-21, with modifications to make the standard more stringent, to further reduce the risk of injury associated with crib mattresses. Staff notes that staff's proposed rule and draft final rule briefing packages contain a description of the performance and labeling requirements in the ASTM standard, including a side-by-side chart showing regulatory text and the changes made by the rule.

For incorporation by reference procedures, we note that ASTM's voluntary standards are protected by copyright, which the Commission (and the federal government generally) must observe. The United States may be held liable for copyright infringement. 28 U.S.C. § 1498. Accordingly, the Commission cannot violate copyright law by publishing ASTM's voluntary standards in the CFR. The Office of the Federal Register (OFR) has established procedures for incorporation by reference that seek to balance the interests of copyright protection and public accessibility of material. 1 CFR part 51. OFR's regulations are based on Freedom of Information Act provisions that require materials to be "reasonably available" when incorporated by reference with approval of the Director of the Federal Register. 5 U.S.C. § 552(a)(1). Under the OFR's requirements, an agency may incorporate by reference specific publications, including standards, if they are "reasonably available to and usable by the class of persons affected." 1 CFR § 51.7. To ensure the material is "reasonably available," an agency must summarize the



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material it will incorporate by reference and discuss in the *Federal Register* notice how that material is available to interested parties. *Id*. §§ 51.3(a), 51.5(a).

The Commission complies with the requirement that publications, including standards, are "reasonably available to and usable by the class of persons affected," whenever incorporating material by reference. For example, when the Commission proposes a rule under section 104 of the CPSIA, the Commission describes and summarizes the requirements of the rule, including the voluntary standard, in the preamble to the rule printed in the *Federal Register*, and explains that ASTM's copyrighted voluntary standards are available to review online for free during the comment period at: https://www.astm.org/CPSC.htm. Once a rule becomes effective, ASTM provides a read-only copy of the standard for review on the ASTM website at: https://www.astm.org/READINGLIBRARY/. As always, any person can purchase a voluntary standard from ASTM, or they may schedule a time to review a voluntary standard (for free) at the Commission's headquarters in Bethesda, MD, or at the National Archives and Records Administration (NARA). Accordingly, citizens who are interested in the content of the law have unimpeded access to the regulation, and they have several avenues for free access to the text of voluntary standards incorporated by reference into a mandatory CPSC standard for a durable infant or toddler product.

c. *Comment: The commenter stated that they intend their comment to be a significant adverse comment that requires CPSC to withdraw the NPR, citing 8 previous times the commenter has submitted a similar comment on CPSC's IBR process for rules updating a section 104 standard.*

**Staff Response**: The commenter is referencing previous comments it made on the Commission's direct final rules to update durable infant or toddler product rules that have already been issued under section 104 of the CPSIA. The Commission did not find the comments on those updates to be a significant adverse comment. In this case, the Commission issued a proposed rule, and it is now issuing a final rule, to establish a consumer product safety standard for crib mattresses; it is not updating an existing rule using a direct final rule. Accordingly, the "significant adverse comment" designation is inapplicable to the current rulemaking. In any event, the Commission declines to withdraw the proposed rule based on the inaccurate factual premise regarding incorporation by reference procedure contained in this comment.

d. *Comment: A commenter asserted that section 9 of the CPSA requires CPSC to publish the text of a proposed consumer product safety rule in the Federal Register. Because section 104 rules are considered consumer product safety rules under the CPSA, the commenter argued that CPSC is required to published the text of the regulation in the Federal Register, and the CPSC did not meet this requirement in the NPR for crib mattresses.*

**Staff Response**: The Commission publishes the text of proposed rules under section 104 of the CPSIA in the *Federal Register*. However, the rulemaking procedure described in section 9 of the CPSA, cited by the commenter, is inapplicable to rules issued under section 104 of the CPSIA. Section 104 of the CPSIA contains a different rulemaking authority and different rulemaking procedures. For example, 15 U.S.C. 2058(c), cited by the commenter, also requires a preliminary regulatory analysis that is inapplicable to rules issued under section 104.



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e. *Comment: A commenter stated that the Freedom of Information Act (FOIA) requires agencies to publish the text of its substantive rules in the Federal Register, citing 5 U.S.C. § 552(a)(1)(D). The commenter stated that § 552(a) creates an exception to this requirement for agencies that incorporate by reference a provision that is "reasonably available to the class of persons affected thereby . . . with the approval of the Director of the Federal Register." The commenter asserted that the CPSA, which allegedly requires publishing the text of a proposed rule in the Federal Register, and the FOIA are in conflict, and that CPSC must follow the CPSA because it is a more specific, later-enacted, requirement and presents a "clear congressional imperative for CPSC to follow the text of the [CPSA]," citing 15 U.S.C. 2058(c). The commenter asserted that based on the CPSA, the Commission must publish the text of the NPR and cannot direct the public to buy a copy of the regulatory text from someone else.*

**Staff Response**: Stakeholders do not need to purchase a copy of the voluntary standard to comment on the rule, and the Commission publishes the text of proposed rules under section 104 of the CPSIA in the *Federal Register*. A summary of the regulatory text is available for free in the staff briefing package and the proposed rule. A free copy of the voluntary standard is available through ASTM's website, NARA, and at the Commission's headquarters in Bethesda, MD. Additionally, section 104 of the CPSIA contains a different rulemaking authority and procedures than the statutory provision cited by the commenter for CPSA section 7 and 9 rules. The statute cited by the commenter is inapplicable to section 104 rules. Finally, CPSC follows the OFR's requirements for incorporation by reference, including the exception in 5 U.S.C. § 552(a), which allows incorporation by reference when the material is "reasonably available to the class of persons affected thereby . . . with the approval of the Director of the Federal Register."

f. *Comment: A commenter contended that the CPSC should not rely on the Office of the Federal Register's interpretation of the exception for incorporation by reference materials in 1 CFR § 51.5, and should instead publish the text of the voluntary standard.*

**Staff Response**: We disagree that the Commission should not follow the OFR requirements for incorporation by reference, because the OFR's interpretation is consistent with the statute, has not been struck down by any court, and the CPSC declines to potentially infringe a copyright. Additionally, stakeholders have free access to the content of the proposed and final rules, including the regulatory text and the voluntary standards upon which the standards are based.

g. *Comment: A commenter alleged that CPSC's proposal to incorporate by reference the crib mattress voluntary standard, rather than set forth the text of the regulation in the OFR, is procedurally deficient because the rule allegedly only allows access to the text of the voluntary standard after a rule is in effect, and because it leaves access to the law up to the "whims" of ASTM. The commenter alleged that ASTM can raise the cost of the voluntary standard, and can "renege" on its promise to keep the standard available in a reading room.*

**Staff Response**: The text of the proposed rule, and a summary of the voluntary standard, are available for free on the Commission's website in the staff's briefing packages and in the draft rules, which are also available, when published, in the *Federal Register*. Moreover, the text of the voluntary standard is available for free both before and after the comment period. Finally, stakeholders can view the rule for free by contacting NARA, and by coming to view the standard at the Commission's headquarters in Bethesda, MD.



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# III. Conclusion

After reviewing and considering the comments, staff recommends clarifying the following issues in the draft final rule:

- Cyclic Impact Test Procedure - revise the test method to require the use of different mattresses for testing each surface because of the potential for testing to be destructive;
- Fitted Sheet Test Procedure - modify the fitted sheet test to focus on corner gap measurements from a projected crib corner, incorporating the general direction ASTM is taking to address the hazard pattern;
- Safety Information - modify the requirements for on-product and package labeling to include important clarifications and to communicate better to consumers the risks and preventative actions related to SIDS and suffocation (see Tab D, Appendix A); and
- Incorporate by reference ASTM F2933 – 21, with modifications, because staff assesses that this revised standard improves the safety of crib mattresses by improving requirements for after-market mattresses for play yards and non-full-size cribs, but does not fully address the hazard patterns addressed in the NPR.



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# TAB B: Draft Final Rule for Crib Mattresses: Crib Mattress and After-Market Play Yard Mattress-Associated Deaths, and Nonfatal Incidents and Concerns Reported to CPSC (January 1, 2010 – April 30, 2021)

TAB B



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**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MARYLAND 20814**

Date: September 21, 2021

TO: Hope E J. Nesteruk
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Directorate for Engineering Sciences

THROUGH: Stephen Hanway
Associate Executive Director,
Directorate for Epidemiology

Risana Chowdhury
Director, Division of Hazard Analysis
Directorate for Epidemiology

FROM: Adam Suchy
Mathematical Statistician, Division of Hazard Analysis
Directorate for Epidemiology

SUBJECT: Draft Final Rule for Crib Mattresses: Crib Mattress and After-Market Play Yard Mattress-Associated Deaths, and Nonfatal Incidents and Concerns Reported to CPSC (January 1, 2010 – April 30, 2021)

## A. Introduction

This memorandum provides CPSC staff's updated data on incidents associated with crib mattresses and after-market play yard mattresses that CPSC staff received after presenting the notice of proposed rulemaking (NPR) briefing package to the Commission in September 2020. For the NPR, CPSC staff extracted the data from incident reports entered into CPSC's Consumer Product Safety Risk Management System[24] (CPSRMS) and the National Electronic Injury Surveillance System (NEISS) between January 1, 2010 and March 31, 2020. In addition, for the NPR, staff characterized the number of reported fatalities and nonfatal incidents and concerns associated with crib mattresses and after-market play yard mattresses. In this memorandum, staff summarizes additional incident reports on crib mattresses received in CPSRMS from April 1, 2020 through April 30, 2021.

[24] CPSRMS is the epidemiological database that houses all anecdotal reports of incidents received by CPSC, "external cause"-based death certificates purchased by CPSC, all in-depth investigations of these anecdotal reports, as well as investigations of select NEISS injuries. Examples of documents in CPSRMS are: hotline reports, Internet reports, news reports, medical examiner's reports, death certificates, retailer/manufacturer reports, and documents sent by state/local authorities, among others.



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Staff considered reports describing incidents in which infants were reportedly found with their face in contact with a crib mattress or the crib sheet covering the crib mattress; infants were found in a prone position on a crib mattress, with no mention of the face being obstructed by the mattress or other crib bedding[25]; a crib mattress with fit issues (*e.g.*, being too small or shrinkage, causing an entrapment hazard); a crib mattress had material, structural integrity, or quality issues, such as chemical odor, causing rashes, protruding coils, falling apart, or too soft or flimsy; and a few other miscellaneous issues associated with crib mattresses. All reports include mention of a crib mattress being used in a sleeping environment, such as a crib, play yard, or toddler bed. For the rest of this memorandum, all crib mattresses and after-market play yard mattresses will be collectively referred to as "crib mattresses."

## B. Incident Data[26]

In the NPR briefing package, CPSC staff was aware of a total of 439 incidents, including 116 reported fatalities and 323 reported nonfatal incidents or issues involving crib mattresses, occurring from January 1, 2010 to March 31, 2020. Since that data extraction, CPSC staff identified an additional 55 incidents entered into the CPSRMS and the NEISS from April 1, 2020 to April 30, 2021, including 23 reported fatalities and 32 reported nonfatal incidents or issues involving crib mattresses.

Staff identified 21 NEISS cases associated with a crib mattress in the NPR, and zero NEISS cases received during the update between April 1, 2020 and April 30, 2021. Because the data did not meet the minimum criteria for reporting an estimate,[27] staff included the 19 NEISS injuries and two NEISS fatalities with the rest of the reported incident data described in this memorandum.

Table 1 presents hazard categories for the incidents reported on in the NPR and incidents reported since the NPR, which are further detailed in the *Fatal Reports* and *Reported Nonfatal Incidents and Concerns* sections below. Since the NPR, staff received 11 reported fatalities involving crib mattress fit issues, as well as 19 reports of nonfatal incidents involving mattresses considered too soft.

[25] Examples of other crib bedding not obstructing the face of an infant in the sleep environment include: bumper pads, blankets, dolls, pillows, sleep positioners, and other unsafe sleep environment factors.
[26] Incidents presented in this memorandum represent a minimum for the number of incidents that have occurred during the given timeframe.
[27] NEISS estimates are reportable, provided the sample count is greater than 20, the national estimate is 1,200 or greater, and the coefficient of variation (CV) is less than 0.33.

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**Table 1: Fatal and Nonfatal Reports Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 (Reported Incidents in the NPR) | | April 1, 2020 – April 30, 2021 (Reported Incidents Since the NPR) | | January 1, 2010 – April 30, 2021 |
|---|---|---|---|---|---|
| Hazard Category | Fatal Reports | Nonfatal Reports | Fatal Reports | Nonfatal Reports | **Total Reports** |
| Chemical/Flammability | 0 | 23 | 0 | 3 | **26** |
| Coil or Spring | 0 | 124 | 0 | 4 | **128** |
| Crib Mattress Used in a Play Yard | 2 | 1 | 0 | 1 | **4** |
| Expand or Inflate | 0 | 6 | 0 | 0 | **6** |
| Face in Mattress | 13 | 1 | 3 | 0 | **17** |
| Fit Issues | 20 | 88 | 11 | 3 | **122** |
| Found Prone | 66 | 3 | 9 | 0 | **78** |
| Mattress Falls Apart | 0 | 18 | 0 | 0 | **18** |
| Softness | 0 | 36 | 0 | 19 | **55** |
| Multiple Contributing Factors (MCF) | 15 | 17 | 0 | 2 | **34** |
| Other | 0 | 6 | 0 | 0 | **6** |
| **Total Reports** | **116** | **323** | **23** | **32** | **494** |

*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

Staff initially extracted incident reports and NEISS injury cases using nine product codes, with no other restrictions on the extraction criteria. Staff then reviewed each record to determine whether a report was associated with a crib mattress. Staff searched the following product codes: *playpens and play yards* (1513), *portable cribs* (1529), *bassinets or cradles* (1537), *baby mattresses or pads* (1542), *cribs, nonportable* (1543), *cribs, not specified* (1545), *mattresses, not specified* (4010*), toddler beds* (4082), and a catch-all product code 9101. As in the data extraction for the NPR, some of the nonfatal reports described concerns about potential hazards associated with a crib mattress, without an actual incident occurring.

None of the fatal incident reports indicated the presence of a witness. Consequently, each case involves some degree of speculation about how the incident occurred. Staff found that the incident details are often vague concerning how the infant was positioned when initially found and what additional items present in the crib environment may have contributed to the fatality. Additionally, staff found that some incidents have conflicting reports, from multiple sources, describing the details of the incident. Generally, the cause of death was stated to be asphyxia, suffocation, or SIDS. CPSC staff categorized the fatal and nonfatal reports into hazard scenarios based on the best available information.

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## C. Results[28]

CPSC staff is aware of 494 reports associated with a crib mattress.[29] Table 2 presents the severity of the reported cases, in order of severity, for the incidents reported in the NPR and incidents reported since the NPR. The NPR covered a reporting period of just over 10 years, and during that time, there were 116 fatalities reported. Since the NPR, an additional 23 fatalities were reported in the 13 months from April 1, 2020 through April 30, 2021.

**Table 2: Reports Associated with Crib Mattresses by Severity and Date Received by CPSC During January 1, 2010–April 30, 2021[30]**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 | April 1, 2020 – April 30, 2021 | January 1, 2010 – April 30, 2021 |
|---|---|---|---|
| Severity | Reported Incidents in the NPR | Reported Incidents Since the NPR | **Total Reports** |
| Fatalities | 116 | 23 | **139** |
| Emergency Department Treatment Received | 15 | 3 | **18** |
| Hospital Admission | 4 | 0 | **4** |
| Seen by Medical Professional | 1 | 0 | **1** |
| First Aid Received by Non-Medical Professional | 1 | 0 | **1** |
| Level of care not known | 66 | 4 | **70** |
| Incident, No Injury | 199 | 23 | **222** |
| No First Aid or Medical Attention Received | 8 | 0 | **8** |
| No Incident, No Injury | 16 | 1 | **17** |
| Unspecified | 13 | 1 | **14** |
| **Total Reports** | **439** | **55** | **494** |

*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

Table 3 presents the year of incident or death of the reported cases, for the incidents reported in the NPR and incidents reported since the NPR. Since the NPR, deaths continue to be reported in the most recent years, 2018 and 2019, even when there is typically an approximate 2-year time lag in complete reporting of deaths to CPSC. The NPR stated that 13 deaths were reported to have occurred in 2018, and 4 deaths in 2019. Since the NPR, 15 and 17 deaths were reported to have occurred in the years 2018 and 2019, respectively.

[28] Percentages in tables may not sum to 100 percent due to rounding.
[29] Of the 494 reports, 21 were from the NEISS.
[30] Deaths and nonfatal incident reports submitted to CPSC come from reports entered in CPSC's CPSRMS and NEISS databases no later than 4/30/2021.

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**Table 3: Reports Associated with Crib Mattresses by Year of Incident and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 (Reported Incidents in the NPR) | | April 1, 2020 – April 30, 2021 (Reported Incidents Since the NPR) | | January 1, 2010 – April 30, 2021 (Total Reports) | |
|---|---|---|---|---|---|---|
| Year of Incident or Death | Fatal Reports | Nonfatal Reports | Fatal Reports[31] | Nonfatal Reports | **Total Fatal Reports** | **Total Nonfatal Reports** |
| 2010 | 20 | 43 | 0 | 0 | **20** | **43** |
| 2011 | 11 | 19 | 0 | 0 | **11** | **19** |
| 2012 | 4 | 27 | 0 | 0 | **4** | **27** |
| 2013 | 7 | 31 | 0 | 0 | **7** | **31** |
| 2014 | 13 | 28 | 0 | 0 | **13** | **28** |
| 2015 | 11 | 34 | 0 | 0 | **11** | **34** |
| 2016 | 8 | 40 | 1 | 0 | **9** | **40** |
| 2017 | 25 | 48 | 0 | 0 | **25** | **48** |
| 2018 | 13 | 33 | 2 | 0 | **15** | **33** |
| 2019 | 4 | 18 | 13 | 2 | **17** | **20** |
| 2020 | 0 | 2 | 6 | 19 | **6** | **21** |
| 2021 | 0 | 0 | 1 | 11 | **1** | **11** |
| **Total Reports** | **116** | **323** | **23** | **32** | **139** | **355** |

*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

## D. Fatal Reports

CPSC staff is aware of 139 reported deaths associated with crib mattresses that were reported to have occurred between January 1, 2010 and April 30, 2021. Table 4 presents hazard categories for the incidents reported in the NPR and incidents reported since the NPR.

**Table 4: Reported Fatalities Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010–April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 | April 1, 2020 – April 30, 2021 | January 1, 2010 – April 30, 2021 |
|---|---|---|---|
| Hazard Category | Reported Incidents in the NPR | Reported Incidents Since the NPR | **Total Fatal Reports** |
| Crib Mattress Used in a Play Yard | 2 | 0 | **2** |
| Face in Mattress | 13 | 3 | **16** |
| Fit Issues | 20 | 11 | **31** |
| Found Prone | 66 | 9 | **75** |
| Multiple Contributing Factors (MCF) | 15 | 0 | **15** |
| **Total Reports** | **116** | **23** | **139** |

*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

[31] CPSC received a death certificate for one fatality in September 2017, and subsequently, CPSC investigated this incident. However, staff did not receive the investigation information until November 2020.

1. *Crib Mattress Used in a Play Yard*: One percent of the fatalities involved use of a crib mattress in a play yard (2 out of 139). Reports state that infants were found wedged between the crib mattress and the mesh of the play yard, due to the crib mattress not fitting snugly in the play yard.

2. *Face in Mattress*: Twelve percent (16 out of 139) of fatalities were associated with an infant who was found with the infant's face reportedly in contact with a crib mattress or crib sheet covering the crib mattress. Based on the available information about each fatality, bedding was present in the sleeping environment in some of these reports; however, bedding was not touching the infant, nor did staff determine that the bedding was a contributing factor in the death.

3. *Fit Issues*: Twenty-two percent (31 out of 139) of fatalities involved issues with the fit of a crib mattress in the sleeping environment. In all of these fatalities, the infants became wedged in gaps between at least one of the sides of a crib mattress and the crib rails or play yard mesh.

4. *Found Prone*: Fifty-four percent (75 out of 139) of fatalities involved an infant found in a prone position but the reports do not mention whether the face of the child was in contact with the crib mattress or crib sheet, and do not mention the face being obstructed by other crib bedding, or other items in the sleep environment. Given the available information about each fatality, bedding was present in the sleeping environment in some of these reports, but staff was unable to determine that bedding was a contributing factor in the deaths.

5. *Multiple Contributing Factors (MCF)*: Eleven percent (15 out of 139) of fatalities involved multiple factors that potentially played a role in the fatality, and the crib mattress was likely one of the contributing factors. Examples of other contributing factors included entrapment between the mattress and bumper pads, entrapment between the mattress and a crib rail with limb entrapment, use of a swaddle, sharing the sleep environment with another infant, and congenital or recent health conditions.

Figure 1 displays the ages, in months, of reported deaths associated with crib mattresses for each hazard category. The oldest fatalities were: two, 3-year-old, and two, 2-year-old children. Staff observed considerably more reported prone fatalities for infants between the ages of 1 and 5-months-old, and most of the deaths in the fit, face in mattress, and MCF hazard categories involved infants between the ages of 1 and 8-months-old, compared to other ages. Among the 23 deaths reported since the NPR, 19 were infants 8 months old or younger, and the remainder include one 11-month-old, one 12-month-old, one 21-month-old, and one 38-month-old infant.

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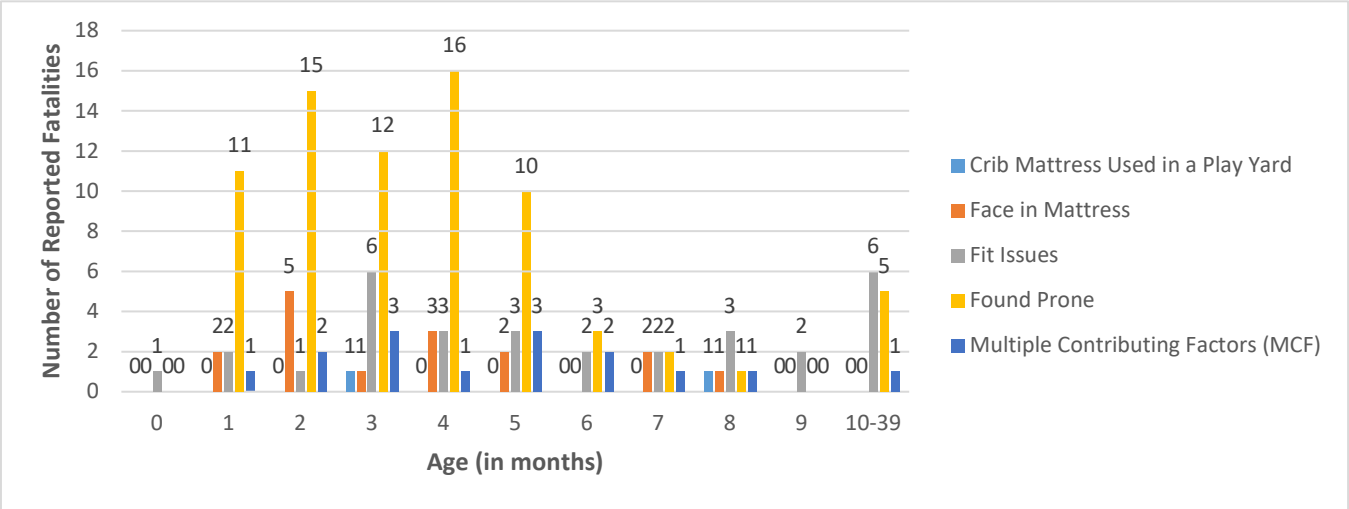
**Figure 1: Reported Fatalities Associated with Crib Mattresses by Age and Hazard Category January 1, 2010 – April 30, 2021**




*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

## E. Reported Nonfatal Incidents and Concerns

CPSC staff is aware of 355 reported nonfatal incidents and concerns associated with crib mattresses that were reported to have occurred between January 1, 2010 and April 30, 2021. Table 5 presents the hazard categories associated with nonfatal crib mattress reports for the incidents reported in the NPR and incidents reported since the NPR.

**Table 5: Nonfatal Reports Associated with Crib Mattresses by Hazard Category and Date Received by CPSC During January 1, 2010 – April 30, 2021**

| Date Received by CPSC | January 1, 2010 – March 31, 2020 | April 1, 2020 – April 30, 2021 | January 1, 2010 – April 30, 2021 |
|---|---|---|---|
| Hazard Category | Reported Incidents in the NPR | Reported Incidents Since the NPR | **Total Nonfatal Reports** |
| Chemical/Flammability | 23 | 3 | **26** |
| Coil or Spring | 124 | 4 | **128** |
| Crib Mattress Used in a Play Yard | 1 | 1 | **2** |
| Expand or Inflate | 6 | 0 | **6** |
| Face in Mattress | 1 | 0 | **1** |
| Fit Issues | 88 | 3 | **91** |
| Found Prone | 3 | 0 | **3** |
| Mattress Falls Apart | 18 | 0 | **18** |
| Softness | 36 | 19 | **55** |
| Multiple Contributing Factors (MCF) | 17 | 2 | **19** |
| Other | 6 | 0 | **6** |
| **Total Reports** | **323** | **32** | **355** |

*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

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1. *Chemical/Flammability*: Seven percent (26 out of 355) of the nonfatal incidents reported a crib mattress having a chemical odor (6), causing rashes (8), developing severe allergies (1), or not meeting mandatory federal flammability standards (11). Three of these 26 incidents were reported to have occurred between April 1, 2020 and April 30, 2021. Among these three incidents, two involved emergency department treatment for rashes or allergy symptoms, and one incident mentions headaches with unspecified severity from a foul odor.

2. *Coil or Spring*: Thirty-six percent (128 out of 355) of nonfatal incidents involved a coil or spring found protruding through the crib mattress. Four of these 128 incidents reportedly occurred during the period between April 1, 2020 and April 30, 2021. Among these four incidents, one involved a knee laceration with the level of care not known, and the other three incidents reported no injury occurring.

3. *Crib Mattress Used in a Play Yard*: One percent (2 out of 355) of nonfatal incidents involved a crib mattress being used in a play yard. One of these two incidents reportedly occurred between April 1, 2020 and April 30, 2021. In the one new incident, a child's arm became entrapped on the side or under the mattress.

4. *Expand or Inflate*: Two percent (6 out of 355) of nonfatal incidents involved a crib mattress that failed to expand or inflate properly. None of these six incidents were reported between April 1, 2020 and April 30, 2021. Staff identified related hazards, including fit issues with gaps appearing around the crib mattress causing entrapment or wedging, and an uneven crib mattress that may cause an infant to roll over.

5. *Face in Mattress*: Less than 1 percent (1 out of 355) of nonfatal incidents involved an infant found limp, pale, and with blue around the lips while face down in contact with a crib mattress. Staff found no other details about the sleep environment in this incident involving a 1-month-old infant who was admitted to the hospital. This incident was reported in the NPR data set.

6. *Fit Issue*: Twenty-six percent (91 out of 355) of nonfatal incidents involved issues with the fit of a crib mattress in the sleeping environment; three were reported between April 1, 2020 and April 30, 2021. Among these three incidents, one child was treated in the emergency department after falling out of the crib due to a mattress that was too thick; one child received marks on the face due to entrapment issues, with an unknown level of treatment; and one incident occurred with no injury reported. In all of these reports, staff determined that gaps were present on one or more sides around the perimeter of a crib mattress, creating a wedging or entrapment hazard between the crib mattress and the crib rails or play yard mesh.

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7. *Found Prone*: One percent (3 out of 355) of nonfatal incidents involved an infant found in a prone position without any mention of the face being in contact with the mattress or crib sheet, and no mention of the face being obstructed by other crib bedding or other items in the sleep environment. Staff found no other details about the sleep environment in any of these three reported incidents. None of these three incidents were reported between April 1, 2020 and April 30, 2021.

8. *Mattress Falls Apart*: Five percent (18 out of 355) of nonfatal incidents involved part of a crib mattress coming apart. In most of these reports, the seams of the mattress unraveled, causing a strangulation hazard due to the exposed stitching of the mattress; and causing a choking or ingestion hazard due to the inner filling of the mattress coming out in small pieces into the sleep environment. Reports state that small pieces of crib mattress filling coming apart included fibers, string, and wool. Staff found that in six incidents, the child was found with string from crib mattress seams or piping wrapped around their neck, which could have led to a fatal outcome if the child had not been found in time. One incident involved an infant choking on a piece of plastic "shredded" crib mattress; and one incident involved a child who was treated and released from the hospital emergency department after ingesting pieces of a plastic crib mattress. None of these 18 incidents were reported between April 1, 2020 and April 30, 2021.

9. *Softness*: Fifteen percent (55 out of 355) of nonfatal incidents involved a crib mattress inner cushioning that was reportedly too soft. Staff found 33 reports of depressions or indentations in the crib mattress, accompanied by the following descriptions: "bunches up/squishy," "dent/depression/dips/indentation/sags/sinks in/smashed/sunken," and "deflates/like an air mattress not fully inflated." Twelve reports described a displaced crib sheet on a crib mattress that caused the mattress to bend or bow, resulting in a gap or fit issue between the mattress and crib rails, creating an entrapment hazard. Four reports claimed that a crib mattress is not breathable. Six reports alleged that a crib mattress is too thin and that the inner cushioning is too soft. Of these 55 incidents, 19 were reported between April 1, 2020 and April 30, 2021. All 19 of these incidents involved an incident with no injury reported.

10. *Multiple Contributing Factors (MCF)*: Five percent (19 out of 355) of nonfatal incidents involved multiple factors playing a role, with a crib mattress likely to be one factor. Two of these 19 incidents were reported between April 1, 2020 and April 30, 2021. One incident involved a mattress that was reported to be too firm, and a child who broke out in rashes, with no information about the level of care received; and one incident involved a slat entrapment hazard, with no injury reported.

11. *Other*: Two percent (6 out of 355) of nonfatal incidents involved miscellaneous other issues associated with a crib mattress. None of these six incidents were reported between April 1, 2020 and April 30, 2021. Reports in this category include: a blade found in a crib mattress; an infant's arm becoming "tangled in a crib mattress"; an infant "slipped

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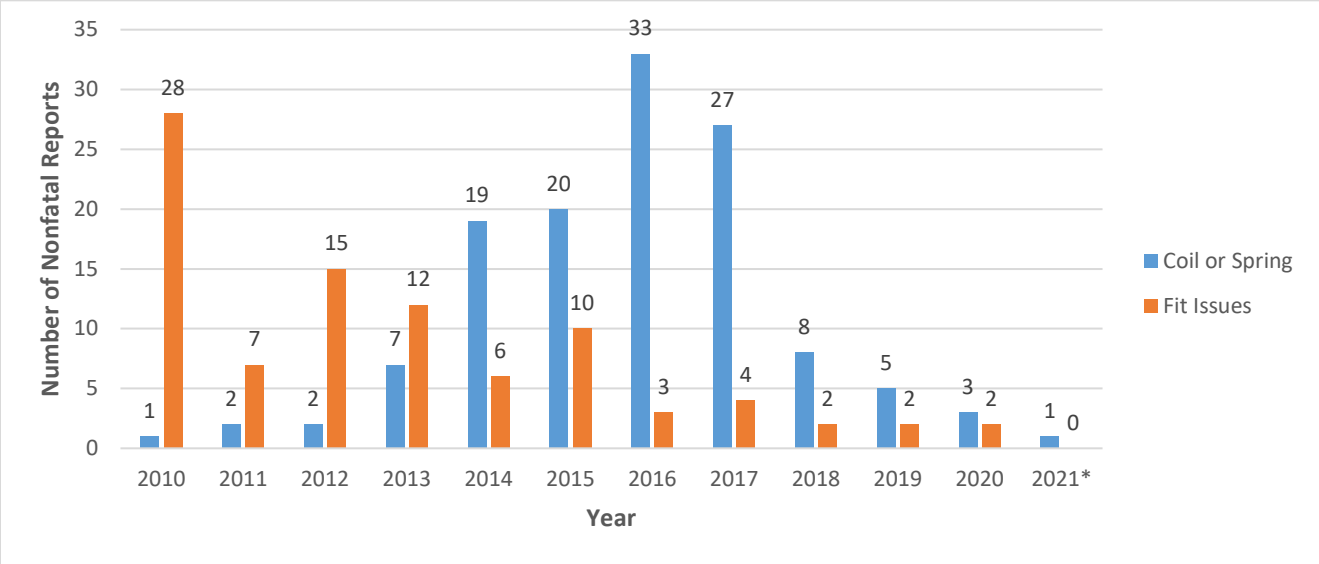
on a crib mattress," causing a slat entrapment; an infant's arm becoming "stuck on a crib mattress"; a crib mattress covered by a loose plastic bag; and concern that crib mattresses do not have proper warning labels to direct caregivers to place infants on their backs when putting them down in a crib.

The hazard categories with the most reported nonfatal incidents associated with crib mattresses cover issues with coils or springs, and crib mattresses that do not fit properly in the sleep environment. Figure 2 presents the number of reported nonfatal incidents from each year for these two nonfatal hazard categories. In the most recent years, from January 2018 to April 2021, staff observed fewer nonfatal reports of coil or spring issues associated with crib mattresses, compared to years 2014 through 2017. Eighty-six percent (78 out of 91 nonfatal reports) of nonfatal reports involving fit issues occurred between 2010 and 2015.

**Figure 2: Reported Nonfatal Coil or Spring and Fit-Related Incidents Associated with Crib Mattresses by Year January 1, 2010 – April 30, 2021**




*Source:* CPSRMS and NEISS databases
Reporting is ongoing; staff considers 2019–2021 data incomplete.

## F. Concluding Remarks

*Reported fatalities since the NPR, date received by CPSC during April 1, 2020 – April 30, 2021:*

- Deaths continue to be reported in the most recent years; since the NPR, staff identified an additional 23 reported fatalities.

- Among the 23 fatalities, 19 were infants 8 months old or younger; one was 11 months old; one was 12 months old; one was 21 months old; and one was 38 months old.

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- Among the 23 reported fatalities, 11 involved crib mattress-fit issues; 9 infants were found in the prone position; and 3 infants were found with their face touching the mattress.

*Reported nonfatal incidents and concerns since the NPR, received by CPSC from April 1, 2020 through April 30, 2021:*

- Staff identified 32 additional reported nonfatal incidents and concerns; among these were 19 involving mattresses that are considered too soft, and 3 involving mattresses with fit issues.

- In the most recent years, from January 2018 through April 2021, staff observed fewer nonfatal reports of coil or spring issues associated with crib mattresses compared to years 2014 through 2017.

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# TAB C: Draft Final Rule for Crib Mattresses: Mechanical Engineering Assessment of the Adequacy of ASTM F2933 – 21 to Address Hazards Associated with Crib Mattresses Intended for Full-Size Cribs, Non-Full-Size Cribs, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs

TAB C

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**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MARYLAND 20814**

Memorandum

DATE: September 20, 2021

TO: Hope E J. Nesteruk
Crib Mattress 104 Project Manager
Directorate for Engineering Sciences

THROUGH: Mark Kumagai
Associate Executive Director,
Directorate for Engineering Sciences

Caroleene Paul
Director, Division of Mechanical and Combustion Engineering
Directorate for Engineering Sciences

FROM: Daniel Taxier
Mechanical Engineer, Division of Mechanical and Combustion Engineering
Directorate for Engineering Sciences

SUBJECT: Draft Final Rule for Crib Mattresses: Mechanical Engineering Assessment of the Adequacy of ASTM F2933 – 21 to Address Hazards Associated with Crib Mattresses Intended for Full-Size Cribs, Non-Full-Size Cribs, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs

# I. Introduction

Pursuant to section 104 of the Consumer Product Safety Improvement Act of 2008 (CPSIA), staff of the U.S. Consumer Product Safety Commission (CPSC) is preparing a briefing packaging recommending that the Commission issue a final rule to establish a mandatory standard for crib mattresses, including crib mattresses intended for use with full-size cribs, non-full-size cribs, and after-market mattresses for play yards and non-full-size cribs (collectively crib mattresses). The Commission issued a notice of proposed rulemaking (NPR) for crib mattresses in July 2020. In support of a final rule, this memorandum assesses the effectiveness of the recently revised ASTM F2933, *Standard Consumer Safety Specification for Crib Mattresses* (ASTM F2933 – 21), to address hazards associated with crib mattresses. Based on a review of the comments received on the NPR and staff's continued work with ASTM, staff recommends that the Commission issue a final rule consistent with the NPR, incorporating by reference the most recent version of the voluntary standard, ASTM F2933 – 21, with the addition of tests (as proposed in the NPR) to address entrapment hazards, suffocation hazards due to



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excessive surface softness, and laceration hazards due to exposure to coil springs. Staff also recommends for the final rule modifications to ensure that all non-full-size crib mattresses are subject to a dimensional performance requirement, as proposed in the NPR.

Section 104(f) of the CPSIA defines "durable infant or toddler products" as "durable products intended for use, or that may be reasonably expected to be used, by children under the age of 5 years." The list of products in section 104(f)(2) does not include crib mattresses (16 CFR § 1130.2(a)(5)). However, in response to petition CP 15-2: petition requesting rulemaking on supplemental mattresses for play yards with non-rigid sides, the Commission voted[32] to "Take Other Action," granting the petition, and directing staff to begin a rulemaking under section 104 of the CPSIA for crib mattresses, as well as for supplemental and after-market mattresses used in play yards and portable cribs, and to add crib mattresses to the list of products in § 1130.2.

To examine and assess the effectiveness of the relevant voluntary standards, section 104 of the CPSIA requires the Commission to consult with representatives of consumer groups, juvenile product manufacturers, and independent child product engineers and experts. CPSC staff regularly participates in the juvenile products subcommittee meetings of ASTM International (ASTM). ASTM subcommittees consist of members who represent producers, users, consumers, government, and academia.[33] The consultation process for this rulemaking commenced during the ASTM subcommittee meeting in May 2018, when staff presented initial recommendations for updating the crib mattress voluntary standard to address the incident data. Since then, staff has actively participated with the ASTM F15.66 subcommittee for Crib Mattresses in revising ASTM F2933 to address the associated hazards.

The NPR was based on ASTM F2933 – 19. ASTM recently published a revised voluntary standard, ASTM F2933 – 21, which does not address all of the Commission's NPR modifications. However, ASTM F2933 – 21 incorporates other changes to the voluntary standard which require after-market non-rectangular non-full-size crib and play yard mattresses to meet the same performance requirements as the original equipment manufacturer (OEM) mattress, as specified in in ASTM F406 – 19 (rather than requiring after-market mattresses to be identical in dimension to OEM mattresses, per the previous version). After-market mattresses also have additional requirements to ensure the mattresses have the proper fit, support, and instruction storage accommodations. The net effect allows different after-market designs (such as non-segmented mattresses to replace segmented OEM mattresses), and allows play yard mattresses up to 1 ½ inch thick, provided that the mattress meets the appropriate specifications.

For the draft final rule, staff of CPSC's Directorate for Engineering Sciences, Division of Mechanical and Combustion Engineering (ESMC) recommends incorporating by reference the most recent version of the voluntary standard, ASTM F2933 – 21, as the mandatory standard for crib mattresses, with modifications as proposed in the NPR. In the NPR, to further reduce the risk of injury associated with crib mattresses, the Commission recommended additional tests to address entrapment hazards, suffocation hazards due to excessive surface softness, and laceration hazards due to exposure to coil springs. For staff's draft final rule, the tests have been updated,

[32] https://www.cpsc.gov/s3fs-public/RCA-Petition_CP_15-2_Requesting_Ban_on_Supplemental_Mattresses_for_Play_Yards_with_Non-Rigid_Sides_052517.pdf
[33] ASTM International website: www.astm.org, About ASTM International.



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based on feedback received in public comments and during ASTM crib mattress subcommittee and task group meetings, as follows:

- Compression Test: This test involves placing a fitted sheet on a full-size crib mattress and measuring the gap between its corners and a point representing the corner of a crib. This test would address hazardous gaps created between the edge of a crib and a full-size crib mattress due to mattress compression; when mattresses are too soft, compression, such as from a crib mattress sheet, may create large corner gaps, posing an entrapment hazard.
    - Based on public comments and ASTM feedback, the test was revised to focus on measurement of hazardous corner gaps (rather than remeasuring all mattress dimensions) and the reference point for the corner gap measurement was changed to match crib dimensions.
- Firmness Test: The test addresses excessively soft mattress surfaces that could indent and conform to an infant's face and become an asphyxiation hazard. Staff proposed adding a test for mattress firmness based on sections 6 and 8 of Australian/New Zealand Standard 8811.1:2013 – *Methods of testing infant products* (AS/NZS 8811.1:2013).
    - Staff recommends finalizing this test as proposed in the NPR.
- Cyclic Loading Test: This test addresses lacerations associated with exposed coil springs for all mattresses that use coil springs, by dropping a 30-lb test mass 250 times in each of four locations on a test mattress.
    - This test has been modified based on public comments and ASTM feedback, with one clarification to use a second mattress to test both surfaces of a coil spring mattress.

Additionally, staff recommends that the dimensional requirements for non-full-size crib mattresses in section 5.7 of ASTM F2933 – 21 apply to all non-full-size crib mattresses, regardless of whether the non-full-size crib mattress is sold as an original equipment manufacturer (OEM) mattress, or as an after-market mattress, and regardless of whether the mattress is rectangular or non-rectangular in shape.

# II. Background on ASTM F2933

## A. *The Product*

ASTM F2933 – 21 provides performance and labeling requirements for mattresses intended for full-size cribs, non-full-size cribs, and after-market mattresses for play yards and non-full-size cribs. Although non-full-size OEM crib mattresses that are supplied with a non-full-size crib have requirements in both ASTM F406 and ASTM F2933, OEM play yard mattresses are covered only in ASTM F406, and after-market play yard mattresses are covered only by ASTM F2933. Staff provides Table 1 to illustrate the interrelationship of these standards with respect to mattresses for play yard and non-full-size cribs. Table 1 presents the types of crib mattresses covered by the voluntary standard, the current dimensional requirements for each mattress type



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(marked with a "C"), and staff's recommended changes to dimensional requirements in ASTM F2933 – 21 (marked with an "R").

**Table 1: Dimensional Requirements for Mattresses Used in Full-Size Cribs, Play yard, Portable Cribs, and Other Non-Full-Size (NFS) Cribs**

| | | | Full- Size cribs | Play Yards | | Rectangular NFS cribs | | Non-Rectangular NFS cribs | |
|---|---|---|---|---|---|---|---|---|---|
| | | | All | OEM* | After-market | OEM* | After-market | OEM* | After-market |
| ASTM F2933 – 21 | Crib Mattresses | 5.7.1.1 | Current (C) | -- | -- | -- | -- | -- | -- |
| Final Rule | Crib Mattresses | Sheet Compression Test | Revised (R) | -- | -- | -- | -- | -- | -- |
| 16 CFR Part 1221/ASTM F406 | Play Yards | 5.16.2 | -- | C | -- | -- | -- | -- | -- |
| 16 CFR Part 1220/ASTM F406 | Non-Full-Size Cribs | 5.17 | -- | -- | -- | C | -- | C | -- |
| ASTM F2933 – 21 | Crib Mattresses | 5.7.2 | -- | -- | -- | C | R | C | R |
| ASTM F2933 – 21 | Crib Mattresses | 5.9.1 | -- | -- | C** | -- | -- | -- | C |

* Includes "replacement mattresses," which are assumed to be sold by an original equipment manufacturer (OEM) and equivalent in dimension and specification to the original mattress (*see* ASTM F2933 – 21 section 3.1.1.1).
** After-market play yard mattresses that are also used in a bassinet attachment to that play yard must also meet ASTM F2194, for bassinets.

ASTM F2933 – 21 defines a "mattress" as ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping on it. ASTM F2933 – 21 also defines an "after-market mattress for play yard or non-full-size crib" as a mattress sold or distributed for a play yard or non-full-sized crib.

B. *Summary of 2021 Update to ASTM F2933, Standard Consumer Safety Specification for Crib Mattresses*

The ASTM Committee F15 on Consumer Products first published the voluntary standard for crib mattresses in 2013, as ASTM F2933 – 13, *Standard Consumer Safety Specification for Crib Mattresses.* The standard was updated three times before the NPR. These updates were reviewed in detail in the NPR engineering memorandum.



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ASTM updated ASTM F2933 after the NPR was published. ASTM approved ASTM F2933 – 21 on June 15, 2021, and the standard was published in July 2021. The revised voluntary standard contains the following modifications:[34]

- Remove the requirement from Section 5.9 that "aftermarket mattresses for soft-sided and non-rectangular, rigid-sided products shall have the same thickness, floor support structure, and attachment method as the mattress it is intended to replace." ASTM considered this requirement overly design restrictive.
- Add requirements for *After-Market Mattress for Play Yards and Non-Full-Size Cribs*: This requirement is for after-market mattresses for play yards and non-full-size cribs, mandating that after-market mattresses for soft-sided and non-rectangular, rigid-sided products must meet the following applicable requirements from ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards: Stability*; *Cord/Strap Length*; *Crib Side Height*; *Height of Sides*; and *Floor Strength*. These sections, in addition to the already-referenced sections of *Mattress, Mattresses for Rigid Sided Products,* and *Mattress Vertical Displacement,* are a comprehensive list of performance requirements from F406 related to play yard and non-full-size crib mattresses. ASTM's rationale is that this requirement is "less design restrictive by more directly relying on appropriate performance requirements under the appropriate product standard."
- Add requirements specifying that an after-market mattress must be the same size or larger than the original equipment mattress, so long as it lays flat on the support structure; and requiring that the after-market mattress floor support structure be at least as thick as the original equipment mattress floor support structure.
- Add requirement in Section 5.9 specifying that the after-market mattress must have equivalent storage accommodations for the product installation manual as the original equipment mattress.
- Change the term "replacement mattress" to "aftermarket mattress" in Section 5.9, following a change suggested by CPSC staff in the NPR. Additionally, the term "product" in this section was clarified to refer to the play yard or non-full-size crib.

These changes all affect requirements for after-market mattresses for non-full-size cribs and play yards. The purpose of having after-market mattresses meet the same requirements as OEM mattresses is to reduce the risk of infant entrapment and suffocation associated with after-market mattresses that are too thick, or that do not fit correctly or attach to a play yard or non-full-size crib, without being design restrictive. ASTM developed these requirements in collaboration with CPSC staff, the ASTM Play Yard Vertical Displacement Task Group, the Play Yard Mattress Fit and Thickness Task Group, and the ASTM Non-Segmented Mattress Task Group.

A further revision of ASTM F2933 – 21 was approved on September 1, 2021 and is expected to be published in the near future. This revision does not affect performance requirements, but does include updated safety information requirements affecting marking and labeling, which are discussed in detail in Tab D. This future revision will remain inconsistent with the

[34] The changes in ASTM F2933 – 21 to the requirements for after-market mattresses are discussed in detail in Section VI of this memorandum.



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Commission's published NPR, and for the reasons detailed in Tab D, staff does not recommend including this revision in the draft final rule.

C. *ASTM F2933 – 21 Requirements*

In addition to the general requirements typically found in other ASTM juvenile product standards, such as requirements for openings, label permanency, and the prohibition of sharp points/edges, small parts, and lead in paints, like ASTM F2933 – 19, section 5 of ASTM F2933 – 21 contains the following four additional requirements that apply specifically to mattresses for cribs, non-full-size-cribs, and after-market mattresses for non-full-size cribs and play yards:

- *§ 5.7 Mattress Dimensions*: This section describes the dimensional requirements for full-size crib mattresses, and for non-full-size crib mattresses that are supplied with a non-full-size crib, to prevent an infant from becoming wedged in a gap caused by a too small crib mattress. To ensure the crib mattress dimensions are within the allowable range, the test requires a mattress to be placed in a test box and pushed against the side of the box with a force prescribed in the test method.

- *§ 5.7.2.2 Mattress Thickness*: This requirement applies to non-full-size crib mattresses supplied with a non-full-size crib, to prevent occupants from falling out of the product (and extends to after-market mattresses for non-rectangular non-full-size cribs as described below for *§ 5.9)*. The requirement states that a mattress supplied with a non-full-size crib shall have a thickness that will provide a minimum effective crib-side height dimension of at least 20 inches when the crib side is in its highest adjustable position and the mattress support is in its lowest adjustable position. Additionally, the mattress shall have a thickness that will provide a minimum effective crib-side height dimension of at least 3 inches when the crib side is in its lowest adjustable position, and the mattress support is in its highest adjustable position.

- *§ 5.8 Mattress Seam Stitching*: This requirement applies to all crib mattresses within the scope of the standard and states that all seam stitching that is accessible to the occupant shall be lock stitching to prevent accessible stitching from becoming loose and creating a small part or strangulation hazard.

- *§ 5.9 After-Market Mattress for Play Yards and Non-Full-Size Cribs*: This requirement is for after-market mattresses for play yards and non-full-size cribs, stating that after-market mattresses for soft-sided and non-rectangular, rigid-sided products must meet the following applicable requirements from ASTM F406, *Standard Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards*: *Stability; Cord/Strap Length; Mattress; Mattresses for Rigid sided products; Crib Side Height; Height of Sides; Floor Strength;* and *Mattress Vertical Displacement*. Additionally, the after-market mattress and floor support structure must be at least the same size as the original equipment mattress; it must lay flat on the play yard support structure or floor; and must include equivalent storage accommodations for the instruction manual. Accordingly, these after-market mattresses must meet the same requirements as the OEM mattress. Requirements for OEM mattresses sold with play yards and non-full-size cribs are codified at 16 CFR



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parts 1220 (non-full-size cribs) and 1221 (play yards), which incorporate by reference ASTM F406. Finally, if the after-market mattress is also intended to be used in a bassinet, it must also meet the requirements in the following sections of ASTM F2194, *Standard Consumer Safety Specification for Bassinets and Cradles*, when tested with each brand and model of product for which it is intended to replace the mattress: *Pad Thickness for Fabric or Mesh Sided Products; Pad dimensions; Side Height;* and *Bassinets with Segmented Mattresses*.

## III. Adequacy of ASTM F2933 – 21 Requirements to Address Associated Hazards

Below staff evaluates whether and how ASTM F2933 – 21 addresses each identified hazard pattern. CPSC's Directorate for Epidemiology, Division of Hazard Analysis (EPHA) staff searched the Consumer Product Safety Risk Management System (CPSRMS) database and the National Electronic Injury Surveillance System (NEISS) database for reported fatalities, incidents, and concerns associated with crib mattresses that occurred between January 1, 2010 and April 30, 2021 (Tab B). Staff is aware of 494 reports, including 139 reported deaths and 355 nonfatal incidents and concerns reported during this time. Staff identified 55 of these incidents, including 23 reported fatalities and 32 reported nonfatal incidents or concerns, since the Commission issued the NPR. From these incidents, staff identified a number of hazard patterns associated with crib mattresses. Table 2 summarizes the staff-identified hazard patterns and how ASTM F2933 – 21 addresses each.



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**Table 2. Staff Assessment of ASTM F2933 – 21 to Address Identified Hazard Patterns**

| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| Chemical/ Flammability Hazards (odors, rash) | All | 16 CFR part 1303 Ban of Lead-Containing Paint<br>16 CFR part 1500 Hazardous Substances Act Regulations (Sections 5.1 and 5.4)<br>16 CFR part 1632 Standard for the Flammability of Mattresses and Mattress Pads<br>16 CFR part 1633 Standard for the Flammability (Open Flame) of Mattress Sets | Adequate | Assessed as adequate in NPR. No change in standard. |
| Coil or Spring (laceration) | Coil or spring mattresses (primarily full-size) | Prohibition of sharp points (Section 5.2) | Inadequate | Draft final rule includes additional cyclic testing to identify potential for springs to break through surface during foreseeable use and misuse. |
| Crib Mattress Used in a Play Yard (suffocation due to ill-fitting mattress) | Aftermarket play yard mattresses | Labeling requirements, requirements for after-market mattresses. Testing requirements harmonized with ASTM F406. (Sections 5.9 and 7.5) | Adequate | Staff's assessment of the revised requirements for after-market mattresses are in Section VI of this memorandum. |
| Expand or Inflate (suffocation due to ill-fitting mattress that does not expand or inflate properly) | Foam products, typically full-size and shipped as "bed in a box" | Dimensional conformity, mattress thickness, and labeling requirements (Section 5.7) | Adequate | This hazard is adequately addressed with F2933's dimensional conformity and mattress thickness. |



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| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| Face in Mattress (suffocation) | All | Labeling requirements (Section 7.3) | Inadequate See also ESHF[35] memo (Tab D) | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1 and revised labeling. |
| Fit Issues (suffocation due to ill-fitting mattress) | All | Dimensional conformity and after-market mattress requirements (Sections 5.7 and 5.9) | Inadequate | Draft final rule contains additional fitted sheet compression test for full-size mattresses and extends dimensional requirements in section 5.7 to all after-market non-full-size crib mattresses. |
| Found Prone (suffocation due to prone position) | All | Labeling requirements (Section 7.3) | Inadequate See also ESHF memo (Tab D) | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1 and revised labelling. |
| Mattress Falls Apart (choking/ingestion) | All | Mattress seam stitching requirement and small parts prohibition (Sections 5.3 and 5.8) | Adequate | Assessed as adequate in NPR. No change in standard. |
| Softness (suffocation due to soft surface) | All | Not addressed | Inadequate | Draft final rule contains a firmness test based on sections 6 and 8 of AS/NZS 8811.1. |

[35] CPSC's Directorate for Engineering Sciences, Division of Human Factors (ESHF).



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| Hazard Pattern | Applicable Mattresses | How Addressed in ASTM F2933 – 21 | Staff assessment of adequacy | Staff Comments |
|---|---|---|---|---|
| Multiple Contributing Factors (MCF) (*e.g.*, entrapment in bumper pads, limb entrapment, crib sharing with another infant, existing health condition) | All | General requirements and warning labels (Sections 5 and 7) | Inadequate | Some of these contributing factors are addressed by additional requirements in the draft final rule described above, while others are related to another product use or other factor out of the scope of the crib mattresses standard. |
| Other | All | General requirements and warning labels (Sections 5 and 7) | Adequate | This category includes hazards which are out of scope of the ASTM standard or for which the cause is unclear. |

The following subsections discuss the hazards specific to crib mattresses within the scope of ASTM F2933 – 21.

*A. Hazard Pattern –Chemical/Flammability Hazards*

Seven percent (26 out of 355) of the nonfatal incidents, including three incidents identified since the NPR, reported a crib mattress having a chemical odor (6), causing rashes (8), developing severe allergies (1), or not meeting mandatory federal flammability standards (11). Reports describe infants suffering from rashes, upper respiratory issues, and headaches. Like ASTM F2933 – 19, the ASTM F2933 – 21 general requirements section addresses these hazards with the inclusion of 16 CFR part 1632 *Standard for the Flammability of Mattresses and Mattress Pads*, 16 CFR part 1633 *Standard for the Flammability (Open Flame) of Mattress Sets,* and 16 CFR part 1303 *Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint*.

*B. Hazard Pattern –Coil or Spring*

Potential laceration hazards due to an exposed coil or spring account for 36 percent (128 out of 355) of the nonfatal incident reports, including four incidents identified since the NPR. Like ASTM F2933 – 19, ASTM F2933 – 21 addresses this hazard by prohibiting sharp points. However, due to the high proportion of reported nonfatal incidents, the draft final rule strengthens the standard with a cyclic impact test, as proposed in the NPR and discussed in Section V of this memorandum, which entails dropping a 30-pound test mass 250 times in four locations on a test mattress.



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*C. Hazard Pattern – Crib Mattress Used in a Play yard*

One percent (2 out of 139) of fatal incidents and one percent (2 out of 355) of nonfatal incidents, including 1 nonfatal incident identified since the NPR, are associated with using a crib mattress in a play yard. The incidents were associated with the use of a crib mattress that did not fit properly in a play yard. Like ASTM F2933 – 19, ASTM F2933 – 21 addresses this hazard with warning label requirements, and additionally, newer requirements specifying that after-market play yard mattresses must meet the same requirements as OEM mattresses. Staff concludes that these revisions will increase the availability of properly fitting after-market mattresses, and reduce the likelihood of caregivers using an ill-fitting crib mattress in a play yard. For the final rule, staff recommends incorporating by reference ASTM F2933 – 21, to include these revisions.

One nonfatal incident involved scratches on an infant's back caused by protruding coils or springs of the crib mattress. Staff recommends addressing the coil or spring hazard, as described in section B above.

*D. Hazard Pattern – Expand or Inflate*

In two percent (6 out of 355) of reported nonfatal incidents, a crib mattress failed to expand or inflate properly. None of these incidents were identified since the NPR. This hazard can occur when a mattress is tightly rolled for shipping or packaging purposes, and then does not completely decompress. Related hazards include fit issues with gaps appearing around the crib mattress, causing entrapment or wedging, and an uneven crib mattress that may cause an infant to roll over. Although this hazard is adequately addressed with F2933's dimensional conformity and mattress thickness requirements, staff asserts that the additional proposed mattress compression test, detailed in Section VI, will strengthen the proposed standard and further reduce injuries associated with the failure of a mattress to expand or inflate fully to prevent hazardous gaps.

*E. Hazard Pattern – Face in Mattress*

Twelve percent (16 out of 139) of fatal incidents and less than one percent (1 out of 355) of nonfatal incidents, including 3 fatal incidents identified since the NPR, are associated with an infant found face down on a crib mattress. ASTM F2933 does not address this hazard pattern. The Human Factors assessment in Tab D provides strengthened warning label recommendations to address this hazard pattern. As proposed in the NPR, staff recommends finalizing the rule with revised warning labels to address this hazard.

*F. Hazard Pattern – Fit issues*

Twenty-two percent (31 out of 139) of fatal incidents and twenty-six percent (91 out of 355) of nonfatal incidents, including 11 fatal incidents and 3 nonfatal incidents identified since the NPR, were associated with the fit of a crib mattress in the sleeping environment.[36] In these reports, gaps between the crib mattress and the crib rail or play yard mesh, on one or more sides around the perimeter of a crib mattress, created a wedging or entrapment hazard. ASTM F2933 – 21

[36] Nearly half of (11 out of 23) fatal incidents identified since the NPR are associated with fit issues.



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contains a mattress dimensional conformity test intended to address this hazard. However, staff found from visual inspection and measurement of mattresses tested, that tight-fitting sheets over crib mattresses can create gaps between the corners of the mattress and the interior corner of the crib, creating an entrapment hazard, as seen in Photo 1. Accordingly, staff concludes that ASTM F2933 – 21 does not adequately address entrapment hazards between the crib mattress and the side of a crib or play yard. To strengthen the standard, staff recommends finalizing the rule with the compression test as proposed in the NPR, with modifications, discussed in Section V, to address the fit issues caused by a tight-fitting sheet.

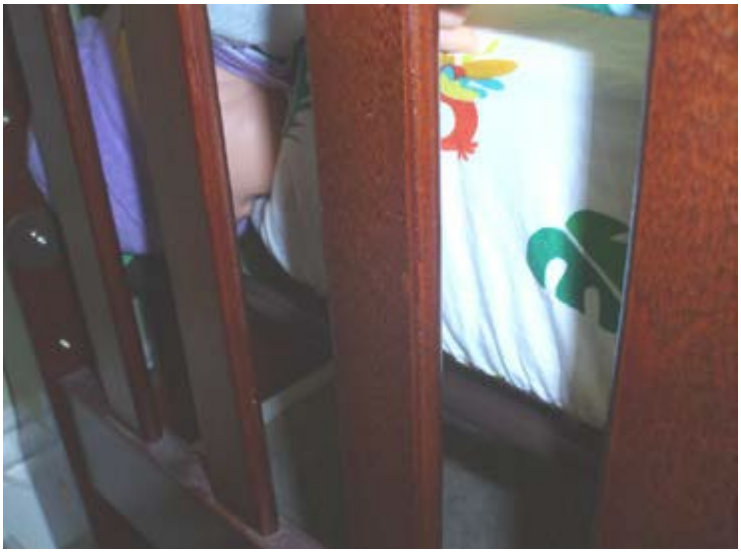

Photo 1. Reenactment of a head entrapment in a corner gap.
Source: CPSC in-depth investigation

ASTM F2933 – 21 also includes provisions to address fit issues with after-market mattresses for play yards and non-rectangular, non-full-size cribs. These provisions require that after-market mattresses meet the same requirements as OEM play yard and non-full-size crib mattresses, as specified in ASTM F406.

As detailed in section VI, currently, the dimensional requirements for after-market non-full-size crib mattresses in section 5.9 of ASTM F2933 – 21 apply only to non-rectangular, non-full-size crib mattresses, and the dimensional requirements in section 5.7 of the standard only apply to OEM non-full-size crib mattresses. This is consistent with staff's assessment of ASTM F2933 – 19 in the NPR. Although labeling requirements in section 7 of the standard apply to all non-full-size crib mattresses, regardless of shape, or whether they are after-market or OEM, ASTM F2933 – 21 contains no dimensional requirements that apply to after-market, rectangular, non-full-size crib mattresses. To address this gap in the standard, staff recommends that the draft final rule finalize the NPR proposal to modify section 5.7 of ASTM F2933 to apply the dimensional requirements to all non-full-size crib mattresses, regardless of shape or whether they are provided with the crib or sold after-market. Staff also recommends finalizing the NPR proposal to modify section 5.9 of ASTM F2933 to remove non-full-size cribs from that section and to clarify requirements for after-market play yard mattresses.

### *G. Hazard Pattern – Found Prone*



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Fifty-four percent (75 out of 139) of fatal and one percent (3 out of 355) of nonfatal incidents, including nine fatal incidents identified since the NPR, are associated with infants found in a prone position on a crib mattress, without any mention of the face being in contact with the mattress or crib sheet, and no mention of the face being obstructed by other crib bedding or other items in the sleep environment. Like staff's assessment of ASTM 2933 – 19 in the NPR, ASTM F2933 – 21 does not address this hazard pattern with a performance test; however, it does address it with warning labels. The Human Factors assessment in Tab D provides warning label recommendations to strengthen the standard to address this hazard pattern. As proposed in the NPR, staff recommends finalizing the rule with revised warning labels to address this hazard.

*H. Hazard Pattern – Mattress Falling Apart*

Five percent (18 out of 355) of nonfatal incidents are associated with mattresses falling apart. Staff did not identify any new incidents since the NPR. In most of these reports, the seams of the mattresses unraveled, causing a strangulation hazard because the thread or cord used for stitching the mattress was exposed. This failure also resulted in a choking or ingestion hazard because the inner filling came out of the mattress in small pieces and into the sleep environment of the crib. Like ASTM F2933 – 19, ASTM F2933 – 21 adequately addresses this hazard with a mattress seam-stitching requirement and small parts prohibition.

*I. Hazard Pattern– Softness*

Fifteen percent (55 out of 355) of nonfatal incidents, including 19 incidents identified since the NPR, are associated with mattress softness. Mattress softness hazards include depressions or indentations found in the crib mattress that could increase the risk of asphyxia. Twelve of these 55 incidents relate to bending, buckling, or mattress compression occurring when a crib sheet was placed on a mattress, shrinking the mattress, and creating an entrapment hazard. Like ASTM F2933 – 19, ASTM F2933 – 21 does not address firmness or softness hazards; nor does it address mattress buckling. However, other international standards, Australian/New Zealand Standard (AS/NZS) 8811.1:2013, and EN 16890:2017, *Children's Furniture – Mattresses for Cots and Cribs – Safety Requirements and Test Methods*, both address mattress firmness. For the final rule, staff recommends finalizing the fitted-sheet test as proposed in the NPR, with modifications. This test is intended to address hazardous corner gaps caused by compression, but may also be used to address the bending or buckling incidents. Additionally, staff recommends finalizing the mattress firmness and softness test as proposed in the NPR, based on the AS/NZS 8811.1:2013 – Methods of testing infant products – Method 1: Sleep Surfaces – Test. The AS/NZS test uses an internationally recognized standard and harmonizes with requirements proposed by the Commission for Crib Bumpers.[37]

*J. Hazard Pattern – Multiple Contributing Factors*

[37] A test based on AS/NZS 8811.1:2013 was used to address a smothering-type suffocation hazard presented by crib bumpers separating from the crib or otherwise protruding into the sleep area and getting underneath an infant. In these situations, the crib bumper behaves like a quilt or soft bedding that is able to conform to, and occlude, airway openings. Extending the requirement to the mattress will similarly reduce the risk of suffocation posed by soft depressions or indentations in crib mattresses.



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Multiple contributing factors accounted for 11 percent (15 out of 139) of fatal and five percent (19 out of 355) nonfatal incidents, including two nonfatal incidents identified since the NPR. Examples of contributing factors are entrapment between the mattress and crib bumper pads, limb entrapment between the mattress and a crib rail, crib occupant usage of a swaddle, sharing of the crib with another infant, and congenital or recent health conditions of infants. Like ASTM F2933 – 19, ASTM F2933 – 21 adequately addresses these hazards in the general requirements sections. ASTM F2933 – 21 also addresses these hazards with safety requirements, but those are inadequate. Tab D outlines the human factors assessment of the requirements for safety information with staff-recommended modifications. As proposed in the NPR, staff recommends finalizing the rule with revised safety information to address this hazard.

*K. Hazard Pattern – Other*

Two percent (6 out of 355) of nonfatal incidents involved miscellaneous other issues associated with a crib mattress. Staff did not identify any new incidents since the NPR. Reports include: a blade found in a crib mattress; an infant's arm becoming "tangled in a crib mattress"; an incident in which an infant "slipped on a crib mattress," causing a slat entrapment; an infant's arm becoming "stuck on a crib mattress"; a crib mattress that is too thick; a crib mattress that had a loose plastic bag for a cover; and a concern about crib mattresses not having proper warning labels to direct caregivers to place infants on their backs when putting them down in a crib. Foreign objects are generally not addressable in product standards. For three of these incidents ("tangled," "slipped," "stuck"), staff could not determine the exact cause of the incident, nor determine whether ASTM F2933 – 21 was the appropriate standard to address the hazard. ASTM F2933 – 21's warning label requirements include a statement that says to place infants on their backs to sleep, and "only use sheets and mattress pads designed specifically for crib mattresses."

# IV. International Standards

In the NPR, staff compared ASTM F2933 – 19 to the international standards AS/NZS 8811.1 and EN 16890, and determined that the ASTM standard is equivalent to or more stringent than these standards to address most incidents associated with the use of crib mattresses in the United States. This assessment is applicable to ASTM F2933 – 21 as well. The exception is that each of these international standards includes a firmness test, while the ASTM standard does not. To address this issue, the draft final rule includes a mattress firmness test, as proposed in the NPR. The ASTM standard was developed through the collaboration of CPSC staff and other stakeholders since its inception up through its most recent version, ASTM F2933 – 21. Therefore, staff continues to conclude that ASTM F2933 is more appropriate than other international standards to address the hazards identified in the incident data, and recommends using it as a basis for the draft final rule.



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# V. Staff-Recommended Modifications to ASTM F2933 to Further Reduce the Risk of Injury Associated with Crib Mattresses

The 2020 NPR proposed to incorporate by reference ASTM F2933 – 19 with modifications to address the hazard patterns identified by staff, including new tests to address entrapment, suffocation, and lacerations. Since the release of the NPR, staff reviewed public comments, feedback received during ASTM crib mattress subcommittee and task group meetings, and the latest version of the standard, ASTM F2933 – 21, and revised the draft final rule accordingly. For the draft final rule, staff recommends finalizing the rule with the addition of the following tests, as proposed in the NPR:

- Compression Test: This test involves placing a fitted sheet on a full-size crib mattress and measuring the gap between its corners and a point representing the corner of a crib. This test would address hazardous gaps created between the edge of a crib and a full-size crib mattress due to mattress compression; when mattresses are too soft, compression, such as from a crib mattress sheet, may create large corner gaps, posing an entrapment hazard.
    - This test has been modified based on public comments and ASTM feedback. The test was revised in the following manner: the measurement technique is focused on hazardous corner gaps, rather than remeasuring all mattress dimensions; the reference point for the corner gap measurement was changed to match crib dimensions.
- Firmness Test: The test addresses excessively soft mattress surfaces for all crib mattresses within the scope of the standard that could indent and conform to an infant's face and become an asphyxiation hazard. Staff proposed adding a test for mattress firmness based on sections 6 and 8 of Australian/New Zealand Standard 8811.1:2013 – *Methods of testing infant products* (AS/NZS 8811.1:2013).
    - Staff recommends finalizing this test as proposed in the NPR.
- Cyclic Loading Test: This test addresses lacerations associated with exposed coil springs for all mattresses that use coil springs, by dropping a 30-lb test mass 250 times in each of four locations on a test mattress.
    - This test has been modified based on public comments and ASTM feedback with one clarification to use a second mattress to test both surfaces of a coil spring mattress.

Since the publication of the NPR, CPSC staff has continued working with ASTM to address these hazards.

## *A. Mattress Entrapment from Compression*

### 1. Hazard Description

CPSC staff is concerned about hazardous gaps that form between the corner of a crib and the corner of the mattress when a fitted sheet is placed on the mattress, compressing the corners and creating large corner gaps that could lead to entrapment.



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### 2. Work with ASTM

In the NPR, CPSC proposed a test method to address the hazard. The test method had a conditioned fitted sheet placed on a full-size crib mattress. The mattress with the sheet was required to meet all dimensional requirements in ASTM F2933 – 19.[38] In addition, measured corner gaps were required to be less than 2.25 inches in length, based on the fifth percentile head breadth of 0- to 3-month-old infants,[39] the already-allowed maximum gap of 1 inch between the sides of the crib mattress and the sides of the crib, and a 0.5-inch margin of safety.

After publication of the NPR, ASTM members discussed the NPR test methods during ASTM crib mattress subcommittee and task group meetings on November 10, 2020, December 3, 2020, and February 16, 2021. At these meetings, ASTM members expressed that for the ASTM voluntary standard, they opposed the test method proposed by CPSC in the NPR. Members stated that crib mattress sheets can vary widely in quality and size; and that by assuming the maximum gap of 1 inch between the sides of the crib mattress and the sides of the crib, the test method was overly restrictive for larger mattresses. Additionally, ASTM members pointed out that the dimension measurement method in ASTM F2933 was established with soft materials in mind, and that the NPR-proposed test method was overly restrictive for mattresses, because the mattress must be compressed twice with the sheet installed to obtain this measurement.

The task group decided to develop an alternative test method, presented during meetings on February 25, 2021, and June 9, 2021. In the alternative test method, the maximum allowable 1-inch gap is applied to the minimum allowable mattress dimensions of 51.625 inches by 27.25 inches, to create a rectangle measuring 52.625 inches by 28.25 inches. This rectangle is the projected crib interior. Then, using the head breadth dimension proposed by staff (3.66 inches), minus a 0.51-inch margin of safety, a line is marked 3.15 inches away from the projected crib interior corner, at an angle of 45 degrees to each of the projected crib sides. A 6-inch-high by 6-inch-wide wood block is then used to apply a 2-pound force to the corner of the mattress to recreate the compression force of a fitted sheet. If the front of the block moves beyond the marked line, then the mattress fails. The test is repeated in each corner. The test proposed by ASTM members has not been balloted.

[38] The dimensional requirements are unchanged in ASTM F2933 – 21.

[39] The 5th percentile head breadth, *i.e.*, the maximum breadth of the head above and behind the ears, of children 0 to 3 months old is approximately 3.66 inches; Snyder, R.G., Schneider, L.W., Owings, C.L., Reynolds, H.M., Golomb, D.H., & Schork, M.A. (1977). Anthropometry of Infants, Children and Youths to Age 18 for Product Safety Design (Report No. UM-HSRI-77-17). Prepared for the U.S. Consumer Product Safety Commission, Washington, D.C.



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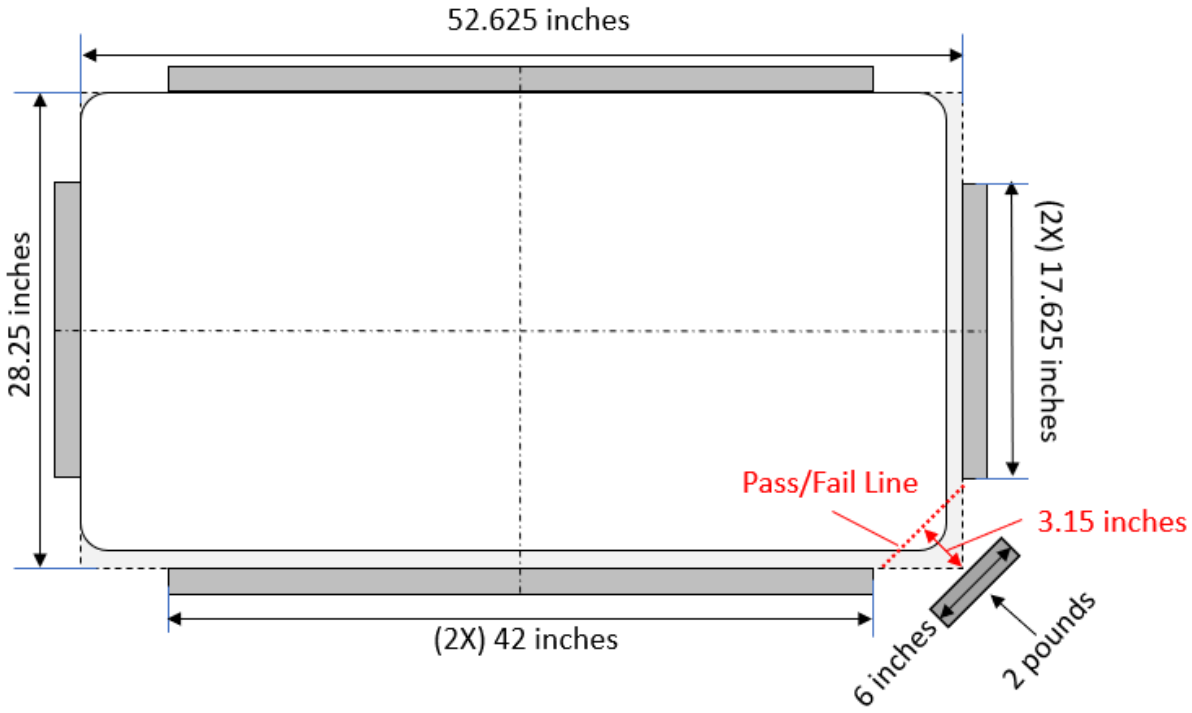


Figure 1. Test fixture proposed by ASTM, as interpreted by CPSC staff.

## 3. Discussion

ASTM members expressed two primary reasons against the test method proposed in the NPR. First, ASTM members stated that crib mattress sheets can vary widely in quality and size. Some public comments agreed with this point, suggesting that fitted sheets should have separate performance requirements addressed by the ASTM infant bedding subcommittee (see Tab A).

CPSC staff has engaged with members of the ASTM Infant Bedding Task Group to reduce the risk of ill-fitting crib mattress fitted sheets and improve sheet performance. However, staff states that the crib mattress should not allow a poorly fitted sheet to adjust its dimensions and create a hazardous gap. Staff will continue working with the ASTM Infant Bedding Task Group to address quality concerns regarding fitted sheets intended for crib mattresses, and then work with the ASTM Crib Mattress subcommittee to refer to these requirements, as applicable. With regard to the fitted-sheet test in the draft final rule, test laboratories can determine the most appropriate sheet for the test, meaning a crib mattress sheet that fits the crib mattress snugly and can be wrapped around the four corners. Staff has not received comments that suggest additional methods to improve the sheet selection process. Staff considers the NPR test method, designed to test for hazardous gaps caused by sheets, to be the most accurate test method, based on available data.

Second, ASTM members stated that the proposed test has the potential to be overly restrictive towards mattresses that are larger than the minimum allowable size. Some public comments make the same point (see Tab A). Staff agrees with ASTM members and public comments on



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this point.[40] The proposal in the NPR assumed every mattress would have the 1-inch maximum allowable gap between the crib and the crib mattress, regardless of size. This assumption is overly restrictive towards mattresses that were designed to fill the space between the crib and crib mattress. The NPR test method can be improved to address this point, by incorporating projected crib dimensions. Staff considers the maximum allowable crib interior dimensions of 53 inches by 28⅝ inches to be a more appropriate position than those initially proposed by ASTM members, because a crib with the maximum interior dimensions will be the worst-case product to consider hazardous corner gaps. Accordingly, the draft final rule incorporates changes to the measurement method, such that the corner gap is measured from the projected corner of a crib, as described in the next section.

Additionally, ASTM members commented that the mattress measurement method described in Section 6.2 was established with concerns about foam compression in mind. As mentioned in the appendix of ASTM F2933 – 21, the rationale for using a dynamic measuring box was "to provide a more repeatable measurement that would take away the variability caused by soft materials." The test method proposed in the NPR would have repeated these measurements with the fitted sheet on the mattress, essentially compressing the mattress twice when taking dimension measurements. In response to these comments, for the final rule, staff recommends removing the requirement that the mattress with the fitted sheet must meet the same dimension requirements as the mattress without the fitted sheet. Instead, the final rule requires the corner gap measurement to be taken separately from the dimension measurements.

### 4. Staff Recommendation

For the draft final rule, staff recommends updating the NPR-proposed requirement for corner gap testing as follows:

- Use projected crib interior dimensions, based on maximum allowable crib interior dimensions, as a reference point for measuring the corner gap.
    - This replaces the recommendation to measure from the adjoining corner of the crib mattress measurement test fixture.
- The corner gap shall not exceed 3.15 inches.
    - This replaces the requirement that the corner gap shall not exceed 2.25 inches, and was changed due to the change in reference point for the measurement.
- Do not repeat mattress dimension measurements with the fitted sheet on the mattress.
    - The mattress dimension measurement method was designed with soft materials in mind. Repeating the measurements during a test intended to measure hazardous corner gaps is unnecessary.

A comparison of the language in the draft final rule to the NPR proposal can be found in Appendix A. A summary of the test method for the draft final rule follows.

Mattress Fitted Sheet Test

[40] Staff notes that of the 11 mattresses tested for the NPR, all of which were larger than the minimum size, none failed the draft proposed test method.



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1. To condition the sheet for compression testing, a store-bought fitted mattress sheet intended for the tested mattress size, consisting of 100 percent cotton, shall be washed in hot water (50° C [122° F] or higher) and dried a minimum of two times on the highest setting, using household textile laundering units.

2. The shrunken fitted sheet shall be placed fully on the mattress, such that each sheet edge is wrapped fully around and under the mattress.

3. The mattress, with the shrunken sheet, shall be positioned in the corner, following section 6.2.2.1 of ASTM F2933 – 21.

4. After positioning, while no force is being applied, measure the gap from the projected crib corner, located 53 in. from Wall C and 28⅝ in. from Wall D, and the crib mattress. See Figure 2 for illustration. The gap shall not exceed 3.15 in.

5. Rotate the mattress 180° and repeat steps 3 and 4.

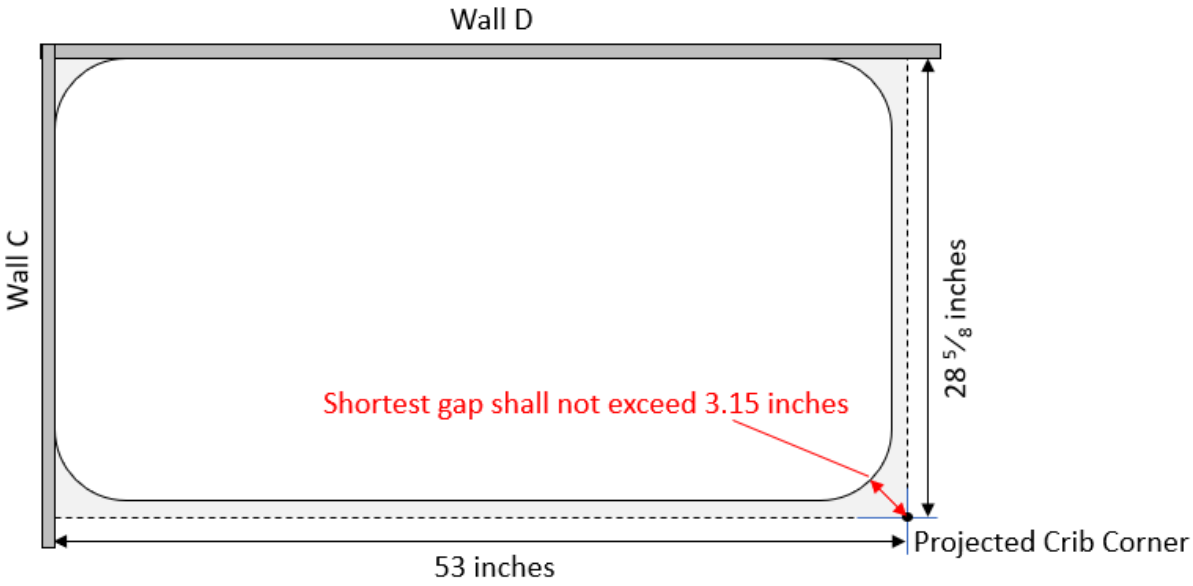


Figure 2. Staff's proposed location of the projected crib corner, from which the corner gap is measured.

Currently, staff is not aware of incidents related to non-full-size crib or play yard mattresses compressing when sheets are installed. Therefore, at this time, staff is not recommending a similar sheet compression test for non-full-size crib or play yard mattresses.

### *B. Mattress Firmness and Suffocation*

#### 1. Hazard Description

Based on the incident data, CPSC staff is concerned that some mattress surfaces may be too soft, and may allow depressions in the surface that conform to an infant's face and compromise an infant's ability to breathe.



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### 2. Work with ASTM

After the Commission issued the NPR, CPSC staff continued to engage with ASTM to address the hazard pattern created by soft crib mattresses in the ASTM standard. The NPR proposed a firmness test method based on the AS/NZS 8811.1:2013 test method for firmness. ASTM members discussed this firmness test at ASTM crib mattress subcommittee and task group meetings on November 10, 2020, December 3, 2020, and February 16, 2021. At these meetings, ASTM members agreed that a firmness test was needed, but debated whether the AS/NZS 8811.1 protocol or the EN 16890 protocol would be more appropriate. Some members agreed with CPSC staff's assessment that the AS/NZS 8811.1 protocol was more appropriate, and found that test results using the EN 16890 protocol could be difficult to interpret. Other ASTM members disagreed, stating that the AS/NZS 8811.1 protocol did not produce consistent results and the EN 16890 protocol was more appropriate. ASTM members did not provide supporting evidence for this conclusion. After the February 16, 2021 meeting, ASTM members agreed to test and compare results using both protocols.

At a June 10, 2021 subcommittee meeting, several ASTM members reported that testing had been conducted using one or both of the firmness protocols, and these members repeated the assertion that the EN 16890 protocol should be favored. One member stated that the AS/NZS 8811.1 protocol results could be inconsistent if the test was not conducted on a flat surface.[41] No detailed test results were provided or discussed at this meeting.

### 3. Discussion

For the NPR, staff compared the AS/NZS 8811.1:2013 and EN 16890, section 8.2.3 test protocols for firmness, and found that the AS/NZS 8811.1:2013 test method was more stringent. CPSC staff concluded this after comparing test results obtained using each protocol on 11 full-size crib mattresses. Only one mattress failed the firmness tests outlined in each standard. The mattress was a two-stage mattress, indicating it had a firmer side intended for infants and a softer side intended for toddlers. Both sides of the mattress failed the AS/NZS protocol. The mattress failed the EN 16890 protocol only on the "toddler" side, which is intentionally made softer.

Additionally, staff found that AS/NZS 8811.1:2013 protocol is more repeatable and is easier to discern when a mattress does not meet the performance requirements, as compared to the EN16980 method. Some ASTM members and public comments have stated that the AS/NZS 8811.1:2013 test protocol does not provide consistent test results, but have not provided evidence to support this conclusion. Staff's testing has not indicated any such issues. Some ASTM members agreed with staff's assessment of AS/NZS 8811.1:2013, and some public comments supported the use of AS/NZS 8811.1:2013 to determine whether a mattress was too soft (see Tab A for staff's response to public comments). Accordingly, to address mattresses that are too soft, for the draft final rule, staff recommends finalizing the rule as proposed, by adding a test for mattress firmness for all crib mattresses within the scope of the standard, based on sections 6 and 8 in the AS/NZS 8811.1 mattress firmness test.

[41] Stitching patterns often contribute to uneven surfaces on crib mattresses.



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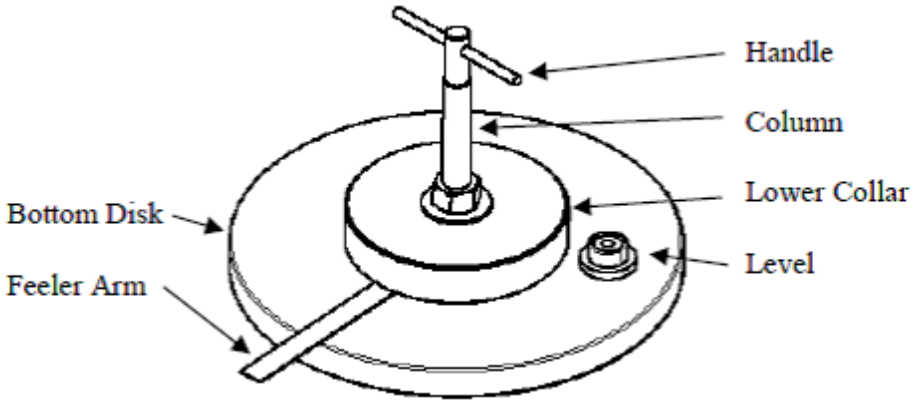


Figure 3. Firmness Test Fixture Adapted from
Australian/New Zealand Standard 8811.1:2013 test apparatus

### 4. Staff's Recommendation

Staff recommends no changes to this requirement from the NPR. A comparison of the language in the draft final rule to the NPR proposal can be found in Appendix A. To further reduce the risk of infant suffocation associated with surface softness in crib mattresses, the draft final rule for Crib Mattresses includes the following mattress firmness test summarized from a test based on section 8 of AS/NZS 8811.1:2013:

1. Mark three equidistant points along the longitudinal center line, with one at the center, and the other two equidistantly between the center and the edge of the mattress. Choose one more "worst-case" scenario test location(s) where an infant's head might lay in a particularly soft spot, or an infant's nose or mouth might contact a protrusion above the sleep surface.
2. Hold the test fixture with its base horizontally, and rotate it so the feeler arm is aligned with the center line of the sleep surface, and pointing in the same direction for each test; then gently set down the fixture on one of the test locations, ensuring that the edge of the bottom disk does not extend beyond the edge of the sleep surface.
3. If the level indicates that the feeler arm is approximately level when the fixture is resting on the sleep surface, observe whether the feeler arm makes any contact with the top of the sleep surface or cover. If the feeler arm is not level, decompress the mattress, allow it to settle, and start again. If the feeler arm contacts the sleep surface even when the test fixture is tilted back so as to raise the feeler arm, assume that such contact would occur had the fixture come to rest horizontally.
4. Repeat steps at remaining locations.

*C. Lacerations from Exposed Coil Springs*



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### 1. Hazard Description

Staff found that thirty-six percent (128 of 355) of the nonfatal incident reports were associated with potential lacerations to infants from an exposed coil or spring.

### 2. Work with ASTM

Since publication of the NPR, CPSC staff has continued working with the Crib Mattress Cyclic Testing task group to refine test requirements that will address the hazard of potential lacerations to infants from an exposed coil or spring. The test was discussed at subcommittee and task group meetings on November 10, 2020, December 9, 2020, and February 16, 2021. During these meetings, ASTM members discussed points that they felt needed clarification if the voluntary standard is revised, including the desire for a means to prevent the mattress from moving around during testing. ASTM members stated, for example, that the standard should clarify that the test applies only to coil spring mattresses, and that two mattresses should be required to test both sides of a mattress. CPSC staff agrees with these recommendations, and staff included several modifications to the test method in the draft final rule. At a subcommittee meeting on June 10, 2021, staff learned that a new draft of the test method had been developed, and a drawing was shown that appeared to depict a revised test location. This draft has not been distributed to CPSC staff or to task group members, and there has not been a ballot.

### 3. Discussion

CPSC staff has typically been in alignment with ASTM members of the Crib Mattress Cyclic Testing task group on how to conduct testing to address the hazard of potential lacerations to infants caused by exposed coils or springs. Public comments were also generally supportive of the test proposed by staff, and the commenters encouraged staff to continue working with ASTM to develop the test (see Tab A). However, ASTM's latest proposal has not been made available or evaluated by staff. Therefore, for the draft final rule, staff has made clarifications related to the test procedure, but it does not recommend any additional changes. Because the NPR already stated that the test applies only to coil spring mattresses, the only additional clarifying statement in the draft final rule is that two mattresses are required to test each side of the mattress.

### 4. Staff's Recommendation

For the draft final rule, staff recommends updating the NPR-proposed test, as follows:

- The coil spring test shall be repeated on each surface of the mattress. The test shall not be repeated using a mattress that has been previously tested with the coil spring test.
    - The test did not previously specify to repeat the test on each surface. This clarification was suggested in public comments and in ASTM meetings to address dual-sided mattresses.

A comparison of the language in the draft final rule to the NPR proposal can be found in Appendix A. Staff's recommended cyclic loading test for the draft final rule, to further reduce the risk of infant lacerations from exposed coils and springs, is as follows:



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1. Mattress shall be tested in an enclosed frame measuring 29 inches x 53 inches (737 mm by 1346 mm) for the purpose of restricting mattress movement. A crib meeting the requirements of ASTM F1169 – 19 would suffice.
2. The mattress can be placed on top of a ¾ inch piece of plywood or oriented strand board (OSB), which is rigidly supported along the perimeter.
3. An impactor with the dimensions of the vertical impactor of ASTM F1169 – 19 weighing 30 lbs. shall be dropped from a height of 6 inches from the top of the mattress surface to the bottom of the impactor, 250 times in four locations (specified in Figure 4), for a total of 1,000 cycles. Cyclic loading rate shall be one drop every 4 ± 1 seconds.
4. At the conclusion of the cyclic loading test, the mattress shall be removed from the test enclosure and visually inspected for exposed wires or coil springs.
5. The coil spring test shall be repeated on each surface of the mattress. The test shall not be repeated using a mattress that has been previously tested with the coil spring test.

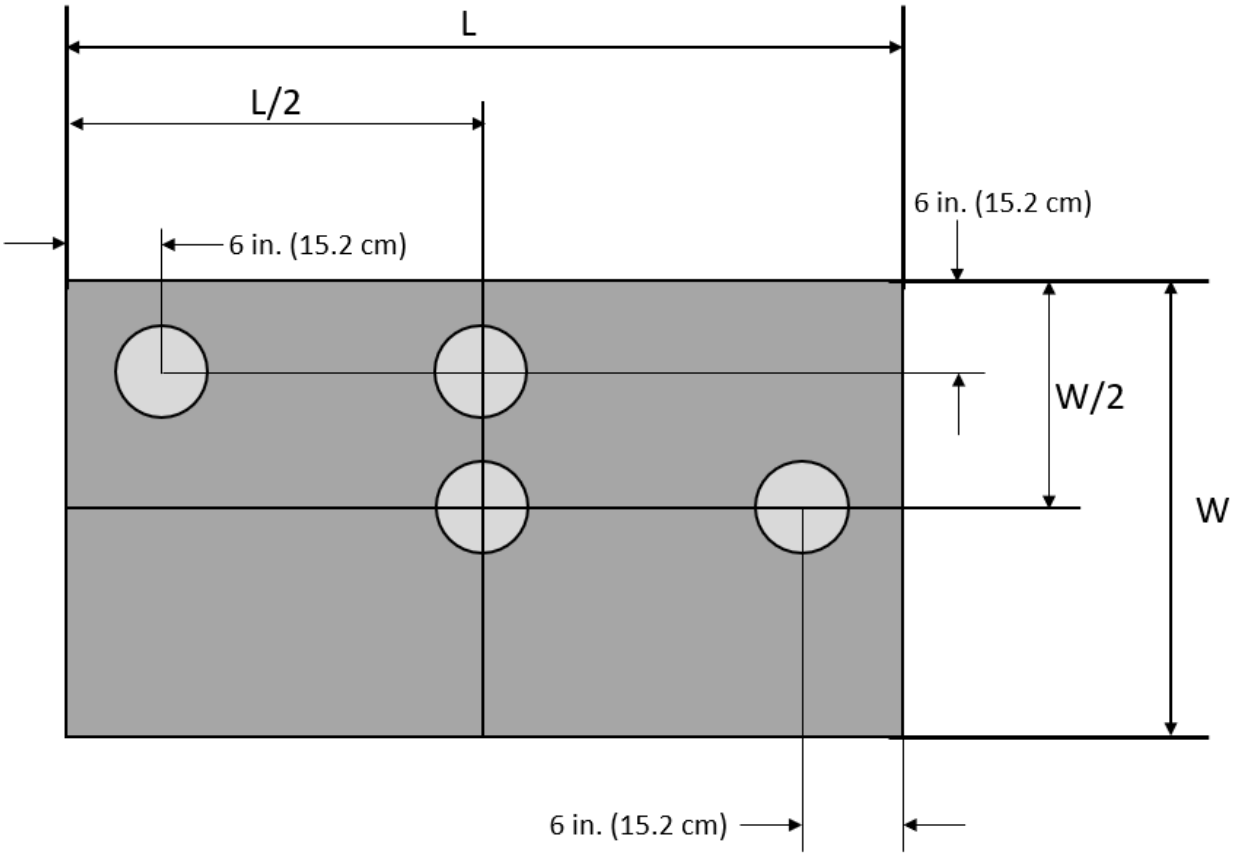


Figure 4. Impact test locations.



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# VI. Staff-Recommended Modifications to Requirements for After-Market Non-Full-Size Crib and Play Yard Mattresses

Dimensional requirements for non-full-size crib mattresses are a key requirement in ASTM F2933 – 21, because size requirements prevent hazardous gaps from forming between the edge of a mattress and the side of the crib, where infants can become entrapped and suffocate. Staff identified a gap in the dimensional requirements for after-market non-full-size cribs in section 5.9 of ASTM F2933 – 21, which does not appear to have a performance requirement for the dimensions of an after-market, rectangular-shaped, non-full-size crib mattress. As explained below, to address this safety gap, staff recommends expanding the non-full-size crib mattress requirements in 5.7.2, which currently apply only to OEM mattresses, to apply to all non-full-size crib mattresses. Staff also recommends additional modifications in sections 5.7 and 5.9 of ASTM F2933 – 21, to clarify ambiguities for performance requirements for mattresses in the standard.

Additionally, ASTM F2933 – 21 includes revised language that would allow non-segmented after-market mattresses to be used with play yards and rigid-sided non-rectangular products whose original equipment mattress was segmented. This revision also applied to after-market mattresses, such that they would be aligned with the requirements for OEM mattresses. Per public comments and comments received during ASTM meetings, staff recommends incorporating these changes into the proposed rule, as discussed below.

### *A. Dimension requirements for all after-market non-full-size crib mattresses*

Staff recommended in the NPR that the current performance requirements for OEM non-full-size crib mattresses in section 5.7.2 of ASTM F2933 – 19 be modified to apply to all non-full-size crib mattresses, regardless of whether the mattress is sold with a crib, and regardless of the shape of the mattress. Accordingly, staff also recommended removing references to after-market non-full-size cribs from section 5.9 of ASTM F2933 – 19, such that section 5.9 focuses solely upon after-market play yard mattresses. For the draft final rule, staff recommends continuing with the change as proposed in the NPR.

Because the size and thickness requirements for OEM non-full-size crib mattresses in section 5.7.2 of ASTM F2933 – 19 repeat the requirements for non-full-size crib mattresses in section 5.17 of ASTM F406, staff recommended in the NPR to modify section 5.7.2 to refer to the requirements for non-full-size crib mattresses in F406, rather than repeating the same requirements in F2933. This change would preclude the size requirements in each standard from unintentionally diverging in the future. For the draft final rule, staff recommends continuing with the change, as proposed in the NPR.

The *Stability*; *Cord/Strap Length*; and *Crib Side Height* requirements in F406 are also applicable to non-full-size crib mattresses, but the requirements were not referenced in ASTM F2933 – 19, or by staff's recommended changes in the NPR. The newly published ASTM F2933 – 21 added a reference to these requirements in section 5.9 of the standard, as described in sections III (above) and VI B (below) of this memorandum. For the draft final rule, staff recommends



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adding the reference to *Crib Side Height* to the list of F406 requirements referred to in section 5.7.2 of ASTM F2933 – 21, and removing it from section 5.9, because it does not apply to play yard mattresses. Staff recommends including a reference to the F406 requirements for *Stability* and *Cord/Strap Length* in section 5.7.2 and section 5.9 of ASTM F2933 – 21, because these are general requirements applicable to non-full-size crib and play yard mattresses. This change is consistent with the changes proposed in the NPR, which would ensure that all after-market non-full-size crib mattresses be subject to the same requirements as OEM non-full-size crib mattresses.

ASTM F2933 – 21 includes additional requirements for after-market, non-rectangular, non-full-size crib mattresses, described in detail below in section VI B (points 5 through 7), which ensure the after-market mattress maintains the proper fit, support, and instruction storage accommodations. Staff recommends extending these requirements to all after-market non-full-size crib mattresses, to be consistent with staff's recommendation in the NPR to extend requirements to all non-full-size crib mattresses, regardless of shape.

For the Commission to maintain version control of the referenced requirements for non-full-size crib mattresses, staff recommends changing the reference from ASTM F406 to the applicable regulation, 16 CFR part 1220, Safety Standard for Non-Full-Size Baby Cribs.

Appendix A outlines staff's recommended changes to section 5.7.2 of ASTM F2933 – 21 for the draft final rule.

*B. Requirements for after-market mattresses for play yards*

ASTM balloted changes to modify section 5.9 of ASTM F2933 – 19. The ballot was approved by ASTM on June 15, 2021, and the revisions were included in ASTM F2933 – 21. The rationale for the revisions was to be less design restrictive by relying more directly on appropriate performance requirements under the proper product standard, including additional references to requirements in F406. In summary, the changes to the voluntary standard are as follows:

1. In section 5.9, "Product" was clarified to refer to the play yard or non-full-size crib, rather than the mattress. Other clarifications of the mattress and the product were made throughout this section.
    a. Staff finds that these term clarifications are appropriate and adequate to make clear what requirements apply to which products, but recommends removing non-full-size cribs from this section to be consistent with staff's recommended changes to section 5.7.2.

2. In section 5.9.1.1, the requirement that the after-market mattress has the same thickness, floor support structure, and attachment method as the mattress it is intended to replace, was removed. (The thickness and floor support structure requirements were replaced; see 5 and 6 below.)
    a. Staff assessed ASTM's new requirements for after-market mattresses and recommends adopting the revised requirements in ASTM F2933 – 21, as written. Before this change, an after-market mattress for a play yard could meet the



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requirements of F406 when tested with the product it is intended for, but still not meet the requirements of this section, due to having a different thickness mattress or different design of floor support structure as the OEM mattress. For example, non-segmented after-market mattresses for products which included a segmented mattress would not be allowed. Similarly, if the OEM play yard mattress was 3/8-inches thick, an after-market mattress with a thickness of 7/8 inches and that would otherwise meet the requirements of an OEM mattress would not be allowed. ASTM has removed the requirement that after-market mattresses be exactly the same as the OEM mattress, and instead, requires that after-market mattresses be tested to the same requirements as OEM mattresses (see 3 below). In addition, after-market mattresses must meet additional requirements regarding size, floor support structure, and instruction storage (5, 6, and 7 below, respectively). Based on this change, the two examples described above may be allowed, so long as they meet all of the requirements for after-market mattresses. However, a 3-inch thick after-market play yard mattress would not be allowed, due to it having a greater thickness than allowed for OEM mattresses. Staff concludes that because after-market mattresses must meet the same dimension and performance requirements as OEM mattresses, as well as additional requirements, this change will not reduce the safety of after-market mattresses.

3. In the new section 5.9.1.1, ASTM added the following list of requirements from F406: *Stability*; *Cord/Strap Length*; *Crib Side Height*; *Height of Sides*; and *Floor Strength.* The following requirements from F406 were already listed: *Mattress*; *Mattresses for Rigid sided products*; *Mattress Vertical Displacement*.
    a. The requirements in F406 applicable to play yard mattresses are those for *Mattress, Stability, Cord/Strap Length, Height of Sides, Floor Strength*, and *Mattress Vertical Displacement*. With the balloted additions, all of these requirements are now listed in this section. Staff recommends removing *Mattresses for Rigid sided products* and *Crib Side Height* from this section, as these requirements apply to non-full-size cribs. Staff recommends these requirements instead be referenced in section 5.7.2, as discussed in the previous section.

4. In the new section 5.9.1.2, ASTM replaced the term "replacement mattress" with "aftermarket mattress."
    a. This change follows staff's recommendation in the NPR.

5. ASTM added the following requirement in the new section 5.9.1.3: "The aftermarket mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the play yard mattress support structure."
    a. Some OEM play yard mattresses are made particularly thin, contributing to the consumer perception that play yard mattresses are uncomfortable, and potentially resulting in consumers placing additional soft bedding in infant sleep environments. With this change, after-market mattresses can be the same size or larger (thicker and/or wider) than the OEM mattress, so long as they lay flat and



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meet the other applicable dimension and test requirements for play yard mattresses, including maximum dimension requirements. This allows after-market play yard mattresses that are thicker than OEM mattresses, but continue to meet maximum dimension requirements (*e.g.* an after-market mattress with foam 7/8 inches thick may be acceptable, but foam more than 1 inch thick would not be acceptable). Staff finds that this change is unlikely to reduce safety, or may improve safety, and therefore, it will be an adequate replacement for the mattress size requirements originally in section 5.9.1.1.

6. ASTM added the following requirement in section 5.9.1.4: "If the original equipment mattress includes a floor support structure, the aftermarket mattress must include a floor support structure that is at least as thick as the original equipment mattress floor support structure."
    a. This change allows for after-market mattresses with a different floor support structure than the OEM mattress (*e.g.,* an after-market, non-segmented mattress in place of an OEM segmented mattress), so long as the floor support structure is at least as thick as the original, and the mattress meets the other applicable requirements for play yard mattresses. This change, along with the requirement that the mattress must lay flat on the play yard support structure (above), ensures that after-market play yard mattresses with a different support structure as the OEM mattress will still have a similar level of support. Staff finds this change will have no impact on safety, and therefore, will be an adequate replacement for the floor support structure requirements originally in section 5.9.1.1.

7. ASTM added the following requirement in section 5.9.1.5: "If the original equipment mattress includes storage accommodations for the product instruction manual, the aftermarket mattress shall provide equivalent storage accommodations for the product instruction manual."
    a. This is a new requirement for after-market mattresses to have equivalent storage accommodations for instructions as the OEM mattress. ESHF staff finds this change to be appropriate, as it increases the likelihood of consumers keeping readily accessible the product's instruction manual, which may have important safety information.[42]

For the draft final rule, staff agrees with ASTM's rationale and supports these seven changes in ASTM F2933 – 21, except where the changes conflict with staff's recommendations to separate the requirements for play yards from the requirements for non-full-size crib mattresses. In particular, staff's proposed change to section 5.7.2 (discussed in Section VI A above) already refers to the ASTM F406 *Crib Side Height* requirement for non-full-size cribs.

For the Commission to maintain version control of the referenced requirements for play yard mattresses, staff recommends changing the reference from ASTM F406 to the applicable regulation, 16 CFR part 1221, Safety Standard for Play Yards. Staff also recommends the reference for play yard mattresses used in a bassinet of a play yard with a bassinet attachment be

[42] Personal communication with Stephen Harsanyi (ESHF) on July 8, 2021.



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changed from ASTM F2194, Consumer Safety Specification for Bassinets and Cradles, to 16 CFR part 1218, Safety Standard for Bassinets and Cradles.

Appendix A outlines staff's proposed changes to section 5.9 of ASTM F2933 – 21.

## VII. Conclusion

ESMC staff reviewed the incident data and evaluated whether ASTM F2933 – 21, or other international standards, addressed the identified hazard patterns for crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs. Staff recommends that the draft final rule incorporate by reference ASTM F2933 – 21, with modifications consistent with the modifications proposed in the NPR, as a mandatory standard for crib mattresses. Staff has clarified several sections in the draft final rule from the NPR, based on public comments and feedback received during staff's work with the ASTM crib mattress subcommittee. To further reduce the risk of injury associated with crib mattresses, staff recommends that the draft final rule include the three additional test methods discussed in Section V above, all of which were proposed in the NPR, as part of the mandatory standard for crib mattresses. These three test methods are:

1. Mattress Compression Test, which involves placing a fitted sheet on a full-size crib mattress and measuring the gap between its corners and the projected corner of the crib. This test would address hazardous gaps created between the edge of a crib and the mattress.

2. Mattress Firmness Test, which addresses excessively soft mattress surfaces for all crib mattresses within the scope of the standard that could indent and become an asphyxiation hazard. This test is based on the method used in sections 6 and 8 of the Australian/New Zealand Standard 8811.1:2013 – *Methods of testing infant products.*

3. Mattress Cyclic Loading Test, which addresses lacerations due to exposed coil springs.

Staff also recommends modifications to extend dimensional requirements to include all after-market non-full-size crib mattresses, and, as discussed in Tab D, modifications to the safety instructions.



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**Appendix A: ESMC Staff's Recommended Revisions to the 2020 Crib Mattress NPR**

Below are ESMC staff's recommendations from the 2020 crib mattress NPR; the revised voluntary standard ASTM F2933 – 21; and staff's clarifications for the draft final rule. For this comparison, staff presents ASTM F2933 – 21 and staff's draft final rule, compared to the 2020 crib mattress NPR as a baseline. Staff underlined additions to the NPR, and single struck-through deletions.

ASTM F2933 – 21, Section 3. Definitions

| 2020 Crib Mattress NPR | ASTM F2933 – 21 | Staff's Draft Final Rule |
|---|---|---|
| 3.1.11 *sleep surface* - The product component, or group of components, providing the horizontal plane, or nearly horizontal plane (≤ 10°), intended to support an infant during sleep. | ~~3.1.11 *sleep surface* - The product component, or group of components, providing the horizontal plane, or nearly horizontal plane (≤ 10°), intended to support an infant during sleep.~~ | [No Change from NPR] |

ASTM F2933 – 21, Section 5. General Requirements

| 2020 Crib Mattress NPR | ASTM F2933 – 21 | Staff's Draft Final Rule |
|---|---|---|
| 5.7.1.1 *Mattress Size*-The dimensions of a full-size crib mattress shall measure at least 27¼ in. (690 mm) wide and 51 ⅝ in. (1310 mm) long. When the mattress is placed against the perimeter and in the corner of the crib, the corner gap shall not exceed 1.75 in. (44.5 mm). Dimensions shall be tested in accordance with 6.2. | 5.7.1.1 *Mattress Size*-The dimensions of a full-size crib mattress shall measure at least 27¼ in. (690 mm) wide and 51 ⅝ in. (1310 mm) long~~. When the mattress is placed against the perimeter and in the corner of the crib, the corner gap shall not exceed 1.75 in. (44.5 mm). Dimensions shall be~~ when tested in accordance with 6.2. | 5.7.1.1 *Mattress Size*-The dimensions of a full-size crib mattress shall measure at least 27¼ in. (690 mm) wide and 51 ⅝ in. (1310 mm) long. When the mattress with the test mattress sheet is placed against the perimeter and in the corner of the crib, the corner gap shall not exceed ~~1.75 in. (44.5 mm)~~3.15 in. (80.0 mm). Dimensions shall be tested in accordance with 6.2. |
| 5.7.2 *Non-Full-Size Crib Mattresses:*<br>5.7.2.1 *Mattress supplied with a non-full-size crib*: shall meet the specifications of *Mattresses for Rigid sided products* of Consumer Safety Specification F406 | 5.7.2 *Non-Full-Size Crib Mattresses:*<br>5.7.2.1 ~~*Mattress supplied with a non-full-size crib*: shall meet the specifications of *Mattresses for Rigid sided products* of Consumer Safety Specification F406~~ | 5.7.2 *Non-Full-Size Crib Mattresses:*<br>For the purposes of this section, the term "product" refers to a non-full-size crib.<br>5.7.2.1 *Mattress supplied with a non-full-size crib*: shall meet the specifications of |



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| 2020 Crib Mattress NPR | ASTM F2933 – 21 | Staff's Draft Final Rule |
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| when tested with the non-full-size crib product with which it is supplied.<br>5.7.2.2 *After-market mattresses for non-full-size cribs:* shall be treated as though the mattresses were "the mattress supplied with a non-full-size crib" and shall meet the specifications of *Mattresses for Rigid sided products* in Consumer Safety Specification F406, when tested to the equivalent interior dimension of the product for which it is intended to be used. | ~~when tested with the non-full-size crib product with which it is supplied.~~<br>*Mattress Size*-The dimensions of a mattress supplied with a non-full-size baby crib shall be such that the mattress, when inserted in the center of the crib, in a noncompressed state at any of the adjustable positions of the mattress support, shall not leave a gap of more than ½ in. (12.7 mm) at any point between the perimeter of the mattress and the perimeter of the crib. When the mattress is placed against the perimeter of the crib, the resulting gap shall not exceed 1.0 in. (25.4 mm).<br>5.7.2.2 ~~*After-market mattresses for non-full-size cribs:* shall be treated as though the mattresses were "the mattress supplied with a non-full-size crib" and shall meet the specifications of *Mattresses for Rigid sided products* in Consumer Safety Specification F406, when tested to the equivalent interior dimension of the product for which it is intended to be used.~~ *Mattress Thickness:*<br>*(1)* A mattress supplied with a non-full-size crib shall, in a noncompressed state, have a thickness that will provide a minimum effective crib-side height dimension of at least 20 in. (508 mm) as measured from the upper surface of the crib side or end panel. For this | *Stability*; *Cord/Strap Length*; *Mattresses for Rigid sided products*; and *Crib Side Height* of ~~Consumer Safety Specification F406~~ 16 CFR part 1220, Safety Standard for Non-Full-Size Baby Cribs, when tested with the ~~non-full-size crib~~ product with which it is supplied.<br>5.7.2.2 *After-market mattresses for non-full-size cribs:* shall be treated as though the mattresses were "the mattress supplied with a non-full-size crib" and shall meet the specifications of *Stability*; *Cord/Strap Length*; *Mattresses for Rigid sided products*; and *Crib Side Height* in ~~Consumer Safety Specification F406~~16 CFR part 1220, Safety Standard for Non-Full-Size Baby Cribs, when tested to the equivalent interior dimension of the product for which it is intended to be used.<br>5.7.2.3 The after-market mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the product mattress support structure.<br>5.7.2.4 If the original equipment mattress includes a floor support structure, the after-market mattress must include a floor support structure that is at least as thick as the original equipment mattress floor support structure. |



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| | measurement, the crib side shall be in its lowest adjustable position.<br>*(2)* A mattress supplied with a non-full-size crib shall, in a noncompressed state, have a thickness that will provide a minimum effective crib-side height dimension of at least 3 in. (76 mm) as measured from the upper surface of the mattress to the upper surface of the crib side or end panel. For this measurement, the crib side shall be in its lowest adjustable position and the mattress support in its highest adjustable position. | 5.7.2.5 If the original equipment mattress includes storage accommodations for the product instruction manual, the after-market mattress shall provide equivalent storage accommodations for the product instruction manual.<br><br>[Rationale: Update to requirements for after-market non-rectangular non-full-size cribs in ASTM F2057 – 21 section 5.9, moved to this section to be consistent with recommendations in NPR.] |
| 5.9 *After-Market Mattress for Play Yard*<br>5.9.1 *For Mesh/Fabric Sided Play Yard Products*<br>5.9.1.1 The mattress shall have the same (within ¼ in., 6.4 mm) thickness, floor support structure, and attachment method as the mattress it is intended to replace.<br>5.9.1.2 The mattress shall meet the specifications of the following sections of Consumer Safety Specification F406 when tested with each brand and model of product it is intended to replace: *Mattress, Mattress Vertical Displacement*.<br>5.9.1.3 If the after-market mattress is intended to be used in the bassinet of a play yard with a bassinet attachment, the mattress shall also meet the specifications of the following sections of Consumer | 5.9 *After-Market Mattress for Play Yard and Non-Full Size Crib*—For the purposes of this section, the term product refers to a play yard or non-full-size crib.<br>5.9.1 *For Mesh/Fabric Sided Products and Rigid Sided Non-Rectangular Products:*<br>5.9.1.1 ~~The mattress shall have the same (within ¼ in., 6.4 mm) thickness, floor support structure, and attachment method as the mattress it is intended to replace.~~<br>~~5.9.1.2~~ The aftermarket mattress and product it is tested in shall meet the ~~specifications~~ applicable requirements of the following sections of Consumer Safety Specification F406 when tested with each brand and model of product for which it is intended to replace the mattress: *Stability*; | 5.9 *After-Market Mattress for Play Yard*— For the purposes of this section, the term "product" refers to a play yard.<br>5.9.1 *For Mesh/Fabric Sided Play Yard Products*<br>5.9.1.1 ~~The mattress shall have the same (within ¼ in., 6.4 mm) thickness, floor support structure, and attachment method as the mattress it is intended to replace.~~<br>~~5.9.1.2~~ The after-market mattress and product it is tested in shall meet the ~~specifications~~ applicable requirements of the following sections of ~~Consumer Safety Specification F406~~16 CFR part 1221, Safety Standard for Play Yards, when tested with each brand and model of product for which it is intended to replace the mattress: *Stability*; *Cord/Strap Length*; |



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| Safety Specification F2194 when tested with each brand and model it is intended to replace: *Pad Thickness for Fabric or Mesh Sided Products; Pad dimensions; Side Height; Bassinets with Segmented Mattresses*.<br>This section (5.9.1.3) applies only to a play yard mattress that is interchangeably used as a play yard mattress and as a bassinet mattress / pad. | *Cord/Strap Length*; *Mattress; Mattresses for Rigid sided products; Crib Side Height; Height of Sides; Floor Strength; Mattress Vertical Displacement*.<br>~~5.9.1.3~~ 5.9.1.2 If the after-market mattress is intended to be used in the bassinet of a play yard with a bassinet attachment, the mattress shall also meet the specifications of the following sections of Consumer Safety Specification F2194 when tested with each brand and model for which it is intended to replace the mattress: *Pad Thickness for Fabric or Mesh Sided Products; Pad dimensions; Side Height; Bassinets with Segmented Mattresses*.<br>This section (~~5.9.1.3~~) applies only to a play yard mattress that is interchangeably used as a play yard mattress and as a bassinet ~~mattress / pad~~ mattress/pad.<br>5.9.1.3 The aftermarket mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the play yard mattress support structure or floor.<br>5.9.1.4 If the original equipment mattress includes a floor support structure, the aftermarket mattress must include a floor support structure that is at least as thick as the original equipment mattress floor support structure. | *Mattress; Height of Sides; Floor Strength; Mattress Vertical Displacement*.<br>~~5.9.1.3~~ 5.9.1.2 If the after-market mattress is intended to be used in the bassinet of a play yard with a bassinet attachment, the mattress shall also meet the specifications of the following sections of ~~Consumer Safety Specification F2194~~16 CFR part 1218, Safety Standard for Bassinets and Cradles, when tested with each brand and model for which it is intended to replace the mattress: *Pad Thickness for Fabric or Mesh Sided Products; Pad dimensions; Side Height; Bassinets with Segmented Mattresses*.<br>This section (~~5.9.1.3~~) applies only to a play yard mattress that is interchangeably used as a play yard mattress and as a bassinet ~~mattress / pad~~ mattress/pad.<br>5.9.1.3 The after-market mattress must be at least the same size as the original equipment mattress or larger and lay flat on the floor of the product, in contact with the play yard mattress support structure or floor.<br>5.9.1.4 If the original equipment mattress includes a floor support structure, the after-market mattress must include a floor support structure that is at least as thick as the original equipment mattress floor support structure. |



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| | 5.9.1.5 If the original equipment mattress includes storage accommodations for the product instruction manual, the aftermarket mattress shall provide equivalent storage accommodations for the product instruction manual. | 5.9.1.5 If the original equipment mattress includes storage accommodations for the product instruction manual, the after-market mattress shall provide equivalent storage accommodations for the product instruction manual.<br><br>[Rationale: the changes in ASTM F2933 – 21 allow for greater flexibility in aftermarket mattress designs, so long as those mattresses meet applicable requirements in ASTM F406 (*i.e.* 16 CFR 1221) and share other similarities with the OEM mattress.] |
| 5.10 Mattress Firmness | ~~5.10 Mattress Firmness~~ | [No Change from NPR] |
| 5.10.1 All crib mattresses within the scope of this standard, when tested in accordance with 6.3, the feeler arm shall not contact the sleep surface of the crib mattress. | ~~5.10.1 All crib mattresses within the scope of this standard, when tested in accordance with 6.3, the feeler arm shall not contact the sleep surface of the crib mattress.~~ | |
| 5.11 Coil Springs | ~~5.11 Coil Springs~~ | [No Change from NPR] |
| The requirements in this section only pertain to crib mattresses with coil springs. | ~~The requirements in this section only pertain to crib mattresses with coil springs.~~ | [No Change from NPR] |
| 5.11.1 When tested in accordance with 6.4, there shall be no exposed coil springs or metal wires. | ~~5.11.1 When tested in accordance with 6.4, there shall be no exposed coil springs or metal wires.~~ | [No Change from NPR] |

ASTM F2933 – 21, Section 6. Test Methods



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| 6.2.2 *Test Equipment-Mattress Sheet:*<br>6.2.2.1 The mattress sheet shall be 100% cotton and fitted for the mattress to be tested.<br>6.2.2.2 The mattress sheet shall be washed in hot water (50° C [122° F] or higher) and dried a minimum of two times on the highest setting using household textile laundering units. This shall be the test mattress sheet. | 6.2.2 *Test Method* ~~Test Equipment-Mattress Sheet~~*:*<br>~~6.2.2.1 The mattress sheet shall be 100% cotton, and fitted for the mattress to be tested.~~<br>~~6.2.2.2 The mattress sheet shall be washed in hot water (50° C [122° F] or higher) and dried a minimum of two times on the highest setting using household textile laundering units. This shall be the test mattress sheet.~~ | [No Change from NPR] |
| 6.2.3 *Test Method:*<br>6.2.3.1 Place the mattress into the mattress measuring box so it is touching Walls C and D. | ~~6.2.2 *Test Method:*~~<br>~~6.2.3.1~~ 6.2.2.1 Place the mattress into the mattress measuring box so it is touching Walls C and D. | [No Change from NPR] |
| 6.2.3.2 To Position the mattress in the measuring box, gradually apply a 7lbf (31.1 N) force to Panel A. Release this force. Then gradually apply a 14 lbf (62.3 N) force to Panel B. Release this force. | ~~6.2.3.2~~ 6.2.2.2 To Position the mattress in the measuring box, gradually apply a 7 lbf (31.1 N) force to Panel A. Release this force. Then gradually apply a 14 lbf (62.3 N) force to Panel B. Release this force. | [No Change from NPR] |
| 6.2.3.3 Apply a 7 ± 1 lbf (31 ± 4.4 N) force to panel A within a period of 5 s. Within 30 s of application of the force to Panel A, and while maintaining this force, apply a 14 ± 1 lbf (62.3 ± 4.4 N) force to Panel B within a period of 5 s. | ~~6.2.3.3~~ 6.2.2.3 Apply a 7 lbf ± 1 lbf (31 N ± 4.4 N) force to panel A within a period of 5 s. Within 30 s of application of the force to Panel A, and while maintaining this force, apply a 14 lbf ± 1 lbf (62.3 N ± 4.4 N) force to Panel B within a period of 5 s. | 6.2.3.3 Apply a 7 lbf ± 1 lbf (31 N ± 4.4 N) force to panel A within a period of 5 s. Within 30 s of application of the force to Panel A, and while maintaining this force, apply a 14 lbf ± 1 lbf (62.3 N ± 4.4 N) force to Panel B within a period of 5 s.<br><br>[Rationale: editorial change for consistent presentation of units. Otherwise no change from NPR.] |
| 6.2.3.4 Apply the forces from 6.2.2.3 for 60 s. With forces still applied, measure the | ~~6.2.3.4~~ 6.2.2.4 Apply the forces from 6.2.2.3 for 60 s. With forces still applied, | [No Change from NPR] |



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| length and width of the interior dimension measured from the horizontal midpoints of Panel A to Wall C (length) and Panel B to Wall D (width). These measurements are to be considered the mattress dimensions. | measure the length and width of the interior dimension measured from the horizontal midpoints of Panel A to Wall C (length) and Panel B to Wall D (width). These measurements are to be considered the mattress dimensions. | |
| 6.2.3.5 Measure the shortest gap between the mattress and the mattress measuring box at the corner adjoining Walls C and D after the dimensions of the mattress have been recorded. The mattress shall not be moved before or during measurement. This shall be the corner gap measurement.<br>6.2.3.6 Rotate the mattress 180° such that the opposing corner is adjacent to Walls C and D, then repeat 6.2.3.2 and 6.2.3.5.<br>6.2.3.7 The test mattress sheet shall be placed on the mattress such that each sheet edge is wrapped fully around and under the mattress.<br>6.2.3.8 The mattress with test mattress sheet shall be measured following steps 6.2.3.1 through 6.2.3.6. The mattress dimensions shall meet the requirements in 5.7. | ~~6.2.3.5 Measure the shortest gap between the mattress and the mattress measuring box at the corner adjoining Walls C and D after the dimensions of the mattress have been recorded. The mattress shall not be moved before or during measurement. This shall be the corner gap measurement.~~<br>~~6.2.3.6 Rotate the mattress 180° such that the opposing corner is adjacent to Walls C and D, then repeat 6.2.3.2 and 6.2.3.5.~~<br>~~6.2.3.7 The test mattress sheet shall be placed on the mattress such that each sheet edge is wrapped fully around and under the mattress.~~<br>~~6.2.3.8 The mattress with test mattress sheet shall be measured following steps 6.2.3.1 through 6.2.3.6. The mattress dimensions shall meet the requirements in 5.7.~~ | 6.2.3.5 ~~Measure the shortest gap between the mattress and the mattress measuring box at the corner adjoining Walls C and D after the dimensions of the mattress have been recorded. The mattress shall not be moved before or during measurement. This shall be the corner gap measurement.~~<br>~~6.2.3.6 Rotate the mattress 180° such that the opposing corner is adjacent to Walls C and D, then repeat 6.2.3.2 and 6.2.3.5.~~<br>~~6.2.3.7~~ The test mattress sheet shall be placed on the mattress such that each sheet edge is wrapped fully around and under the mattress.<br>~~6.2.3.8 The mattress with test mattress sheet shall be measured following steps 6.2.3.1 through 6.2.3.6. The mattress dimensions shall meet the requirements in 5.7.~~<br>6.2.3.6 Repeat step 6.2.3.2. Then measure the shortest gap between the mattress and the projected crib corner after the dimensions of the mattress have been recorded. The projected crib corner is located 53 in. ± 1/8 in. (1346 mm ± 3.2 mm) from Wall C and 28 5/8 in. ± 1/8 in. |



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| | | (727 mm ± 3.2 mm) from Wall D, as shown in Fig. 2. The mattress shall not be moved during measurement. This shall be the corner gap measurement.<br>6.2.3.7 Rotate the mattress 180° such that the opposing corner is adjacent to Walls C and D, then repeat 6.2.3.6.<br><br>[Rationale: the revised test uses projected crib dimensions to measure the corner gap, and separates the corner gap measurement from other dimension measurements to focus on hazardous corner gaps.] |
| 6.3 Mattress Firmness | ~~6.3 Mattress Firmness~~ | [No Change from NPR] |
| 6.3.1 *Test Fixture*<br>6.3.1.1 The fixture, as shown in Fig. 2, shall be a rigid, robust object with a round footprint of diameter 203 ±1 mm, and an overall mass of 5200 ±20 g. The lower edge of the fixture shall have a radius not larger than 1 mm. Overhanging the footprint by 40 ±2 mm shall be a flexible, flat bar of width 12 ±0.2 mm with square-cut ends. This bar may be fashioned from a shortened hacksaw blade. The bar shall rest parallel to the bottom surface of the fixture and shall be positioned at a height of 15 ±0.2 mm above the bottom surface of the fixture. The bar shall lay directly over a radial axis of the footprint (i.e. such that a longitudinal centerline of the bar | ~~6.3.1 *Test Fixture*~~<br>~~6.3.1.1 The fixture, as shown in Fig. 2, shall be a rigid, robust object with a round footprint of diameter 203 ±1 mm, and an overall mass of 5200 ±20 g. The lower edge of the fixture shall have a radius not larger than 1 mm. Overhanging the footprint by 40 ±2 mm shall be a flexible, flat bar of width 12 ±0.2 mm with square-cut ends. This bar may be fashioned from a shortened hacksaw blade. The bar shall rest parallel to the bottom surface of the fixture and shall be positioned at a height of 15 ±0.2 mm above the bottom surface of the fixture. The bar shall lay directly over a radial axis of the footprint (i.e. such that a longitudinal centerline of the bar~~ | 6.3.1 *Test Fixture*<br>6.3.1.1 The fixture, as shown in Fig. ~~2~~3, shall be a rigid, robust object with a round footprint of diameter 203 mm ±1 mm, and an overall mass of 5200 g ± 20 g. The lower edge of the fixture shall have a radius not larger than 1 mm. Overhanging the footprint by 40 mm ± 2 mm shall be a flexible, flat bar of width 12 mm ± 0.2 mm with square-cut ends. This bar may be fashioned from a shortened hacksaw blade. The bar shall rest parallel to the bottom surface of the fixture and shall be positioned at a height of 15 mm ± 0.2 mm above the bottom surface of the fixture. The bar shall lay directly over a radial axis of the footprint (i.e. such that a |



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| would pass over the center of the footprint). | ~~would pass over the center of the footprint).~~ | longitudinal centerline of the bar would pass over the center of the footprint).<br><br>[Rationale: Update to figure numbers due to figure added in a previous section, and editorial change to units for consistency. Otherwise, no change from NPR.] |
| 6.3.1.2 Included on the fixture, but not overhanging the footprint, shall be a linear level that is positioned on a plane parallel to the bar, and in a direction parallel to the bar.<br>6.3.1.3 Other parts of the fixture, including any handle arrangement and any clamping arrangement for the bar, shall not comprise more that 30% of the total mass of the fixture, and shall be mounted as concentric and as low as possible.<br>6.3.2 *Test Method:*<br>6.3.2.1 Mattresses that are supplied with a product shall be tested when positioned on that product. Mattresses, sold independent of a product, shall be tested on a flat, rigid, horizontal support. After-market mattresses for play yards and non-full-size cribs shall be tested with each brand and model of product it is intended to replace.<br>6.3.2.2 Where a user of a mattress could possibly position either side face up, even if this is not an intended use, then both sides of the mattress shall be tested. | ~~6.3.1.2 Included on the fixture, but not overhanging the footprint, shall be a linear level that is positioned on a plane parallel to the bar, and in a direction parallel to the bar.~~<br>~~6.3.1.3 Other parts of the fixture, including any handle arrangement and any clamping arrangement for the bar, shall not comprise more that 30% of the total mass of the fixture, and shall be mounted as concentric and as low as possible.~~<br>~~6.3.2 *Test Method:*~~<br>~~6.3.2.1 Mattresses that are supplied with a product shall be tested when positioned on that product. Mattresses, sold independent of a product, shall be tested on a flat, rigid, horizontal support. After-market mattresses for play yards and non-full-size cribs shall be tested with each brand and model of product it is intended to replace.~~<br>~~6.3.2.2 Where a user of a mattress could possibly position either side face up, even if this is not an intended use, then both sides of the mattress shall be tested.~~ | [No Change from NPR] |



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| 6.3.2.3 Before testing each mattress, the following steps shall be followed:<br>(1) Verify there is no excess moisture in the mattress, beyond reasonable laboratory humidity levels.<br>(2) Allow sufficient time per the manufacturer's instructions to fully inflate, if shipped in a vacuum sealed package.<br>(3) Shake and or agitate the mattress in order to fully aerate and distribute all internal components evenly.<br>(4) Place the mattress in the manufacturer's recommended use position if there is one, in the supplied product, or on a flat, rigid, horizontal support.<br>(5) Let the mattress rest for at least 5 minutes.<br>(6) Mark a longitudinal centerline on the mattress sleep surface, and divide this line in half. This point will be the first test location. Then further divide the two lines on either side of the first test location into halves. These will be the second and third test locations.<br>6.3.2.4 Position the test fixture on each of the test locations, with the footprint of the fixture centered on the location, with the bar extending over the centerline and always pointing at the same end of the mattress sleep surface. | ~~6.3.2.3 Before testing each mattress, the following steps shall be followed:~~<br>~~(1) Verify there is no excess moisture in the mattress, beyond reasonable laboratory humidity levels.~~<br>~~(2) Allow sufficient time per the manufacturer's instructions to fully inflate, if shipped in a vacuum sealed package.~~<br>~~(3) Shake and or agitate the mattress in order to fully aerate and distribute all internal components evenly.~~<br>~~(4) Place the mattress in the manufacturer's recommended use position if there is one, in the supplied product, or on a flat, rigid, horizontal support.~~<br>~~(5) Let the mattress rest for at least 5 minutes.~~<br>~~(6) Mark a longitudinal centerline on the mattress sleep surface, and divide this line in half. This point will be the first test location. Then further divide the two lines on either side of the first test location into halves. These will be the second and third test locations.~~<br>~~6.3.2.4 Position the test fixture on each of the test locations, with the footprint of the fixture centered on the location, with the bar extending over the centerline and always pointing at the same end of the mattress sleep surface.~~ | |



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| (1) At each test location in turn, rotate the bar to point in the required direction, and gently set the fixture down on the mattress sleep surface, ensuring that the footprint of the fixture does not extend beyond the edge of the mattress. The fixture shall be placed as horizontal as possible, using the level to verify. If the bar makes contact with the top of the mattress sleep surface, even slightly, the mattress is considered to have failed the test.<br>(2) Repeat Step (1) at the remaining locations identified in 6.3.2.3(6).<br>(3) Repeat Step (1) at a location away from the centerline most likely to fail (*e.g.* a very soft spot on the sleep surface or at a raised portion of the sleep surface). In the case of testing a raised portion of a sleep surface, position center of the fixture such that the bar is over the raised portion, to simulate the position of an infant's nose.<br>In the event that the fixture is not resting in a nearly horizontal orientation, repeat the test procedure at that location by beginning again from Step (1) above. However, if the test produces a fail even with the device tilted back away from the | ~~(1) At each test location in turn, rotate the bar to point in the required direction, and gently set the fixture down on the mattress sleep surface, ensuring that the footprint of the fixture does not extend beyond the edge of the mattress. The fixture shall be placed as horizontal as possible, using the level to verify. If the bar makes contact with the top of the mattress sleep surface, even slightly, the mattress is considered to have failed the test.~~<br>~~(2) Repeat Step (1) at the remaining locations identified in 6.3.2.3(6).~~<br>~~(3) Repeat Step (1) at a location away from the centerline most likely to fail (*e.g.* a very soft spot on the sleep surface or at a raised portion of the sleep surface). In the case of testing a raised portion of a sleep surface, position center of the fixture such that the bar is over the raised portion, to simulate the position of an infant's nose.~~<br>~~In the event that the fixture is not resting in a nearly horizontal orientation, repeat the test procedure at that location by beginning again from Step (1) above. However, if the test produces a fail even with the device tilted back away from the~~ | |



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| bar so as to raise it, then a fail can be recorded. | ~~bar so as to raise it, then a fail can be recorded.~~ | |
| 6.4 Coil Spring Test | ~~6.4 Coil Spring Test~~ | [No Change from NPR] |
| 6.4.1 General—This test consists of dropping a specified weight repeatedly onto the mattress. The test assists in evaluating the structural integrity of a mattress with coil springs. | ~~6.4.1 General—This test consists of dropping a specified weight repeatedly onto the mattress. The test assists in evaluating the structural integrity of a mattress with coil springs.~~ | [No Change from NPR] |
| 6.4.2 Test Fixture: | ~~6.4.2 Test Fixture:~~ | [No Change from NPR] |
| 6.4.2.1 A guided free-fall impacting system machine (which keeps the upper surface of the impact mass parallel to the horizontal surface on which the crib is secured) (See Fig. 3). | ~~6.4.2.1 A guided free-fall impacting system machine (which keeps the upper surface of the impact mass parallel to the horizontal surface on which the crib is secured) (See Fig. 3).~~ | 6.4.2.1 A guided free-fall impacting system machine (which keeps the upper surface of the impact mass parallel to the horizontal surface on which the crib is secured) (See Fig. ~~3~~4). |
| 6.4.2.2 A 30-lb (13.6-kg) impact mass (see Fig. 4 and Fig.5). | ~~6.4.2.2 A 30-lb (13.6-kg) impact mass (see Fig. 4 and Fig.5).~~ | 6.4.2.2 A 30-lb (13.6-kg) impact mass (see ~~Fig. 4~~Fig. 5 and Fig. ~~5~~6). |
| 6.4.2.3 A 6-in. (150-mm) long gauge. | ~~6.4.2.3 A 6-in. (150-mm) long gauge.~~ | [No Change from NPR] |
| 6.4.2.4 An enclosed frame measuring 29 inches by 53 inches (737 mm by 1346 mm) for the purpose of restricting mattress movement. When testing full-size mattresses, a full-size crib meeting the requirements of ASTM F1169-19 would suffice. | ~~6.4.2.4 An enclosed frame measuring 29 inches by 53 inches (737 mm by 1346 mm) for the purpose of restricting mattress movement. When testing full-size mattresses, a full-size crib meeting the requirements of ASTM F1169-19 would suffice.~~ | [No Change from NPR] |
| 6.4.2.5 a ¾" piece of plywood or OSB that is rigidly supported along the perimeter. | ~~6.4.2.5 a ¾" piece of plywood or OSB that is rigidly supported along the perimeter.~~ | 6.4.2.5 a ¾" piece of plywood or oriented strand board (OSB) that is rigidly supported along the perimeter.<br><br>[Rationale: Clarification of "OSB."] |
| 6.4.3 Test Method: | ~~6.4.3 Test Method:~~ | [No Change from NPR] |
| 6.4.3.1 Place the mattress on the wooden support and inside the enclosed frame. | ~~6.4.3.1 Place the mattress on the wooden support and inside the enclosed frame.~~ | [No Change from NPR] |



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| 6.4.3.2 Position geometric center of the impact mass above the geometric center of the test mattress. | ~~6.4.3.2 Position geometric center of the impact mass above the geometric center of the test mattress.~~ | [No Change from NPR] |
| 6.4.3.3 Adjust the distance between the top surface of the mattress and bottom surface of the impact mass to 6 in. (150 mm) (using the 6-in. (150-mm) long gauge, per 6.4.2.3) when the impact mass is in its highest position. Lock the impactor mechanism at this height and do not adjust the height during impacting to compensate for any change in distance as a result of the mattress compressing or the mattress support deforming or moving during impacting. | ~~6.4.3.3 Adjust the distance between the top surface of the mattress and bottom surface of the impact mass to 6 in. (150 mm) (using the 6-in. (150-mm) long gauge, per 6.4.2.3) when the impact mass is in its highest position. Lock the impactor mechanism at this height and do not adjust the height during impacting to compensate for any change in distance as a result of the mattress compressing or the mattress support deforming or moving during impacting.~~ | [No Change from NPR] |
| 6.4.3.4 Allow the 30-lb (13.6-kg) impact mass to fall freely 250 times at the rate of one impact every 4 s. Load retraction shall not begin until at least 2 s after the start of the drop. | ~~6.4.3.4 Allow the 30-lb (13.6-kg) impact mass to fall freely 250 times at the rate of one impact every 4 s. Load retraction shall not begin until at least 2 s after the start of the drop.~~ | [No Change from NPR] |
| 6.4.3.5 Repeat the step described in 6.4.3.4 at the other test locations shown in Fig. 6. | ~~6.4.3.5 Repeat the step described in 6.4.3.4 at the other test locations shown in Fig. 6~~ | 6.4.3.5 Repeat the step described in 6.4.3.4 at the other test locations shown in Fig. ~~6~~7. |
| | | 6.4.4 The coil spring test shall be repeated on each surface of the mattress. The test shall not be repeated using a mattress that has been previously tested with the coil spring test.<br><br>[Rationale: require testing both sides to accommodate dual-sided mattress designs.] |



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Figures referenced in Staff's Recommended Revisions to Test Methods:

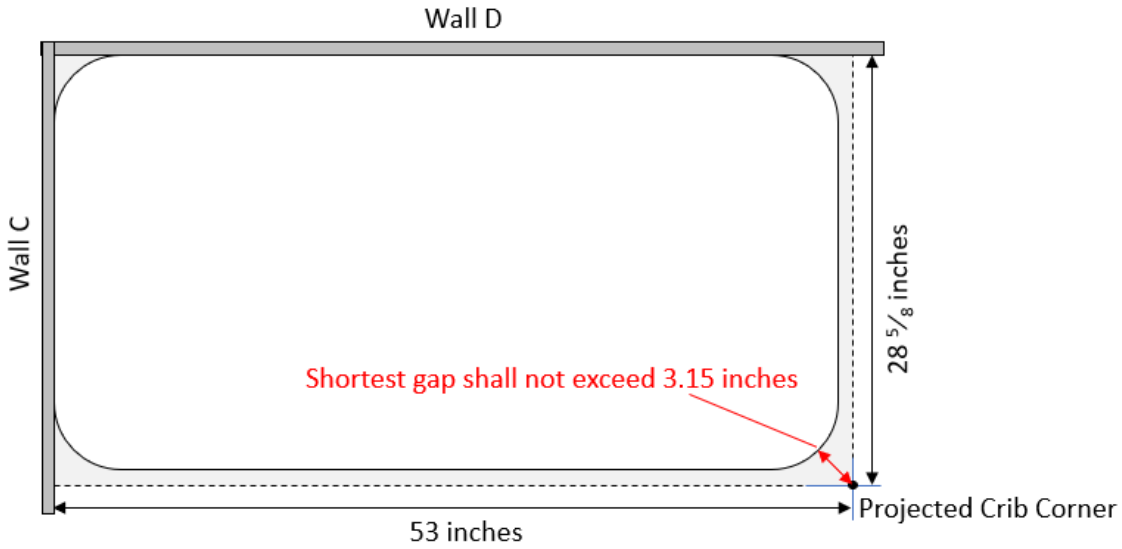


**Figure 2. Projected crib corner and corner gap measurement location**



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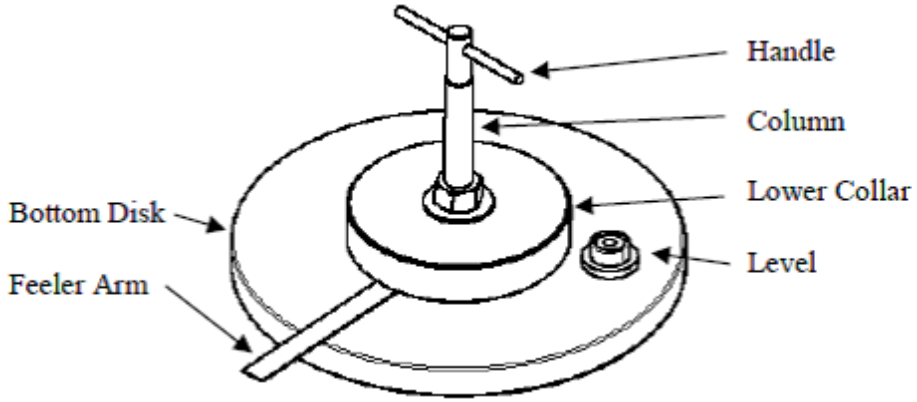


**Figure 3. Firmness Test Fixture Adapted from Australian/New Zealand Standard 8811.1:2013 test apparatus**



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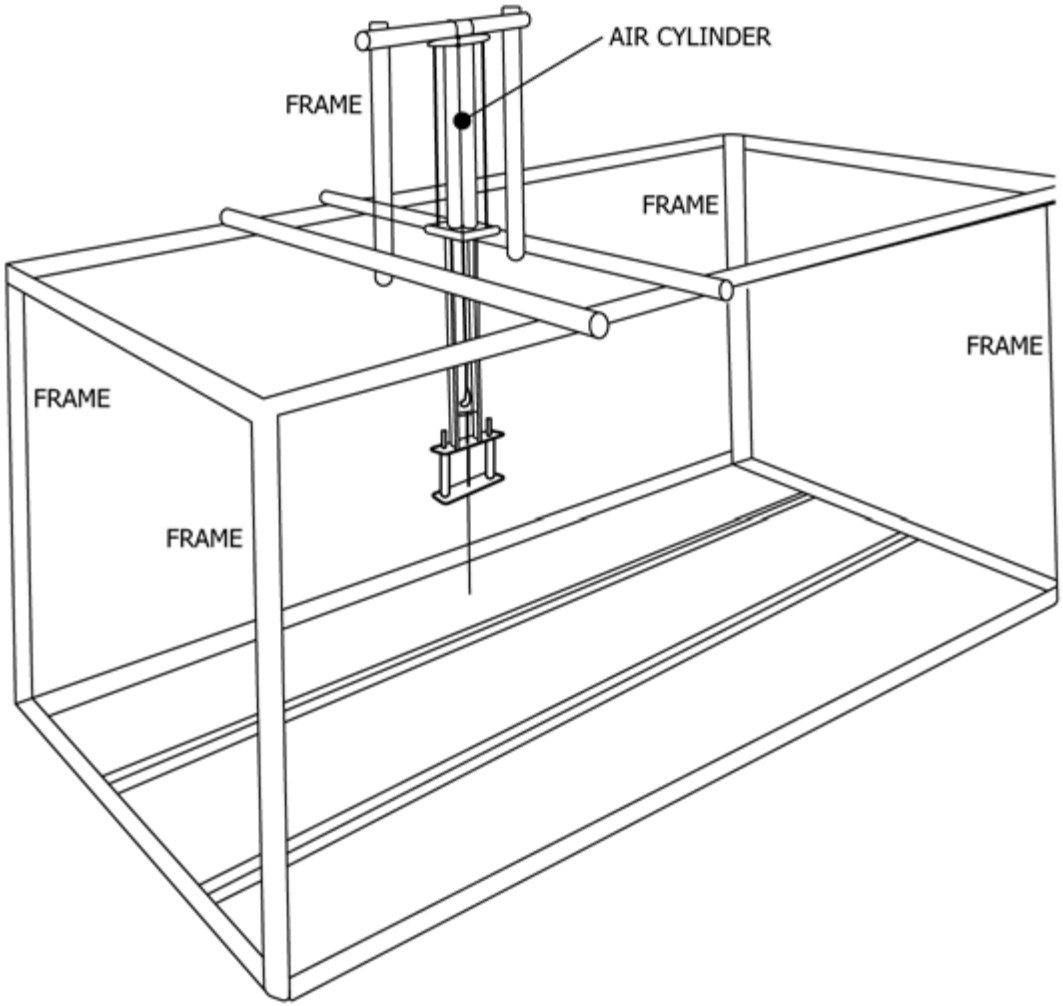


**Figure 4. Typical free fall impacting system[43]**

[43] Reprinted, with permission, from ASTM F1169-19 Standard Consumer Safety Specification for Full-Size Baby Cribs, copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.



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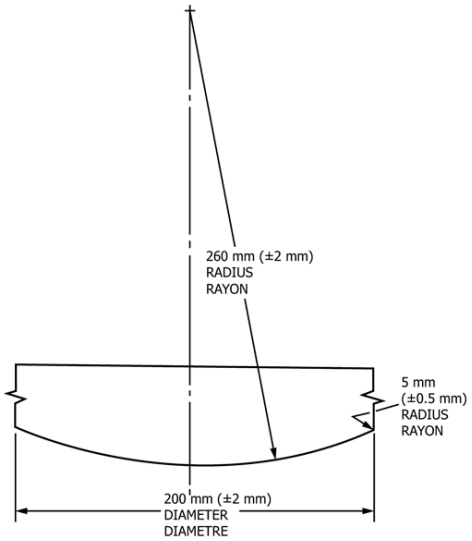


**Figure 5. Profile of Impact mass[43]**

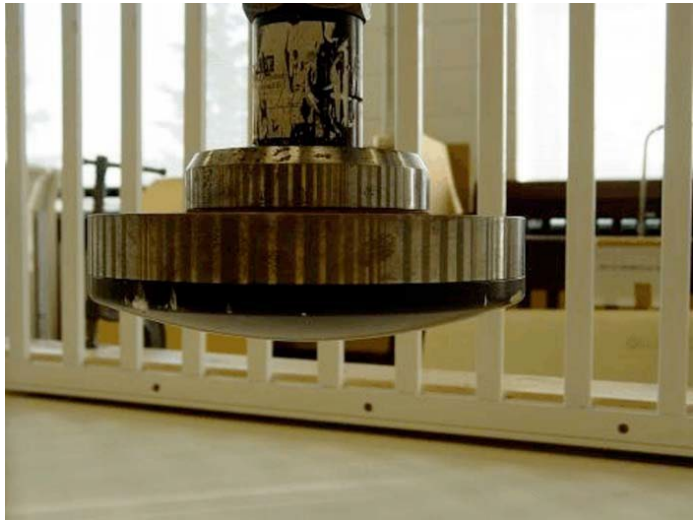

**Figure 6. Photo of typical impact mass[43]**

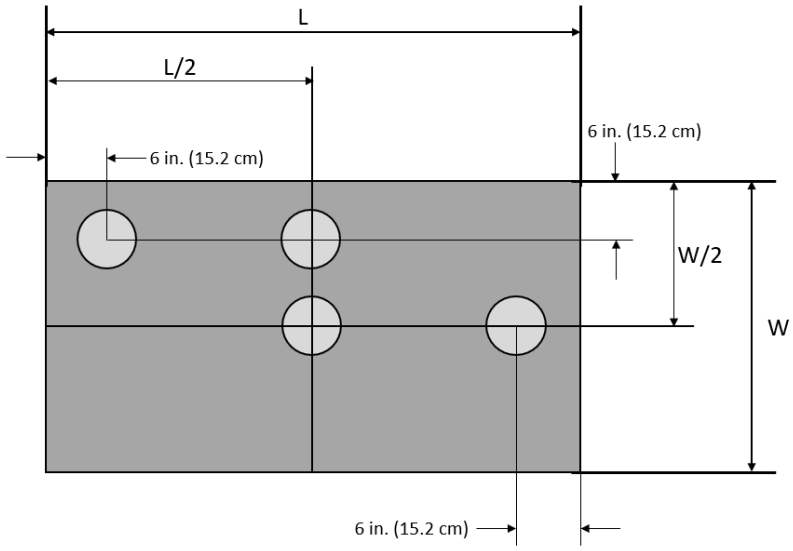


**Figure 7. Impact test locations**



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# TAB D: Draft Final Rule for Crib Mattresses: Human Factors Staff Revised Safety Information Requirements for Crib Mattresses, Non-Full-Size Crib Mattresses, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs (CPSIA Section 104)





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**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MARYLAND 20814**

Memorandum

Date: September 21, 2021

TO: Hope Nesteruk, Children's Program Manager
Division of Mechanical and Combustion Engineering,
Directorate for Engineering Sciences

THROUGH: Mark Kumagai, Associate Executive Director,
Directorate for Engineering Sciences

Rana Balci-Sinha, Director
Division of Human Factors,
Directorate for Engineering Sciences

FROM: Stephen Harsanyi, Engineering Psychologist
Division of Human Factors,
Directorate for Engineering Sciences

SUBJECT: Draft Final Rule for Crib Mattresses: Human Factors Staff Revised Safety Information Requirements for Crib Mattresses, Non-Full-Size Crib Mattresses, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs (CPSIA Section 104)

## I. Introduction

The ASTM International (ASTM) voluntary standard ASTM F2933, *Standard Consumer Safety Specification for Crib Mattresses,* establishes requirements for full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for cribs, play yards, and non-full-size cribs (collectively, "crib mattresses"). These requirements, which pertain to product warning and instructional literature for consumers (collectively, "safety information") and mattress performance, seek to address known and foreseeable hazards such as, but not limited to, sudden unexpected infant death (SUID), chemical concerns, and exposed springs or other sharp objects.

On September 30, 2020, CPSC staff delivered to the Commission a draft notice of proposed rulemaking (NPR) for publication in the *Federal Register*, and a briefing package ("NPR package") that assessed the effectiveness of ASTM F2933 – 19, presenting CPSC staff's draft



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proposed rule on crib mattresses.[44,45] Staff recommended that the Commission publish an NPR that incorporates by reference ASTM F2933 – 19, with revisions to safety information and performance requirements. Staff of CPSC's Directorate for Engineering Sciences, Division of Human Factors (ESHF) focused in the NPR briefing package on supporting performance requirements with safety information requirements in the reduction of the risks of death and serious injury associated with crib mattresses, including SUID related to prone positioning, soft bedding, and gap entrapment. The NPR appeared in the *Federal Register* on October 26, 2020 (16 *Fed. Reg*. 67,906).

In this memorandum, staff reviews relevant ASTM activities since the NPR, and discusses staff's safety information recommendations for the draft final rule.

## II. Discussion

The Commission's NPR on crib mattresses recommended the following changes to the safety information requirements specified in ASTM F2933 – 19:

- Clarifying the definition of "conspicuous" in section 3, *Terminology;*
- Improving marking and labeling requirements in section 7, *Marking and Labeling;* and
- Adding instructional literature requirements in a new section 8, *Instructional Literature*.

Staff explained recommendations in detail in CPSC staff's NPR briefing package. Among other factors, staff's recommendations considered incident data,[46] results from survey[47] and focus group research[48], relevant literature,[49] requirements in ANZI Z535.4,[50] recommendations from the ASTM Ad Hoc Language Task Group,[51] and suggestions from other stakeholders

[44] CPSC Staff's NPR Briefing Package to the Commission: Notice of Proposed Rulemaking – Safety Standard for Crib Mattresses available using the following link: https://cpsc.gov/s3fs-public/Notice-of-Proposed-Rulemaking-Safety-Standard-for-Crib-Mattresses.pdf?mDLf.MBLutFluwt6QFjeZRhYdNLFRR.J.
[45] The Commission's October 26, 2020 published NPR can be accessed here: https://www.govinfo.gov/content/pkg/FR-2020-10-26/pdf/2020-22558.pdf.
[46] The ESHF memorandum in CPSC staff's NPR briefing package details staff's findings regarding the prevalence in incident data of infant prone positioning, soft bedding, and mattress size/corner gaps.
[47] The 2014 "Durable Nursery Products Exposure Survey (DNPES): Final Summary Report," by Westat, details the findings of a survey conducted in 2013, which collected information about durable infant and toddler products.
[48] The 2019 "Consumer Product Safety Commission (CPSC): Caregiver Perceptions and Reactions to Safety Messaging Final Report" (Safety Messaging Report) by Fors Marsh Group, summarizes focus group research and a literature review pertaining to safe sleep practices in various products, including cribs and play yards.
[49] For example, Joyner et al. (2009) as cited in the Safety Messaging Report, posited that caregivers are likely to trust implicitly the safety of products under the misconception that if a product is sold to the public, then it is likely safe to use. Staff finds this common misconception particularly likely with regards to infant products; the greater vulnerability of infants to product hazards is likely to support the expectation of caregivers that infant products are designed to be safe.
[50] ANSI Z535.4, *American National Standard for Product Safety Signs and Labels*, is the primary U.S. voluntary consensus standard for product safety signs and labels.
[51] ASTM juvenile products standards have begun adopting "Ad Hoc" recommendations since 2016, to increase the consistency of on-product warning design among juvenile products, and to address numerous warning format issues



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participating in the ASTM F15.66 subcommittee on crib mattresses and the greater ASTM F15 committee on consumer products.[52] Since the NPR was published, CPSC received comments from the public pertaining to the NPR's safety information requirements. These comments and staff's responses to the comments are provided in Tab A. Two of the comments requested that staff continue collaborative efforts with ASTM to address weaknesses in safety information requirements for crib mattresses. In the following sections, staff discusses these ASTM activities and staff's recommended changes to the NPR to further improve the safety of crib mattresses. See Appendix A for a side-by-side comparison of the NPR, ASTM's latest recommendations, and staff's draft final rule.

### A. ASTM Subcommittee Activities and ASTM F2933

After the NPR was published, staff continued to work with ASTM F15.66 to address deficiencies in the safety information requirements in ASTM F2933. ASTM F15 balloted revised sections of the standard, closing April 12, 2021. The ballot, F15 (21-02), addressed safety information requirements in item 13, *Revision of F2933-2019 Consumer Safety Specification for Crib Mattresses WK72077*. The ballot item received three negative votes. Two negative votes were administrative. One negative vote, submitted by staff on April 6, 2021, included a letter identifying deviations from the NPR (see Appendix B).

On June 9, 2021, ASTM F15.66 reviewed staff's letter, and voted on whether the letter was persuasive. Several attendees shared rationales for some of the substantive deviations from the NPR. Below staff discusses these rationales and provides staff's responses.

1. The NPR includes SIDS in the hazard identifier (*i.e.,* "SIDS AND SUFFOCATION HAZARDS"), which in the balloted version, reads "SUFFOCATION HAZARD." In addition to requesting rationale for this incongruity, staff asked ASTM F15.66 to discuss a public comment on the NPR, which recommends making the hazard identifier active; *i.e.,* "Help Prevent SIDS and Suffocation" (see Tab A). Several ASTM members argued that the hazard identifier should remain as balloted in order to keep the focus on the suffocation hazard, which they believed to be the most important message. ASTM members also claimed that SIDS is already well known, and therefore it does not need to be included in the hazard identifier. As discussed in the NPR package and the ballot letter, staff finds it important to include "SIDS" in the hazard identifier for numerous reasons, including the following: (1) SIDS, in addition to suffocation, is cited frequently in reports of fatal incidents; (2) several statements in the warning label address the SIDS hazard; and (3) SIDS, by definition, is a poorly understood hazard, and consumers are

related to capturing consumer attention, improving readability, and increasing hazard perception and avoidance behavior.

[52] Since May 2018, CPSC staff has been participating in ASTM F15.66 to address the identified hazards. Subcommittee members include manufacturers, safety and health advocacy groups, and other critical stakeholders. Changes to ASTM F2933 proposed by ASTM F15.66 have been balloted by ASTM F15 (see discussion of ASTM Ballot F15 (21-02), below).



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more likely to read the warning message if they know it includes actions by which to limit the risk of SIDS.[53]

2. The NPR prioritizes the prone sleep message, "**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation," directly after the hazard identifier. In the balloted version, this message appears much lower in the warning label (Appendix A). Several ASTM members argued that addressing the suffocation hazard involving soft bedding needs to be the primary thrust of the warnings, and that the prone sleep message should be lower in the warning. Staff's prioritization of the prone sleep message, which is supported by a public comment (Tab A), is important for communicating to consumers the most common hazardous use pattern that staff observed in fatal crib mattress incidents. As detailed in Tabs B and in the NPR package, the majority of the deaths involved prone positioning, often with no other known contributing factors. Staff concludes that the prone sleep message needs to be communicated foremost. The likelihood that consumers will see this critical message will be improved by placing at the top of the warning label a statement that advises against infant prone sleep. Staff does not agree that prioritizing the prone sleep message as proposed in the NPR will make it less likely that consumers will read and follow the messages pertaining to suffocation from soft bedding, which are emphasized in the label; the prone sleep message is followed by a suffocation-specific heading (*i.e.,* "Babies have suffocated") and several statements, including bulleted points, about soft bedding. The NPR-proposed arrangement of warnings increases the likelihood that consumers will be made aware of the SIDS and suffocation hazards in the event that they read only the first half of the label.

3. The NPR includes the following additional requirements for after-market mattresses for rigid-sided, rectangular, non-full-size cribs: (1) All warnings added by the original manufacturer in addition to those required by this standard, (2) assembly/attachment instructions that were provided on the original mattress, and (3) the brand(s) and model(s) number(s) of the product(s) in which the mattress is intended to be used. In the balloted version, these requirements apply only to mesh/fabric-sided products and rigid-sided non-rectangular products. Several ASTM members argued that these warnings are not suitable for after-market mattresses for rigid-sided, rectangular products, claiming that there are standard sizes for rigid-sided rectangular products. Staff does not find this claim to be factual; excluding full-size cribs, there are no official standardized interior dimensions of rigid-sided, rectangular non-full-size cribs. ASTM F406 – 19, the applicable mandatory standard, requires only that the interior length dimension is either greater than 55 in. (139.7 cm) or smaller than 49 3⁄4 in. (126.3 cm), and/or the interior

[53] Detailed in the NPR package, SIDS is a subcategory of SUID that refers to infant deaths that cannot be explained after a thorough case investigation.



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width dimension is greater than 30 5⁄8 in. (77.7 cm) or smaller than 25 3⁄8 in. (64.3 cm). Considering that this subsection of the rule excludes full-size cribs, for the draft final rule staff recommends the NPR-proposed language, thereby ensuring that consumers see the additional information for after-market mattresses for rigid-sided, rectangular, non-full-size cribs (Appendix A).

4. The NPR includes requirements for instructional literature. These requirements are consistent with recommendations from the ASTM Ad Hoc Language Task Group. Several ASTM members argued that instructions are unnecessary for crib mattresses, alleging use of the products is intuitive and that relevant information is provided in the on-product labels. In addition to aligning with Ad Hoc recommendations, given the significance of the hazards, staff finds it important to incorporate another medium, *i.e.,* instructional literature, by which to communicate the SIDS and suffocation hazards to consumers. The NPR package demonstrates through incident data and research involving surveys and focus groups that consumers continue to use crib mattresses in ways contrary to the proposed safety information. Given the inherent limitations of safety information, which depends on persuading consumers to behave differently and perhaps inconveniently (such as repositioning a sleeping infant), staff concludes that using multiple mediums is critical to communicate hazard-avoidance behaviors to consumers to motivate consumer actions.

In the June 9, 2021 meeting, staff raised additional concerns, including the following: (1) the word "product" was used in the balloted item to refer to both crib mattresses and structures (cribs, non-full-size cribs, and play yards), and (2) the balloted item used "should" instead of "shall" in reference to required labeling specifying maximum gaps between the mattress and product sides, and that the reference was made in a "Note," which by definition is not mandatory (see ballot F15 (21-02), item 13, note 7 in Appendix A). The subcommittee agreed that these additional concerns were valid, but determined that the ballot should not be delayed, and that further improvements would be considered in the future. Subcommittee voting members voted on whether staff's negative was non-persuasive, and the motion passed with 11 affirmatives, 1 negative, and 6 abstentions. The full F15 committee upheld the subcommittee's non-persuasive finding on August 2, 2021 (ballot F15 (21-05), item 8). Therefore, a further revision of ASTM F2933 – 21 was approved on September 1, 2021 with publication forthcoming. However, this future revision will remain inconsistent with the Commission's published NPR, and for the reasons detailed in this memorandum, staff does not recommend including this revision in the draft final rule.

ASTM included the following additional deviations in the ballot (F15 (21-02), item 13), which were not sufficiently discussed in the June 9, 2021 meeting. Staff did not receive direct comments on the NPR pertaining to the following deviations; however, consistent with comments on the NPR, which requested that staff consider ongoing ASTM activities, staff assessed whether these deviations added to the safety of the products. One such deviation was placement of the following warning message lower in the label than in the NPR: "DO NOT cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase



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the risk of SIDS." Staff does not find it appropriate to have this important warning towards the bottom of the label, located below a detailed explanation of how to identify hazardous gaps. The label already includes a warning pertaining to gaps above this warning about overheating, and staff reiterates the importance of addressing the hazardous uses early on in the label, as text lower in the label is less likely to be read. Additionally, the layout proposed in the NPR positions the gap measurement message directly above the related interior dimensions message for cribs, and closer to other required statements pertaining to product size.

The balloted item also deviated from the NPR regarding the packaging requirements. The NPR-proposed packaging requirements incorporate recommendations from the ASTM Ad Hoc Language Task Group. The ASTM-balloted packaging requirements expand on these Ad Hoc recommendations, including product-specific clarifications and incorporating formatting requirements from section 7.4. After further consideration, staff agrees that some of these changes may further improve the safety of crib mattresses (see section C, below, and Appendix A). However, other changes are merely editorial and do not add to the safety of crib mattresses, and therefore staff finds it more appropriate to align with the ASTM Ad Hoc committee's recommendations. Further, for the same reasons specified above, staff disagrees with the exclusion of important packaging requirements for after-market mattresses for rigid-sided, rectangular, non-full-size cribs.

### B. Recommended Improvements to the NPR

As requested in public comments on the NPR, staff continued efforts with ASTM to further improve the safety information requirements for crib mattresses. Based on these communications and ASTM F15's balloted changes to safety information to be incorporated into ASTM F2933 – 21, staff recommends the below changes to the NPR to further reduce the risks of death and serious injury associated with crib mattresses. See Appendix A for more information.

- In section 3.1.2, change "conspicuous*,* adj—visible while the mattress is being placed in its intended use position," to "conspicuous, adj — visible when the mattress is being handled by a consumer placing the mattress in its intended use position in a product." This change aligns with the latest consensus ballot by ASTM F15, and clarifies the intended meaning of "conspicuous" in the NPR-proposed language, that the warning should be conspicuous to the consumer.

- In section 7.4.6.2, change "The text in each column needs to be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points," to "The text in each column should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points." This change, from the mandatory language of "needs to" to the recommended language of "should," aligns with the latest recommendations from Ad Hoc and the consensus ballot by ASTM F15, and it is important to provide manufacturers with flexibility in arranging the bulleted hazard avoidance statements based on mattress-specific requirements, where appropriate.



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- In section 7.5, change "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 ⅜ in. (3.5 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses," to "The blank in the mattress fit statement beginning with 'If a gap is larger than,' needs to be filled with '1 ½ in. (3.8 cm)' for full-size crib mattresses and '1 in. (2.5 cm)' for all other mattresses." This change for full-size crib mattresses from 1 ⅜ inches to 1 ½ inches aligns with the latest consensus ballot by ASTM F15. This change results in a minor conflict between the warning message and the maximum gap afforded by the performance requirements (*i.e.,* a conflict of ⅛ in.); however, staff agrees with ASTM F15.66, which determined by consensus the following: the difference of ⅛ inch is unlikely to reduce the safety of full-size crib mattresses, the conflict is unlikely to confuse consumers (they are unlikely to be familiar with the requirements in the standard), and the new measurement (1 ½ in.) is more tangible for consumers to estimate, thereby increasing the likelihood of consumers attempting to measure, and accurately measuring, gaps between the full-size crib mattress and side walls of the full-size crib.

- In section 7.5.3, change "Manufacturers are permitted to include additional warnings between the warnings specified in 7.5 and 7.6 if desired," to "Additional manufacturer warnings are permitted between the warnings specified in 7.5 and 7.6 if desired." This editorial change clarifies further the allowance in the rule, and it is consistent with the latest consensus ballot by ASTM F15.

- Section 7.8 includes several changes to the requirements for retail packaging, as specified in Appendix A. These changes take into consideration the latest consensus ballot by ASTM F15, and further improve the safety of crib mattresses by doing the following: (1) incorporating formatting requirements from section 7.4, and (2) clarifying the warnings and statements required for specific mattress types.

- Renumber Figures 7 – 10 to Figures 8 – 11. This shift in numbering accounts for an additional figure that staff recommends adding to ASTM F2933 – 21, Section 6, as part of the final rule (see Tab C).

- For Figure 10, now recommended as Figure 11, change the caption from "Example of warning label for After-Market Mattress for Rigid Sided Rectangular Products. Items italicized in brackets are to be added as appropriate. The blanks are to be filled in as appropriate," to "Example of warning label for After-Market Mattress for Rigid-Sided, Rectangular, Non-Full-Size Cribs. Items italicized in brackets are to be added as appropriate." This change provides an important clarification that the example is not for full-size crib mattresses; full-size crib mattresses have a different warning label from these products.

To illustrate the above changes to the warning labels, staff provides in the Figure below a comparison of the NPR-proposed, the latest consensus ballot to be incorporated into ASTM F2933 – 21, and draft final rule warning labels for full-size crib mattresses. See Appendix A, Figures 10 and 11, for examples of the draft final rule warnings for non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs.



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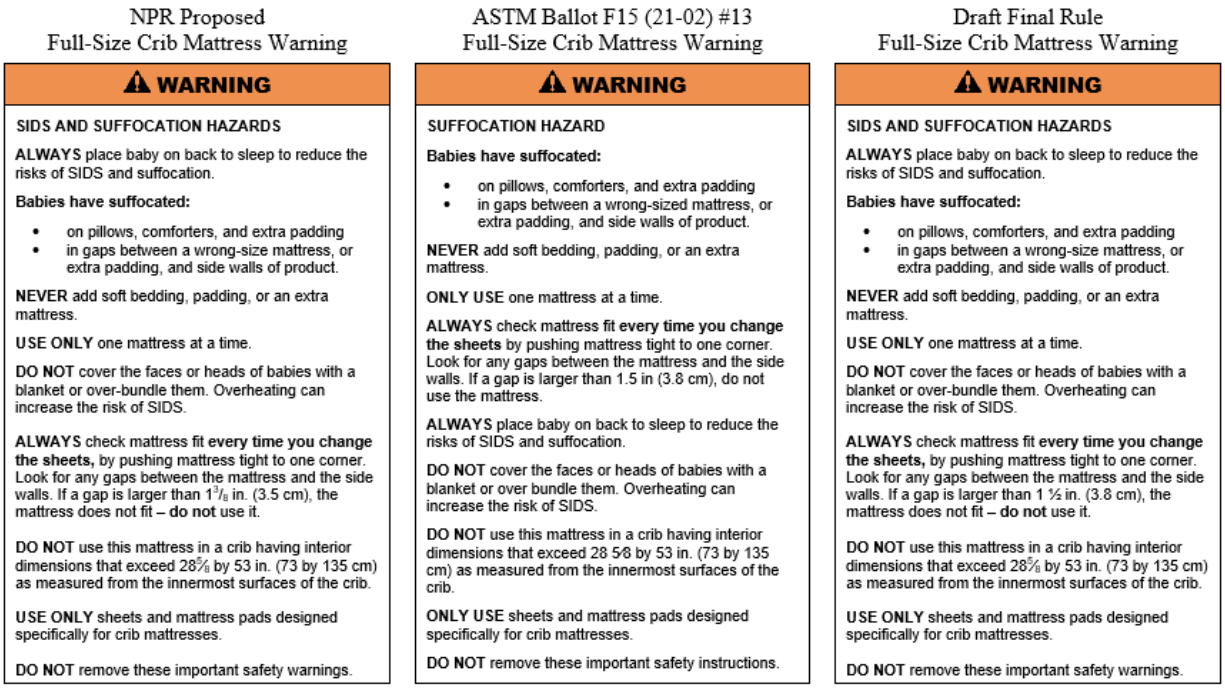


***Figure.*** Examples of NPR-proposed (left), ASTM-balloted (middle), and draft final rule (right) warning labels for full-size crib mattresses. These labels are not shown in actual size.

## III. Conclusion

Staff has reviewed and considered the public comments received on the NPR for crib mattresses and the continued developments in ASTM activities pertaining to crib mattresses. In this memorandum, staff recommends requirements for safety information for the draft final rule, based on the public comments and ASTM F15's latest consensus ballot (balloted changes to be incorporated into ASTM F2933 – 21 in the near future). In Appendix A, we identify safety information improvements for the draft final rule, with side-by-side comparisons to the NPR-proposed requirements and ASTM F15's balloted requirements.



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# APPENDIX A: Staff Comparison of CPSC NPR on Crib Mattresses, Latest ASTM F15 Ballot, and CPSC Draft Final Rule.

Changes to CPSC staff's proposed language since the NPR are identified in the second and third columns as follows: recommended additions are underlined, and recommended deletions are single struck-through. Sections held constant are identified as "[No change.]." Warning label examples consistent with the recommendations in this draft final rule package are provided below the table for section 7. Figures 7 – 10 in the NPR have been renumbered to Figures 8 – 11. This shift in numbering accounts for an additional figure that staff recommends be added to ASTM F2933 – 21, Section 6, as part of the final rule (see Tab C). ASTM Ballot F15 (21-02) #13 will be incorporated into ASTM F2933 – 21 in the near future.

## ASTM F2933 – 21, Section 3. Terminology

| CPSC NPR on Crib Mattresses | ASTM Ballot F15 (21-02) #13 | Draft Final Rule |
|---|---|---|
| 3.1.2 conspicuous, adj—visible while the mattress is being placed in its intended use position. | 3.1.2 conspicuous, adj — visible ~~while~~ when the mattress is being ~~placed~~ handled by a consumer placing the mattress in its intended use position in a product. | 3.1.2 conspicuous, adj — visible ~~while~~ when the mattress is being ~~placed~~ handled by a consumer placing the mattress in its intended use position in a product.<br>[Align with ballot F15 (21-02) #13.] |

## ASTM F2933 – 21, Section 7. Marking and Labeling

| CPSC NPR on Crib Mattresses | ASTM Ballot F15 (21-02) #13 | Draft Final Rule |
|---|---|---|
| 7.1 Each mattress and its retail package shall be marked or labeled clearly and legibly to indicate the following:<br>7.1.1 The name, place of business (city, state, and mailing address, including zip code), and telephone number of the manufacturer, distributor, or seller.<br>7.1.2 A code mark or other means that identifies the date (month and year at a minimum) of manufacture. | [No change.] | [No change.] |
| 7.2 The marking and labeling on the product shall be permanent. | [No change.] | [No change.] |
| 7.3 Any upholstery labeling required by law shall not be used to meet the requirements of this section. | [No change.] | [No change.] |
| 7.4 Warning Design for Mattresses:<br>7.4.1 The warnings shall be easy | 7.4 Warning Design for ~~Mattresses~~ Product<br>7.4.1 The warnings shall be easy to read and understand and be in the | 7.4 Warning Design for Mattresses:<br>7.4.1 The warnings shall be easy to read and understand and be in the English language at a minimum. |



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| to read and understand and be in the English language at a minimum.<br>7.4.2 Any marking or labeling provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.<br>7.4.3 The warnings shall be conspicuous and permanent.<br>7.4.4 The warnings shall conform to ANSI Z535.4—2011, American National Standard for Product Safety Signs and Labels, sections 6.1–6.4, 7.2–7.6.3, and 8.1, with the following changes.<br>7.4.4.1 In sections 6.2.2, 7.3, 7.5, and 8.1.2, replace ‘‘should’’ with ‘‘shall.’’<br>7.4.4.2 In section 7.6.3, replace ‘‘should (when feasible)’’ with ‘‘shall.’’<br>7.4.4.3 Strike the word ‘‘safety’’ when used immediately before a color (*e.g.,* replace ‘‘safety white’’ with ‘‘white’’).<br>Note 3—For reference, ANSI Z535.1 provides a system for specifying safety colors.<br>7.4.5 The safety alert symbol ‘‘[Safety Alert Symbol]’’ and the signal word ‘‘WARNING’’ shall be at least 0.2 in. (5 mm) high. The remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm), except where otherwise specified.<br>Note 4—For improved warning readability, typefaces with large height-to-width ratios, which are commonly identified as ‘‘condensed,’’ ‘‘compressed,’’ ‘‘narrow,’’ or similar should be avoided.<br>7.4.6 Message Panel Text Layout:<br>7.4.6.1 The text shall be left aligned, ragged right for all but one-line text messages, which can be left aligned or centered.<br>Note *5*—Left aligned means that the text is aligned along the left margin, and, in the case of multiple columns of text, along the left side of each individual column. Please | English language at a minimum.<br>7.4.2 Any marking or labeling provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.<br>7.4.3 The warnings shall be conspicuous and permanent.<br>7.4.4 The warnings shall conform to ANSI Z535.4 – 2011, American National Standard for Product Safety Signs and Labels, sections 6.1-6.4, 7.2-7.6.3, and 8.1, with the following changes.<br>7.4.4.1 In sections 6.2.2, 7.3, 7.5, and 8.1.2, replace “should” with “shall.”<br>7.4.4.2 In section 7.6.3, replace “should (when feasible)” with “shall.”<br>7.4.4.3 Strike the word “safety” when used immediately before a color (e.g., replace “safety white” with “white”).<br>Note 3—For reference, ANSI Z535.1 provides a system for specifying safety colors.<br>7.4.5 The safety alert symbol ‘‘[Safety Alert Symbol]’’ and the signal word ‘‘WARNING’’ shall be at least 0.2 in. (5 mm) high. The remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm), except where otherwise specified.<br>Note 4–For improved warning readability, typefaces with large height-to-width ratios, which are commonly identified as “condensed,” “compressed,” “narrow,” or similar should be avoided.<br>7.4.6 Message Panel Text Layout<br>7.4.6.1 The text shall be left aligned, ragged right for all but one-line text messages, which can be left aligned or centered.<br>Note 5—Left aligned means that the text is aligned along the left margin, and, in the case of multiple columns of text, along the left side of each individual column. ~~Please s~~ See Fig. ~~7~~ X1.1 in the appendix for examples of left aligned text. | 7.4.2 Any marking or labeling provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.<br>7.4.3 The warnings shall be conspicuous and permanent.<br>7.4.4 The warnings shall conform to ANSI Z535.4—2011, American National Standard for Product Safety Signs and Labels, sections 6.1–6.4, 7.2–7.6.3, and 8.1, with the following changes.<br>7.4.4.1 In sections 6.2.2, 7.3, 7.5, and 8.1.2, replace ‘‘should’’ with ‘‘shall.’’<br>7.4.4.2 In section 7.6.3, replace ‘‘should (when feasible)’’ with ‘‘shall.’’<br>7.4.4.3 Strike the word ‘‘safety’’ when used immediately before a color (*e.g.,* replace ‘‘safety white’’ with ‘‘white’’).<br>Note *3*—For reference, ANSI Z535.1 provides a system for specifying safety colors.<br>7.4.5 The safety alert symbol ‘‘[Safety Alert Symbol]’’ and the signal word ‘‘WARNING’’ shall be at least 0.2 in. (5 mm) high. The remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm), except where otherwise specified.<br>Note *4*—For improved warning readability, typefaces with large height-to-width ratios, which are commonly identified as ‘‘condensed,’’ ‘‘compressed,’’ ‘‘narrow,’’ or similar should be avoided.<br>7.4.6 Message Panel Text Layout:<br>7.4.6.1 The text shall be left aligned, ragged right for all but one-line text messages, which can be left aligned or centered.<br>Note *5*—Left aligned means that the text is aligned along the left margin, and, in the case of multiple columns of text, along the left side of each individual column. Please see FIG. ~~7~~8 for examples of left aligned text. |



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| see FIG. 7 for examples of left aligned text.<br><br>7.4.6.2 The text in each column needs to be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points. Multiple precautionary statements shall be separated by bullet points if paragraph formatting is used.<br>7.4.7 Example warnings in the format described in this section are shown in FIGS. 8, 9, and 10. | 7.4.6.2 The text in each column ~~needs to~~ should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points. Multiple precautionary statements shall be separated by bullet points if paragraph formatting is used.<br>7.4.7 Example warnings in the format described in this section are shown in ~~FIGS. 8, 9, and 10~~Figs. 2, 3, and 4. | 7.4.6.2 The text in each column ~~needs to~~ should be arranged in list or outline format, with precautionary (hazard avoidance) statements preceded by bullet points. Multiple precautionary statements shall be separated by bullet points if paragraph formatting is used.<br>7.4.7 Example warnings in the format described in this section are shown in FIGS. ~~8~~9, ~~9~~10, and ~~10~~11. |
| 7.5 Warning Statements—Each mattress shall have warning statements to address the following, at a minimum, unless otherwise specified. The blank in the mattress fit statement beginning with ''If a gap is larger than,'' needs to be filled with ''1 3⁄8 in. (3.5 cm)'' for full-size crib mattresses and ''1 in. (2.5 cm)'' for all other mattresses.<br>Note 6—Address means that verbiage other than what is shown can be used as long as the meaning is the same or information that is product-specific is presented.<br>**SIDS AND SUFFOCATION HAZARDS**<br>**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation.<br>**Babies have suffocated:**<br>• on pillows, comforters, and extra padding<br>• in gaps between a wrong-size mattress, or extra padding, and side walls of product.<br>**NEVER** add soft bedding, padding, or an extra mattress.<br>**USE ONLY** one mattress at a time.<br>**DO NOT** cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS.<br>**ALWAYS** check mattress fit **every time you change the sheets**, by pushing mattress tight to one corner. Look for any gaps between the mattress and the side walls. If a gap is larger than _____, the mattress does not fit—**do not** use it. | 7.5 Warning Statements—Each ~~mattress~~ product shall have warning statements to address the following, at a minimum~~, unless otherwise specified. The blank in the mattress fit statement beginning with ''If a gap is larger than,'' needs to be filled with ''13⁄8 in. (3.5 cm)'' for full-size crib mattresses and ''1 in. (2.5 cm)'' for all other mattresses.~~<br>Note *6*—Address means that verbiage other than what is shown can be used as long as the meaning is the same or information that is product-specific is presented.<br>Note 7—The blank should be filled with "1 1/2 in. (3.8 cm)" for full-size crib mattresses or "1 in. (2.5 cm)" for all other products<br>~~**SIDS AND**~~ **SUFFOCATION HAZARD~~S~~**<br>~~***ALWAYS*** place baby on back to sleep to reduce the risks of SIDS and suffocation.~~<br>**Babies have suffocated:**<br>• on pillows, comforters, and extra padding<br>• in gaps between a wrong-sized mattress, or extra padding, and side walls of product.<br>**NEVER** add soft bedding, padding, or an extra mattress.<br>~~**USE**~~ **ONLY USE** one mattress at a time.<br>~~**DO NOT** cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS.~~<br>**ALWAYS** check mattress fit **every time you change the sheets**~~,~~ by pushing mattress tight to one corner. Look for any gaps between | 7.5 Warning Statements—Each mattress shall have warning statements to address the following, at a minimum, unless otherwise specified. The blank in the mattress fit statement beginning with ''If a gap is larger than,'' needs to be filled with ''~~13⁄8~~ 1 ½ in. (3.~~5~~8 cm)'' for full-size crib mattresses and ''1 in. (2.5 cm)'' for all other mattresses.<br>Note 6—Address means that verbiage other than what is shown can be used as long as the meaning is the same or information that is product-specific is presented.<br>**SIDS AND SUFFOCATION HAZARDS**<br>**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation.<br>**Babies have suffocated:**<br>• on pillows, comforters, and extra padding<br>• in gaps between a wrong-size mattress, or extra padding, and side walls of product.<br>**NEVER** add soft bedding, padding, or an extra mattress.<br>**USE ONLY** one mattress at a time.<br>**DO NOT** cover the faces or heads of babies with a blanket or over-bundle them. Overheating can increase the risk of SIDS.<br>**ALWAYS** check mattress fit **every time you change the sheets**, by pushing mattress tight to one corner. Look for any gaps between the mattress and the side walls. If a gap is larger than _____, the mattress does not fit—**do not** use it. |



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| 7.5.1 For full-size crib mattresses, the following warning statements shall be included with the warnings from 7.5 exactly as stated below:<br>• **DO NOT** use this mattress in a crib having interior dimensions that exceed 28⅝ by 53 in. (73 by 135 cm) as measured from the innermost surfaces of the crib.<br>• **USE ONLY** sheets and mattress pads designed specifically for crib mattresses.<br>7.5.2 For non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs, the following warning statement shall be included with the warnings from 7.5 exactly as stated below:<br>• **USE ONLY** sheets and mattress pads designed specifically for this mattress size.<br>7.5.3 Manufacturers are permitted to include additional warnings between the warnings specified in 7.5 and 7.6 if desired. | the mattress and the side walls. If a gap is larger than _____, ~~the mattress does not fit~~ do not use ~~it~~ the mattress.<br>**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation.<br>**DO NOT** cover the faces or heads of babies with a blanket or over bundle them. Overheating can increase the risk of SIDS.<br>7.5.1 For full-size crib mattresses, the following warning statements shall be included with the warnings from 7.5 exactly as stated below:<br>~~•~~ **DO NOT** use this mattress in a crib having interior dimensions that exceed 28 5⁄8 by 53 in. (73 by 135 cm) as measured from the innermost surfaces of the crib.<br>~~•~~ **ONLY USE ~~ONLY~~** sheets and mattress pads designed specifically for crib mattresses.<br>7.5.2 For non-full-size crib mattresses and after-[strike through dash]market mattresses for play yards and non-full-size cribs, the following warning statement shall be included with the warnings from 7.5 exactly as stated below:<br>~~•~~ **ONLY USE ~~ONLY~~** sheets and mattress pads designed specifically for this mattress size.<br>7.5.3 ~~Manufacturers~~ Additional manufacturer warnings are permitted ~~to include additional warnings~~ between the warnings specified in 7.5 and 7.6 if desired. | 7.5.1 For full-size crib mattresses, the following warning statements shall be included with the warnings from 7.5 exactly as stated below:<br>• **DO NOT** use this mattress in a crib having interior dimensions that exceed 28⅝ by 53 in. (73 by 135 cm) as measured from the innermost surfaces of the crib.<br>• **USE ONLY** sheets and mattress pads designed specifically for crib mattresses.<br>7.5.2 For non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs, the following warning statement shall be included with the warnings from 7.5 exactly as stated below:<br>• **USE ONLY** sheets and mattress pads designed specifically for this mattress size.<br>7.5.3 ~~Manufacturers~~ Additional manufacturer warnings are permitted ~~to include additional warnings~~ between the warnings specified in 7.5 and 7.6 if desired. |
| 7.6 The following warning statement shall be included exactly as stated below and shall be located at the bottom of the warnings on each mattress:<br>**DO NOT** remove these important safety warnings. | 7.6 The following warning statement shall be included exactly as stated below and shall be located at the bottom of the warnings on each ~~mattress~~ product:<br>**DO NOT** remove these important safety instructions. | [No change.] |
| 7.7 Additional Marking and Warnings for After-Market Mattresses for Play Yards and Non-Full-Size Cribs—The mattress shall have:<br>7.7.1 All warnings added by the original manufacturer which are in addition to those required by this standard.<br>7.7.2 Assembly/attachment | 7.7 Additional Marking and Warnings for After-Market Mattresses for Play Yards and Non-Full-Size Cribs~~—The mattress shall have:~~<br>~~7.7.1 All warnings added by the original manufacturer which are in addition to those required by this standard.~~<br>~~7.7.2 Assembly/attachment~~ | [No change.] |



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| instructions that were provided on the original mattress.<br>7.7.3 The specific brand(s) and model(s) number(s) of the product(s) in which it is intended to be used.<br>7.7.4 For Rigid Sided Rectangular Products—the following statement shall appear exactly as stated below (the blanks are to be filled in as appropriate).<br>This mattress measures ___ long, ___ wide, and ___ thick when measured from seam to seam. | ~~instructions that were provided on the original mattress.~~<br>~~7.7.3 The specific brand(s) and model(s) number(s) of the product(s) in which it is intended to be used.~~<br>~~7.7.4 For Rigid Sided Rectangular Products—the following statement shall appear exactly as stated below (the blanks are to be filled in as appropriate).~~<br>~~This mattress measures ___ long, ___ wide, and ___ thick when measured from seam to seam.~~<br>7.7.1 For Mesh/Fabric Sided Products and Rigid Sided Non-Rectangular Products — The mattress shall have:<br>7.7.1.1 All warnings added by the original manufacturer in addition to those required by this standard.<br>7.7.1.2 Assembly/attachment instructions that were provided on the original mattress.<br>7.7.1.3 The brand(s) and model(s) numbers of the product(s) in which the product is intended to be used.<br>7.7.2 For Rigid Sided Rectangular Products — The mattress shall have:<br>This mattress measures _____ long, _____ wide, and _____ thick when measured from seam to seam. (The blanks are to be filled in.) | |
| 7.8 Package Warnings.<br>7.8.1 The warnings and statements are not required on the retail package if they are on the mattress and are visible in their entirety through the retail package. Cartons and other materials used exclusively for shipping the mattress are not considered retail packaging.<br>7.8.2 Warning Statements—Each mattress' retail package shall have statements to address the following, at a minimum.<br>7.8.2.1 All warnings included in section 7.5, as applicable.<br>7.8.2.2 All additional markings and warnings included in section 7.7, as applicable. | 7.8 ~~Package Warnings.~~ Warning Design for Retail Packages<br>7.8.1 Each product's retail package shall be labeled with warnings and statements required in 7.8.1.1, 7.8.1.2, or 7.8.1.3 as specified in 7.4.1, 7.4.2, 7.4.4, 7.4.5, and 7.4.6. The warnings and statements are not required on the retail package if they are on the ~~mattress~~ product and are visible in their entirety ~~through~~ and are not concealed by the retail package. Cartons ~~and other materials~~ used exclusively for shipping the ~~mattress~~ product are not considered retail packaging.<br>7.8.1.1 For full size crib mattresses - each product's retail package shall be labeled with | 7.8 ~~Package Warnings.~~ Warning Design for Retail Packages<br>7.8.1 The warnings and statements are not required on the retail package if they are on the mattress and are visible in their entirety through the retail package. Cartons and other materials used exclusively for shipping the mattress are not considered retail packaging.<br>7.8.2 Warning Statements—Each mattress' retail package shall have statements to address the following, at a minimum, and as specified in 7.4.1, 7.4.2, and 7.4.4-7.4.6.<br>~~7.8.2.1 All warnings included in section 7.5, as applicable.~~<br>~~7.8.2.2 All additional markings and warnings included in section 7.7, as applicable.~~ |



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| | warnings and statement required in 7.5 and 7.5.1<br>7.8.1.2 For aftermarket mattresses for Mesh/Fabric Sided Products and Rigid Sided Non-Rectangular Products— each product's retail package shall be labeled with warnings and statements required in 7.5 and 7.7.1.<br>7.8.1.3 For aftermarket mattresses for Rigid Sided Rectangular Products— each product's retail package shall be labeled with warnings and statements required in 7.5 and 7.7.2.<br~~7.8.2 Warning Statements—Each mattress' retail package shall have statements to address the following, at a minimum.~~<br~~7.8.2.1 All warnings included in section 7.5, as applicable.~~<br~~7.8.2.2 All additional markings and warnings included in section 7.7, as applicable.~~ | 7.8.2.1 For full-size crib mattresses, each mattress' retail package shall be labeled with the warnings and statements specified in 7.5 and 7.5.1.<br>7.8.2.2 For non-full-size crib mattresses and after-market mattresses for play yards and non-full-size cribs, each mattress' retail package shall be labeled with the warnings and statements specified in 7.5, 7.5.2, 7.7.1-7.7.4, as applicable. |

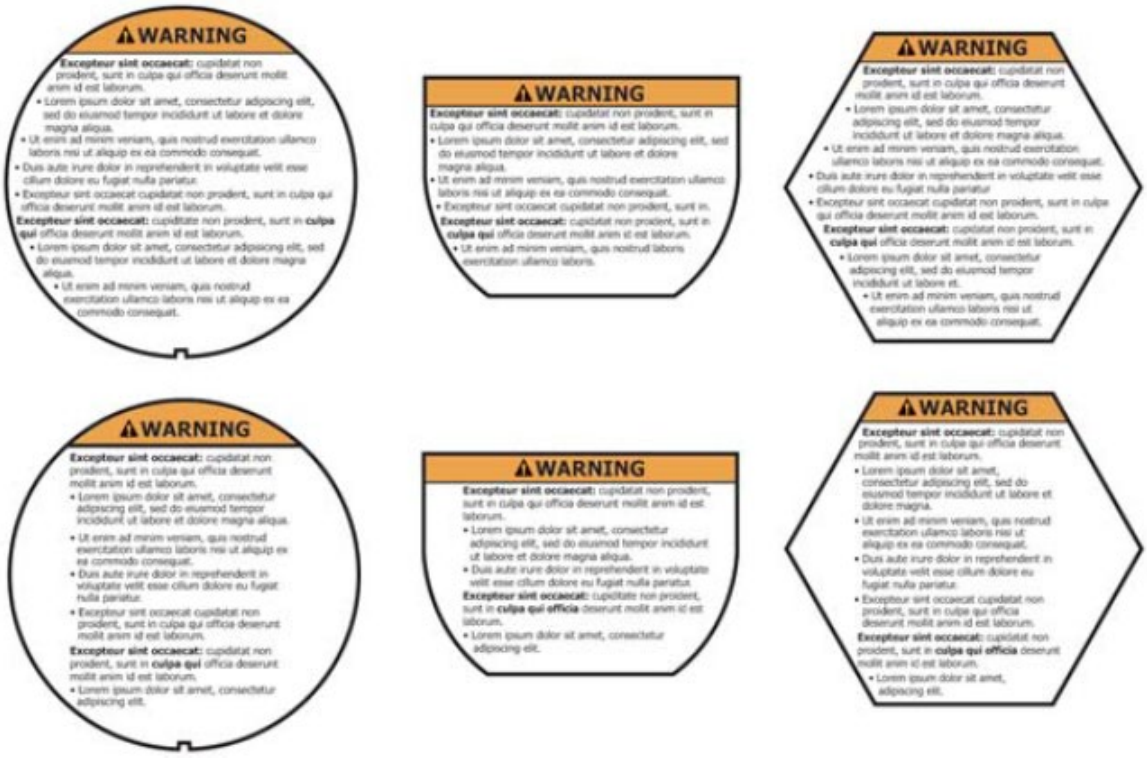


**FIG. 8 Examples of Left Aligned Text.** This figure is not shown in actual size.



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**FIG. 9 Example of warning label for Full-Size Crib Mattress.** This figure is not shown in actual size.



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**FIG. 10 Example of warning label for After-Market Mattress for Mesh/Fabric Sided Products and Rigid Sided Non-Rectangular Products.** Items italicized in brackets are to be added as appropriate. This figure is not shown in actual size.



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**FIG. 11 Example of warning label for After-Market Mattress for Rigid Sided Rectangular Non-Full-Size Cribs.** Items italicized in brackets are to be added as appropriate. The blanks are to be filled in as appropriate. This figure is not shown in actual size.



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## Section 8. Instructional Literature (new section 8 added to ASTM F2933 – 21, shifting existing section 8 to section 9)

| CPSC NPR on Crib Mattresses | ASTM Ballot F15 (21-02) #13 | Draft Final Rule |
|---|---|---|
| 8.1 Instructions shall be provided with the mattress and shall be easy to read and understand, and shall be in the English language, at a minimum. These instructions shall include information on assembly, maintenance, cleaning, and use, where applicable. | [No section on instructional literature.] | [No change.] |
| 8.2 The instructions shall have statements to address the following, at a minimum.<br>8.2.1 All warnings included in section 7.5, as applicable.<br>8.2.2 All additional markings and warnings included in section 7.7, as applicable. | | |
| 8.3 The warnings in the instructions shall meet the requirements specified in 7.4.4, 7.4.5, and 7.4.6, except that sections 6.4 and 7.2–7.6.3 of ANSI Z535.4 need not be applied. However, the signal word and safety alert symbol shall contrast with the background of the signal word panel, and the cautions and warnings shall contrast with the background of the instructional literature.<br>Note 7—For example, the signal word, safety alert symbol, and the warnings may be black letters on a white background, white letters on a black background, navy blue letters on an off-white background, or some other high-contrast combination. | | |
| 8.4 Any instructions provided in addition to those required by this section shall not contradict or confuse the meaning of the required information, or be otherwise misleading to the consumer.<br>Note 8—For additional guidance on the design of warnings for instructional literature, please refer to ANSI Z535.6, American National Standard: Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials. | | |



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# APPENDIX B: CPSC Staff Letter Regarding ASTM Ballot F15 (21-02), Item #13

U.S. CONSUMER PRODUCT SAFETY COMMISSION
5 Research Place, Rockville MD 20850

Stephen Harsanyi
Engineering Psychologist
Division of Human Factors

(301) 987-2209
sharsanyi@cpsc.gov

April 6, 2021

TRANSMITTED VIA BALLOT NEGATIVE

Mr. Jonathan Lee
Subcommittee Chairman for ASTM F15.66,
c/o ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

Dear Mr. Lee:

This letter responds to ASTM ballot F15 (21-02), item #13, *Proposed Changes to ASTM F2933-19 Standard Consumer Safety Specification for Crib Mattresses*.[1] Staff of the U.S. Consumer Product Safety Commission (CPSC) is voting negative on the ballot item.[2]

As staff discussed with the ASTM F15.66 subcommittee on Crib Mattresses, and in particular, the Crib Mattress Standard Language Review Task Group on March 4, 2021, there are numerous editorial and substantive deviations between the proposal in ballot F15 (21-02), item #13, and the Commission's NPR on crib mattresses in October 2020.[3] Below, staff identifies several of the more substantive deviations, which staff urges the subcommittee to consider. Staff urges the subcommittee to review the Commission's NPR on crib mattresses for detailed explanations, as well as staff's NPR Briefing Package for our recommendations.

1. Staff proposes adding "**SIDS AND**" to the hazard identifier, which, in the balloted version, reads "**SUFFOCATION HAZARD**." Consistent with the NPR, staff recommends stating "**SIDS**

[1] The views expressed in this letter are those of CPSC staff and have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.
[2] 16 CFR part 1031, as amended in 2016, permits CPSC staff to vote and hold leadership positions on an optional basis, provided that such activities have the prior approval of CPSC's Office of the Executive Director. CPSC staff sought and received approval to vote in March 2021, on matters pertaining to ASTM F15.66.
[3] The Commission's October 26, 2020 published NPR can be accessed here: https://www.govinfo.gov/content/pkg/FR-2020-10-26/pdf/2020-22558.pdf. Additionally, staff's September 2020 NPR Briefing Package for crib mattresses can be accessed here: https://cpsc.gov/s3fs-public/Notice-of-Proposed-Rulemaking-Safety-Standard-for-Crib-Mattresses.pdf.



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**AND SUFFOCATION HAZARDS.**" Among other relevant points, the staff's NPR Briefing Package includes the following explanation:

> After further consideration, staff recommends beginning the hazard identifier with '**SIDS AND**' to convey more accurately the hazards addressed by the label. The warnings in ASTM F2933 – 19, and recommended by staff, include content regarding both SIDS and suffocation. SIDS is a less understood hazard than suffocation, so including SIDS in the hazard identifier adds motivation for consumers to read about the hazard and how to reduce the likelihood of it occurring. Additionally, staff found that SIDS, in addition to suffocation, is cited frequently in reports of fatal incidents. Therefore, staff recommends that both hazards be communicated to consumers foremost in the warning message to increase the likelihood of consumers reading the warning label, learning about the hazards, and following the guidance.

2. Staff proposes prioritizing the prone sleep warning (*i.e.,* "**ALWAYS** place baby on back to sleep to reduce the risks of SIDS and suffocation") directly after the hazard identifier, consistent with the NPR. In the balloted version, the prone sleep warning is positioned near the bottom of the warnings in section 7.5. Among other relevant points, staff's NPR Briefing Package includes the following explanation:

   > ASTM F15 balloted and supported placement of this warning below the warnings pertaining to soft bedding and gap entrapment. After further consideration, staff concludes that such placement is inappropriate; this statement must be prioritized in the warning message because, as discussed in the above sections, the majority of deaths involved prone positioning, often with no other known contributing factors. Placing at the top of the warning message, a warning advising against infant prone sleep, will improve the likelihood that consumers will see this critical warning statement.

3. Consistent with the NPR, staff proposes including rigid-sided rectangular products in section 7.7.1, which, in the balloted version, includes only mesh/fabric sided products and rigid sided non-rectangular products (this section falls under 7.7, which applies to After-Market Mattresses for Play Yards and Non-Full-Size Cribs). Among other relevant points, staff's NPR Briefing Package includes the following explanation:

   > This ensures that consumers using after-market mattresses for rigid sided rectangular products are shown important, product-specific safety information provided by the original manufacturer (*i.e.,* warnings added by the original manufacturer, assembly/attachment instructions provided on the original mattress, and the brand(s), model(s) number(s) of the product(s) in which it is intended to be used).

4. Consistent with the NPR, staff proposes including requirements for instructional literature. The requirements are based on recommendations from the ASTM Ad Hoc Language task group. The balloted version does not include requirements for instructional literature. Among other relevant points, staff's NPR Briefing Package includes the following explanation:

   > Add a section on instructional literature, section 8, which specifies that instructional literature must accompany crib mattresses. In alignment with recommendations from the Ad Hoc task group and members of ASTM F15, these requirements generally specify that these instructions shall (a) be easy to read and understand; (b) include information



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regarding assembly, maintenance, cleaning, and use, where applicable; and (c) address the same warning and safety-related statements that must appear on the product, with similar formatting requirements, but without the need to be in color. Requiring instructional literature pertaining to the identified hazards ensures that consumers are provided an additional medium by which to be informed about the hazards.

Thank you for the opportunity to comment on this ballot item. CPSC staff looks forward to continuing to work with ASTM to improve and clarify the requirements of ASTM F2933. Please contact me (sharsanyi@cpsc.gov) if you have any questions or need additional information.

Sincerely,

Stephen Harsanyi
Engineering Psychologist,
Division of Human Factors

CC: Hope E J. Nesteruk, CPSC Children's Program Manager
Patricia L. Edwards, CPSC Voluntary Standards Coordinator



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# TAB E: Final Regulatory Flexibility Analysis of the Staff-Recommended Draft Final Rule for Full-Size Crib Mattresses, Non-Full-Size Crib Mattresses, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs

TAB E



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**UNITED STATES**
**CONSUMER PRODUCT SAFETY COMMISSION**
**4330 EAST WEST HIGHWAY**
**BETHESDA, MD 20814**

Memorandum

Date: September 21, 2021

To: Hope E J. Nesteruk,
Project Manager, Crib Mattress Team
Division of Mechanical and Combustion Engineering,
Directorate for Engineering Sciences

Through: Robert Franklin
Senior Staff Coordinator,
Directorate for Economic Analysis

From: Cynthia Gillham
Economist,
Directorate for Economic Analysis

Subject: Final Regulatory Flexibility Analysis for the Staff-Recommended Draft Final Rule for Full-Size Crib Mattresses, Non-Full-Size Crib Mattresses, and After-Market Mattresses for Play Yards and Non-Full-Size Cribs

## I. Introduction

On October 20, 2020, the Consumer Product Safety Commission (CPSC) published a notice of proposed rulemaking (NPR) for crib mattresses in the *Federal Register* (85 *Fed. Reg*. 67,906). The proposed rule incorporated by reference the then-current voluntary ASTM International (ASTM) standard for crib mattresses, ASTM F2933-19, *Standard Consumer Safety Specification for Crib Mattresses*, with modifications that would make the mandatory standard more stringent than the voluntary standard, to further reduce the risk of injury. The draft final rule has the same requirements enumerated in the 2020 NPR, with a few clarifications, and references the revised ASTM standard, ASTM F2933-21.

This memorandum evaluates the potential economic impact of the draft final rule for crib mattresses on small entities, as required by the Regulatory Flexibility Act (RFA).[54] Section 604 of the RFA requires that federal agencies prepare a final regulatory flexibility analysis (FRFA) when they promulgate a final rule, unless the head of the agency certifies that the rule will not have a significant economic impact[55] on a substantial number of small entities. Staff anticipates a possible significant economic impact for one small domestic importer and two small domestic manufacturers that supply crib mattress products to the U.S. market. Accordingly, we have prepared a FRFA.

[54] 5 U.S.C. §§ 601-612.

[55] We assume that an impact of more than 1% of annual revenue could be significant. The impact consists of the costs of relabeling or redesigning products to be compliant with the standard, including costs of recordkeeping and third-party testing, or removing non-compliant products from the marketplace.

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The FRFA must describe the impact of the rule on small entities and identify any alternatives that may reduce the impact. Specifically, the FRFA must contain:

1. a statement of the need for, and objectives of, the rule;
2. a summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a statement of the assessment of the agency of such issues, and a statement of any changes made in the rule as a result of such comments;
3. the responses of the agency to any comments filed by the Chief Council for Advocacy of the Small Business Administration in response to the proposed rule, and a detailed statement of any changes made to the proposed rule in the final rule as a result of the comments;
4. a description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;
5. a description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and
6. a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

## II. Objectives and Legal Basis of the Draft Proposed Rule

The objective of the draft final rule is to reduce the risk of injury and death associated with full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs (collectively referred to as "crib mattresses"). CPSC staff identified five hazard patterns among 439 reported incidents with crib mattress products in the 2020 NPR, including fatalities and injuries. Since the 2020 NPR was published, CPSC staff received a total of 55 additional incident reports related to crib mattresses between April 1, 2020 to April 30, 2021. (For additional detail on reported fatal and non-fatal incidents, see Tab B.)

Section 104 of the CPSIA requires the CPSC to examine and assess the effectiveness of any voluntary consumer product safety standards for durable infant or toddler products and promulgate consumer product safety standards that are substantially the same as the voluntary standards, or more stringent than the voluntary standards, if the Commission determines that more stringent requirements would further reduce the risk of injury associate with the products. The draft final rule will make all crib mattresses subject to a consumer product safety standard that is substantially the same as, or more stringent than, the corresponding ASTM standard.

### *A. ASTM F2933-21*

*ASTM F2933-21* forms the basis of the staff-recommended draft final rule for crib mattresses. As written, the standard is intended to address injuries associated with crib mattresses. However,



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staff found that the requirements in the standard are inadequate to address the risk of injury associated with crib mattresses, including entrapment hazards, suffocation hazards due to excessive surface softness, laceration hazards due to exposure to coil springs, and hazards associated with inadequate safety information.

*B. Compliance with the draft final rule*

To comply with the draft final rule, all suppliers must ensure that their crib mattresses comply with performance and labeling requirements, be third-party tested by a CPSC-accepted laboratory and certified as compliant to the standard. As an alternative to modifying their crib mattresses to conform with this rule, suppliers may decide to exit the market sector by either discontinuing existing products or re-labeling and remarketing them as not intended for use as a crib mattress. For some products where the physical design is distinctly intended for crib mattress use, remarketing for a non-crib mattress use may not be possible. For full-size crib mattresses, the products could be remarketed for use in toddler beds and are already designed for this use. Additionally, some popular play yard mattresses are already cross marketed for use as a play pad or sleeping pad for use outside of the actual play yard.[56] The impact on any particular firm will depend on whether any mattress product cannot be modified in a cost-efficient manner and will need to be removed from the market, the amount and type of modification the product would require to achieve compliance with this rule, how much of their product line is crib mattresses, and whether remarketing the item as not for crib mattress use would reduce demand. In the case that a crib mattress product must be removed from the market, the firm may be able to replace sales lost from the removal of a non-compliant product with sales from a compliant one.

## III. The Product

Crib mattresses are designed to provide a sleep surface for infants and toddlers and are marketed for use from birth through toddler age. As defined by ASTM F2933 - 21, "crib mattresses" include full-size crib mattresses, non-full-size crib mattresses, and after-market mattresses for play yards and non-full-size cribs.

Full-size crib mattresses are sold to fit full-size cribs and are referred to by industry as "Standard" crib mattresses. Crib mattresses that meet these specifications come in a variety of designs, are made with a broad array of materials, and are marketed for infant and toddler use. Consumers who purchase a full-size crib are able to select from a variety of full-size crib mattresses available for sale on the market that are designed to fit correctly in a full-size crib. Section 5.7.1 of ASTM F2933-21 identifies the dimensions of a full-size crib mattress to measure at least 27 ¼ inches wide and 51 5/8 inches long.

Section 3.1.1 of ASTM F2933 - 21 defines an after-market mattress for a play yard or non-full-size crib as a mattress sold or distributed for a play yard or non-full-size crib.[57] Dimensions for

[56] Play yard mattresses are advertised as suitable for use outside of the play yard crib for toddler sleeping and napping at daycare.
[57] Section 3.1.1 of ASTM F2933-21 excludes replacement mattresses provided or sold by the original equipment manufacturer.



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non-full-size cribs and play yards range in length and width and mattresses for non-full-size cribs are not necessarily rectangular. Consumers who purchase a non-full-size crib or play yard need to be conscious of the size of the non-full-size crib mattress or play yard mattress size they purchase, to ensure it fits correctly into the crib or play yard. Because these products do not have standard dimensions, it may be difficult at times for consumers to determine which non-full-size crib mattress or play yard mattress is appropriate for use in their non-full-size crib or play yard, if exact dimensions are not provided.

One example of a distinct product available for sale in the U.S. that falls within the broad category of rectangular non-full-size crib mattress is the "mini" crib mattress, sometimes referred to as a "portable" crib mattress. According to an industry article published in January 2021 on BabyList.com, mini cribs may have advantages over standard cribs, indicating that they save space, are easier to move, and that infants will fit in a mini crib until it becomes time for a child to transition into a toddler bed.[58] While the average standard crib mattress is 52 in. long and 28 in. wide, the average mini crib mattress is 38 in. long and 24 in. wide. Therefore, mini crib mattresses require the consumer to purchase and use mini crib sheets to be used with the smaller frame.

The thickness measurement of a mini crib mattress, also called the height dimension, typically ranges from 1 in. to 6 in. According to the January 2021 industry article, mini cribs typically come with a "skimpy" 1 in. mattresses provided by the original equipment manufacturer (OEM).[59] As the mattress height of a mini crib mattress varies, this can complicate proper fit for mini crib mattress sheets.

Another popular mattress product is the after-market play yard mattress. In a June 2021 industry article from BestReviews.com, play yard mattresses are said to be used for sleep that takes place away from home, such as at daycare, at a grandparent's house, or at a hotel. They find that "many parents choose to add a mattress to the playard's [sic] floor pad to make it a more comfortable place to sleep."[60]

After-market play yard mattresses available for sale vary in size but can be 37.5 in. to 38 in. long and 25.5 in. to 26 in. wide.[61] After market play yard mattresses come in a variety of thicknesses, from about 1.5 in. to 3 in. thick. When sales of after-market play yard mattresses are made online, online retailers of after-market play yard mattresses suggest to consumers that play yard mattresses are frequently purchased with a play yard. Online consumer comments suggest consumers do have questions on which models of play yard mattresses fit correctly into available play yards.[62]

Overall, based on the measurements of after-market mini crib mattresses and play yard mattresses available for sale, it is possible for consumers to purchase a mini crib mattress and

[58] https://www.babylist.com/hello-baby/best-mini-cribs
[59] https://www.babylist.com/hello-baby/best-mini-cribs
[60] https://bestreviews.com/best-playard-mattresses
[61] Among the five best play yard mattresses, rated by bestreviews.com, two mattresses were 26 in. wide × 38 in. long, two mattresses were 26 in. wide × 27.5 in. long, and one was 25 in. wide × 27.5 in. long, according to online product descriptions. Three mattresses were 1.5 inches thick, one was 2.25 inches thick, and one was 3 inches thick.
[62] Review of online products completed by staff on July 21, 2021.



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place it inside a play yard. The mini crib mattress would fit properly, in length, in the play yard, but the mini crib mattress would fit improperly in width. In some cases, the fit of a mini crib mattress in a play yard could be close enough that consumers may not realize they have used the product improperly or in an unsafe manner. The draft final rule addresses this scenario by requiring clear labeling of which crib mattresses should be used for a particular product.

## IV. The Market

Based on information from the 2013 CPSC Durable Nursery Products Exposure Survey (DNPES) of U.S. households with children under 6 years old, an estimated 9.2 million cribs were in use in households with young children in 2013.[63] This represented about 73 percent of the estimated 12.6 million total cribs owned by households (*i.e.*, about 3.4 million cribs were owned, but not in use). Cribs, for the purposes of the DNPES, included both full-size and non-full-size cribs, which are designed to be used with a crib mattress; therefore, staff estimates at least 9.2 million (full-size and non-full-size) crib mattresses were in use in 2013.

According to the same survey, an estimated 5.8 million play yards were in use in households with young children. This represented about 54 percent of the estimated 10.9 million total play yards owned by households (*i.e.*, about 5.1 million play yards were owned, but not in use).

In addition to the products in use in households with young children, as estimated from the survey, cribs and crib mattresses are probably in use in some households without young children (*e.g.*, un-surveyed homes of older adults providing care for grandchildren). Furthermore, the DNPES did not cover child care facilities. One childcare industry group's 2018 directory[64] lists more than 115,000 licensed childcare centers and more than 137,000 home daycare providers, some of which may use crib or play yard mattresses. Furthermore, the survey did not cover hotels or other commercial lodging establishments. The U.S. Bureau of Labor Statistics (BLS) reports that there are about 70,000 lodging establishments in the accommodation industry sector, North American Industry Classification System (NAICS) code 721.[65] Based on the Commission's contacts with childcare and lodging facilities, crib, play yard, and crib mattress usage in such establishments is relatively common.[66]

CPSC staff estimates that there are currently at least 32 domestic manufacturers or importers supplying crib mattresses to the U.S. market; 19 are domestic manufacturers and 13 are domestic importers. In addition, six foreign companies distribute crib mattresses to the U.S.[67] Among the 38 firms identified, roughly half are members of the JPMA, the major U.S. trade association that represents juvenile product manufacturers and importers. Many domestic suppliers of crib mattress are also members of ASTM. The majority of domestic manufacturers of crib mattresses

[63] Respondents were asked to include cribs that had been converted into toddler beds in their count of cribs owned, but were instructed to only include time used in the product *as a crib* in response to use questions.
[64] Child Care Centers estimate entire U.S. (2018, April 27). http://childcarecener.us/.
[65] U.S. Bureau of Labor Statistics, "Quarterly Census of Employment and Wages," April 2018. http://www.bls.gov/iag/tgs/iag721.htm.
[66] Staff contacts included phone inquiries with daycare and hotel establishments.
[67] Determinations were made using information from Dun & Bradstreet, as well as from websites.



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are considered small businesses, according to SBA guidelines, and many of these small firms are JPMA or ASTM members.

Currently staff estimates that there are over 300 crib mattress models available in the market.[68] According to data collected by staff, approximately 75 percent of crib mattresses available for sale in the U.S. are standard (full-size) crib mattresses. The typical manufacturer or importer of crib mattresses carries on average 10 mattress models. While some manufacturers produce a large variety of crib mattress models, others produce only a small selection of one or two models.

The average cost of a crib mattress available for sale in the United States is $150.[69] Full-size crib mattresses are generally more expensive than smaller after-market play yard and mini-crib mattresses. For consumers with limited income, smaller, less expensive crib mattresses may appear to be a suitable alternative to higher-priced full-size crib mattresses.

Many crib mattresses are advertised online as meeting the CPSC mattress and mattress pad flammability requirements, and/or being free from chemical flame retardants.[70] Crib mattresses are defined as children's products and are already subject to various other federal safety rules, such as lead and phthalate content limits and testing.

## V. Small Entities to Which the Draft Proposed Rule Would Apply

Manufacturers of crib mattresses are typically categorized under the NAICS category 337910 (Mattress Manufacturing). The Small Business Administration (SBA) guidelines consider mattress manufacturing establishments to be small if they have fewer than 1,000 employees.[71] Importers of crib mattresses are typically categorized under NAICS code 423210 (Furniture Merchant Wholesalers) and SBA guidelines would consider them small if they have fewer than 100 employees.

As noted earlier, there are approximately 32 domestic firms currently known to be supplying crib mattresses to the U.S. market. Following SBA size guidelines, 27 are small firms—14 domestic manufacturers and 13 domestic importers. The five remaining domestic firms are large manufacturers.

The expected impact of the draft final rule on small manufacturers and importers of crib mattresses will differ based on whether their crib mattresses are already compliant with ASTM F2933 – 21, the size-type of crib mattress the firm supplies to the market, and the materials used in the crib mattresses. Staff estimates that approximately 75 percent of crib mattresses on the market are full-size crib mattresses, that approximately 40 percent of full-size crib mattresses are coil/innerspring mattresses, and that the remaining majority are foam-core mattresses.[72] Staff identified at least 15 small firms that only produce foam-core mattresses, while many small entities produce a combination of both coil and foam-core crib mattresses.

[68] Based on staff's compiled search results of data available on the internet, April-June 2021.
[69] Price estimated from data available on the internet, collected between April-June 2021.
[70] Review of manufacturers' websites, product labels, and materials.
[71] The size guidelines are established by the U.S. Small Business Administration (SBA).
[72] Based on staff's compiled search results of data available on the internet, April-June 2021.



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## VI. Requirements of the Draft Final Rule

The staff-recommended draft final rule would incorporate by reference the voluntary standard for crib mattresses (*ASTM F2933-21*), with modifications to make the standard more stringent. ASTM F2933 – 21 includes (1) general requirements, (2) test methods, and (3) instructions for proper marking and labeling. More specifically, instructions will provide information on assembly, maintenance, cleaning, and use, where applicable. If finalized, the draft final rule would become a mandatory consumer product safety rule.

In addition to incorporating the requirements of ASTM F2933-21, the draft final rule would include additional requirements to address hazards not addressed by the voluntary standard. These requirements include additional testing and changes to the marking, labeling and instructional literature. (For additional detail on the requirements for marking, labeling and instructional literature, see Tab D.) The additional testing requirements are:

- **Compression Test:** to address hazardous gaps created between the edge of a crib and a mattress when a mattress is too soft and compresses when used with a fitted sheet;
- **Firmness Test:** to address excessively soft mattress surfaces that create an asphyxiation hazard when the surface indents; and,
- **Cyclic Load Test:** to address laceration injury incurred as a result of exposure to inner-coil springs.

Table 1 provides an overview of which types of crib mattresses would be subject to additional testing.

**Table 1. Testing requirement matrix**

| Testing Requirements | Type of Crib Mattress | | |
|---|---|---|---|
| | All crib mattresses* | Only full-size crib mattresses | Only full-size, coil-spring inner core, crib mattresses |
| ASTM F2933 - 21 | × | | |
| Compression Test | | × | |
| Firmness Test | × | | |
| Cyclic-load Test | | | × |

* The set of all crib mattresses is defined to include full-size crib mattresses, after-market non-full-size crib mattresses, and after-market play yard mattresses.

If the draft final rule becomes a mandatory standard, firms whose crib mattresses do not comply will need to evaluate their products, determine what changes would be required to meet the standard, and decide how to proceed. Noncompliant products would need to be removed from the U.S. market, modified to meet the mandatory standard, or remarketed for purposes other than use as crib mattresses. New crib mattress products introduced to the market would also need to comply with the standard.



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If the Commission issues a final rule for crib mattresses, they will be subject to the third-party testing and certification requirements under the CPSA, as codified in 16 CFR part 1107 (children's product testing rule) and 16 CFR part 1110 (certificate rule), which require that manufacturers and importers certify that their products comply with the applicable children's product safety standards, based on third party testing, and subject their products to third party testing periodically. Third-party testing costs are in addition to the costs of modifying the crib mattresses to meet the standard. For crib mattresses, the third-party testing costs are expected to be about $950 per testing cycle per model. This is an increase in the costs as estimated in the IRFA in the 2020 NPR, which estimated a cost of $325 per sample. Testing costs are explained in more detail in the following section.

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## VII. Impact of Draft Proposed Rule on Small Manufacturers and Importers

Of the 27 small manufacturers and importers identified by staff, 14 (9 manufacturers and 5 importers) are members of the Juvenile Products Manufacturers Association (JPMA), but staff cannot determine how many crib mattresses are currently certified to ASTM F2933 – 21. Many of the firms that would be subject to the draft final rule are known to produce a variety of children's products that are already subject to a children's product safety rule, and therefore, are familiar with such requirements.[73] Additionally, two firms that are not known to be JPMA members, are members of ASTM.

Mentioned previously, as required by section 14 of the CPSA and its implementing regulations, manufacturers and importers of crib mattresses would be required to certify that their crib mattresses comply with the requirements of the draft final rule, based on the results of third-party testing by a CPSC-accepted third party conformity assessment body (*i.e.*, testing laboratory). However, crib mattresses are also already subject to third party testing requirements and therefore firms that supply crib mattresses to the U.S. market are already familiar with third party testing requirements.[74,75] Crib mattresses must already comply with two federal mattress flammability standards: 16 CFR parts 1632 and 1633. Firms that supply crib mattresses that are designed or intended primarily for children age 12 or under need to prepare a Children's Product Certification (CPC) that references parts 1632 and/or part 1633, when applicable. At this time CPSC staff are not aware of any small domestic firms that supply crib mattresses to the U.S. market that are not compliant with CPSC's mattress flammability standards. Additionally, crib mattresses are subject to lead testing, unless exempt, phthalate testing for certain child care articles, and small parts testing and small parts labeling, as applicable. Adoption of the draft final rule would augment these existing requirements.

[73] Crib mattresses listed for sale on a variety of online retail websites often include product descriptions indicating that the crib mattress product meets CPSC general safety standards, while not referencing any one specific CPSC safety standard.

[74] Manufacturers and importers of children's products must certify compliance with applicable federal safety requirements in a Children's Product Certificate (CPC). Testing by a third party CPSC-Accepted Laboratory must serve as the basis for the production of the CPC.

[75] Mattresses intended for children must be tested at a third-party test laboratory or a fire-walled internal laboratory: https://cpsc.gov/s3fs-public/pdfs/blk_media_mattress.pdf. In either case, the lab would need to be CPSC-accepted to test to the standards since crib mattresses are considered to be primarily intended for children 12 and under.



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As part of the 2020 NPR, staff requested comments from small firms on the number of crib mattress models they would typically certify to the ASTM standard annually, but did not receive any comments on the request. Staff notes that some small manufacturers and importers of crib mattresses to the U.S. market would not be subject to all the tests proposed in the draft final rule, because the firm may only supply foam-core and/or non-full-size crib mattress products to the market.

### *A. Costs Associated with Modifying Products*

The majority of crib mattresses tested by staff already meet the performance requirements of the draft final rule, and would not require any modification in order to comply. While we do not know the exact costs of modifying crib mattresses to comply with the draft final rule, we do know that such costs would vary by product model. During the public comment period for the 2020 NPR, CPSC did not receive any comments related to one-time costs of redesigning a product to meet the standard as proposed. Nonetheless, it is possible that some manufacturers of non-complying mattresses might choose to drop the model rather than incur the expense associated with modifying it.[76], therefore, there is a possibility that adoption of the draft final rule could result in the removal of one or more crib mattress models from commerce.

Changes to marking and labeling will be necessary on crib mattress products. Generally, costs associated marking and labeling as well as providing instructional materials are low on a per-unit basis. Many crib mattress suppliers already provide instructions with their crib products, but firms will need to ensure the content and formatting of the instructions required for crib mattresses meet the requirements of the draft final rule.[77] Likewise, the cost of warning labels is generally low, especially if some warning labels are already present, and the product does not need to be modified to accommodate new labels.

### *B. Third Party Testing Costs*

Promulgating the draft final rule would require all manufacturers and importers of crib mattresses to meet additional third-party testing requirements under section 14 of the CPSA. As allowed by the component part testing rule (16 CFR 1109), importers may rely upon third party tests obtained by their suppliers, which could reduce the impact on importers. In addition, businesses selling products covered by this rule were already required to certify compliance to general children's product rules for lead, phthalates, and small parts with third party testing, so those third-party testing costs would not be considered new costs of compliance to this rule.

While CPSC did not receive any comments on the 2020 NPR cost estimates provided in the IRFA, ongoing discussions with suppliers through ASTM indicate third-party testing bodies will

[76] Costs associated with modification of a crib mattress might include but are not limited to costs of skilled labor for the modification or redesign, costs associated with finding and changing to a new materials supplier if necessary, flammability testing costs for the modified model if new ticking materials are used, and additional testing costs prescribed in ASTM F2933 and those of the draft proposed rule.

[77] Instructions required shall be provided with the mattress and shall be easy to read and understand, and shall be in the English language, at a minimum. These instructions shall include information on assembly, maintenance, cleaning, and use, where applicable.



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need to develop protocols for the testing proposed in the draft final rule as well as prices for the prescribed testing.

Based on information from a testing laboratory, the cost of testing to the current version of ASTM F2933 is $200 to $250 per sample. However, the cost of testing varies based on the type of crib mattress and the number of samples tested. Furthermore, testing rates may have changed by accredited labs. According to new information provided by one crib mattress supplier, the price charged to test to ASTM F2933 for suppliers with very few models may be as high as $400 per model tested.[78] Costs for additional testing that would be required by the draft final rule would increase the cost of testing substantially, though not all crib mattresses would be subject to all of the testing requirements. (See table 1 for a matrix of crib mattress testing based on mattress type.)

Staff estimates that for a manufacturer or importer with 10 crib mattress models that requires only one test per model to provide a high degree of assurance, the full cost of third-party testing will be approximately $4,000, plus $2,000 in costs for compression testing, plus $1,000 for the cost of possible cyclic load testing, plus $2,500 for required firmness testing, for a total of $9,500 in third-party testing costs or an average of $950 per model.[79]

*C. Summary of Impacts*

Generally, based on Small Business Administration guidelines, CPSC considers impacts that exceed one percent of a firm's revenue to be *potentially* significant. The lowest reported annual revenue for any small domestic firm producing crib mattress models was $1.07 million. One percent of annual revenue for the firm is $10,700 ($1,070,000 x 0.01). Consequently, if the costs of modifying their mattresses to comply with the standard exceeded $10,700, the rule should be considered to have a significant impact for the firm. This would include the costs of modifying non-compliant mattresses to comply with the requirements, the loss of revenue that results from removing non-compliant mattresses from their product line, and the cost of third-party testing. For manufacturers or importers with greater revenue, the impact of the draft proposed rule would have to be higher than this for the impact to be considered significant.

Given that a substantial number of crib mattresses already comply with the requirements of the draft final rule and some of the testing costs are already being borne by firms that certify to the current voluntary standard, it seems unlikely that the rule would have a significant impact on a substantial number of small entities. Furthermore, CPSC did not receive any public comments on the costs of the proposed rule, or impediments to modifying existing crib mattress products to conform to the draft rule, especially those that would result in the removal of the mattress product from the market, or other comments on possible impacts the rule might have on small domestic manufacturers or importers. Nevertheless, to the extent that a crib mattress supplier would need to remove a crib mattress model from commerce because it will not meet the standards of the draft final rule or cannot be modified in a cost-efficient manner, a few small

[78] Information provided by the crib mattress supplier included quotes received from two prominent testing laboratories.

[79] The estimated costs of $950 per model for testing in the FRFA is an increase over the amount estimated in the IFRA. The cost for third party testing was estimated to be $250 to $325, per sample, in the IRFA.



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firms could potentially consider the costs of adopting the draft final rule to be significant. Based on limited data available for small private firms serving this market, staff identified three small domestic firms—two small domestic manufacturers and one small domestic importer that might consider the impact significant was such that they dropped one or more crib mattress models from their line.

## VIII. Other Federal Rules that May Duplicate, Overlap, or Conflict with the Draft Proposed Rule

CPSC staff has not identified any other federal rules that duplicate, overlap, or conflict with the draft proposed rule.

## IX. Efforts to Minimize and Alternatives Considered to Reduce the Impact on Small Entities

CPSC has attempted to minimize the impact of the draft final rule on small entities in the following ways.

### *A. Requesting Public Comments*

CPSC published a notice of proposed rulemaking in the *Federal Register* on October 26, 2020 (85 *Fed. Reg*. 67,906) and requested comments on any alternatives to the proposed rule that could reduce the burden on small entities. Among others, these proposed alternatives included the adoption of the ASTM standard without modification and delaying the effective date of the requirements. None of the comments received mentioned a burden or impact on small entities or any concern that the final rule might impose on small entities.

No comments were received raising significant issues in response to the IRFA. CPSC did not receive any comments from SBA. (Tab A provides the summary of the public comments received on the draft proposed rule and staff's responses.)

### *B. Delay the Effective Date of the Requirements*

The Administrative Procedure Act (APA) generally requires that the effective date of the rule be at least 30 days after publication of the final rule. 5 U.S.C. 553 (d). CPSC generally considers six months to be sufficient time for suppliers of durable infant or toddler products to come into compliance with a new standard under section 104 of the CPSIA. Six months is also the period that the Juvenile Products Manufacturers Association (JPMA) typically allows for products in the JPMA certification program to transition to a new standard once that standard is published.

The October 2020 NPR proposed a 6-month effective date after publication of the final rule, for products manufactured or imported on or after that date. Commenters on the 2020 NPR both supported and opposed the 6-month effective date. Some commenters urged the effective date be as soon as possible, indicating additional time for the rule to become effective would put infants at risk. Other commenters requested an indefinite delay of the rulemakings, until ASTM



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completes changes and updates to the voluntary standard, and those associated with crib mattresses.

Staff recommends retaining the proposed 6-month effective date for the final rule, because suppliers have had lead time to prepare for this rule since the NPR was published on October 26, 2020. Many crib mattresses within the scope of the draft final rule require no change in design to achieve compliance with the final rule. Furthermore, six months from the change in a voluntary standard is the time frame that JPMA uses for its certification program, so compliant manufacturers are used to this time frame to comply with a modified standard.

Because some manufacturers of crib mattresses may experience some kind of economic impact as a result of the draft final rule, providing a 6-month effective date should mitigate the effects of the rule on small businesses. A 6-month effective date will provide manufacturers and importers time to spread the impact of the rule over a 6-month time period, to reduce any sudden economic impact of the draft final rule. For businesses that would choose to exit the crib mattress market, or discontinue certain crib mattress models currently in production (rather than produce conforming products), such a delay might provide them with time to adjust marketing towards other product offerings, sell inventory, or consider alternative business opportunities.

### *C. Consultation with ASTM*

CPSC staff have worked extensively with ASTM in the continued development and improvement of voluntary safety standards for crib mattresses referenced in the draft final rule. Members of ASTM include small domestic manufacturers and importers of products to which the draft final rule would apply. Small entities to whom the draft final rule will apply have taken part in discussions and engaged in product testing during the development of the standard. Feedback from these entities was considered by ASTM and CPSC in developing the revised voluntary standard and draft final rule, respectively.

## X. Conclusion

This memorandum evaluated the impacts of the draft final rule on small entities, as required by the RFA. Staff identified 27 small domestic firms currently supplying crib mattresses to the U.S. market, and found that for at least two small domestic manufacturers and one small domestic importer of crib mattresses, the cost of complying with the draft final rule could be considered potentially significant.

Staff has provided a description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes. Based on the analysis provided in this memorandum, it seems unlikely that the proposed rule would have a significant impact on a substantial number of small entities because many small firms in this industry sector already certify their products to the voluntary standard being adopted with modification; CPSC testing indicates that crib mattresses available on the market will likely require no modification in order to comply with the draft final rule; small entities have actively engaged in the development of the voluntary standard being adopted with modification and have not indicated that the draft final rule would impose a significant economic impact; some small



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firms already market their crib mattresses for use outside of the crib and could rebrand these products rather than removing them from the market; and testing costs associated with the draft final rule cannot be considered significant to any small firm currently supplying the market.

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