



UNITED STATES
 CONSUMER PRODUCT SAFETY COMMISSION
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This document has been electronically approved and signed.

DATE: September 30, 2020

BALLOT VOTE SHEET

TO: The Commission
 Alberta E. Mills, Secretary

THROUGH: John G. Mullan, General Counsel
 Mary T. Boyle, Executive Director

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

SUBJECT: Notice of Proposed Rulemaking: Standard for the Flammability of Mattresses and Mattress Pads; Proposed Amendment

BALLOT VOTE DUE Tuesday, October 6, 2020

Staff is forwarding a briefing package to the Commission, recommending that the Commission publish in the *Federal Register* the attached draft notice of proposed rulemaking (NPR) to amend the Standard for the Flammability of Mattresses and Mattress Pads (Standard), 16 CFR part 1632.

The Standard sets forth a test to determine the ignition resistance of a mattress or mattress pad when exposed to a lighted cigarette. It currently requires the use of Standard Reference Material cigarette SRM 1196 as an ignition source. The National Institute of Standards and Technology (NIST), the former sole supplier of SRM 1196, has exhausted its supply of SRM 1196, and is unable to procure more of these cigarettes. NIST has replaced SRM 1196 with SRM 1196a. The draft NPR proposes to amend the Standard to replace SRM 1196 with SRM 1196a as the ignition source in the Standard. The Office of the General Counsel is providing the attached draft NPR 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)

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

Consumer Hotline and General Information: 1-800-638-2772 ★ CPSC's Web Site: <http://www.cpsc.gov>

(Signature)

(Date)

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

(Signature)

(Date)

IV. Take other action specified below:

(Signature)

(Date)

Attachment: Draft *Federal Register* Notice: Notice of Proposed Rulemaking: Standard for the Flammability of Mattresses and Mattress Pads; Proposed Amendment

DRAFT

[Billing Code 6355-01-P]

CONSUMER PRODUCT SAFETY COMMISSION

[Docket No. CPSC-XXXX-XXXX]

16 CFR Part 1632

Standard for the Flammability of Mattresses and Mattress Pads; Proposed Amendment

AGENCY: Consumer Product Safety Commission.

ACTION: Proposed rule.

SUMMARY: The Consumer Product Safety Commission (Commission, or CPSC) is proposing to amend its Standard for the Flammability of Mattresses and Mattress Pads. The ignition source cigarette specified in the standard for use in the mattress standard's performance tests, Standard Reference Material cigarette SRM 1196, is no longer available for purchase. The Commission is proposing to amend the mattress standard to require a revised Standard Reference Material cigarette, SRM 1196a, which was developed by the National Institute of Standards and Technology, as the ignition source for testing to the mattress standard.

DATES: Comments on the proposal should be submitted no later than **[insert date 75 days after date of publication in the FEDERAL REGISTER]**.

ADDRESSES: Comments, identified by Docket No. CPSC-XXXX-XXXX, may be submitted electronically or in writing:

Electronic Submissions: Submit electronic comments to the Federal eRulemaking Portal at: <https://www.regulations.gov>. Follow the instructions for submitting comments. The CPSC does not accept comments submitted by electronic mail (e-mail), except through

<https://www.regulations.gov>. The CPSC encourages you to submit electronic comments by using the Federal eRulemaking Portal, as described above.

Mail/hand delivery/courier Written Submissions: Submit comments by mail/hand delivery/courier to: Division of the Secretariat, Consumer Product Safety Commission, Room 820, 4330 East West Highway, Bethesda, MD 20814; telephone: (301) 504-7479; email: amills@cpsc.gov.

Instructions: All submissions must include the agency name and docket number for this notice. CPSC may post all comments received without change, including any personal identifiers, contact information, or other personal information provided, to:

<https://www.regulations.gov>. Do not submit electronically: confidential business information, trade secret information, or other sensitive or protected information that you do not want to be available to the public. If you wish to submit such information, please submit it according to the instructions for written submissions.

Docket: For access to the docket to read background documents or comments received, go to: <https://www.regulations.gov>, and insert the docket number, CPSC-2020-XXXX, into the “Search” box, and follow the prompts.

FOR FURTHER INFORMATION CONTACT: Lisa Scott, Directorate for Laboratory Sciences, Office of Hazard Identification and Reduction, U.S. Consumer Product Safety Commission, 5 Research Place, Rockville, MD 20850; telephone: 301-987-2064; email: lscott@cpsc.gov.

SUPPLEMENTARY INFORMATION:

A. Background

1. The Standard

The Standard for the Flammability of Mattresses and Mattress Pads (Standard), 16 CFR part 1632, issued pursuant to the Flammable Fabrics Act (FFA), 15 U.S.C. 1191 *et seq.*, sets forth a test to determine the ignition resistance of a mattress or mattress pad when exposed to a lighted cigarette. Lighted cigarettes are placed at specified locations on the surface of a mattress or mattress pad. The Standard establishes pass/fail criteria for the tests. The Standard currently specifies the ignition source for these tests as Standard Reference Material cigarette SRM 1196, available for purchase from the National Institute of Standards and Technology (NIST). *See* 16 CFR 1632.4(a)(2).

2. Development of the Original Standard Reference Material Cigarette

The original specification for the Standard's ignition source included physical characteristics of a conventional, commercially available, non-filtered, king-sized cigarette. Although no specific brand was identified in the standard, a Pall Mall Red cigarette, manufactured by R. J. Reynolds Tobacco Company (RJR), was commonly known to meet the specifications. In early 2008, RJR notified CPSC that the company intended to convert its production of Pall Mall Red cigarettes to be Fire Standard Compliant (FSC).

In 2008, CPSC sought to find an alternate ignition source and contracted with NIST to develop an ignition source with an ignition strength equivalent to the conventional Pall Mall Red cigarette. The ignition strength value is on a scale from 0 to 100 and is analogous to the percentage of full-length burns on a laboratory substrate. Lower values indicate a cigarette is more likely to self-extinguish when not actively being smoked, while higher values indicate a

cigarette is more likely to remain lit while unattended. The Pall Mall Red ignition strength varied by vintage from a measured low of 35 to a high of 95, most often falling at the higher end of the range. FSC cigarettes are required to have an ignition strength lower than 25 and in practice are often much weaker to ensure uniform compliance.

In 2010, NIST developed SRM 1196, *Standard Cigarette for Ignition Resistance Testing*. SRM 1196 was available for purchase starting in September 2010. On November 1, 2010, CPSC proposed the use of the SRM 1196 cigarette as the standard ignition source. 75 FR 67047. On September 23, 2011, CPSC issued a final rule amending the Standard to specify SRM 1196 as the standard ignition source, which became effective on September 23, 2012. 76 FR 59014.

3. Development of a New Standard Reference Material Cigarette

All of the SRM 1196 cigarettes were produced in one production run in 2010, with a supply estimated to last approximately 10 years. NIST staff made several attempts to procure a new batch of SRM 1196 cigarettes as the supply dwindled, but in late 2018, the supply of SRM 1196 was depleted before NIST was able to complete a new procurement. NIST was unable to find a manufacturer to produce additional SRM 1196 cigarettes. However, NIST successfully procured SRM 1196a as a replacement for SRM 1196.

NIST conducted tests to determine whether the SRM 1196 properties were replicated in the new SRM 1196a. NIST evaluated the suitability of SRM 1196a by examining the cigarette's ignition strength, tobacco column length and mass, use of unbanded paper, and absence of a filter. Tobacco column length is the length of the cigarette that contains tobacco. Banded paper contains bands that slow the cigarette's combustion when not actively being smoked, while unbanded paper does not contain these bands. NIST affirmed that these SRM 1196 properties were replicated in the new SRM 1196a, because it has a similar ignition strength, tobacco

column length and mass, it uses unbanded paper, and it has no filter. NIST began selling SRM 1196a in February 2020.

4. CPSC Staff Evaluation of SRM 1196a¹

CPSC staff evaluated SRM 1196a in a pilot study and then a full-scale study to determine whether it is a comparable, safety-neutral replacement for SRM 1196.

CPSC staff conducted an initial pilot study in late 2019 to evaluate the suitability of SRM 1196a as a substitute for SRM 1196. The goal of the pilot study was to ensure the full-scale study met statistically robust and scientifically meaningful criteria. Staff evaluated the confidence interval and margin of error to utilize in the full-scale study, based on an examination of the 2010 transition from the original ignition source to SRM 1196, CPSC compliance data, and the number of test replicates required by the Standard. Based on this analysis and testing during the pilot study, staff subject matter experts determined that a 90 percent confidence interval and equivalence margin of 35 percent were appropriate.

CPSC staff then conducted a full-scale study in early 2020 to determine whether there is statistical equivalence between SRM 1196 and SRM 1196a. In the full-scale study, staff evaluated both SRM 1196 and SRM 1196a and found statistically equivalent char length pass/fail patterns for all tested mattress substrates. Test results were within a 90 percent confidence interval and equivalence margin of 35 percent. Staff noted that NIST certified the ignition strengths of both SRMs to be comparable based on a 95 percent confidence interval with a 5 percent margin in laboratory testing. While the bounds found by CPSC staff are larger than the NIST confidence interval, staff determined that the NIST tests only examined the cigarette characteristics on substrates which have little variability. The CPSC testing included

¹ Staff Briefing Package, Proposed Amendment to 16 CFR Part 1632 Standard for the Flammability of Mattresses and Mattress Pads, is available at [LINK].

representative mattress materials that are inherently more variable than the benchmark substrates in the NIST cigarette tests. Furthermore, staff analysis of both SRM cigarettes found that the physical dimensions of SRM 1196 and SRM 1196a are nearly identical. Based on the evidence provided by the full-scale study, pilot study, and NIST certification, as well as examination of CPSC compliance data and data from the 2010 transition from the original ignition source to SRM 1196, CPSC staff's review showed that SRM 1196a cigarettes are statistically equivalent to SRM 1196. On these bases, the Commission finds that SRM 1196a is a comparable, safety-neutral replacement for SRM 1196.

B. Statutory Provisions

The FFA sets forth the process by which the Commission can issue or amend a flammability standard. In accordance with those provisions, the Commission is proposing to amend the Standard to specify the SRM 1196a cigarette developed by NIST as the ignition source to be used for testing under the Standard. As required by the FFA, the proposed rule contains the text of the amendment, alternatives that the Commission has considered, and a preliminary regulatory analysis. 15 U.S.C. 1193(i). Before issuing a final rule, the Commission must prepare a final regulatory analysis and make certain findings concerning any relevant voluntary standard, the relationship of costs and benefits of the rule, and the burden imposed by the regulation. *Id.* 1193(j). In addition, the Commission must find that the standard: (1) is needed to adequately protect the public against the risk of the occurrence of fire leading to death, injury, or significant property damage; (2) is reasonable, technologically practicable, and appropriate; (3) is limited to fabrics, related materials, or products which present unreasonable risks; and (4) is stated in objective terms. *Id.* 1193(b).

The Commission also must provide an opportunity for interested persons to make an oral presentation concerning the rulemaking before the Commission may issue a final rule. *Id.*

1193(d). The Commission requests that anyone who would like to make an oral presentation concerning this rulemaking please contact the Commission's Division of the Secretariat (see the ADDRESS section of this notice) within 45 days of publication of this notice. If the Commission receives requests to make oral comments, a date will be set for a public meeting via webinar for that purpose, and notice of the meeting will be provided in the *Federal Register*.

C. Description of the Proposed Amendment

Currently, the Standard requires that the ignition source for testing mattresses “shall be a Standard Reference Material cigarette (SRM 1196), available for purchase from the National Institute of Standards and Technology....” 16 CFR 1632.4(a)(2). CPSC now proposes to amend the Standard to require the use of SRM 1196a instead of SRM 1196.

D. Preliminary Regulatory Analysis

Section 4(i) of the FFA requires that the Commission prepare a preliminary regulatory analysis when it proposes to issue or amend a flammability standard under the FFA and that this analysis be published with the proposed rule. 15 U.S.C. 1193(i). CPSC staff conducted this analysis to assess the regulatory impact of the proposed amendment.

1. Market/Industry Information

The size of the U.S. mattress market increased from \$17.4 billion in 2018 to \$18.1 billion in 2019. Roughly 23.6 million mattress units shipped in 2018. Approximately 29 percent (6.8 million) of units shipped were imported products.

Three industry sectors supply Mattresses and Mattress Pads to the U.S. Market, categorized under the North American Industry Classification System (NAICS): NAICS Sector

337910 – Mattress Manufacturing, NAICS Sector 314120 – Curtain and Linen Mills, and NAICS Sector 423210 – Furniture and Merchant Wholesalers.

The Mattress Manufacturing Sector (337910) includes establishments primarily engaged in manufacturing innerspring, box spring, and non-innerspring mattresses. The Curtain and Linen Mills Sector (314120) comprises establishments primarily engaged in manufacturing household linens, bedspreads, sheets, tablecloths, towels, and shower curtains, from purchased materials. This sector includes mattress pad and mattress protector manufacturing. The Furniture and Merchant Wholesalers Sector (423210) is primarily engaged in the merchant wholesale distribution of furniture, except hospital beds and medical furniture. Importers of mattresses are typically categorized under NAICS code 423210.

According to the Small Business Administration (SBA), a firm in the Mattress Manufacturing sector (NAICS sector 337910) can be defined as “small” if the firm employs fewer than 1,000 workers. Under this definition, among the 250 firms identified by staff in the sector, 240 are small businesses that supply mattress products. The SBA defines a firm within the Curtain and Linen Mills Sector (NAICS sector 314120) as small if the firm employs fewer than 750 workers. Under this definition, among the 20 firms identified by staff, 19 firms are small and currently supply mattress products to the U.S. mattress market. Finally, a firm in the Furniture and Merchant Wholesale Sector (NAICS sector 423210) is defined as small if the firm employs fewer than 100 workers. All of the 88 firms staff identified in this sector meet this definition of small. Under SBA-provided definitions, staff finds the majority of firms supplying the U.S. market for mattresses and mattress pads are small businesses.

2. The Mattress Standard

The mattress standard at 16 CFR part 1632 requires premarket, full-scale prototype testing for each new mattress design. Prototype testing also must be performed for each change in materials of an existing design that may affect cigarette ignition resistance.

Under the Standard, four defined test procedures require the use of an SRM ignition source: the mattress test procedure, the mattress pad test procedure, the ticking classification test procedure, and the tape edge substitution test procedure. The number of test cigarettes required by these test procedures range from 18 SRM test cigarettes consumed during the ticking classification test, to 108 SRM test cigarettes consumed during the mattress or mattress pad test procedures. Furthermore, under the Standard only SRM test cigarettes from unopened packages can be selected for a series of tests, and if a cigarette extinguishes before burning its full length on any mattress surface location, the test must be repeated with a freshly lit cigarette. Therefore, mattress and mattress pad test procedures require, in practice, 6 packs of SRM cigarettes, the ticking classification test procedure requires in practice 1 pack of SRM cigarettes, and the tape edge substitution test requires, at a minimum, 2 packs of SRM cigarettes.

SRM 1196a is available for purchase from NIST at a minimum order of 2 cartons. A carton contains 10 packs, and each pack contains 20 cigarettes; therefore, two cartons from NIST will contain 400 SRM cigarettes. Based on information collected by staff from a selection of domestic third-party testing facilities, a third-party testing facility uses an average of 10 to 40 packs of SRM cigarettes (or between 200 – 800 test cigarettes) per month. These data provide insight into the number of tests cigarettes used by third party testing facilities located in the United States, as an order of magnitude. A testing facility that uses 400 test cigarettes per month would need to purchase two cartons of SRM cigarettes from NIST every month.

3. Potential Benefits and Costs

The SRM cigarette described in the proposal would have approximately the same ignition strength characteristics as originally intended by the Standard. The use of SRM 1196a cigarettes would not change the flammability performance tests or test method required under the Standard.

i. Potential Benefits

The proposed amendment is “safety-neutral,” so mattresses that passed or failed under the existing Standard would be expected to generate similar results when SRM 1196a is used. The level of protection provided by the Standard would neither increase nor decrease as a result of the change from SRM 1196 to SRM 1196a. Thus, there would be no impact on the level or value of fire safety benefits derived from the 16 CFR part 1632 Standard.

Because NIST has exhausted its supply of SRM 1196, adopting the proposed amendment to require the use of SRM 1196a will allow firms access to an ignition source that would permit them to continue testing mattresses and mattress pads to the Standard. The proposed amendment would thus provide significant benefits to firms, since failing to adopt this amendment would mean that the Standard would require firms to test using an ignition source that is no longer available for purchase.

As an interim measure in 2018, when NIST’s stock of SRM 1196 cigarettes was depleted, CPSC’s Office of Compliance issued guidance stating that testing to the Standard could be completed with commercial king-size, non-filtered FSC cigarettes. CPSC’s Office of Compliance amended its Interim Enforcement Policy guidance, effective September 2020, to allow testing with either reserved stock of SRM 1196 or new stock of SRM 1196a. Accordingly, testing with FSC cigarettes to the Standard is no longer permitted. The Commission welcomes comments concerning whether any entity has a stockpile of SRM 1196 cigarettes and whether

the Commission should continue to allow the use of SRM 1196 cigarettes as an ignition source under the Standard.

SRM cigarettes provide a common ignition source for all laboratories, while commercially available FSC cigarettes do not offer that consistency. The ignition strength of FSC cigarettes vary from one brand to another. Because FSC cigarettes are required to have an ignition strength lower than 25 and are often much weaker, FSC cigarettes would have an ignition strength substantially lower than SRM 1196a. As a result, compliance test results would vary between a test conducted with one brand of FSC cigarette and another, making testing, reporting, and enforcement inconsistent and unreliable.

Furthermore, FSC cigarettes are intended to self-extinguish when left unattended. Under the Standard, results from a cigarette that does not burn its full length are not accepted. Any cigarette which extinguishes before burning its full length on any mattress surface location must be retested with a freshly lit cigarette. As a result, use of the FSC cigarette as the replacement ignition source would likely lead to an increase in the average number of cigarettes used for each complete test. FSC cigarettes would likely self-extinguish, requiring multiple freshly lit cigarettes to complete a test, thereby increasing the costs of testing and time burdens associated with testing.

In contrast to the inconsistency and unreliability of FSC cigarettes, the replacement SRM 1196a is a statistically equivalent replacement for SRM 1196, and would reduce the need for retesting and lighting fresh FSC cigarettes. Furthermore, SRM 1196a allows for consistency in reporting and testing between laboratories. The proposed amendment specifying SRM 1196a as a replacement cigarette would achieve consistency and prevent uncertainty for industry, testing laboratories, and CPSC.

ii. Potential Costs

The cost increase associated with the proposed amendment is related to the SRM test cigarettes used as the ignition source for testing. Prices for SRM 1196a are set by NIST. SRM 1196a is available for purchase from NIST at a minimum order of 2 cartons, at a cost of \$400, plus shipping. A carton contains 10 packs, and each pack contains 20 cigarettes; therefore, two cartons from NIST will contain 400 SRM cigarettes. The price charged for SRM 1196a is approximately 74 percent higher than the price for SRM 1196. The price charged by NIST for SRM 1196 had been \$230 for 2 cartons of test material (20 packs of cigarettes), plus shipping.

If SRM 1196a is adopted as the replacement for SRM 1196, manufacturers and importers of mattresses would be responsible for ensuring that their mattress products are tested using SRM 1196a. If a supplier's mattress product does not comply with the requirements, they will need to either modify the product, or cease their manufacture or importation. Additionally, as required by the CPSIA and its implementing regulations, manufacturers and importers of youth mattresses would be required to certify that their mattresses intended for children comply with the requirements of the Standard. Many domestic manufacturers of youth mattresses are small entities as defined by SBA. The following analysis reviews some of the possible impacts using SRM 1196a in the Standard.

The annual cost of adopting the SRM 1196a test cigarette will vary among small firms. Different firms offer a variety of mattress products and have different operational procedures for mattress product development and testing. Among other considerations, the number of mattresses produced annually by small firms is not uniform. Furthermore, some firms perform testing procedures in-house, while others elect or are required to have testing performed by a CPSC-approved conformity assessment body. The number of new prototypes that a firm will

bring to market, and the size of a production run by a small firm, is up to the firm to decide; but the cost per firm of the proposed amendment would be impacted by these individual decisions.

Staff has reviewed a variety of likely cost increases that may be faced by small firms in adopting SRM 1196a, in three separate testing scenarios. The Commission welcomes comments on the number and types of tests performed by firms on a monthly (or annual) basis. The Commission also welcomes comments from small firms on estimates of the number of SRM test cigarettes they use on a monthly (or annual) basis.

To determine the likely costs faced by small firms from use of SRM 1196a cigarettes, staff analyzed testing costs related to the Standard in a manner that is consistent with past economic analysis of the industry. The analysis uses commercial data published online for mattress manufacturing, bedding manufacturing, and wholesale mattress product importers acquired from Dun and Bradstreet. Staff has also reviewed current mattress products available on the market from a variety of small domestic suppliers and has received input from industry on the type and frequency of testing performed by industry under the Standard. Based on all of the information that staff has analyzed, staff has determined that the following three scenarios represent a likely range of costs incurred by small firms.

Scenario 1

A small firm produces on average 20 new mattress models per year. Five of these new mattress models are new prototypes, and 14 models are made with new ticking substitutions. The one remaining model requires a tape edge substitution test. Such a firm would consume 46 packs of test cigarettes annually.

(5 mattress tests x 6 packs + 14 ticking tests x 1 pack + 1 tape substitution test x 2 packs = 30 packs + 14 packs + 2 packs = 46 packs)

Scenario 2

A small firm produces on average 5 new mattress models per year. Two of these new mattress models are new prototypes, and the remaining three models are made with new ticking substitutions. Such a firm would consume 15 packs of test cigarettes annually.

(2 mattress tests x 6 packs + 3 ticking tests x 1 pack = 12 packs + 3 packs = 15 packs)

Scenario 3

A small firm produces on average 3 new mattress models per year. Each mattress model is sold with a protective mattress pad, intended for use with a crib mattress in a standard-size crib. Such a firm would consume 36 packs of test cigarettes annually.

(3 mattress tests x 6 packs + 3 mattress pad tests x 6 packs = 18 packs + 18 packs = 36 packs)

As noted, the cost of SRM 1196a is about 74 percent higher than that of SRM 1196. Not accounting for shipping costs, a pack of SRM 1196 costs the firm approximately \$11.50, while SRM 1196a costs the firm \$20. Using the cost of SRM 1196 and SRM 1196a, we can calculate the cost increase faced by firms under the three scenarios above:

- In scenario 1, the firm with 20 new models using 46 test cigarette packs annually would incur increased costs of \$391, from \$529 annually (46 packs x \$11.50 per pack = \$529) to \$920 annually (46 packs x \$20 per pack = \$920).
- In scenario 2, the firm with five new models using 15 test cigarette packs annually would incur increased costs of \$127.50, from \$172.50 annually (15 packs x \$11.50 per pack = \$172.50) to \$300 annually (15 packs x \$20 per pack = \$300).
- In scenario 3, the firm with 3 new mattress models and 3 new mattress pad models using 36 packs annually would incur increased costs of \$306, from \$414 annually (36 packs x \$11.50 per pack = \$414) to \$720 annually (36 packs x \$20 per pack = \$720).

Staff finds the effective increase in the price per pack charged by NIST from \$11.50 to \$20 ranges from roughly \$127.50 to \$391 per year, among small firms in the above scenarios. Therefore, this is roughly the cost increase that small firms may face if SRM 1196a is adopted as the replacement reference material. The cost to a small firm would vary depending on the testing scenario.

The number of new prototypes that a small firm will bring to market is up to the individual firm to decide, but the cost per firm of the proposed amendment would be impacted by these individual business decisions. The small firm may choose to make new prototypes every year and bring them to market, or it may elect to substitute ticking and modify existing models of mattress products that are selling well or are customer favorites.

In summary, the proposed amendment to specify the SRM 1196a cigarette is not expected to have a significant impact on expected benefits or costs of the Standard in 16 CFR part 1632. Both the expected benefits and likely economic costs of the amendment are small, and the likely effect on testing costs per new prototype mattress or ticking substitution would be minor, especially when the projected cost is allocated over a production run of complying mattresses.

4. Regulatory Alternatives

The Commission could consider two basic alternatives to the proposed amendment: (1) allow for the use of FSC cigarettes as the ignition source; or (2) take no action on the smoldering ignition source issue.

Neither the proposed amendment nor alternative one would likely have a substantial economic impact. There would, however, be some relative differences in terms of resource costs and potential effects on the level of benefits the Standard affords. Alternative two would impose a significant economic impact, as it would require firms to use an ignition source that is no longer available, effectively making it impossible for firms to comply with the Standard. The advantages and disadvantages of these two basic alternatives are discussed below.

a. Allow for the Use of FSC Cigarettes

Under the first alternative, manufacturers and testers could conduct tests with any available FSC cigarettes.

A possible advantage of the Commission taking this alternative action is that some of the projected minor increase in resource costs of testing would not be incurred, since FSC cigarettes are less expensive than SRM 1196a. As noted, however, firms would likely have to use many more FSC cigarettes than SRM 1196a cigarettes due to the likelihood that FSC cigarettes would extinguish before testing is complete.

Disadvantages of the Commission taking this action include an increase in test result variability due to differences in cigarettes. Tests would be less reliable and results would vary depending on which cigarette was used. This would create uncertainty and confusion surrounding the reliability of tests for compliance with 16 CFR part 1632. Manufacturers and testing firms would have to conduct tests that are either wasteful (in terms of extra cigarettes required to complete a test due to cigarettes prematurely extinguishing) or have irreproducible and unreliable results.

b. No Action

If the CPSC took no action, firms would be required to use an ignition source that is no longer available for purchase. Firms would be unable to comply with the Standard.

In summary, there are no readily available or technically feasible alternatives to the proposed amendment that would have lower estimated costs and still address the need for a consistent ignition source that retains the “safety-neutral” approach of the proposed amendment.

E. Regulatory Flexibility Act Certification

Under the Regulatory Flexibility Act (RFA), 5 U.S.C. 601 et seq., an agency that engages in rulemaking generally must prepare initial and final regulatory flexibility analyses describing the impact of the rule on small businesses and other small entities. Section 605 of the RFA provides that an agency is not required to prepare a regulatory flexibility analysis if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

The proposed rule would retain the current mattress test procedure, but require that entities performing cigarette ignition tests (including the CPSC, other state agencies, and industry testing organizations) purchase and use SRM 1196a cigarettes at a higher cost than the price at which SRM 1196 cigarettes had been sold. No additional actions would be required of small entities. The costs associated with the proposed rule would essentially be borne by mattress manufacturers and importers that perform (or pay fees for) compliance testing.

All of the suppliers of mattress products to the U.S. market identified by staff are domestic firms. We limit our analysis to domestic firms because U.S. Small Business Administration (SBA) guidelines pertain to U.S.-based entities.

To determine whether a regulatory flexibility analysis or a certification statement of no significant impact on a substantial number of small entities is appropriate for a proposed rule, staff determines a threshold for “no significant economic impact.” The SBA provides leeway in determining the threshold and provides several varied examples of screening measures, including the one percent of gross revenue measure. Staff has chosen the gross revenue calculation because we have data to support its calculation.

For each market segment, staff is able to demonstrate that the proposed rule would impose an economic impact of less than 1 percent of gross revenue for the affected firms. Therefore, staff recommends certification for the rule. The following analysis provides the basis for this conclusion.

1. Small Mattress Manufacturers

Staff identified 240 firms in the Mattress Manufacturing Sector that meet SBA size standards for small business. Among small mattress manufacturing firms, 220 firms employed fewer than 100 workers. Across small firms in the Mattress Manufacturing sector, staff found annual revenue averaged \$10.49 million.

The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$128,000. One percent of annual revenue for the firm is \$1,280 (\$128,000 x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$1,280 should be considered significant.

Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard, the increase would amount to less than 1 percent of annual revenue, \$1,280, and would not be considered significant.

2. Small Textile Manufacturers

Staff identified 19 firms in the Textile Manufacturing Sector that meet SBA size standards for small business. Among small textile manufacturing firms, 14 firms employed fewer than 20 workers. Across small firms in the Textile Manufacturing sector, staff found annual revenue averaged \$2.83 million.

The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$200,000. One percent of annual revenue for the firm is \$2,000 (\$200,000

x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$2,000 should be considered significant.

Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard, the increase would amount to less than 1 percent of annual revenue, \$2,000, and could not be considered significant.

3. Small Importers

Staff identified 88 firms in the Mattress Wholesale Sector that meet SBA size standards for small business. Among small wholesale importers of mattress products, 72 firms employed fewer than 20 workers. Across small firms in the Mattress Wholesale sector, staff found annual sales averaged \$7.84 million.

The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$322,000. One percent of annual revenue for the firm is \$3,220 (\$322,000 x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$3,220 should be considered significant.

Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard, the increase would amount to less than 1 percent of annual revenue, \$3,220, and could not be considered significant.

4. Conclusion

Based on this information, the proposal would have little or no effect on small producers because the design and construction of existing, compliant mattress products would remain unchanged and because the resource cost increase of using SRM 1196a cigarettes would represent a minimal increase in total testing costs. Thus, the Commission preliminarily

concludes that the proposed rule would not have a significant impact on a substantial number of small businesses or other small entities.

F. Environmental Considerations

Pursuant to the National Environmental Policy Act, and in accordance with the Council on Environmental Quality regulations and CPSC procedures for environmental review, the Commission has assessed the possible environmental effects associated with the proposed rule.

The Commission's regulations state that amendments to rules providing performance requirements for consumer products normally have little or no potential for affecting the human environment. 16 CFR 1021.5(c)(1). Nothing in this proposed rule alters that expectation. Therefore, because the proposed amendment would have no adverse effect on the environment, neither an environmental assessment nor an environmental impact statement is required.

G. Executive Orders

According to Executive Order 12988 (February 5, 1996), agencies must state in clear language the preemptive effect, if any, of new regulations. The proposed rule, if finalized, would modify a flammability standard issued under the FFA. With certain exceptions that are not applicable in this instance, no state or political subdivision of a state may enact or continue in effect "a flammability standard or other regulation" applicable to the same fabric or product covered by an FFA standard if the state or local flammability standard or other regulations is "designed to protect against the same risk of the occurrence fire" unless the state or local flammability standard or regulation "is identical" to the FFA standard. *See* 15 U.S.C. 1476(a). The proposed rule would not alter the preemptive effect of the existing mattress standard.

Thus, the proposed rule would preempt nonidentical state or local flammability standards for mattresses or mattress pads designed to protect against the same risk of the occurrence of fire.

H. Effective Date

Section 4(b) of the FFA (15 U.S.C. 1193(b)) provides that an amendment of a flammability standard shall become effective one year from the date it is promulgated, unless the Commission finds for good cause that an earlier or later effective date is in the public interest, and the Commission publishes the reason for that finding. Section 4(b) of the FFA also requires that an amendment of a flammability standard shall exempt products “in inventory or with the trade” on the date the amendment becomes effective, unless the Commission limits or withdraws that exemption because those products are so highly flammable that they are dangerous when used by consumers for the purpose for which they are intended. The Commission believes that an effective date of thirty days would give adequate notice to all interested persons for firms to obtain SRM 1196a cigarettes from NIST. The purpose of this amendment is to allow manufacturers to replace SRM 1196 cigarettes which are no longer available. Accordingly, manufacturers are already purchasing SRM 1196a cigarettes as the SRM 1196 stock is depleted. Therefore, the Commission proposes that the amendment to the ignition source provision of the standard would become effective 30 days after publication of a final amendment in the *Federal Register*. The Commission seeks comment on the proposed effective date.

I. Proposed Findings

Section 4(a) and (j)(2) of the FFA require the Commission to make certain findings when it issues or amends a flammability standard. The Commission must find that the standard or amendment: (1) is needed to adequately protect the public against the risk of the occurrence of fire leading to death, injury, or significant property damage; (2) is reasonable, technologically practicable, and appropriate; (3) is limited to fabrics, related materials, or products which present unreasonable risks; and (4) is stated in objective terms. 15 U.S.C. 1193(b). In addition, the

Commission must find that: (1) if an applicable voluntary standard has been adopted and implemented, that compliance with the voluntary standard is not likely to adequately reduce the risk of injury, or compliance with the voluntary standard is not likely to be substantial; (2) that benefits expected from the regulation bear a reasonable relationship to its costs; and (3) that the regulation imposes the least burdensome alternative that would adequately reduce the risk of injury. Because section 4(a) of the FFA refers to proceedings for the determination of an appropriate flammability standard “or other regulation or amendment,” and because this proposed rule would be an amendment rather than a new flammability standard, for purposes of this section of the preamble, we will refer to the proposed rule as a “proposed amendment.” These findings are discussed below.

The amendment to the Standard is needed to adequately protect the public against unreasonable risk of the occurrence of fire. The current Standard specifies as the ignition source cigarettes that are no longer being produced. In order for the Standard to continue to be effective (and for labs to test mattresses and mattress pads to determine whether they comply with the Standard), it is necessary to change the ignition source specification. Changing the ignition source to SRM 1196a, rather than FSC cigarettes, will ensure that testing is reliable and that results will not vary from one lab or manufacturer to another. Such variation would be likely if labs or manufacturers were able to use different ignition sources that have similar physical properties but different burning characteristics.

The amendment to the Standard is reasonable, technologically practicable, and appropriate. The proposed amendment is based on technical research conducted by NIST and CPSC staff, which established that the SRM 1196a cigarette is capable of providing reliable and reproducible results in flammability testing of mattresses and mattress pads. The proposed SRM

1196a ignition source represents an equivalent, safety-neutral ignition source for use in testing to establish compliance with the Standard.

The amendment to the Standard is limited to fabrics, related materials, and products that present an unreasonable risk. The proposed amendment would continue to apply to the same products as the existing Standard.

Voluntary standards. There is no applicable voluntary standard for mattresses. The proposal would amend an existing federal mandatory standard.

Relationship of benefits to costs. Amending the Standard to specify SRM 1196a cigarettes as the ignition source would allow testing to the Standard to continue without interruption, would maintain the effectiveness of the Standard, and would not significantly increase testing costs to manufacturers and importers of mattresses and mattress pads. Thus, there is a reasonable relationship between benefits and costs of the proposed amendment. Both expected benefits and costs of the proposed amendment are likely to be small. The likely effect on testing costs would be minor.

Least burdensome requirement. No other alternative would allow the Standard's level of safety and effectiveness to continue. Thus, the proposed amendment imposes the least burdensome requirement that would adequately address the risk of injury.

J. Conclusion

For the reasons discussed above, the Commission preliminarily finds that amending the mattress flammability standard (16 CFR part 1632) to specify SRM 1196a cigarettes as the ignition source is needed to adequately protect the public against the unreasonable risk of the occurrence of fire leading to death, injury, and significant property damage. The Commission also preliminarily finds that the amendment to the Standard is reasonable, technologically

practicable, and appropriate. The Commission further finds that the amendment is limited to the fabrics, related materials, and products that present such unreasonable risks.

List of Subjects in 16 CFR Part 1632

Consumer protection, Flammable materials, Labeling, Mattresses and mattress pads, Records, Textiles, Warranties.

For the reasons given above, the Commission proposes to amend 16 CFR part 1632 as follows:

PART 1632 – STANDARD FOR THE FLAMMABILITY OF MATTRESSES AND MATTRESS PADS (FF 4-72, AMENDED)

1. The authority citation for part 1632 continues to read as follows:

Authority: 15 U.S.C. 1193, 1194; 15 U.S.C. 2079(b).

2. Section 1632.4 is amended to read as follows:

Sec. 1632.4 Mattress test procedure.

(a) * * *

(2) *Ignition source.* The ignition source shall be a Standard Reference Material cigarette (SRM 1196a), available for purchase from the National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, MD 20899.

* * * * *

Dated: _____.

Alberta E. Mills, Secretary
Consumer Product Safety Commission



Staff Briefing Package

Draft Proposed Amendment to 16 CFR Part 1632 *Standard for the Flammability of Mattresses and Mattress Pads*

September 30, 2020

For additional information, contact:

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Executive Summary

The *Standard for the Flammability of Mattresses and Mattress Pads* (Standard) is codified at 16 CFR part 1632. The Standard includes a test method that evaluates the smoldering ignition resistance of a mattress or mattress pad by exposing the surface to specified lighted cigarettes in a draft-protected environment. The standard ignition source specified at 16 CFR §1632.4(a)(2) is a Standard Reference Material (SRM) cigarette, which is available for purchase from the National Institute of Standards and Technology (NIST).

SRM 1196, *Standard Cigarette for Ignition Resistance Testing*, was procured by NIST in a single production run intended to last approximately 10 years from its introduction in 2010. In late 2018, the supply of the first production run of SRM 1196 was depleted. Due to the depletion of the SRM 1196 cigarettes, the CPSC's Office of Compliance issued several Interim Enforcement Policies for the mattress industry, providing testing guidance related to cigarette availability. The November 2018 Enforcement Policy allowed reduced testing of mattresses and mattress pads while there was a shortage of SRM 1196, and when the supplies were depleted in December 2018, a revised Enforcement Policy permitted testing with commercial off-the-shelf (COTS), king-size, non-filtered FSC cigarettes. Subsequently, NIST procured and certified a new production run, which was introduced as SRM 1196a, in February 2020. CPSC staff's evaluation of SRM 1196a concluded that it is a comparable, safety-neutral replacement for SRM 1196, and the Office of Compliance has issued industry guidance on SRM 1196a.

Accordingly, staff prepared a draft proposed amendment to update the standard ignition source specified in 16 CFR part 1632, *Standard for the Flammability of Mattresses and Mattress Pads*. The proposed amendment seeks to update the reference in 16 CFR § 1632.4(a)(2), from the current SRM 1196 to the equivalent SRM 1196a. Staff recommends that the Commission publish a notice of proposed rulemaking (NPR) in the *Federal Register* to reflect the update of the ignition source specification from NIST SRM 1196 to NIST SRM 1196a.

Staff notes that the cost of SRM 1196 was approximately \$230 per unit (20 packs of cigarettes), while one unit of SRM 1196a sells for \$400. Staff concludes that this increased cost will not have a significant economic impact on a substantial number of small entities. Therefore, the Commission can certify under the Regulatory Flexibility Act that this rule will not have a significant impact on a substantial number of small entities.

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UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814

Memorandum

Date: September 30, 2020

TO: The Commission
Alberta E. Mills, Secretary

THROUGH: John G. Mullan, 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
Lisa Scott, Project Manager, Directorate for Laboratory Sciences, Office of Hazard Identification and Reduction

SUBJECT: Draft Proposed Amendment to 16 CFR Part 1632
Standard for the Flammability of Mattresses and Mattress Pads

Introduction

This memorandum presents information on CPSC staff's draft proposed amendment to update the standard ignition source specified in 16 CFR part 1632, *Standard for the Flammability of Mattresses and Mattress Pads*.

Background

The *Standard for the Flammability of Mattresses and Mattress Pads* (Standard) is codified at 16 CFR part 1632. The Standard includes a test method that measures the smoldering ignition resistance of a mattress or mattress pad by exposing the surface to specified lighted cigarettes in a draft-protected environment. The standard ignition source specified at 16 CFR § 1632.4(a)(2) is a Standard Reference Material (SRM) cigarette that is available for purchase from the National Institute of Standards and Technology (NIST). The proposed staff amendment seeks to update the reference, from the current SRM 1196 to a comparable, safety-neutral replacement, SRM 1196a.



Image of a single pack of SRM 1196a (foreground) and SRM 1196 (background). Photo Credit: NIST

When issued under the Flammable Fabrics Act (FFA) in 1972, the original specification for the ignition source included physical characteristics of a conventional, commercially available, non-filtered, king-sized cigarette. Although no specific brand was identified in the standard, a Pall Mall Red cigarette, manufactured by R. J. Reynolds Tobacco Company (RJR), was commonly known to meet the specifications. In early 2008, RJR notified the CPSC that the company intended to convert its production of Pall Mall Red cigarettes to be Fire Standard Compliant (FSC) to meet an increasing number of states' so-called "fire-safe cigarette" requirements.¹

In 2008, CPSC sought to find an alternate ignition source and contracted with NIST to develop an ignition source with an ignition strength equivalent to the conventional Pall Mall Red cigarette. The ignition strength² value is on a scale from 0 to 100 and is analogous to the percentage of full-length burns (PFLB) on a laboratory substrate. Lower values indicate a cigarette more likely to self-extinguish when not actively being smoked; higher values indicate a cigarette is more likely to remain lit while unattended. The Pall Mall Red ignition strength varied by vintage from a measured low of 35 to a high of 95, most often falling at the higher end of the range. FSC cigarettes are required to have an ignition strength lower than 25 and in practice are often much weaker to ensure uniform compliance.

Through the 2008 CPSC staff contract with NIST, NIST developed SRM 1196, *Standard Cigarette for Ignition Resistance Testing*. SRM 1196 was available for purchase starting in September 2010. On November 1, 2010, CPSC proposed the use of the SRM 1196 cigarette as the standard ignition source in an NPR. (75 Fed. Reg. 67047). On September 23, 2011, the CPSC issued a final rule amending the

¹ Fire Standard Compliant refers to cigarettes that have been tested using the test method in ASTM E 2187, *Standard Test Method for the Ignition Strength of Cigarettes*. FSC cigarettes are designed to reduce the amount of time that a cigarette continues to burn when it is not actively being smoked.

² Ignition strength is determined using the test method in ASTM E 2187, *Standard Test Method for the Ignition Strength of Cigarettes*.

Standard to specify SRM 1196 as the standard ignition source, which became effective on September 23, 2012. (76 Fed. Reg. 59014).

All of the SRM 1196 cigarettes were produced in one production run, with a supply estimated to last approximately 10 years. NIST staff made several attempts to procure a new batch of SRM 1196 cigarettes as the supply dwindled, but in late 2018, the supply of SRM 1196 was depleted before NIST was able to complete a new procurement.

As an interim measure, the CPSC's Office of Compliance issued several Interim Enforcement Policies to permit the industry to continue to produce new products until a consistent replacement for SRM 1196 became available. The November 2018 Interim Enforcement Policy³ allowed reduced testing of mattresses and mattress pads while there was a shortage of SRM 1196. CPSC issued the December 2018 Interim Enforcement Policy⁴ when the NIST supply of SRM 1196 was depleted. It permitted testing with commercial off-the-shelf (COTS), king-size, non-filtered FSC cigarettes.

In February 2020, NIST procured and subsequently certified a replacement for SRM 1196, named SRM 1196a.⁵ NIST affirmed that SRM 1196 properties were replicated in the new SRM 1196a, because it has a similar ignition strength, tobacco column length and mass,⁶ uses unbanded paper,⁷ and has no filter. CPSC staff also evaluated SRM 1196a, and staff concluded that it is an appropriate replacement for SRM 1196 to test under the requirements of 16 CFR part 1632. NIST began selling SRM 1196a in February 2020. CPSC's Office of Compliance amended its Interim Enforcement Policy guidance to allow testing with either reserved stock of SRM 1196, or new stock of SRM 1196a, effective September 2020.⁸

Fire Incident Data

Recent fire loss estimates indicate that smoking material ignitions of mattresses or bedding lead to a large number of fire deaths and injuries. The memorandum in Tab A discusses the most recently available estimates. For the period from 2015 through 2017, there was an estimated annual average of

³ Interim Enforcement Policy for Mattress Pads Subject to 16 CFR part 1632, November 2018.

https://cpsc.gov/s3fs-public/Mattress%20Pads_Interim%20Enforcement%20Policy%2011.9.18%20Final%20%28002%29_0.pdf?kS3RljSlb5mNPYDi0.DxpbXebBI6A7RC

⁴ Updated Interim Enforcement Policy for Mattresses and Mattress Pads Subject to 16 CFR part 1632, December 2018.

<https://www.cpsc.gov/s3fs-public/Updated-Interim-Enforcement-Policy-for-Mattresses-and-Mattress-Pads-Dec2018.pdf?bELowYefQz9JuMUX6Ww.J0JoU1knh.jE>

⁵ NIST Releases a New Standard Cigarette for Testing the Flammability of Mattresses and Furniture, February 2020.

<https://www.nist.gov/news-events/news/2020/02/nist-releases-new-standard-cigarette-testing-flammability-mattresses-and>

⁶ Tobacco column length is the length of the cigarette that contains tobacco. For a non-filtered cigarette, this is the full length of the cigarette.

⁷ FSC cigarettes often employ "banded paper" to meet the requirements of FSC requirements. This paper has two to four thicker bands of paper along the length of the cigarette that function as "speed bumps" to slow the combustion when not actively being smoked. Non-FSC cigarettes use unbanded paper.

⁸ 2020 Interim Enforcement Policy for Mattresses and Mattress Pads Subject to 16 CFR part 1632, March 2020.

https://cpsc.gov/s3fs-public/2020InterimEnforcementPolicyforMattressesandMattressPadsUpdateDuetoCOVID19_032020.pdf

1,400 fires in which smoking materials ignited mattresses or bedding. These led to an estimated annual average of 200 deaths and 310 injuries.

Over the last couple of decades, the estimated number of these injuries has declined, while the estimated number of deaths has held fairly steady. As an overall proportion of residential structure fire deaths, deaths from smoking material ignitions of mattresses and bedding are a larger fraction of the total in recent years than they were in the early 2000s and consistently a major cause of fire death hazards in CPSC data.

Comparison of Ignition Source Alternatives

NIST staff specified performance requirements for the SRM 1196a contract which were comparable to the performance characteristics of SRM 1196 using a modified version⁹ of ASTM E 2187. The physical dimensions of both models are nominally identical. NIST staff certified SRM 1196a to have an ignition strength of 95.6% +/- 2.0%.¹⁰ SRM 1196 has an ignition strength of 90.0% +/- 2.1%. NIST included the following statement on the SRM 1196a certificate¹¹:

The ignition strength of the replacement for SRM 1196, SRM 1196a, is believed to be within 5% of that from SRM 1196 with 95% probability, and, therefore it is expected these regulations and test methods will adopt SRM 1196a as the specified standard ignition source.

In addition to the certification from NIST that SRM 1196 and SRM 1196a have equivalent characteristics using the modified ASTM E 2187 test method, CPSC staff evaluated both SRM cigarettes in side-by-side comparisons on representative substrates to further demonstrate that both SRM cigarettes yield comparable performance in CPSC testing situations. These materials included a noncompliant mattress and mattress pad and several ticking substitution mockups with different ticking classifications. Staff concludes in the memorandum in Tab B that SRM 1196a is a comparable, safety-neutral replacement for SRM 1196.

Staff's review shows that SRM 1196a is the most appropriate ignition source to replace SRM 1196 for the following reasons:

- Commercial cigarettes do not offer the same consistency of a certified SRM. The ignition strength varies from one brand to another, so compliance test results could vary between a test conducted by a firm with Brand A, and a test conducted by CPSC staff with Brand B, even

⁹ Ignition strength is determined using the test method in ASTM E 2187, *Standard Test Method for the Ignition Strength of Cigarettes*. SRM ignition strength follows same procedure but with a modified substrate responsive to the ignition strengths of SRM cigarettes. The modification to this test method is described in NIST Technical Note 1627.

<https://www.nist.gov/publications/modification-astm-e-2187-measuring-ignition-propensity-conventional-cigarettes-0>

¹⁰ These certified values and uncertainties are developed using a Bayesian statistical model supported by a random sample of cigarettes tested in a random sequence by multiple test operators using multiple test chamber apparatus. A NIST staff Technical Note describing the process is currently in review at NIST.

¹¹ [NIST Certificate of Analysis for Standard Reference Material 1196a.](https://www-s.nist.gov/srmors/certificates/1196a.pdf)

[https://www-s.nist.gov/srmors/certificates/1196a.pdf.](https://www-s.nist.gov/srmors/certificates/1196a.pdf)

though both brands may meet the parameters in the December 2018 Interim Enforcement Policy. SRM cigarettes provide a common ignition source for all laboratories.

- Cigarettes that are FSC are, by design, intended to self-extinguish when not actively being smoked. The test procedure in the Standard requires the cigarette to burn its full length to be a valid test. Section 1632.4(d) *Testing* requires a minimum of 18 lit cigarettes to burn their full length undisturbed on a mattress or mattress pad being tested. “If a cigarette extinguishes before burning its full length on any mattress surface location . . . the test must be repeated with a freshly lit cigarette.” Because FSC cigarettes are specifically designed to reduce the amount of time that a cigarette continues to burn while unattended, testing with FSC cigarettes could lead to many test locations with an incomplete initial data point, and also lead to substantially more repeated tests. This would add testing material costs by requiring more cigarettes to complete a test and increase the time required to complete the test.
- SRM 1196 and SRM 1196a are both “conventional” (non-FSC) cigarettes, comparable in ignition strength to the original cigarette ignition source specification in the Standard. Maintaining this continuity is an important safety consideration for the smoldering ignition resistance performance of legacy mattress and mattress pad prototypes and components. Deviating from this continuity could require manufacturers, particularly component manufacturers, to retest their product lines, and it may result in new ticking classifications.
- Both NIST and CPSC staff laboratory analyses conclude that SRM 1196a is a statistically equivalent replacement for SRM 1196 in all critical parameters.
 - The physical dimensions are nominally identical.
 - NIST certified the ignition strengths of both SRMs to be comparable based on a 95 percent confidence interval with a 5 percent margin in laboratory testing using the modified ASTM E 2187 test method.
 - CPSC concluded the ignition performance of both SRMs to be comparable based on a 90 percent confidence interval with a ± 35 percent margin in laboratory testing on representative mattress material substrates. While these bounds are larger than the NIST confidence interval for ASTM testing, it should be noted the NIST tests only examined the cigarette characteristics on substrates which have little variability. The CPSC testing must incorporate both cigarette and representative mattress materials and the mattress materials are inherently more variable than the benchmark substrates in the ASTM/NIST cigarette tests. Furthermore, this standard would be comparable to retrospective examination of the 2010 transition from the original ignition source to SRM 1196, CPSC compliance data, and the number of test replicates required by the standard.¹²

¹² Staff analyses also included a review of Office of Compliance records, including test records from before SRM 1196 was introduced in 2010.

Initial Regulatory Flexibility Analysis

The Directorate for Economic Analysis (EC) prepared an analysis to determine the effect of the increased cost of SRM 1196a on small businesses in the mattress industry. The memorandum in Tab C discusses this analysis. Both SRM 1196 and SRM 1196a are sold in units consisting of two cartons of cigarettes (20 packs). The cost of SRM 1196 was approximately \$230. One unit of SRM 1196a sells for \$400 from the NIST SRM office.

The economic analysis performed by staff finds the effective annual cost increase of adopting SRM 1196a would range from roughly \$127.50 to \$391 per firm, among small firms. This increase in cost would amount to less than 1 percent of the annual revenue of any small mattress-supplying firm in the United States. Therefore, staff recommends that the Commission certify that this rule will not have a significant impact on a substantial number of small entities involved in the manufacture or importing of mattresses or mattress pads.

The analysis concludes that incorporating SRM 1196a into the Standard (substituting SRM 1196a for SRM 1196 in the mandatory product safety rule), will not have a significant economic impact on a substantial number of small entities.

Conclusion

The smoldering ignition of mattresses and bedding is a leading fire hazard in CPSC annual data reports. Staff concludes that the Standard should be updated to restore the robust level of testing afforded by an SRM cigarette, replacing the Interim Enforcement Policy guidance issued when SRM 1196 was depleted in December 2018. While the temporary policy to permit testing with FSC cigarettes permitted the industry to continue producing new products, staff continued to pursue a comparable replacement for SRM 1196.

Staff's analyses in the accompanying tabs conclude that SRM 1196a is a comparable, safety-neutral alternative to SRM 1196, which will not have a significant economic impact on a substantial number of small businesses.

Recommendation

CPSC staff recommends that the Commission publish a notice of proposed rulemaking in the *Federal Register*, as drafted by staff, for a 75-day public comment period, to reflect the update of the ignition source specification from NIST Standard Reference Material 1196, to NIST Standard Reference Material 1196a.

Tab A – Fire Loss Estimates



**UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814**

Memorandum

Date: August 4, 2020

TO: Lisa Scott
16 CFR Part 1632 Mattress Standard Project Manager
Senior Fire Protection Engineer
Directorate of Laboratory Sciences

THROUGH: Stephen Hanway
Associate Executive Director
Directorate for Epidemiology

Risana Chowdhury
Division Director
Division of Hazard Analysis

FROM: David Miller
Division of Hazard Analysis

SUBJECT: Mattress and Bedding Fire Loss Estimates

Purpose

This memorandum provides estimates of deaths and injuries associated with mattress fires with an emphasis on casualties from fires where the heat source is smoking materials. The data are from the National Fire Incident Reporting System (NFIRS). This will show whether the hazard from smoldering mattress fires continues to be sizable. This is important when considering amending the Consumer Product Safety Commission's (CPSC) Standard for the Flammability of Mattresses and Mattress Pads (16 CFR part 1632) to update for a new standard reference material (SRM) cigarette.

Background

The Standard addresses fires where cigarettes ignite mattresses (or mattress pads). This standard sets forth a test to determine the ignition resistance of a mattress or mattress pad when exposed to a smoldering cigarette. Thus, the test is designed to exclude smolder-prone mattresses from the market to prevent deaths and injuries from fires where smoking materials ignite mattresses. The testing for this standard involves placing lit cigarettes directly on mattresses and on top of a layer of sheeting on mattresses. The standard originally called for using a commercial cigarette with specific physical characteristics in the tests. When that cigarette was no longer available, the standard was amended to require an SRM cigarette (SRM 1196) for the testing. The supplies of SRM 1196 have now been depleted. A new SRM cigarette, SRM 1196a, has been produced to be used in part 1632 testing.

CPSC is considering amending the Standard to require the SRM 1196a cigarette to be used in testing. There continues to be a large number of smoking material-ignited mattress and bedding fire deaths and injuries in the United States. If there was no smolder testing of mattresses, this could lead to more smolder-prone mattresses on the market and in U.S. homes, which could lead to higher numbers of smoking material mattress and bedding deaths and injuries.

Estimates

NFIRS data, in conjunction with the NFPA's national fire loss estimates, are used to produce estimates of residential structure fires and associated losses where a mattress or bedding was the *Item First Ignited*. NFIRS has a variable called *Item First Ignited*, and the following codes are counted as mattress and bedding fires:

“31 – Mattress, pillow”

“32 – Bedding; blanket, sheet, comforter”

When there is a mattress or bedding fire, it is difficult for the fire investigator to determine whether it was the mattress or bedding that ignited first. This is especially true of the more serious fires that lead to deaths or injuries. For this reason, CPSC staff does not distinguish between the codes for mattress (31) or bedding (32) in their estimates. These two codes are combined as “Mattress and Bedding.”

NFIRS also has a variable called *Heat Source* with codes for things that ignite the *Item First Ignited*. CPSC staff groups the *Heat Source* codes into “Smoking Materials,” “Small Open Flame,” and “Other.” There are three *Heat Source* codes that comprise the “Smoking Materials” codes:

‘61 – Cigarette’¹³

‘62 – Pipe or cigar’

‘63 – Heat from undetermined smoking material’

There are a different set of three *Heat Source* codes that make up the “Small Open Flame” codes:

‘64 – Match’

‘65 – Cigarette lighter’

‘66 – Candle’

All of the other *Heat Source* codes, including codes like ‘12 – Radiated, conducted heat from operating equipment,’ and ‘13 – Arcing,’ fall into the ‘Other’ category.

These CPSC staff estimates exclude intentionally set fires (except for child play fires) and non-civilian casualties. The estimates are also restricted, as NFIRS is, to fires attended by the fire service. Tables 1, 2, and 3 include fire, death, and injury estimates from the three most recent years, 2015 – 2017, for which CPSC staff has estimates.

¹³ A large majority of the NFIRS ‘Smoking Material’ fires (and fire deaths and injuries) are ones where the *Heat Source* is ‘61 – Cigarette.’

Table 1. Mattress and Bedding Fires, 2015 - 2017

Year	Total M&B Fires	Smoking Materials	Small Open Flame	Other Ignitions
2015	6,900	1,300	1,200	4,400
2016	6,500	1,400	1,100	4,100
2017	6,500	1,400	1,100	4,000
2015–2017 Avg.	6,700	1,400	1,100	4,200

Note: Estimates are made using data from NFIRS. Fire estimates are rounded to the nearest 100. Estimates from different Heat Sources may not add exactly to the total due to rounding.

Table 2. Mattress and Bedding Fire Deaths, 2015 - 2017

Year	Total M&B Deaths	Smoking Materials	Small Open Flame	Other Ignitions
2015	270	180	10	80
2016	360	250	20	90
2017	340	180	30	120
2015–2017 Avg.	320	200	20	100

Note: Estimates are made using data from NFIRS. Fire death estimates are rounded to the nearest 10. Estimates from different Heat Sources may not add exactly to the total due to rounding.

Table 3. Mattress and Bedding Fire Injuries, 2015 - 2017

Year	Total M&B Injuries	Smoking Materials	Small Open Flame	Other Ignitions
2015	910	280	160	470
2016	860	310	180	370
2017	950	340	160	450
2015–2017 Avg.	910	310	160	430

Note: Estimates are made using data from NFIRS. Fire injury estimates are rounded to the nearest 10. Estimates from different Heat Sources may not add exactly to the total due to rounding.

For 2015 through 2017, an estimated annual average of 200 deaths and 310 injuries were caused by smoking materials igniting mattresses or bedding. The deaths are an estimated 8.8 percent of the total number of residential structure fire deaths. The only combination of *Heat Source* and *Item First Ignited* codes with a larger estimated number of annual average deaths, from 2015 through 2017, is Smoking Material-Upholstered Furniture fire deaths (220), which is 9.4 percent of the total deaths.

Table 4 and Figure 1 show the NFIRS Mattress and Bedding Total fire death estimates, as well as the Smoking Material death estimates from 2000 through 2017. They both use 3-year average estimates.

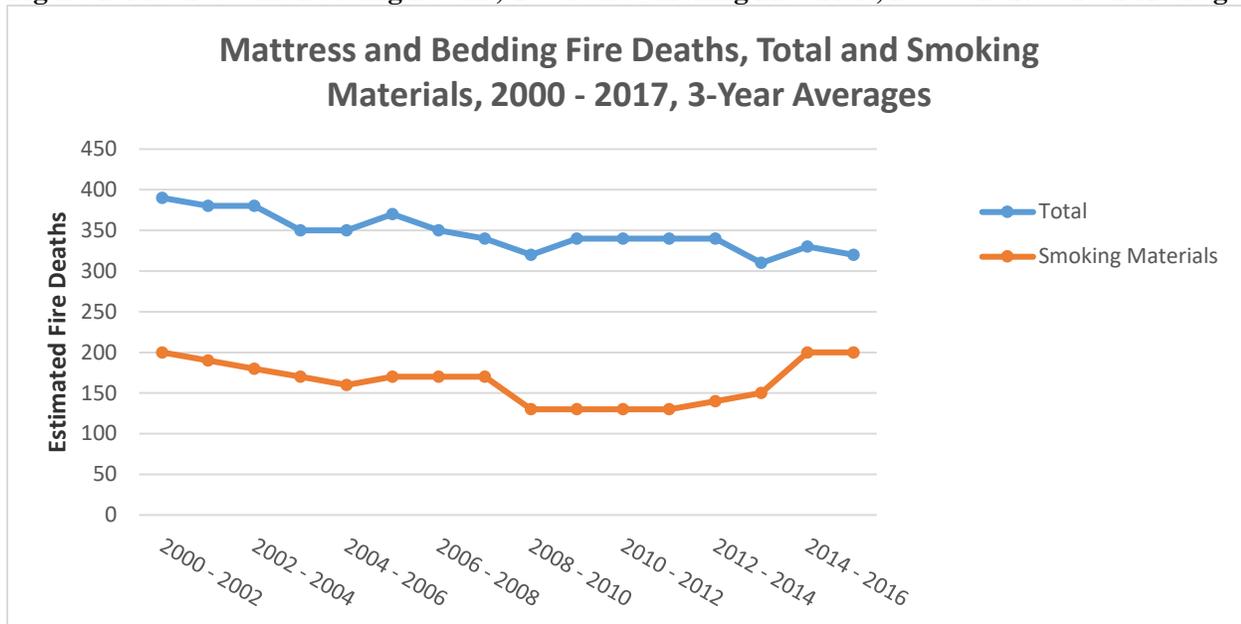
Table 4. Mattress and Bedding Deaths, Total and Smoking Materials, 2000–2017 3-Year Averages

Years	Total Mattress and Bedding Deaths	Smoking Materials
2000 – 2002 Avg.	390	200
2001 – 2003 Avg.	380	190
2002 – 2004 Avg.	380	180
2003 – 2005 Avg.	350	170
2004 – 2006 Avg.	350	160
2005 – 2007 Avg.	370	170
2006 – 2008 Avg.	350	170
2007 – 2009 Avg.	340	170
2008 – 2010 Avg.	320	130
2009 – 2011 Avg.	340	130
2010 – 2012 Avg.	340	130
2011 – 2013 Avg.	340	130
2012 – 2014 Avg.	340	140
2013 – 2015 Avg.	310	150
2014 – 2016 Avg.	330	200
2015 – 2017 Avg.	320	200

Note: Estimates are made using data from NFIRS. Fire death estimates are rounded to the nearest 10.

For the 3-year average of 2000 through 2002, Smoking Material – Mattress, Bedding fire deaths comprised an estimated 7.9 percent of all residential structure fire deaths. In 2015 through 2017, Smoking Material – Mattress, Bedding fire deaths were an estimated 8.8 percent of the total residential structure fire deaths.

Figure 1. Mattress and Bedding Deaths, Total and Smoking Materials, 2000 – 2017 3-Year Averages



Beginning with 2015 data, CPSC staff has been performing a specific type of quality control editing that can affect the ‘Smoking Material’ and ‘Other’ death estimates. CPSC staff began assigning to CPSC Field investigators all fatal incidents with a *Heat Source* code of ‘43 – Hot ember or ash’ or ‘60 – Heat

from other open flame or smoking materials.’ These investigations, in many cases, led to editing of the data. Many of the incidents originally coded with a *Heat Source* of ‘43 – Hot ember or ash,’ were actually miscodes of cigarette fires. Many of the fires, originally coded as ‘60 – Heat from other open flame or smoking materials,’ were ones where the specific *Heat Source* was unknown. These edits, particularly the ones for the ‘43 – Hot ember or ash’ incidents, tend to increase the estimates for ‘Smoking Material’ fire deaths and decrease the estimates for ‘Other’ fire deaths.

To assess the effect of the editing on the Mattress and Bedding fire death estimates for 2015 through 2017, CPSC staff also produced estimates using the pre-edited data. This led to the same total annual average estimate of Mattress and Bedding fire deaths (320), but a decrease of 40 (from 200 to 160) for ‘Smoking Material’ deaths and an increase of 40 (from 100 to 140) for ‘Other’ deaths. The ‘Small Open Flame’ annual average estimate remained the same at 20. Because this editing was not done until the 2015 data, it is logical to believe that before 2015, the ‘Smoking Material’ deaths were underestimated, and the ‘Other’ deaths were overestimated.

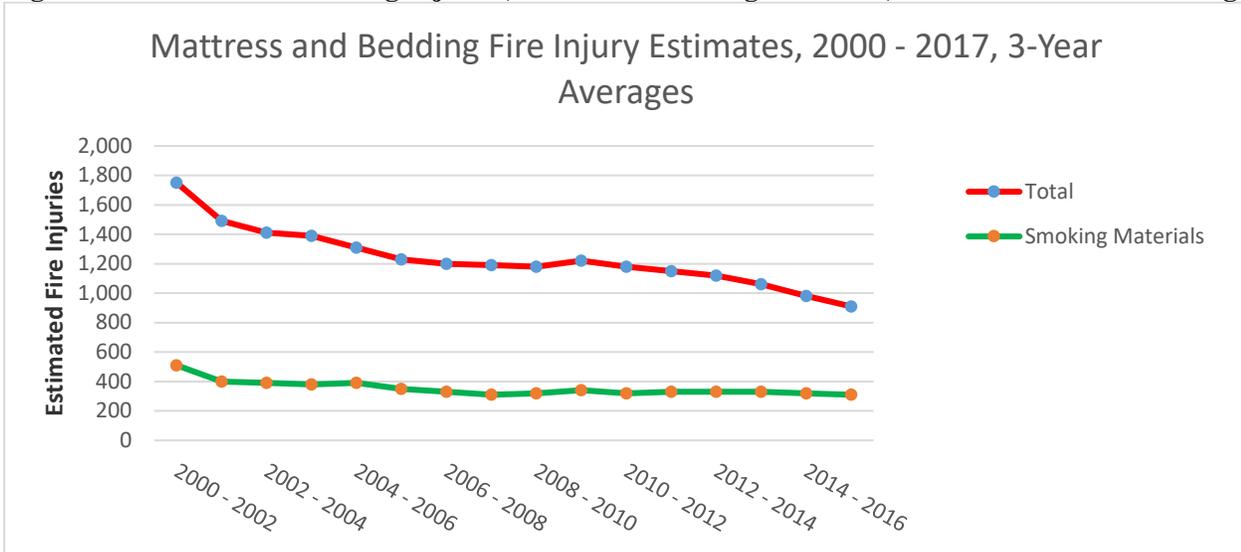
Table 5 and Figure 2 show the Mattress and Bedding-Total and Smoking Material nonfatal fire injury estimates from 2000 to 2017. Again, 3-year averages are used.

Table 5. Mattress and Bedding Injuries, Total and Smoking Materials, 2000 – 2017

Years	Total Mattress and Bedding Injuries	Smoking Materials
2000 – 2002 Avg.	1,750	510
2001 – 2003 Avg.	1,490	400
2002 – 2004 Avg.	1,410	390
2003 – 2005 Avg.	1,390	380
2004 – 2006 Avg.	1,310	390
2005 – 2007 Avg.	1,230	350
2006 – 2008 Avg.	1,200	330
2007 – 2009 Avg.	1,190	310
2008 – 2010 Avg.	1,180	320
2009 – 2011 Avg.	1,220	340
2010 – 2012 Avg.	1,180	320
2011 – 2013 Avg.	1,150	330
2012 – 2014 Avg.	1,120	330
2013 – 2015 Avg.	1,060	330
2014 – 2016 Avg.	980	320
2015 – 2017 Avg.	910	310

Note: Estimates are made using data from NFIRS. Fire injury estimates are rounded to the nearest 10.

Figure 2. Mattress and Bedding Injuries, Total and Smoking Materials, 2000 – 2017 3-Year Averages



Conclusions

Based on CPSC staff’s NFIRS estimates, deaths and injuries continue to be a substantial hazard from smoking materials igniting mattresses and bedding. Annual average estimates from the most recent 3 years of NFIRS (2015 – 2017) are of 320 deaths and 910 injuries. Smoking material ignitions account for 200 of these deaths and 310 of these injuries. The estimated 200 deaths from smoking material ignitions of mattresses and bedding are 8.8 percent of the estimated total residential structure fire deaths (2,290) for this time period. This proportion is even higher than it was in the 3-year period from 2000 through 2002, when it was 7.9 percent.

It is difficult for fire investigators to determine whether the *Item First Ignited*, in a particular bed fire, is the mattress, a sheet, a blanket, a comforter, pillow, etc. For this reason, CPSC staff combine fires where the *Item First Ignited* is ‘31 – Mattress, pillow’ and ones where it is ‘32 – Bedding; blanket, sheet, comforter’ into one group called ‘Mattress and Bedding.’ The Standard for the Flammability of Mattresses and Mattress Pads, 16 CFR part 1632, addresses fires where smoking materials ignited mattresses or a sheet on top of a mattress. As can be seen from the data, over the last two decades, the estimated number of Smoking Material - Mattress and Bedding injuries has declined, while the estimated number of deaths has held fairly steady. There continues to be a large number of smoking material-ignited mattress and bedding fire deaths and injuries in the United States.

Tab B – CPSC Staff Equivalence Study



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
BETHESDA, MD 20814

Memorandum

Date: July 2, 2020

TO: Lisa Scott
16 CFR Part 1632 Mattress Standard Project Manager
Senior Fire Protection Engineer
Directorate of Laboratory Sciences

THROUGH: Stephen Hanway
Associate Executive Director
Directorate for Epidemiology

Risana Chowdhury
Division Director
Division of Hazard Analysis

FROM: Tammy Massie
Division of Hazard Analysis

SUBJECT: Mattress Ignition Equivalence Testing and Results Comparing New SRM 1196a to SRM 1196 Cigarettes

Purpose

This memorandum presents summary results from an analysis based on laboratory testing data establishing statistical equivalence of two Standard Reference Material (SRM) cigarettes: SRM 1196a and SRM 1196.¹⁴ The conclusions from the data and associated statistical analysis provide evidence to support the comparability of the two cigarettes and demonstrate that the new cigarette SRM 1196a is a suitable replacement for SRM 1196. Furthermore, specific results from staff studies, as well as the totality of evidence from these studies, supports CPSC staff's proposed technical amendment to 16 CFR part 1632, *Standard for the Flammability of Mattresses and Mattress Pads* (Standard).

Background

The National Institute of Standards and Technology (NIST) developed and maintains SRM 1196 *Standard Cigarette for Ignition Resistance Testing*. This cigarette is the specified ignition source for 16 CFR part 1632, *Standard for the Flammability of Mattresses and Mattress Pads* (Standard). A new

¹⁴ Note: An important note about statistical equivalence is that equivalence does NOT mean identical, it means the difference is less than a predetermined difference delta "Δ."

standardized cigarette, SRM 1196a, will be replacing a previous version of the cigarette, SRM 1196, after the NIST supply of SRM 1196 was depleted in December 2018.

NIST has proposed the use of SRM 1196a cigarettes in place of SRM 1196 and performed testing on the cigarettes to verify comparability using the ASTM E 2187¹⁵ test method. CPSC staff reviewed the two types of cigarettes to assess whether the char patterns on mattress materials, which are correlated to mattress flammability, are consistent, regardless of the cigarette ignition source, SRM 1196 or SRM 1196a. CPSC staff examined these two cigarettes to evaluate their burn characteristics and to determine if the two cigarettes are statistically equivalent. The statistical equivalence was based on the pass/fail rates of the cigarettes based on the criterion in the CPSC regulatory standard. Specifically, 16 CFR Section 1632.3(b) *Test Criterion* requires that the char length on the mattress or mattress pad not exceed 2 inches (5.1 cm) in any direction from the nearest point of the lit cigarette. The pass/fail rates were based on char created when lit cigarettes were placed on select individual mattress substrates: Mattress, Mattress Pad and Ticking-material commonly used to cover mattresses (collectively to be referred to as “mattress substrates”).

The testing was done in two stages: a pilot study and a full-scale study.

Pilot Study

From late November through mid-December 2019, an experimental pilot study was performed by CPSC staff on each of the mattress substrates to characterize the char/smolder patterns from the two cigarettes: SRM 1196a and SRM 1196. These pilot study data were used to identify the metric to be measured, as well as to determine a preliminary assessment of the CPSC regulatory standard based on the two cigarettes: SRM 1196a and SRM 1196 on each of the mattress substrates. In the pilot study, staff tested 18 cigarettes of each type on a single mattress, three cigarettes of each type on two types of ticking and four cigarettes of each type on a single mattress pad with 0 percent to 100 percent failure rates, depending on the substrate.

The pilot study confirmed that the dichotomous response of pass/fail indicated in the Standard was the practicable metric given testing constraints of limited resources including cigarettes, time, and mattress materials to use as substrates.

The pilot study provided insight to identify the criteria for establishing the comparability of the two cigarettes. The goal of the pilot study included computing sample size and power analysis¹⁶ to ensure the full-scale study met statistically robust and scientifically meaningful criteria. Staff took into account a retrospective examination of the 2010 transition from the original ignition source to SRM 1196, CPSC compliance data, and the number of test replicates required by the Standard to identify and confirm the confidence interval (CI) and associated margins (90% CI +/- 35%).

¹⁵ ASTM E 2187 Standard Test Method for Measuring the Ignition Strength of Cigarettes.

¹⁶ The statistical power of a study (sometimes called sensitivity) is how likely the study is to distinguish an actual effect from a product of chance. The analysis helps determine what sample sizes would be sufficient for detecting differences.

Full-Scale Study

From mid-December 2019 through January 2020, CPSC staff launched a full-scale study on each mattress substrate. The primary goal of the full-scale study was to determine if there is statistical equivalence between the two cigarettes, SRM 1196 and SRM 1196a.

Staff designed this study based on all available data, including data from the pilot study. Staff utilized an experimental study design that included sample size/power calculations and block randomization schemes¹⁷ for each of the mattress substrates to ensure a quality study that would be able to demonstrate the statistical equivalence of the two cigarettes, which would then ensure the exchangeability of the two cigarettes in the mattress flammability test. The primary endpoint of interest was the pass/fail criterion related to the char/smolder pattern described in 16 CFR Section 1632.3(b) *Test Criterion*, and the goal was to determine whether the char patterns from the two SRM cigarettes were statistically equivalent based on these outcome measures and the criteria listed below. In other words, staff determined whether each tested mattress passed or failed when tested to the Standard with both SRM 1196 and SRM 1196a cigarettes, and then analyzed the resulting data to determine whether SRM 1196 and SRM 1196a are statistically equivalent.

Measure of Equivalence

To determine whether SRM 1196 and 1196a are statistically equivalent, staff used an equivalence margin of 35 percent with a 90 percent Confidence Interval (CI). Staff determined that a 90 percent CI around the difference between the likelihood of passing based on a char length of less than 2 inches on each mattress substrate for the two different cigarettes would be bounded by [-35%, 35%]. Differences bounded by greater than 35 percent or less than 35 percent would signal that the results produced by the two kinds of cigarettes would be too different to consider the cigarettes statistically equivalent. Staff subject matter experts further determined that a 90 percent CI and equivalence margin of 35 percent were appropriate, based on staff's analysis of compliance data, as well as historical data collected and examined by CPSC staff in the 2011 amendment to the Standard from the original ignition source to SRM 1196.¹⁸ This 90 percent CI with a +/-35% margin criterion were identified and clearly specified by staff well in advance of the full-scale study tests in a proposal submitted to both the statistical and laboratory sciences personnel and management.

Staff also used two additional “secondary/tertiary” criteria to support the equivalence of the two cigarettes, which were also pre-specified by staff prior to the full-scale study. These secondary/tertiary criteria were defined as follows:

¹⁷ Block randomization works by randomizing participants within blocks such that an equal number are assigned to each treatment. An advantage of randomization is that it controls for factors that may be important, but are not identified in advance.

¹⁸ Standard for the Flammability of Mattresses and Mattress Pads; Technical Amendment, 76 FR 59014, September 23, 2011. <https://www.govinfo.gov/content/pkg/FR-2011-09-23/pdf/2011-24482.pdf>

- Zero would be included within the 90 percent CI. In other words, when a 90 percent CI was placed around the difference between the two cigarettes, the range of values within the interval would overlap with a value of 0 percent (*i.e.*, no difference between the two kinds of cigarettes).
 - By including “0” within the CI, the two cigarettes include the potential to be identical or equal.
- The absolute value of the point estimate of the difference of the success/failure rates between the two cigarettes would be less than 25 percent. Instead of considering the variability of the difference, this criterion focuses on the observed difference in the number of pass/fail results.
 - This ensures the mean (or average) difference of the pass/fail rates of the two cigarettes on each substrate is no larger than 25 percent.

The study was designed to test the primary hypothesis of equivalence, which is that the 90 percent CI of the difference being bounded between -35 percent and 35 percent, *i.e.*, the two cigarettes would be statistically “equivalent” using these criteria. However, the two secondary/tertiary hypotheses were pre-specified and included to provide additional supportive evidence of the comparability of the two cigarettes. These two additional criteria provide supportive evidence of the similarity and comparability of the two cigarettes based on observed char patterns.

Summary of Results

In the full-scale study, each mattress substrate had thirty-six (36) SRM 1196 and thirty-six (36) SRM 1196a cigarettes placed in a randomized block design and the char/smolder patterns were noted to be passes or failures. Table 1) illustrates the results of the full-scale study, including the failure rates, the 90 percent CI of the difference between the failure rates of the two cigarettes, and whether the pre-specified criteria for equivalence were met. The results in Table 1) illustrate that for each of the three mattress substrate categories, the point estimates all meet the pre-specified requirement by falling between -13 percent and 11 percent. Furthermore, each 90 percent CI falls within the pre-specified range [-0.35, 0.35]. Thus, the cigarettes yield similar char length pass/fail patterns for all mattress substrates within the full-scale study and the primary and secondary/tertiary criteria for equivalence were met, which establishes the comparability of the two cigarettes SRM 1196 and SRM 1196a.

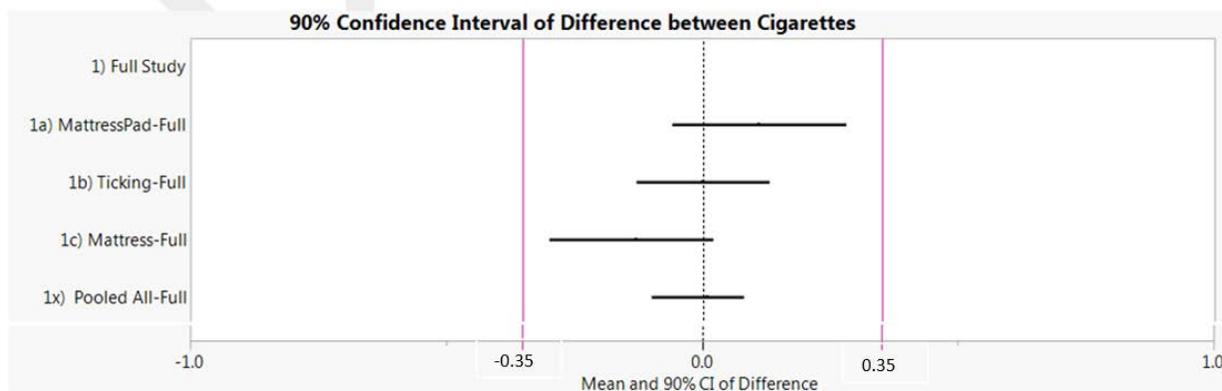
Table 1) Tabulation of Results for Full-Scale Char/Smolder Pattern Study-All Mattress Substrates

Substrate	Cigarette Failure Rate Percent (Fail/Total)		Point Estimate of % Difference	90% CI of Difference	Pre-specified Primary and Secondary/Tertiary Criteria to Support Equivalence		
	Old: 1196	New: 1196a			90% CI	0 in 90% CI	Diff <25%
Mattress Pad	58.3% (21/36)	69.4% (25/36)	11%	[-0.06, 0.28]	√	√	√
Ticking	97.2% (35/36)	97.2% (35/36)	0.0%	[-0.13, 0.13]	√	√	√
Non-compliant Mattress	88.9% (32/36)	75.0% (27/36)	-13%	[-0.30, 0.02]	√	√	√
TOTAL	81.4% (88/108)	80.6% (87/108)	0.9%	[-0.10, 0.08]	√	√	√

Note: The 90% CI within [-0.35, 0.35] are the primary criteria for equivalence.

Figure 1) illustrates the results presented in the above table; it includes the scientifically meaningful 90 percent CI of the difference between likelihood of failures observed in the full-scale study for the various mattress substrates for the two cigarettes: SRM 1196 and SRM 1196a. Within the graphic, the margins pre-specified to establish equivalence: [-0.35, 0.35] or +/- 35percent are noted with a solid pink line. As long as the 90 percent CI of the difference falls within this bound, the two cigarettes are considered equivalent. Based on both the tabulation above and the graphic below, the cigarettes are comparable.

Figure 1) Plot Summarizing the 90 Percent CI of Difference in Failure Percentages between Tests Using SRM 1196 and SRM 1196a



These results based on the full-scale study are supported by additional analysis that considers the totality of evidence. This pooled analysis, while not statistically rigorous, combines the pilot study and full-scale study as well as all data for all mattress substrates and is presented below. It provides supportive evidence of the comparability of the two cigarettes based on char patterns on various mattress substrates.

A summary of all results of this combined analysis for all comparative data collected to date is included in Table 2. Within Table 2 it can be observed that 162 of each the new SRM 1196a and old SRM 1196

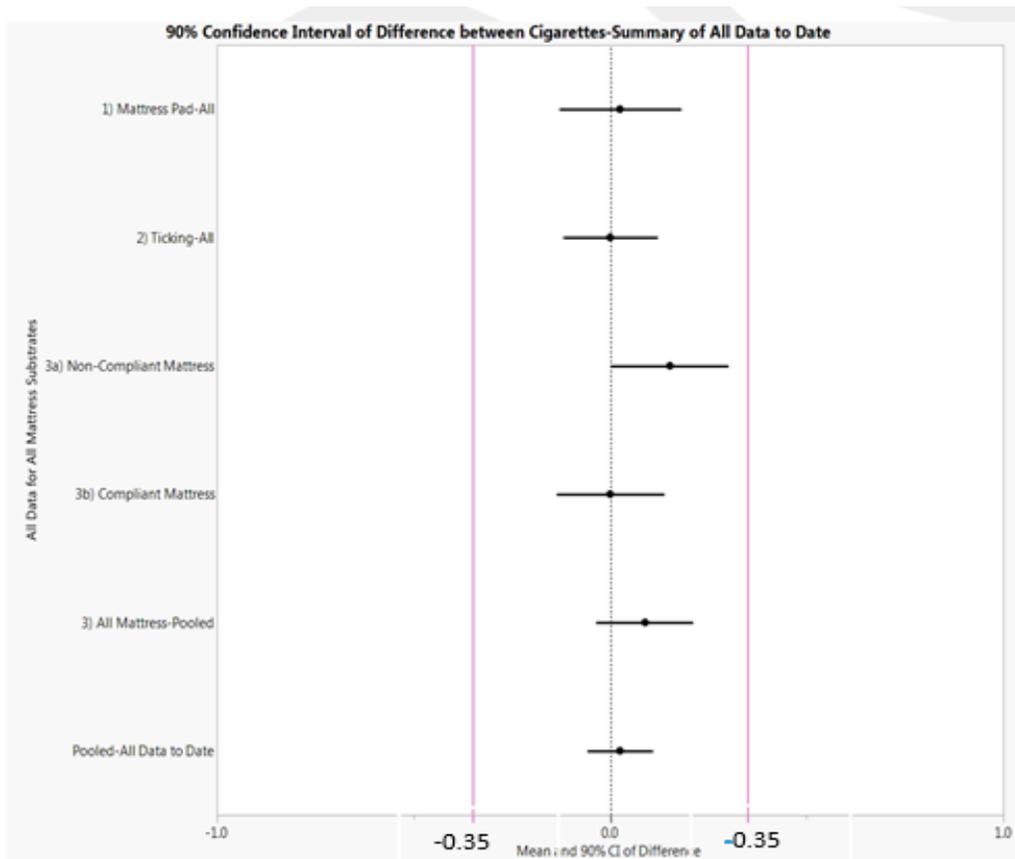
cigarettes were exposed to a variety of mattress substrates. Although the difference in failure rates varied from -15 percent to 8 percent depending on the substrate and number of cigarettes exposed, the pooled analysis of these data demonstrated that the criteria for equivalence were still met.

Table 2) Tabulation of Results for the Char/Smolder Pattern-All Data Collected for All Mattress Substrates

Substrate	Cigarette Failure Rate Percent Fail (Total)		Point Estimate Difference	Pre-specified Criteria to Support Equivalence		
	Old: 1196	New: 1196a		90% CI	0 in 90% CI	Diff <25%
All Mattress Pads	63% (41)	71% (41)	7%	√	√	√
Ticking	98% (42)	98% (42)	0.0%	√	√	√
All Non-compliant Mattresses	85% (46)	70% (46)	-15%	√	√	√
All Compliant Mattresses	0% (33)	0% (33)	0%	√	√	√
All Mattresses	49% (79)	41% (79)	8%	√	√	√
TOTAL	65% (162)	63% (162)	2%	√	√	√

Figure 2 illustrates the results presented in the above table. It shows the 90% CI of the difference between likelihood of failures observed in all data collected including: the pilot study, the full-scale study, and additional tests on a compliant mattress. Similar to the previous figure denoting the 90% CI for each mattress substrate, within this graphic, the margins pre-specified to establish equivalence: [-0.35, 0.35] or +/- 35 percent are noted with a solid pink line.

Figure 2) Plot Summarizing the 90 Percent CI of Difference between SRM 1196 and SRM 1196a Failure Percentages for All Data Collected for all Mattress Substrates



Conclusion

Based on the evidence provided within the full-scale study, pilot study and NIST certification, CPSC staff concludes that the SRM 1196 and SRM 1196a cigarettes met the pre-specified statistical tests of equivalence. Thus, the two cigarettes are comparable and the replacement of the SRM 1196 cigarette with the SRM 1196a cigarette is acceptable.

Acknowledgements

The author would like to thank the following Directorate for Laboratory Sciences staff who were instrumental in collecting the CPSC data upon which this analysis is based. These staff conducted over 200 individual cigarettes tests between November 2019 and January 2020 at the National Product Testing and Evaluation Center (NPTEC): Drew Bernatz, Jonathan Kent, Andrew Lock, Greg Masenheimer, and Lisa Scott. David Miller from the Division of Hazard Analysis also contributed to this analysis.

Tab C – Initial Regulatory Flexibility Analysis



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

Memorandum

Date: July 31, 2020

TO: Lisa Scott,
Project Manager
Mattress Flammability Standard Rule Review

THROUGH: Gregory B. Rodgers, Ph.D.
Associate Executive Director,
Directorate for Economic Analysis

Robert Franklin
Senior Staff Coordinator
Directorate for Economic Analysis

FROM: Cynthia Gillham
Economist
Directorate for Economic Analysis

SUBJECT: Initial Regulatory Flexibility Analysis for Standard Reference Material 1196a,
Standard for the Flammability (Smoldering) of Mattresses and Mattress Pads

Introduction

The Standard for the Flammability of Mattresses and Mattress Pads (the Standard) specifies the Standard Reference Material (SRM) 1196 test cigarette as the ignition source for compliance testing under 16 CFR part 1632. Consumer Product Safety Commission (CPSC) staff recommends that the Commission issue a proposed amendment under Section 4 of the Flammable Fabrics Act (FFA), replacing the standard reference material, SRM 1196 with SRM 1196a.

Requirements of Applicable Statutes

Section 4(i) of the FFA requires that the Commission prepare a preliminary regulatory analysis when it proposes to issue or amend a flammability standard under the FFA and that the analysis be published with the proposed rule, 15 U.S.C. § 1193(i). The analysis must include:

- a preliminary description of the potential benefits and potential costs of the proposed regulation, including any benefits or costs that cannot be quantified in monetary terms, and an identification of those likely to receive the benefits and bear the costs; and

- a description of any reasonable alternatives to the proposed regulation, together with a summary description of their potential benefits and costs, and a brief explanation of the reasons why these alternatives were not chosen.

In addition, under the Regulatory Flexibility Act (RFA), the Commission is required to describe potential effects of the amendment on small businesses and other small entities.¹⁹ Sections 603 and 605 of the RFA require that agencies prepare an initial regulatory flexibility analysis (IRFA) and make it available to the public for comment when the notice of proposed rulemaking (NPR) is published, unless the head of the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities.

This preliminary report presents an analysis of potential impacts in accordance with both applicable statutes, the FFA and the RFA. Based on this review, staff recommends the Commission certify that this rule will not have a significant impact on a substantial number of small entities involved in the manufacturing or importing of mattresses or mattress pads.

Product Information

Mattresses are defined in the Standard as “a ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping upon.” (See 16 CFR § 1632.1(a).) This includes, but is not limited to, adult mattresses, youth mattresses, crib mattresses (including portable crib mattresses), bunk bed mattresses, futons, and water beds or air mattresses which contain upholstery material between the ticking and the mattress core.²⁰ (See 16 CFR § 1632.1(a)(1).) Mattresses used in or as part of upholstered furniture are also included; examples are convertible sofa bed mattresses, corner group mattresses, day bed mattresses, roll-away bed mattresses, high risers, and trundle bed mattresses. The Standard also applies to all mattress pads, where the term mattress pad means a thin flat mat or cushion, and/or ticking filled with resilient material for use on top of a mattress. (See 16 CFR § 1632.1(b).) For the rest of this memorandum, all mattresses and mattress pads to which the Standard applies will be collectively referred to as “mattress products.”

Market Information

The size of the U.S. mattress market increased from \$17.4 billion in 2018, to \$18.1 billion in 2019.^{21,22} Over this period, the three largest domestic mattress companies lost market share: Serta Simmons Bedding LLC, Tempur Sealy International Inc., and Select Comfort Corp. Bed-in-a-box retailers, like Casper Sleep Inc., Edizone LLC, Saatva Inc., and Resident Home LLC (formerly known as Nectar), gained market share. Over the past 5 years, staff finds, based on Euromonitor International estimates, a longer-term trend of other smaller companies gaining an increasing share of the total U.S. mattress market.

¹⁹ 5 U.S.C. §§ 601-612.

²⁰ Mattresses that are medical devices regulated by the FDA are not subject to CPSC regulations.

²¹ These data correspond to sales data from companies in the U.S. mattress market provided by Euromonitor International. Euromonitor International Limited 2020 © All rights reserved. (June 25, 2020). “*USA Mattress Market Share, 2014-2019*,” Retrieved from <https://www.portal.euromonitor.com/>.

²² For Euromonitor International market estimates a mattress is defined to be any size and of any material, including innerspring, pillow-top, hybrid, memory foam, gel, specialty foam (*i.e.*, polyurethane or latex). It also includes futons.

Table 1. Market Share of Mattress Sector by Company, 2018 and 2019

Company Name (National Brand Owner)	2018	2019
Serta Simmons Bedding LLC	29.4	26.4
Tempur Sealy International Inc.	24.5	23.5
Select Comfort Corp	8.8	8.7
Resident Home LLC	1.7	2.7
Innocor Inc.	2.4	2.4
Casper Sleep Inc.	2.0	2.3
Edizone LLC (Purple Mattress)	1.3	1.9
Saatva Inc.	1.3	1.4
Inter Ikea Systems BV	1.3	1.3
Others	27.1	29.5
Total	100	100

Source: Euromonitor International 2020 ©

Note: Shares may not total to 100 due to rounding.

According to data available from the 2018 Industry Report published by the International Sleep Products Association (ISPA²³), roughly 23.6 million mattress units shipped in 2018. Approximately 29 percent (6.8 million) of units shipped were imported products.²⁴

Industry Trends

The U.S. mattress industry is impacted by e-Commerce. A survey by ISPA reported that 45 percent of mattresses purchased in 2018 were online purchases, up from 35 percent in 2017. Brands of mattresses that are sold directly to consumers online, rather than through traditional retail means like brick and mortar storefronts, are referred to as “bed-in-a-box” brands by industry. In recent years there has been an increase of bed-in-a-box brands available to consumers, with more than 100 estimated online mattress companies in business in 2019. Bed-in-a-box brands that manufacture their own mattresses include Brentwood Home, Brooklyn Bedding, and Purple.²⁵

Industry Classification

Three industry sectors supply Mattresses and Mattress Pads to the U.S. Market, categorized under the North American Industry Classification System (NAICS):

1. NAICS Sector 337910 – Mattress Manufacturing
2. NAICS Sector 314120 – Curtain and Linen Mills
3. NAICS Sector 423210 – Furniture and Merchant Wholesalers

²³ The International Sleep Products Association (“ISPA”) represents the mattress manufacturing industry. ISPA’s Statistics Committee collects annual data about the mattress industry. ISPA publishes an annual report of sales and trends.

²⁴ International Sleep Products Association (ISTM) Industry Report, 2018.

²⁵ Wu, Jessica, “There are now 175 online mattress companies—and you can’t tell them apart” (August 18, 2019), CNBC Retail: <https://www.cnbc.com/2019/08/18/there-are-now-175-online-mattress-companiesand-you-cant-tell-them-apart.html>.

The Mattress Manufacturing Sector (337910) comprises establishments primarily engaged in manufacturing innerspring, box spring, and non-innerspring mattresses. The Curtain and Linen Mills Sector (314120) comprises establishments primarily engaged in manufacturing household linens, bedspreads, sheets, tablecloths, towels, and shower curtains, from purchased materials. This sector includes mattress pad and mattress protector manufacturing. The Furniture and Merchant Wholesalers Sector (423210) is primarily engaged in the merchant wholesale distribution of furniture, except hospital beds and medical furniture. Importers of mattresses are typically categorized under NAICS code 423210.

According to the Small Business Administration (SBA), a firm in the Mattress Manufacturing sector (NAICS sector 337910) can be defined as “small” if the firm employs fewer than 1,000 workers.²⁶ Under this definition, among the 250 firms identified by staff in the sector, 240 are small businesses that supply mattress products. The SBA defines a firm within the Curtain and Linen Mills Sector (NAICS sector 314120) as small if the firm employs fewer than 750 workers.²⁷ Under this definition, among the 20 firms identified by staff, 19 firms are small and currently supply mattress products to the U.S. mattress market. Finally, a firm in the Furniture and Merchant Wholesale Sector (NAICS sector 423210) is defined as small if the firm employs fewer than 100 workers. All of the 88 firms staff identified in this sector meet this definition of small. Under SBA-provided definitions, staff finds the majority of firms supplying the U.S. market for mattresses and mattress pads are considered small businesses.

Requirements of the Draft Proposed Rule

CPSC staff proposes to amend the Standard to revise the ignition source specification. The ignition source cigarette specified in the Standard, SRM 1196, is no longer available from NIST for purchase. On February 18, 2020, NIST certified SRM 1196a as the replacement material for SRM 1196. SRM 1196a can only be procured from NIST.

On March 10, 2020, CPSC adopted the 2020 Interim Enforcement Policy, naming SRM 1196 and SRM 1196a as appropriate ignition sources for evaluating mattress products for compliance with the Standard.²⁸ The March 2020 revised Interim Enforcement Policy supersedes the previous policy, rescinding the use of commercially available Fire Standards Compliant (FSC) cigarettes to evaluate products for compliance with the Standard. The economic analysis below evaluates the cost impact of the price increase charged by NIST for SRM 1196a.

Under the Standard, four defined test procedures require the use of an SRM ignition source: the mattress test procedure, the mattress pad test procedure, the ticking classification test procedure, and the tape edge substitution test procedure. The number of test cigarettes required by the various test procedures range from 18 SRM test cigarettes consumed during the ticking classification test, to 108 SRM test cigarettes consumed during the mattress or mattress pad test

²⁶ The size guidelines are established by the U.S. Small Business Administration (SBA).

²⁷ Ibid.

²⁸ Previously, under the December 2018 Interim Enforcement Policy, when the NIST supply of SRM 1196 had been depleted, the CPSC Office of Compliance temporarily allowed for testing to continue using commercially available, so called Fire Standards Compliant (FSC) cigarettes.: <https://www.cpsc.gov/s3fs-public/Updated-Interim-Enforcement-Policy-for-Mattresses-and-Mattress-Pads-Dec2018.pdf?bELowyEfQz9JuMUX6Ww.J0JoU1knh.jE>.

procedures. Furthermore, under the standard only SRM test cigarettes from unopened packages can be selected for a series of tests, and if a cigarette extinguishes before burning its full length on any mattress surface location, the test must be repeated with a freshly lit cigarette.²⁹ Therefore, mattress and mattress pad test procedures require in practice 6 packs of SRM 1196a, the ticking classification test procedure requires in practice 1 pack of SRM 1196a, and the tape edge substitution test requires, at a minimum, 2 packs of SRM 1196a. (See Table 2.)

Table 2. Approximated number of test cigarettes consumed under the current standard, by test type

Test	Minimum cigarettes consumed during test procedure	Packs needed (approximated)	Description of SRM use on test surfaces
Mattress test	108	6	Test six surfaces, 18 cigarettes per surface.
Mattress pad test	108	6	Test six surfaces, 18 cigarettes per surface.
Ticking classification	18	1	Nine cigarettes used in ticking over foam. Nine cigarettes used in ticking over cotton batting.
Tape edge substitution	36	2	Test two surfaces, 18 cigarettes per surface.

The cost increase associated with the proposed amendment is related to the SRM test cigarettes used as the ignition source for testing. Prices for SRM 1196a are set by NIST. The SRM is available for purchase from NIST at a minimum order of 2 cartons, at a cost of \$400, plus shipping. (See Table 3.) A carton contains 10 packs, and each pack contains 20 cigarettes; therefore, two cartons from NIST will contain 400 SRM cigarettes.

The price charged for SRM 1196a is approximately 74 percent higher than the price NIST had charged for SRM 1196.³⁰ The price charged by NIST for SRM 1196 had been \$230 for 2 cartons of test material (20 packs of cigarettes), plus shipping. For a comparison of prices, Table 3 provides data for various test cigarettes, including the FSC cigarettes.

²⁹ 16 CFR § 1632.4 - Mattress test procedure.

³⁰ According to NIST, the price charged for the SRM is proportional to the cost of the contract for procuring the whole SRM batch.

Table 3. Prices for Standard Reference Materials (SRMs), not including shipping

Cigarette type	Cost for 2 Cartons (20 packs)	Cost per pack	Cost per cigarette	Relevant considerations
Fire Standards Compliant (FSC) cigarettes	\$130*	\$6.50	\$0.325	Prices vary regionally, governed by State law.
NIST SRM 1196	\$230	\$11.50	\$0.575	This product is no longer available for sale.
NIST SRM 1196a	\$400	\$20.00	\$1	Available for purchase.

*Prices vary regionally from \$40 to \$110 per carton. Data collected February 2020:

<https://www.salestaxhandbook.com/>.

Based on information collected by staff from a selection of domestic third-party testing facilities, a third-party testing facility uses an average of 10 to 40 packs of SRM cigarettes (or between 200 – 800 test cigarettes) per month.³¹ These data provide insight into the number of tests cigarettes used by third party testing facilities located in the United States, as an order of magnitude. A testing facility that uses 400 test cigarettes per month would need to purchase two cartons of SRM cigarettes from NIST every month. Although these data do not tell us much about testing performed at in-house laboratories, it is a useful piece of information. For example, staff considers a third-party testing facility that purchases 20 cartons of SRM per month to be an industry outlier.

Impact of Draft Proposed Rule on Small Manufacturers

If SRM 1196a is adopted as the replacement for SRM 1196 under the CPSC regulation, manufacturers and importers of mattresses would be responsible for ensuring that their mattress products are tested using the adopted SRM. If a supplier’s mattress product does not comply with the requirements, they will need to either modify the product, or cease their manufacture or importation. Additionally, as required by the CPSIA and its implementing regulations, manufacturers and importers of youth mattresses would be required to certify that their mattresses intended for children comply with the requirements of the Standard.³² Many domestic manufacturers of youth mattresses are small entities as defined by SBA. The following analysis reviews some of the possible impacts of codifying the use of SRM 1196a in the Standard.

The annual cost of adopting the SRM 1196a test cigarette will vary among small firms. Different firms offer a variety of mattress products and have different operational procedures for mattress product development and testing. Among other considerations, the number of mattresses produced annually by small firms is not uniform. Furthermore, some firms perform testing procedures in-house, while others elect or are required to have testing performed by a CPSC-approved conformity assessment body. The number of new prototypes that a firm will

³¹ Data collected in October 2018.

³² Mattresses intended for children must be tested at either an accredited third-party testing laboratory or a fire-walled internal laboratory. In either case, the facility must be a CPSC-accepted testing laboratory to test to the Standard because the product being evaluated is intended for use by children 12 and under.

bring to market, and the size of a production run by a small firm, is up to the firm to decide; but the cost per firm of the proposed amendment would be impacted by these individual decisions.

Staff has reviewed a variety of likely cost increases that might be faced by small firms in adopting SRM 1196a, in three separate testing scenarios. Staff welcomes comments on the number and types of tests performed by firms on a monthly (or annual) basis. Staff also welcomes comments from small firms on estimates of the number SRM test cigarettes they use on a monthly (or annual) basis.

To determine the likely costs faced by small firms from use of SRM cigarettes, staff has analyzed testing costs related to the Standard in a manner that is consistent with past economic analysis of the industry. The analysis uses commercial data published online for mattress manufacturing, bedding manufacturing, and wholesale mattress product importers acquired from Dun and Bradstreet.³³ Staff has also reviewed current mattress products available on the market from a variety of small domestic suppliers and has received input from industry on the type and frequency of testing performed by industry under the Standard. Based on all of the information that staff has analyzed, staff has determined that the following three scenarios represent a likely range of costs incurred by small firms.³⁴

Scenario 1

A small firm produces on average 20 new mattress models per year.³⁵ Five of these new mattress models are new prototypes, and 14 models are made with new ticking substitutions. The one remaining model requires a tape edge substitution test. Such a firm would consume 46 packs of test cigarettes annually.³⁶

(5 mattress tests x 6 packs + 14 ticking tests x 1 pack + 1 tape substitution test x 2 packs = 30 packs + 14 packs + 2 packs = 46 packs)

Scenario 2

A small firm produces on average 5 new mattress models per year. Two of these new mattress models are new prototypes, and the remaining three models are made with new ticking substitutions. Such a firm would consume 15 packs of test cigarettes annually.³⁷

(2 mattress tests x 6 packs + 3 ticking tests x 1 pack = 12 packs + 3 packs = 15 packs)

³³ Dun and Bradstreet is a corporation that offers information on commercial credit, as well as reports on businesses for more than 100 million companies: <https://www.dnb.com/>.

³⁴ The three scenarios provided likely overestimate the number of packs used in each test combination scenario because staff has assumed that a fresh pack of cigarettes is opened for each test performed and remaining SRM cigarettes are discarded, as prescribed by the Standard. In reality, remaining SRM cigarettes from recently opened packs are likely used in testing laboratories from previously opened packs, if many tests are being performed consecutively, or in combination.

³⁵ Small domestic manufacturers of youth mattresses may typically produce 20 new models annually.

³⁶ In practice, industry may only use 842 test cigarettes (or 42 packs) to perform the test combination of scenario 1. (540 cigarettes + 252 cigarettes + 36 cigarettes = 842 cigarettes)

³⁷ In practice, industry may only use 270 test cigarettes (or 14 packs) to perform the test combination of scenario 2. (216 cigarettes + 54 cigarettes = 270 cigarettes)

Scenario 3

A small firm produces on average 3 new mattress models per year. Each mattress model is sold with a protective mattress pad, intended for use with a crib mattress in a standard-size crib. Such a firm would consume 36 packs of test cigarettes annually.³⁸

(3 mattress tests x 6 packs + 3 mattress pad tests x 6 packs = 18 packs + 18 packs = 36 packs)

As noted, the cost of SRM 1196a is about 74 percent higher than that of SRM 1196. Not accounting for shipping costs,³⁹ a pack of SRM 1196 costs the firm approximately \$11.50, while SRM 1196a costs the firm \$20. (See table 2.) Using the cost of SRM 1196 and SRM 1196a, we can calculate the cost increase faced by firms under the three scenarios above:

- In scenario 1, the firm with 20 new models using 46 test cigarette packs annually would incur increased costs of \$391, from \$529 annually (46 packs x \$11.50 per pack = \$529) to \$920 annually (46 packs x \$20 per pack = \$920).
- In scenario 2, the firm with five new models using 15 test cigarette packs annually would incur increased costs of \$127.50, from \$172.50 annually (15 packs x \$11.50 per pack = \$172.50) to \$300 annually (15 packs x \$20 per pack = \$300).
- In scenario 3, the firm with 3 new mattress models and 3 new mattress pad models using 36 packs annually would incur increased costs of \$306, from \$414 annually (36 packs x \$11.50 per pack = \$414) to \$720 annually (36 packs x \$20 per pack = \$720).

Staff finds the effective increase in the price per pack charged by NIST from \$11.50 to \$20 ranges from roughly \$127.50 to \$391 per year, among small firms in the above scenarios. Therefore, this is roughly the cost increase that small firms may face if SRM 1196a is adopted as the replacement reference material. The cost to a small firm would vary depending on the testing scenario.

As mentioned, the number of new prototypes that a small firm will bring to market is up to the individual firm to decide, but the cost per firm of the proposed amendment would be impacted by these individual business decisions. The small firm may choose to make new prototypes every year and bring them to market, or they may elect to substitute ticking and modify existing models of mattress products that are selling well or are customer favorites. The cost of adopting SRM 1196a will depend on these individual production decisions, which are not controlled by CPSC. This flexibility is a benefit of the Standard as it is currently written and allows room for industry to innovate new fire-safe mattress products.⁴⁰

³⁸ In practice, industry may only use 648 test cigarettes (or 33 packs) to perform the test combination of example 3. (324 cigarettes + 324 cigarettes = 648 cigarettes)

³⁹ Shipping costs are not included in the analysis because they are not unique to SRM 1196a.

⁴⁰ Use of the tests in §§1632.6 and 1632.7 is optional.

Impact on Small Business

All of the suppliers of mattress products to the U.S. market identified by staff are domestic firms. We limit our analysis to domestic firms because U.S. Small Business Administration (SBA) guidelines pertain to U.S.-based entities.

To determine whether a regulatory flexibility analysis or a certification statement of no significant impact on a substantial number of small entities is appropriate for a proposed rule, staff determines a threshold for “no significant economic impact.” The SBA provides leeway in determining the threshold and provides several varied examples of screening measures, including the one percent of gross revenue measure.⁴¹ Staff has chosen the gross revenue calculation because we have data to support its calculation.

For each market segment staff is able to demonstrate that the draft proposed rule would impose an economic impact of less than 1 percent of gross revenue for the affected firms. Therefore, staff recommends certification for the rule. The following analysis provides the basis for this conclusion.

Small Mattress Manufacturers

- Staff identified 240 firms in the Mattress Manufacturing Sector that meet SBA size standards for small business. Among small mattress manufacturing firms, 220 firms employed fewer than 100 workers. Across small firms in the Mattress Manufacturing sector, staff found annual revenue averaged \$10.49 million.
- The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$128,000. One percent of annual revenue for the firm is \$1,280 (\$128,000 x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$1,280 should be considered significant.
- Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard for the Flammability of Mattresses and Mattress Pads, the increase would amount to less than 1 percent of annual revenue, \$1,280, and would not be considered significant.

Small Textile Manufacturers

- Staff identified 19 firms in the Textile Manufacturing Sector that meet SBA size standards for small business. Among small textile manufacturing firms, 14 firms employed fewer than 20 workers. Across small firms in the Textile Manufacturing sector, staff found annual revenue averaged \$2.83 million.
- The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$200,000. One percent of annual revenue for the firm is \$2,000

⁴¹ See U.S. Small Business Administration, Office of Advocacy. *A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act*. pp.19. <https://advocacy.sba.gov/2017/08/31/a-guide-for-government-agencies-how-to-comply-with-the-regulatory-flexibility-act/>.

(\$200,000 x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$2,000 should be considered significant.

- Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard for the Flammability of Mattresses and Mattress Pads, the increase would amount to less than 1 percent of annual revenue, \$2,000, and could not be considered significant.

Small Importers

- Staff identified 88 firms in the Mattress Wholesale Sector that meet SBA size standards for small business. Among small wholesale importers of mattress products, 72 firms employed fewer than 20 workers. Across small firms in the Mattress Wholesale sector, staff found annual sales averaged \$7.84 million.
- The lowest reported annual revenue for any small domestic firm in this mattress product supplying sector was \$322,000. One percent of annual revenue for the firm is \$3,220 (\$322,000 x 1 percent). Therefore, for this small domestic supplier, any increase in cost that exceeds \$3,220 should be considered significant.
- Estimating a cost increase of \$391, the high end estimated cost of incorporating SRM 1196a into the Standard for the Flammability of Mattresses and Mattress Pads, the increase would amount to less than 1 percent of annual revenue, \$3,220, and could not be considered significant.

Regulatory Alternatives and Other Federal Rules

As an alternative to adopting the draft proposed amendment to revise the ignition source specification, replacing the previous reference material, SRM 1196, with the revised ignition source, SRM 1196a, the Commission might consider adopting the FSC cigarette, in a manner similar to the guidance that had been provided in the December 2018 Interim Enforcement Policy.⁴² FSC cigarettes could appear to be an alternative to SRM cigarettes because they are commercially available and available for purchase at a lower cost. However, adopting FSC cigarettes as the ignition source for the Standard poses alternative challenges.

SRM cigarettes provide a common ignition source for all laboratories, while commercially available FSC cigarettes do not offer that consistency. The ignition strength of FSC cigarettes vary from one brand to another. As a result, compliance test results would also vary between a test conducted with one brand of FSC cigarette and another, making testing, reporting, and enforcement less consistent.

Furthermore, FSC cigarettes are intended to self-extinguish when left unattended. Under the Standard, results from a cigarette that does not burn its full length are not accepted. Any cigarette which extinguishes before burning its full length on any mattress surface location must

⁴² Updated Interim Enforcement Policy for Mattresses and Mattress Pads Subject to 16 CFR Part 1632, December 21, 2020: <https://www.cpsc.gov/s3fs-public/Updated-Interim-Enforcement-Policy-for-Mattresses-and-Mattress-Pads-Dec2018.pdf?bELowYEfQz9JuMUX6Ww.J0JoU1knh.jE>.

be retested with a freshly lit cigarette. As a result, adopting the FSC cigarette as the replacement ignition source for the Standard could lead to an increase in the average number of cigarettes used for each complete test, as cigarettes self-extinguish and multiple freshly lit cigarette are needed to complete a test, thereby increasing the costs of testing. The cost of using additional FSC cigarette materials in laboratories and the time burden associated with repeating the test by trained professionals reduces the attractiveness of self-extinguishing FSC cigarettes as an alternative.

Instead, the replacement SRM 1196a is a statistically equivalent replacement for SRM 1196 in all critical parameters as outlined in Tab B – CPSC Staff Equivalence Study, and in practice would reduce the need for retesting, lighting fresh FSC cigarettes. Furthermore, SRM 1196a allows for consistency in reporting and testing between laboratories. Following this reasoning, staff cannot recommend adopting the FSC cigarette as the replacement for SRM 1196.

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

Conclusion

Incorporating SRM 1196a into the Standard for the Flammability of Mattresses and Mattress Pads, replacing SRM 1196 in the mandatory product safety rule, will not have a significant economic impact on a substantial number of small entities. CPSC staff proposes to amend the Standard to revise the ignition source specification, replacing the previous reference material, SRM 1196, with the revised ignition source, SRM 1196a. Under the Standard, four defined test procedures require the use of the standard reference material ignition source. If SRM 1196a is adopted as the replacement for SRM 1196 under the Standard, manufacturers and importers of mattresses would be responsible for ensuring that their mattress products are tested using the adopted SRM. The economic analysis performed by staff evaluates the impact on small entities of revising the Standard to adopt SRM 1196a, and finds the effective increase of adopting SRM 1196a would range from roughly \$127.50 to \$391 per year, among small firms. This increase in cost would amount to less than 1 percent of the annual revenue to any small mattress supplying firm in the U.S. Therefore, staff recommends the Commission certify that this rule will not have a significant impact on a substantial number of small entities involved in the manufacture or importing of mattresses or mattress pads.

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