

Transcript of CPSC Podcast 2020 – Overview of U.S. Mattress Requirements

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Hi, my name is Sylvia Chen, and I want to welcome you to this podcast presentation today.

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As CPSC's Director of International Programs, Richard O'Brien stated, design of safe products at the outset is critical. CPSC is a United States federal government agency charged with protecting the public from unreasonable risks of injury or death associated with the use of consumer products under the agency's jurisdiction. We have developed this podcast series not only to inform about regulations, standards, and other safety requirements, but also to emphasize the importance of designing products with safety considerations in mind, and to offer best practices for enhancing safety in a variety of common consumer products.

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The series covers seven common consumer products and the requirements for keeping consumers safe, focusing on products affecting millions of consumers, such as electronics, apparel, bicycles, mattresses, infant and toddler products, carriages and strollers, and toys. In this podcast series, you can expect to learn about the key hazards and risks of the product, important design and manufacturing considerations, regulations and standards that CPSC uses to ensure product safety, best practices you can employ, and what resources are available to assist you in understanding and implementing the requirements.

The podcasts include English and Chinese slide decks, and Chinese narration to make this important safety information as accessible as possible. Additionally, CPSC has established a dedicated email box, where listeners can send in any questions at their convenience, in English or Chinese. Our staff will monitor and respond to your questions. Transcripts in English are available on this site.

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The slides used in this podcast are not a comprehensive statement of legal requirements or policy, and thus, should not be relied upon for that purpose. You should consult official versions of U.S. statutes and regulations, as well as published CPSC guidance when making decisions that could affect the safety and compliance of products entering U.S. commerce. Note that references are provided at the end of the presentation.

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In this presentation, we will focus on the CPSC's requirements for mattresses to be introduced into commerce in the United States. We will discuss what meets the definition of a "mattress" and the specific CPSC requirements. Additionally, we will provide best practices for designing for product safety and additional mattress references and resources.

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Two products fall within the scope of the CPSC mattress regulations: mattresses and mattress pads.

CPSC defines a “mattress” as a ticking (cover fabric) filled with a resilient material used alone or in combination with other products intended or promoted for sleeping upon, including mattresses that have undergone renovation. Mattresses are subject to two flammability regulations, 16 CFR parts 1632 and 1633.

CPSC defines a “mattress pad” as a thin, flat mat or cushion, or ticking filled with resilient material for use on top of a mattress. Mattress pads are subject to one flammability regulation, 16 CFR part 1632.

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This list includes some examples of what the CPSC considers mattresses. In addition to traditional mattresses, crib mattresses, futons, sleeper sofas or camper mattresses, water beds and air mattresses are also considered mattresses that must meet flammability requirements. For more information about what is considered a mattress by CPSC, you can contact our staff or read these sections of the regulations.

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The CPSC requirements for mattresses fall under three different statutes. Flammability requirements are under the Flammable Fabrics Act. Lead content requirements are under the Federal Hazardous Substances Act. Lead in paint and surface coatings, phthalates, product certification, and tracking label requirements are all under the Consumer Product Safety Act.

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The Flammable Fabrics Act dictates flammability requirements for a variety of textile-related products, such as apparel, children’s sleepwear, and carpets and rugs. As mentioned, mattresses and mattress pads fall under parts 1632 and 1633 of this Act.

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In addition to the difference in products covered, the two flammability standards have very different testing criteria. The test for part 1632 uses a smoldering ignition source, a standard cigarette, and part 1633 uses an open-flame ignition source made up of two propane burners that generate flames. These tests have been designed with common ignition scenarios of consumer mattresses in mind.

We will discuss the two test methods in detail.

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The Standard for the Flammability of Mattresses and Mattress Pads, 16 CFR part 1632, has been in effect since 1972. The standard was intended to increase the safety of residential mattresses by improving their resistance to smoldering ignition sources, such as cigarettes. The standard specifies a prototype testing scheme where a representative design is tested and used as the basis for determining compliance of the resulting production units. Any changes in design require testing to determine the impact the change has on compliance with the regulation. This testing scheme is described more fully in later slides.

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For mattresses, the standard states that six surfaces shall be tested. However, the current interim enforcement policy requires that at least two surfaces of the prototype mattress be tested, decreasing the testing burden for manufacturers. For single-sided mattresses, at least two mattresses will need to be tested. For double-sided mattresses, each side could be tested to meet the two-surface requirement, as long as the second surface has not been impacted by the first test. In the case where a mattress has two different surfaces, and both are intended as sleeping surfaces, each unique surface would need to be tested at least twice.

To characterize accurately the mattress prototype's flammability performance, all of the design features, such as tufts or seams, must be tested, both on the bare mattress and with standard sheeting. That means that 18 cigarettes are placed on each prototype mattress test surface, divided evenly with nine on the bare half and nine between sheeting on the other half.

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For mattress pads, the standard states that six specimens shall be tested, and the interim enforcement policy does not apply to mattress pads.

As with mattresses, all of the design features must be tested both on the bare mattress pad and with standard sheeting.

If the mattress pad has been treated with a flame-retardant finish, it should be laundered 10 times following the refurbishment process in the standard, and then tested.

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The standard reference material (SRM) ignition source, 1196 Standard Cigarette for Ignition Resistance Testing, recently was updated by the National Institute of Standards and Technology (NIST) to SRM 1196a. The supply of the previous SRM had been depleted and a new SRM was manufactured to replace it. The new SRM is equivalent to the previous SRM for purposes of mattress testing, having been designed to have the same physical dimensions and ignition strength, characterized using the same test method used for the previous SRM.

These cigarettes should be considered specialized test equipment. Non-SRM cigarettes may not be used to meet the testing requirements. SRM 1196a can be obtained directly from NIST.

CPSC staff expects to incorporate this new SRM into the 1632 regulation by the end of calendar year 2020.

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This slide shows how the test cigarettes are set up on a mattress specimen. As mentioned, each design feature should be tested. The cigarettes should be placed randomly across the test surface, divided among the different design features that are present. For the bare half of the mattress, the SRM should be placed directly on each design feature. For example, to test a quilted design feature, the cigarette should be placed along the sewn line of thread, as shown in the picture labeled "quilt" in the slide. The other half of the test specimen will have two layers of sheeting. The SRM will be placed between the two layers of sheeting and across the surface and different design features. More detail, including best

testing practices, can be found in the CPSC staff laboratory testing manual that will be mentioned later in this presentation.

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The specimen's flammability performance is judged by the spread of the charring on the specimen test surface. The char may not exceed 2 inches or 5.1 cm in any direction from the SRM cigarette. In this slide, you can see a passing and failing test location. If a SRM cigarette self-extinguishes, meaning that it stops burning with no intervention before it has burned its full length, another SRM cigarette must be placed in the same type of design feature in a different location of the test surface.

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All mattresses subject to the standard must, at a minimum, be labeled with the month and year of manufacture, as well as the manufacturing location. This requirement does not mean that a separate label is necessary if this information is already included on another label, such as that required by part 1633, which will be discussed later. Mattress manufacturers should also note that there may be additional requirements that are dictated by specific states, and manufacturers should be knowledgeable about those requirements if they plan to sell mattresses in those states.

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Mattress pads must meet the same minimum labeling requirements as mattresses, but they have an additional requirement, if they have been treated with a flame-retardant chemical. For these treated mattresses pads, the label should be marked with the letter "T," and instructions should be included to make sure that consumers understand how to launder and care for the mattress pad so that it can maintain its flammability performance.

As with mattresses, states may have additional labeling requirements for mattress pads that must be followed.

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Part 1632 stipulates that mattress and mattress pad manufacturers are also required to maintain certain records. Manufacturers must maintain records on the product specifications and descriptions. All test details and results should be maintained, including test reports and photographs taken of the test specimen before and after testing. The regulation has a list of other required records that must be maintained if they are applicable to the product. For more information, read section 1632.31 of the standard.

Any required records must be kept while the prototype is in use and for 3 years after discontinuing its use. That means that if any product is relying on testing based on a particular prototype, those records must be maintained as long as the relevant product or products are being manufactured and for an additional 3 years after production has ended. Children's products may have additional recordkeeping requirements.

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The CPSC takes action against products that fail to meet the requirements of part 1632. Although this regulation has been in place for several decades, there are still products introduced into commerce that

do not meet these requirements. Here is an example of a mattress pad recall. This mattress pad failed to meet these requirements, and thus, was recalled. Consumers were offered a refund for the product.

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Although part 1632 addressed the common fire scenario of a smoldering ignition source, such as a cigarette, mattresses remained large fuel loads in homes and were susceptible to ignition through open flame. To address that hazard, 16 CFR part 1633, *Standard for the Flammability (Open Flame) of Mattress Sets*, was developed to limit the intensity of mattress-involved fires, thereby increasing the time of fire discovery and improving the chances for consumers to escape a deadly fire. An unprotected mattress can take just minutes to reach flash-over conditions, a point where a room and its contents spontaneously combust.

This standard became effective in 2007, and it uses a prototype testing scheme similar to that in part 1632.

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This test requires a specialized facility and an instrumented hood that can capture the required test outputs. The number of specimens required to be tested depends on what stage prototype is being characterized. Testing should be performed as the prototype is expected to be used by the consumer. For example, if the mattress is intended to be used alone, it would be tested alone. If it is intended to be used with a foundation, the testing should include the foundation.

The ignition instrument consists of two propane burners, one placed at the top edge of the mattress, parallel to the mattress surface, and one placed at the side of the mattress or mattress and foundation. The burners are ignited for 70 and 50 seconds, respectively. The burners were designed to approximate the impact of burning bed clothes, such as sheets and blankets.

In this picture, you see the initial stage of testing where a mattress and foundation set are ignited.

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This image shows a typical noncompliant mattress and a typical compliant mattress side-by-side. The difference in performance between a non-compliant mattress and a compliant mattress is often this apparent, even just 3 minutes into the test. The safety implications are easy to see. These pictures truly illustrate the impact of this standard on mattress safety.

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The test is allowed to continue for 30 minutes, unless the testing scenario becomes dangerous. The standard states that the ignited specimen may not exceed a total heat release of 15 megajoules (MJ) in the first 10 minutes of the test and that the peak heat release rate may not exceed 200 kilowatts (kW) at any point during the test.

The image shows a representative plot of the heat release rate for a noncompliant mattress. The horizontal axis is time. The vertical axis is heat release rate in kilowatts. The heat release rate is not permitted to go above 200 kW at any point during the 30-minute test. Note the second arrow in the plot is the point at which this mattress failed this requirement. The total heat release is determined

once the test is complete, by measuring the area under the curve of the heat release rate for the first 10 minutes of the test.

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Because this is a destructive test, the standard calls for a test of prototypes that allow for characterization of the mattresses that fall within the specific prototype design. To qualify a prototype mattress, three consecutively tested specimens must meet the flammability requirements. If there is a specimen that fails to meet the requirements, the prototype is disqualified, and the process must begin again, once the failure is addressed.

Once a prototype is qualified, it can be produced by another manufacturer or at another location with only a single test to show that it performs similarly to the qualified prototype. This test is intended as a quality assurance check on consistent manufacturing and “confirmation” that the specimen is equivalent to the qualified prototype. A qualified and confirmed prototype should be exactly the same.

A subordinate prototype is a design that may differ from a qualified or confirmed prototype but not in any way that would impact its flammability performance. A subordinate prototype does not require testing.

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This testing scheme was developed to lower testing burdens for manufacturers, allowing for the sharing, or *pooling*, of designs and test results, thereby decreasing the amount of testing required by manufacturers.

Additionally, by identifying design components that do not impact flammability, manufacturers can extend their mattress offerings without taking on additional testing. Features such as mattress size, fabric coverings, also called *ticking*, and changes in other design components that do not negatively affect flammability performance can be changed without triggering a need for full-scale testing. However, any of these changes without testing must be based on *reasonably objective criteria*, meaning that these changes without testing must be evidence-based and demonstrable. For example, if the qualified or confirmed prototype had an untreated 100 percent cotton ticking and the subordinate prototype had a 100 percent wool ticking of a similar fabric style, one could conclude that the flammability performance would not be negatively impacted because untreated cotton is more flammable than wool, which is a self-extinguishing fiber.

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This slide shows a visual representation of how prototype testing works.

In this example, Factory A designs and manufactures a mattress. Three mattresses of this design are made for testing. If they pass the part 1633 tests consecutively with no failures, the mattress design becomes a qualified prototype.

Factory A can continue making exactly that mattress or can use reasonably objective criteria to make small changes and manufacture subordinate prototypes.

Based on the qualified prototype of Factory A, Factory B can make a confirmed prototype. Once it passes the part 1633 test, Factory B can continue making the confirmed prototype, or it can use reasonably objective criteria to make small changes and manufacture subordinate prototypes.

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In this scenario, Factory A would test three specimens to qualify its prototype. No testing would be required for the subordinate prototypes, as long as reasonably objective criteria were used when making small design changes.

Factory B would test one specimen to confirm the prototype, and no testing would be required for the subordinate prototypes, as long as reasonably objective criteria were used when making small design changes.

This example shows how prototype pooling can help decrease testing costs.

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Labeling requirements in part 1633 are more detailed than for mattresses under part 1632. Mattresses must be labeled with a permanent, conspicuous, and legible label in English with the following information:

- 1) The name of the domestic manufacturer or importer and foreign manufacturer;
- 2) Address of domestic manufacturer or address of importer and foreign manufacturer;
- 3) Month and year of manufacture;
- 4) Model identification;
- 5) Prototype ID;
- 6) A certification statement; and
- 7) A statement identifying whether the mattress is intended to be sold alone or with a foundation, including information on what foundation is intended.

More information on labeling can be found in section 1633.12.

By meeting the requirements of part 1633, a manufacturer satisfies the requirements for mattresses in part 1632. There is no need for a separate label for part 1632 on mattresses.

This slide shows two label templates, one for mattresses intended either alone or with a specific foundation (left) and one for mattresses intended to be used without foundations (right).

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Foundations must also be labeled. Foundation labels must contain the following information:

- 1) The name of the domestic manufacturer or importer and foreign manufacturer;
- 2) Address of domestic manufacturer or address of importer and foreign manufacturer;
- 3) Month and year of manufacture;

- 4) Model identification;
- 5) Prototype ID; and
- 6) Foundation ID.

In this slide, the label on the left shows a mattress label for mattresses intended to be used only with a foundation. On the right, is a template for a foundation label.

In addition to the label content, there are also prescriptive requirements, for size, font, and other details that can be found in section 1633.12.

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Part 1633 requires collecting and maintaining records, including:

- 1) Testing information, such as test reports, videos, and pictures;
- 2) Records on prototypes;
- 3) Prototype pooling records; and
- 4) Quality assurance records.

These records must be maintained in English by the manufacturer or importer while the prototype is in use and kept for 3 years after it is discontinued. Children's mattresses may have additional recordkeeping requirements.

For more information on recordkeeping, see section 1633.11 and the CPSC mattress information page.

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CPSC occasionally sees mattresses that fail to meet the requirements of part 1633. Here is an example recall of a foam mattress.

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Consumer products subject to a consumer product safety rule, standard, or ban are required to be certified by the domestic manufacturer or U.S. importer.

For general use products, those not intended specifically for children 12 years of age or younger, domestic manufacturers or U.S. importers must issue a General Certificate of Conformity, or GCC. A GCC is based on a test of each product or a reasonable testing program and must include all requirements to which a product is subject. The testing does not need to be performed by a CPSC-accepted third party laboratory. Most general use mattresses will require a GCC.

Children's Product Certificates, or CPCs, must be issued for children's products intended for ages 12 and under. A CPC relies on testing performed by a CPSC-accepted third party laboratory for all of the requirements to which the product is subject. Crib mattresses and potentially other mattresses intended specifically for children require a CPC.

Although manufacturers outside of the United States cannot certify their products under the CPSA, they can have the testing performed and provide the results to the U.S. importer. The U.S. importer can rely

on this testing to issue a certificate, as long as all requirements are met and due care is exercised, meaning the degree of care that a prudent and competent person engaged in the same line of business or endeavor would exercise under similar circumstances. Due care does not permit willful ignorance.

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There are chemical content requirements that must be met for children's apparel.

The Federal Hazardous Substances Act (FHSA) requires that the lead content in children's products may not exceed 100 parts per million.

Under the Consumer Product Safety Act (CPSA), lead concentrations in paint and other surface coatings may not exceed 90 parts per million.

Also under the CPSA, certain phthalate concentrations may not exceed 0.1% in children's toys and childcare articles. A "childcare article" is defined as a product used to facilitate sleeping and feeding for children 3 years or younger.

In 2017, the Commission issued a phthalates final rule (16 CFR part 1307) with an effective date of April 25, 2018. Any children's toy or child care article that contains concentrations of more than 0.1 percent of eight specified phthalates is prohibited. More information may be found in the rule or on the CPSC website.

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Children's products that are designed or intended primarily for use by children ages 12 or younger must have distinguishing permanent marks, generally referred to as "tracking labels."

These labels must be:

- affixed to the product and its packaging,
- visible and legible, and
- provide certain identifying information.

Tracking labels must contain certain basic information, including:

1. The name of the manufacturer or private labeler;
2. The location and date of production of the product;
3. Detailed information on the manufacturing process, such as a batch or run number, or other identifying characteristics; and
4. Any other information to facilitate ascertaining the specific source of the product.

All tracking label information should be visible and legible.

Compliance with the tracking label requirement will help improve the effectiveness and response rates for any future recalls. It also helps CPSC staff and companies in the chain of commerce. When a component has been identified as the source of a hazard or violation, the tracking label helps identify other products that may contain the same component.

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There are several best practices CPSC suggests for companies to enhance consumer safety:

- First, know your product's requirements and emphasize compliance throughout your supply chain. Highlighting the importance of compliance to your employees and suppliers will translate into safer products.
- Second, make sure that required testing is taking place. If relying on test results from another party, exercise due care, making sure that valid and accurate test results are provided.
- Third, maintain consistent internal controls and procedures and maintain records. In the event that there is a safety issue with your product, these records will serve to document your safety efforts.
- Fourth, stay on top of your supply chain. Ongoing testing of components is a good quality assurance practice, as well as maintaining consistent communication with your suppliers.
- Fifth, trust but verify. Make sure that materials and components meet specifications during ongoing production and be wary of "golden samples" that are not representative of the delivered product.
- Sixth, make process a priority. Repeatable and consistent methodology make for a more reliable product.
- Finally, when in doubt, report. There is a reporting requirement for manufacturers and importers of consumer products, if a safety issue arises. Even if you are not sure, it is better to reach out to the CPSC with safety concerns, and we can help identify issues and warn consumers.

Make consumer product safety a part of your process from the very beginning!

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Thank you, and we hope you enjoyed this podcast. If you have any questions on the presentation, please do not hesitate to submit your questions in English or Chinese to the mailbox mentioned earlier: CPSCinChina@cpsc.gov. This mailbox is routinely monitored.

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We also wish to remind viewers that CPSC has many technical documents and resources available in Chinese. The conclusion of this presentation provides many links to resources viewers may find useful.

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We encourage viewers to check out CPSC's Regulatory Robot, available in English, Chinese, and several other languages. The Regulatory Robot is an automated tool that can help identify safety requirements for many different types of products. Many companies have found this tool to be extremely helpful.

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As mentioned, there are detailed mattress resources available online from CPSC. These resources include a dedicated mattress information page, the full text of each regulation, CPSC's laboratory test manuals, and other recent mattress presentations. It is important to note that the full requirements are in the regulations. These other supporting documents are intended as companion documents to clarify some of the requirements, but the final authority is the regulation itself.