



TEST MANUAL

THE STANDARD FOR THE FLAMMABILITY OF
MATTRESSES AND MATTRESS PADS
16 CFR PART 1632

CONSUMER PRODUCT SAFETY COMMISSION
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THIS TEST MANUAL HAS BEEN DEVELOPED TO PROVIDE GUIDANCE TO MANUFACTURERS OF MATTRESSES AND MATTRESS PADS FOR COMPLIANCE WITH THE FEDERAL STANDARD FOR THE FLAMMABILITY OF MATTRESSES AND MATTRESS PADS (16 CFR PART 1632). IN THE CASE OF A DISCREPANCY BETWEEN THE STANDARD AND THIS MANUAL, THE STANDARD WILL SUPERSEDE THE TEST MANUAL.

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I. BACKGROUND

The Standard for the Flammability of Mattresses and Mattress Pads, 16 CFR Part 1632, (Appendix A) was issued in 1972 to protect the public from the unreasonable risks of death, personal injury and property damage associated with fires that resulted from the ignition of mattresses by cigarettes. The standard prescribes a test to determine the ignition resistance of a mattress or mattress pad when exposed to a lighted cigarette.

The standard was issued by the Department of Commerce under the authority of the Flammable Fabrics Act and has been in effect since June 22, 1973. In 1973, responsibility for the Flammable Fabrics Act was transferred to the U.S. Consumer Product Safety Commission.

As originally issued, the standard required manufacturers to perform both prototype and production testing of mattresses and mattress pads to ensure compliance with the standard before the mattresses and mattress pads were sold in commerce. The mattress/mattress pad prototype test involved the testing of a new mattress/mattress pad design prior to production. It was a one time test for each design. The production mattress/mattress pad test involved the periodic testing of randomly selected mattresses/mattress pads from production units.

As part of the Commissions's 1980 "Rule Review" program, an analysis of the mattress standard was conducted. The analysis concluded that certain changes could be made to the standard that would reduce the economic burden to manufacturers without lowering the level of safety provided by the standard. At the time of the "Rule Review", the majority of mattresses on the market were made with a layer of urethane foam directly under the ticking which resulted in these mattresses consistently passing the mattress standard.

In October 1984, the Commission issued amendments to the mattress standard. Several changes were made to the text of the standard to improve its clarity, precision and practicability. The major change to the standard was to eliminate the requirement for production testing of mattresses and mattress pads by manufacturers of those products. Elimination of production testing reduced the costs of testing and recordkeeping without decreasing the resistance of mattresses/mattress pads to ignition from smoldering cigarettes. This change, however, required manufacturers to rigorously monitor construction and materials used to produce mattresses and mattress pads and to retest prototypes when these are changed. Prototype testing of new mattress/mattress pad designs prior to production is still required under the standard.

II. SCOPE

This test manual for 16 CFR Part 1632, "Standard for the Flammability of Mattresses and Mattress Pads" (Appendix A), provides detailed testing procedures, test materials and suggested test data report formats to use when conducting compliance testing under the standard. This test manual was developed to provide guidance to manufacturers and importers of mattresses and mattress pads subject to the standard.

INTRODUCTION

The standard provides requirements for testing of prototype designs of mattresses and mattress pads which are subject to the standard. The requirements must be met before the products can be sold in commerce. A test is specified to determine the ignition resistance of a mattress or mattress pad when exposed to a lighted cigarette. All mattresses and mattress pads as defined by the standard are subject to the requirements of the standard. Futons are included in the definition of a mattress. For a complete definition of the terms mattress and mattress pad, see §1632.1(a) and §1632.1(b), Definitions, (Appendix A).

The standard provides two optional test methods that can be used to reduce the number of additional prototype tests required when materials are changed. One of the optional test methods is the Ticking Substitution Test. This test procedure classifies ticking fabrics into categories to allow substitution of ticking fabrics as permitted in §1632.6(c) of the standard without requiring a new prototype test of the mattress or mattress pad. The second optional test method is the Tape Edge Substitution Test. This test procedure may be used to demonstrate that the substitution of tape edge materials will not reduce the ignition resistance of a mattress or mattress pad prototype.

The requirements of the standard apply to all manufacturers of mattresses and mattress pads subject to the standard, and are also

applicable to all other persons or firms initially introducing mattresses or mattress pads into commerce, including importers and renovators. For a complete definition of the term "manufacturer" see §1632.1(i).

Hereafter the term "mattress" will refer to mattresses, mattress pads, futons and other products which are included in the definition of mattress and mattress pad unless otherwise noted.

III. GENERAL PROCEDURES

SAFETY PRECAUTIONS

All tests should be conducted in such a manner as to provide the maximum protection to those individuals conducting the testing. A fire extinguisher should be available for use if necessary.

The test area will be large enough to accommodate a full scale mattress prototype in a horizontal position. The test area will be equipped with a suitable system such as a laboratory hood, for exhausting smoke and noxious gases produced during testing.

TEST MATERIAL ACCURACY

The standard test materials (i.e., sheets/sheeting fabric, cotton batting and urethane foam) specified in the standard to conduct the Mattress and Mattress Pad, Ticking Substitution and Tape Edge Substitution test procedures are available from several sources. The trade associations listed in Appendix B should be able to provide assistance in locating sources for the standard materials. When the standard materials are received, it is important that they be evaluated to ensure their conformance with the specifications in the standard.

In order to ensure the accuracy of the tests, each new shipment of standard test materials should be evaluated for the following information:

1. The fiber content of the white sheets or sheeting fabric will be 100% cotton. (Mattress, Ticking and Tape Edge Substitution Tests)
2. The weight of the sheets/sheeting fabric will be 3.7 ± 0.8 oz/yd² (125 ± 28 gm/m²). (Mattress, Ticking and Tape Edge Substitution Tests)

3. The absence of borate in the cotton batting will be confirmed. (Ticking Substitution Test)
4. The absence of thermoplastic fibers in the cotton batting will be confirmed. (Ticking Substitution Test)
5. The thickness of the urethane foam will be confirmed. (Ticking Substitution Test)
6. The absence of a flame retardant in the urethane foam will be confirmed. (Ticking Substitution Test)
7. The density of the urethane foam will be 1.2 to 1.5 lb/ft³. (Ticking Substitution Test)

PROTOTYPE IDENTIFICATION

The mattress prototype will be clearly marked with an assigned prototype identification number. The prototype identification number will be clearly visible in any photographic records, and will also be included on the mattress prototype specification sheet.

PERSONNEL AND TEST REPORT CERTIFICATION

Test results and details of each prototype test should include the prototype identification number, ticking classification if known, (including ticking test results and details of testing or appropriate certification from the ticking supplier), test room conditions, cigarette locations, number of relights for each location, whether each cigarette location passed or failed, name and signature of person conducting the test and date of test. This record will also include a certification by the person overseeing the testing as to the test results and that the test was carried out in accordance with the standard.

IV. MATTRESS PROTOTYPE TEST PROCEDURE

INTRODUCTION

A prototype test is conducted initially when a new mattress or mattress pad design is developed or when there has been a change in materials of a prototype that influences cigarette ignition resistance. A change in prototype materials includes a change to any of the following: materials, design, construction methods, and material source.

Conducting a new test because there has been a change in materials or construction methods is required only when those materials or construction methods involved are determined or suspected of influencing cigarette ignition resistance. Materials influencing cigarette ignition resistance include the fiber content of thread and tufting twine. Methods of construction influencing cigarette ignition resistance include the materials and the order of the layers of components directly under the ticking fabric. Ticking and tape edge materials, by definition, also influence the cigarette ignition resistance of a mattress or mattress pad. Mattress prototypes can be chosen to minimize retesting requirements in the future. (See Chapters V and VI of this manual for guidance on minimizing the testing required.)

Records are required to support any determination that particular materials (such as core materials) or construction methods used in a mattress prototype **did not influence** the ignition resistance of the prototype and could be substituted with another material without additional testing. Such records should include photographs of the prototype mattress's cross section indicating the depth of char penetration. Materials below the char do not influence the ignition resistance of the prototype. Physical specimens, including cross sections of the tested mattress prototype may also be kept to show which materials were not involved in the char penetration. (See Appendix C, Figure 1, for

a diagram of a mattress cross section indicating char penetration.) These records should be kept with the prototype test records.

TEST REQUIREMENTS

Mattress and mattress pad manufacturers must test a prototype of a mattress or a mattress pad to qualify that mattress or mattress pad for production. Each manufacturer required to perform prototype testing by the standard will construct or select enough units of each proposed mattress prototype to provide six surfaces for testing. If both surfaces of the prototype are suitable for testing then a minimum of three mattresses or mattress pads are required. If only one surface of the prototype is suitable for testing, then six mattresses or mattress pads are required.

APPARATUS AND TEST MATERIALS

The apparatus and test materials required to conduct the Mattress Prototype Test are specified in §1632.4(a) of the standard.

The washing machine, tumble dryer and detergent used to conduct the laundering of flame resistant mattress pads, required in §1632.5(2) of the standard, are specified in the American Association of Textile Chemists and Colorists (AATCC) Test Method 124. Copies of this document are available from the American Association of Textile Chemist and Colorists, Post Office Box 12215, Research Triangle Park, North Carolina 27709. Telephone number, 919/549-8141.

TEST PREPARATION

Sheeting Fabric/Sheets

The white 100% cotton sheeting fabric or sheets are required by the standard to be laundered one time before conditioning and testing. They will be laundered once in an automatic home washing machine using the hot water setting and the longest normal wash

cycle with the manufacturer's recommended quantity of a commercial detergent. Then they will be dried in an automatic home tumble dryer.

Flame Resistant Mattress Pads

A mattress pad containing a chemical flame retardant is required to be labeled with the letter "T", as discussed in §1632.31(b)(1) and (2). If a mattress pad contains a chemical fire retardant, then it will be laundered ten times prior to conditioning and testing. The laundering procedure specified is the AATCC Test Method 124, washing procedure 6.2(III) and drying procedure 6.3.2(b). Mattress pads intended for one time use or those that are not intended to be laundered, as determined by CPSC, will not be laundered.

CONDITIONING

The mattress prototype will be removed from any packaging prior to conditioning. The mattress prototype, laundered sheets or sheeting fabric and loose cigarettes will be maintained at a temperature greater than 18°C (65°F) and a relative humidity of less than 55 percent for 48 continuous hours. The mattress prototype, laundered sheets and cigarettes will be supported in a manner that allows free movement of air around them during the conditioning period.

MATTRESS/MATTRESS PAD TEST PROCEDURE

Test Room

The mattress prototype test will be conducted in a draft protected area equipped with a suitable exhaust system such as a laboratory hood capable of exhausting smoke and noxious gases produced during the test. Operate the exhaust system during the testing on a setting that will result in minimal air movement. Section 1632.4(a) of the standard requires that testing be conducted in a "draft-protected" area. Although this term is not

defined in terms of a specific air velocity, an air velocity of 200 ft/min or less at the test location is suggested.

The test room should have a temperature greater than 18°C (65°F) and a relative humidity of less than 55 percent. When the atmospheric conditions of the test room do not meet these conditions, testing must begin within ten minutes after the mattress prototype is removed from the conditioning area. Testing begins when at least one lighted cigarette is placed on the mattress prototype. Test room conditions will be recorded on the mattress prototype test data sheet.

Test Surface Preparation

In the test room, the mattress prototype will be supported on a suitable platform, in a flat horizontal position at a height reasonable for making observations. Mattress pads and thin flexible mattresses will be tested directly over a glass fiberboard substrate as specified in §1632.4(a)(1)(ii).

A line will be drawn across the mattress prototype test surface laterally dividing the surface into two equal size sections (Figure 2, Appendix C). One section is labeled "Sheet" for the Two-Sheet test, and the other is labeled "Bare" for the Bare Mattress/Mattress Pad test. If the other side of the mattress prototype is intended for sleeping upon and/or suitable for testing, then it will be tested immediately after completion of the first side. The second side of a mattress pad is not suitable for testing if the char penetrates through to the second side. Six mattress/mattress pad surfaces must be tested to qualify a mattress prototype. Although not required by the standard, the individual mattress/mattress pad test surfaces may be numbered one through six. This is a convenient way to distinguish test surfaces in the photographic records.

Test Locations

At least 18 cigarettes will be burned on each mattress prototype surface. A minimum of nine cigarettes are burned on the

"Bare" test surface, and a minimum of nine cigarettes are burned on the "Sheet" test surface (Figure 3).

The types of surface test locations if present, where cigarettes will be placed are:

1. smooth surface
2. tape edge (or edge seam)
3. quilted surface
4. tufted surface.

Although not specifically mentioned in the standard, the following are additional surface locations that will be tested if present in the mattress prototype:

5. surface seam
6. projecting edge (as a result of a top stitched seam at the ends of a futon).

When three or more types of surface locations are present, three cigarettes will be burned on each different surface location for each test surface, Bare and Two-Sheet.

When only two types of surface locations are present on the mattress prototype surface, four cigarettes will be placed on the smooth surface location which is the location least likely to sustain smoldering. Five cigarettes are placed on the tufted, quilted, or tape edge locations. These locations are more likely to sustain smoldering. For example, if the two surface locations are a smooth surface and a tuft, then four cigarettes will be burned on the smooth surface and five cigarettes will be burned on the tuft locations for each test surface.

The cigarettes will be positioned at least six inches (15.2 cm) apart on the mattress prototype surface. Although not specified in the standard, the cigarettes can be lighted using a vacuum pump or vacuum cleaner and an alcohol burner. The cigarettes will not be burned more than 0.16 inch (4 mm) before being placed on the mattress prototype surface.

Bare Mattress/Mattress Pad Test

Cigarette Placement - Smooth Surface Location

Each burning cigarette will be placed directly on a smooth surface location on the half of the test surface reserved for the Bare Mattress/Mattress Pad test. The full length of each cigarette will burn on a smooth surface without burning across a tuft or stitching of a quilted or seamed area. If this is not possible because of the mattress prototype design, then the cigarette will be placed in a position that allows as much of the butt end as possible to burn on the smooth surface.

Cigarette Placement - Tape Edge Location

Each burning cigarette will be placed in the depression between the mattress prototype top surface and the tape edge, parallel to the tape edge on the half of the test surface reserved for the Bare Mattress/Mattress Pad test.

Straight pins will be used to support a cigarette that rolls off the tape edge. Three straight pins may be inserted through the edge at a 45° angle so that one pin supports the cigarette at the lit end, one at the center, and one at the butt end. The heads of the pins will be below the upper surface of the cigarette (Figure 3).

If there is no tape edge but a seam is present along the top edge, then the cigarette will be supported in place along the seam and parallel to the edge with straight pins. The straight pins will be positioned as described above. If there is no tape edge or seam along the top edge, then the cigarettes are placed at the other surface locations.

Cigarette Placement - Quilted Location

Each burning cigarette will be positioned directly over the thread or in the depression created by the quilting process on the half of the test surface reserved for the Bare Mattress/Mattress Pad test. If the quilt design is such that the cigarette cannot burn its full length over the thread or depression, then the cigarette will be placed in a position that allows as much of the butt end as possible to burn on the thread or depression.

Cigarette Placement - Tufted Location

Each burning cigarette will be positioned so that it burns down into the depression caused by the tuft, and so that the butt end burns over the buttons or laces (threads, yarns) used in the tuft on the half of the test surface reserved for the Bare Mattress/Mattress Pad test.

Cigarette Placement - Surface Seam

When a seam is present on the surface of the mattress prototype then each burning cigarette will be positioned parallel with the seam and directly on the seam on the half of the test surface reserved for the Bare Mattress/Mattress Pad test.

Cigarette Placement - Projecting Edge

In some futon constructions, the futons are closed at each end with a top stitched seam that creates a projecting (flange like) edge. This edge is capable of supporting a cigarette during testing and each burning cigarette will be positioned in the depression created by the stitching on the half of the test surface reserved for the Bare Mattress/Mattress Pad test. **NOTE: This is not considered a true tape edge.**

Requirements for a Complete Test

The Bare Mattress/Mattress Pad test is complete when one of the following requirements have been met:

1. The cigarettes tested at each surface location have burned their full lengths. The number of cigarettes will depend on the number of surface locations available for testing.
2. The cigarettes tested at each surface location have extinguished before burning their full lengths. The number of cigarettes will depend on the number of surface locations available for testing. A maximum of two relights are allowed for each individual cigarette test location.
3. The char length at any individual cigarette test location does not meet the test criterion. (See page 15 for Test Criterion.)

If a cigarette extinguishes before burning its full length on any mattress prototype surface location, pops out of position when tested on a tuft, or rolls off a test location, then the test will be repeated with a new, lighted cigarette on a different portion of the same type of surface location on the mattress prototype until either of the above three requirements have been met.

Two-Sheet Test

The laundered and conditioned sheets or sheeting fabric will be torn or cut into pieces that are sufficient to cover one half of the mattress prototype. One section of the sheet is spread smoothly over the mattress prototype surface reserved for the Two-Sheet test and tucked under the mattress prototype. (Figure 2) The hem or any other portion of the sheet that is more than one fabric thickness will not be directly under or over a test cigarette. Immediately after the cigarettes are positioned at each

test location then the top (second) sheet will be placed smoothly over the bottom (first) sheet to cover the burning cigarettes.

The top sheet will not be lifted or raised during testing unless an obvious ignition occurs or until the cigarettes have burned out. Holding a hand near the surface of the top sheet over the test location will help to determine if the cigarette has extinguished. If no heat is felt or smoke observed, then the cigarette has burned out.

Cigarette Placement Locations

Each burning cigarette will be placed directly on the bottom sheet on the mattress prototype at the same type of test locations (smooth surface, tape edge, quilted, tufted, surface seam, or projecting edge) as defined in the Bare Mattress/Mattress Pad test.

In order to eliminate the air space as much as possible between the surface of the mattress prototype and the bottom sheet, it is necessary to depress the bottom sheet into the depressions that occur at the test locations. This depression can be formed using a suitable instrument (i.e. thin rod).

Requirements for a Complete Test

The Two-Sheet test is complete when either of the three requirements as defined in the Bare Mattress/Mattress Pad test have been met.

TEST CRITERION

The test criterion specified in §1632.3(b) states that individual cigarette test locations pass the test if the char length is not more than 2 inches (5.1 cm) in any direction from the nearest point of the cigarette. Char lengths will be measured using a linear scale graduated in millimeters, 0.1 inch or 1/16 inch divisions. Char length measurements will be made on the mattress prototype surface and downward into the mattress prototype in case of burns that penetrate through the mattress prototype surface.

In the interest of safety, the test operator should discontinue the test and record a failure before reaching the 2 inch (5.1 cm) char length if an obvious ignition has occurred. If an ignition has occurred, immediately wet the exposed area with water, cut around the burning material with a knife or scissors and pull the material out of the mattress prototype with tongs. Make sure that all charred or burned material is removed. Ventilate the room.

Prototype Test Qualification

The mattress prototype will be accepted if all the cigarette test locations on all six surfaces meet the test criterion. The mattress prototype will be rejected if one or more of the cigarette test locations on any of the six surfaces do not meet the test criterion.

Rejected prototype mattresses may be reworked to improve the resistance to ignition from cigarettes by making changes in design, construction methods, materials selection or other means. The redesigned mattress prototype will be retested for qualification in the same manner as the original prototype qualification testing.

DATA ACQUISITION AND REPORT FORMAT

The test results and additional comments for each mattress prototype tested will be recorded on a test data sheet. An example of a test data sheet is included in Appendix D.

The data sheet documents the test results and any additional observations concerning the test. Test results for each individual cigarette location will be recorded as "P" (pass) or "F" (fail), or any other appropriate designation indicating a pass or fail as defined by the test criterion of the standard.

PROTOTYPE RECORDS

Records of all prototype tests and the disposition of rejected prototypes will be maintained by the manufacturer, importer, or person initially introducing these items into commerce. These records will be maintained for as long as the mattress prototype is

in production, and will be maintained for three years thereafter. Each mattress prototype record will include:

1. Mattress prototype manufacturing specifications including the assigned prototype identification number and date. An example of a mattress specification data sheet is included in Appendix D.
2. Test results and details of each prototype test performed, including prototype identification number, ticking classification if known, test room conditions, cigarette locations, number of relights for each location, whether each cigarette location passed or failed, name and signature of person conducting the test and date of test. These test records will also include a certification by the person overseeing the testing as to the test results and that the test was carried out in accordance with the standard. An example of a mattress prototype test data sheet is included in Appendix D.
3. Photographs of each surface tested (with sheet/sheeting material removed). Each photograph should clearly indicate which part of the mattress prototype was sheeted and which part was tested bare. Each of the cigarette locations should be visible on the photographs. The photographs must also include the prototype identification number. The date of the test and the individual mattress test surface number could also be included in the photographic records.
4. Test results establishing that substituted core or interior materials (other than the ticking, tape edge, tufting material, or material directly under the ticking) do not influence the ignition resistance of the prototype must be maintained. These records should include photographs of the tested prototype mattress cross section clearly indicating the depth of char penetration (preferably at the deepest char location tested). Physical specimens, including cross sections of the tested mattress prototype may also be kept to show which materials were not involved in the char penetration.
5. Test results establishing the ticking classification to verify acceptable equivalency if a substitution is made. If this optional test procedure is used, appropriate records will be maintained with

the mattress prototype test results. See Chapter V of this test manual for the specific test procedures, ticking substitution procedures, and recordkeeping requirements.

In addition to the above records, mattress pad prototype records will also include:

1. Details of any approved alternate laundering procedure used in laundering mattress pads required by the standard to be laundered before testing.
2. Identification, composition, and details of the application of any flame retardant treatments employed relative to mattress pads or mattress pad components.

LABELING REQUIREMENTS

Each mattress or mattress pad subject to the standard must bear a permanent, accessible and legible label containing the month and year of manufacture and the location of the manufacturer. This information may be placed below the "date of delivery" line on the law tag provided it is printed or rubber stamped in black ink and is in all capital letters. The manufacturer may code the month and year of manufacture and location of manufacture, provided the decoding information is made available to Commission staff on request. If the manufacturer has more than one manufacturing facility in a particular city, the street address must be included in addition to the city and state.

In addition, mattress pads which contain a chemical fire retardant must be prominently, conspicuously, and legibly labeled with the letter "T". These mattress pads must also be labeled with precautionary instructions to protect the pads from agents or treatments which are known to cause deterioration of their flame resistant properties.

V. TICKING SUBSTITUTION PROCEDURE

TICKING PROTOTYPE CLASSIFICATION TEST REQUIREMENTS

The purpose of this optional procedure is to eliminate the requirement for frequent mattress prototype requalification when a change in ticking fabric is made. This procedure may be used to verify acceptable equivalency if a manufacturer wishes to change the ticking used on a particular mattress or mattress pad without conducting a prototype test as specified in §1632.4 or §1632.5. A single thickness ticking fabric, an entire quilted ticking and the single thickness ticking fabric used on the surface of a quilted ticking may be substituted using the ticking classification and substitution procedures. In addition, the other components (foam, thread, backing, etc.) used in a quilted ticking may be substituted using the ticking classification test as the basis for demonstrating that the change does not alter the flammability performance of that quilted ticking.

In general, a mattress ticking prototype is a ticking of a specific construction, color, or combination of colors or color pattern, weave pattern design, finish application, fiber content, and fabric weight per unit area. For a complete definition see §1632.6(b)(1), Mattress Ticking Prototype, and §1632.6(b)(2), Mattress Pad Ticking Prototype.

The ticking substitution procedure provides a means to classify ticking fabrics into categories to allow substitution of the ticking material on a mattress or mattress pad without requiring a new prototype test of the mattress or mattress pad. If a mattress prototype was constructed using an unclassified ticking, only that specific unclassified ticking fabric can be used in the production of mattresses or mattress pads based on that mattress prototype. However, if a mattress prototype was constructed using a classified ticking, the following substitutions can be made:

Class A tickings may be used on any qualified mattress prototype without conducting new prototype tests. Class B tickings

may be used on any mattress prototype which was qualified with a Class B or Class C ticking fabric without conducting new prototype tests. Each Class C ticking fabric requires a new mattress prototype test before it is used in production.

Class A tickings act as barriers against cigarette ignition; Class B tickings have no effect on cigarette ignition; and Class C tickings have the potential to act as a contributor to cigarette ignition.

To minimize prototype testing requirements, manufacturers can survey the ticking fabric classes and internal components available for use, and choose a fabric with the lowest classification for the prototype test. For example, if a Class C fabric is tested on the mattress prototype, any Class A or B ticking fabric may be substituted in the future without further prototype testing. However, any other Class C ticking fabrics must be prototype tested before being used in production.

The ticking classification test requirements are comprised of two parts: Ticking over Foam Test and Ticking over Cotton Batting Test. It is important that an improper substitution of ticking fabric does not occur. This can happen when a fabric is tested over the foam and does not ignite and testing is not repeated with the ticking fabric directly over cotton batting, (See Part 1, Ticking Over Foam Test and Part 2, Ticking over Cotton Batting Test). The test operator should not necessarily assume at this point that the ticking fabric is a Class B. The potential problem occurs if the ticking is really a Class A, but is identified as a Class B for purposes of mattress prototype testing and later substituted in production by a real Class B ticking. This substitution could reduce the ignition resistance of the mattress because the mattress has not been qualified in prototype testing with a true Class B ticking. This caution also applies to quilted tickings.

Part 1. Ticking Over Foam Test

Three replicates (specimens) of the ticking prototype will first be tested directly over urethane foam as described in the

Ticking Substitution Test Procedure of this Chapter. A total of nine cigarette test locations, three per ticking specimen will be tested.

If one or more cigarette test locations in Part 1 fail to meet the test criterion, stop the test and classify the ticking as provided under Test Criterion, page 24.

Part 2, Ticking Over Cotton Batting Test

If all nine cigarette test locations in Part 1 meet the test criterion, three additional specimens of the ticking prototype must be tested directly over cotton batting as described in the Ticking Substitution Test Procedure of this Chapter. Three replicates will be tested for each ticking prototype classification test. A total of nine cigarette test locations per ticking will be tested.

APPARATUS AND TEST MATERIALS

The apparatus and test materials required to conduct the Ticking Substitution Test are specified in §1632.6(e)(1), §1632.4(a) and include that which is described in the Apparatus and Test Materials section of Chapter IV, The Mattress Prototype Test Procedure of this manual.

Refer to Chapter III, General Procedures for the verification criteria of the standard test materials required in the Ticking Substitution test.

Figures 4 and 5 in Appendix C contain drawings of the Test Box (Mounting Box) and template. The template is designed to allow for a one inch (2.54 cm) marking around the placement of the cigarette, and its use is optional.

TEST PREPARATION AND CONDITIONING

The sheets or sheeting fabric will be laundered as stated in the Test Preparation section of Chapter IV of this manual. The ticking specimens, cigarettes, sheets or sheeting fabric, urethane

foam and cotton batting will be conditioned as described in the Conditioning section of Chapter IV of this manual.

TICKING SUBSTITUTION TEST PROCEDURE

Test Room

The Ticking Substitution test will be conducted in the test room as described in the Mattress/Mattress Pad Test Procedure section of Chapter IV of this manual.

Specimen Preparation

Each ticking specimen will measure no less than 20 inches by 20 inches (50.8 cm x 50.8 cm) square. Three specimens will be used in Part 1 and three specimens in Part 2. The six specimens will be cut from each ticking prototype as defined in §1632.6(b)(1) and (2), and will be representative of the ticking prototype. Representative of the ticking prototype means that prominent color and print pattern designs should be included when selecting specimens to test. Quilted tickings should include portions of their quilt patterns which allow the entire length of a lighted cigarette to lay on the stitching line.

The 12 inch by 12 inch by 6 inch (30.5 cm x 30.5 cm x 15.2 cm) deep plywood test box will be filled with 2 ± 0.01 lb (907.2 \pm 4 grams) of the cotton batting. The cotton batting will be allowed to protrude above the opening of the box to a height of up to 3 inches (7.6 cm) at the crown.

Part 1, Ticking Over Foam Test

The 12 inch by 12 inch by 0.25 inch (30.5 cm x 30.5 cm x 6.3 mm) thick piece of urethane foam will be placed directly over the cotton batting in the test box. The ticking specimen will be placed directly over the foam.

Part 2, Ticking Over Cotton Batting Test

The ticking specimen will be placed directly over the cotton batting in the test box without the urethane foam.

In each case, the ticking specimen will be stretched over the foam and/or batting and attached to the sides of the test box. To avoid wrinkles and to ensure consistent and good contact between the ticking and the filling materials in the test box, the ticking specimen must be stretched tightly. CPSC has found that staples hold the ticking specimen in a taut position better than tape.

Cigarette Placement

Three lighted cigarettes will be placed on an individual ticking specimen. At least one cigarette will be placed on the most prominent part of the color and pattern design in the ticking. If the ticking is quilted, then one cigarette will be placed over the thread or the depression created by the quilting process. Although not specified in the standard, the cigarettes can be lighted using a vacuum pump or vacuum cleaner and an alcohol burner. The cigarettes will not be burned more than 0.16 inch (4 mm) before placed on the test surface. The cigarettes will be immediately covered with a 12 inch by 12 inch square of sheeting.

The cigarettes will be placed at least 2 inches (5.1 cm) apart and 2 inches from the edge of the test box. To prevent the cigarette from rolling off the test surface, straight pins will be used to support the cigarette. The heads of the pins will be below the upper surface of the cigarette.

If a cigarette extinguishes before burning its full length, then the test will be repeated with a new, lighted cigarette on a different portion of the ticking specimen until either:

1. The three cigarettes have burned their full length.
2. The three cigarettes have extinguished before burning their full length. A maximum of two relights is allowed for each individual cigarette test location.

3. The char length at any individual cigarette test location does not meet the test criterion.

After the test is completed, the ticking specimen, the foam (if present) and the charred and/or heat discolored cotton batting will be removed from the test box. New cotton batting will be added to replace the discarded batting in order to maintain the 2 ± 0.01 lb (907.2 \pm 4 grams) necessary for each subsequent test.

TEST CRITERION

The test criterion specified in §1632.6(d)(2) states that individual cigarette test locations pass the test if the char length is not more than 1 inch (2.54 cm) in any direction from the nearest point of the cigarette, and the cotton batting does not ignite.

An individual test specimen passes the test if all three cigarette test locations meet the cigarette test criterion.

The char length will be measured using a linear scale graduated in millimeters, 0.1 inch or 1/16 inch divisions. Char length measurements are made on the ticking specimen surface and downward into the filling materials of the test assembly in case of burns that penetrate through the ticking specimen surface.

In the interest of safety, the test operator should stop the test and record a failure before reaching the 1 inch (2.54 cm) char length if an obvious ignition has occurred. Water should be used to extinguish ignitions.

Ticking Classification

A ticking prototype will be categorized into one of three classes as follows:

Class A: A ticking prototype tested over urethane foam and cotton batting in the test boxes; all six ticking specimens meet the test criterion; the cotton batting did not ignite.

Class B: A ticking prototype tested over the urethane foam and cotton batting in the test boxes; all three ticking specimens over the urethane foam meet the test criterion, but one or more of the three ticking specimens over the cotton batting do not meet the test criterion.

Class C: A ticking prototype tested directly over the urethane foam in the test box, and one or more of the three ticking specimens do not meet the test criterion.

DATA ACQUISITION AND REPORT FORMAT

The test results and additional comments for each ticking tested will be recorded on a test data sheet. An example of a ticking classification test data sheet can be found in Appendix D.

The data sheet documents the test results and any additional observations concerning the test. Test results for each individual cigarette test location will be recorded as "P" (pass) or "F" (fail) or any other appropriate designation, as defined by the test criterion in the Ticking Substitution Test Procedure in the standard, §1632.6(d)(2).

TICKING CLASSIFICATION RECORDS

Although the use of the ticking substitution procedure is optional, proper recordkeeping is required if this procedure is used. Records of all ticking classification tests will be maintained by the manufacturer, importer or person initially introducing these items into commerce. These records will be maintained for as long as the ticking is being used in production, and will be maintained for three years thereafter.

If the testing was conducted by the ticking supplier, a certification stating the ticking classification and that the ticking was tested in accordance with §1632.6 can be substituted for the test results and details of the classification test. However, if a mattress or mattress pad fails to comply with the standard, the mattress or mattress pad manufacturer or importer must assume full responsibility under the standard. The Commission

has no authority under this standard to compel ticking manufacturers or distributors to comply with this standard or to establish, maintain and provide upon request, the required records.

Each ticking classification record will include:

1. The manufacturing specifications and description of any ticking material substituted or used on a qualified mattress or mattress pad. The identification of the mattress prototype(s) must also be included. An example of a ticking prototype specification sheet is included in Appendix D.

2. Test results and details of any ticking classification test, including the ticking classification (A, B, or C), the test room conditions, the number of relights, whether each cigarette location passed or failed, the name and signature of the person conducting the test and the date of the test. In addition, photographs of the cigarette locations and/or swatches of the fabrics could also be included. An example of a ticking classification test data sheet is included in Appendix D.

or

If the testing was conducted by the ticking supplier, a certification stating the ticking classification and that the ticking fabric was tested in accordance with §1632.6.

VI. TAPE EDGE SUBSTITUTION PROCEDURE

TAPE EDGE SUBSTITUTION TEST REQUIREMENTS

This test may be used by manufacturers of mattresses or mattress pads to demonstrate that the substitution of tape edge materials will not reduce ignition resistance of a mattress prototype. The use of this test is optional. The mattress prototype must be previously qualified. This test is used to satisfy the Consumer Product Safety Commission that any changes to or replacements of an existing tape edge material do not reduce the ignition resistance of a mattress prototype.

Changes to the tape edge may require new mattress prototype tests or tape edge substitution tests. These changes include the color of the binding tape or an increase or decrease in the width of binding tape used. If the use of different widths or colors of binding tape is anticipated, then the original mattress prototype may be constructed with the different widths or colors on the mattresses used to test that prototype. The number of cigarettes at the tape edge location is increased so that the required number of cigarettes will be burned on each width and/or color of binding tape. The required number of cigarettes needed to qualify the prototype is discussed in the Test Location section of this Chapter. Test records must clearly show the results of each variation of the prototype mattress. Photographic records will also clearly show each variation.

The Tape Edge Substitution Test Procedure can also be used to qualify other new tape edge constructions such as flanges etc.

APPARATUS AND TEST MATERIALS

The apparatus and test materials required to conduct the Tape Edge Substitution Test are specified in §1632.4(a) of the standard.

TEST PREPARATION AND CONDITIONING

The sheets or sheeting fabric will be laundered as stated in the Test Preparation section of Chapter IV of this manual. The mattress/mattress pad, cigarettes and sheets/sheeting fabric will be conditioned as described in the Conditioning section of Chapter IV of this manual.

TEST PROCEDURE

Test Room

The Tape Edge Substitution test will be conducted in the test room as described in the Mattress/Mattress Pad Test Procedure section of Chapter IV of this manual.

Test Surface Preparation

The test surface of the mattress/mattress pad will be prepared as described in the Mattress/Mattress Pad Test Procedure section of Chapter IV of this manual.

Test Location

At least 36 cigarettes will be burned at the tape edge location on the two surfaces of the mattress prototype. Eighteen cigarettes will be burned on each surface of the mattress prototype. Nine cigarettes are burned on the "Bare" test surface and nine cigarettes are burned on the "Sheet" test surface.

The cigarettes will be positioned at least 6 inches (15.2 cm) apart on the mattress/mattress pad surface. The cigarettes can be lighted using a vacuum pump or vacuum cleaner and an alcohol burner. The cigarettes will not be burned more than 0.16 inch (4 mm) before being placed on the test surface.

Bare Mattress/Mattress Pad and Two-Sheet Tests

Each burning cigarette will be positioned at the tape edge location as described in the Mattress/Mattress Pad Test Procedure section of Chapter IV of this manual.

The Bare Mattress/Mattress Pad and Two-Sheet tests are complete when either of the following requirements have been met:

1. The specified number of cigarettes have burned their full length.
2. The specified number of cigarettes have extinguished before burning their full length. A maximum of two relights is allowed for each individual cigarette test location.
3. The char length at any individual cigarette test location does not meet the test criteria.

If a cigarette extinguishes before burning its full length, or rolls off the tape edge test location, then the test will be repeated with a new, lighted cigarette on a different portion of the tape edge until one of the above conditions are met.

TEST CRITERION

The test criterion specified in §1632.3(b) states that individual cigarette test locations pass the test if the char length is not more than 2 inches (5.1 cm) in any direction from the nearest point of the cigarette. Char lengths will be measured as described in the Test Criterion section of Chapter IV of this manual.

Prototype Test Qualification

A mattress prototype incorporating the substituted material(s) will be accepted only if all the cigarette test locations meet the test criterion.

DATA ACQUISITION AND REPORT FORMAT

The test results and additional comments for each tape edge substitution will be recorded on data sheets. A example of a tape edge substitution test data sheet can be found in Appendix D.

Records are maintained setting forth the details of the materials substitution and showing the results of the testing. Photographic records will be taken of each surface tested in accordance with the Tape Edge Substitution procedure with the prototype identification number of the mattress/mattress pad.

TAPE EDGE SUBSTITUTION RECORDS

Although the use of the Tape Edge Substitution procedure is optional, proper recordkeeping is required if this procedure is used. Records of all tape edge substitution tests will be maintained by the manufacturer, importer or person initially introducing these items into commerce. These records will be maintained for as long as the tape edge is being used in production, and will be maintained for three years thereafter.

Each tape edge substitution record will include:

1. The manufacturing specifications and description of any tape edge material substituted on a qualified mattress or mattress pad prototype. The identification of the mattress prototype(s) will also be included. An example of a tape edge specification data sheet is included in Appendix D.
2. Test results and details of any test of tape edge materials, including the prototype identification number, the test room conditions, the number of relights, whether each cigarette location passed or failed, the name and signature of the person conducting the test and the date of the test. The record will also include a certification by the person overseeing the testing as to the test results and that the test was carried out in accordance with §1632.7. In addition, photographs of the cigarette locations and/or swatches of the tape edge materials could also be included. An example of a tape edge substitution test data sheet is included in Appendix D.

APPENDIX A

**THE STANDARD FOR THE FLAMMABILITY
OF MATTRESSES AND MATTRESS PADS
16 CFR PART 1632**

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

Subpart A—The Standard

Sec.

- 1632.1 Definitions.
- 1632.2 Purpose, scope and applicability
- 1632.3 General requirements.
- 1632.4 Mattress test procedure
- 1632.5 Mattress pad test procedure.
- 1632.6 Ticking substitution procedure.
- 1632.7 Tape edge substitution procedure.
- 1632.8 Glossary of terms

Subpart B—Rules and Regulations

- 1632.31 Mattresses/mattress pads—labeling, recordkeeping, guaranties and "one of a kind" exemption.

Subpart C—Interpretations and Policies

- 1632.61—1632.62 [Reserved]

Sec
1632.63 Policy clarification on renovation of mattresses

AUTHORITY 15 USC 1193, 1194; 15 USC 2079(b)

SOURCE 49 FR 39796, Oct. 10, 1984, unless otherwise noted

Subpart A—The Standard

§ 1632.1 Definitions

In addition to the definitions given in section 2 of the Flammable Fabrics Act as amended (15 USC 1191), the following definitions apply for the purpose of the standard

(a) "Mattress" means a ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping upon

(1) This definition includes, but is not limited to, adult mattresses, youth mattresses, crib mattresses including portable crib mattresses, bunk bed mattresses, futons, water beds and air mattresses which contain upholstery material between the ticking and the mattress core, and any detachable mattresses used in any item of upholstered furniture such as convertible sofa bed mattresses, corner group mattresses, day bed mattresses, roll-a-way bed mattresses, high risers, and trundle bed mattresses See § 1632.8 Glossary of terms, for definitions of these items

(2) This definition excludes sleeping bags, pillows, mattress foundations, liquid and gaseous filled tickings such as water beds and air mattresses which do not contain upholstery material between the ticking and the mattress core, upholstered furniture which does not contain a detachable mattress such as chaise lounges, drop-arm love seats, press back lounges, push-back sofas, sleep lounges, sofa beds (including jackknife sofa beds), sofa lounges (including glide outs), studio couches and studio divans (including twin studio divans and studio beds), and juvenile product pads such as car bed pads, carriage pads, basket pads, infant carrier and lounge pads, dressing table pads, stroller pads, crib bumpers, and playpen pads See § 1632.8 Glossary of terms, for definitions of these items

(b) "Mattress Pad" means a thin, flat mat or cushion, and/or ticking filled with resilient material for use on top of a mattress This definition includes, but is not limited to, absorbent mattress pads, flat decubitus pads, and convoluted foam pads which are totally enclosed in ticking This definition excludes convoluted foam pads which are not totally encased in ticking

(c) "Ticking" means the outermost layer of fabric or related material that encloses the core and upholstery materials of a mattress or mattress pad A mattress ticking may consist of several layers of fabric or related materials quilted together

(d) "Core" means the main support system that may be present in a mattress, such as springs, foam, hair block, water bladder, air bladder, or resilient filling.

(e) "Upholstery material" means all material, either loose or attached, between the mattress or mattress pad ticking and the core of a mattress, if a core is present

(f) "Tape edge" (edge) means the seam or border edge of a mattress or mattress pad

(g) "Quilted" means stitched with thread or by fusion through the ticking and one or more layers of upholstery material.

(h) "Tufted" means buttoned or laced through the ticking and upholstery material and/or core, or having the ticking and upholstery material and/or core drawn together at intervals by any other method which produces a series of depressions on the surface

(i) "Manufacturer" means an individual plant or factory at which mattresses and/or mattress pads are produced or assembled

(j) "Mattress prototype" means mattresses of a particular design, sharing all materials and methods of assembly, but excluding differences in mattress size If it has been shown as a result of prototype qualification testing that an upholstery material or core will not reduce the ignition resistance of the mattress prototype, substitution of another material for such material shall not be deemed a difference in materials for prototype definition (See § 1632.31(c)(4) for records required to

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demonstrate that a change of materials has not reduced ignition resistance of a mattress prototype) If it is determined or suspected that a material has influenced the ignition resistance of the mattress prototype, a change in that material, excluding an increase in thickness, shall be deemed a difference in materials for purposes of prototype definition unless it is previously shown to the satisfaction of the Consumer Product Safety Commission that such change will not reduce the ignition resistance of the mattress prototype Ticking materials may be substituted in accordance with § 1632.6 Tape edge materials may be substituted in accordance with § 1632.7

(k) "Mattress pad prototype" means mattress pads of a particular design, sharing all materials and methods of assembly, but excluding differences in mattress pad size A change in existing material, except an increase in thickness, shall be deemed a difference in materials for purposes of prototype definition unless it is previously shown to the satisfaction of the Consumer Product Safety Commission that such change will not reduce the ignition resistance of the mattress pad prototype Ticking materials may be substituted in accordance with § 1632.8 Tape edge materials may be substituted in accordance with § 1632.7

(l) "Surface" means one side of a mattress or mattress pad which is intended for sleeping upon and which can be tested

§ 1632.2 Purpose, scope, and applicability

(a) *Purpose* (1) This standard prescribes requirements for testing of prototype designs of mattresses and mattress pads before the sale in commerce or the introduction in commerce of any mattress or mattress pad which is subject to the standard The standard prescribes a test to determine the ignition resistance of a mattress or a mattress pad when exposed to a lighted cigarette

(2) The standard sets forth a test at § 1632.6 which may be used to classify ticking materials for resistance to cigarette ignition

(3) The standard sets forth a test at § 1632.7 which may be used to demonstrate that the substitution of tape

edge materials will not reduce the ignition resistance of a mattress prototype or a mattress pad prototype

(b) *Scope* (1) All mattresses, as defined in § 1632.1(a), and all mattress pads, as defined in § 1632.1(b), manufactured or imported after the effective date of this amendment are subject to the requirements of the standard as amended

(2) All mattresses, as defined in § 1632.1(a), and all mattress pads, as defined in § 1632.1(b), manufactured or imported after June 22, 1973, and before the effective date of this amendment are subject to those requirements of the Standard for the Flammability of Mattresses (and Mattress Pads) (16 CFR Part 1632) which were in effect before the effective date of this amendment

(3) Manufacturers or importers desiring to use the ticking substitution procedure provided in § 1632.6 may classify the ticking being used on each mattress prototype before or after the effective date of this amendment using the test procedure set forth in that section

(4) One-of-a-kind mattresses and mattress pads may be excluded from testing under this standard in accordance with rules established by the Consumer Product Safety Commission (See § 1632.31(f) exemption for mattresses and mattress pads prescribed by a physician)

(c) *Applicability* (1) The requirements for prototype testing prescribed by this standard are applicable to each "manufacturer" (as that term is defined in § 1632.1(i)) of mattresses or mattress pads subject to the standard which are manufactured for sale in commerce. The requirements of this standard for prototype testing are also applicable to all other persons or firms initially introducing mattresses or mattress pads into commerce, including importers, each such firm shall be deemed to be a "manufacturer" for purposes of this standard

(2) The test at § 1632.6 for classification of ticking materials may be used by manufacturers of mattresses or mattress pads and by manufacturers of ticking materials The test at § 1632.7 may be used by manufacturers of mattresses to demonstrate that

substitution of tape edge materials will not reduce ignition resistance of a mattress prototype or a mattress pad prototype Use of the tests in §§ 1632 6 and 1632 7 is optional.

§ 1632 3 General requirements.

(a) *Summary of test method.* The method measures the ignition resistance of a mattress or mattress pad by exposing the surface to lighted cigarettes in a draft-protected environment The surfaces to be tested include smooth, tape edge, and quilted or tufted locations, if they exist on the mattress or mattress pad surface. A two-sheet test is also conducted on similar surface locations In the latter test, the burning cigarettes are placed between the sheets

(b) *Test criterion.* When testing the mattress or mattress pad surface in accordance with the testing procedure set forth in § 1632 4 *Mattress test procedure*, individual cigarette test locations pass the test if the char length is not more than 2 inches (5.1 cm) in any direction from the nearest point of the cigarette In the interest of safety, the test operator should discontinue the test and record a failure before reaching the 2 inch char length if an obvious ignition has occurred

(c) *Pre-market testing* Each manufacturer required to perform prototype testing by the standard shall perform the testing required by the standard with acceptable results before selling in commerce or introducing in commerce any mattress or mattress pad which is subject to the standard

(d) *Specimen selection and qualification.* (1) Each manufacturer required to perform prototype testing by the standard shall construct or select enough units of each proposed mattress prototype or proposed mattress pad prototype to provide six surfaces for testing A minimum of three mattresses or mattress pads are required if both sides can be tested, six mattresses or mattress pads are required if only one side can be tested Test each of the six surfaces according to § 1632 4(d) If all the cigarette test locations on all six mattress surfaces yield passing results using the criterion specified in § 1632 3(b), accept the

mattress prototype If all six surfaces of a mattress pad yield passing results using the criterion in § 1632 3(b), and all other applicable requirements prescribed by § 1632 5 are met, accept the mattress pad prototype. If one or more of the cigarette test locations on any of the six surfaces fail to meet the test criterion of § 1632 3(b), reject the mattress prototype or the mattress pad prototype

(2) Prototype qualification testing may be repeated after action has been taken to improve the resistance of the mattress prototype or the mattress pad prototype to cigarette ignition by changes in design, construction methods, materials selection, or other means When prototype qualification is repeated after rejection of a prototype, such qualification testing shall be conducted in the same manner as original qualification testing

(3) Each mattress prototype and each mattress pad prototype must be accepted in prototype qualification before any mattress or mattress pad manufactured in accordance with such mattress prototype or mattress pad prototype is sold in commerce or introduced in commerce Any manufacturer required to perform testing by the standard may rely on prototype tests performed before the effective date of this amended standard, provided that such tests were conducted in accordance with all requirements of §§ 1632 1(i), 1632 3(d), and 1632 4, and yield passing results when the test criterion of § 1632 3(b) is applied If the ticking classification test at § 1632 6 is to be used when relying on prototype tests performed before the effective date of the standard, the ticking currently used on that mattress prototype must be classified before substitution of ticking using § 1632 6.

(4) Rejected prototype mattresses or prototype mattress pads shall not be retested, offered for sale, sold, or promoted for use as a mattress (as defined in § 1632 1(a)) or for use as a mattress pad (as defined in § 1632 1(b)) except after reworking to improve the resistance to ignition by cigarettes, and subsequent retesting and acceptance of the mattress prototype (as defined in § 1632 1(f)) or the

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mattress pad prototype (as defined in § 1632.1(k)).

§ 1632 4 Mattress Test Procedure

(a) *Apparatus and Test Materials—*(1) Testroom. The testroom shall be large enough to accommodate a full-scale mattress in a horizontal position and to allow for free movement of personnel and air around the test mattress The test area shall be draft-protected and equipped with a suitable system for exhausting smoke and/or noxious gases produced by testing The testroom atmospheric conditions shall be greater than 18°C (65°F) and at less than 55 percent relative humidity

(i) The room shall be equipped with a support system (e.g. platform, bench) upon which a mattress may be placed flat in a horizontal position at a reasonable height for making observations.

(ii) If thin flexible mattresses or mattress pads are being testing the room shall also be equipped with a glass fiberboard test surface The glass fiberboard shall be approximately 1 inch (2.5 cm) thick and have a thermal conductivity of $0.30 \pm 0.05 \text{ cal (g) / hr cm}^2 \text{ }^\circ\text{C/cm}$ ($0.24 \pm 0.04 \text{ Btu/hr ft}^2 \text{ }^\circ\text{F/in}$) at 23.9°C (75°F)

(2) *Ignition source* The ignition source shall be cigarettes without filter tips made from natural tobacco, 85 ± 2 mm long with a tobacco packing density of $0.270 \pm 0.02 \text{ g/cm}^3$ and a total weight of $1.1 \pm \text{gm}$

(3) *Fire extinguisher* A pressurized water fire extinguisher, or other suitable fire extinguishing equipment, shall be immediately available

(4) *Water bottle* A water bottle fitted with a spray nozzle shall be used to extinguish the ignited portions of the mattress

(5) *Scale* A linear scale graduated in millimeters, 0.1 inch, or 1/4 inch divisions shall be used to measure char length

Glass fiberboard that meets Federal Specification HH-1-558B is acceptable Under this specification the board must be Form A, Class I, and plain faced Copies of the specifications may be obtained from the Business Service Centers of the General Services Administration Regional Offices

(6) *Sheets or Sheeting Material* White, 100 percent cotton sheets or sheeting material shall be used. It shall not be treated with a chemical finish which imparts a characteristic such as permanent press or flame resistance. It shall have 120-210 threads per square inch and fabric weight of $3.7 \pm 0.8 \text{ oz/yd}^2$ ($125 \pm 28 \text{ gm/m}^2$) The size of the sheet or sheeting material shall be appropriate for the mattress being tested

(7) *Other apparatus* In addition to the above, a thermometer, a relative humidity measuring instrument, a thin rod, straight pins, a knife or scissors, and tongs are required to carry out the testing

(b) *Test Preparation—*(1) *Mattress samples* The mattress shall be removed from any packaging prior to conditioning The mattress surface shall be divided laterally into two sections (see fig 1), one section for the bare mattress tests and the other for the two-sheet tests

(2) *Sheets or sheeting material* The sheets or sheeting material shall be laundered once before use in an automatic home washer using the hot water setting and longest normal cycle with the manufacturer's recommended quantity of a commercial detergent, and dried in an automatic home tumble dryer

(i) The sheet shall be cut across the width into two equal parts after washing

(ii) Sheeting material shall be cut in lengths to cover 1/2 of a mattress as described in § 1632 4(d)(3)

(3) *Cigarettes* Unopened packages of cigarettes shall be selected for each series of tests The cigarettes shall be removed from packaging prior to conditioning

(c) *Conditioning* The mattresses, laundered sheets or sheeting material, and loose cigarettes shall be conditioned in air at a temperature greater than 18°C (65°F) and a relative humidity less than 55 percent for at least 48 continuous hours prior to test The mattresses, laundered sheets or sheeting material, and cigarettes shall be supported in a suitable manner to permit free movement of air around them during conditioning The mat-

ress meets this conditioning requirement if the mattress and/or all its component materials, except the metallic core, if present, have been exposed only to the above temperature and humidity conditions for at least 48 continuous hours prior to testing the mattress

(d) *Testing*—(1) *General Mattress specimens* shall be tested in a testroom with atmospheric conditions of a temperature greater than 18°C (65°F) and a relative humidity less than 55 percent. If the test is not performed in the conditioning room, at least one lit cigarette shall be placed on the mattress surface within 10 minutes of removal from the conditioning room. The other side of the mattress shall be tested immediately after completion of the first side.

(i) At least 18 cigarettes shall be burned on each mattress test surface, 9 in the bare mattress tests and 9 in the 2 sheet tests. If three or more mattress surface locations (smooth surface, tape edge, quilted, or tufted areas) exist in the particular mattress surface under test, three cigarettes shall be burned on each different surface location. If only two mattress surface locations exist in the particular mattress surface under test (tape edge and smooth surface), four cigarettes shall be burned on the smooth surface and five cigarettes shall be burned on the tape edge.

(ii) Light and place one cigarette at a time on the mattress surface. (If previous experience with a similar type of mattress has indicated that ignition is not likely, the number of cigarettes which may be lighted and placed on the mattress at one time is left to the test operator's judgment. The number of cigarettes must be carefully considered because a smoldering or burning mattress is extremely hazardous and difficult to extinguish.) The cigarettes must be positioned no less than 8 inches apart on the mattress surface. Each cigarette used as an ignition source shall be well lighted but not burned more than 4 mm (0.16 inch) when placed on the mattress. (Fire extinguishing equipment must be readily available at all times.)

(iii) If a cigarette extinguishes before burning its full length on any

mattress surface location, pops out of position when tested on a tuft, or rolls off a test location, the test must be repeated with a freshly lit cigarette on a different portion of the same type of location on the mattress surface until either the number of cigarettes specified in § 1632.4(d)(1)(i) have burned their full lengths, the number of cigarettes specified in § 1632.4(d)(1)(i) have extinguished before burning their full lengths, or failure has occurred according to § 1632.3(b) *Test criterion*.

(2) *Bare mattress tests*—(i) *Smooth surface*. Each burning cigarette shall be placed directly on a smooth surface location on the test surface on the half reserved for bare mattress tests. The cigarettes should burn their full lengths on a smooth surface without burning across a tuft, or stitching of a quilted area. However, if this is not possible because of mattress design, then the cigarettes shall be positioned on the mattress in a manner which will allow as much of the butt ends as possible to burn on smooth surfaces. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)). **CAUTION.** Even under the most carefully observed conditions, smoldering combustion can progress to the point where it cannot be readily extinguished. It is imperative that a test be discontinued as soon as ignition has definitely occurred. Immediately wet the exposed area with a water spray (from water bottle), cut around the burning material with a knife or scissors and pull the material out of the mattress with tongs. Make sure that all charred or burned material is removed. Ventilate the room.

(ii) *Tape edge*. Each burning cigarette shall be placed in the depression between the mattress top surface and the tape edge, parallel to the tape edge of the half of the test surface reserved for bare mattress tests. If there is only a seam or no depression at the edge, support the cigarettes in place along the edge and parallel to the edge with straight pins. Three straight pins may be inserted through the edge at a 45° angle such that one pin supports the cigarette at the burned end, one at the center, and one at the butt. The heads of the pins must be below the

upper surface of the cigarette (see fig 2). Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

CIGARETTE LOCATION

MATTRESS PREPARATION

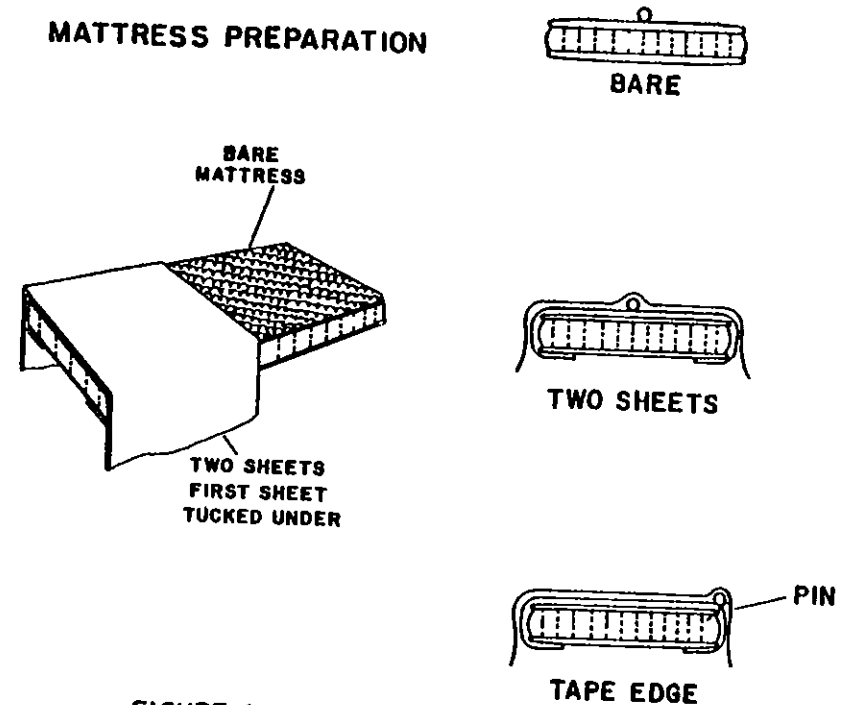


FIGURE 1

FIGURE 2

(iii) *Quilted location*. If quilting exists on the test surface, each burning cigarette shall be placed on quilted locations of the test surface. The cigarettes shall be positioned directly over the thread or in the depression created by the quilting process on the half of the test surface reserved for bare mattress tests. If the quilt design is such that the cigarettes cannot burn their full lengths over the thread or depression, then the cigarettes shall

be positioned in a manner which will allow as much of the butt ends as possible to burn on the thread or depression. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(iv) *Tufted location.* If tufting exists on the test surface, each burning cigarette shall be placed on tufted locations of the test surface. The cigarettes shall be positioned so that they burn down into the depression caused by the tufts and so that the butt ends of the cigarettes burn out over the buttons or laces used in the tufts or the depressions made by the tufts on the half of the test surface reserved for bare mattress tests. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(3) *Two-sheet tests.* Spread a section of sheet or sheeting material smoothly over the mattress surface which has been reserved for the two-sheet test and tuck under the mattress. Care must be taken that hems or any other portion of the sheet which is more than one fabric thickness, is neither directly under nor directly over the test cigarette in the two-sheet test.

(i) *Smooth surfaces.* Each burning cigarette shall be placed directly on the sheet covered mattress in a smooth surface location as defined in the bare mattress test. Immediately cover the first sheet and the burning cigarette loosely with a second, or top sheet (see fig. 2). Do not raise or lift the top sheet during testing unless obvious ignition has occurred or until the cigarette has burned out. Whether a cigarette has extinguished may be determined by holding the hand near the surface of the top sheet over the test location. If no heat is felt or smoked observed, the cigarette has burned out. If ignition occurs, immediately remove the sheets and cigarette and follow the cautionary procedures outlined in the bare mattress test. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(ii) *Tape edge.* (A) Each burning cigarette shall be placed in the depression between the top surface and the tape edge on top of the sheet, and immediately covered with a second sheet.

It is important the air space be eliminated, as much as possible, between the mattress and the bottom sheet at the test location before testing. Depress the bottom sheet into the depression using a thin rod or other suitable instrument.

(B) In most cases, the cigarettes will remain in place throughout the test. However, if the cigarettes show a marked tendency to roll off the tape edge location, they may be supported with straight pins. Three straight pins may be inserted through the bottom sheet and tape at a 45° angle such that one pin supports the cigarette at the burning end, one at the center, and one at the butt. The heads of the pins must be below the upper surface of the cigarette (see fig. 2). Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(iii) *Quilted locations.* If quilting exists on the test surface, each burning cigarette shall be placed in a depression caused by quilting, directly over the thread and on the bottom sheet, and immediately covered with the top sheet. It is important that the air space be eliminated, as much as possible, between the mattress and the bottom sheet at the test location before testing. Depress the bottom sheet into the depression using a thin rod or other suitable instrument. If the quilt design is such that the cigarettes cannot burn their full lengths over the thread or depression, then the cigarettes shall be positioned in a manner which will allow as much of the butt ends as possible to burn on the thread or depression. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(iv) *Tufted locations.* If tufting exists on the test surface, each burning cigarette shall be placed in the depression caused by tufting, directly over the tuft and on the bottom sheet, and immediately covered with the top sheet. It is important that the air space be eliminated, as much as possible, between the mattress and the bottom sheet at the test location before testing. Depress the bottom sheet into the depression using a thin rod or other suitable instrument. The

cigarettes shall be positioned so that they burn down into the depression caused by the tuft and so that the butt ends of the cigarettes burn out over the buttons or laces, if used in the tufts. Report results for each cigarette as pass or fail as defined in the test criterion (see § 1632.3(b)).

(e) *Records.* Records of all prototype test results, and the disposition of rejected prototypes shall be maintained by the person or firm required to perform testing by the standard in accordance with § 1632.31(c).

§ 1632.5 Mattress pad test procedure

(a) *Testing.* All mattress pads shall be tested, in the condition in which they are intended to be sold, according to § 1632.4 Mattress test procedure, using the glass fiberboard substrate.

(b) *Flame Resistant Mattress Pads.* The following additional requirements shall be applicable to mattress pads which contain a chemical fire retardant.

(1) These mattress pads shall be tested in accordance with § 1632.4 Mattress test procedure after they have been washed and dried 10 times as described in § 1632.5(b)(2).

(i) Such laundering is not required of mattress pads which are intended for one time use and/or are not intended to be laundered, as determined by the Consumer Product Safety Commission.

(ii) Mattress pads which are not susceptible to being laundered and are labeled "dryclean only" shall be drycleaned by a procedure which has previously been found acceptable by the Consumer Product Safety Commission.

(2) *Laundering Procedure.* (i) The washing procedure to be used for flame resistant mattress pads is prescribed in AATCC Test Method 124-82, "Appearance of Durable Press Fabrics After Repeated Home Laundering" washing procedures 6 2(III), with a water temperature of 60°±28 °C (140°±5 °F).

(ii) The drying procedure to be used for flame resistant mattress pads is prescribed in AATCC Test Method 124-82, "Appearance of Durable Press Fabrics After Repeated Home Laundering," drying procedure 6 3 2(b).

(iii) Maximum load shall be 3 46 kg (8 lb) and may consist of any combination of test items and dummy pieces.

(iv) AATCC Test Method 124-82, "Appearance of Durable Press Fabrics After Repeated Home Laundering," is found in the Technical Manual of the American Association of Textile Chemist and Colorists, Vol 58, 1982 (incorporated by reference). Copies of this document are available from the American Association of Textile Chemist and Colorists, Post Office Box 12215, Research Triangle Park, North Carolina 27709.

This document is also available for inspection at the Office of the Federal Register, Room 8401, 1100 L Street, NW, Washington, DC 20408. This incorporation by reference was approved by the Director of the Federal Register. These materials are incorporated as—they exist in the edition which has been approved by the Director of the Federal Register and which has been filed with the Office of the Federal Register.

(v) A different number of wash and dry cycles using another procedure may be specified and used, if that procedure has previously been found to be equivalent by the Consumer Product Safety Commission.

(3) *Labeling—(i) Treatment label.* If a mattress pad contains a chemical fire retardant, it shall be labeled with the letter "T" pursuant to rules and regulations established by the Consumer Product Safety Commission.

(ii) *Care label.* All mattress pads which contain a chemical fire retardant treatment shall be labeled with precautionary instructions to protect the pads from agents or treatments which are known to cause deterioration of their flame resistance. Such labels shall be permanent and otherwise in accordance with rules and regulations established by the Consumer Product Safety Commission in § 1632.31(b).

(iii) *Exception.* One time use products as defined in § 1632.5(b)(1)(i) are not subject to these labeling requirements.

§ 1632.6 Ticking substitution procedure

(a) This procedure may be used to verify acceptable equivalency if a mattress or mattress pad manufacturer wishes to change the ticking used on a particular mattress or mattress pad prototype without conducting a prototype test as specified in § 1632.4 or § 1632.5. The procedure includes a ticking classification test that may be used by a ticking, mattress or mattress pad manufacturer or by a distributor of ticking.

(b) *Definitions.* For the purpose of this section the following definitions apply in addition to those in § 1632.1.

(1) *Matress Ticking Prototype.* Means a ticking of a specific construction, color, or combination of colors or color pattern, weave pattern design, finish application, fiber content, and weight per unit area. With respect to film-coated ticking, a mattress ticking prototype means in addition to the factors listed above, a given method of application, chemical formula, and thickness of application of film coating. With respect to a quilted ticking, a mattress ticking prototype means the combination of a specific ticking as described above, a specific filling, thickness, density, and chemical composition, a specific thread, a specific method of quilting, and a specific backing fabric construction, weave, finish, fiber content, and weight.

(2) *Matress Pad Ticking Prototype.* (i) Means a ticking of a specific construction, color, or combination of colors or color pattern, weave pattern design, finish application, fiber content, and weight per unit area. With respect to film-coated ticking, a mattress pad ticking prototype means in addition to the factors listed above, a given method of application, chemical formula, and thickness of application of film coating.

(ii) Quilted ticking is excluded from this definition. Therefore, the following procedures may not be used to substitute quilted ticking used on or as a mattress pad.

(c) *Scope and application.* (1) This procedure provides an independent evaluation of the cigarette ignition characteristics of ticking and for the classification of ticking into one of three performance classes Class A

represents tickings evaluated as acting as barriers against cigarette ignition, Class B represents tickings evaluated as having no effect on cigarette ignition, and Class C represents tickings evaluated as having the potential, in some manner, to act as a contributor to cigarette ignition.

(2) Substitution of any ticking which has been evaluated as Class A using the procedure in this § 1632.6 for any other ticking material shall not be a "difference in materials" as that phrase is used in §§ 1632.1 (j) and (k). Consequently, any ticking material evaluated as Class A under this test procedure may be used on any qualified mattress prototype or on any qualified mattress pad prototype without conducting new prototype tests.

(3) Substitution of any ticking which has been evaluated as Class B using the procedure in this § 1632.6 for the ticking material used on any mattress prototype or on any mattress pad prototype which was qualified in prototype testing with a testing material evaluated as Class B or a Class C shall not be a "difference in materials" as that phrase is used in §§ 1632.1 (j) and (k). Consequently, any ticking material evaluated as Class B under this test procedure may be used on any mattress or mattress pad which was qualified in prototype testing with a Class B or Class C ticking material without conducting new prototype tests. However, if Class B ticking material is to be used on any mattress or mattress pad which was qualified in prototype testing with a Class A ticking material, the mattress prototype or mattress pad prototype must be requalified, using a Class B ticking.

(4) A ticking material which has been evaluated as Class C using the procedure in this § 1632.6 may be used only on a mattress or mattress pad which was qualified in prototype testing with that particular Class C ticking material. Consequently, a ticking material evaluated as Class C under this test procedure may not be used on any mattress or mattress pad which was qualified in prototype testing using another Class C ticking material, or a Class A or Class B ticking material, without conducting new prototype tests.

(d) *General Requirements.* (1) This procedure is a ticking prototype performance classification test. Ticking not classified according to this procedure may be used on mattresses or mattress pads if the mattress prototype or mattress pad prototype has been qualified utilizing the unclassified ticking in question.

(2) *Test Criterion.* (i) *Cigarette.*—An individual cigarette test location passes the test if the char length is not more than 1 inch (2.54 cm) in any direction from the nearest point of the cigarette, and the cotton felt is not ignited.

CAUTION In the interest of safety, the test operator should discontinue the test and record a failure before reaching the 1 inch (2.54 cm) char length if, in his opinion, an obvious ignition has occurred.

(ii) *Test Specimen.*—An individual test specimen passes the test if all three cigarette test locations meet the cigarette test criterion of this paragraph.

(3) *Specimen selection.* Three specimens shall be used for each ticking prototype classification test, with each specimen measuring no less than 20 inches by 20 inches (50.8 cm x 50.8 cm) square. The three specimens shall be selected from any fabric piece taken from a ticking prototype. The specimens shall be representative of the ticking prototype.

(4) *Ticking Classification.* A ticking prototype is classified as Class A, Class B, or Class C, in accordance with the following schedules.

(i) *Class A.*—A ticking prototype is classified as Class A when three specimens, tested in accordance with § 1632.6(e), meet the test criterion in § 1632.6(d)(2) when the ticking is tested directly over the cotton felt on the test box.

(ii) *Class B.*—A ticking prototype is classified as Class B when three specimens, tested according to § 1632.6(e), meet the test criterion in § 1632.6(d)(2) when the ticking is tested on a $\frac{1}{4}$ inch \pm $\frac{1}{2}$ inch (6.3 mm \pm 8 mm) thick urethane foam pad covering the cotton felt on the test box.

(iii) *Class C.*—A ticking prototype is classified as Class C when any specimen tested according to § 1632.6(e),

falls to meet the test criterion in § 1632.6(d)(2) when the ticking is tested on a $\frac{1}{4}$ inch \pm $\frac{1}{2}$ inch (6.3 mm \pm 8 mm) thick urethane foam pad covering the cotton felt on the test box.

(e) *Test Procedure.*—(1) *Apparatus.* For the purpose of this section the following apparatus and materials are required in addition to that which is listed in § 1632.4 (a) and (b).

(i) *Sheet and Sheeting Material.* Test covers made from sheets or sheeting material shall not be less than 12 inches by 12 inches (30.48 cm by 30.48 cm) square.

(ii) *Template.* Designed to allow for a one inch marking around the placement of the cigarette (see figure 3). Use of this template is optional.

(iii) *Stapler or masking tape* or other means of attachment to secure fabric to test box.

(iv) *Mounting Box.* A 6 inch deep, 12 inch square plywood box. The box contains two $\frac{1}{2}$ inch in diameter ventilation holes (See figure 4).

(v) *Cotton Felt.* (A) The cotton felt shall be a thoroughly-garnetted mixture of all new material consisting of not less than 67% linters and of not more than 33% clean picker blend or equivalent binder and not more than 5% non-cellulosic total content. The felt shall not be bleached, moistened or chemically treated in any way.

(B) The felt may be re used repeatedly after completion of each test by removing all of the smoldering, charred, heat discolored fibers, or fibers exposed to water as a result of extinguishing the cotton ignited by previous test.

(vi) *Urethane Foam.* The urethane foam shall have a density of 1.2 to 1.5 pounds per cubic foot, an indentation load deflection of 22 to 35 pounds, with each test specimen measuring no less than 12 inches by 12 inches (30.48 cm by 30.48 cm) square, having a thickness of $\frac{1}{4}$ inch \pm $\frac{1}{2}$ inch (6.3 mm \pm 8 mm). The foam shall not be treated with a flame retardant chemical.

(2) *Conditioning.* The test specimens, cigarettes, laundered sheets or sheeting material, foam and felt shall be conditioned as described in § 1632.4(c).

(3) *Specimen Preparation.* (i) Place 907 2±4 grams (two pounds) of cotton felt in the test box, allowing the felt to protrude above the opening of the box to a height of up to 3 inches (7.62 cm) at the crown.

(ii) For the first part of this test, place a 12 inches by 12 inches (30.48 cm by 30.48 cm) square urethane foam pad on top of the cotton felt. Stretch the ticking specimen over the foam pad and fasten it to the sides of the test box using a stapler or tape. Be careful to avoid wrinkles in the fabric and have sufficient tautness to assure firm contact between the fabric and the filling materials in the test box.

(4) *Testing.* (i) Ticking specimens shall be tested in a testroom with atmospheric conditions of a temperature greater than 18 °C (65 °F) and a relative humidity less than 55%.

(ii) Three cigarettes shall be burned on each ticking specimen, with no more than one cigarette burning at any time. At least one cigarette shall be placed on the most prominent part of the color and weave pattern design in the ticking. If the ticking is quilted, one cigarette shall be placed over the thread or in the depression created by the quilting process. Each cigarette must be positioned no less than two inches (5.08 cm) from any other cigarette or the edge of the box.

(iii) Light and place one cigarette on the test specimen. Immediately cover the burning cigarette with a sheet test cover. The cigarette shall be well lighted but not burned more than 4 mm (0.16 inch) when placed on the test specimen. The cigarette may be supported by three straight pins such that one pin supports the cigarette at the burning end, one at the center and one at the butt. The heads of the pins must be below the upper surface of the cigarette. Upon completion of the three cigarette burns and removal of the fabric and foam specimens, remove all of the char or heat discoloration on the cotton felt as stated in § 1632.6(e)(v)(B). Fresh new felt shall be added to replace the discarded fibers in the amount necessary to maintain the full 907 2±4 grams (two pounds) of felt for each test.

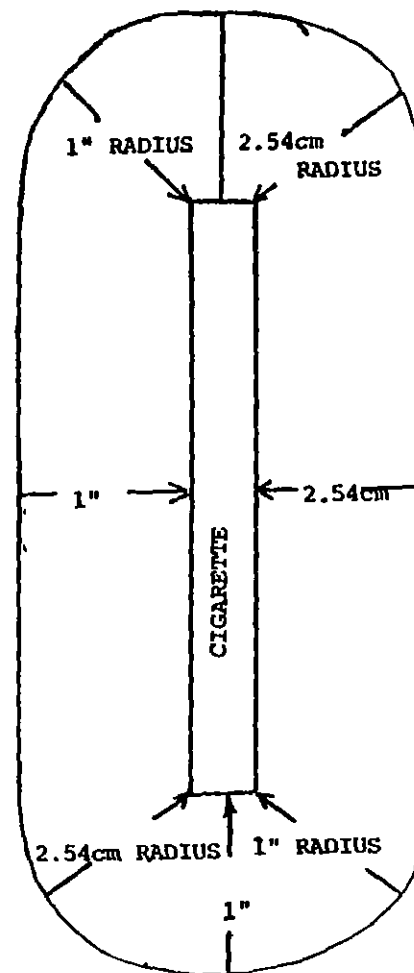
(iv) If the cigarette extinguishes before burning its full length, the test must be repeated with a freshly lit cigarette on a different portion of the ticking specimen until either three cigarettes have burned their full lengths or three cigarettes have extinguished. Report result for each cigarette as pass or fail as defined in Test Criterion § 1632.6(d)(2). An obvious ignition is recorded as a failure.

(v) If ignition occurs with any of the three cigarette burns on the ticking specimen, terminate testing of that specimen and classify according to § 1632.6(d)(4).

(vi) If all cigarette test locations meet the Test Criterion in § 1632.6(d)(2), repeat procedure outlined in § 1632.6(e)(4)(iii) for the second part of the test with new ticking specimens that will be retested directly over the cotton felt, without the urethane foam pad. Remove the urethane foam pad and charred or heat discolored area from the cotton felt as specified in § 1632.6(e)(v)(B) prior to testing. Record the test results as pass or fail as defined in Test Criterion § 1632.6(d)(2) and classify according to § 1632.6(d)(4).

(5) *Records.* Records of any ticking classification test results relied upon by the mattress or mattress pad manufacturer or importer shall be maintained in accordance with rules and regulations established by the Consumer Product Safety Commission in § 1632.31(c). As provided by § 1632.31(c)(6), manufacturers or importers of mattresses or mattress pads may rely on a certification of compliance with this section of the standard provided by the ticking manufacturer or distributor; however, if a mattress or mattress pad fails to comply with the standard, the mattress or mattress pad manufacturer or importer must assume full responsibility under the standard. The Commission has no authority under this standard to compel ticking manufacturers or distributors to comply with this section or to establish, maintain and provide upon request, the records specified in § 1632.31(c).

FIGURE 3



1 INCH (2.54cm) TEMPLATE

TOLERANCES + 1/32" - 0"

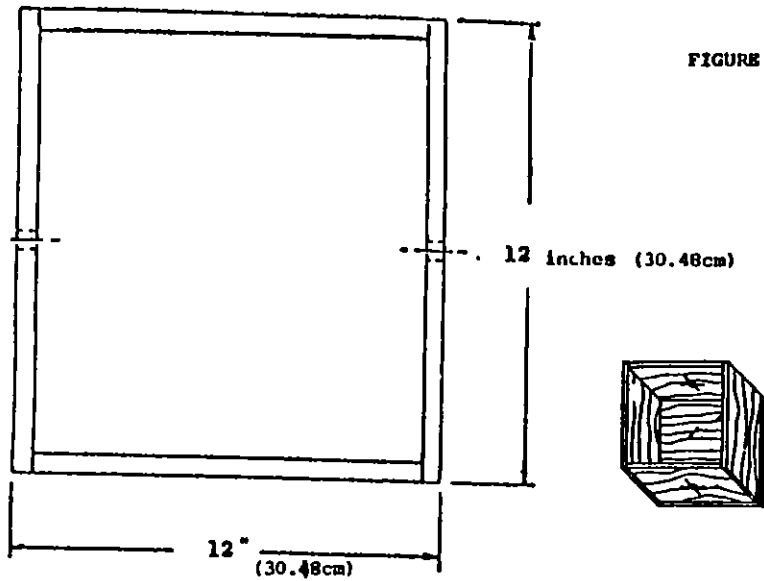
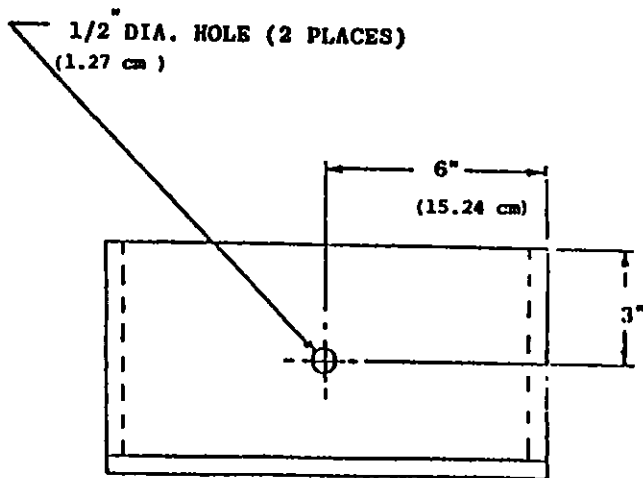


FIGURE 4



TEST BOX

MATERIAL 1/2" PLYWOOD

TOLERANCES + 1/32" - 0"

Consumer Product Safety Commission

§ 1632.7 Tape edge substitution procedure

(a) Sections 1632.1 (j) and (k) provide in part that "a change in existing material shall be deemed a difference in materials for purposes of prototype definition unless it is shown to the satisfaction of the Consumer Product Safety Commission that such change will not reduce the ignition resistance" of the mattress prototype or the mattress pad prototype.

(b) The Commission will regard a showing "to the satisfaction of the Consumer Product Safety Commission" to have been made with respect to materials substitution of items such as flange materials and tapes at the tape edge under the following circumstances:

(1) The mattress or mattress pad prototype has been qualified previously under the provisions of § 1632.3, and

(2) A substitution of materials involving only tape edge construction is contemplated; and

(3) A prototype mattress or mattress pad incorporating the substitute materials has been tested in accordance with applicable procedures in § 1632.4 by placing 36 cigarettes (18 per surface—9 bare and 9 two sheet) at tape edge locations with no test failure as determined by applying the test criterion of § 1632.3(b), and

(4) Records are maintained setting forth the details of the materials substitution and showing the results of the testing referred to in paragraph (b)(3) of this section. The records are to be maintained in accordance with regulations established by the Consumer Product Safety Commission (see § 1632.31).

§ 1632.8 Glossary of terms

(a) *Absorbent pads* Pad used on top of mattress. Designed to absorb urine thereby reducing skin irritation, can be one time use.

(b) *Basket pad*. Cushion for use in an infant basket.

(c) *Bunk beds* A tier of beds, usually two or three, in a high frame complete with mattresses (see fig 5).

(d) *Car bed*. Portable bed used to carry a baby in an automobile.

(e) *Carriage pad*. Cushion to go into a baby carriage.

(f) *Chaise lounge* An upholstered couch chair or a couch with a chair back. It has a permanent back rest, no arms, and sleeps one (see fig 5).

(g) *Convertible sofa*. An upholstered sofa that converts into an adult sized bed. Mattress unfolds out and up from under the seat cushioning (see fig 5).

(h) *Convuluted foam pad*. A bed pad made of foam in an egg crate configuration not encased in ticking.

(i) *Corner groups* Two twin size bedding sets on frames, usually slipcovered, and abutted to a corner table. They also usually have loose bolsters slipcovered (see fig 5).

(j) *Crib bumper* Padded cushion which goes around three or four sides inside a crib to protect the baby. Can also be used in a playpen.

(k) *Daybed*. Daybed has foundation, usually supported by coil or flat springs, mounted between arms on which mattress is placed. It has permanent arms, no backrest, and sleeps one (see fig 5).

(l) *Decubitus pad*. Designed to prevent or assist in the healing of decubitus ulcers (bed sores). Flat decubitus pads are covered by the standard convuluted decubitus pads made entirely from foam are not covered by the standard.

(m) *Dressing table pad*. Pad to cushion a baby on top of a dressing table.

(n) *Drop arm loveseat*. When side arms are in vertical position, this piece is a loveseat. The adjustable arms can be lowered to one of four positions for a chaise lounge effect or a single sleeper. The vertical back support always remains upright and stationary (see fig 5).

(o) *Futon*. A flexible mattress generally used on the floor that can be folded or rolled up for storage. It usually consists of resilient material covered by ticking.

(p) *High riser*. This is a frame of sofa seating height with two equal size mattresses without a backrest. The frame slides out with the lower bed and rises to form a double or two single beds (see fig 5).

(q) *Infant carrier and lounge pad*. Pad to cushion a baby in an infant carrier.

(r) *Mattress foundation*. Consists of any surface such as foam, box springs

or other, upon which a mattress is placed to lend it support for use in sleeping upon.

(s) *Pillow* Cloth bag filled with resilient material such as feathers, down, sponge rubber, urethane, or fiber used as the support for the head of a person

(t) *Playpen pad* Cushion used on the bottom of a playpen.

(u) *Portable crib* Smaller size than a conventional crib Can usually be converted into a playpen

(v) *Press-back lounges* Longer and wider than conventional sofa beds When the lounge seat is pressed lightly, it levels off to form, with the seat, a flat sleeping surface The seat slopes, in the sitting position, for added comfort (see fig 5)

(w) *Push-back sofa* When pressure is exerted on the back of the sofa, it becomes a bed When the back is lifted, it becomes a sofa again Styled in tight or loose cushions (see fig 5)

(x) *Roll away-bed* Portable bed which has frame which folds in half with the mattress for compact storage.

(y) *Sleep lounge* Upholstered seating section is mounted on a sturdy frame May have bolster pillows along the wall as backrests or may have attached headrests (see fig 5)

(z) *Stroller pad* Cushion used in a baby stroller.

(aa) *Sofa bed* These are pieces in which the back of the sofa swings down flat with the seat to form the

sleeping surface. All upholstered Some sofa beds have bedding boxes for storage of bedding There are two types: the one-piece, where the back and seat are upholstered as a unit, supplying an unbroken sleeping surface; and the two-piece, where back and seat are upholstered separately (see fig 5)

(bb) *Sofa lounge*—(includes glideouts) Upholstered seating section is mounted on springs and in a special frame that permit it to be pulled out for sleeping. Has upholstered backrest bedding box that is hinged. Glideouts are single sleepers with sloping seats and backrests Seat pulls out from beneath back and evens up to supply level sleeping surface (see fig 5)

(cc) *Studio couch* Consists of upholstered seating section on upholstered foundation Many types convert to twin beds (see fig 5).

(dd) *Studio divan* Twin size upholstered seating section with foundation is mounted on metal bed frame Has no arms or backrest, and sleeps one (see fig 5)

(ee) *Trundle bed* A low bed which is rolled under a larger bed In some lines, the lower bed springs up to form a double or two single beds as in a high riser (see fig 5).

(ff) *Twin studio divan* Frames which glide out (but not up) and use seat cushions, in addition to upholstered foundation to sleep two Has neither arms nor back rest (see fig 5).

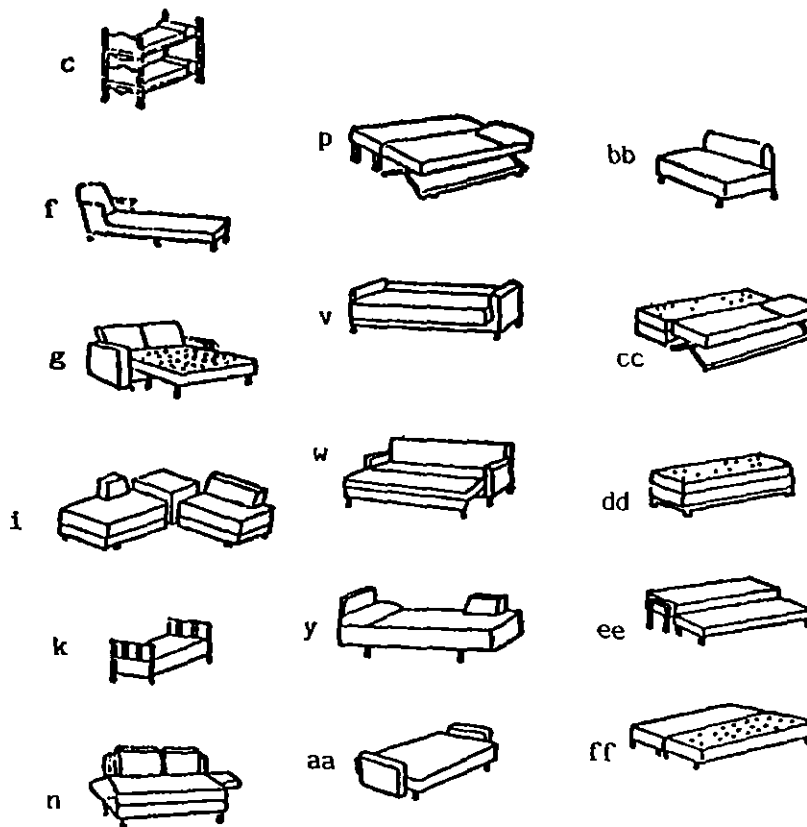


Figure 5

Effective date. The amended standard shall become effective on April 10, 1985 As required by section 4(b) of the Flammable Fabrics Act (15 U.S.C. 1193(b)), mattresses and mattress pads which are in inventory or with the trade on the effective date of the amended standard are exempt from its requirements, but must comply with all applicable requirements of the original standard

Subpart B—Rules and Regulations

§ 1632.31 Mattresses/Mattress Pads—Labeling, recordkeeping, guaranties and “one of a kind” exemption

(a) *Definitions* For the purposes of this section, the following definitions apply.

(1) “Standard for the Flammability of Mattresses” or “Standard” means the Standard for the Flammability of Mattresses and Mattress Pads (FF 4-

72, amended), (16 CFR Part 1632, Subpart A)

(2) The definition of terms set forth in the § 1632.1 of the Standard shall also apply to this section

(b) *Labeling* (1) All mattress pads which contain a chemical fire retardant shall be labeled with precautionary instructions to protect the pads from agents or treatments which are known to cause deterioration of their flame resistance. Such labels shall be permanent, prominent, conspicuous, and legible

(2) If a mattress pad contains a chemical fire retardant, it shall be prominently, conspicuously, and legibly labeled with the letter "F".

(3) Each mattress or mattress pad subject to the Standard shall bear a permanent, accessible, and legible label containing the month and year of manufacture and the location of the manufacturer (See § 1632.1(i) of the Amended Standard)

(4) The information required on labels by this section shall be set forth separately from any other information appearing on such label. Other information, representations, or disclosures, appearing on labels required by this section or elsewhere on the item, shall not interfere with, minimize, detract from, or conflict with the required information.

(5) No person, other than the ultimate consumer, shall remove or mutilate, or cause or participate in the removal or mutilation of, any label required by this section to be affixed to any item

(6) Products intended for one time use (see § 1632.5(b)(1)(i)) are not subject to the requirements of paragraphs (1) and (2) of this § 1632.31(b)

(c) *Records—manufacturers, importers, or persons initially introducing items into commerce.* Every manufacturer, importer, or other person initially introducing into commerce mattresses or mattress pads subject to the standard, irrespective of whether guarantees are issued relative thereto, shall maintain the records hereinafter specified

(1) Manufacturing specifications and description of each mattress or mattress pad prototype with an assigned prototype identification number

(2) Test results and details of each prototype test performed in accordance with § 1632.4 or § 1632.5, including prototype identification number, ticking classification if known, test room condition, cigarette locations, number of relights for each location, whether each cigarette location passed or failed, name and signature of person conducting the test and date of test. These records shall include a certification by the person overseeing the testing as to the test results and that the test was carried out in accordance with the Standard

(3) Photograph (color or black and white) of the bare surface of each mattress or mattress pad tested, in accordance with § 1632.4 or § 1632.5, with the prototype identification number of the mattress or mattress pad and a clear designation as to which part of the mattress or mattress pad was sheeted and which part was tested bare

(4) Records to support any determination that a particular material, other than the ticking or tape edge material used in a mattress or mattress pad prototype, did not influence the ignition resistance of the prototype and could be substituted by another material. Such record should include photographs or physical specimens

(5) Manufacturing specifications and description of any new ticking or tape edge material substituted in accordance with § 1632.6 or § 1632.7, with the identification number of the prototype involved

(6) The test results and details of any ticking classification test conducted in accordance with § 1632.6, including the ticking classification (A, B, or C), the test room condition, the number of relights, whether each cigarette location passed or failed, the name and signature of the person conducting the test and the date of the test, or a certification from the ticking supplier. The certification should state the ticking classification and that the ticking was tested in accordance with § 1632.6

(7) The test results and details of any test of tape edge materials conducted in accordance with § 1632.7, including prototype identification

number, test room condition, number of relights, whether each cigarette passed or failed, name and signature of person conducting the test and date of test. The record shall include a certification by the person overseeing the testing as to the test results and that the test was carried out in accordance with § 1632.7

(8) Photograph (color or black and white) of the bare surface of each mattress or mattress pad tested in accordance with § 1632.7, with the prototype identification number of the mattress or mattress pad and a clear designation as to which part of the mattress or mattress pad was sheeted and which part was tested bare.

(9) Details of any approved alternate laundering procedure used in laundering mattress pads required by the Standard to be laundered during testing

(10) Identification, composition, and details of the application of any flame retardant treatments employed relative to mattress pads or mattress pad components

(11) Disposition of all failing or rejected prototype mattress or mattress pads. Such records must demonstrate that the items were retested and reworked in accordance with the Standard prior to sale or distribution and that such retested or reworked mattresses or mattress pads comply with the Standard, or must otherwise show the disposition of such items

(12) The records required by this paragraph shall be maintained for as long as the prototype is in production, the ticking is being used on the mattresses or mattress pad prototype, and/or the tape edge material is being used on the mattress or mattress pad prototype, and shall be retained for 3 years thereafter

(d) *Tests for guaranty purposes.* Reasonable and representative tests for the purpose of issuing a guaranty under section 8 of the Act for mattress or mattress pads subject to the Standard shall be those prototype and substitution tests performed, pursuant to the requirements of the Standard

(e) *Compliance with this section.* No person subject to the Flammable Fabrics Act shall manufacture for sale, import, distribute, or otherwise

market or handle any mattress or mattress pad which is not in compliance with § 1632.31

(f) *"One of a kind" exemption for physician prescribed mattresses and mattress pads.* (1) A mattress or mattress pad manufactured in accordance with a physician's written prescription or manufactured in accordance with other comparable written medical therapeutic specification, to be used in connection with the treatment or management of a named individual's physical illness or injury, shall be considered a "one of a kind mattress" and shall be exempt from testing under the Standard pursuant to § 1632.2(b)(4) thereof. Provided, that the mattress bears a permanent, conspicuous and legible label which states

WARNING This mattress or mattress pad may be subject to ignition and hazardous smoldering from cigarettes. It was manufactured in accordance with a physician's prescription and has not been tested under the Federal Standard for the Flammability of Mattresses (FF 4-72)

Such labeling must be attached to the mattress or mattress pad so as to remain on or affixed thereto for the useful life of the mattress or mattress pad. The label must be at least 40 square inches (250 sq cm) with no linear dimension less than 5 inches (125 cm). The letters in the word "WARNING" shall be no less than 0.5 inch (1.27 cm) in height and all letters on the label shall be in a color which contrasts with the background of the label. The warning statement which appears on the label must also be conspicuously displayed on the invoice or other sales papers that accompany the mattress in commerce from the manufacturer to the final point of sale to a consumer

(2) The manufacturer of a mattress or mattress pad exempted from testing under this paragraph shall, in lieu of the records required to be kept by paragraph (c) of this section, retain a copy of the written prescription or other comparable written medical therapeutic specification for such mattress or mattress pad during a period of three years, measured from the date of manufacture

(3) For purposes of this regulation the term "physician" shall mean a physician, chiropractor or osteopath licensed or otherwise permitted to practice by any State of the United States

(c) For purposes of this document, mattress renovation includes a wide range of operations. Replacing the ticking or batting, stripping a mattress to its springs, rebuilding a mattress, or replacing components with new or recycled materials, are all part of the process of renovation. Any one, or any combination of one or more, of these steps in mattress renovation is considered to be mattress manufacture.

Subpart C—Interpretations and Policies

§§ 1632.61—1632.62 [Reserved]

§ 1632.63 Policy clarification on renovation of mattress.

(d) If the person who renovates the mattress intends to retain the renovated mattress for his or her own use, or if a customer or a renovator merely hires the services of the renovator and intends to take back the renovated mattress for his or her own use, "manufacture for sale" has not occurred and such a renovated mattress is not subject to the mattress standard.

(a) Section 3 of the Flammable Fabrics Act (15 U.S.C. 1192) prohibits, among other things, the "manufacture for sale" of any product which fails to conform to an applicable standard issued under the act. The standard for the Flammability of Mattresses, as amended (FP 4-72) (Subpart A of this part), issued pursuant to the act, provides that, with certain exceptions, mattress must be tested according to a prescribed method. The standard does not exempt renovation, nor does it specifically refer to renovation.

(e) However, if a renovated mattress is sold or intended for sale, either by the renovator or the owner of the mattress who hires the services of the renovator, such a transaction is considered to be "manufacture for sale".

(b) The purpose of this document is to inform the public that mattresses renovated for sale are considered by the Commission to be mattresses manufactured for sale and, therefore, subject to the requirements of the Mattress Standard. The Commission believes that this policy clarification will better protect the public against the unreasonable risk of fires leading to death, personal injury or significant property damage, and assure that purchasers of renovated mattresses receive the same protection under the Flammable Fabrics Act as purchasers of new mattresses.

(f) Accordingly, mattress renovation is considered by the Commission to be "manufacture for sale" and, therefore, subject to the Mattress Standard, when renovated mattresses are sold or intended for sale by a renovator or the customer of the renovator.

(g) A renovator who believes that certain mattresses are entitled to one-of-a-kind exemption, may present relevant facts to the Commission and petition for an exemption. Renovators are expected to comply with all the testing requirements of the Mattress Standard until an exemption is approved.

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APPENDIX B

TRADE ASSOCIATIONS

Futon Association of North America
FANA
P.O. Box 6548
Chico, California 95927-6548
916-534-7833
1-800-327-3262
Ms. Debra Austin

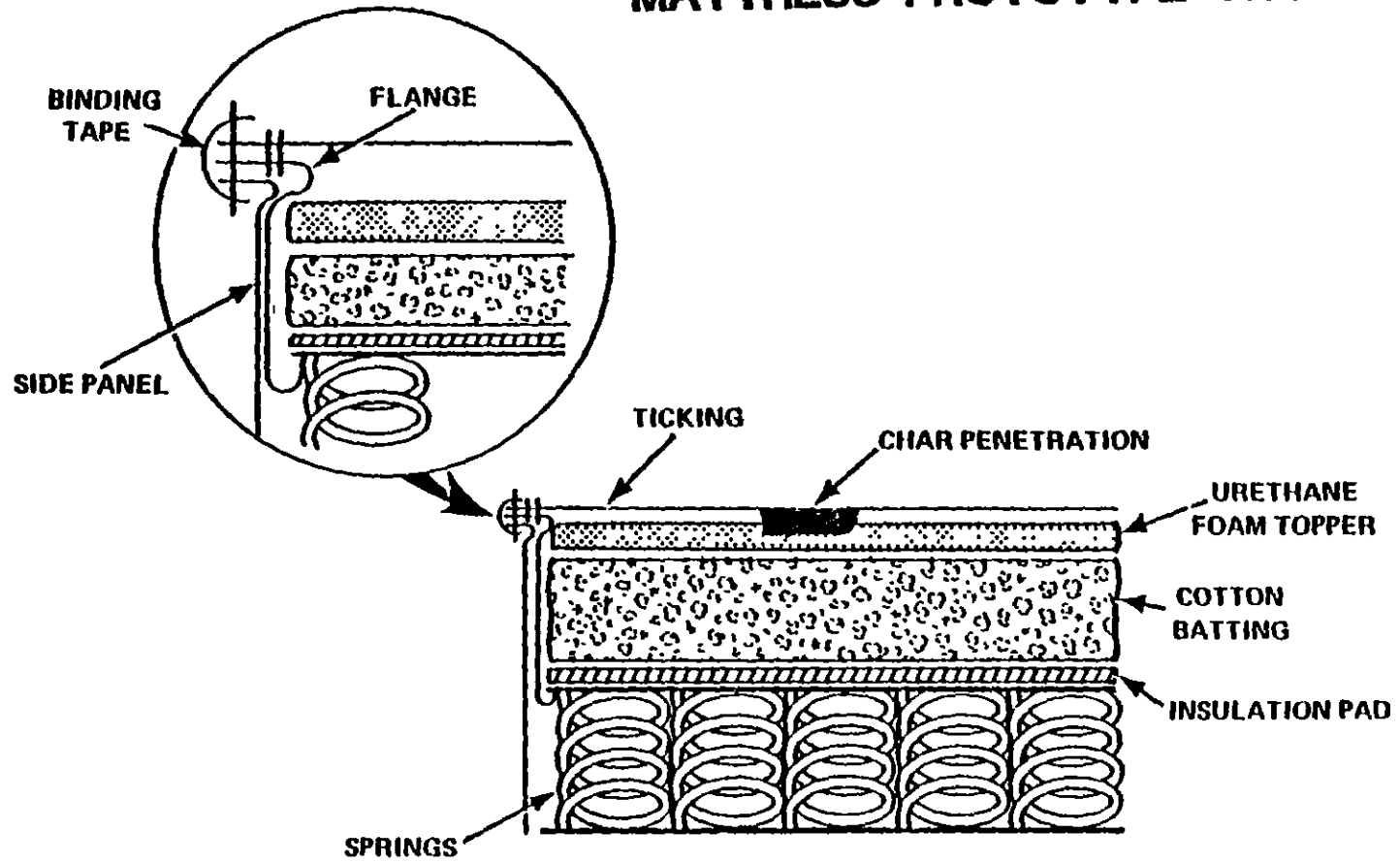
International Sleep Products Association
ISPA
333 Commerce Street
Alexandria, Virginia 22314
703-683-8371
Mr. Russell Abolt

APPENDIX C

FIGURES

FIGURE 1

MATTRESS PROTOTYPE CROSS SECTION



MATTRESS PREPARATION

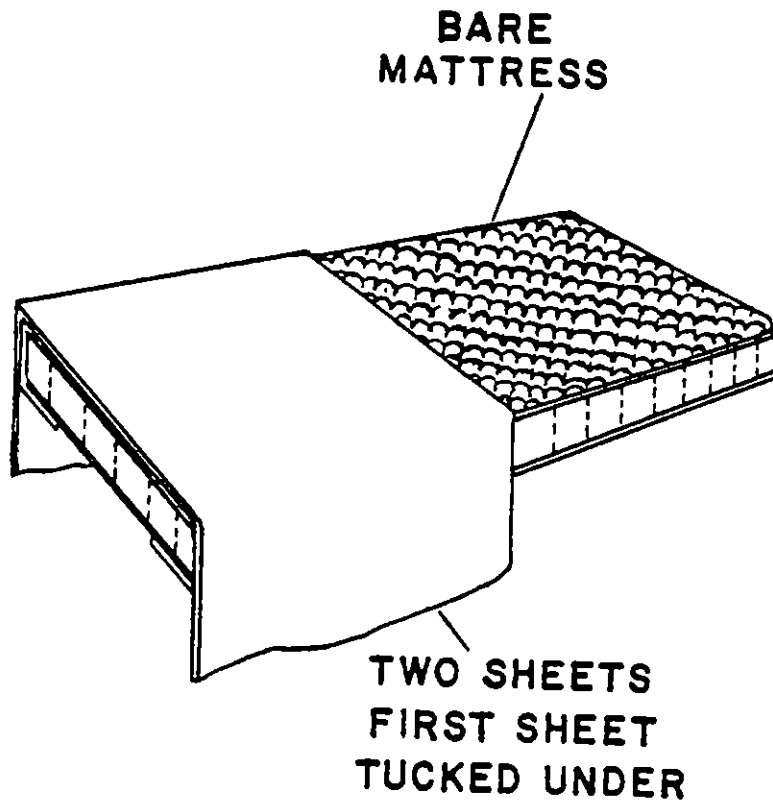
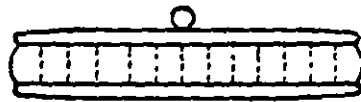
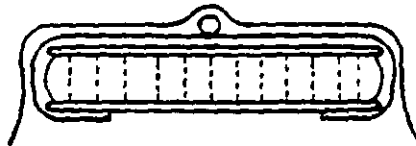


FIGURE 2

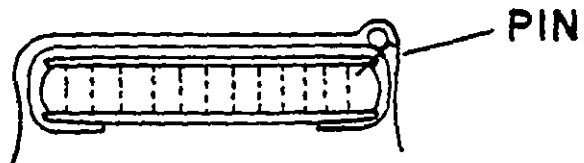
CIGARETTE LOCATION



BARE



TWO SHEETS



TAPE EDGE

FIGURE 3

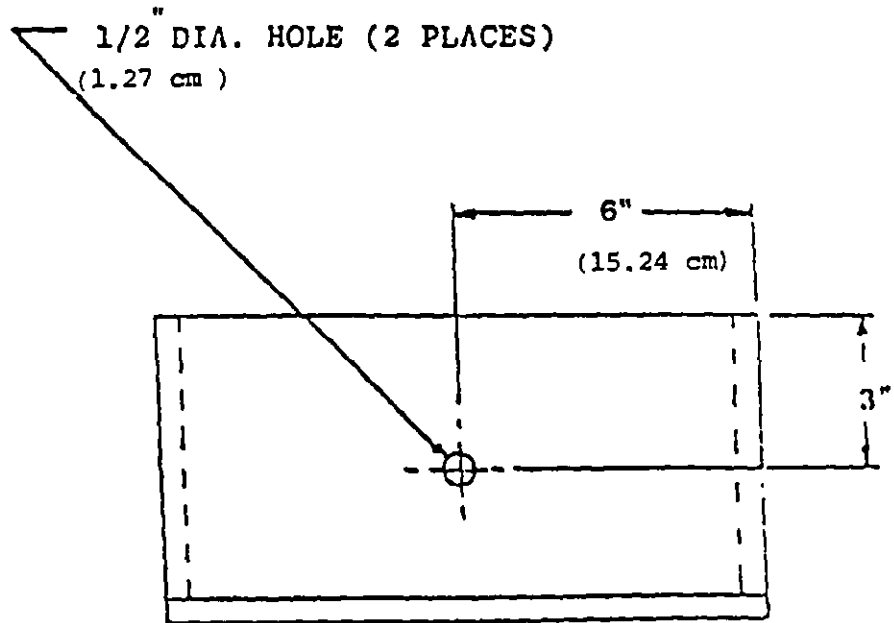
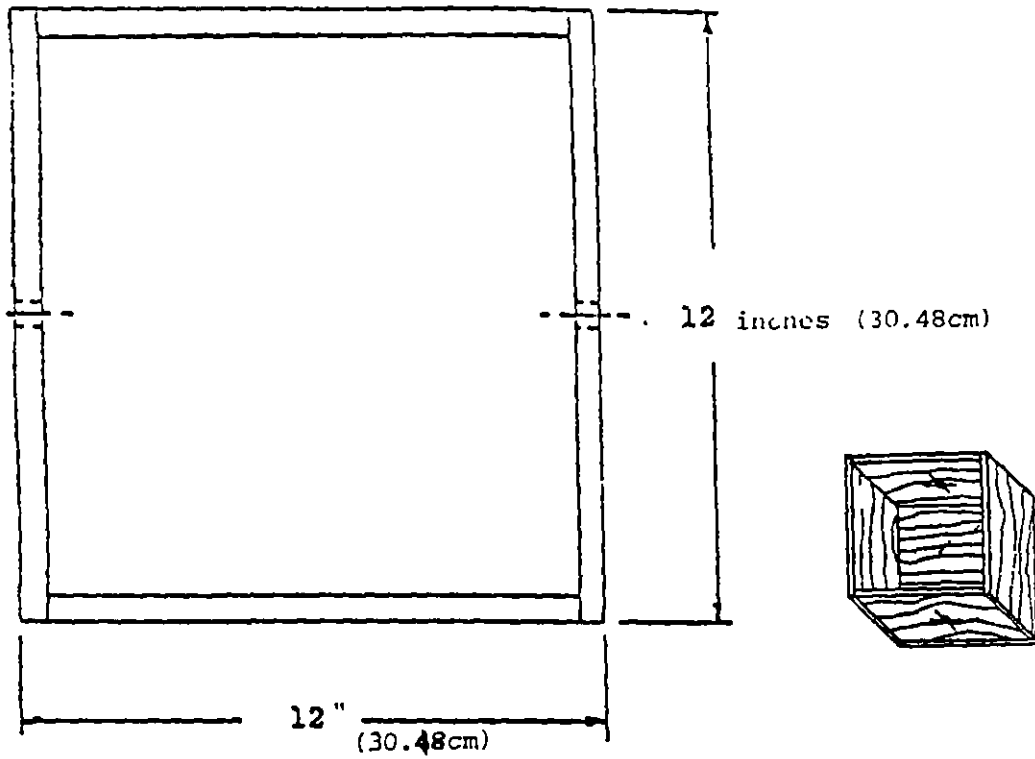
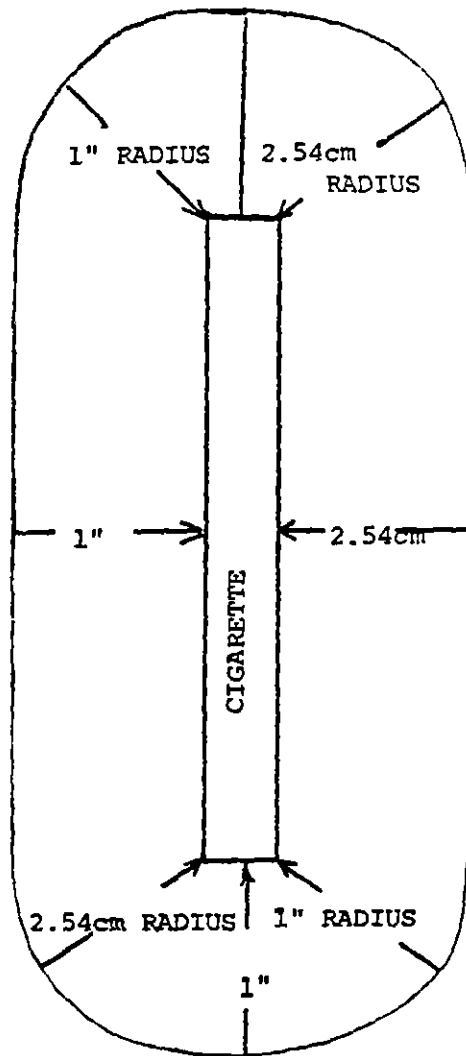


FIGURE 4

TEST BOX

MATERIAL 1/2" PLYWOOD



1 INCH (2.54cm) TEMPLATE

TOLERANCES + 1/32" - 0"
(.08 cm)

FIGURE 5

APPENDIX D

EXAMPLE SPECIFICATION AND DATA TEST RECORDS

MANUFACTURING SPECIFICATIONS FOR
MATTRESSES AND MATTRESS PADS

MATTRESS STANDARD 16 CFR PART 1632

DATE: _____

PROTOTYPE IDENTIFICATION NUMBER: _____

METHOD OF ASSEMBLY: ___ Smooth ___ Tufted
 ___ Panel Quilt ___ Continuous Quilt

ORDER OF ASSEMBLY FROM SURFACE TO CORE: _____

DESCRIPTION OF COMPONENT MATERIALS USED IN THE PROTOTYPE: At a minimum include the information needed to reorder the component including the suppliers. If a particular component is not used in the prototype, write "None" in the space provided.

1. TICKING: Ticking Class: _____
(Include Ticking Prototype Number or Certification Number)

2. QUILTED TICKING COMPONENTS: Quilted ticking Class: _____
(Include Ticking Prototype Number or Certification Number)

a. Filling (foam, fiber-fill or combination foam and fiber-fill): _____

b. Quilt Backing: _____

c. Thread: _____

3. FOAM (If more than one layer, describe all layers):

Date: _____

Prototype Identification Number: _____

4. COTTON BATTING OR COTTON FELT (If more than one layer, describe all layers): _____

5. INSULATOR PAD (May be freely substituted if it does not influence cigarette ignition during prototype testing):

6. CORE (May be freely substituted if it does not influence cigarette ignition during prototype testing):

7. FLANGE: _____

8. BINDING TAPE: _____

9. TUFTING (buttons, laces, threads, yarns and twine):

10. THREAD: _____

11. BORDER OR BOXING COMPONENTS (These components may be freely substituted if they do not influence cigarette ignition during prototype testing):

a. Ticking: _____

b. Filling: _____

c. Thread: _____

12. OTHER (Specify): _____

MATTRESS PROTOTYPE TEST DATA SHEET
MATTRESS STANDARD 16 CFR PART 1672

Prototype Identification Number: _____

Ticking Classification: _____

DATE: _____ TEST ROOM: _____ °C _____ %RELATIVE HUMIDITY

SURFACE 1		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
SURFACE 2		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
SURFACE 3		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						

Date: _____

Prototype Identification Number: _____

SURFACE 4		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
SURFACE 5		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
SURFACE 6		Cigarette Number					Number of Relights
		1	2	3	4	5	
Bare Surface Test	Smooth						
	Quilt/Tuft						
	Tape Edge						
Two Sheet Test	Smooth						
	Quilt/Tuft						
	Tape Edge						

TEST RESULTS: Accept _____ Reject _____

I certify that this test was carried out in full accordance with the provisions of the Standard for the Flammability of Mattresses and Mattress Pads (FF 4-72 Amended).

Tested By: _____ Certified By: _____

(page 4 of 4)

MANUFACTURING SPECIFICATIONS FOR
TICKING SUBSTITUTIONS

MATTRESS STANDARD 16 CFR PART 1632.6

DATE: _____

TICKING PROTOTYPE IDENTIFICATION NUMBER: _____

DESCRIPTION OF COMPONENT MATERIALS: At a minimum include the information needed to reorder the component. If a particular component is not used in the prototype, write "None" in the space provided.

TICKING: Ticking Class: _____

1. Construction: _____

2. Color/Color Pattern: _____

3. Finish Application: _____

4. Fiber Content: _____

5. Fabric Weight: _____

ADDITIONAL FACTORS:

QUILTED TICKING COMPONENTS:

1. Filling (foam, fiber-fill or combination foam and fiber-fill): _____

a. Thickness: _____

b. Density: _____

c. Chemical Composition: _____

2. Quilt Backing: _____

3. Thread: _____

Date: _____

Ticking Prototype Identification Number: _____

FILM-COATED TICKING:

1. Application Method: _____

2. Thickness of Application of Film-coating: _____

3. Chemical Formula: _____

SUPPLIER(S): _____

STYLE NUMBER: _____

THIS TICKING WILL BE SUBSTITUTED ON THE FOLLOWING MATTRESS
PROTOTYPE(S): _____

TICKING CLASSIFICATION TEST DATA SHEET
MATTRESS STANDARD 16 CFR PART 1632.6

Ticking Prototype Identification Number: _____

Ticking Description: _____

Description of Ticking Components as appropriate or applicable:

Filling: _____

Quilt Backing: _____

Thread: _____

DATE: _____ TEST ROOM: _____ °C _____ % RELATIVE HUMIDITY

PART 1. TICKING OVER FOAM:

Test Specimen Number	Cigarette Number			No. of Relights
	1	2	3	
1				
2				
3				

PART 2. TICKING OVER COTTON BATTING:

Test Specimen Number	Cigarette Number			No. of Relights
	1	2	3	
1				
2				
3				

TEST RESULTS: Class: _____

I certify that this test was carried out in full accordance with the provisions of Part 1632.6 of the Standard for the Flammability of Mattresses and Mattress Pads (FF 4-72 Amended).

Tested By: _____ Certified By: _____

(page 3 of 3)

MANUFACTURING SPECIFICATIONS FOR
TAPE EDGE SUBSTITUTIONS

MATTRESS STANDARD 16 CFR PART 1632.7

DATE: _____

PROTOTYPE IDENTIFICATION NUMBER: _____

DESCRIPTION OF COMPONENT MATERIALS: At a minimum include the information needed to reorder the component. If a particular component is not used in the prototype, write "None" in the space provided.

1. TICKING: Ticking Class: _____

2. QUILTED TICKING COMPONENTS:

a. Filling (foam, fiber-fill or combination foam and fiber-fill): _____

b. Quilt Backing: _____

c. Thread: _____

3. BINDING TAPE: _____

a. Color: _____

b. Width: _____

c. Fiber Content: _____

d. Construction: _____

4. FLANGE: _____

Date: _____

Prototype Identification Number: _____

5. TUFTING TWINE: _____

6. THREAD: _____

7. BORDER OR BOXING COMPONENTS: These components may be freely substituted if they do not influence cigarette ignition during prototype testing.

a. Ticking: Ticking Class: _____

b. Filling: _____

c. Thread: _____

d. Other (Specify): _____

**TAPE EDGE SUBSTITUTION TEST
MATTRESS STANDARD 16 CFR PART 1632.7**

Prototype Identification Number: _____

Tape Edge Description:

1. Original Material: _____

2. Substitute Material: _____

SURFACE 1	Cigarette Number									No. of Relights
	1	2	3	4	5	6	7	8	9	
Bare Surface Test										
Two Sheet Test										

DATE: _____ TEST ROOM: _____ °C _____ %RELATIVE HUMIDITY

COMMENTS: _____

SURFACE 2	Cigarette Number									No. of Relights
	1	2	3	4	5	6	7	8	9	
Bare Surface Test										
Two Sheet Test										

DATE: _____ TEST ROOM: _____ °C _____ %RELATIVE HUMIDITY

COMMENTS: _____

TEST RESULTS: Accept _____ Reject _____

I certify that this test was carried out in full accordance with the provisions of Part 1632.7 of the Standard for the Flammability of Mattresses and Mattress Pads (FF 4-72 Amended).

Tested By: _____ Certified By: _____