

#### § 1632.4

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

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#### § 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 tested 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  $0.30 \pm 0.05$  cal (g) / hr cm<sup>2</sup> °C/cm ( $0.24 \pm 0.04$  Btu/hr ft<sup>2</sup> °F/in) at 23.9 °C (75 °F).<sup>1</sup>

(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  $0.270 \pm 0.02$  g/cm<sup>3</sup> and a total weight of 1.1±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 1/16 inch divisions shall be used to measure char length.

(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

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

imparts a characteristic such as permanent press or flame resistance. It shall have 120–210 threads per square inch and fabric weight of  $3.7 \pm 0.8$  oz/yd<sup>2</sup> ( $125 \pm 28$  gm/m<sup>2</sup>). 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  $\frac{1}{2}$  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 mattress 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 condi-

tions 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 6 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

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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)).

MATTRESS PREPARATION

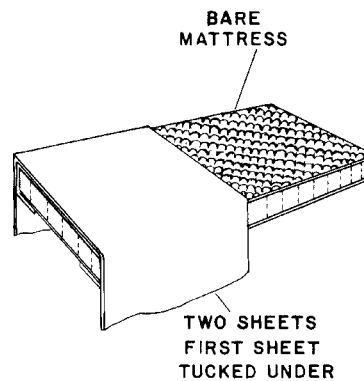
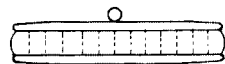
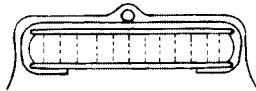


FIGURE 1

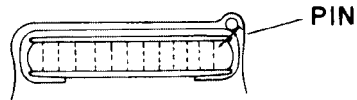
## CIGARETTE LOCATION



BARE



TWO SHEETS



TAPE EDGE

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 smoke 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.

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(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)).

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(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) Washing shall be performed in accordance with sections 8.2.2 and 8.2.3 of AATCC Test Method 124–1996, using wash temperature V (60° ±3 °C, 140° ±5 °F) specified in Table II of that method, and the water level, agitator speed, washing time, spin speed and final spin cycle specified for “Normal/Cotton Sturdy” in Table III.

(ii) Drying shall be performed in accordance with section 8.3.1(A) of AATCC Test Method 124–1996 “Appearance of Fabrics after Repeated Home Laundering,” Tumble Dry, using the exhaust temperature (66° ±5 °C, 150° ±10 °F) and cool down time of 10 minutes specified in the “Durable Press” conditions of Table IV.

(iii) Maximum washer load shall be 3.64 Kg (8 pounds) and may consist of any combination of test samples and dummy pieces.

(iv) AATCC Test Method 124–1996 “Appearance of Fabrics after Repeated