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Standard Test Methods for Evaluation of Innersprings and Boxsprings Evaluation of Innersprings, Boxsprings, Mattresses or Mattress Sets¹

This standard is issued under the fixed designation F 1566; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 ~~These test methods cover nationally recognized methods for testing mattress innersprings and boxsprings to ensure uniformity of results.~~

1.2 ~~These test methods are applicable to un-upholstered innersprings and boxsprings only and are not applicable to finished upholstered mattresses or boxsprings. Any conclusions covering such items are outside the scope of these test methods.~~

1.1 These test methods cover recognized methods for testing mattress innersprings, boxsprings, and finished mattresses or mattress sets, or both, to ensure uniformity of results.

1.2 These test methods are applicable to un-upholstered mattress core units including but not limited to innersprings, air chambers, and foam cores, un-upholstered foundations including but not limited to boxspring and build up foundations, finished foundations and mattress constructions. Data developed is for comparative analysis with no pass/fail criteria applicable.

1.3 ~~The durability test (Section 7), impact test (Section 8) and firmness retention test/surface deformation (Section 9) require the use of an upholstered innerspring or boxspring, or both. A standardized upholstery is specified in each case.~~

1.4 ~~The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.) require upholstered samples. Firmness testing may be ran on un-upholstered components, innerspring units and flexible boxsprings (6.1 through 6.4), or finished mattresses or mattress sets (6.5 through 6.8). A standardized upholstery package is specified if evaluating a mattress core or un-upholstered foundation. These test methods are intended to be used on newly manufactured products..~~

1.4 The values stated in SI units are to be regarded as standard. The values in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D648 ~~Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position~~ ASTM Standards:²

E 4 Practices for Force Verification of Testing Machines

3. Terminology

3.1 *Definitions:*

3.1.1 *boxspring unit, n*—foundation for the mattress consisting of wire spring elements mounted on a frame.

3.1.2 *boxspring, upholstered, n*—foundation for the mattress consisting of wire spring elements mounted on a frame, generally upholstered and covered on top and sides with ticking, and bottom with a dust cover.

3.1.3 ~~*contract units*~~ foundation, n—~~term used to indicate units marketed in large quantities, usually by contract, to quantity users, that is, hotel, motel, institutional, etc.~~—support base for a finished mattress generally upholstered and covered on top and sides with ticking, and bottom with a dust cover.

3.1.4 *innerspring unit, n*—interconnection of wire spring elements other than mounting on a frame that forms a single unit that can be incorporated into a mattress.

3.1.5 *mattress, innerspring, n*—any mattress containing an innerspring unit.

¹ These test methods are under the jurisdiction of ASTM Committee F15 on Consumer Products and are the direct responsibility of Subcommittee F15.32 on Innersprings and Boxsprings.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.6 *posturized innerspring, n*—~~innerspring assembly with the center third having a higher coil density or larger wire gage.~~
—innerspring assembly having a varying coil density or varying wire gauge.

3.1.7 *mattress, n*—finished, assembled mattress core with upholstery package and cover.

3.1.8 *mattress core, n*—innermost support core of a mattress upon which upholstery is affixed.

3.1.9 *mattress set, n*—finished mattress and foundation combination.

3.1.10 *upholstery, n*—combination of materials designed to cover and add support or comfort, or both, to a mattress core.

4. Significance and Use

4.1 ~~Four separate test methods are outlined for use in evaluation of mattress innerspring or boxspring units, or both.~~

4.2 ~~These test methods include measurements of firmness, firmness retention, durability, effect of impact, etc.~~

4.3 ~~One or more of the test methods shall be used separately or in combination to provide for appropriate evaluations.~~

4.1 Two separate test methods are outlined for use in evaluation of (1) mattress components, innersprings and boxsprings and (2) mattresses and mattress sets.

4.2 Component innerspring and boxspring test methods include measurements of firmness, firmness retention, durability, and effect of impact.

4.3 Mattress and mattress set test methods include measurements of firmness, firmness retention, durability, effect of impact, and height change.

4.4 One or more of the test methods shall be used separately or in combination to provide for appropriate evaluations.

5. Conditioning

5.1 ~~Prior to testing, condition units for at least 8 h at $23 \pm 5^\circ\text{C}$ in accordance with Test Method D648.~~

6.

5.1 Before testing, condition units for a minimum of 8 h at $23 \pm 2.8^\circ\text{C}$ ($73.4 \pm 5^\circ\text{F}$), with a relative humidity of $50 \pm 5\%$, in a flat position.

6. Firmness Rating

6.1

INNERSPRING AND FLEXIBLE FOUNDATION

6.1 *Specimen*—The unit to be tested is an un-upholstered mattress ~~innerspringcore~~ or ~~boxspring~~flexible foundation unit.

6.2 *Apparatus:*

6.2.1 *Platen*—~~The platen shall be a round aluminum disk weighing $8 \pm 0.2\text{ lb}$ ($3.6 \pm 0.1\text{ kg}$) with a diameter of $13.54 \pm 0.2\text{ in.}$ ($344 \pm 5\text{ mm}$) connected to the loading mechanism with a flexible connection (see —The platen shall be a round rigid disk with a diameter of $344 \pm 5\text{ mm}$ ($13.54 \pm 0.2\text{ in.}$) connected to the loading mechanism with a flexible connection (see Fig. 1).~~

6.2.2 *Loading Mechanism*³—A device capable of providing a load of ~~300 lbf (1335N)~~1335 N (300 lbf) or more with accuracy of $\pm 1\%$.

6.2.3 *Deflection Device*—~~For use in determining deflection, that is, ruler or electronic device accurate to $\frac{1}{32}\text{ in.}$ (1 mm). —For use in determining deflection, that is, ruler or electronic device accurate to 1 mm ($\frac{1}{32}\text{ in.}$) with minimum stroke of 101.6 mm (4 in.).~~

6.3 *Test Procedure:*

6.3.1 Place specimen directly onto a rigid, flat surface.

6.3.2 Run tests at four separate locations as shown in Fig. 2; ~~Location 5 being optional.~~

6.3.3 ~~At each test location, determine resistance values in 0.5-lbf (2-N) increments at 0.5, 1, 1.5, 2, 2.5, and 3 in. (12.5, 25, 38, 50, 63, and 76 mm) with a tolerance of $\pm 0.04\text{ in.}$ ($\pm 1\text{ mm}$) of deflection of the top surface for innersprings and 0.5 and 1 in. (12.5 and 25 mm) with a tolerance of $\pm 0.04\text{ in.}$ ($\pm 1\text{ mm}$) of deflection of the top surface for boxsprings.~~

6.4, *Location 5 being optional.*

6.3.3 At each test location, determine resistance values in 2-N (0.5-lbf) increments at 12.5, 25, 38, 50, 63, and 76 mm (0.5, 1, 1.5, 2, 2.5, and 3 in.) with a tolerance of $\pm 1\text{ mm}$ ($\pm 0.04\text{ in.}$) of deflection of the top surface for innersprings and 12.5 and 25 mm (0.5 and 1 in.) with a tolerance of $\pm 1\text{ mm}$ ($\pm 0.04\text{ in.}$) of deflection of the top surface for flexible foundations.

6.3.4 The zero reference point shall be determined using a common contact force of 4.4 N (1 lb).

6.3.5 The test speed is $50 \pm 5\text{ mm/min}$ ($2 \pm 0.2\text{ in./min}$).

6.4 *Calculation/Results:*

6.4.1 Determine a firmness rating for a uniformly constructed innerspring ~~units~~unit by totaling resistance values at Locations 3 and 4 for all deflections and dividing the total by 2 ~~(for two for an average)~~; average.

³ See Practices E 4 for calibration techniques.