Designation: F 1085 – 03ε1

An American National Standard

Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels[1]

This standard is issued under the fixed designation F 1085; 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.

ε[1] NOTE—Editorial changes were made throughout in May 2003.

1. Scope

1.1 This specification provides the requirements for mattresses and box springs that are for use in berths for officers, crew, and passengers in marine vessels. This shall be considered a minimum standard.

1.2 The values stated in inch-pound units are to be regarded as the standard (except where such units are not present, when discussing fire test methods). The values given in parentheses, in SI units, are for information only.

1.3 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions.*

1.4 *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:*

D 123 Terminology Relating to Textiles[2]

D 1424 Test Method for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus[2]

D 3574 Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams[3]

D 3951 Practice for Commercial Packaging[4]

D 5034 Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)[5]

D 6193 Practice for Stitches and Seams[5]

D 6413 Test Method for Flame Resistance of Textiles (Vertical Test)[5]

E 162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source[6]

E 176 Terminology of Fire Standards[6]

E 662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials[6]

F 1566 Test Methods for Evaluation of Innersprings and Box Springs[7]

E 1590 Test Method for Fire Testing of Mattresses[6]

2.2 *ANSI Standards:*

ANSI Z357.1-1981 American National Standard for Bedding Products and Components[8]

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes[8]

2.3 *California Bureau of Home Furnishings and Thermal Insulation Standard:*

CA Technical Bulletin 129, (CA TB 129) Flammability Test Procedure for Mattresses for Use in Public Buildings—October 1992[9]

2.4 *Federal Standards:*

Code of Federal Regulations Title 16, Vol 2, Part 1632[10]

Purchase Description—Mattress—Innerspring, Flame-Resistant, Shipboard—NAVSEA 05L PD 4-02 (May 2002)[11]

[1] This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.03 on Outfitting and Deck Machinery.

Current edition approved May 10, 2003. Published June 2003. Originally approved in 1988 and published as F 1085 – 88. Discontinued December 2002 and reinstated as F 1085 – 03ε1.

[2] *Annual Book of ASTM Standards*, Vol 07.01.

[3] *Annual Book of ASTM Standards*, Vol 08.04.

[4] *Annual Book of ASTM Standards*, Vol 15.09.

[5] *Annual Book of ASTM Standards*, Vol 07.02.

[6] *Annual Book of ASTM Standards*, Vol 04.07.

[7] *Annual Book of ASTM Standards*, Vol 15.07.

[8] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

[9] Available from California Bureau of Home Furnishings and Thermal Insulation, 3483 Orange Grove Ave., North Highlands, CA 95660.

[10] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SSOP, Washington, DC 20402-9328.

[11] Available from NAVSEA, Naval Sea Systems Command, Dept. of Navy, 1333 Isaac Hull Ave., STOP 5149 (SEA 05P6), Washington Navy Yard, DC 20376-5149.

2.5 *NFPA Standard:*

NFPA 301 Code for Safety to Life from Fire on Merchant Vessels[12]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification associated with textiles, see Terminology D 123. For definitions of terms used in this specification associated with fire issues, see Terminology E 176.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *border*, *n*—a material that forms the side panel that surrounds the perimeter of the mattress and defines its depth.

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

3.2.3 *box spring assembly*, *n*—an interconnection of coil springs, border wire, and top wire assembly contained within a box spring.

3.2.4 *flaming droplets*, *n*—drops of material exhibiting evidence of flames when falling from a test specimen and that continues exhibiting evidence of flames for a period of at least 10 s.

3.2.5 *flange*, *n*—strip of material secured to the perimeter of an upholstery panel to secure to the innerspring core.

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

3.2.7 *insulator pad*, *n*—one or more layers of a cushioning system between the upholstery and mattress core, which consist of foam or other cushioning or filling materials.

3.2.8 *mattress*, *n*—ticking filled with a resilient material used alone or in combination with other products intended or promoted for sleeping upon.

3.2.9 *mattress core*, *n*—the main support system that may be present in a mattress, such as springs, foam, or resilient filling.

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

3.2.11 *mattress, solid core*, *n*—any mattress containing padding, but not an innerspring unit.

3.2.12 *quilted*, *adj*—stitched with any thread or by fusion through the ticking and one or more layers of upholstery material.

3.2.13 *tape edge*, *n*—seam or border edge of a mattress.

3.2.14 *ticking*, *n*—the outermost layer of fabric or related material that encloses the core and upholstery materials of a mattress or mattress pad.

4. Ordering Information

4.1 Orders for items purchased under this specification shall define the following:

4.1.1 *Mattresses*—Quantity, dimensional requirements, type (solid core or innerspring), and weight per each size.

4.1.2 *Box Springs*—Quantity, dimensional requirements, and weight per each size.

4.1.3 Upholstery material selections are to be offered as choices by the manufacturer or distributor to the purchaser. The selection shall be of good quality suitable for commercial use and for use aboard U.S. Navy vessels.

4.1.4 When first article of inspection is required, it shall be spelled out in the paperwork.

5. Materials and Manufacture

5.1 *Innerspring Mattress*—The essential components of an innerspring mattress are: an innerspring core, cushioning, upholstery ticking (either quilted or with a smooth top, and potentially including a flange), and a border. Optional components include various insulating layers or pads, flanges, and tapes. All materials used shall meet the mechanical property and fire performance requirements of Table 1. All materials used shall comply with appropriate commercial bedding industry standards of manufacture and durability. Any construction of an innerspring mattress that is suitable for its intended use and that complies with the performance requirements shown herein shall be permitted to be used.

5.1.1 *Innerspring Core*—The innerspring core shall be constructed from an all-wire carbon steel. The coils shall extend the full length and width of the mattress. The coils shall be permanently secured to provide long-term structural stability. Various core designs shall be permitted. The support properties of the innerspring core, in terms of firmness rating, durability, resistance to impact, firmness retention, and surface deformation, shall be assessed by Test Methods F 1566. The coils, or the complete spring unit assembly, shall be given suitable thermal treatment to relieve residual stresses caused by coiling.

5.1.2 *Cushioning and Insulator Layers*—An insulator pad shall be placed over each sleeping surface of the innerspring core to insulate the upholstery from the core. The various cushioning layers shall be constructed of materials that meet the performance requirements of Table 1.

5.1.3 *Ticking and Cover Assembly*—The cover construction shall be suitable for the type of mattress construction used. Upholstery ticking materials shall be durable, per common bedding industry practices. The ticking for each sleeping surface shall be cut in one piece without fabric splices. The ticking for the mattress border shall be made of not more than two pieces of ticking, with the ends spliced and sewn together in a continuous manner leaving no gaps or voids in uniformity and finish. The border assembly shall be secured to the top and bottom sleeping surfaces of the mattress, by automatic sewing, per common bedding industry practices.

5.1.4 *Border*—The ticking for the mattress border shall be made of not more than two pieces of ticking, with the ends spliced and sewn together in a continuous manner leaving no gaps or voids in uniformity and finish. The border assembly shall be secured to the top and bottom sleeping surfaces of the mattress, by automatic sewing, per common bedding industry practices.

5.1.5 *Tape*—A tape shall be permitted to be used to conceal the seams formed between the border, if present, and an upholstery panel. The tape shall be continuously stitched along

[12] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101.

TABLE 1 Mattress Component Requirements

Component	Characteristic	Requirement	Test Method
Upholstery Ticking	Initial Flammability		
(and Flange, Tape, and Pocketing Materials, if used)	Char Length	≤5.0 in. (127 mm)	Test Method D 6413
(Notes 1 and 2)	After Flame	≤2.0 s	Test Method D 6413
	No Flaming Droplets		Test Method D 6413
	Flammability after 15 Launderings		
	Char Length	≤5.0 in. (127 mm)	Test Method D 6413
	After Flame	≤2.0 s	Test Method D 6413
	No Flaming Droplets		Test Method D 6413
	Other Properties		
	Tear Strength (Note 3)	Warp: 3.5 lb min; Filling: 3.5 lb min	Test Method D 1424
	Breaking Strength (Note 3)	Warp: 94 lb min; Filling: 58 lb min	Test Method D 5034
Border Ticking	Flammability		
	Char Length	≤1.5 in. (138 mm)	Test Method D 6413
	After Flame	≤2.0 s	Test Method D 6413
	No Flaming Droplets		Test Method D 6413
	D_{MAX}	50	Test Method E 662
	D_{MAX}	No Flaming Droplets	Test Method E 662
	Other Properties		
	Tear Strength	Warp: 4 lb min; Filling: 4 lb min	Test Method D 1424
	Breaking Strength	Warp: 94 lb min; Filling: 50 lb min	Test Method D 5034
Cushioning and Insulator Layers	Flammability		
	Char Length	≤5.0 in. (127 mm)	Test Method D 6413
	After Flame	≤2.0 s	Test Method D 6413
	No Flaming Droplets		Test Method D 6413
	Flame Spread (I_s) (Note 4	10	Test Method E 162
	D_{MAX}(Note 4)	200	Test Method E 662
	D_{MAX}(Note 4)	No Flaming Droplets	Test Method E 662
	Other Properties		
	Dry Heat Aging / Compression Force Deflection	No more than 20 % change in compression force deflection	Test Method D 3574, Methods C and K

NOTE 1—Only Molten and/or Flaming Droplets requirement applies to Tape.
NOTE 2—Only Initial Flammability requirements apply to Pocketing Material.
NOTE 3—Tear Strength and Breaking Strength apply only to Upholstery Ticking.
NOTE 4—When materials are not identical on both sides, each side shall be tested as a different specimen.

the total length of each seam, with no gaps or voids between the upholstery panel and border surfaces.

5.1.6 *Seam and Stitching*—The seam and stitch types shall be in accordance with Practice D 6193. All seams shall be securely stitched. Seams shall not slip or pull out.

5.1.7 *Mattress*—All mattress components shall meet the requirements of Table 1, as appropriate. The overall mattress shall meet the performance requirements of Table 2, as discussed in Section 6. For dimensional requirements, see 6.6.

TABLE 2 Full Mattress Requirements

Characteristics	Requirement	Test Method
	Fire Performance Characteristics	
Minimum	a. Maximum Rate of Heat Release ≤100 kW	Test Method E 1590
	b. Maximum Total Heat Release in first 10 min of test ≤25 MJ	Test Method E 1590
	c. Maximum Mass Loss in the first 10 min of test ≤3 lb (1.4 kg)	Test Method E 1590
	d. Class A Pass	16 CFR 1632
Optional (US Navy Requirement)	a. Maximum Rate of Heat Release ≤150 kW	Annex A1
	b. Maximum Average Specific Extinction Area <300 m^2/kg	Annex A1
	c. No Flaming Droplets	Annex A1
	Physical Characteristics	
Durability (Rollator Test)	a. Firmness Rating of 75 lbf ± 10 %, after 100 000 cycles	Test Method F 1566, Section 7
	b. Permanent Deformation ≤20 % of depth	Test Method F 1566, Section 7
	c. No Damage	Test Method F 1566, Section 7
Firmness Retention and Surface Deformation (Cornell Test)	a. Accumulated Dimple ≤1.75 in. (44.5 mm)	Test Method F 1566, Section 9
	b. Support Firmness Change ≤(+ 40 %) - (-15 %)	Test Method F 1566, Section 9
Dimensions	See Section 6	
Weight	See Section 6	
	Visual Characteristics	
Visual Defects	See section 6.5	ANSI/ASQC Z1.4