

**SPECIFICATION
FOR
MATTRESSES, BED, INNERSPRING**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers innerspring mattresses generally used by state institutions and agencies.

I. CLASSIFICATION

Innerspring mattresses shall be classified in the following types, classes and sizes:

Type I - Rigid Spring Unit. Intended for use where firm edges are acceptable and mattress does not need to fold or roll from end to end.

Class 1 - Regular ticking

Class 2 - Anti-bacterial, moisture resistant ticking. Intended for use where bacterial control and/or moisture resistance is required.

Type II -Flexible Spring Unit. Intended for use on Gatch type hospital beds or where folding and rolling from end to end is required.

Class 1 - Regular ticking

Class 2 - Anti-bacterial, moisture resistant ticking. Intended for use where bacterial control and/or moisture resistance is required.

TABLE I - MINIMUM PHYSICAL REQUIREMENTS

	WIDTH	LENGTH	THICKNESS	TOTAL FELT	NO. SPRING COILS	NO. TUFTS (WHEN TUFTED)
Size I	36"	75"	6"	14 lb.	162	28
Size II	36"	80"	6"	16 lb.	171	28
Size III	38"	75"	6"	16 lb.	162	28
Size IV	53	75"	6"	22 lb.	234	28

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Request For Bids shall form a part of this specification to the extent described in REQUIREMENTS.

AATCC 147-1976 Evaluation of Antibacterial Finishes on Fabrics

American Assn. of Textile Chemists and Colorists

P.O. Box 12215

Research Triangle Park, N.C. 27709

U.S.D.A. C&MS-SRA-180 Cotton & Cotton Linters Stds.

U.S. Department of Agriculture

Washington, DC 20250

Federal Standard No. 191, Textile Test Methods

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

16CFR1632 Part 1632 – Standard for the Flammability of Mattresses and Mattress Pads

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

16CFR1633 Part 1633 – Standard for the Flammability (Open Flame) of Mattresses Sets

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

III. REQUIREMENTS

A. FILLING MATERIALS

The following filling materials are acceptable:

Cotton Felt

The cotton felt filling shall consist of 60% Cotton Linters and 40% Cotton Mill By-Products -- as defined in U.S.D.A. C&MS-SRA-180 Cotton & Cotton Linters Stds, and in North Carolina statutes as applicable. The felt shall be thoroughly mixed, evenly distributed, and well garnetted so as to produce unbroken, laminated sheets of interlaced felt.

Linters shall be U.S.D.A. Grades 4 or 5, first cut, cotton, shall be new, not previously used, and conforming to this grade or better.

Cotton mill by-products shall be in accordance with the definition in the North Carolina statutes as applicable.

B. TICKING

Regular ticking shall be minimum 6.2 oz./sq.yd. (.21kg/sq.m) woven with gray or blue stripes or gray and white stripes. No water repellent treatment is required. Flame retardance shall be as required to meet the requirements under Section III.U.FLAMMABILITY. Thread count

shall be 70/in. (2.75/mm) warp and 44/in. (1.75/mm) filling. Minimum breaking strength (grab method) shall be 110 lbs. (50 kg) warp and 60 lbs. (27 kg) filling. Stripes shall run lengthwise of the mattress.

Sleep surfaces shall be one piece.

Anti-bacterial moisture resistant ticking shall be minimum 10oz./sq.yd. (339g./sq.m) with tolerance of minus ½ oz. (17g) and plus 1 oz. (34g). Breaking strength (Grab method) minimum 110(50 kg) both warp and filling. Coating adhesion 12 lbs./2"(15.4 kg/5.cm) width Federal Standard 191, Test 5970. Hydrostatic water resistance 175 lbs./sq. in. (1206kPa) Federal Standard 191, Test 5512. Flame Resistance, as specified in Section III.U.FLAMMABILITY. When tested by AATCC Test 147-1976 parallel streak method, the reduction of Staphylococcus aureus bacteria shall be not less than 98%, and Klebsiella pneumoniae bacterial shall be not less than 85%.

C. VENTILATORS

The ventilators shall be one piece of non-ferrous material not less than .013" (.330 mm) thick with an outside diameter not less than 7/8" (22 mm). At least 60% of the face shall be perforated with holes not exceeding 1/8" (3.7 mm) diameter. There shall be 4 ventilators equally spaced on each side or on head and foot sides of the mattress. Ventilators are required only in Class 2 mattresses.

D. WIRE MATS

The wire mat used for the spring covering shall conform to the following construction: a series of oil-tempered steel wires 0.041" (1.04 mm) in diameter, uniformly spaced at a distance of not more than 1" (25.4 mm) apart and passing through fiber cords spaced a uniform distance of not more than 8" (203 mm) apart. The fiber cord shall be constructed of not less than 30 pound (13.6 kg) Kraft paper with a 3 strand jute center, or accepted substitute, and shall have a breaking strength of not less than 100 pounds (45 kg). The diameter of the center cords shall be not less than 0.17" (4.3 mm) and the diameter of the outside or border cords shall be not less than 0.14" (3.5 mm). The wire shall pass through the center cords and be knotted around the outside cords.

E. TYPE I - RIGID SPRING UNIT

All wire spring unit, knotted or loose end coil construction shall consist of transverse rows of coils connected by the use of helicals running at right angles to the long axis of the unit in such a manner as to prevent lateral slippage and to permit a free hinge action. All coils shall be hourglass shape except that the coils in the two longitudinal rows forming the sides of the unit may be cylindrical or elliptical, when this is the practice in the manufacture of the units, conforming to good construction. All coils shall be of not less than 13 U.S. Standard gauge steel wire. There shall be not less than three active turns or convolutions per coil, and the coils shall be 5" ±¼" (127 ± 6 mm) in height. All knots shall be turned down and ends of helicals turned in so as to form smooth and rounded terminations. Helical springs shall be not less than 17 U.S. Standard gauge and shall be not more than 3/8" (10 mm) in diameter and shall have not less than 2 turns per inch (4/50 mm). Entire unit shall be edged with border wire not less than 6 U.S. Standard gauge.

F. TYPE II - FLEXIBLE SPRING UNIT

The flexible spring unit shall be so constructed that it may be rolled or folded from end to end. Free end, knotted end or offset coils may be used. All flexible spring units shall have

border wire, 15 gauge minimum, 9 gauge maximum, secured across the end of the spring unit and extend minimum 6" on each side and attached so as to give support to the ends and corners of the unit.

Free end coils shall be minimum 13 gauge for edge and corner coils. All others shall be minimum 13½ gauge. Corner coils shall have not less than 6 convolutions. The ends of corner coils shall be formed to approximately 4" (100 mm) radius. Construction forming the sides of the spring unit shall present a straight edge to the outer edge of the unit and coils shall be cylindrical. All other coils shall be hourglass shape. All coils except corners shall have not less than 4½ convolutions.

Free end coil spring units shall be constructed to keep edges from sagging and prevent side sway. The construction shall consist of transverse rows of alternating right and left hand coils connected with helicals running at right angles to the long axis of the unit. The free end of the coils shall be anchored within the helical without the use of any locking device. The coils forming the end rows shall have a double overlap of the end convolutions into the end and second helical. The end row shall have a stabilizer wire between 10½ and 15 gauge placed within each of the 4 end helicals with the free ends extending to the center of the second row of coils at each end and fastened so as to prevent slippage. The ends of helicals shall be turned in to form a smooth rounded termination.

Knotted end coils shall be minimum 13 gauge. All coils shall be hourglass in shape except that the coils in the two longitudinal rows forming the sides of the spring unit may be cylindrical or elliptical in shape. Coils shall have not less than three convolutions between the knots. Coils shall be $5 \pm \frac{1}{4}$ " (127 ± 6 mm)high.

Knotted coil units shall consist of transverse rows of coils connected by helicals running at right angles to the long axis of the unit. Sides of coils where joined to helicals shall pass through 3 turns of the helical. All knots shall be turned down and ends of helicals shall be turned inward to form a smooth rounded termination.

Offset coils shall be not less than 13 gauge. All coils shall be hourglass shaped except edge coils which shall be cylindrical and shall have 2 precision offset sections in each end convolution of the coil placed in proper transverse position to receive the interlocking helical which surrounds each offset portion of the coil and securely hold each coil in position. There shall be not less than 3 convolutions per coil. Coils shall be $5" \pm \frac{1}{4}"$ (157 ± 6 mm) high.

Offset coil units shall consist of transverse rows of coils connected by helicals running at right angles to the long axis of the unit. The offset sections of the coils shall engage the helicals so as to hold each coil in position and prevent slippage and maintain dimensional stability. Ends of helicals shall be turned inward to form a smooth rounded termination.

Dual firmness feature, wherein the two opposing faces of the mattresses provide different firmness, is NOT desired.

G. COMMERCIAL BONDED POLYESTER BATTING

A bonded polyester batting may be used for border construction or for heat barrier. The batting shall be bonded with an approved durable bonding agent uniformly applied. The bonding agent shall be less than 18% by weight of the finished batting. The bonding agent shall be applied to both sides of the batting.

H. OPEN MESH FABRIC

Open mesh fabric shall be 1½ to 3½ oz. per sq.yd. (51 to 120g/sq.m) - 4 x 4 per sq. in. (160 x 160 sq.m) one-cross-one leno weave. Weave shall have 8 warp ends (315/m) and 4 pick ends/in (160/m). It shall be made of vinyl coated or synthetic fibers.

I. NON-WOVEN FABRIC

Non-woven fabric shall be 1½ to 3½ oz./sq. yd. (51 to 120g/sq.m) and shall be either a spun bonded nylon, polyester or polypropylene fabric.

J. EDGE BINDING TAPE

Edge binding tape shall be 5/8" (16 mm) min. width synthetic or an approved fire resistant or smoldering ignition resistant treated cotton. Minimum breaking strength of tape shall be 30 lbs. (13.6 kg). Inverted seams at perimeter of mattress are also acceptable.

K. TUFTING TAPE BRAID OR TWINE

Tufting of mattress is permissible but not required.

L. UNICELLULAR POLYETHYLENE FOAM

The border may be constructed by using unicellular polyethylene foam minimum 1/8" (3 mm) thick.

M. POLYURETHANE FOAM

Foam may be used as a heat barrier and may be substituted for cotton felt as described in III.O. TUFTING. Foam shall be flame retardant and minimum density of 1.7 lbs./cu.ft. (27.2 kg/cu.m).

N. INSULATION

The spring unit shall be covered both top and bottom with a wire mat as specified in III.D.WIRE MATS. The wire mat shall be covered with premium grade 3 oz./sq.yd. (101 g/sq.m) sisal felt, or in lieu thereof, a comparable suitable cotton or synthetic felt pad. Cotton felt, when used, shall be as specified in III.A.COTTON FELT. Felt shall be stitched to an open mesh or non-woven fabric. Stitches shall be 2" (50.8 mm) apart and 1"(25 mm) long. Insulating pads shall be securely attached around the edge of the entire unit by stitching or stapling (hog rings)at 4" (101 mm) intervals.

O. FELT DISTRIBUTION

The cotton felt shall be placed over the spring covering material in full length and full width layers. From 85 to 95% of the cotton felt shall be distributed in layers of equal weight on both faces of the mattress. These layers shall produce uniform thickness with the exception that the remaining 5 to 15% of the total weight of felt on each face shall be uniformly distributed over the middle one-third of the length of the face for the full width of the mattress. Both sides of the mattress shall be finished so that either side may be used as the sleeping side with equal comfort. Felt not to be stitched to padding.

The total weight of felt per mattress for each size shall be no less than shown in Table I.

Sheet foam may be used as heat barrier and may be compensated for in lieu of felt in the following manner" ¼" (6 mm) foam shall compensate for 2 lbs. (907 g) of felt. In no case shall the use of foam reduce the weight of felt required by more than 50%. Spun bonded felt composed of synthetic and cotton fibers and containing not less than 25% by weight of cotton may be used as a substitute for cotton felt.

P. BORDER

The border at the edge of the spring assembly shall be padded with additional layers of cotton felt (or equal) effectively held in place to give the outside edge of the mattress a box effect. The construction along the inner edge shall be suitably re-inforced and finished to maintain a sharply defined box edge. Additional felt shall be used to form a well-rounded corner. The hemmed edges of the cover ticking shall be fully sewn to the edges of the border ticking and the edge of cover and border shall be finished and fully sewn within the folds of minimum 5/8" (16 mm) tape; this sewing shall be done by machine and shall extend completely around the edges of the mattress.

Also, thermal bonded polyester or unbonded polyester may be used to form a well rounded corner.

Q. TUFTING

When tufted construction is used the mattress shall be well tufted with the minimum number of tufts shown in Table I.

For Class 2 mattresses with anti-bacterial cover, the felt may be covered with a suitable sheeting material and inner tufted or other suitable means of securely anchoring felt shall be used. No tufting shall penetrate the anti-bacterial cover. The cover may be heavy duty vinyl.

If called for (or allowed) in the Invitation For Bids, polyurethane-coated nylon ticking may be provided in lieu of vinyl.

R. QUILTING

When quilted construction is used, the felt shall be quilted to the cover or otherwise secured to prevent wadding or shifting of felt.

For Class 2 mattresses with anti-bacterial cover, the felt shall be secured to prevent wadding or shifting of felt. The cover shall not be quilted.

S. WORKMANSHIP

All workmanship shall be first class in every respect. The finished mattress shall be free from all avoidable imperfections of manufacture and from defects affecting the appearance or serviceability. Both sides of the mattress shall be so finished that either side may be used with equal comfort. No lifting straps are required.

Any materials or processes not specifically described in this specification shall in keeping with good industry practice.

T. LABELING

A sewed label shall be attached to each mattress as required by Public Health Law of North Carolina, Section 130A-265, and in compliance with the latest format approved by the Association of Bedding & Furniture Law Officials.

Included on the above label, or on a separate adjacent label as appropriate, shall be the identification of each of the CFR flammability requirements cited elsewhere herein with which the mattress complies for flammability resistance.

Manufacturer of mattresses shall hold a North Carolina registration number issued by the Dept of Health and Human Services. This registration number shall be included on the sewed label, in the proper format.

U. FLAMMABILITY

All mattresses shall comply with Code of Federal Regulations 16CFR1632, "Standard for the Flammability of Mattresses and Mattress Pads."

All mattresses shall comply with Code of Federal Regulations 16CFR1633, "Standard for the Flammability (Open Flame) of Mattress Sets."

IV. WARRANTY

The manufacturer warrants to the Owner that all mattresses furnished under this specification will be of good material and workmanship and agrees to replace promptly any units which by reason of defective material and workmanship shall fail under normal use, free of negligence or accident, for a minimum period of one year from date of acceptance. Such replacement shall be free of any charge to the Owner or his representative.

V. SERVICE, PARTS AND MANUALS

This specification does not require any service, parts or manuals to be supplied.

VI. ACCEPTANCE INSPECTION AND TESTING

The following provisions apply to all mattress manufacturers who are supplying mattresses under this specification.

MATTRESS TRACEABILITY SYSTEM: The contractor must have in place a detailed internal tracking system, such that if a user's mattress is determined to be defective in flammability resistance, all identical mattresses can be located and removed. Such tracking system must include as a minimum the mattress manufacturer's lot number. For contractor's benefit, it is recommended that the tracking system also include the mattress serial number, or the mattress sequence number within the lot. This additional tracking data may allow identification of a reduced number of identical defective mattresses. All appropriate tracking data shall be provided on a permanent fireproof label affixed to each mattress, which may be the same label required above under Section III.T, if such is fireproof.

The contractor is to submit to the Purchaser within ten (10) calendar days of notification of contract award written documentation which confirms the existence of the mattress producer's viable tracking program as set forth above, and which completely describes the elements and process of such tracking program. Failure to provide this documentation in a timely manner and in acceptable form may be considered grounds for removal of the contractor. The Purchaser will forward the documentation to the Chief Standards Engineer, Division of Purchase & Contract, Raleigh, NC, immediately upon receipt for his review, after which he will advise the Purchaser as to the acceptability of the documentation and the tracking program. The State

reserves the right to have its authorized representative visit the mattress producer's plant unannounced, during normal working hours, and at any time during the contract period, to inspect and confirm the tracking program. A finding that the mattress producer has failed to maintain the tracking program as approved by the Chief Standards Engineer may result in removal of the contractor and in other measures as may be authorized by the contract.

It is required that the contractor submit to the Division of Purchase & Contract on a quarterly basis the information specified below, for each mattress sold by the contractor. The quarterly reports are to be in written or electronic form and are to be received by the Division within ten (10) working days after the end of the quarter. Quarters end on the last day of the respective months of March, June, September, and December. The information required is:

- (a) Line item under which mattress was produced
- (b) Name of using agency, college, university, or institution purchasing the mattress
- (c) The mattress manufacturer's lot number (and if available the serial or sequence number) of the mattress
- (d) The identification of the flammability test (by date, test report number, name of test facility, lot number, and if available the serial or sequence number, of test mattress) which applies to the line item under which the mattress was produced.
- (e) The date and location of the physical inspection of the first sample, and lot number (and if available the serial or sequence number) of test mattress, which represents the line item under which the mattress was produced.

The State may require, at its option, the data to be submitted in only electronic form, and in a specific format which would be provided to the contractor in a timely manner.

ACCEPTANCE INSPECTION FOR PHYSICAL CONSTRUCTION: Before initiating production of mattresses for any given line item, the supplier is responsible for shipping to a North Carolina site to be specified after award of contract, one mattress from that line item for inspection. Each line item must be represented by its own dedicated sample mattress. **Immediately upon shipment of this mattress, the contractor is to contact the Sleep Products Branch (within the NC Dept of Environment and Natural Resources), 919-733-6407, to request the inspection.** This inspection will confirm that the physical construction of the mattress is in accordance with the contract requirements, and that the materials used and the affixed exterior label are in accordance with NC statutes and the contract requirements. A form approved by the Division of Purchase & Contract, and which may be obtained at http://www.doa.state.nc.us/PandC/mattress_form.pdf, will be used by the Sleep Products Branch to report the results of the physical inspection. If the sample is rejected, the reasons therefor shall be fully disclosed on the form, so that all appropriate parties can be apprised of such reasons. The original of the completed and signed form shall be forwarded by the Sleep Products Branch inspector to the Chief Standards Engineer, Division of Purchase & Contract, Raleigh, NC. A copy of the completed and signed form shall be forwarded by the Sleep Products Branch inspector to the purchasing officer (or appropriate purchaser) of the using agency. The using agency is cautioned that a copy of the above-linked mattress physical inspection form, properly completed and signed, and confirming acceptability of the sample mattress, should be in the agency's possession before payment is released to the contractor.

If the sample is determined to be acceptable, it will be retained for comparison, as necessary, against the remainder of the delivered units from that line item. The State may select one unit for each 50 delivered on the order to compare against the initial sample. Such comparison may involve invasive inspections which could render the mattresses unsuitable for use. The supplier is responsible for restoring the inspected units to new condition, or otherwise for providing replacement mattresses for the sacrificed units, also including the initial sample. The Sleep Products Branch may require that inspection of several selected samples be delayed until an

authorized inspector can be present at the site. However, if necessary, mattresses may be installed before the corresponding sample(s) has/have been inspected.

FLAMMABILITY TESTING: In addition, before initiating production of mattresses for any given line item, the contractor is responsible, including all costs therefor, for having mattresses from that line item tested for compliance with 16CFR1632 Part 1632 and with 16CFR1633 Part 1633, at an independent testing lab of the State's choice, such as The Govmark Organization, Inc., Farmingdale, NY, or Stork Twin City Testing, St. Paul, MN. (The number of mattresses tested shall be as called for in the above regulations, except as may be modified by Interim Enforcement Policies issued by the U.S. Consumer Product Safety Commission and effective at time of mattress production.) An original certified copy of the test report results is to be mailed directly by the testing lab to the Chief Standards Engineer, Division of Purchase & Contract. The State has the option to select and test additional units anywhere within the production run, at its own expense. If ANY tested mattress fails to comply with either of the above tests, the circumstances will be investigated, and if warranted, the contractor may be required to retrieve at his own expense all suspect mattresses delivered under the affected line item, and to fully refund any payment already received therefor. A separate set of flammability tests is required for EACH line item, except that a mattress from a single line item may represent other line items which differ from the former only with respect to mattress size.

On a line item for which a mattress is fire tested, the tested mattress may be considered to be the "prototype," which is defined herein as a specific design of mattress that provides the basis for production of mattress models that are similar to the prototype, within the following constraints: A production lot (or simply "lot"), as used herein, means any quantity of finished mattresses that are produced in a production interval defined by the manufacturer (either in terms of quantity or time) and are intended to replicate a specific prototype. In particular, except as otherwise required herein, the manufacturer may sell under this contract a model of a successfully fire-tested prototype without fire-testing the model if the model differs from such prototype only with respect to size, ticking, unless the ticking of the qualified prototype has characteristics (such as chemical treatment or special fiber composition) designed to improve the performance in the fire test prescribed herein, or if the manufacturer can demonstrate to the State's satisfaction that a difference or differences in any component, material, or method of construction between the prototype and the model would not cause the model to fail the required fire test.

Note that it is NOT required that a mattress from each delivery be tested per the above.

For traceability purposes, the contractor is responsible for providing to the independent testing lab, at the time the mattress is submitted, the following information on the order, and requesting that this information be stated in the laboratory's test report:

- (a) Contract number
- (b) Line item number
- (c) Mattress description
- (d) Manufacturer's lot number
- (e) Sequence or serial number of the tested mattress, if available
- (f) Date of production of the tested mattress

RANDOM SCREENING FOR FLAMMABILITY RESISTANCE: To maximize mattress fire safety while minimizing fire testing costs, the State may at its discretion conduct at any time and location flammability screening tests of a nature it deems appropriate, including testing of individual mattress components, on any mattress to be delivered, or which have been delivered, /under the contract. These screening tests shall exclude individual mattresses that are, per the contract, specifically intended for fire testing under promulgated standards, and furthermore

these screening tests may not be substituted for, nor take precedence over, such promulgated standards. If a mattress subjected to the screening test indicates possible insufficient fire resistance, then the circumstances may be further investigated, and appropriate action taken as necessary to rectify the matter.

VII. DELIVERY AND PAYMENT

Delivery and payment for mattresses under this specification shall be in accordance with the terms and conditions of The Invitation For Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

Mattresses shipped by closed truck, unmixed with other freight, and protected from injury, direct from bidder's plant or warehouse to the purchaser, do not require cartons. Mattresses shipped by L.C.L. freight, express, or by truck in mixed cargo shall be packed in fiberboard or cardboard cartons.

VIII. ORDERING DATA

Purchasers should exercise any desired option offered herein and should specify the following in the Requisition and Invitation For Bids.

1. Title, number, and date of this specification.
2. Type, class, and size of mattress required.
3. **IMPORTANT:** It is highly recommended that the purchaser include with the Invitation For Bids the standard questionnaire for this specification, which may be obtained at <http://www.doa.state.nc.us/pandc/7210-1qx.pdf>.
4. For Class 2 (antibacterial) mattresses, if polyurethane-coated nylon ticking may be provided in lieu of vinyl.

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