DEAS 1115-2:2022

ICS: 97.140

DRAFT EAST AFRICAN STANDARD

Mattresses — Specification – Part 2: Spring mattress

EAST AFRICAN COMMUNITY

First Edition 2022

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 069, *Organic and Inorganic chemicals.*

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

DEAS 1115 consists of the following parts, under the general title *Mattresses — Specification:*

– *Part 1: Flexible polyurethane foams*

– *Part 2: Spring mattresses*

Mattresses — Specification – Part 2: Spring mattress

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for spring mattress for the general usage. This standard does not cover orthopaedic and reconstituted mattresses.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8124-3, *Safety of toys - Migration of certain elements*

ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method*

ISO 13934-2, *Textiles — Tensile properties of fabrics — Part 2: Determination of maximum force using the grab method*

ISO 105-C10, *Methods for the determination of colour fastness of textile Materials to washing*

ISO 105-D01, *Method for determination of colour fastness of textile materials to dry cleaning*

ISO 380, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area*

DEAS 1115-1, *Domestic mattresses — Specification — Part 1: Flexible polyurethane (polyether) foams*

ISO 23213, *Carbon steel wire for bedding and seating springs*

ISO 11130, *Corrosion of metals and alloys — Alternate immersion test in salt solution*

3 Terms and definitions

For the purposes of this standard, the following and terms and definitions shall apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1 basic filling
filling adjacent to the spring unit

3.2 bursting strength
force required to rupture a fabric by distending it with pressure applied at right angles to the plane of the fabric

3.3 breaking strength
maximum load (or force) supported by a specimen in a tensile test carried to rupture

3.4 core
central part of spring mattress that provides support to the mattress, with the material being made of springs.

3.5 defective
spring mattress that fails in one or more respects to comply with the appropriate requirements of the specification

3.6 spring unit
unit made up of either open coil or pocketed springs and the connecting elements between them including boarder wire.

3.7 open coil spring
spring mattress in which the springs are not enclosed in pockets but connected together by other suitable means

3.8 pocketed spring
spring mattress in which the springs are enclosed inside pockets and the pockets are connected together by suitable means.

3.9 insulation
suitable insulating material on both sides of the spring unit to prevent the spring from protruding

3.10 padding
any suitable material which can give comfort to the user

3.11 tick
suitable outer cover that provides a comforting top layer of the mattress

3.12 warp
yarns/threads lying lengthways in a fabric as woven

3.13 weft
yarns/threads lying width ways in a fabric as woven (at right angles to the warp)

3.14 yarn
generic term for a continuous strand of textile fibres or filaments without twisting, suitable for plying, knitting, braiding, weaving or otherwise intertwining to form a textile end product

4 Requirements

4.1 General requirements

4.1.1 Spring mattress shall not contain impurities or harmful residues such as amines which are volatile and driven off by heat generated in the formation of foam.

4.1.2 Adhesives used shall be either nitrile or neoprene based. If neoprene-based adhesives are used, they shall not have acidity of more than pH 3.5. The adhesives shall be able to withstand heat and moisture treatments as effectively as the foam itself.

4.1.3 Monofilament sewing thread shall not be used.

4.1.4 All sewing shall be securely and neatly finished off.

4.1.5 The spring unit used shall be tempered with heat or electricity.

4.1.6 The spring mattresses shall have a prebuilt border (see 4.2.3) that covers the sides and ends of the mattresses.

4.2 Specific requirements

4.2.1 *Ventilators*

If the spring mattress is fitted with ventilators;

a) Ventilators shall be made of suitable material which do not contain antimony, arsenic, barium, cadmium, chromium, lead, selenium, mercury or any soluble compound of any of these elements, exceeding the amounts given in table 1.

b) Ventilators (if fitted) shall not be positioned on the sleeping surface of a mattress.

Table 1: heavy metals limits for ventilators

S/N	Parameter	Limit, mg/kg, max	Test method
i.	Antimony	60	ISO 8124-3
ii.	Arsenic	25	
iii.	Barium	1 000	
iv.	Cadmium	75	
v.	Chromium	60	
vi.	Lead	90	
vii.	Mercury	60	
viii.	Selenium	500	

4.2.2 The cover of spring mattresses shall be of a woven ticking, or a knitted ticking and shall conform to the specific requirements given in Table 2 when tested in accordance with the methods specified therein.

Table 2 — Specific requirements for ticking

SL. No	Characteristic		Requirement	Test method
i)	Breaking strength (woven ticking) N, min.	Warp	980	ISO 13934-1
		Weft	490	
ii)	Bursting strength (knitted ticking), KPa, min.		700	ISO 13934-2
iii)	Colour fastness to washing	Change in colour, rating, min.	4	ISO 105-C10
		Staining of transfer cloths, rating, min		
iv)	Colour fastness to dry-cleaning	Change in colour, rating, min.	4	ISO 105-D01
		Staining of transfer cloths, rating, min		
v)	Flammability		No foam specimen shall burn for 3 or more minutes nor shall burn beyond 75 mm gauge line	Annex A

4.2.3 Prebuilt borders shall be firm and shall consist of one or more layers of wadding, polypropylene fabric, or other acceptable material (of total thickness in all cases, at least 5 mm) stitched to a backing of Hessian or other material of at least equal strength and of acceptable quality.

4.2.4 Hessian used as the backing of the basic filling and for prebuilt borders shall conform to the specific requirements given in Table 3 when tested in accordance with the methods specified therein

Table 3 — Specific requirements for hessian fabric

SL. No	Characteristic		Requirement	Test method
i)	Breaking strength N, min.	Warp	310	ISO 13934-1
		Weft	220	
ii)	Threads per 10 cm, min.	Warp	27	ISO 13934-2
		Weft	21	
iii)	Mass per unit area, g/m^2, min.		155	ISO 3801

4.2.5 Polypropylene fabric used as the backing of the basic filling shall be of split film polypropylene yarns. When tested in accordance with ISO 3801, the minimum mass per unit area of the fabric shall be 155 g/m^2.

4.2.6 *Padding*

Spring mattress shall consist of a layer of a minimum of 25 cm around the core in a composite structure with the sole purpose of equalizing the pressure on the human body.

4.2.7 *Ticking*

The tick can be fixed to the mattress by means of stitching or by tapes running through the mattress (tufting). Sometimes the tick is not fixed, and can be removed from the mattress by customer.

4.2.8 *Spring unit*

4.2.8.1 The whole of the spring unit, including vertical springs and where applicable the helical wire used in lacing the springs together, shall be made from wire conforming to ISO 23213.

4.2.8.2 All spring unit, knotted-coil construction shall consist of transverse rows of coils connected by helicals running at right angles of the long axis of the unit in such a manner as to prevent a free hinge action.

4.2.8.3 Each unit shall have helical or clipped border on both top and bottom perimeters with 4 mm minimum oil tempered border wire, where the corners of this unit have 63.5 mm

4.2.8.4 The spring shall have the minimum height of 10 cm with at least 4 turns or convolutions.

4.2.8.5 Each finished spring unit shall be regular in shape and size and when measured with the unit standing on a flat surface, the edges shall stand vertically, forming a right cylinder, with no point on the vertical side varying by more than 10 mm from the sides of the right cylinder.

4.2.8.6 The size of the inner spring shall have the minimum of 90 mm when tested according to Annex B.

4.2.8.7 All wire ends shall face inwards and helical wires shall be clenched or crimped to ensure secure fixing.

4.2.8.8 All metal parts shall show no evidence of corrosion when assessed in accordance with ISO 11130.

4.2.9 *Dimension*

4.2.9.1 Spring mattress shall have a minimum thickness of 15 cm when tested according to Annex B. Width and length allowed shall comply with DEAS 1115-1. However, the width and length may be customized.

4.2.9.2 The material used for edge frames shall be high carbon steel strip of width at least 5 mm and thickness at least 1.60 mm or high carbon steel wire of diameter at least 3.75 mm when tested according to Annex B.

4.2.10 *Number of springs*

4.2.10.1 Each spring unit shall contain not less than the number of springs specified for the appropriate mattress size in tables 5 and 6.

Table 5: Mattresses for adults' use

Nominal unit size (mm)	Minimum number of springs	
	Open coil	Pocketed
900 X 1 900	192	300
1 000 X 2 000	225	338
1 350 X 1 900	288	450
1 500 X 2 000	325	520
1 880 X 2 000	384	928

4.2.11.2 The spring density for units of sizes other than those listed in tables 2 and 3 shall be at least the value shown in table 4.

Table 6: Mattresses for children's use

Nominal unit size (mm)	Minimum number of springs	
	Open coil	Pocketed
540 X1150	54	105
690 X 1300	88	153

4.2.10.3 The spring density for units of sizes other than those listed in tables 5 and 6 shall be at least the value shown in table 7.

Table 7: Minimum spring density for units of other sizes

Use	Minimum number of springs	
	Open coil spring density (springs/m^2)	Pocketed spring density (springs/m^2)
Adults	108	169
Children	87	169

4.2.11 Endurance

When a mattress is subjected to an endurance test in accordance with Annex C, there shall be no significant failure of any part (internal or external) of the mattress that could affect its fitness for use, and the loss in height at any of the points tested shall not exceed 5 %.

5 Packaging

5.1 Each mattress shall be so packed that they are adequately protected during normal transportation and storage.

5.2 Mattresses shall be individually wrapped in sealed bags that prevent any damage, gross distortion and nicking to contents during storage and transportation.

6 Labelling

Each spring mattress shall be legibly and indelibly labelled in the outer upper waist of the mattress or a label attached on it, in English and/or any other official language (French, Kiswahili, etc) used in the importing East African Partner State with the following information:

a) grade of foam mattress;
b) nominal length, width and thickness;
c) registered trade name of the product if any;
d) name of the manufacturer;
e) batch number/lot number and date of manufacture;
f) country of origin; and
g) instructions as applicable.

7 Sampling

Representative samples shall be taken in accordance with the Annex D.

Annex A

(normative)

Test for flammability

A.1 Apparatus

An apparatus as shown schematically in Figure A.1 and consisting of a heat-resistant glass tube (chimney) in which a test specimen can be mounted, the base of the tube being connected to metered supplies of oxygen and nitrogen. The glass tube shall have a diameter of at least 75 mm and a height of at least 450 mm, and shall have at its base a bed of glass beads (or other inert particles) that will mix and distribute the incoming gases. The tube shall also contain a clamp that is capable of holding a test specimen (vertically) that the top of the specimen is at least 100 mm below the top of the tube.

The oxygen and nitrogen used shall be of commercial grade (or better) and shall be supplied to the base of the glass tube through individual metering devices that enable the volumetric flow of each gas to be measured with an accuracy of 1 % or better.

A.2 Test specimens

From the appropriate slab cut five specimens each of size 12.5 $\pm$ 0.5 mm x 12.5 $\pm$ 0.5 mm x 130 mm and draw a gauge line across each specimen 75 mm from the end that is to be positioned uppermost in the apparatus.

A.3 Procedure

Clamp a test specimen in the holder of the apparatus so that it is held vertically in the centre of the glass chimney. Open the valves of the gas cylinders and adjust the flow so that the oxygen content of the gas mixture is 20 $\pm$ 0.2 % and that the flow rate up the glass chimney (as calculated from the volumetric flow rate divided by the cross-sectional area of the chimney) is 40 $\pm$ 10 % mm/s. Allow the gas to flow for at least 30 s and then, using a small gas flame at the end of a tube, ignite the test specimen so that the whole of the upper surface is burning. Note whether the specimen burns for 3 min or longer and if not, whether or not the specimen has burned to below the 75 mm gauge line. Repeat the test with the remaining four specimens.

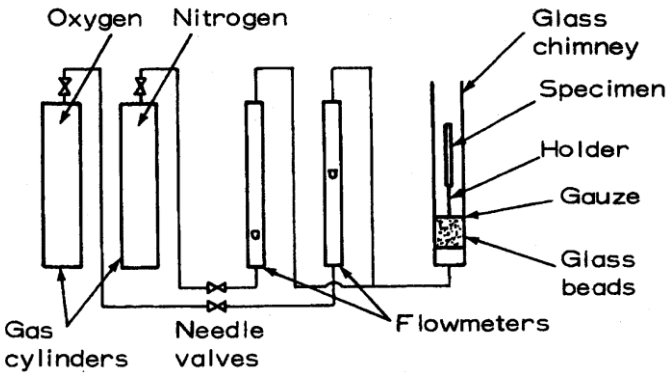

Figure A.1 — General arrangement of flammability test apparatus

Annex B

(normative)

Dimensions

B.1 Apparatus

B.1.1 Metre rule, a steel rule graduated in millimeters and accurate to 1 mm (or better).

B.1.2 Micrometer, a micrometer accurate to 0.01 mm (or better) with a presser foot of area at least 6.5 cm and capable of exerting a pressure of 100 ± 10 Pa.

B.2 Procedure

Measure the dimensions of each sample (using the steel rule for dimensions greater than 30 mm and the micrometer for dimensions not exceeding 30 mm).

Annex C

(normative)

Test method for endurance

C.1 Apparatus

A compression apparatus capable of cyclically compressing (between parallel platens) the central part of the complete mattress to 67 % of its free height and then releasing it, at a rate of 60 ± 5 cycles/minute. The apparatus shall have a lower platen large enough to support the whole mattress, and an upper compressing platen with a corrugated contact surface of the size and shape shown in Figure C.1. The specified compression shall be measured at the positions of maximum compression caused by the corrugated platen.

C.2 Preparation of test specimens

C.2.1 Place the mattress to be tested and taken in accordance with Annex H, on a solid plane horizontal base for a period of at least 12 h.

C.2.2 Place a flat steel pressure plate (of diameter 300 mm ± 2 mm and mass 2 kg ± 0.2 kg) on each of the six measurement positions (in turn) shown in Figure C.2, and measure (to an accuracy of ± 2 mm) the height of the mattress at each of these positions. Ensure that the pressure plate is lowered slowly and without shock on to each of the measurement positions, and that each measurement is taken at least 10 s after application of the pressure plate.

C.3 Procedure

Position the upper platen of the apparatus with its longitudinal axis along the longitudinal axis of the mattress and its centre vertically above the midpoint, 0, of the measurement positions (see Figure C.2), secure the mattress against horizontal movement, and operate the apparatus for 60 000 compression cycles. Allow the mattress to recover for at least 12 h, again measure the height as described in C.2.2, and calculate (for each of the six points) the loss in height as a percentage of the original height. Cut the mattress open and examine for compliance with 4.2.12

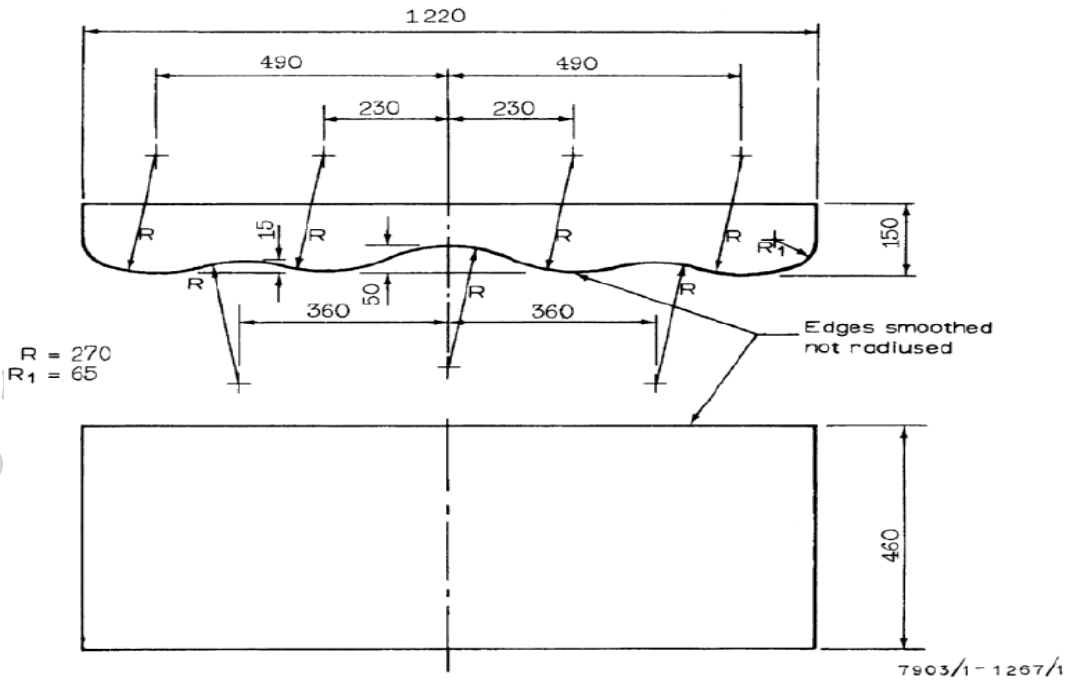

Figure C.1 — Compressing platen for endurance test

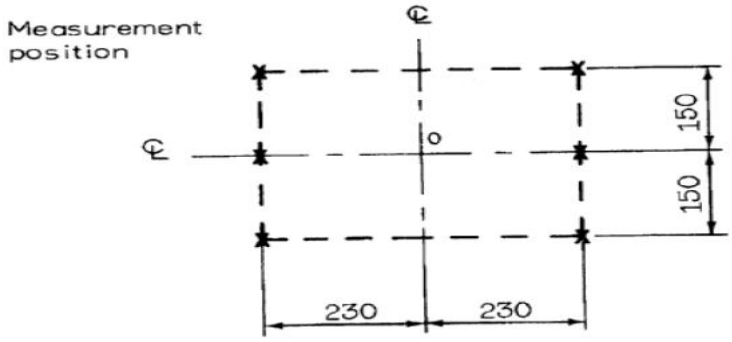

Figure C.2 — Measurement positions for endurance test

Annex D

(normative)

Sampling

D.1 General

D.1.1 A lot shall comprise not less than 10 and not more than 500 inner spring mattresses of the same class, materials, dimensions, and construction, from one manufacturer, submitted at any one time for inspection and testing

D.1.2 The sampling procedure in D.2 – D.3 shall be applied in determining whether a lot complies with the relevant requirements of the specification. The samples so taken shall be deemed to represent the lot for the respective properties.

D.2 Sample for inspection

From the lot take (when relevant, at random) the number of mattresses shown in Column 2 of Table D.1 relative to the appropriate lot size shown in Column 1. Visually examine each mattress for all the relevant requirements of Clause 4, compliance of which is not assessed by the testing.

D.3 Sample for testing

After visual inspection of the sample taken in accordance with D.1, take from it at random the number of mattresses shown in Column 3 of Table D.1 relative to the appropriate lot size shown in Column 1.

Table D.1 Sample sizes

1	2	3
Lot size, mattresses	Sample for inspection, mattresses	Sample for testing mattresses
10 - 15	All	2
16 - 100	15	2
101 - 300	20	4
301 - 500	30	6

Bibliography

[1] TZS 1411:2014 *Spring Mattress - Specification*

[2] US 1575: 2014 *Spring mattresses - Specification*