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Beds for domestic use

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Bed Manufacturers Association All Japan (JBA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS S 1102 : 1993** is replaced with this Standard.

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Beds for domestic use

1 Scope This Japanese Industrial Standard specifies the beds for domestic use⁽¹⁾ (hereafter referred to as “beds”).

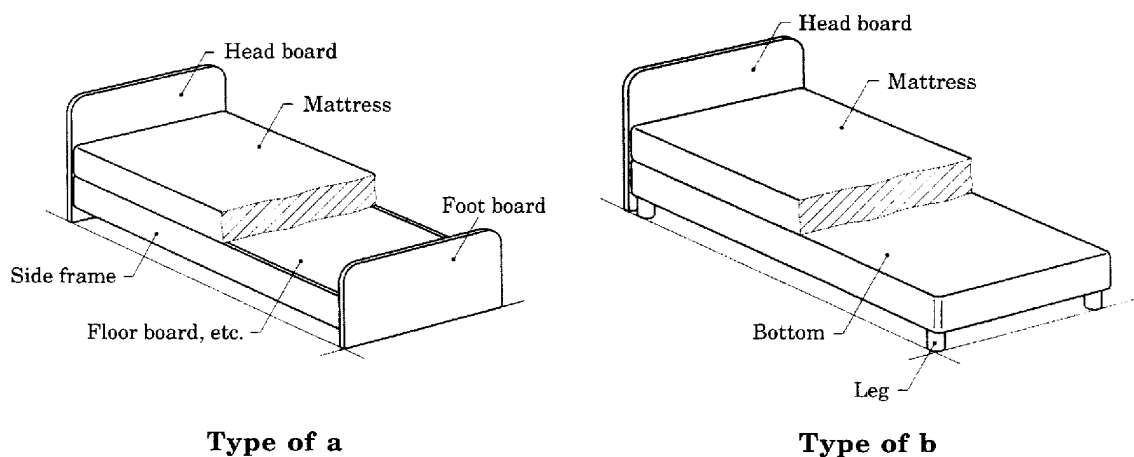
Note ⁽¹⁾ The said beds for domestic use mean those combined by the mattress used for sleeping and the structure to support the mattress, and do not include the beds having the special function and structure such as baby bed, sofa bed, bunk bed, reclining type bed.

2 Normative references The standards listed in attached table 1 contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions (including amendments) of the standards shall be applied.

3 Classification The classification of beds shall be as follows:

- a) **Type of a** The beds of the type with head board and foot board contacting with floor among the structures supporting mattress.
- b) **Type of b** The beds of the type with legs contacting with floor among the structures supporting mattress.
- c) **Type of c** The beds of the type other than types a and b.

4 Designation of each part The designation of each part shall be in accordance with figure 1.



Type of a

Type of b

Figure 1 Types and designation of each part

5 Quality The quality shall be as follows:

- a) The processing such as sewing, nailing, adhering, welding shall be secure, the defects such as flaw, fissure, change in quality, deformation, disconnection of joint shall not exist and the finishing shall be good.

- b) For the beds, the creak, strange sound, etc. to hinder in practical use shall not be generated.
- c) The structure shall be stable when placed on a horizontal floor and be considered so as not to damage the floor.
- d) The each part shall be well finished and the part contacting with human body or clothes shall be free from sharp protrusion, fine split, burr, flash, etc.
- e) The materials, which are safe in use and satisfy the requirements in clause 7, shall be used and the generation of hazardous gas and uncomfortable smell shall be restrained.
- f) The outside fabric shall have sufficient strength, have not the possibility of discolouration, fading and the like to hinder in practical use and be free from stain, dirt and the like.
- g) The rust detrimental to practical use shall not be produced on metallic part.
- h) The paint film shall not have the possibility of peeling easily, be smooth on the surface and be free from crack, unevenness and the like.
- i) The beds shall be measured and tested according to clauses 6 and 8 and conform to the specifications in table 1, table 2 and table 3.
- j) The structure shall have sufficient strength and stability, and the construction work shall be secure.
- k) When wooden materials are used, attention shall be payed so as not to produce the defects such as fissure, warp, worm hole after assembled.
- l) Adhesion, welding and the like shall be securely carried out and the connected surface at face side part shall be smoothly finished.
- m) In the case of assembling by using screws, other metal fittings, the connected part shall be securely jointed so as not to produce looseness.

Table 1 Performance and measuring test items

Item	Performance	Test subclause
Durability of mattress	a) The amount of setting, d_1, d_2, d_3 shall be not more than 40 mm, respectively. b) The outside fabric shall be free from gap, fray, rent, etc. c) The padding shall be free from movement, cave-in, disconnection. d) The spring shall be free from break, disconnection.	8.1.1
Vertical load	The increase amount of deflection $D_1 \leq 45$ (mm) $D_2 \geq 5$ (mm)	8.1.2
Strength of leg part	The defects such as looseness, shaking or deformation detrimental to practical use of structure shall not be produced at leg and fixed part of leg or at fixing part of head board and foot board.	8.2.1

Table 1 (concluded)

Item	Performance	Test subclause
Strength of side frame	The defects such as looseness, disconnection of parts, fissure, crack of materials detrimental to practical use shall not be produced.	8.2.2
Strength of floor board	The defects such as fissure, break of materials detrimental to practical use shall not be produced.	8.2.3
Durability of drawer	The defects such as damage, looseness, deformation detrimental to practical use shall not be produced at drawer and fitted part of drawer.	8.2.4 a)
Disconnection of bottom board of drawer	The defects such as damage, looseness, deformation detrimental to practical use shall not be produced at drawer.	8.2.4 b)
Strength of outside fabric of mattress	Tensile strength shall be not less than 300 N.	8.2.5
Painting film adherence at wooden part	The peeling of paint film shall be not more than 5.	8.2.6 b)
Painting film adherence at metallic part	The peeling of paint film shall be not more than 5.	8.2.6 c)
Rust prevention of painted metallic part	Rust shall not be produced.	8.2.6 d)

6 Dimensions The dimensions of mattress shall be expressed by modular nominal dimensions given to the reference plane of mattress and be in accordance with table 2. The structure dimensions of beds apply correspondingly to the dimensions of mattress.

Table 2 Modular nominal dimensions of width and length

Unit: mm

Nominal dimension (width)		Nominal dimension (length)		Nominal dimension (thickness)	Tolerance on width and length
Dimension	Abbreviation	Dimension	Abbreviation		
820	08	1 950	19	—	+50
980	09	2 050	20		-30
1 100	11				
1 200	12				
1 400	14				
1 520	15				

Remarks : For the thickness, the tolerance is not specified because the nominal dimensions are not specified.

6.1 Manufacturing tolerance The manufacturing tolerance shall be in accordance with table 3 in relation to the dimensions marked based on the Household Goods Quality Labelling Law. The manufacturing tolerances on width and length are included in the tolerances of modular nominal dimensions.

Table 3 Manufacturing tolerance

Unit: mm

Marked dimension		Manufacturing tolerance
Width	Less than 1 000	± 20
	1 000 or over to and excl. 1 500	+ 25 - 20
	1 500 or more	+ 30 - 20
Length		+ 30 - 20
Thickness	Less than 180	± 18
	180 or more	± 20

6.2 Measurement of dimensions The entity dimensions of mattress shall be measured as follows.

6.2.1 Measuring instrument and measuring apparatus

- a) For the measuring instrument, a straight bar of 1 mm or finer in precision shall be used.
- b) For the measuring apparatus, a stand with smooth surface capable of inclining as shown in figure 2.1 shall be used.

6.2.2 The inclination angle when measuring shall be in accordance with table 4.

Table 4 Inclination angle when measuring

Classification	Inclination angle
Spring mattress	60° for length and width, horizontal for thickness.
Urethane foam mattress and foam rubber mattress	30° for length and width, horizontal for thickness.

6.2.3 Measuring method The measuring method of the entity dimensions of mattress shall be as follows:

- a) Mount the mattress on the measuring apparatus and incline it (see figure 2.1).
- b) Indicate the measurement points at approximately central part of the side of mattress (see figure 2.2).
- c) Measure the length of L_1 , and L_3 (see figure 2.3).
- d) Turn the mattress and measure the length L_2 and L_4 .
- e) Measure the width (W) and thickness (T) according to the similar procedure.

f) Obtain the entity dimensions of mattress according to the following formulae.

$$\text{Length} = \frac{L_1 + L_2 + L_3 + L_4}{2} \quad (\text{mm})$$

$$\text{Width} = \frac{W_1 + W_2 + W_3 + W_4}{2} \quad (\text{mm})$$

$$\text{Thickness} = \frac{T_1 + T_2 + T_3 + T_4}{2} \quad (\text{mm})$$

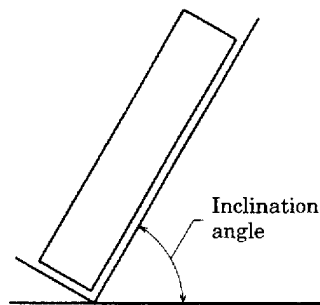


Figure 2.1 Measuring apparatus

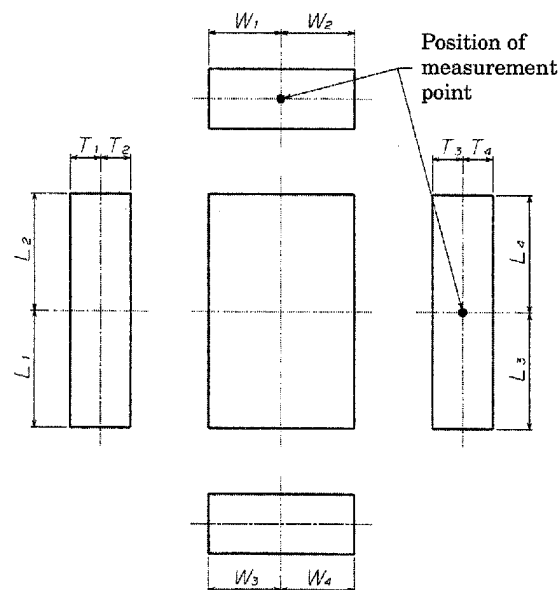


Figure 2.2 Measurement points and measurement parts

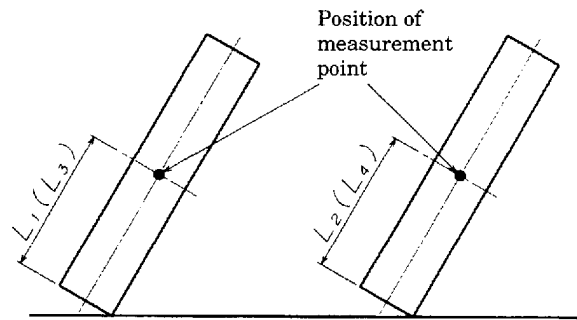


Figure 2.3 Measuring method

7 Materials The materials to be used for beds shall be as follows:

- a) The materials to be used for beds shall conform to the specifications in table 5 or that equal or superior to this.
- b) The woods to be used shall be usually not more than 15 % in moisture content.
- c) Other materials and parts shall have the sufficient strength and quality capable of performing the respective functions.

Table 5 Standards of materials

Materials	Standards
Wood	That shall be grade 2 or better of woods specified in JAS of sawn lumber.
Plywood	That shall be class 2 or better specified in JAS and the amount of formaldehyde emission shall be F☆☆☆☆ or F☆☆☆ specified in JAS .
Wooden material	That shall be specified in JIS A 5905 and the amount of formaldehyde emission shall be F☆☆☆☆ or F☆☆☆. That shall be specified in JIS A 5908 and the amount of formaldehyde emission shall be F☆☆☆☆ or F☆☆☆.
Synthetic resin material	JIS K 6401 JIS K 6903
Metallic material	JIS G 3101 JIS G 3123 JIS G 3131 JIS G 3141 JIS G 3350 JIS G 3444 JIS G 3445 JIS G 3446 JIS G 3466 JIS G 3506 JIS G 3521 JIS G 4305
Adhesives	That shall be F☆☆☆☆ or F☆☆☆ in the amount of formaldehyde emission.
Paints	That shall be F☆☆☆☆ or F☆☆☆ in the amount of formaldehyde emission.

8 Test methods

8.1 Test method of mattress

8.1.1 Durability test of mattress

The durability test of mattress shall be as follows:

Remarks : An example of the bed performance test equipment to be used for durability test is as shown in attached figure 1.

- a) Mount a mattress⁽²⁾ on the test table and place the major axis of pressure plate⁽³⁾ on the measuring position⁽⁴⁾ of mattress parallel to the width direction.

Notes (2) When the bottom has a cushion structure, the bed is mounted on the test table.

- (3) The shape and dimensions of pressure plate shall be in accordance with figure 3.

- (4) The measuring position shall be the central part of mattress when the modular nominal dimension in width direction of mattress is less than 1 300 mm, and be the position of one third in width direction on the central line in longitudinal direction of mattress for not less than 1 300 mm.

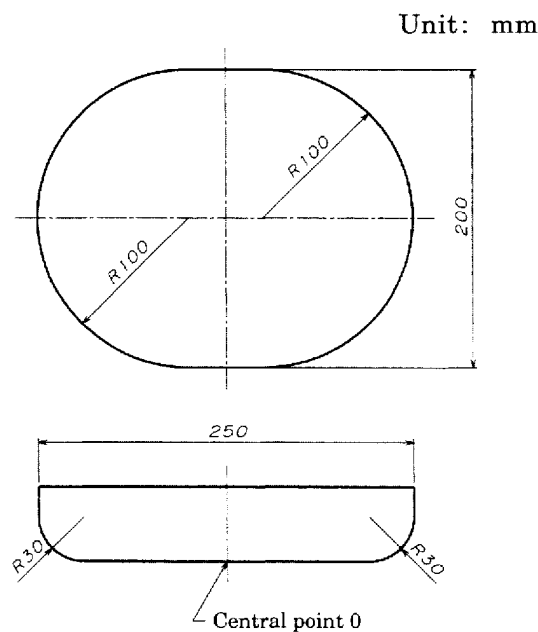


Figure 3 Pressure plate

- b) When the load of 5 N is added to the pressure plate, take the height of the central point on the pressure plate as O_1 , and set the load indicator and deflectometer at 0 N and 0 mm. Then, add pressure up to the load of 1 000 N at the speed of not more than 300 mm/min and record the load-deflection diagram.
- c) Adjust the test equipment so that the pressure plate reciprocates at the distance from the point, O_1 to the point where the load of 1 000 N is added, and move it up and down 200 times at the speed of 160 times/min \pm 10 times/min⁽⁵⁾, then, remove the pressure plate.

- d) Next, take the height of central point on the pressure plate, when the load of 5 N is added, as O_2 . Measure the deflection amount from O_1 to O_2 , and record it as the setting amount, d_1 (mm).

Remarks : The measurement of deflection amount shall be carried out within 30 min after the up-and-down movement.

- e) Set the load indicator and deflectometer respectively at 0 N and 0 mm at the position of O_2 , add pressure from O_1 to the load of 1 000 N in similar to **b**), and record the load-deflection diagram.
- f) After adjusting the test equipment so that the pressure plate reciprocates at the distance from the point, O_1 to the point when the load of 1 000 N is added, move it up and down 10 000 times [including 200 times carried out in **c**)] at the speed of 160 times/min \pm 10 times/min⁽⁵⁾, then, remove the pressure plate.

Note ⁽⁵⁾ In only the case where the change of test speed is required depending on the material characteristics, it may be changed to 60 times/min as the lower limit.

- g) Next, take the height of central point on the pressure plate, when the load of 5 N is added, as O_3 . Add d_1 to the deflection amount from O_2 to O_3 to make the setting amount d_2 (mm) and record it.
- h) Repeat the similar procedures to **e**), **f**), and **g**), add pressure until the integrated times become 80 000 times, and record the load-deflection diagram and the setting amount d_3 (mm). Then, examine the existence of abnormalities of mattress.

8.1.2 Vertical load test From the load-deflection diagram recorded at every 0 time, 200 times, 10 000 times, 80 000 times in **8.1.1**, the increase amount of deflection, D_1 , D_2 are obtained according to the following formula.

$$D1 = \delta_{350} - \delta_{150} \text{ (mm)}$$

$$D2 = \delta_{1000} - \delta_{800} \text{ (mm)}$$

where, δ_{150} : deflection amount (mm) at the time of 150 N load
 δ_{350} : deflection amount (mm) at the time of 350 N load
 δ_{800} : deflection amount (mm) at the time of 800 N load
 δ_{1000} : deflection amount (mm) at the time of 1 000 N load

8.2 Test methods of structure

8.2.1 Strength test of legs The strength test of legs, which are classified into the types a, b and c according to the types of beds as shown in clause **3**, shall be as follows:

- a) **Type of a** Place the structure on a horizontal floor, provide slide-stoppers within the range of 30 mm from the floor and add the load of 441 N horizontally and in reverse direction alternately along the longitudinal direction of structure for 5 s to the central part of head board or foot board at the position of 600 mm in height from the floor (the most upper end when the height is short). After repeating

these operations 10 times, respectively, examine the existence of shaking and abnormal connection at the fixing part of head board or foot board.

Remarks : When the structure floats while testing or the occasion requires because of other causes, auxiliary load may be mounted.

- b) **Type of b** Turn the structure upside down, fix it horizontally, and add the load of 294 N to each leg horizontally and in reverse direction alternately for 5 s along the longitudinal direction and traverse direction of structure. After repeating these operations 10 times, respectively, examine the existence of shaking and abnormal connection at legs and the fixing part of legs. The position of adding load shall be within the range of 30 mm from the edge of legs.
- c) **Type of c** For the type other than a and b, carry out by applying correspondingly either type of a or b.

8.2.2 Strength test of side frame Put the fulcrum on the position⁽⁶⁾ of 50 mm from the both ends of side frame, add pressure gently up to 3 000 N as applying a bearing plate of 200 mm in length to the central part, and holding it for 1 min as adding pressure (see figure 4).

After removing the pressure, examine the existence of the looseness and disconnection of parts, the fissure and crack of materials and the like.

Note (6) When the fulcrum can not be placed at the position of 50 mm from the both sides of side frame, it may be placed at the position within 100 mm at most.

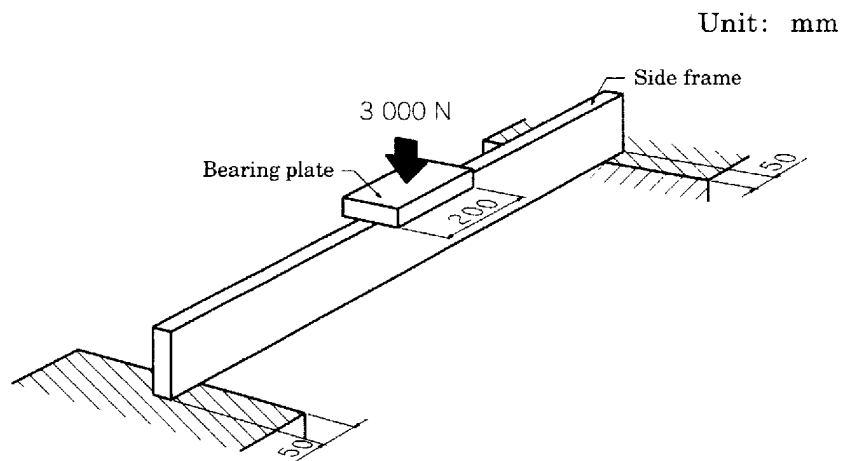


Figure 4 Strength test of side frame

8.2.3 Strength test of floor board The strength test of floor board shall be carried out by using the single body of floor board for the beds of type with floor board. Add pressure up to 2 000 N by applying the side of 500 mm of pressure plate of 300 mm × 500 mm to the central part of floor board in longitudinal direction of bed under the condition supporting at 20 mm of the both ends of floor board, and hold it for 1 min as adding pressure (see figure 5). When adding pressure, consider so as to loading uniformly. After removing the pressure, examine the existence of fissure, crack, etc. of materials.

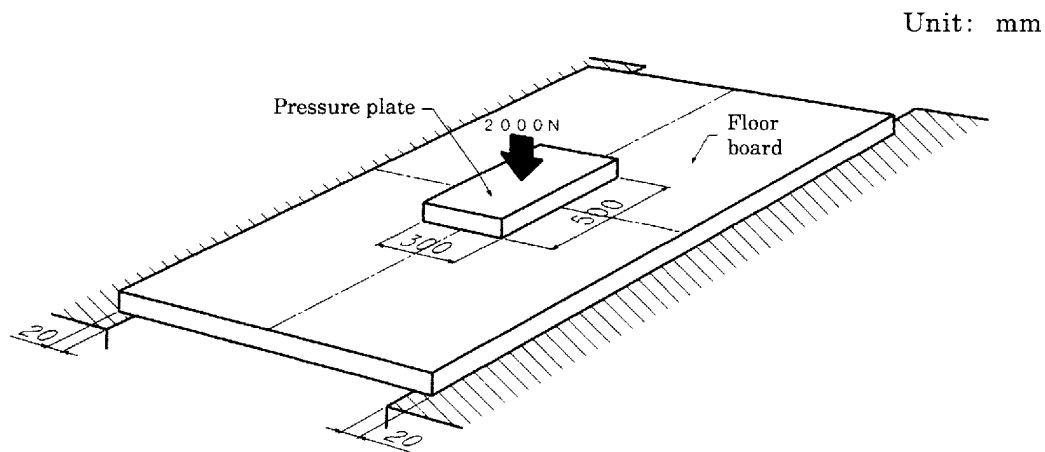


Figure 5 Strength test of floor board

8.2.4 Strength test of drawer part The strength test of drawer part shall be as follows:

- a) **Durability test of drawers** Fix the base so that the bed does not move on the floor during the durability test. For the drawer, place the weight of 0.3 kg per 1 L of inside capacity of drawer. Provided that the upper limit of weight per one drawer shall be 7.5 kg.

Open and close the drawer lightly only 5 000 times without supporting vertically. Draw out the drawer from the completely closed condition to one third of its inside measurement of length (depth), however, to the position where at least 100 mm in length remains in the inside of drawer (see figure 6). When the stopper for preventing falling-out is equipped in the drawer, open the drawer fully so as not to add excessive force to the stopper. Open and close the drawer at the rate of approximately 12 times/min.

Add the force to a handle or to the middle part of two handles, if exist. For the drawer without a handle, add the force at the same height as runners.

Before and after the test, examine the appearance and function of the drawer.

- b) **Test for disconnection of bottom plate of drawer** Insert the drawer into runners or hang it by the similar method to it, and put the weight of 0.3 kg per 1 L in the inside capacity of drawer. Provided that the upper limit of weight per one drawer shall be 7.5 kg.

Add the force of 30 N through the bearing plate⁽⁷⁾ for load to the centre of the front surface and rear surface of drawer at the height of approximately 25 mm from the bottom of drawer (see figure 7). Add the force 10 times, and maintain at least for 10 s every time.

Note ⁽⁷⁾ The bearing plate for load shall be the rigid disc of 100 mm in diameter (50 mm when the inside space of drawer is limited) with flat surface and the edge is rounded to 12 mm in radius.

Before and after the test, examine the appearance and function of the drawer.

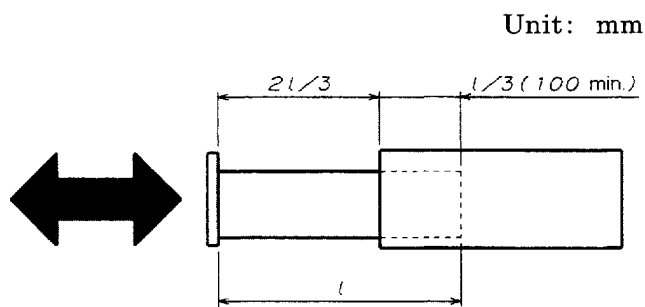


Figure 6 Durability test of drawer

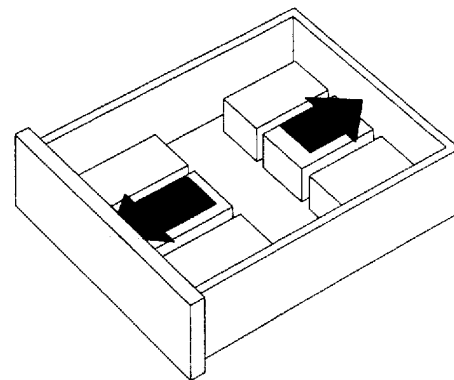


Figure 7 Test of disconnection of bottom plate of drawer

8.2.5 Tensile strength test of outside fabrics The tensile strength test of outside fabrics shall be carried out according to method A of **JIS L 1096** for general woven fabrics and the strip method of **JIS L 1018** for knitted fabrics and the maximum load (N) up to break shall be obtained.

8.2.6 Paint film test The paint film test shall be as follows:

- a) **Test piece** The test piece to be used for paint film test shall be taken from the specimen so as to be approximately 150 mm in length and approximately 50 mm in width for wooden series and steel plate, and approximately 150 mm in length as the original form for steel pipe. Provided that the test piece manufactured under the same production conditions as the specimen may be used.
- b) **Paint film adherence test of wooden part** Draw each 11 scratch lines intersecting at right angles with each other at intervals of 2 mm so as to reach the wooden substrate on the test piece by using a sharp blade to make 100 grids of 2 mm × 2 mm. After sticking a pressure sensitive adhesive tape specified in **JIS Z 1522** on it, immediately peel off and examine the existence of peeling of paint film.
- c) **Paint film adherence test of metallic part** Draw each 11 scratch lines intersecting at right angles with each other at intervals of 1 mm so as to reach the metallic substrate on the test piece by using a sharp blade to make 100 grids of 1 mm × 1 mm. After sticking a pressure sensitive adhesive tape specified in **JIS Z 1522** on it, immediately peel off and examine the existence of peeling of paint film.
- d) **Rust prevention test of painted metallic part** Make flaws at each diagonal line so as to reach the metallic substrate on the test piece by using a sharp blade, and immerse the flawed test piece by about half into a beaker containing 3 % brine (15 °C to 25 °C) by about 70 mm in depth as shown in figure 8, after lapse of time of 100 h, examine the existence of blistering at outside of 3 mm at both sides of flaws. Draw up it, wash it gently with water, thereafter dry it and examine the existence of rust at the outside of 3 mm on both sides of flaws.

Unit: mm

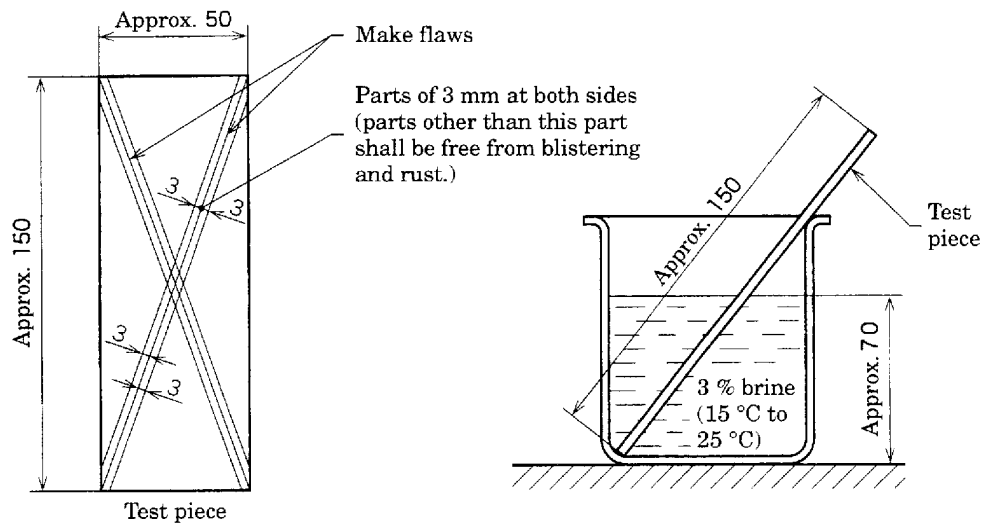


Figure 8 Rust prevention test of painted metallic part

9 Inspection The inspection shall be carried out on quality, dimensions, structure and processing according to the reasonable inspection plan and conform to the specifications in clauses 5 and 6.

10 Record The following information shall be recorded as the record of inspection.

- a) Standard number
- b) Sampling inspection plan adopted
- c) Pressurizing speed in durability test, other inspection conditions to be specially mentioned
- d) Inspection results

11 Marking The following information shall be marked on the beds.

- a) Dimensions Modular nominal dimensions (width × length) given to the reference plane of mattress or its abbreviation
- b) Name of manufacturer or its abbreviation
- c) Year of manufacture or its abbreviation
- d) Grade marking of the amount of formaldehyde emission The grade of the amount of formaldehyde emission of plywood, wooden materials, adhesives and paints used for materials shall be marked.

When F☆☆☆☆ and F☆☆☆ are mixed depending on the materials used, the marking grade shall be marked as F☆☆☆☆.

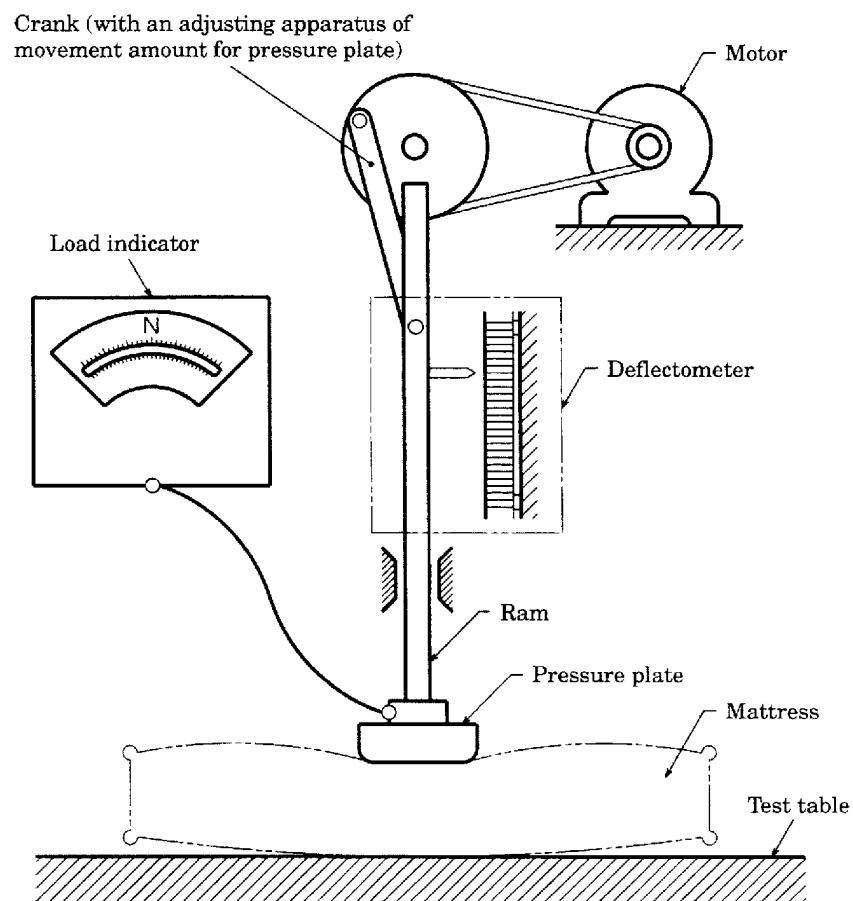
Example (1) Nominal dimensions 09-19

(2) Name of manufacturer ○○○○

- (3) Year of manufacture 2004
- (4) Grade marking of the amount of formaldehyde emission (frame part)
F☆☆☆☆

12 Instruction manual The beds shall be appended with following instruction manual.

- a) Precaution on assembly
- b) Precautions in use
- c) Other necessary information



Attached Figure 1 Example of bed performance test equipment

Attached Table 1 Normative references

- JIS A 5905 *Fiberboards*
JIS A 5908 *Particleboards*
JIS G 3101 *Rolled steels for general structure*
JIS G 3123 *Cold finished carbon and alloy steel bars*
JIS G 3131 *Hot-rolled mild steel plates, sheets and strip*
JIS G 3141 *Cold-reduced carbon steel sheets and strip*
JIS G 3350 *Light gauge steels for general structure*
JIS G 3444 *Carbon steel tubes for general structural purposes*
JIS G 3445 *Carbon steel tubes for machine structural purposes*
JIS G 3446 *Stainless steel pipes for machine and structural purposes*
JIS G 3466 *Carbon steel square pipes for general structural purposes*
JIS G 3506 *High carbon steel wire rods*
JIS G 3521 *Hard drawn steel wires*
JIS G 4305 *Cold rolled stainless steel plates, sheets and strip*
JIS K 6401 *Flexible polyurethane foam for cushion*
JIS K 6903 *Laminated thermosetting high-pressure decorative sheets*
JIS L 1018 *Test methods for knitted fabrics*
JIS L 1096 *Testing methods for woven fabrics*
JIS Z 1522 *Pressure sensitive adhesive cellophane tapes*
JAS *Plywood*
JAS *Softwood sawn lumber for fixtures, softwood sawn lumber for sheathing, hardwood sawn lumber, rough square board with wane*

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