

KES

Fabric Material for Automobiles

KES B-P003

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1. Scope of Application

This standard specifies primarily to automobile sheets, interior furnishing fabrics and woven textile materials that are used for floor carpets etc. (Hereinafter referred to as "Fabric").

Remark: These standards are also applicable to similar types of non-woven fabric materials used for the same purpose (For example felt-type carpets).

2. Kind

The kinds of fabric are classified according to the kinds of manufacturing processes and material quality, kinds and their combinations as indicated in Table 1.

Table 1

Kind	Kind of manufacturing process and codes		Kinds of material quality and codes		Remarks
Kind 1	Covering fabric	S	Sheep wool	W	
			Chemical fabric	K	
			Mixed fabric	M	
Kind 2	Woven fabric for covering	A	Chemical fabric	K	
			Mixed fabric	M	
Kind 3	Moquette for covering	W	Sheep wool	W	
			Chemical fabric	K	
			Mixed fabric	M	
Kind 4	Transplanted carpet	U	Chemical fabric	K	
			Mixed fabric	M	
Kind 5	Felt-type carpet	M	Chemical fabric	K	Non-woven fabric
			Mixed fabric	M	

3. Composition of Material Codes

The composition of fabric material codes shall be indicated as follows.

(1) When it is not necessary to specially indicate general formation.

F - S - W - S - Using place⁽¹⁾

Kind of material quality

Kind of manufacturing process

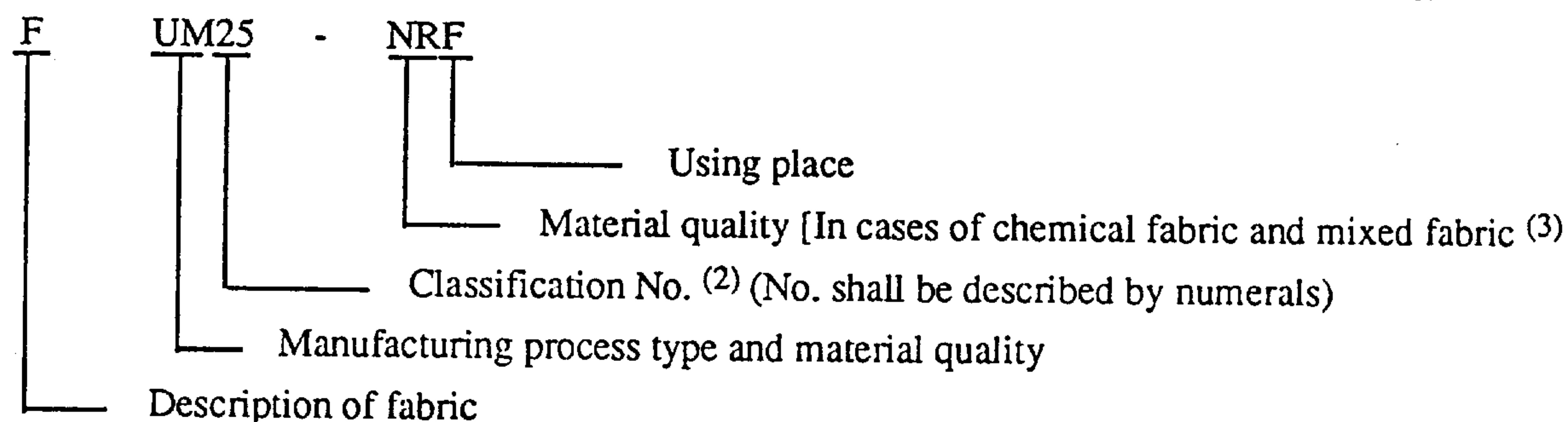
Description of fabric

Note ⁽¹⁾ Using place shall be described with following English characters.

F: Floor part S: Seat part T: Interior furnishing (Trim) part

Remark: General formation shall conform to the agreements between the parties concerned.

(2) Indications of each composition including general formation shall be indicated as follows.



Note (2) Classification No. shall be affixed, depending on general formation.

(3) In cases of chemical fabric and mixed fabric, the descriptions of detailed material quality shall, in principle, be made by affixing the initial letter (English letter) of the material quality names.

A: Acryl E: Polyester N: Nylon

P: Poly propylene R: Rayon

NA: Mixed fabrics of nylon and acryl (hereinafter, 2 letter composition shows mixed fabrics)

4. Quality

Each type of fabric shall be tested according to item 9 and shall conform to the standards of parts 1-3. However, alteration of standard values, additions or omissions of test items depending on the usage classification of each type of fabric and quality requirements may be indicated separately. (Refer to item 12 describing methods)

5. Physical Appearance

There shall not be any defects that may be detrimental to usage as color stains, pollution, scratches, thread cuts etc. on each type of fabric. And each shall not have any different items with each sample. Furthermore, the surface conditions such as fabric colors, printed patterns, gloss etc. shall be agreed to between the parties concerned.

6. Material and Method of Manufacturing

Fabric is manufactured by transplanting fiber (Natural, sythesis) to a sheet, or adhering fiber to foam. Furthermore, colors, patterns, gloss and incombustibility treatment shall be agreed separately.

7. Selection Methods of Test Pieces

Test pieces shall be selected, in principle, from the material lot of uniform quality which has been made public in the length of 1m. And adjust the conditions to expose them to normal conditions in the test place for 24 hours.

8. Treatment Methods of Test Pieces

Take each piece out of the fabric portion at random in which the threads lengthwise and breadthwise are

different from each other, except for the portions 50mm from both fringes of the fabric.

9. Testing Method

9.1 Standard Conditions of the Test Place

The standard conditions of test room shall be the standard temperature and humidity conditions of KS A 0006 (Standard atmospheric conditions for testing); that is to say, temperature of $20 \pm 2^{\circ}\text{C}$ and relative humidity of $65 \pm 5\%$. (Hereinafter referred to as "standard conditions") and the testing date, temperature and humidity shall be indicated in the report of test results.

9.2 Adjustment Method of Test Result Values

The values of test results shall be adjusted to one place down from the specified value counting $1/5$ and higher fractions as units according to KES A-A003 (Adjustment methods of values).

9.3 Measurements of Thickness

The thickness shall be measured at 5 places or more, at random, with a compressing load of $50\text{gf}/\text{cm}^2$, by means of using a thickness gauge attached to a pressure plate of 10mm in diameter, according to KES Q-B229 (Checking standards of dial gauge measurements of up to 0.01mm). The average value of measurements shall be calculated down to one decimal place indicated in mm.

9.4 Measurements of Pile Length

For the felt type fabric, the pile length shall be measured by the following methods.

- (1) In case of a cut pile, take a test piece from the original fabric, insert the scale in between the piles and keep the scale upright to the foam surface. Then read the length from the foam surface to the upper end of pile up to 0.5mm at the least measuring 10 places of different portions, calculate the average value down to one decimal place and have it indicated in mm.

9.5 Density Measurements

- (1) Method A: Place each test piece on a Table using the methods primarily applied to density measurements of fabric for covering, and remove tension by natural handling only then count the number of threads lengthwise and breadthwise contained amid each 100mm distance using magnifying glass. Measuring in 3 different 100mm places, calculate the average value, rounded-off to the nearest integral number integer and indicate the unit of number of threads/100mm.
- (2) Method B: This method is primarily applied to density measurements of felt types of fabric (Including non-woven fabric). Measurements shall be made in the same way as in method A - The transplanted number of threads amid a 127mm distance breadthwise shall be indicated by a gauge (number of threads/5in) and the number of threads amid 100mm distance lengthwise shall be indicated by a stitch (number of threads/100mm).

9.6 Mass Measurements

3 sheets of the test piece 250mm of breadth and 250mm of length shall be measured to the unit of 1mg and the average value calculated of the 3 sheets, rounded off to the nearest integral number. The mass shall be calculated by multiplying the calculated average value by 16 and shall be

indicated in g/cm³.

9.7 Tensile Strength and Elongation

Prepare 3 sheets each for the test piece breadthwise and lengthwise dimensions of 50mm in breadth and 250mm in length mark of 100mm in length in the middle breathwise and lengthwise. This test piece shall be installed on the tension tester ⁽¹⁾. Pulling at chuck interval of 150mm and at a rate of 200mm/min. calculate the maximum load and the length of each marked line. Tensile strength shall be calculated by the unit of maximum load kgf[N]/50mm, and the elongation shall be calculated by the following equation.

$$\text{Elongation} = \frac{L1 - L0}{L0} \times 100$$

Where, L0: Length of marked line before test

L1: Length of marked line at maximum load

These test results for 3 sheets of the test piece each for breadthwise and lengthwise measurements shall be indicated by average values for each. Furthermore, when the test piece is pulled apart at the places other than the marked line, that value of measurement shall not apply, and test shall be repeated.

Note ⁽⁴⁾ A pendulum type tension tester shall be used, and when using other types, the type and model shall be recorded.

9.8 Static Load Elongation and Residual Strain

Pre test pieces 50mm of breadth and 300mm of length for 5 sheets each lengthwise and breathwise, and install them on a malthens fatigue tester, and pull with a load of 20 kgf for 5 minutes at the chuck interval, distance of 150mm and making line, length of 100mm. At this time, measure the elongation to the unit of 1mm. Therafter, removing the load and dismounting it from the tester, leave the test piece alone for 10 min. on a flat table and then measure the residual elongation up to the unit of 1mm. The elongation and residual strain ratio are calculated by the following equation.

$$\text{Static load elongation (\%)} = L_1 - 100$$

$$\text{Residual strain ratio (\%)} = L_2 - 100$$

Where, L1: The length of marked line 5min. after load is hung (mm)

L2: The length of marked line after removing load and being left alone for 10 min.

These test results for the 5 sheets of the test pieces each for breadthwise and lengthwise shall be indicated by the integral number of the average value.

9.9 Compression Elasticity

Prepare 3 sheets as test pieces of 50mm of breadth and 50mm of length, and install them on the Tabe of the compression of the initial load of 200gf [1.96N]. Next, compressing with a load of 350gf measure their thickness. Therafter, remove the load and let the test pieces alone for 30 minites, of the initial load of 200gf. Moreover the thickness shall be read up to the nearest unit of 0.1mm using a micrometer that is adjusted to the compression scale of 10cm² in area. The

compression elastic percentage shall be calculated by the following equation.

$$\text{Compression elastic percentage} = \frac{t_2 - t_1}{t_0 - t_1} \times 100$$

Where, t_0 : Thickness under the initial load

t_1 : Thickness under the measuring load

t_2 : Thickness under the 2nd initial load after measurement

These test results shall be indicated by the average value for the 3 sheets as the test pieces.

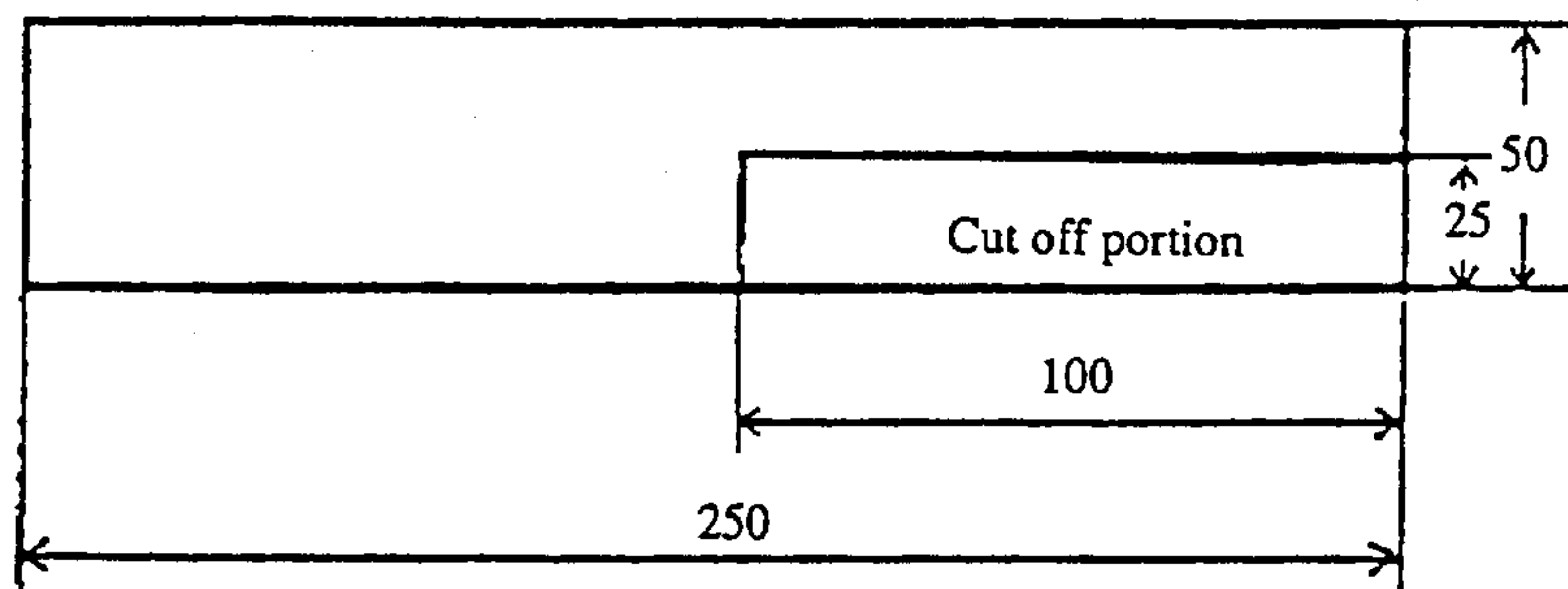
Remark (5): The pile recovery tester shall be utilized as the tester, and in case other compression testers are used, the types and models shall be recorded.

9.10 Tearing Strength

Prepare the test pieces indicated in Figure 1. 5 sheets each: breadth of 50mm and length of 100mm. Install the test pieces on a tension tester (specified in P.7) and pull at the chuck interval distance of 130mm, and with the speed rate of 200mm/min; then secure the maximum load. The tearing strength shall be indicated with the maximum load, at which the test pieces are torn off and damaged in terms of kgf[N]. These test results shall be represented by the average value of the measurements of the 5 sheets as the test pieces each for breadth and length respectively.

Figure 1

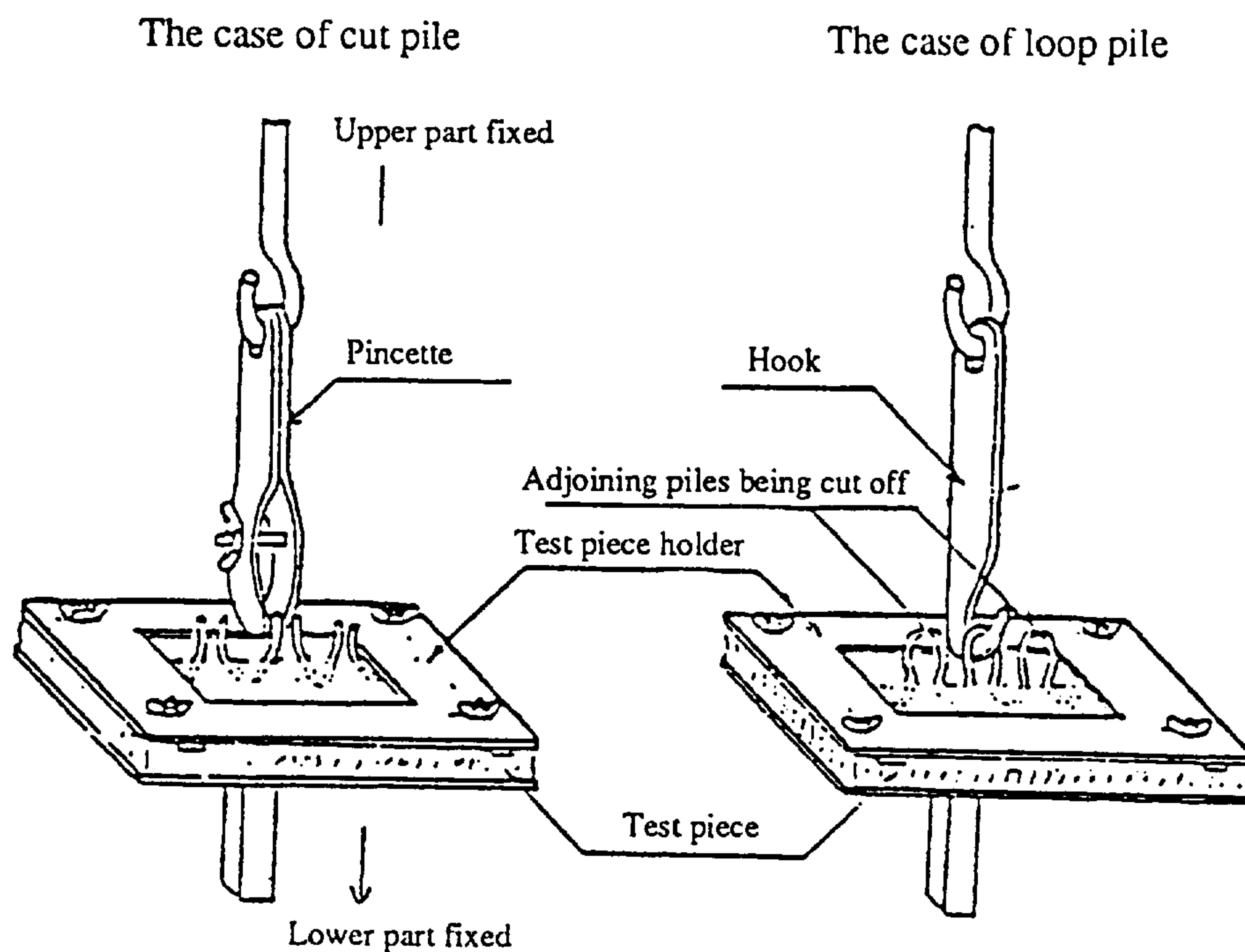
Unit: mm



9.11 Pile Omission Strength

Prepare 5 sheets as the test pieces each with dimensions of 55mm of breadth and 90mm of length and install them on a tension tester (specified in 9.7) by means of a jig as indicated in Figure 2. Then secure the maximum load, pulling at the speed rate of 300mm/min. The pile omission strength shall be indicated with the maximum load at which the piles are being pulled out in terms of kgf[N]. These test results shall be represented by the average values of the 5 sheets of the test pieces.

Figure 2



9.12 Strength of Seam

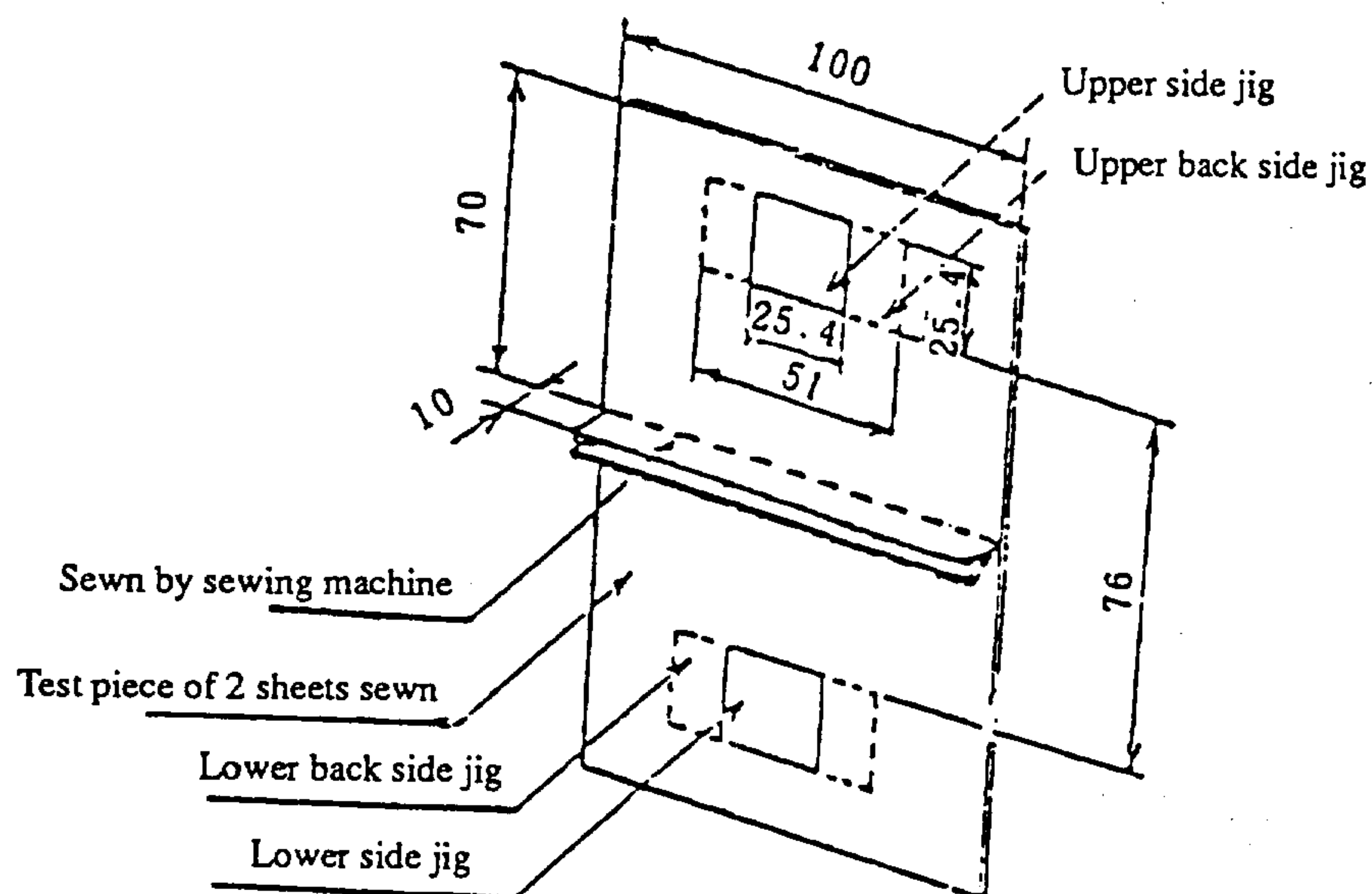
Prepare 3 sets each of test pieces lengthwise and breadthwise, making 2 sheets as 1 set with the dimensions of 100mm in breadth and 80mm in length; and double up 2 sheets of each set to be the two surfaces facing each other. Then sew the longer bottom side portion 10mm away from the fringe with a sewing machine; thus test pieces are ready for the test. The test pieces shall be installed on a tension tester (specified in 9.7) in the conditions as indicated in Figure 3, and the maximum load shall be secured by pulling at the speed rate of 200mm/min. The seam strength shall be indicated with the maximum load by which the fabric has been torn off at the seams in terms of kgf[N]. These test results shall be represented by the average value of 3 sets each for measurements of breadth and length respectively.

Note (6) Unless otherwise indicated, the thread of the sewing machine shall be #20 nylon thread and the pitch of the seam shall be 5mm.

Remark: The classifications of breadth and length of the test pieces shall be such that the seam that are sewn in a rectangular direction against the breadthwise thread is to be considered the breadth, and the other direction is to be the length.

Figure 3

Unit: mm



9.13 Albrasion Resistance

(1) Method A

Cut 1 sheet of the test piece cut from a lengthwise section of the fabric with the dimensions 30mm in breadth and 250mm in length and install it on the testing table of crane trembled type friction tester specified in (1), 4 of KS K 0650 (Test methods for color fastness to rubbing: crock meter method) so as to contact the friction rod on which wet cotton canvas (7) No. 10 of KS K 1450 (Cotton canvas fabrics) is attached. Then, the 3,000 frequencies of reciprocating friction shall be made by a load of 500 gf and at the reciprocating speed rate of 30 frequencies/min, amid 100mm of the test piece. Thereafter, making a comparison of the abrasion degree of the test piece surface with the standard sample which was agreed to between the parties concerned and by visual inspection judgement shall be made according to Table 2. Observation shall be made for the range of 80mm in the midst of test piece.

Note (7) Renew cotton canvas fabric for each test piece and it shall not be reused.

(8) Standard samples shall be renewed every 6 months.

Table 2

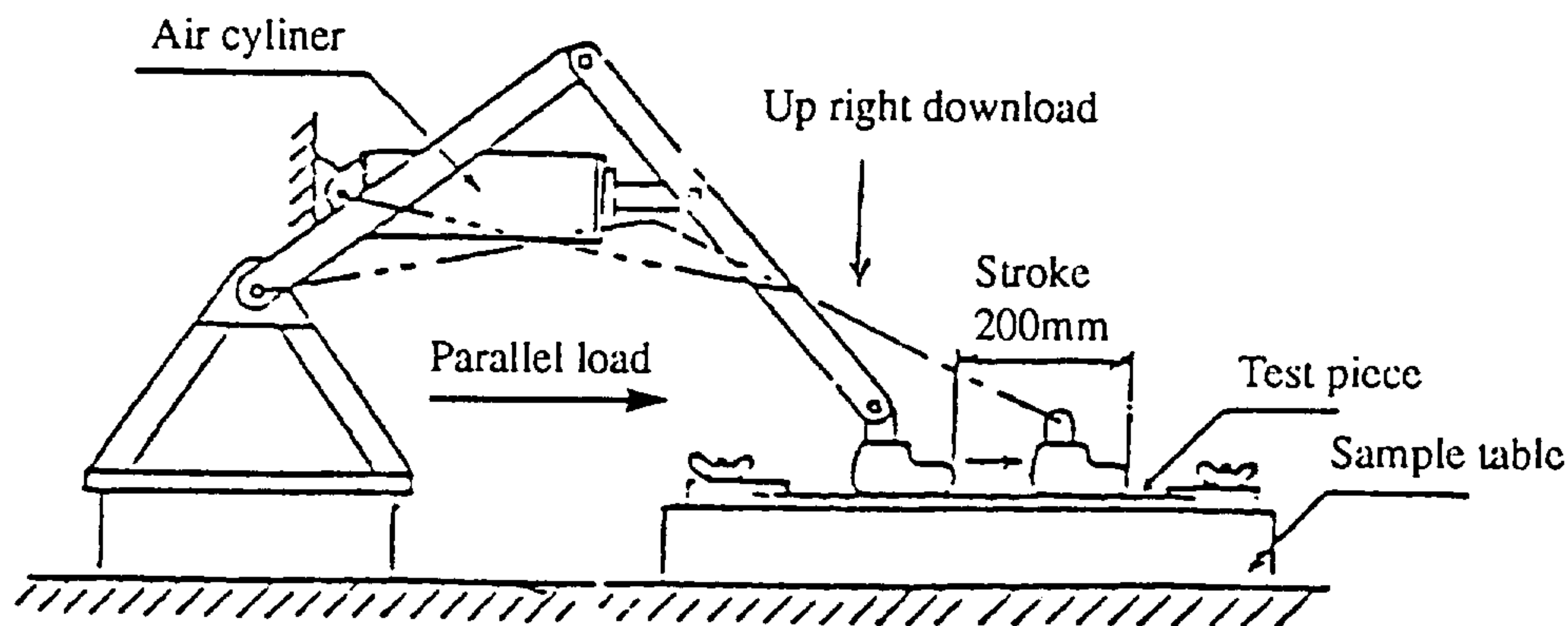
Class	Judgement standards
1	The variation is severe
2	The variation is a somewhat severe
3	The variation is clearly observed
4	The variation is difficult to observe
5	The variation can not be observed at all

(2) Method B

Prepare one sheet of the test piece in the dimensions of 30mm in breadth and 500mm in length, install and fix it on a foot-shaped. Abrasion tester as indicated in Figure 4, removing any unnatural tension and flattening any creases. A 25 kgf[245N] load to the direction of upright down and a 10kgf[98N] load in a parallel direction shall be added on the foot-shaped mold (9) and operate the tester in a parallel direction with 200mm strokes and 20-25 c.p.m operation cycles. After the operation of 1,000 and 30,000 frequencies respectively, the abrasion degree of the test piece shall be observed visually inspected, and the abrasion resistance shall be judged conforming to Table 2.

Note (9) The 26cm long foot-shaped mold is made of leather or plastics.

Figure 4

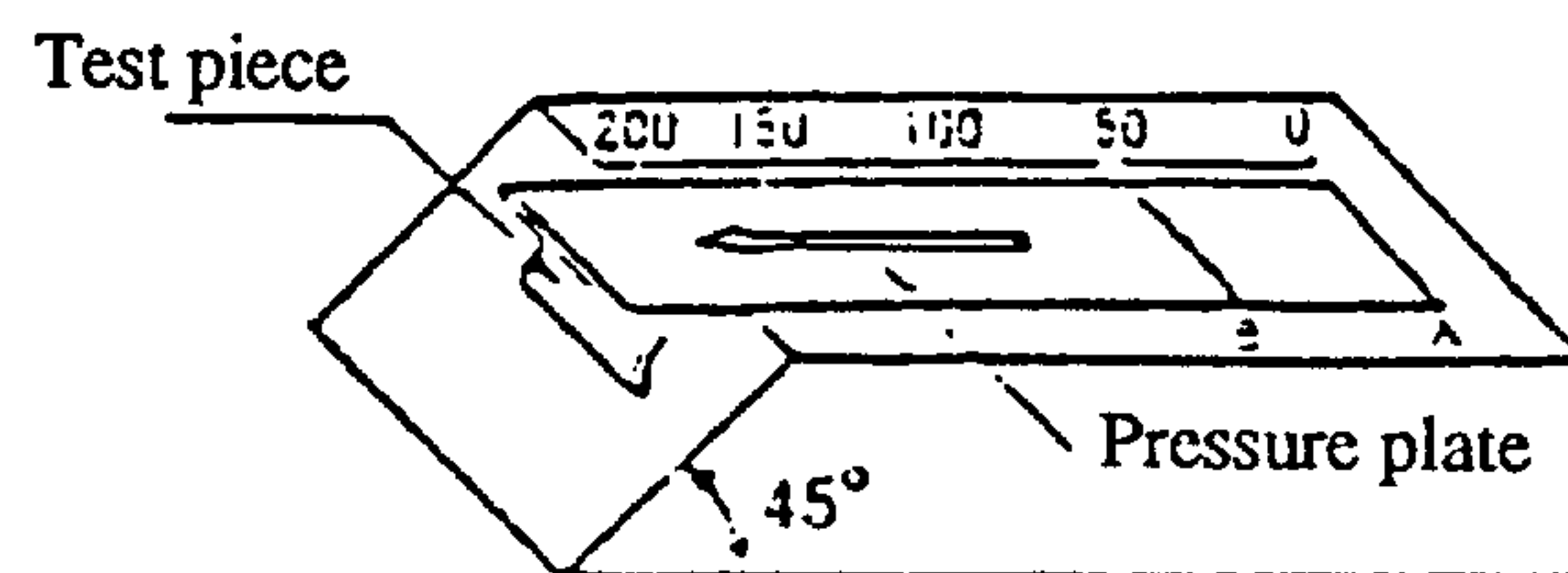


9.14 Flex-Rigidity

Prepare 5 sheets each of test pieces, breadthwise and lengthwise dimensions of 25mm in breadth and 200mm in length, and install each on the flat and parallel surface of the scale which has an oblique plane with an angle of 45° as indicated in Figure 5, with the narrow side endline coinciding with the baseline (A). Then, pressing each test piece with a pressure plate of the same size as the test piece, move each toward the oblique plane at the speed rate of about 10mm/sec and when the end of the test piece contacts the oblique plane, measure the location of the other end (B) using the scale. The flex-rigidity shall be indicated by the average value of the moving distance [B point measurement (mm)] for the 3 sheets (each breadthwise and lengthwise : on both the surface and on the backside).

Figure 5

Unit: mm



9.15 Light Resistance Properties

Utilizing test pieces prepared with the dimensions of 60mm in breadth, and 200mm in length for A, B, D methods of the test condition classifications in Table 3, and 75 x 150mm dimensions for the C method, the installation shall be made according to the manner shown in Figures 6.1-6.4, and in the tester as specified by 3.8 the ultraviolet ray carbon arc-type light lamp light resistance tester of JIS L 0842 (Test methods for color fastness to carbon arc lamp light).

And, conforming to Table 3.1 (Test condition classifications), and making the choices of classification codes which conform to the applicable usage of test pieces, the test shall be implemented in the conditions indicated in Table 3.2 (Test conditions). After the test, take the test pieces out and put them in a paper bag of which the inside is painted with black paint, then leave them alone at room temperatures for 12 hours or more. Thereafter, compare the test pieces with non-investigation part by visual observation for the degree of color change and fading. The judgements shall be made in comparison with KS K 0911 (Gray scale for assessing changes in colour) according to Table 3.3 (Judgement standards for color changes and fading). Moreover, for the C method in the classification of Table 3.1 (Test condition classifications); after completion of the after mentioned test, the tests of (1), (2) under 400 hours of lighting time shall be implemented.

(1) Fabric aging

After the test, stick a pieces of transparent adhesive tape (to be agreed to between the parties) on the sample surface. And, removing the 2 pieces of tape quickly, check if there are any worn fabric fibers stuck on the adhesive side of each piece of tape and make judgements after comparing with the specified sample.

(2) Hardening

At the standard temperature conditions of the test room of 9.1, bend the test piece breadthwise 180°C with the surface inside and then repeat the procedure with the backside inside. Thereafter, check the degree of light dispersion at each bent portion checking for any creases that may have been made, then make judgements after comparing the test piece with the specified sample.

Remark: However, this hardening test is required when non-woven fabric is being used as single parts or when flexible foreign matter is being used that has the possibility of bending during usage.

Table 3.1. Test condition classification

Usage Kind	SEAT	DOOR TRIM QTR TRIM	TOPCEILING SUNVISOR	Rr.P.K.G TRUNK MAT (10)	FLOOR MAT TRUNK MAT TRUNK END/SIDE TRIM (11)
Kind 1	Method A	Method A	—	—	—
Kind 2	Method A	Method A	Method B	—	—
Kind 3	Method A	Method A	—	—	—
Kind 4	—	Method D	—	—	Method D
Kind 5	—	Method D	—	Method C	Method D

Note (10) Meant to be the trunk mat that receives sun light directly.

(11) Meant to be the trunk mat that receives no direct sun light.

Table 3.2. Test condition

Classification	Test condition	
Method A	Backside attachment of B.P.T $83 \pm 3^{\circ}\text{C}$, thickness 10mm urethane foam (Density 0.020-0.24 ether type)	Lighting time 250 hrs
Method B	Backside attachment of B.P.T $63 \pm 3^{\circ}\text{C}$, thickness 10mm urethane foam (Density 0.020-0.024 ether type)	Lighting time 250 hrs
Method °C	Backside attachment of B.P.T $83 \pm 3^{\circ}\text{C}$, thickness 2.5mm hard, board (However, color change and fading degree shall be judged by visual inspection after 250 hrs of elapsed time)	Lighting time 400 hrs
Method D	B.P.T $63 \pm 3^{\circ}\text{C}$, no backside attachment	Lighting time 250 hrs

Remark: B.P.T is the abbreviation of black panel temperature.