

JIS

JAPANESE INDUSTRIAL STANDARD

**Testing methods for several
characteristics of textile floor
coverings**

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JAPANESE INDUSTRIAL STANDARD
Testing methods for several characteristics of
textile floor coverings

J I S
L 1023-1992

1. Scope

This Japanese Industrial Standard specifies the testing methods for drawing out strength of pile yarn, exfoliation strength of backing material, stain and cleaning, abrasion resistance, and electrostatic property of textile floor coverings⁽¹⁾ (hereafter referred to as the "coverings").

Note ⁽¹⁾ The coverings mean the products having textile surface which covers floors.

Remarks 1. The applicable standards of this standard are as follows.

- JIS K 1462 Iron (III) oxide for ferrite
- JIS K 5107 Carbon black (pigment)
- JIS K 8330 Diatomaceous earth
- JIS K 8746 Kaolin
- JIS L 1021 Testing methods for construction of textile floor coverings
- JIS L 1022 Testing methods for loss of thickness by loading of textile floor coverings
- JIS L 1096 Testing methods for woven fabrics
- JIS R 5210 Portland cement

2. The international standard corresponding to this standard is as follows.

- ISO 4919-1978 Textile floor coverings—Determination of tuft withdrawal force.

3. The unit and numerical values given in { } in this standard are based on the traditional units, and are appended for informative reference.

2. Definitions

The main terms used in this standard are defined in JIS L 1021, 2. (Definitions).

3. Sampling and preparation of specimen and test piece

As specified in JIS L 1021, 3. (Sampling and preparation of specimen and test piece).

4. Test condition

As specified in JIS L 1021, 4. (Test condition).

5. Kinds of tests

The kinds of tests are specified as follows.

- (1) Drawing out strength of pile yarn
- (2) Exfoliation strength of backing material
- (3) Staining and cleaning tests
- (4) Abrasion resistance
- (5) Electrostatic property

6. Drawing out strength of pile yarn

The drawing out strength of pile yarn shall be measured as follows.

(1) Apparatus The apparatus for the test shall be specified as follows.

- (a) Tensile tester To have an accuracy of $\pm 5 \%$.
- (b) Test piece holder To fix a test piece horizontally.
- (c) Cut pile chuck
- (d) Loop pile hook

(2) Test piece According to JIS L 1021, 3. (Sampling and preparation of specimen and test piece), take five or more test pieces, measuring 100×100 mm each.

(3) Operation

- (3.1) For cut pile Nip an end of pile yarn with the cut pile chuck. Use the tensile tester, and pull it at a speed of 100 mm/min. Measure the maximum load (N{kgf}) when the pile yarn comes off. If the adjacent pile yarn or a part of pile yarn only is pulled, the measurement result shall be ignored.

When the specimen is a tufted carpet, nip the tips of adjacent pile yarns at the same time. Use the tensile tester, and pull it at a speed of 100 mm/min. Measure the maximum load (N{kgf}) when the pile yarn comes off. In this case, it shall be noted in the test report that two pieces of pile yarn were pulled.

- (3.2) For loop pile The tip of pile yarn shall be hooked by the loop pile hook. Pull it at a speed of 100 mm/min. Measure the load (N{kgf}) when either or both of adjacent pile yarn slip.

When this procedure is difficult, it is allowed to cut tips of two pile yarns adjacent to the pile yarn to be pulled, and measure the maximum load (N{kgf}) when the pile yarn comes off. In this case, it shall be noted in the test report that the adjacent pile yarns were cut.

For both cases of (3.1) and (3.2), if a yarn is the same composition as the tip of test piece, or the same as the yarn pulled previously, or if a yarn is within a range of 25 mm, such a yarn shall not be pulled. Twenty or more pieces of yarn shall be tested. Almost equal number of yarn shall be tested from each test piece taken. If a pile yarn snaps during the test, it may be counted as effective number of tests, but it shall be excluded from calculation.

(4) Calculation The drawing out strength of pile yarn is expressed by the mean value of measured load (N{kgf}) to the second decimal place.

Furthermore, the test report shall accompany the coefficient of variation⁽²⁾.

Note (2) The coefficient of variation is calculated by the following equation.

$$\text{Coefficient of variation (\%)} = \frac{\sigma}{\bar{x}} \times 100$$

where, σ : standard deviation

$\bar{x}$: mean value

(5) Test result The test result shall contain the following items.

(5.1) Kind of test

(5.2) Drawing out strength (N{kgf}) of pile yarn. However, when the specimen is cut piles, state whether one piece of pile yarn was pulled or two pieces of pile yarn were pulled. When the specimen is loop piles, state whether the two adjacent pile yarn were cut or not.

(5.3) Coefficient of variation

7. Exfoliation strength of backing material

The exfoliation strength of backing material of tufted carpet having the backing material (secondary foundation fabric) shall be measured as follows.

(1) Apparatus The tensile tester as specified in 6. (1) (a).

(2) Test piece According to JIS L 1021, 3. (Sampling and preparation of specimen and test piece), take five test pieces, each size 50 × 150 mm, separately along the warpwise and weftwise directions. Peel the backing material by 50 mm length from the lengthwise end.

(3) Operation Clamp the backing material peeled according to (2) at one claw of the pulling tester. Clamp the foundation fabric at another claw of the pulling tester. Pull them at a speed of 100 mm/min, and peel by 50 mm length.

When a tensile tester of constant-speed tension type is used, measure the maximum load (N{kgf}) required to peel each test piece. When a tensile tester has an automatic recorder, take 3 pieces respectively in a descending order of size from the maximum value and in an ascending order of size from the minimum value, required for peeling each test piece. Their mean value of 6 pieces in total is the exfoliation strength of that test piece.

(4) Calculation The exfoliation strength of backing material is presented by the mean value of five test pieces each, for the warpwise and weftwise directions, to the first decimal place.

(5) Test result The test result shall contain the following items.

(a) Kind of test

(b) Kind of tester used

(c) Exfoliation strength (N{kgf}) in warpwise direction, and exfoliation strength (N{kgf}) in weftwise direction

8. Staining and cleaning tests

8.1 Staining test Soil resistance of coverings shall be assessed as follows. Assessment shall be made against dry stain using the standard staining matter.

(1) Apparatus and standard staining matter

(1.1) Apparatus The apparatus for the test shall be specified as follows.

(1.1.1) Stain tester A device, as shown in Fig. 1., of the following structure and materials.

(1.1.1.1) Main body A rotary type dynamic loading tester that is specified in JIS L 1022, 9. (1.3), and provided with two impact rollers for staining test. The number of revolutions of a testing table shall be $70 \text{ min}^{-1} \{ \text{r/m} \}$.

- (1.1.1.2) **Impact rollers for staining test** The impact rollers moves, as shown in Fig. 1, upward and downward, and in circular arc motion. A pair rollers, the left and right rollers, fall onto the testing table at the rate of 194 turns/min.

Furthermore, the shape and materials shall be specified as follows.

- (a) **Shape** Truncated cone. Dimensions are shown in Fig. 1 Front view of main structure.
 - (b) **Material** Aluminium alloy
 - (c) **Inside of roller** Hollow enough to be filled with dry staining matter.
 - (d) **Peripheral outside of roller** Punch holes (diameter, 1 mm; 72 holes) to allow suitable amount of dry staining matter filled in the roller to drop onto the test piece through the holes. Fig. 2 shows the front view of roller and the sectional view at AA. The center of hole is shown in the front view. The position of hole is shown in the sectional view. One row has 5 holes at intervals of 5.5 mm. Another row has 4 holes at intervals of 5.5 mm, but starting from the point 2.75 mm deviated. These rows are arranged alternately.
- (1.1.1.3) **Vacuum nozzle** The suction tip measures 2×38 mm. The height is adjustable. The suction pressure shall be 4.9 kPa (500 mmAq).

Fig. 1. Staining tester

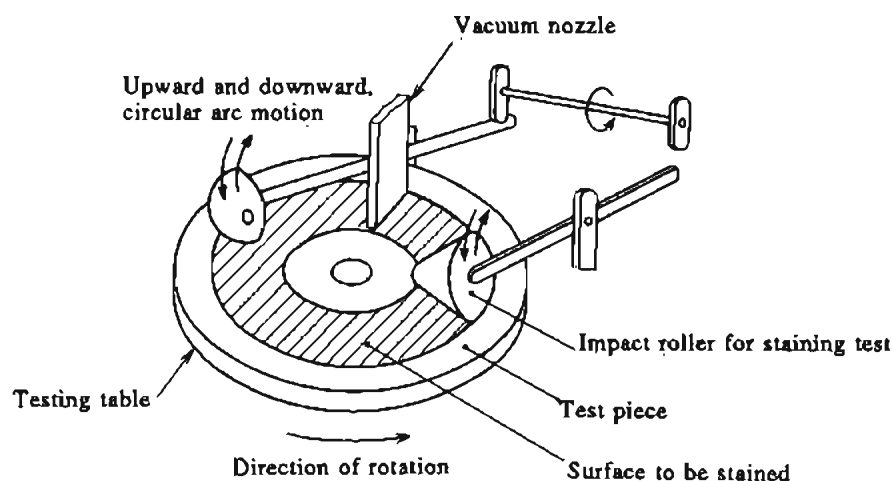


Fig. 1 (Continued)

Front view of main structure

Unit: mm

Side view of main structure

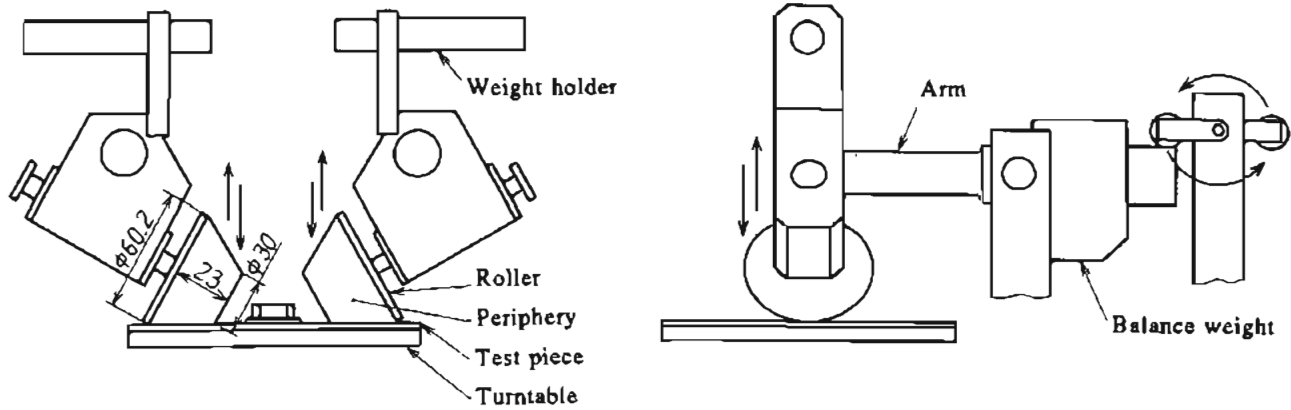
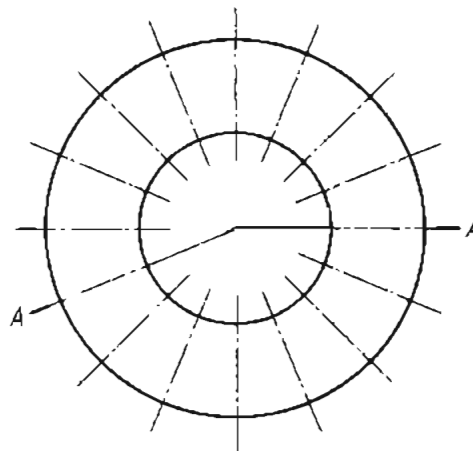


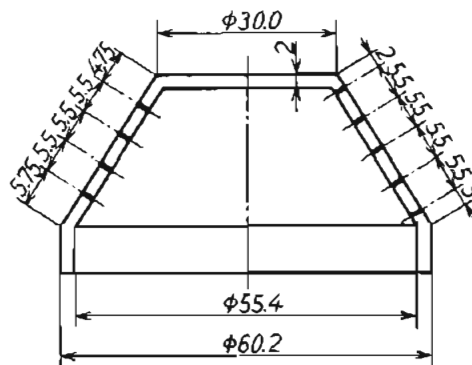
Fig. 2. Front view and sectional view of roller

Front view of roller



Sectional view of roller

Unit: mm



- (1.2) **Standard staining matter** The standard staining matter used for the test shall be as prescribed in Table 1 in content and percentage (%) by mass thereof.

Table 1. Content and percentage by mass of standard staining matter

Content	Percentage by mass %
Peat moss	40
Portland cement (JIS R 5210)	17
Kaolin (JIS K 8746)	17
Diatomaceous earth (JIS K 8330)	17
Carbon black (JIS K 5107)	0.1
Iron (III) oxide for ferrite (JIS K 1462)	0.15
Nujol	8.75

Furthermore, nujol, mentioned in the Table, is refined mineral oil. The Saybolt viscosity at 38°C is 360 to 390. The specific gravity at 15°C is 0.880 to 0.900. The standard staining matter shall be dried in a desiccator containing silica gel, and then used for the test.

- (2) **Test piece** According to JIS L 1021, 3. (Sampling and preparation of specimen and test piece), take 2 circular test pieces having the diameter of 140 mm. Punch a hole of 6 mm in diameter at the center of test piece.

Furthermore, in addition to the test specimen, prepare a specimen for a preliminary test.

- (3) **Operation** Fill each impact roller with about 20 g of the standard staining matter. Mount the rollers to the tester. Before the test, to ensure uniform fall of standard staining matter on the test piece, mount a preliminary test specimen to the testing table, and give preliminary impact for the period of 100 revolutions of testing table. Next proceed to the test. Mount the test piece to the testing table, and stain it for the period of 50 revolutions of testing table. After staining is finished, perform vacuum suction immediately. Continue suction for the period of 20 revolutions of testing table. The height of vacuum nozzle shall be so adjusted to touch the test piece slightly. The vacuum pressure shall be 4.9 kPa {500 mmAq}.

After every 200 revolutions of staining in total including the preliminary impact, repeat the above operation.

- (4) **Assessment** For each of two test pieces, observe the difference between pre-test lightness and post-test lightness. Observe also the color difference between color chips of the grey scale for evaluating staining. Compare both differences, and read the rating of the staining of the specimen.

Furthermore, if the grey scale rating is different between the two test pieces, take the lower rating as the test result. The assessment by a colorimeter is given in Informative reference 5.