भारतीय मानक **IS 7877 (Part 1 to 4) : 2023**

Indian Standard

हस्तनिर्मित कालीनों के नमूने लेने और परीक्षण करने के तरीके

(पहला पुनरीक्षण)

Methods of Sampling and Tests for Hand-Made Carpets

(First Revision)

ICS 97.150

भारतीय मानक ब्यूरो
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December 2023 **Price Group 7**

Wool, Wool Products and Textile Floor Coverings Sectional Committee, TXD 04

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wool, Wool Products and Textile Floor Coverings Sectional Committee had been approved by the Textiles Division Council.

The present revision has been made in the light of experience gained since last revision and to incorporate the following major changes:

a) Tibetan knot has been added as Type VI knot; and

b) This standard was earlier published consisting of 5 parts, in this revision Part 3 of the standard covering 'Determination of number of knots' has been excluded as a separate standard IS 17858 'Textile floor coverings — Determination of number of tufts and/or loops per unit length and per unit area' has been published covering the method of determination of number of knots per unit length/area and subsequent parts have been renumbered.

The composition of the Committee responsible for the formulation of this standard is listed in Annex B

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

METHODS OF SAMPLING AND TESTS FOR HAND-MADE CARPETS

PART 1 SAMPLING AND SELECTION OF AREAS FOR PHYSICAL TESTS AND CHEMICAL ANALYSIS

(First Revision)

1 SCOPE

This standard (Part 1) gives the method for sampling and selection of areas for carrying out the physical tests and chemical analysis of hand-made carpets.

2 SAMPLING

2.1 Each carpet shall be tested separately for the different characteristics.

2.2 For physical tests and chemical analysis, remove adequate quantities of yarn forming pile from the back side of the carpet from different parts by a suitable hook. For colour fastness tests adequate quantity of yarn of each colour used in the carpet shall be removed at random.

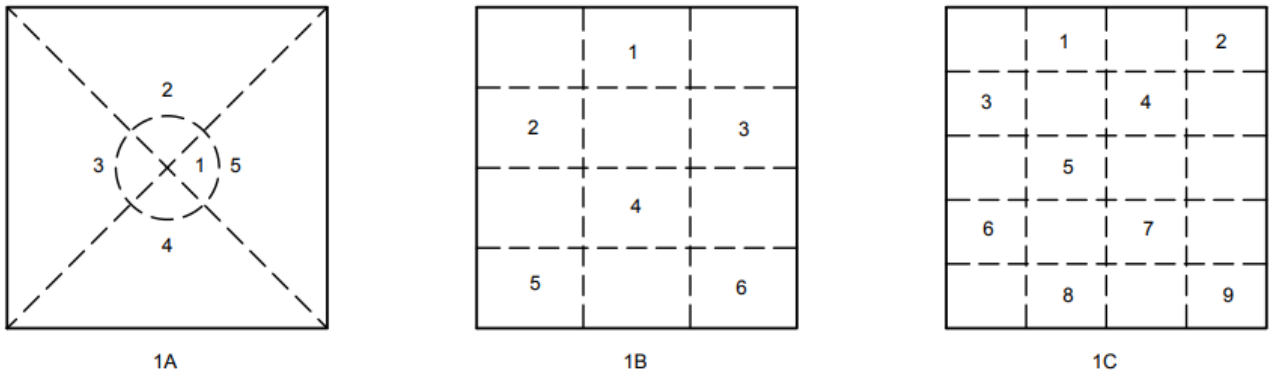
NOTE — In case of carpets having a number of colours in pile, it may not be desirable to carry out colour fastness tests on such colours which are used in small quantities because removal of such yarn might damage the design of the carpet.

2.3 The pile yarn shall be taken from different parts of the carpet in such a way as to make the sample as representative of the carpet as possible taking care that not more than one knot is removed from any one spot within an area of 10 cm^2 so as to avoid damage to the carpet. The samples of pile yarn shall not be removed from the carpet within 10 cm from the selvedge's as well as the transverse edges.

3 AREAS OF TEST

The number of measurements and areas of test (except colour fastness) shall depend on the size of the carpet as given below:

Sl No.	*Size of the Carpet*	*Minimum Number of Measurement*	*Areas of Test*
(1)	(2)	(3)	(4)
i)	Up to and including 6 m^2	5	*see* Fig. 1A
ii)	Above 6 and up to 14 m^2	6	*see* Fig. 1B
iii)	Above 14 m^2	9	*see* Fig. 1C



1A 1B 1C

FIG.1 AREAS OF TEST

Indian Standard

METHODS OF SAMPLING AND TESTS FOR HAND-MADE CARPETS

PART 2 DETERMINATION OF TYPE OF KNOTS

(First Revision)

1 SCOPE

1.1 This standard (Part 2) describes six types of knots used in the manufacture of hand-made carpets and gives a visual method for their identification.

1.2 All the knots made in Indian carpets are either Persian knots or derivation of the same.

1.3 An informatory note on the six types of knots is given in Annex A.

2 AREAS OF TEST

Select the areas of test in accordance with **3** of Part 1.

3 DESCRIPTION OF TYPES OF KNOTS

3.1 Single Knots

Single knots are of two types, namely, Type I and Type II.

3.1.1 *Type* I (*see* Fig. 1)

For this type, the weaver:

a) makes knots by:

1) looping a strand of pile yarn around a (the first) warp thread;

2) passing the strand under the adjacent (the second) warp thread to the left of the first warp thread; and

3) pulling up the strand and cutting it;

b) weaves the backing between two adjacent rows of knots by laying two (or more) weft threads, interlacing each with warp threads as in plain weave.

NOTE — The two weft threads one over the row of knots and the other under it, shall be inserted in the opposite sheds.

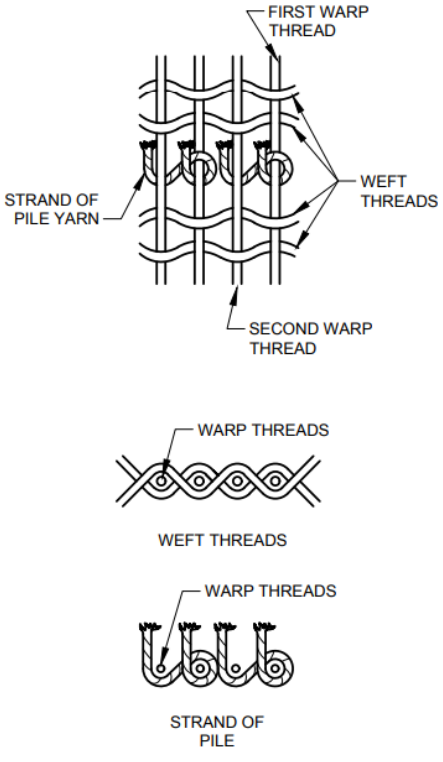


FIG. 1 TYPE 1

3.1.2 *Type* II (*see* Fig. 2)

For this type, the weaver:

a) makes knots by

1) looping a strand of pile yarn around a (the first) pair of warp threads;
2) passing the strand under the adjacent (the second) pair of warp threads to the left of the first pair of warp threads; and
3) pulling up the strand and cutting it;

b) weaves the backing between two adjacent rows of knot by laying two (or more) weft threads, interlacing each with pairs of warp threads as in a basket weave (a weave repeating on two pairs of warp threads and two weft threads).

NOTE — The two weft threads, one over the row of knots and the under it, shall be inserted in the opposite sheds.

3.2 Double Knots

Double knots are of three types, namely, Type III, Type IV and Type V.

3.2.1 *Type* III *(see* Fig. 3)

For this type, the weaver makes knots as in Type II and weaves the backing as in Type I.

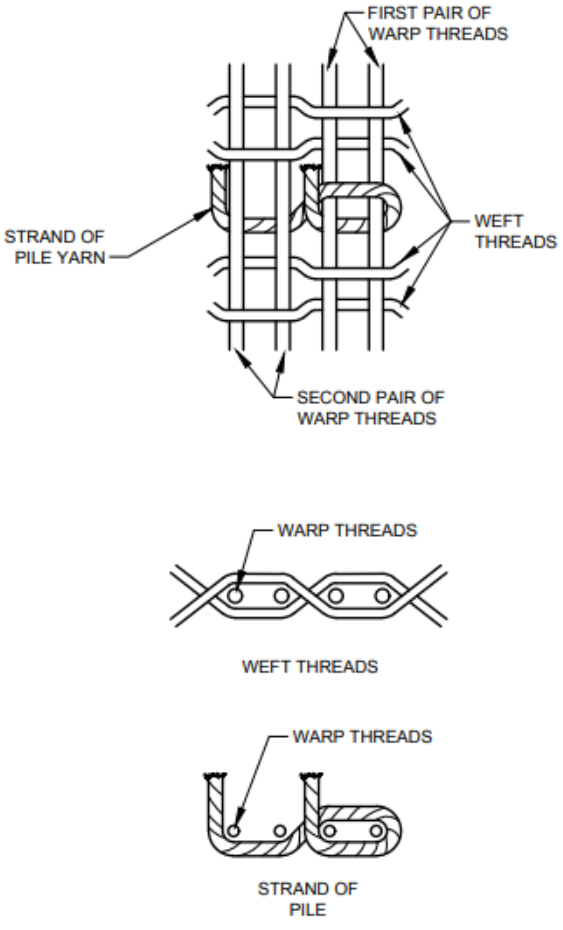


FIG. 2 TYPE II

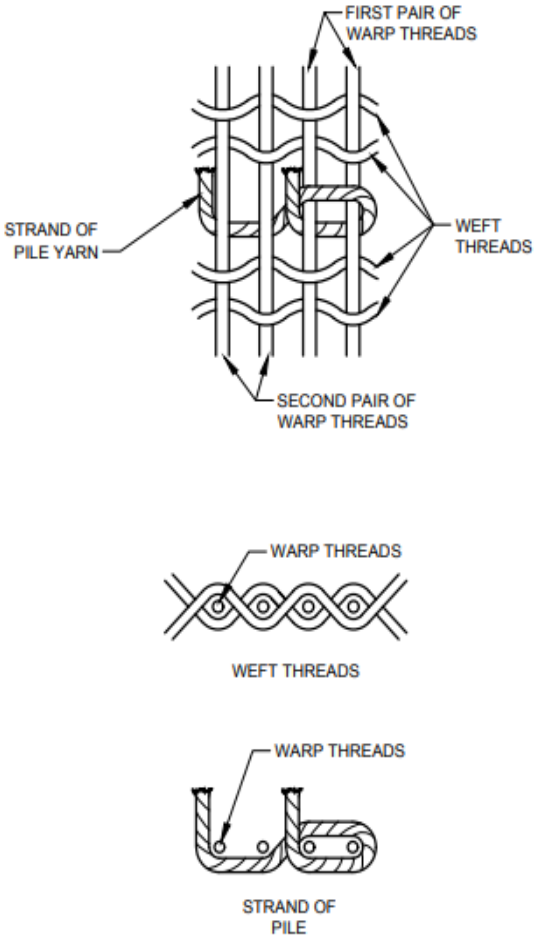


FIG. 3 TYPE III

3.2.2 *Type* IV (*see* Fig. 4)

For this type, the weaver

a) makes knots by:

1) looping a strand of pile yarn around a (the first) warp thread;

2) passing the strand above the adjacent (the second) warp thread to the left of the first warp thread;

3) passing the strand behind the adjacent (the third) warp thread to the left of the second warp thread; and

4) pulling up the strand and cutting it.

b) makes the second knot as in (a) above after leaving the adjacent (the fourth) warp thread to the left of the third warp thread; and

c) weaves the backing as in Type I.

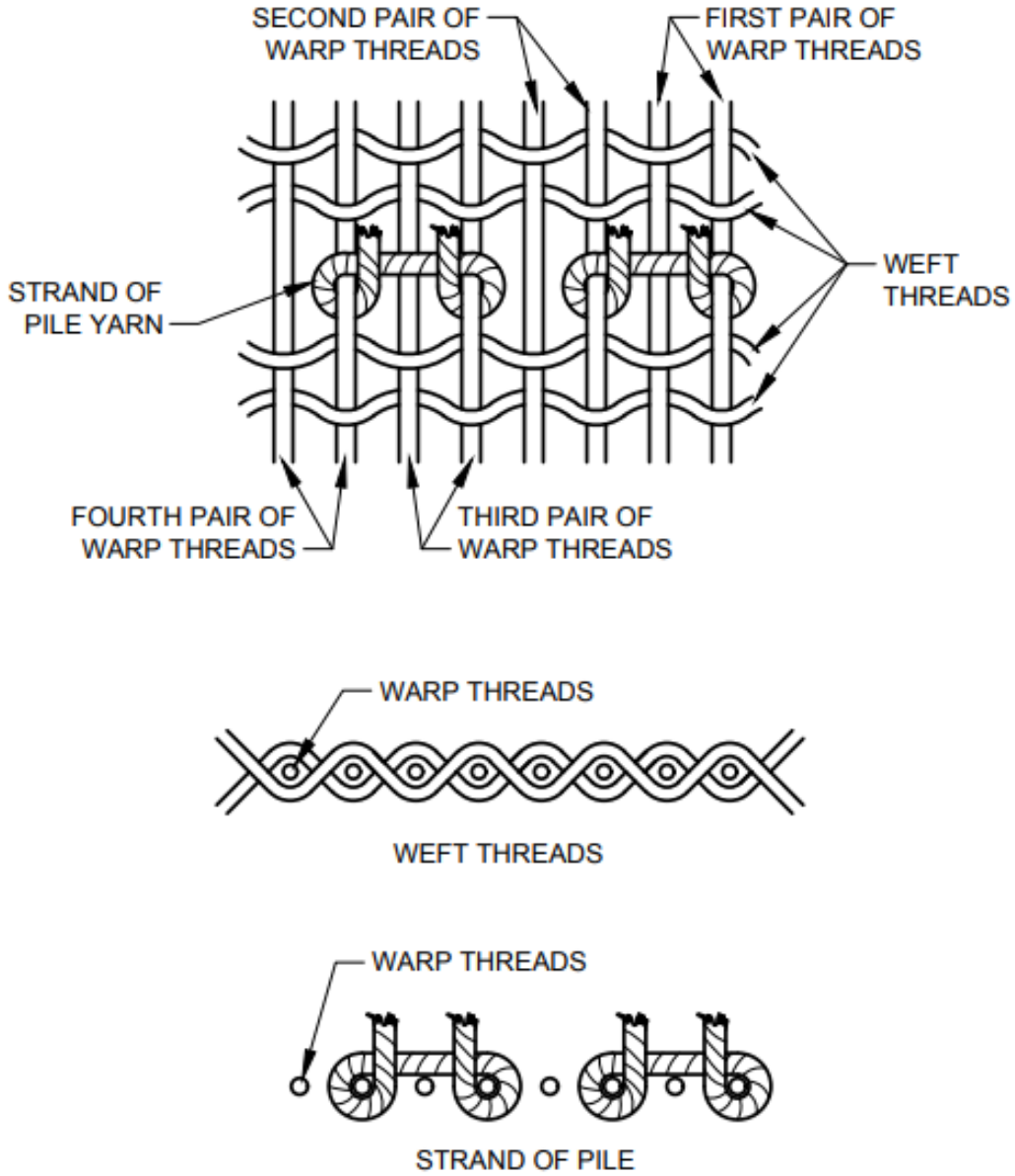


FIG. 4 TYPE IV

3.2.3 *Type* V (*see* Fig. 5)

For this type, the weaver:

a) makes some knots as in Type I and the remaining as in Type II; and
b) weaves the backing as in Type I.

NOTE — Type V of knots is used only in figured carpets.

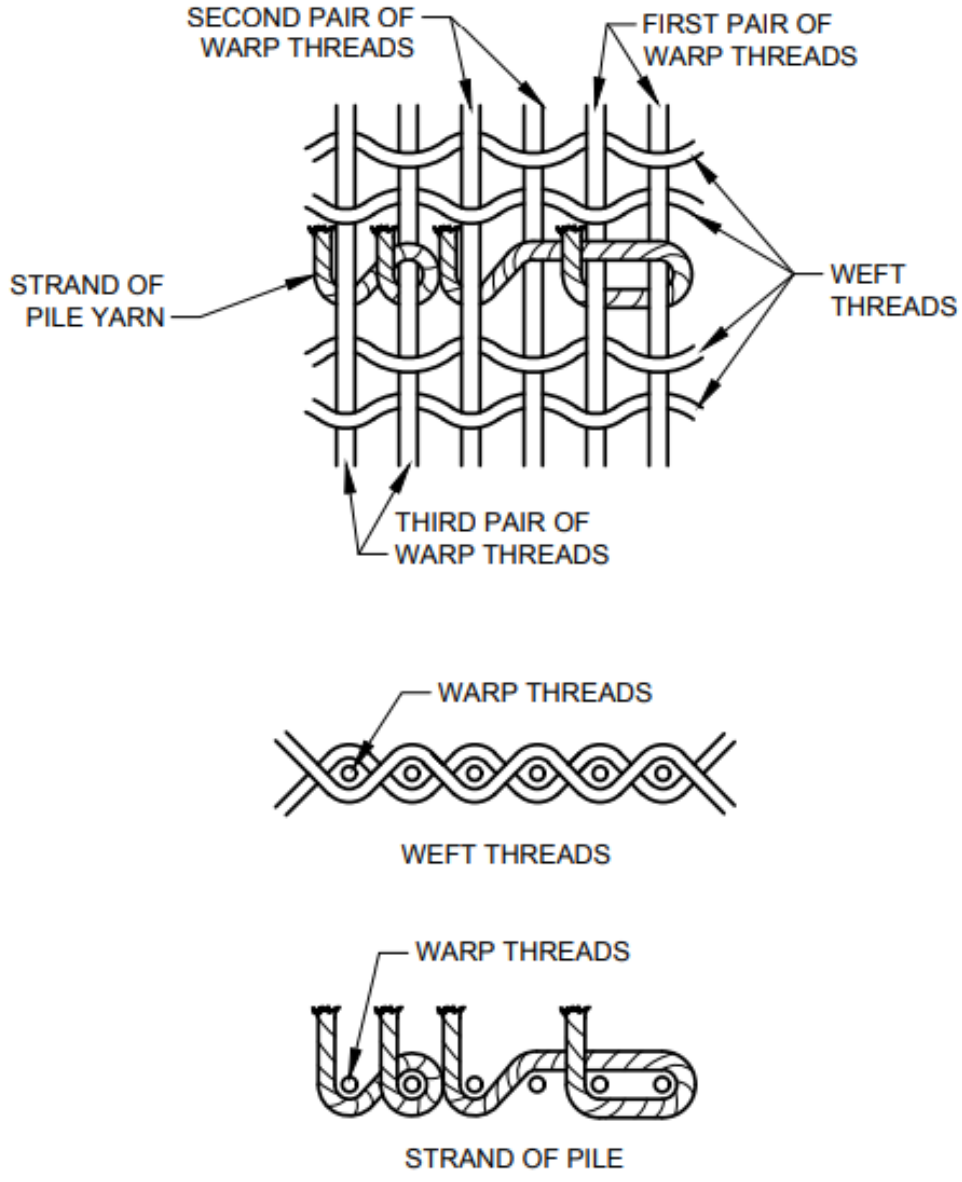


FIG. 5 TYPE V

3.3 Type VI (*see* Fig. 6 and Fig.7)

Tibetan Knot

The Tibetan knot has a completely different structure than the other knots. These knots are made by using a temporary rod along the width of the carpet, which is placed in front of the warp.

For this type, the weaver

a) makes knots by:

1) Mounting the rod along the width of the carpet;
2) Placing the long pile yarn around two warp threads;
3) Turning the pile yarn around the rod; and
4) When the weaver is done with the entire row of knots the loops around the rod are cut to create the cut pile.

NOTE — To create loop pile, the rod is removed and pile is retained as it is.

4 PROCEDURE FOR IDENTIFYING TYPES OF KNOTS

4.1 Bend the face of the carpet in such a way that pile formed by the two adjacent rows of tufts is pushed apart thus revealing bases of these tufts. Visually examine the knots carefully using a suitable magnifying glass, if necessary, and determine which type of knot has been used.

4.2 Similarly examine the knots in the different areas of carpet.

5 REPORT

Report the type of knots identified to which the arrangement of knots corresponds and a reference to this standard.

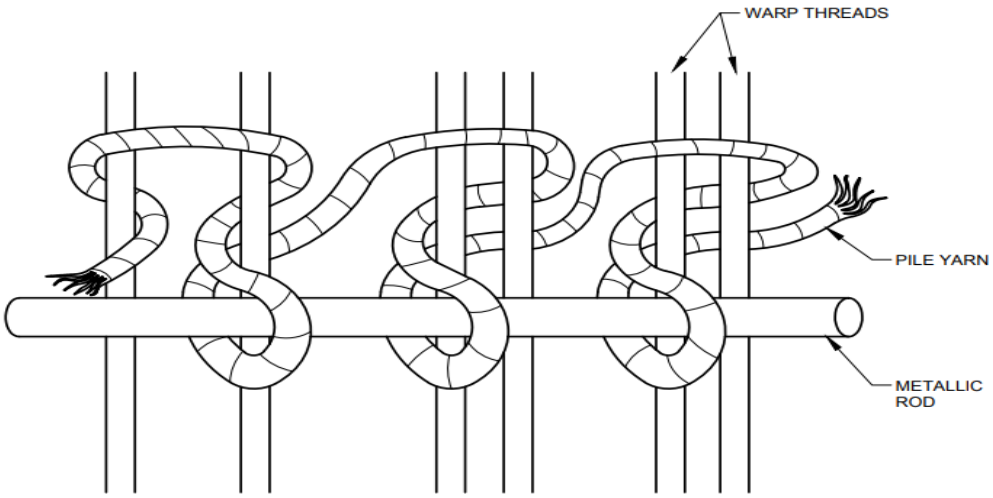


FIG. 6 TYPE VI

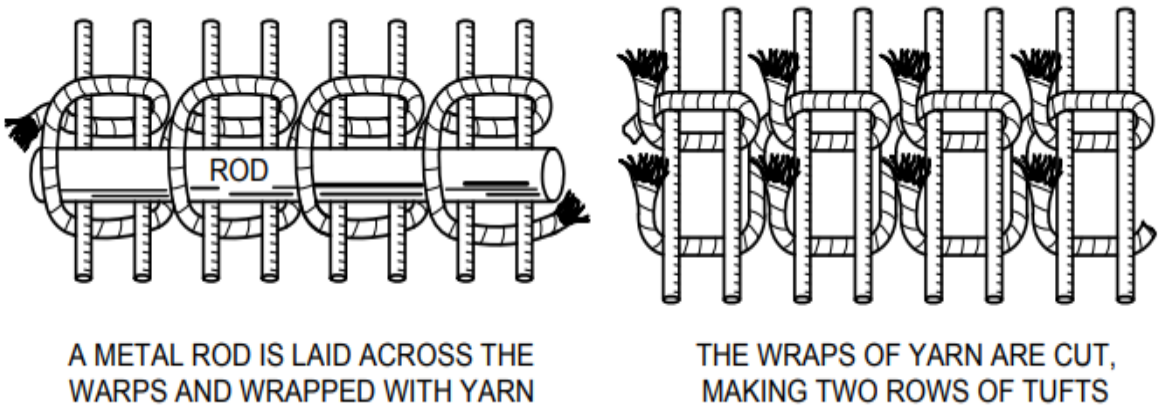


FIG. 7 TIBETAN KNOT

ANNEX A

(*Clause* 1.3)

INFORMATORY NOTE ON VARIOUS TYPES OF KNOTS

A-1 SINGLE KNOTS

A-1.1 Type I produces single knots. Such a knot is made on paid of warp threads

A-1.2 Type II also produces single knots, the only difference as compared to Type I is that this knot is made on two pairs of warp threads. The two threads work as one and both of these pass through the same heald. The use of double warp increases the strength of the fabric warpwise.

A-1.2.1 This method is adopted for producing carpets having very few, say 12 to 20 knots per decimetre width wise. This method is also adopted in such cases where coarse warp yarn of required count might not be generally available.

A-2 DOUBLE KNOTS

A-2.1 The back of a carpet with double knots may not show the same fineness as a carpet made with single knots. is also less as compared to carpets made The pile density of such carpets with single knots.

A-2.2 Type III produces double knots. A knot is produced on four warp threads. However, the alternate warp threads are in the same shed, that is, the fabric is woven in plain weave.

A-2.3 Type IV is a variation of Type III to adjust it to coarse weave rather than fine weave.

A-2.4 Type V gives a combination of single knots and double knots. Actually the knots by Type III are never produced alone and these are always made in conjunction with single knots where the design of carpets so demands.

Indian Standard

METHODS OF SAMPLING AND TESTS FOR HAND-MADE CARPETS

PART 3 DETERMINATION OF PILE HEIGHT

(First Revision)

1 SCOPE

1.1 This standard (Part 3) prescribes a method for determination of the pile height, that is, tuft leg length above woven ground.

1.1.1 The tuft leg length above woven ground is the same as pile height when the pile is in the vertical position. Generally, the hand-knotted carpets have unidirectional pile, that is, the tufts lie at an angle to the ground opposite to the direction in which weaving has been proceeded. If the tufts are not measured in vertical position, the observations may not give correct results about the pile height rather it would give the measurement of pile thickness.

2 TERMINOLOGY

For the purpose of this standard, the pile height (tuft leg length) shall mean the length of pile from the point where it emerges from the woven ground to its free extremity.

3 PRINCIPLE

The pile height is found by inserting in the pile, at right angles to the woven ground, flat metal gauges of known height and determining which gauge corresponds to the pile height.

4 AREAS OF TEST

Select the areas of test in accordance with **3** of Part 1.

5 APPARATUS

Gauges made of flat metal strips of shape as shown in Fig. 1, available in intervals of 1 mm shall be used.

6 PROCEDURE

6.1 Insert a gauge between two rows of pile (tuft legs) ensuring that the firm contact is made with the woven ground. Select for measurement the row of pile lying adjacent to the gauge but towards the end of the carpet last woven. Stroke the pile into vertical position besides the gauge thus giving necessary support to the pile to keep them into vertical position. By successively using different-gauges, select the gauge that corresponds to the pile height. Check that this is the nearest gauge by inserting in the same position gauges a unit higher and lower than selected. height to the nearest millimetre. Determine the pile

6.2 If the carpet, due to its design, contains pile of different heights, determine the pile height at all level portions.

6.3 Repeat the measurement in the different areas of carpet.

7 REPORT

Calculate the average pile height and report the same to the nearest millimetre.

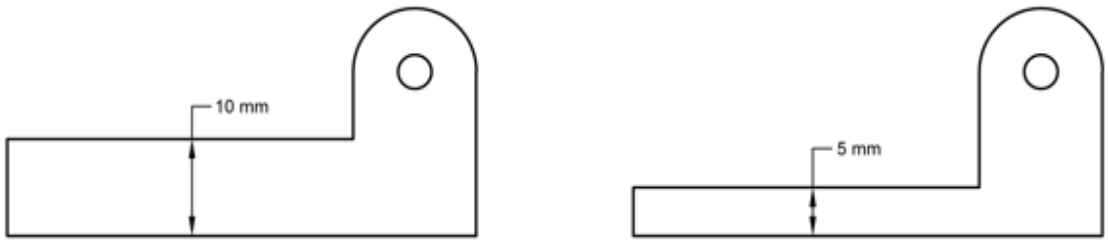


FIG. 1 GAUGES

Indian Standard

METHODS OF SAMPLING AND TESTS FOR HAND-MADE CARPETS

PART 4 DETERMINATION OF DIMENSIONS

(First Revision)

1 SCOPE

This standard (Part 4) prescribes a method for determination of length, width and diagonals of rectangular and square carpets, diameter in case of circular carpets and major and minor axes in case of oval-shaped carpets.

2 APPARATUS

A rule or instrument capable of measuring accurately to the nearest millimetre shall be used.

3 PROCEDURE

3.1 General Instructions

Spread the carpet on a smooth flat surface taking care that no wrinkles are present. Make the measurements between the outer edges of the base of the pile on the opposite edges of the carpet. Make all the measurements to the nearest millimetre.

3.2 Rectangular and Square Carpets

3.2.1 *Length*

Make the measurement in the warp direction in such a way that two measurements are made at an approximately 10 cm within each selvedge of the carpet and one approximately in the middle. Calculate the average length to the nearest 5 mm for carpet measuring up to 100 cm and to the nearest 10 mm for largest carpets.

3.2.2 *Width*

Make five measurements in the weft direction in such a way that two measurements are made at an approximately 10 cm within each edge of the carpet and three measurements made at distances approximately L/4, L/2 and 3L/4 from one edge of the carpet (L being the length of the carpet). Calculate the average width to the nearest 5 mm for carpets measuring up to 100 cm width and to the nearest 10 mm for larger carpets.

3.2.3 *Diagonals*

Make the measurement along the line joining the two diagonally opposite corner of the carpet to the nearest 5 mm for carpets having diagonals up to 100 cm and to the nearest 10 mm for largest carpets.

3.3 Circular Carpets

3.3.1 *Diameter*

Make the measurement of the diameter of the carpet at four different points distributed along the periphery. Calculate the average of the four readings to the nearest 5 mm for carpets measuring up to 100 cm in diameter and to the nearest 10 mm for larger carpets.

NOTE — To facilitate the measurement of major and minor axes the centre of the carpet may be determined by first folding the carpet into half along the major axis and then refolding it into further half along the minor axis thus making it into a quarter size. The point where he two folds cross may be taken as the centre of the carpet.

3.4 Oval-Shaped Carpets

3.4.1 *Major and Minor Axes*

Make the measurement of the major and minor axes of the carpet at least at two points. Calculate the average of the two readings to the nearest 5 mm for carpets measuring up to 100 cm in major or minor axes as the case may be and to the nearest 10 mm for larger carpets.

NOTE —To facilitate the measurement of major and minor axes the centre of the carpet may be determined by first folding the carpet into half along the major axis and then refolding it into further half along the minor axis thus making it into a quarter size. The point where the two folds cross may be taken as the centre of the carpet.

4 REPORT

Report the dimensions of carpets as given below:

Rectangular and square carpets	As obtained in **3.2.1, 3.2.2 and 3.2.3**
Circular carpets	As obtained in **3.3.1**
Oval-shaped carpets	As obtained in **3.4.1**

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Wool, Wool Products and Textile Floor Coverings Sectional Committee, TXD 04

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Review of Indian Standards

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This Indian Standard has been developed from Doc No.: TXD 04 (20297).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi