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IS 12674-2 (1989): Methods of test for strength and stability of settees and benches, Part 2: Stability [CED 35: Furniture]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

**METHOD OF TEST FOR STRENGTH AND
STABILITY OF SETTEES AND BENCHES**

PART 2 STABILITY

भारतीय मानक

सेटी और बेंचों की सातर्था और स्थिरता की परीक्षण पद्धति

भाग 2 स्थिरता ज्ञात करना

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NEW DELHI 110002

FOREWORD

This Indian Standard (Part 2) was adopted by the Bureau of Indian Standards on 24 February 1989, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

This standard is being issued in two parts. This part (Part 2) describes the methods of test to determine the stability of settees and benches by simulating the overturning forces that occur in use. Part 1 of this series gives the methods of test to determine the strength of settees and benches. However, this standard does not apply to multiseating units for stadium seating as the loads applied are not representative of this type of use.

In the formulation of this standard, considerable assistance has been derived from BS 4875 (Part 4) : 1985 'Strength and stability of furniture : Part 4 Methods of determination of strength of settees', issued by the British Standards Institution, UK.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

METHOD OF TEST FOR STRENGTH AND STABILITY OF SETTEES AND BENCHES

PART 2 STABILITY

1 SCOPE

1.1 This standard (Part 2) describes method for determination of stability of all types of settees, and other articles, such as, benches with seats for from two to four persons.

2 TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Stability

It is the ability to withstand overturning.

3 GENERAL REQUIREMENTS FOR TESTS

3.1 Test Loading

3.1.1 All loads and forces shall be measured to an accuracy of ± 5 percent.

NOTE — The tests may in certain cases be carried out by means of loads or forces. For practical purposes, a force of 10 N may be taken to be equal to the downward force due to a mass of 1 kg.

3.1.2 The apparatus used to apply seat loading shall not restrain the article from overturning, nor hinder horizontal movement of the article when the back force is applied.

3.2 Setting-up of Furniture

The articles shall be tested as delivered. Self assembly furniture shall be assembled according to instructions supplied with the article. If the article can be combined in different ways, the most adverse combination shall be used for each test.

NOTE — The test results are only valid for the article tested. When the test results are intended to be applied to other similar articles, the test specimen should be representative of the production model.

4 APPARATUS

4.1 Means of Applying Required Loads or Forces

4.2 Means of Measuring Dimensions to an Accuracy of ± 0.2 mm

4.3 Loading Point Template (see Fig. 1, 2 and 3)

This consists of two-shaped members fastened together by a pivot at one end. The contours of the shaped surfaces are so devised as to sink into the upholstery for a representative distance under

moderate loads. For this purpose, the seat loading arm shall have a total mass of 20 kg, applied through the seat loading point. The apparatus is marked as shown in Fig. 1 so that the template can be positioned easily with two members at an angle of 90° to each other.

4.4 Floor, comprising a level horizontal surface.

4.5 Stops

These shall prevent the article from sliding but not from overturning. Stops shall be not higher than 12 mm, except in cases where the design of the article necessitates the use of higher stops, where the lowest stop which will prevent the article from moving shall be used.

4.6 Local Loading Pad, a rigid cylindrical object 100 mm in diameter having a flat face with a 12 mm radius on the front edge.

NOTE — All loading pads should be capable of pivoting at least in the vertical plane and if design constrictions allow it, also in the horizontal plane.

5 DETERMINATION OF SEAT LOADING POINTS

5.1 General

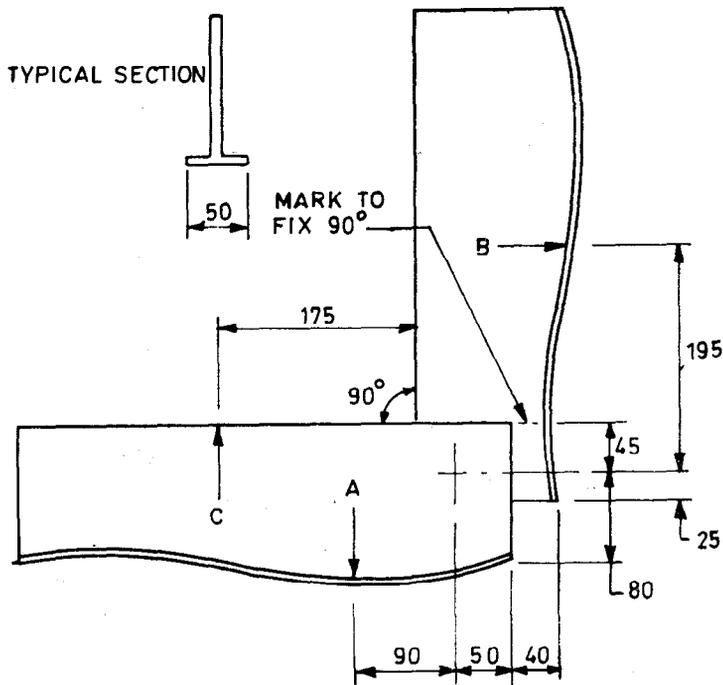
If the number of seats in the article is not obvious, divide the total seat length (in mm) by 600 mm and round to the nearest whole number to determine the number of seats. Divide the total seat length into seats of equal length. Mark the position of each of the seat(s).

5.2 Loading Point for Settees

Position the template (4.3) with its load applied at the seat loading point on the centreline of the seat as far towards the rear as possible. Adjust its position by pushing the back loading portion into the back, so levering the seat portion forward until the shape of the template correlates with that of the seat (see Fig. 3). Mark the required loading point from the template. Repeat the procedure on the other seats.

5.3 Loading Point for Benches

Set up the template (4.3) at an angle of 90° with the aid of the mark as shown in Fig. 3. Place on the bench as shown in Fig. 2. Mark the required loading point from the template.



A = seat load (settees)
 B = back load
 C = seat load (benches)

All dimensions in millimetres.

FIG. 1 LOADING POINT TEMPLATE

6 PROCEDURES

6.1 General

Position the article on the floor (4.4) with the legs restrained by stops (4.5). Record whether the article tends to overturn during each of the tests in 6.2 to 6.4.

6.2 Forwards Overturning and Sideways Overturning for Articles Without Arms

Position the article with the stops against the front legs on one side (as appropriate). Apply a force of 600 N vertically by means of the loading pad (4.6) so as to act at a point 50 mm from the edge of the seat at those positions along its exposed periphery most likely to result in instability (usually tests on the centreline are sufficient). Apply a force of 20 N horizontally along a horizontal line extended forwards from the point where the base of the loading pad meets the upper surface of the seat.

Position the front feet of benches against stops. Apply a vertical force of 600 N by means of the loading pad (4.6) at a point 50 mm from the edge of the seat nearest to the stopped feet. Apply a horizontal force of 20 N through the centre of the seat in a direction towards the stopped feet.

6.3 Rearwards Overturning for Articles with Backs

Position the article with the stops against the rear legs. Apply a vertical force of 600 N to the seat by means of the loading pad (4.6) at the seat loading point (see 5). Determine the distance h (in mm) between the loaded seat height and the floor by measuring the distance between the horizontal bar and the base of the pad, and subtracting it from the distance between the horizontal bar and the floor. For articles having a value of h greater than 720 mm, use an overturning force of 80 N. For articles having a value of h less than 720 mm, calculate the overturning force F (in N) required from the following formula:

$$F = 285.7 (1 - h/1000)$$

Apply force F to an accuracy of ± 5 percent, horizontally to the back of the article at a height of 300 mm above the unloaded seat, or at the top edge of the backrest, whichever is lower.

NOTE — This test only applies to articles with backs extending 50 mm or more above the unloaded seat.

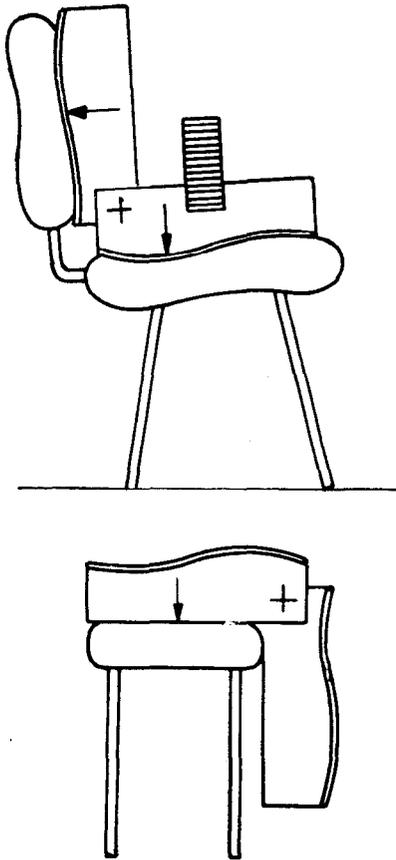


FIG. 2 POSITION OF LOADING POINT TEMPLATE

6.4 Sideways Overturning for Articles with Arms

Position the article with the stops (4.5) against the legs or base of one side. Apply a vertical force of 250 N at a point 100 mm to one side of the fore and aft centreline of the seat and between 175 and 250 mm forward of the rear edge of the seat. Apply a vertical force of 350 N by means of the loading pad (4.6) at a position 37.5 mm inside the outer edge of the arm at the most adverse position along its length. Apply a horizontal force of 20 N outward at the upper surface of the armrest and in line with the vertical arm force on the side with stopped feet (see 3).

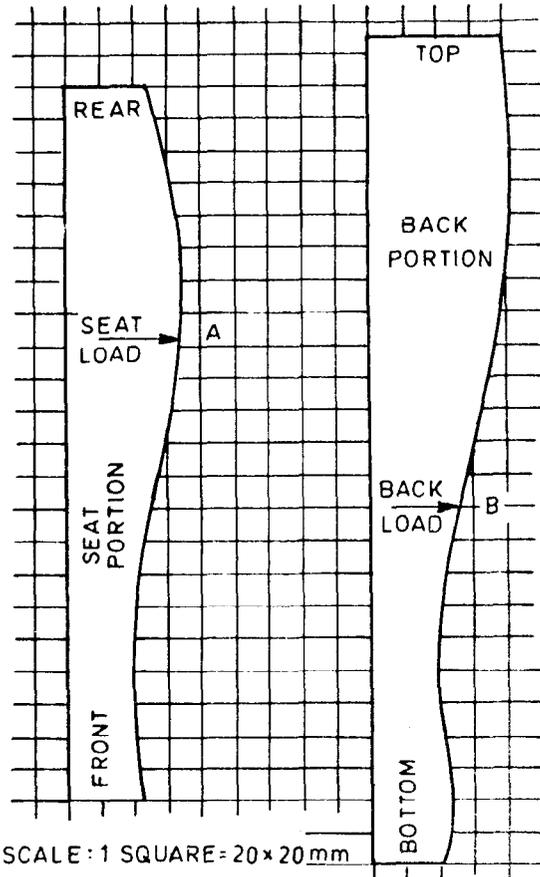


FIG. 3 LOADING SURFACE CURVES FOR CHAIR SEAT AND BACK LOADING TEMPLATE

7 INTERPRETATION OF RESULTS

7.1 Each article shall be considered to have passed the test if the article did not overturn during the test and if the requirements of the appropriate product specification are met.

8 TEST REPORT

8.1 The test report shall include the following particulars:

- Details of the article of seating tested,
- Whether the article overturned during testing, and
- Details of any deviation from the test procedures.

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