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# Raised access floors

The European Standard EN 12825:2001 has the status of a British Standard

ICS 91.060.30

## National foreword

This British Standard is the official English language version of EN 12825:2001.

This Standard provides a method of classifying and comparing the performance of raised access floor systems and their associated components.

During the preparation of the standard, consideration was given to the need for application and installation guidance within the standard.

Given the significant variation in customer requirements and national preferences it was decided that guidance should form part of a separate code of practice covering in detail their application and installation.

Agreement to produce a Code of Practice for the UK has been established and will be published on completion.

In the absence of the Code of Practice attention is drawn to the information concerning both subjects contained in the Property Services Agency document MOB PF2 PS/SPU March 1992 (Copyright: Access Flooring Association) and the National Building Specification NBS version K41 April 1993.

The UK participation in its preparation was entrusted to Technical Committee B/550, Raised access floors, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

### Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

### Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 35 and a back cover.

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ICS 91.060.30

English version

## Raised access floors

Planchers surélevés

Doppelböden

This European Standard was approved by CEN on 21 July 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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## Bibliography

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 323, Raised Access Floors, the Secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2002, and conflicting national standards shall be withdrawn at the latest by February 2002.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This standard specifies the characteristics and performance requirements of raised access floors for which the main intended use is the internal fitting out of buildings, providing full access to the services to the plenum. This standard does not cover requirements related to dangerous substances that may be subject to regulations.

It is applicable to modular, factory made flooring elements, comprising panels and pedestals and defines the test methods and measurement.

It provides for the evaluation of conformity of the product to this European Standard.



## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to other revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1081, *Resilient floor coverings — Determination of electrical resistance.*

EN ISO 140-12, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 12: Laboratory measurement of room to room airborne and impact sound insulation of an access floor (ISO 140-12:2000).*

EN 1815, *Resilient and textile floor coverings — Assessment of static electrical propensity.*

prEN 12524, *Building materials and products — Energy related properties — Tabulated design values.*

EN 12664, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Dry and moist products of medium and low thermal resistance.*

EN 12667, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance.*

prEN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from fire reaction tests.*

prEN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests (excluding products for use in ventilation systems).*

ENV 61024-1, *Protection of structures against lightning — Part 1: General principles (IEC 61024-1:1990, modified).*

HD 384.4.41, *Electrical installations of buildings — Part 4: Protection for safety; Chapter 41: Protection against electrical shock.*

HD 384.4.473, *Electrical installations of buildings — Part 4: Protection for safety; Chapter 47: Application of protective measures for safety; Section 473: Measures of protection against overcurrent.*

HD 384.5.54, *Electrical installations of buildings — Part 5: Selection and erection of electrical equipment; Chapter 54: Earthing arrangements and protective conductors.*

HD 384.6.61, *Electrical installations of buildings — Part 6: verification; Chapter 61: initial verification.*

### 3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

#### 3.1

##### **bridging / beam**

load bearing component to accommodate situations where pedestals and stringers/beams (if available) cannot be located in their normal positions

#### 3.2

##### **collapse**

state reached when deflection of the element or panel will continue without further increasing the test load

#### 3.3

##### **components**

parts of access floor elements, e.g. panels, pedestals, stringers, etc.

#### 3.4

##### **deflection**

movement of tested specimen caused by load expressed as a deviation from the former linear level

#### 3.5

##### **deformation**

alteration of the shape of a specimen

#### 3.6

##### **deviation**

difference between a specified dimension or position and the actual dimension or position

#### 3.7

##### **edge trim**

component of the panel, either adhered or mechanically fixed to all four sides to provide protection to the panels and to the floor covering

#### 3.8

##### **element**

kit that consists of one completely fabricated panel supported by pedestals together with other components e.g. stringers, conductive pads, etc. fixed as intended for the finished floor

#### 3.9

##### **finished floor height (FFH)**

nominal vertical dimension from the specified sub floor level to the specified finished floor level

#### 3.10

##### **indentation**

movement of the indenter into the specimen surface

#### 3.11

##### **length of side**

overall dimension of any side of a panel





**3.12**

**manufacturer's stated panel size**

dimension to which the tolerances are applied

**3.13**

**nominal panel size**

theoretical dimension used for commercial description

**3.14**

**panel**

load bearing horizontal component of the access floor. It is supported by the under structure (e.g. pedestals and stringers)

**3.15**

**pedestal**

vertical component or part of the element which transmits the loading to the subfloor

**3.16**

**plenum**

available space between the underside of the panels of the access floor and the sub-floor

**3.17**

**plenum height**

distance between the highest point of the sub floor and the lowest point of the underside of the access floor

**3.18**

**raised access floor**

factory made flooring system comprising panels supported on understructure of pedestals, and/or stringers or other components as applicable providing a load bearing structure for the fitting out of a building

**3.19**

**safety factor**

the factor by which the ultimate load is divided to establish the working load

**3.20**

**ultimate load**

maximum load at the time of failure of the element during the specified ultimate load test procedure

**3.21**

**stringer**

horizontal component connecting pedestals that may support panels (beams)

**3.22**

**system**

assembly of elements forming a complete installed raised access floor

**3.23**

**working load**

load given by dividing the ultimate load by the safety factor (ultimate load is sometimes called failure load and working load is sometimes called design load as well as nominal load)



## 4 Requirements

### 4.1 General and load classes

The ultimate load is the main criterion for classification.

All other load bearing characteristics are related to the ultimate load.

Raised access floors are classified according to the ultimate load as given in Table 1.

**Table 1 — Classes of elements**

<b>Class</b>	<b>Ultimate load kN</b>
1	<sup>3</sup> 4
2	<sup>3</sup> 6
3	<sup>3</sup> 8
4	<sup>3</sup> 9
5	<sup>3</sup> 10
6	<sup>3</sup> 12

### 4.2 Load bearing capacity

#### 4.2.1 General

The raised access floor shall be designed and manufactured in such a way that it provides mechanical resistance and stability and that the loading that is liable to act upon it during its intended use will not lead to deformation or collapse.

#### 4.2.2 Static loading requirements

The element when subjected to the test procedures as given in 5.2.1 shall meet the following criteria:

- Before the element collapses it shall have withstood the relevant ultimate load for its class as given in Table 1;
- When the load applied is equivalent to the working load which is the ultimate load divided by the safety factor, the measured deflection shall not exceed the stated value in accordance to Table 2.

Two classes of the safety factor are specified: 2,0 and 3,0.

<b>Table 2 — Classes of deflection</b>	
<b>Class</b>	<b>Maximum deflection mm</b>
A	2,5
B	3,0
C	4,0

### 4.2.3 Pedestal vertical load bearing capacity

The understructure has to support 4 times the working load of the system tested. The pedestal may not become distorted or damaged. Tests shall be carried out in accordance with 5.2.2.

### 4.2.4 Permanent deformation after loading

After the application for 30 min of a test load equivalent of the working load at the weakest point of the element, the residual deflection 5 min after the removal of the load shall not exceed 0,5 mm when testing according to 5.4.

## 4.3 Dynamic loading requirements

### 4.3.1 Absorption of hard body impacts

Where required, the element shall sustain the hard body impact test as described in 5.5.1. This test shall not cause any parts of the element to collapse, requiring that the test result be stated only if the test has been performed.

### 4.3.2 Absorption of soft body impacts

Where required, the element shall sustain the soft body impact test as described in 5.5.2.

This test shall not cause any parts of the element to collapse, requiring that the test result be stated only if the test has been performed.

## 4.4 Dimensional deviations

The panels of a raised access floor shall be manufactured within dimensions that enable their interchangeability.

Deviations of dimensions shall not exceed the values given in Table 3 for one of the appropriate classes.

**Table 3 — Deviations on panel dimensions**

Identification	Deviation mm	
	Class 1	Class 2
Length of panel sides, see 5.6.3	± 0,2	± 0,4
Squareness of panel, see 5.6.4	± 0,3	± 0,5
Straightness of sides horizontally, see 5.6.5	± 0,3	± 0,5
Thickness of panel without covering, see 5.6.6	± 0,3	± 0,5
Thickness of panel with coverings *, see 5.6.6	± 0,3	± 0,5
Panel twist, see 5.6.7	0,5	0,7
Vertical warping of panels, see 5.6.8	0,3	0,6
Difference in height between perimeter trims and panel surface, see 5.6.9	± 0,3	± 0,4
* plus thickness deviation of floor covering only if measured including covering		

#### **4.5 Protection against corrosion**

The element shall comply with European standards, if existing, in respect of protection of metallic materials against corrosion if existing. In the absence of such standards, elements shall comply with requirements valid in the place of use of the product.

#### **4.6 Peel resistance of floor covering**

Where peel resistance is required, the connection to the floor panel shall have a peel resistance more than 0,8 N/mm. The peel resistance shall be determined by the test method in accordance with 5.7.

#### **4.7 Reaction to fire**

Where required, the raised access floor shall be classified for its reaction to fire according to prEN 13501-1. Where the test method permits a representative portion of the raised access floor to be tested, this shall be done in accordance with the provisions of that method (i.e. for the positioning of joints). Where not possible, reaction to fire testing and classification shall be on the basis of the performance of each component and/or material making up the raised access floor. In this case, results for the raised access floor shall be based on stating the reaction to fire classification of each component and/or material.

Where materials or components may be classified as reaction to fire Class A1 without the need for testing<sup>1)</sup>, this shall be stated for that material or component.

#### **4.8 Resistance to fire**

Where required, the raised access floor shall be classified for its resistance to fire according to prEN 13501-2.

#### **4.9 Electrostatic conductivity**

The element shall comply with EN 1081, EN 1815 and HD 384.6.61, where relevant.

#### **4.10 Risk of electrocution**

The element shall comply with HD 384.5.54, HD 384.4.473, where relevant.

In addition the element shall comply with European Standards in respect of risk of electrocution if existing. In the absence of such standards, elements shall comply with requirements valid in the place of use of the product.

#### **4.11 Acoustic insulation**

Where required the impact and/or airborne sound insulation of the raised access floors shall be tested in accordance to EN ISO 140-12.

#### **4.12 Thermal conductivity**

Where required, the thermal conductivity shall be determined in accordance to prEN 12524 or by testing to EN 12644 or EN 12667.

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<sup>1)</sup> See Commission Decision 96/603/EC



## **5 Test and measurement methods**

### **5.1 General**

Testing of the element shall be carried out with reference to the requirements as follows:

The tests in 5.2, 5.3, 5.4, 5.5, 5.6 and 5.7 shall be carried out at a temperature of  $(20 \pm 5) ^\circ\text{C}$  and  $(55 \pm 10) \%$  relative humidity.

If adhesive is used to fix the pedestals the tests in 5.2, 5.3, 5.4 and 5.5 shall begin as determined by the manufacturer but not before 48 h have elapsed.

Test specimen shall be taken at random from the actual production and shall be representative of actual or intended day to day production.

The test report shall contain the following minimum information for all tests:

- 1) Name and address of testing body; 2) Name and address of the applicant;
- 3) Date of submittal of samples or sampling of test specimens;
- 4) Date of test;
- 5) Environmental conditions;
- 6) Description and construction details (include grade and classification details) of materials submitted for tests;
- 7) Accuracy and precision of test equipment used;
- 8) Numeric results of measurement of tests as stipulated and the classes or grade reached;
- 9) Statement of PASS or FAIL for hard body and soft body impact test, if relevant, and any damage which occurred;
- 10) Signature and designation of person responsible.

### **5.2 Static load**

#### **5.2.1 Load test on element**

##### **5.2.1.1 Test conditions**

See 5.1.

##### **5.2.1.2 Principle**

A steadily increasing load shall be applied to an element until failure of the element occurs. A graph shall be produced showing the deflection of the element against the applied load.

##### **5.2.1.3 Apparatus**

A test apparatus in accordance with the layout of Figure 1, together with a deflection measuring device connected to a continuous recording apparatus.

#### 5.2.1.4 Procedure

Panels shall be mounted on the particular pedestals as they would be on site. Pedestals shall be adjusted to their maximum permissible height. If stringers are part of the element they shall be included together with any other fixings such as bolts holding panels to pedestals. If adhesive is used to fix the pedestals to the sub-floors then the test shall not begin until 48 h after the adhesive was first applied.

A steel frame shall be rigidly fixed around the panel without direct connection as shown in Figure 1 to avoid horizontal movement of the element.

The indenter shall be a  $(25 \pm 0,1)$  mm steel cube, the corners of which shall be rounded to a radius of not more than 2 mm. The test shall be repeated four times placing the indenter in the following positions:

- at the centre of the weakest edge, where this can be identified, if not two adjacent edges shall be tested;
- at the centre of the panel;
- at a diagonal 70 mm from the edge of a pedestal head;
- at any point which the test laboratory considers a point of weakness.

A new panel shall be used for each test. The pedestals may be re-used at the discretion of the test laboratory if they have not been deformed in any manner.

A bedding-in load consisting of the working load stated by the manufacturer shall be applied and maintained for a period of 5 min via the indenter and then released.

The deflection sensor is zeroed after  $(5 \pm 1)$  min loading of 200 N. This load has to be released before the beginning of the test.

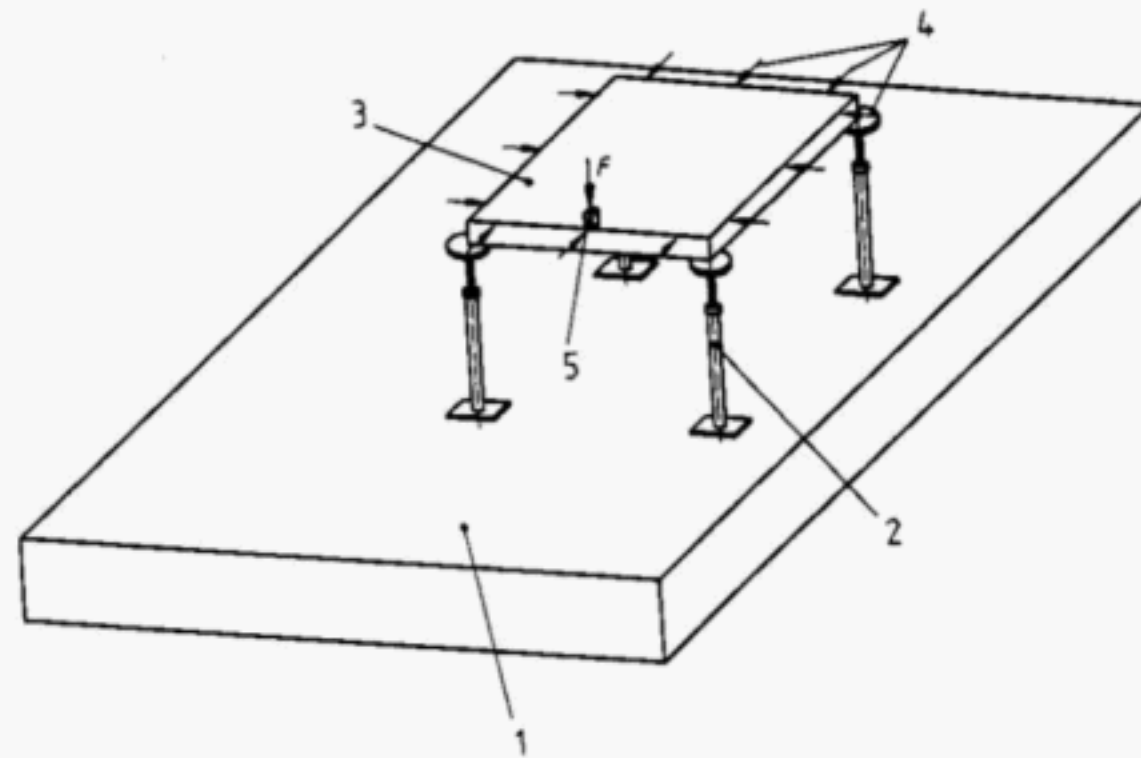
A steadily increasing load shall be applied at a speed of  $120 \text{ N/s} \pm 10 \%$  until failure of any part of the element occurs. The deflection on the underside of the panel shall be continuously recorded from the beginning up to the point of failure.

#### 5.2.1.5 Expression of results and precision of test methods

Deflection readings shall be read within a limit of error of  $\pm 0,01$  mm and load within an error of  $\pm 1 \%$ .

A graph shall be produced showing deflection against the applied test load.

The deflections at the points where the test load equals the specified working load and failure load shall be specifically marked on the graph. The maximum deflection permitted at the working load shall be indicated on the graph.



### Key

- 1 Measurement table
- 2 Pedestal
- 3 Panel
- 4 Rigid frame
- 5 Indentor (25 mm x 25 mm)
- F Load

**Figure 1 — Load test on element**

### 5.3.1 Pedestal vertical load test

#### 5.3.1.1 Sampling

All parts forming a pedestal shall be taken at random from the actual production.

#### 5.3.1.2 Preparation and preservation of samples and test pieces

See 5.1

#### 5.3.1.3 Principle

A load is applied to determine whether the pedestals meet the requirement defined in 4.2.3.

#### 5.3.1.4 Apparatus

A test apparatus in accordance with Figure 2 shall be used.

### 5.3.1.5 Procedure

The pedestal base shall be rigidly fastened to a rigid substratum within the test apparatus. Instead of fastening by adhesive or mechanical fixing an appropriate clamping device may be used providing its adequacy is proven by comparative tests and checked at regular intervals.

The same applies to the use of the same pedestal bases for more than one test.

Stringers are not used in this test.

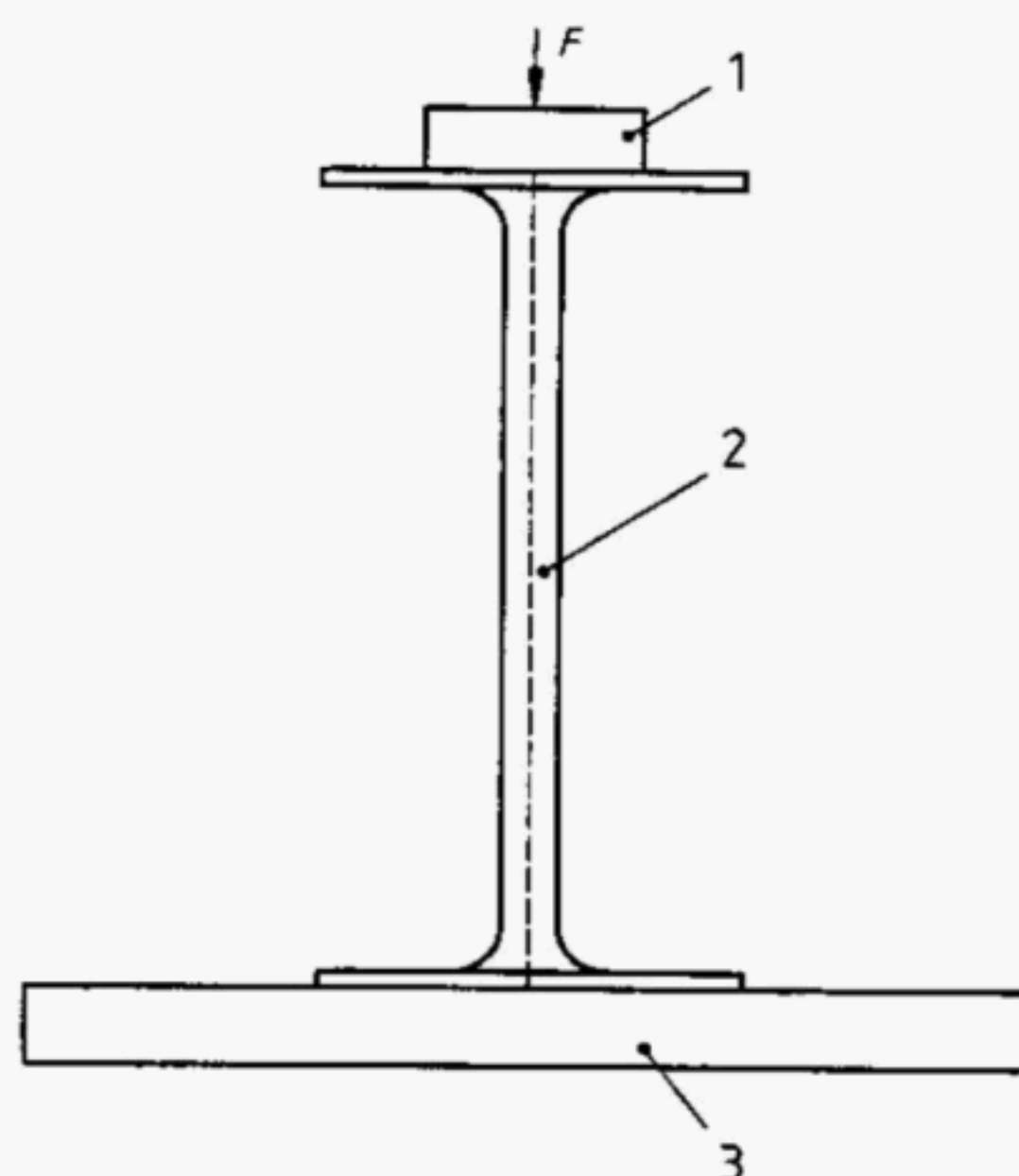
The pedestal upper part shall be adjusted to the utmost height attributed to the particular pedestal type.

The indenter shall be placed exactly over the centre of the pedestal head on the top of the panel corner.

A test load shall be applied at a rate of  $120 \text{ N/s} \pm 10 \%$  to the stated value.

The same fixing method as intended to be used in practice, or a method representing the intended fixing method, shall be used in the test.

The pedestal may not show any sign of collapse.



#### Key

- 1 Indendor 50 mm ´ 50 mm
- 2 Pedestal
- 3 Measurement table

**Figure 2 — Pedestal vertical load test**

## **5.4 Permanent deformation test on element**

### **5.4.1 Sampling**

See 5.3.1.1

### **5.4.2 Preparation and preservation of samples and test pieces**

See 5.1

### **5.4.3 Principle**

This test is carried out using the same apparatus and procedure as test 5.2.1 except the load is not increased beyond the working load point and is held at that load for 30 min. Residual deformation is measured 5 min after removal of the load.

### **5.4.4 Apparatus**

See 5.2.1.4.

### **5.4.5 Procedure**

This test is carried out as an extension of the test as described in 5.2.1 using one element only.

The indenter is placed at wherever the test laboratory considers the weakest point of the element.

The working load is applied by a 25 mm cube for  $5 \pm 1$  min. The load is then removed and the deflection sensor zeroed.

A steadily increasing load shall be applied at a speed of  $120 \text{ N/s} \pm 10 \%$  until the load equals the specified working load. The load shall be maintained for 30 min and then removed. The deflection on the underside of the panel under the applied load shall be recorded 5 min after the removal of the load. Deflection readings shall be read within a limit of error of  $\pm 0,01 \text{ mm}$  for deformation and within a limit of error of  $1 \%$  for load.

## **5.5 Dynamic Loading**

### **5.5.1 Hard body impact test**

#### **5.5.1.1 Sampling**

One element (and stringers if applicable) has to be sampled at random from the actual production.

#### **5.5.1.2 Preparation and preservation of samples and test pieces**

See 5.1.

#### **5.5.1.3 Principle**

To assess whether or not an element withstands an impact load from a hard body.

#### **5.5.1.4 Apparatus**

See Figure 3.

Sufficient free space shall be available under the test panel to ensure that the panel does not touch the sub-floor.



### 5.5.1.5 Procedure

A steel indenter with a mass of  $(4,5 \pm 0,05)$  kg and with a 50 mm hemispherical end shall be dropped inside a guide tube of 55 mm internal diameter onto the test panel from a height of  $(600 \pm 10)$  mm onto the following positions:

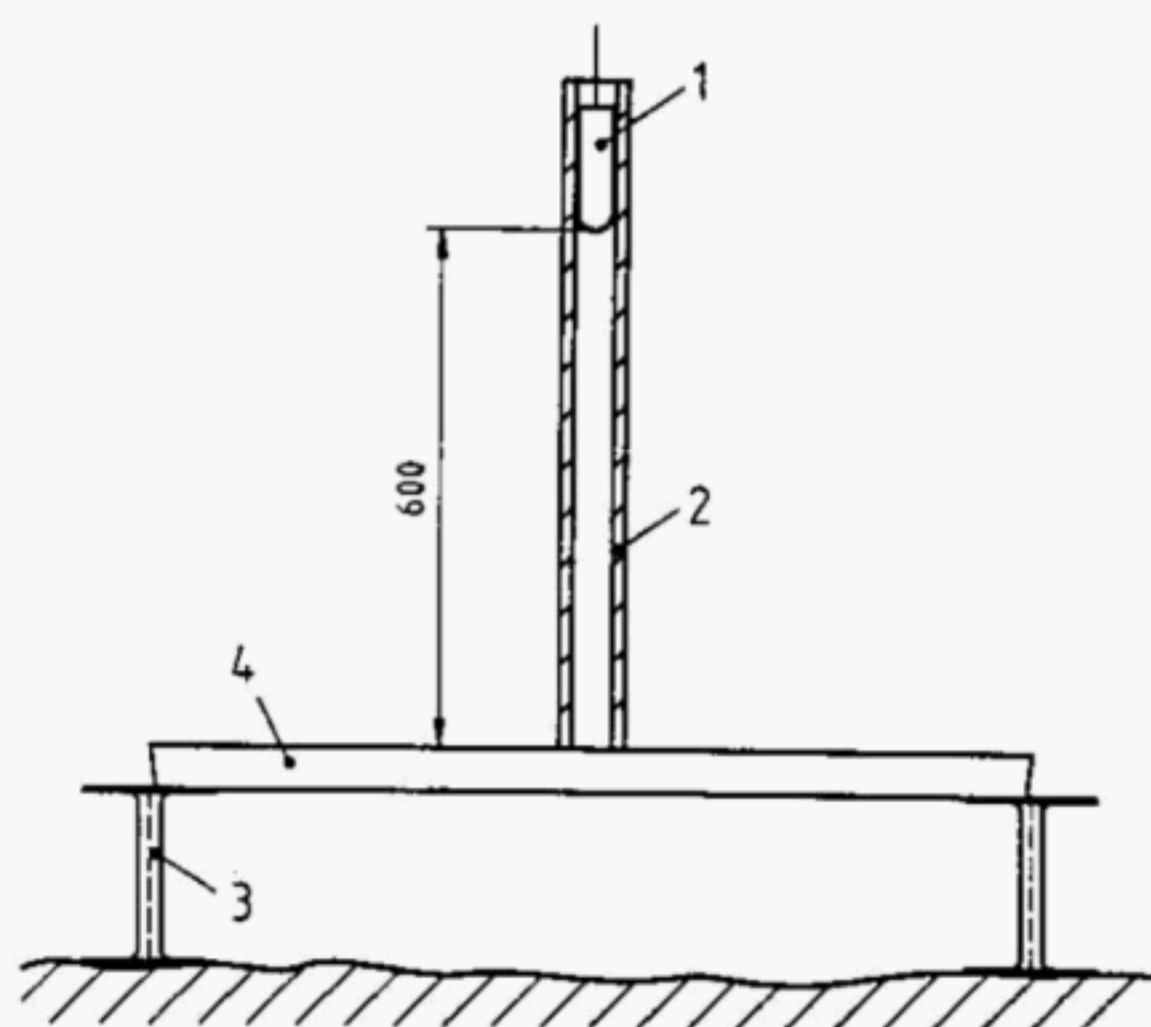
- the centre of the panel and;
- the centre of one edge of the panel and/or;
- any other point which is the weakest point of the element.

The panel shall not collapse or crack after any impact.

### 5.5.1.6 Expression of results

The result shall be reported as PASS or FAIL depending on whether or not the panel collapses or cracks. Any damage to the panel shall be reported.

Dimensions in millimetres



### Key

- 1 4,5 kg indenter
- 2 Guide tube, 55 mm diameter
- 3 Support
- 4 Load bearing layer

**Figure 3 — Hard body impact test**



## **5.5.2 Soft body impact test**

### **5.5.2.1 Sampling**

One element (and stringers if applicable) has to be sampled at random from the actual production.

### **5.5.2.2 Preparation and preservation of samples and test pieces**

See 5.1

### **5.5.2.3 Principle**

To assess whether or not a panel withstands an impact load from a soft body.

### **5.5.2.4 Apparatus**

A device in accordance with Figure 4 or equivalent shall be used.

**5.5.2.4.1** A flat bottomed canvas bag containing dried sand 2 to 4 mm diameter and having a mass of  $(40 \pm 0,8)$  kg. The bag shall be 300 mm maximum in diameter.

**5.5.2.4.2** A device for hoisting and instantaneous release of a bag.

**5.5.2.4.3** A measuring rod with length equal to the prescribed drop height  $(1\ 000 \pm 10)$  mm.

Sufficient free space shall be available under the test panel to permit the bottom of the bag to penetrate the panel at failure.

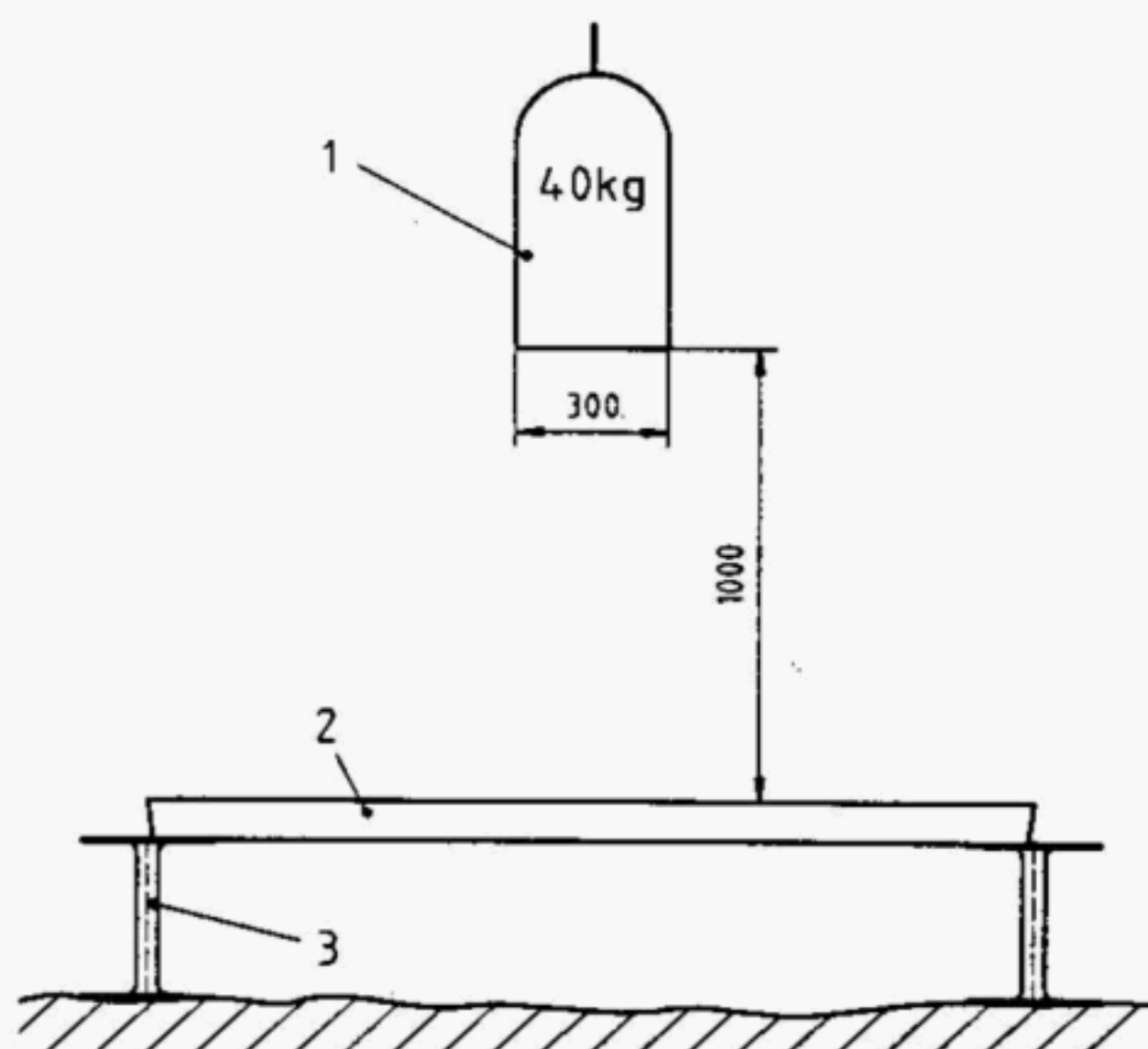
### **5.5.2.5 Procedure**

The filled bag shall be dropped on to the test panel from a height of 1 m.

The first drop shall make contact with the centre of the panel. A second drop shall be made on the centre of one edge of the panel so that the complete bag bottom meets the panel surface. The panel shall not collapse or crack.

### **5.5.2.6 Expression of results**

The result shall be reported as PASS or FAIL depending on whether or not the panel collapses or cracks. Any damage to the panel shall be reported.



### Key

- 1 Sandbag
- 2 Panel
- 3 Pedestal

**Figure 4 — Soft body impact test**

## 5.6 Measurement of dimensions

### 5.6.1 General

Measurements shall be carried out on panels as they are to be supplied to the customer, except that for initial testing procedures the covering (if any) may be omitted (see Table 3), providing it does not contribute to the structural strength of the panel.

At the discretion of the test laboratory measurements may be made by other methods and/or equipment than those shown in Figures 5 to 11 subject to the principles stated being adhered to and achieving the same accuracy and precision.

All dimensions in Figures 5 to 11 are nominal.

### 5.6.2 Sampling and preparation for dimensional measurement

When sampling the measurements shall be made on three new panels taken at random from the actual production.

For the preparation and preservation of samples and test pieces see 5.1.

### **5.6.3 Length of panel sides**

#### **5.6.3.1 Principle**

Measurements shall be made at the level of the line of contact with adjacent panels.

They are made parallel to one edge, in order to obtain deviation from the manufacturer's stated size.

#### **5.6.3.2 Apparatus**

A measuring device in accordance with Figure 5 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

#### **5.6.3.3 Procedure**

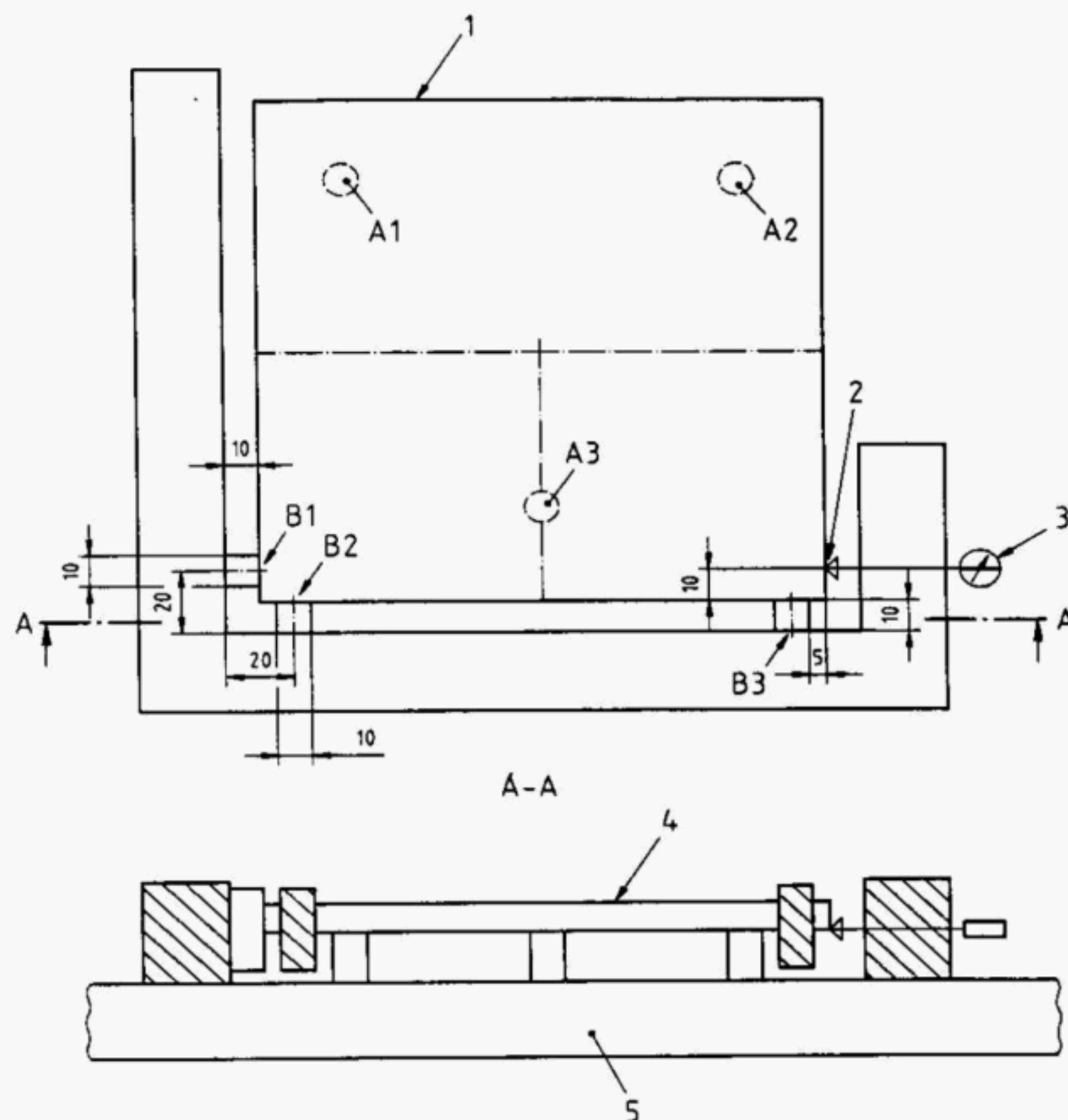
Zero the dial gauge to the manufacturer's stated size, measured from the transverse stop B1.

The panel is put upside down into contact with traverse stops B1, B2 and B3.

The four sides of the panel are successively measured.

#### **5.6.3.4 Expression of results including methods of calculation and precision of the test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.



### Key

- 1 Panel  
2 Front edge  $\varnothing$  5 mm  
3 Dial gauge C1 4  
Panel top side  
5 Measurement table  
A1 A3 Support stops  
B1 B3 Traverse stops

**Figure 5 — Length of panel sides**

#### 5.6.4 Squareness of panel

#### 5.6.4.1 Principle

Squareness is determined by measuring the length of the deviation from the perpendicular on a reference line.

Measurements shall be made at the level of the line of contact with adjacent panels.

**5.6.4.2 Apparatus**

A measuring device in accordance with the layout of Figure 6 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

**5.6.4.3 Procedure**

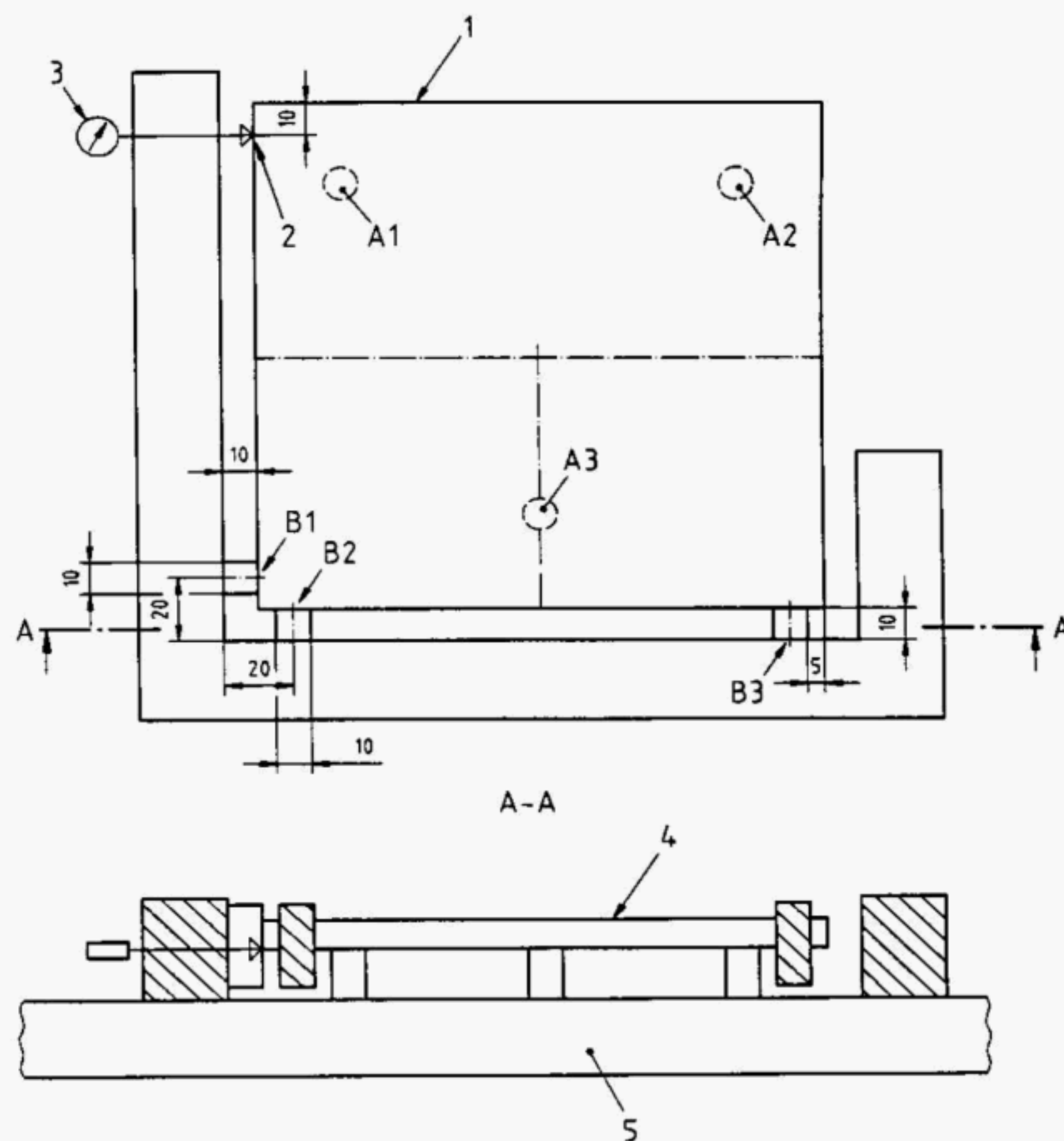
Zero the dial gauge C2 to the exact perpendicular established by the transverse stops B.1 and the reference line through B2 and B3.

Place the panel upside down into contact with the transverse stops B1, B2 and B3.

The four sides of the panel are successively measured.

**5.6.4.4 Expression of results including methods of calculation and precision of the test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the tolerances given in Table 3.

**Key**

- 1 Panel
- 2 Front edge  $\varnothing$  5 mm
- 3 Dial gauge C2
- 4 Panel bottom side
- 5 Measurement table
- A1 A3 Support stops
- B1 B3 Traverse stops

**Figure 6 — Measurement of squareness of panel**



## **5.6.5 Straightness of sides horizontally**

### **5.6.5.1 Principle**

Straightness is determined by measuring the deviation from a reference line.

Measurements shall be made at the level of the line of contact with adjacent panels.

They are made parallel to one edge, in order to obtain deviation from the manufacturer's stated size.

### **5.6.5.2 Apparatus**

A measuring device in accordance with Figure 7 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

### **5.6.5.3 Procedure**

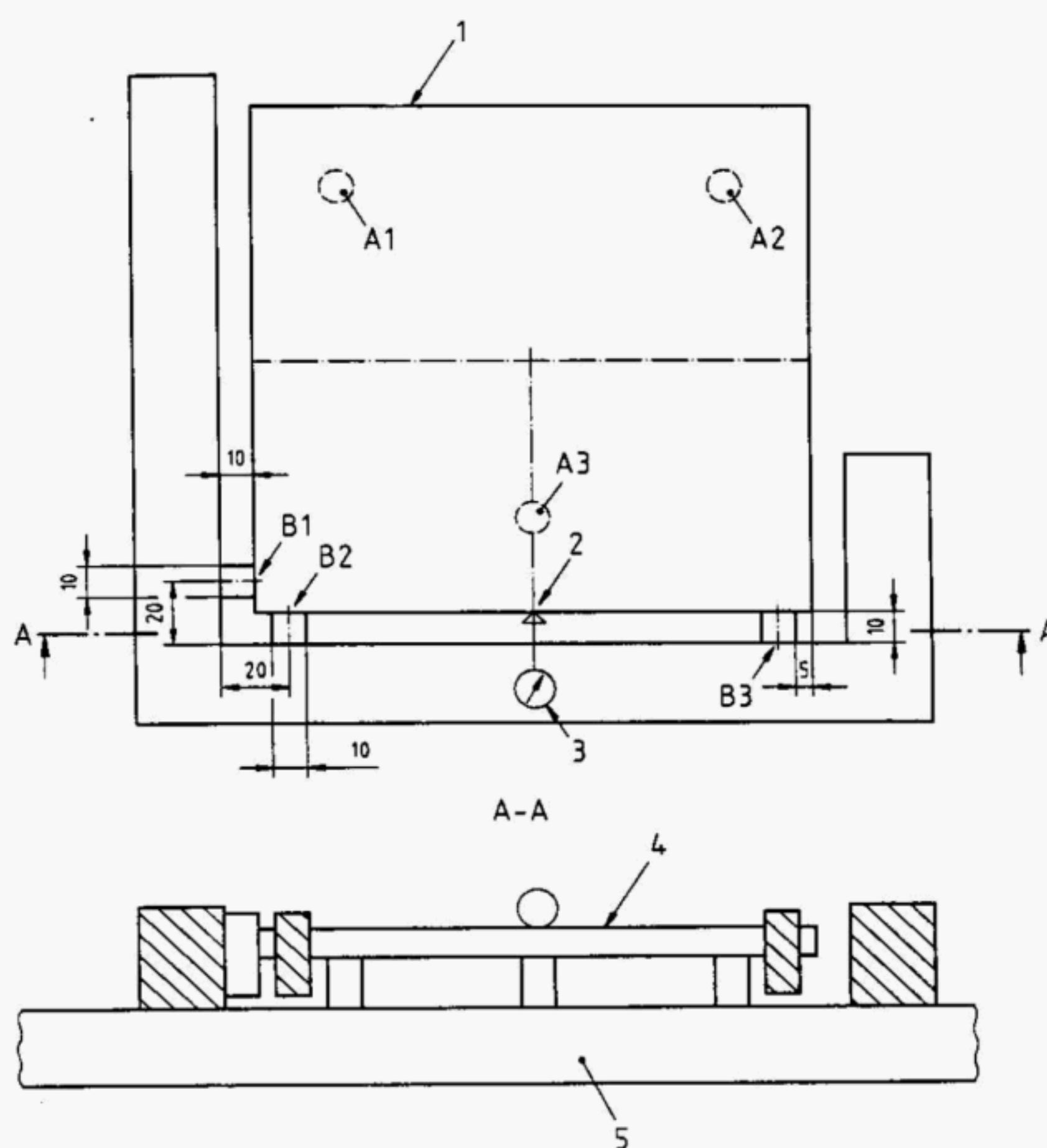
Zero the dial gauge C.3 to the reference line passing through B2 and B3.

The panel is placed upside down into contact with the transverse stops B1, B2 and B3.

The deviations on the four sides of the panel are successively measured.

### **5.6.5.4 Expression of results including methods of calculation and precision of test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.



### Key

- 1 Panel
- 2 Front edge  $\varnothing$  5 mm
- 3 Dial gauge C3
- 4 Panel bottom side
- 5 Measurement table
- A1 A3 Support stops
- B1 B3 Traverse stops

**Figure 7 — Measurement of straightness of panel sides horizontally**

## 5.6.6 Thickness of panel

### 5.6.6.1 Principle

Thickness is determined by measuring the deviation from the manufacturer's stated value.

### 5.6.6.2 Apparatus

A measuring device in accordance with Figure 8 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

### 5.6.6.3 Procedure

The panel is put upside down on three calibrated blocks A, B and C as shown in Figure 8.

A 5 kg mass H shall be placed as shown in Figure 8. Zero the dial gauge F to the manufacturer's stated size.

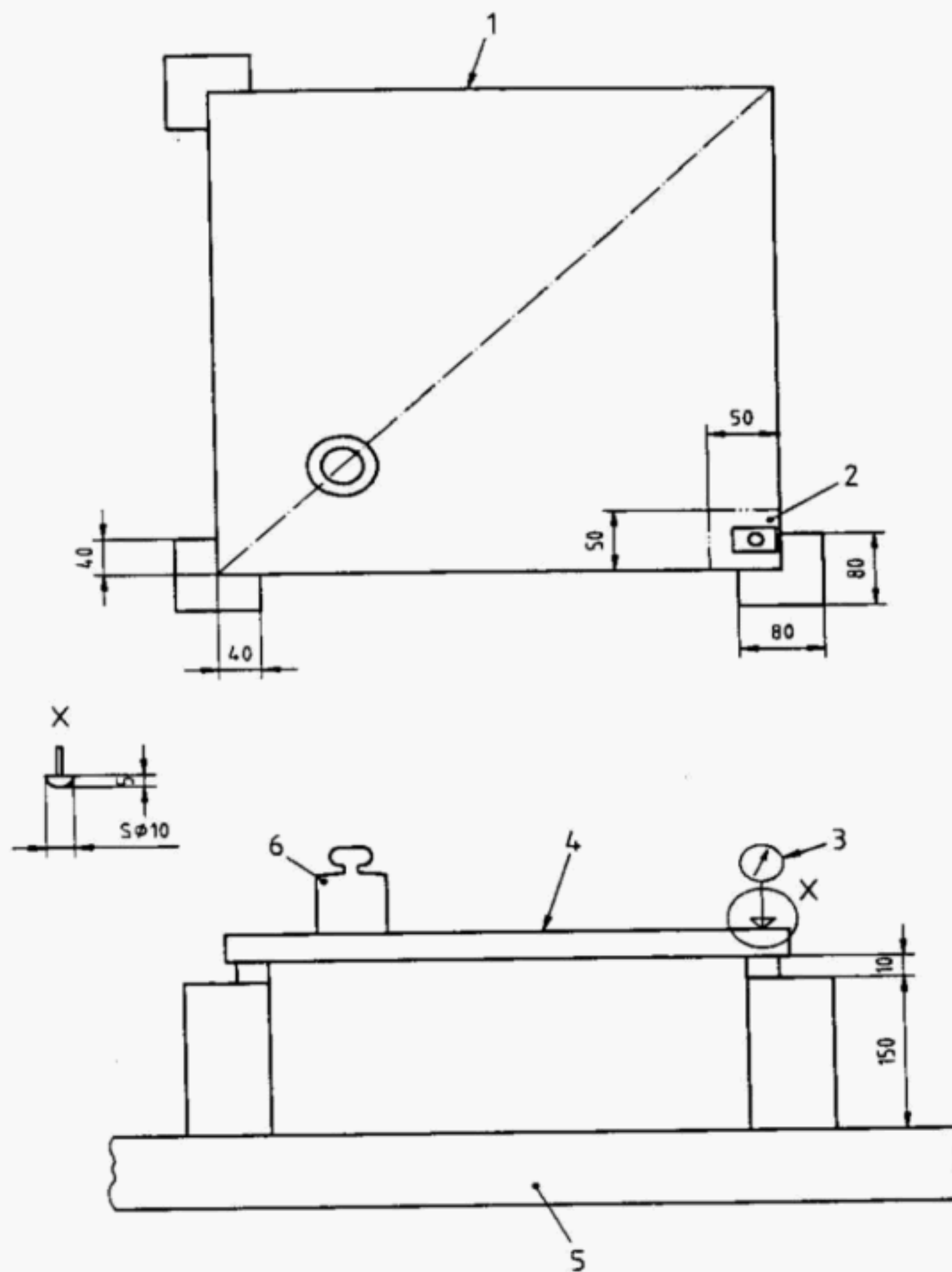
Measurements shall be made at the manufacturer's stated point within the normal supporting area and within the edge trims.

The deviation on the four corners is successively measured, by turning the panel.

#### 5.6.6.4 Expression of results including methods of calculation and precision of test methods

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.

Dimensions in millimetres



## Key

- 1 Panel
- 2 Measuring area
- 3 Dial gauge F
- 4 Panel top side
- 5 Measuring table
- 6 Mass

**Figure 8 — Measurement of panel thickness**

### **5.6.7 Panel twist**

#### **5.6.7.1 Principle**

Panel twist is determined by measuring the movement of the panels at the rocking corner.

#### **5.6.7.2 Apparatus**

A measuring device in accordance with Figure 9 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

#### **5.6.7.3 Procedure**

The panel is put upside down on four calibrated blocks as shown in Figure 9.

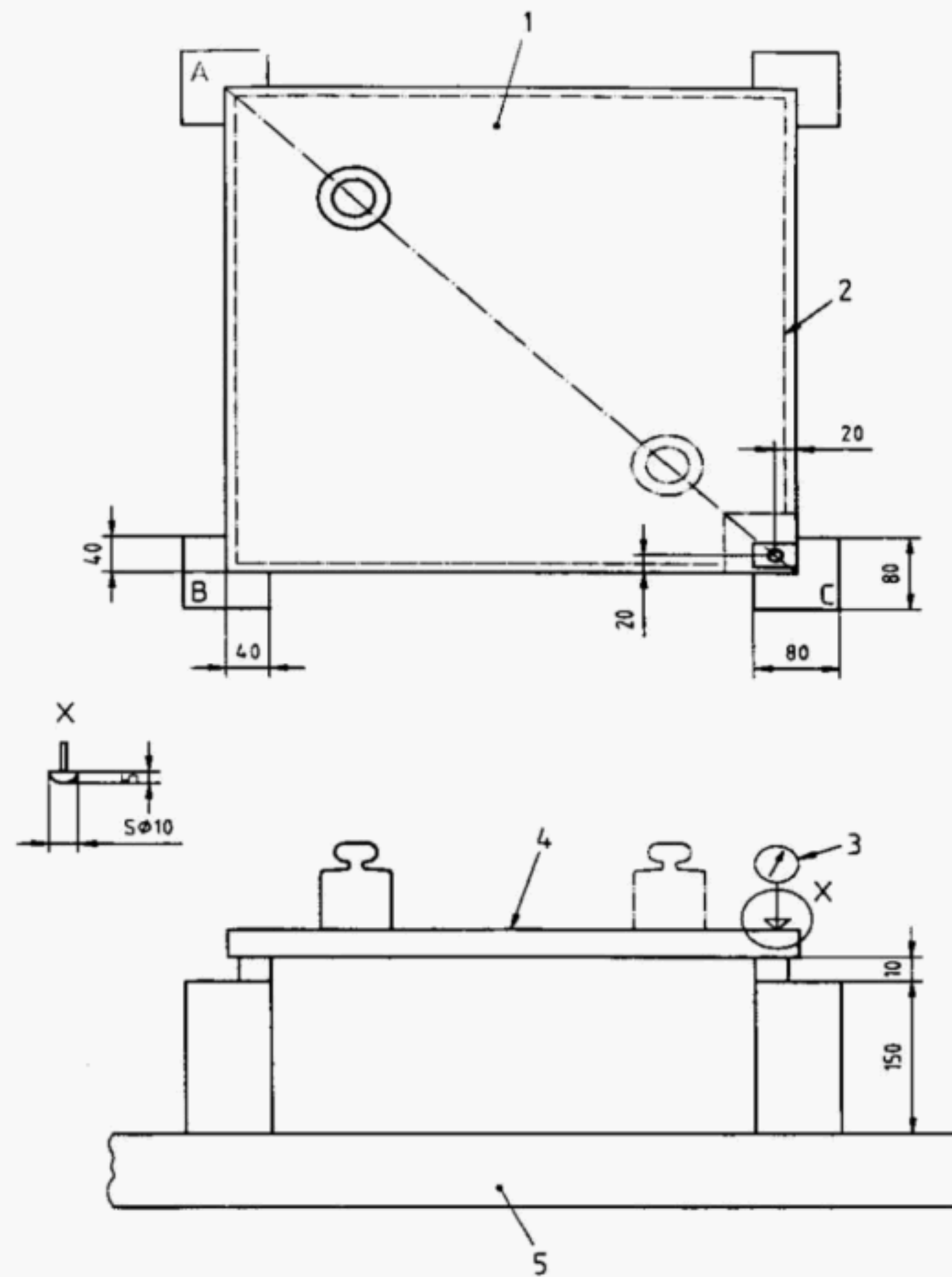
A mass of 5 kg shall be placed as shown in Figure 9 on one of the rocking corners (if any).

Zero the dial gauge and place it at the opposite corner.

Move the weight to the opposite corner and read the dial gauge.

#### **5.6.7.4 Expression of results including methods of calculation and precision of test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.



### Key

- 1 Panel
- 2 Perimeter trims
- 3 Dial gauge
- 4 Panel top side
- 5 Measurement table

**Figure 9 — Measurement of panel twist**

## **5.6.8 Vertical warping of panels**

### **5.6.8.1 Principle**

Vertical warping of panel sides is determined by measuring the deviation of a parallel line between a reference plane and the top surface of a panel.

### **5.6.8.2 Apparatus**

A measuring device in accordance with Figure 10 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

### **5.6.8.3 Procedure**

The panel is placed upside down on the three calibrated blocks A, B and C.

A 5 kg mass shall be placed as shown in Figure 10.

Zero the dial gauge F to the reference line across the top of the blocks B and C.

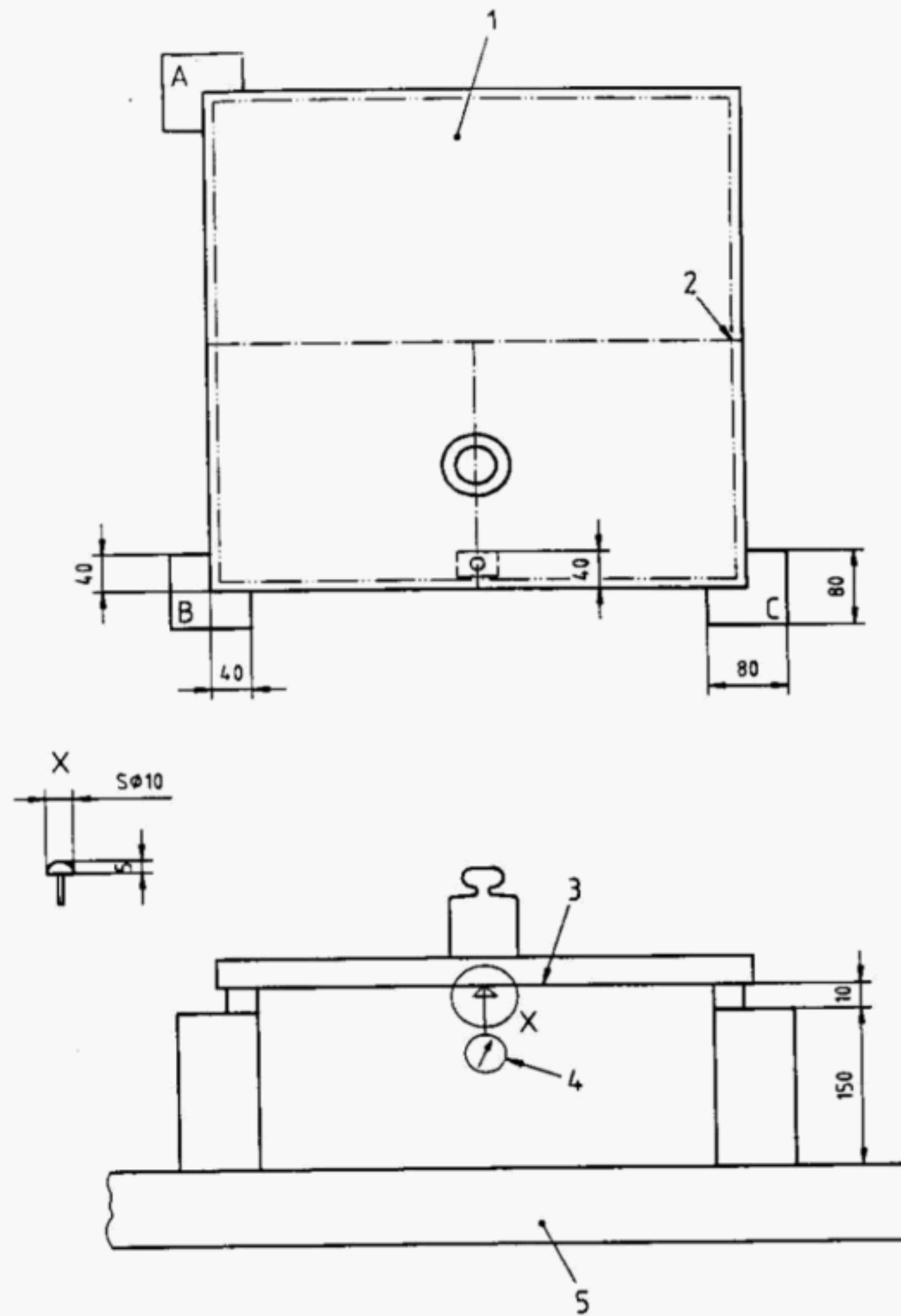
The deviation on the four sides of the panel is successively measured, by turning the panel.

### **5.6.8.4 Expression of results including methods of calculation and precision of test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.



Dimensions in millimetres



### Key

- 1 Panel
- 2 Perimeter trims
- 3 Panel top side
- 4 Dial gauge
- 5 Measurement table

Figure 10 — Measurement of vertical warping of the panel side

## **5.6.9 Difference in height from perimeter trims to panel surface**

### **5.6.9.1 Principle**

Measuring of the difference between the top surface of the panel and the surface of the edge trim.

### **5.6.9.2 Apparatus**

A measuring device in accordance with Figure 11 shall be used.

The measuring device shall have a reading accuracy of 0,01 mm.

### **5.6.9.3 Procedure**

The panel is placed topside up on four blocks as shown in Figure 11.

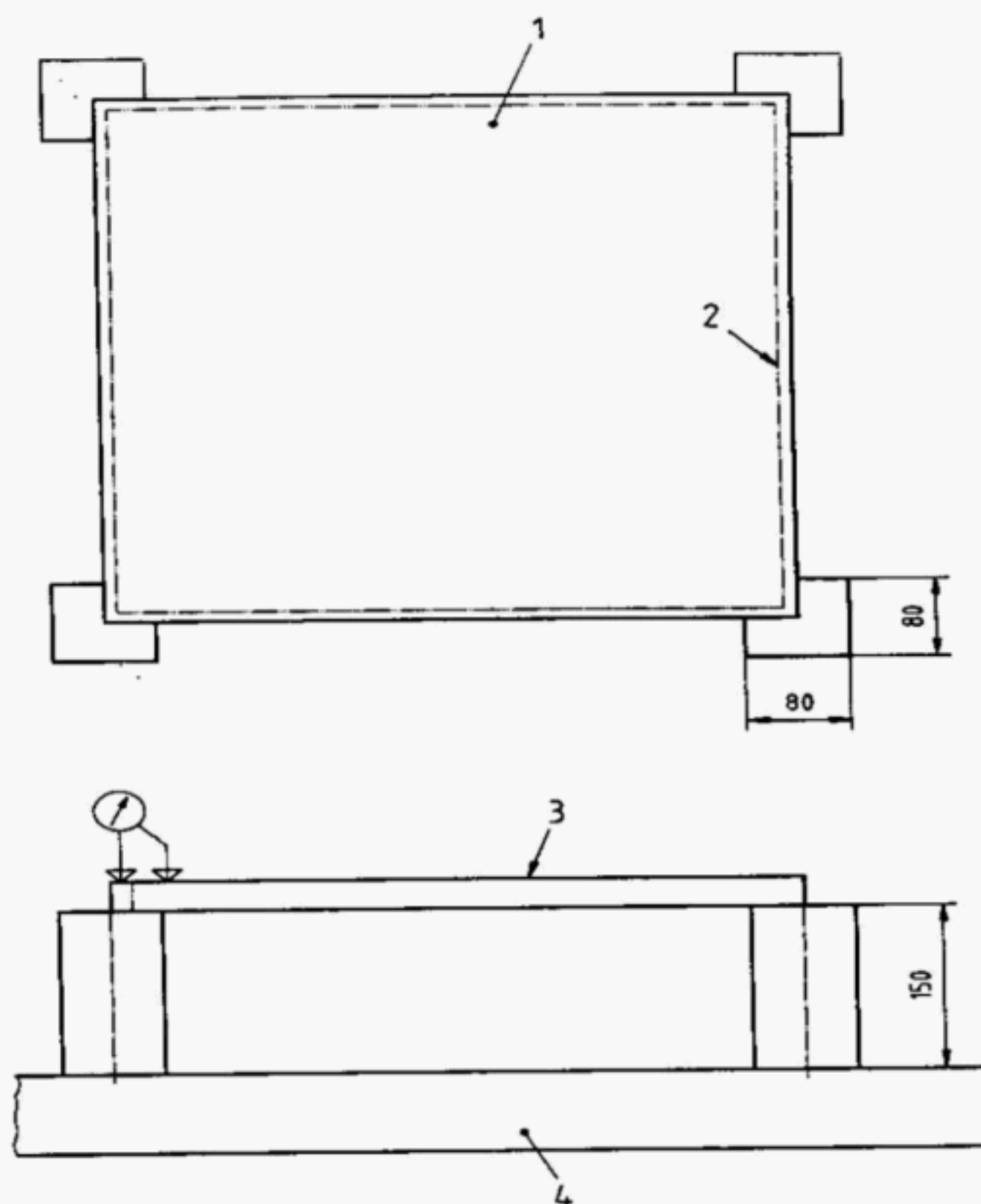
Zero the dial gauge on the top surface of the panel.

The deviation is obtained by putting the dial gauge on the topside of the trim. The measurement shall be made at the location where the deviation of the trims is the greatest.

The deviation of the four sides is successively measured by turning the panel.

### **5.6.9.4 Expression of results including methods of calculation and precision of test methods**

Readings are to be taken to two decimal places and shall be rounded and recorded to the nearest first decimal place. All measured deviations shall be within the values given in Table 3.



### Key

- 1 Panel
- 2 Perimeter trims
- 3 Panel top side
- 4 Measurement table

**Figure 11 — Measurement of difference in height from perimeter trims to panel surface**

### 5.7 Peel resistance

To determine the peel resistance, two strips are cut out from the access floor panel each as shown in Figure 12 and Figure 13.

The stripes shall have the following dimensions:

- strip width  $b$  shall be 50 mm;
- strip length  $x$  shall be at least half the panel size.

The arrows in the figure show the direction of pull. A peel angle of  $90^\circ$  to the panel level shall be applied. During the test the pulling power  $F$  in the hatched area of the strips is constantly monitored and recorded. The mean peel resistance of the test strip is derived from the following equation:

$$\text{mean peel resistance} = \frac{\text{mean.pull.power}}{\text{width.of.test.strip}}$$

N/mm.

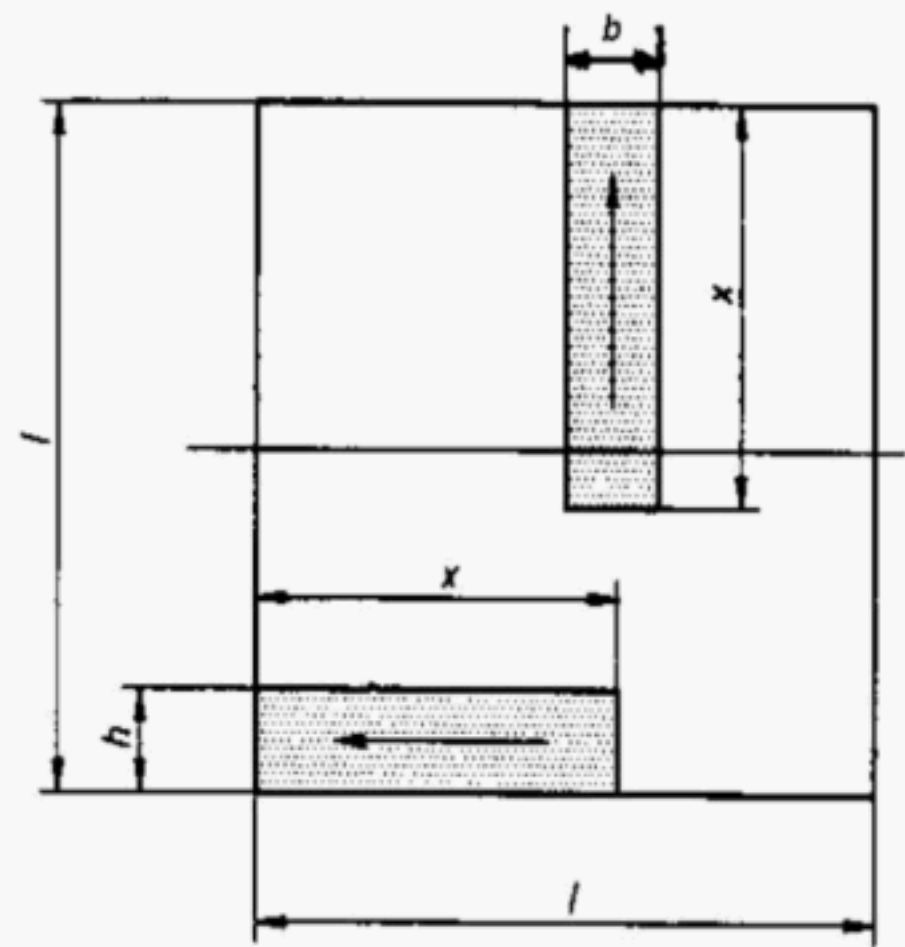
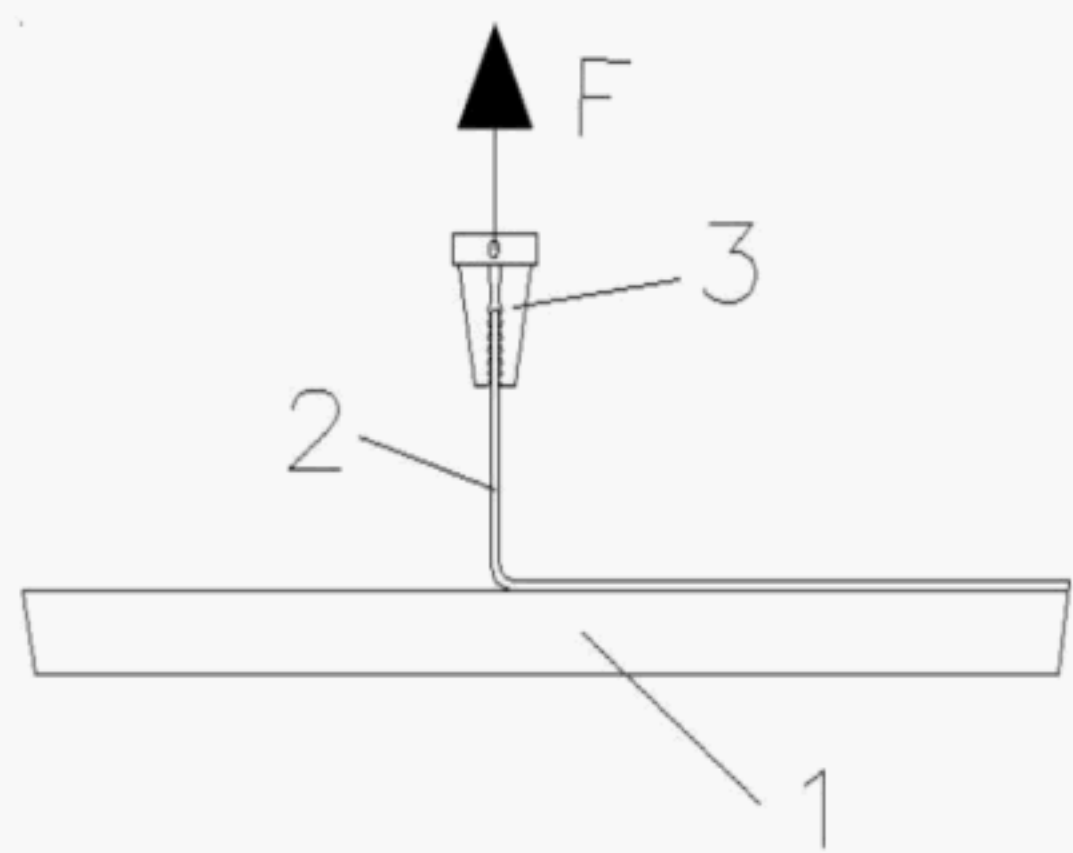


Figure 12 — Peel resistance test



**Key**

- 1 Panel
- 2 Floor finish
- 3 Pliers

Figure 13 — Peel resistance test

## 6 Evaluation of conformity

### 6.1 General

The compliance of a raised access floor with the requirements of this standard and with the stated values (including classes) shall be demonstrated by:

- initial type testing;
- factory production control by the manufacturer, including product assessment.

For the purposes of testing, floors may be grouped into families, where it is considered that the selected property is common to all floors within that family.

NOTE A family is a group of products within which a change of components does not affect the characteristic(s) stated.

### 6.2 Type testing

#### 6.2.1 Initial type testing

Initial type testing shall be performed on first application of this standard. Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account. Whenever a change occurs in the floor design, the raw material or supplier of components, or the production process (subject to the definition of a family, see 6.1), which would change significantly one or more of the stated characteristics, the type test shall be repeated for the appropriate characteristic(s).

If tests or assessments (e.g. reaction to fire, release of dangerous substances) have been performed in accordance with the provisions of another European Standards and the results are stated with the component or raw material concerned, the manufacturer of the raised access floor need not repeat the test or assessment.

Characteristics determined without test (e.g. reaction to fire Class A1 without testing or emission of dangerous substances by controlling content) are not subject to initial type testing.

The results of all type tests shall be recorded and held by the manufacturer for a period of at least five years.

### 6.3 Factory production control (FPC)

#### 6.3.1 General

The manufacturer shall establish, document and maintain a FPC-system to ensure that the product placed on the market conforms with the stated performance characteristics. The FPC-system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

A FPC-system conforming with the requirements of the relevant part(s) of EN ISO 9000, and made specific to the requirements of this standard, will be considered to satisfy the above requirements.

The result of inspections, tests or assessments shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded.

#### 6.3.2 Equipment

All weighing, measuring and testing equipment used by the manufacturer shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

### 6.3.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

### 6.3.4 Design process

If design or calculation has been used, (except where verified by testing), the FPC-system shall document the design of products, identify the checking procedure and those individuals responsible for the design.

During the design process itself, a record shall be kept of all checks, their results, and any corrective actions taken. The record shall be sufficiently detailed and accurate to demonstrate that all stages of the design phase, and all checks, have been carried out satisfactorily.

## 7 Marking, labelling and packaging

### 7.1 Marking and labelling

The following information shall appear on the commercial documents:

- the manufacturers' trademark or identification mark;
- the number and year of this European Standard;
- the year and month of marking;
- the following characteristics, as relevant:
  - reaction to fire;
  - resistance to fire;
  - load bearing capacity and deflection;
  - grade of tolerance;
  - safety factor;
  - electrostatic conductivity;
  - impact sound insulation;
  - airborne sound insulation;
  - thermal conductivity;
  - peel resistance;
  - corrosion protection;
  - risk of electrocution;
  - hard body impact; —  
soft body impact.

The components shall be identifiable so that they can be linked to the element and thereby to the commercial documents.

### 7.2 Packaging

The packaging shall ensure that the product will be transported and delivered without any damage and shall provide protection against humidity.

## **Bibliography**

EN ISO 9000, *Quality management and quality assurance standards.*



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