BRITISH STANDARD

BS EN
13264:2001

Ventilation for buildings — Floor mounted air terminal devices — Tests for structural classification

The European Standard EN 13264:2001 has the status of a British Standard

ICS 91.140.30

National foreword

This British Standard is the official English language version of EN 13264:2001

The UK participation in its preparation was entrusted to Technical Committee RHE/2, Air diffusion and air distribution, 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.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 July 2001

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Ventilation for buildings - Floor mounted air terminal devices - Tests for structural classification

Ventilation des bâtiments - Bouches d'air montées en plancher - Essais pour classification structurelle

Lüftung von Gebäuden - Bodenseitig eingebaute Luftdurchlässe - Prüfungen für die bauliche Klassifizierung

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by September 2001, and conflicting national standards shall be withdrawn at the latest by September 2001.

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Introduction

There are many types of floor mounted air terminal devices used in applications such as domestic, industrial, commercial and computer rooms, for both supply of treated air to, and extraction from, a space. It is important to understand the different types of units available and be able to compare each type of unit under standard test conditions for structural integrity. This laboratory test standard identifies commercially available unit types together with a method of classification and appropriate tests for each particular type.

1 Scope

This European Standard specifies structural classifications for floor mounted Air Terminal Devices (ATD's) in respect of their possible applications and the following related structural test methods:

a) Static test methods.

b) Impact test methods.

c) Dynamic test methods.

Electrical continuity requirements for platform raised floor systems and components are not covered in this standard.

Requirements for aerodynamic and acoustic testing of air terminal devices are not covered in this standard.

The standard does not deal with any simulations relating to the wear characteristics of Air Terminal Devices.

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 or 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).

CR 12792, *Ventilation for buildings — Symbols and terminology*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in CR 12792, together with the following, apply.

3.1
deflection of device
distance moved by the grille or its parts from the original position when subject to load

3.2
deformation after load
permanent deflection measured from the original position after applying and removing the load

3.3
floor mounted air terminal device (ATD)
air terminal device intended to be mounted in the floor of the treated space

3.4
pedestal
adjustable supporting structure for raised floor systems which include, where applicable, the head complete, the base column, and adjustment and locking devices (see Figure 3)

3.5
platform raised floor system
complete raised access floor comprising load bearing fixed or removable panels supported by adjustable pedestals to provide underfloor space for the housing and distribution of services etc.. It includes all necessary accessories, fixing and installation, and floor covering where applicable

3.6
stability of deflection of device
difference in deflection when measured 30 min and 60 min after applying a load

3.7
structural class of the ATD
class identified for loading conditions under which the air terminal device is intended to be used

4 Classification

The structural classes shall be as specified in Table 1, which also indicates typical applications.

Table 1 — Structural classes and typical applications

Structural class	Typical applications
Extra light	General residential premises, i.e. houses, private office accommodation.
Light	General office accommodation without heavy equipment, homes for the elderly
Medium	General office accommodation where it is expected that heavy equipment such as drafting tables will be used, typically Data preparation areas Educational accommodation Public areas
Heavy	Computer rooms, telephone exchanges, public areas, control rooms.
Extra heavy	Computer rooms with heavy equipment and other special applications.

5 Instrumentation

5.1 Load measurement

5.1.1 Loads shall be measured with either a pressure transducer or a pressure gauge.

5.1.2 Load measuring instruments shall have accuracies of within ± 1 % over their full range.

5.1.3 Load measuring instrument shall be calibrated before use and re-calibrated at intervals not greater than 12 months.

5.2 Deflection measurement

5.2.1 Deflection shall be measured with either a deflection transducer or a dial deflection gauge.

5.2.2 Deflection measuring instruments shall have accuracies of within ± 1 % over their full range.

5.2.3 Deflection measuring instruments shall be calibrated before use.

6 Test programmes

This section specifies the respective tests to be carried out on the various structural classes of terminal devices. Table 2 specifies the static concentrated loads to be applied when tested in accordance with clause 7 for the various structural classes. Table 3 specifies the impact loads to be applied when tested in accordance with clause 8 for the various structural classes, and Table 4 specifies the rolling loads to be applied in accordance with clause 9 for the various structural classes.

Table 2 — Structural classes for static concentrated loads

Structural class	Load
Extra light	0,75 kN over 25 mm × 25 mm area
Light	1,5 kN over 25 mm × 25 mm area
Medium	3,0 kN over 25 mm × 25 mm area
Heavy	4,5 kN over 25 mm × 25 mm area
Extra heavy	4,5 kN over 25 mm × 25 mm area and 11 kN over 4 off 25 mm × 25 mm areas

Table 3 — Structural classes for impact loads

Structural classes	Load
ATD's of all classes having dimensions of nominal minimum dimensions of 600 mm × 600 mm	40 kg mass from a height of 1 m

Table 4 — Structural classes for rolling load (dynamic test)

Structural class	Test	Load
Extra light	Not applicable	
Light or medium	Deformation	2 kN
	Stability of deflection	3 kN
Heavy or extra heavy	Deformation	3 kN
	Stability of deflection	4,5 kN

7 Static concentrated load test

7.1 General

The test shall be carried out to establish the classification of floor mounted air terminal devices under point loading conditions, except that for small devices it may only be necessary to test at the centre position or any other position which is considered to be the point of maximum weakness.

The following parameters shall be determined:

— Deflection

— Stability of deflection

— Safety loading (integrity)

— Deformation

— Structural class

7.2 Test installation

7.2.1 A different ATD shall be used for each of the loading positions as shown in Figure 1.

7.2.2 The concentrated load tests shall be carried out using an indentor consisting of a steel cube (25 ± 1) mm × (25 ± 1) mm × (25 ± 1) mm with its corners radiused to a minimum of 2 mm. The indentor shall be positioned on the ATD to be tested using an installation similar to that shown in Figure 2.

7.2.3 The means of support for the ATD shall be as recommended by the manufacturer. ATD's intended for use with raised floors shall be supported on steel blocks or floor jacks.

7.3 Test procedure

7.3.1 A pre-test load (Bedding-in load) shall be applied before starting the full test for each ATD. Half of the test load specified in Table 2 shall be applied for a period of 2 min and then removed, and a further 5 min shall elapse before the test proper commences.

7.3.2 The deflection measurement gauge shall be set to zero.

7.3.3 The test load specified in Table 2 shall be applied at the position (a) indicated in Figure 1 and maintained for a period of 60 min and the deflection measured to an accuracy of 0,1 mm directly beneath the indentor at the following time periods:

a) immediately after applying the load;

b) 30 min after applying the load;

c) removing the load (at 60 min after commencing the tests);

d) 30 min after removing the load.

7.3.4 The procedures specified in 7.3.1 to 7.3.3 shall be repeated at each of the loading points indicated in Figure 1 where applicable using a different ATD for each of the tests.

7.3.5 After removal of the load, the indentation shall be measured.

7.4 Safety loading

A different ATD shall be subjected to three times the test load as specified in Table 2 and applied at the position (a) indicated in Figure 1, or at the weakest point of the ATD if different to the indicated point (a). The procedure shall be in accordance with 7.2.2 to 7.3.3 with deflection measurement made after removal of the load.

7.5 Classification parameters

The parameters for classification shall be in accordance with Table 5.

Table 5 — Parameters for classification for static concentrated load test

Structural class	Maximum allowable deflection	Maximum allowable stability of deflection	Maximum allowable deformation	Safety Loading
All structural classes tested	$\leq 0{,}004 \times$ shortest span between supports or 2,5 mm whichever is the greater	0,2 mm difference in deflection (see 3.6)	0,7 mm measured 30 min after removal of the load	Shall not collapse

7.6 Special test measurements for extra heavy structural class only

The procedures as described in 7.2 to 7.5 shall be carried out on two different extra heavy structural class ATD's with the following differences:

a) the static load of 11 kN shall be applied through an indentor comprising four steel cubes as described in 7.2 each mounted at the corner of a 200 mm $\times$ 200 mm square steel plate at least 12 mm thick, using an installation similar to shown in Figure 3;

b) the test positions shall be as described in Figure 4;

c) the safety loading test shall be 22 kN applied through the indentor plate at point (a) indicated in Figure 4 or at the weakest point of the ATD if different to point (a);

7.7 Test report

The test report shall include the following information:

a) The full specification of the ATD;

b) A drawing to show the positions of the applied loads and the method of supporting the ATD;

c) The achieved structural class of the ATD;

d) The deflection 30 min after applying the load;

e) The deflection 60 min after applying the load;

f) The stability of deflection of the ATD (the difference in deflection between 30 min and 60 min after applying the load;

g) The deformation (the deflection measured 30 min after removal of the test load);

h) Any damage to the ATD as recorded under 7.4.

8 Impact load test

8.1 General

This test is applicable to ATD's having minimum nominal dimensions of 600 mm × 600 mm.

The test shall be made to determine the resistance to an impact load, and the following parameters shall be determined:

— Stability of deflection

— Deformation

8.2 Test installation

8.2.1 The test installation shall consist of a flexible fabric bag having a base diameter of 300 mm ± 20 mm and containing 40 kg of dry sand. The bag shall be suspended on a quick release system such that the base of the bag is 1 m above the top surface of the ATD to be tested as shown in Figure 5.

8.2.2 The means of support for the ATD shall be as recommended by the manufacturer. ATD's intended for use with raised floors shall be supported on steel blocks or floor jacks.

8.3 Test procedure

8.3.1 The deflection measurement gauge shall be set to zero.

8.3.2 The bag shall be released and allowed to drop freely on to the centre of the ATD.

8.3.3 Immediately after the impact the ATD shall be examined to establish whether or not it has collapsed.

8.3.4 The deformation shall be measured 30 min after the impact.

8.4 Classification parameters

The parameters for classification shall be in accordance with Table 6.

Table 6 — Parameters for classification for impact load test

Structural class	Maximum allowable deformation	Stability of deflection
All structural classes tested	1,0 mm	Shall not collapse

8.5 Test report

The test report shall include the following information:

a) The full specification of the ATD;

b) A drawing to show the method of supporting the ATD;

c) The structural class of the ATD.

9 Dynamic testing - rolling load test

9.1 General

The test shall be made to determine the ability of an ATD to sustain rolling loads across its surface area.

The following parameters shall be determined:

— Deformation

— Stability of deflection

These tests are not applicable to the extra light structural classification.

9.2 Test installation

9.2.1 The installation shall be typically as described in Figure 6 and consist of a means of applying a load directly to a hard plastic wheel 150 mm in diameter and 40 mm wide. A facility shall be provided to traverse the loaded wheel at a velocity of 0,33 m/s in a linear plane across both the full surface of the ATD and the extended surfaces on each side of the ATD.

9.2.2 The means of support for the ATD shall be as recommended by the manufacturer. ATD's intended for use with platform raised floor systems shall be supported on steel blocks or pedestals.

9.3 Test procedure

9.3.1 The deflection measurement gauge shall be set to zero.

9.3.2 The rolling load specified in Table 4 shall be applied to the wheel when in contact with the ATD.

9.3.3 The wheel shall be traversed 25 times across the ATD and on to the extended surface on the axis specified as test 1 in Figure 7 or Figure 8 as appropriate.

9.3.4 On completion of 25 traverses the deformation on the axis of traverse shall be measured in both the vertical and horizontal directions.

9.3.5 The procedures 9.3.1 to 9.3.4 shall be repeated on the axis specified as test 2 in Figure 7 or Figure 8 as appropriate.

9.4 Classification parameters

The parameters for classification shall be in accordance with Table 7.

Table 7 — Parameters for classification for rolling load test (dynamic testing)

Structural class	Maximum allowable deformation		Stability of deflection
	Vertical	Horizontal	
Light or medium	Test 1 : 1,00 mm	1,00 mm	Shall not collapse
	Test 2 : 1,00 mm	1,00 mm	Shall not collapse
Heavy or extra heavy	Test 1 : 4,00 mm	1,00 mm	Shall not collapse
	Test 2 :4,00 mm	1,00 mm	Shall not collapse

9.5 Test report

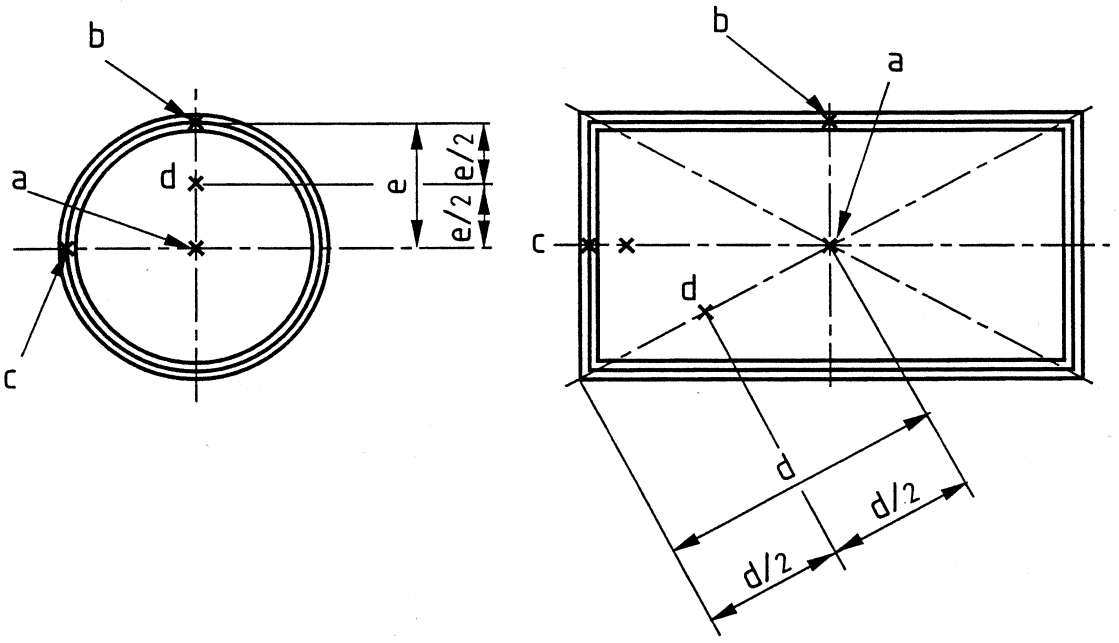
The test report shall include the following information:

a) A full specification of the ATD;

b) The structural class achieved by the ATD under test;

c) Description or drawing of the test apparatus;

d) The extent and position of each of the traverses of the wheel.



a) Circular

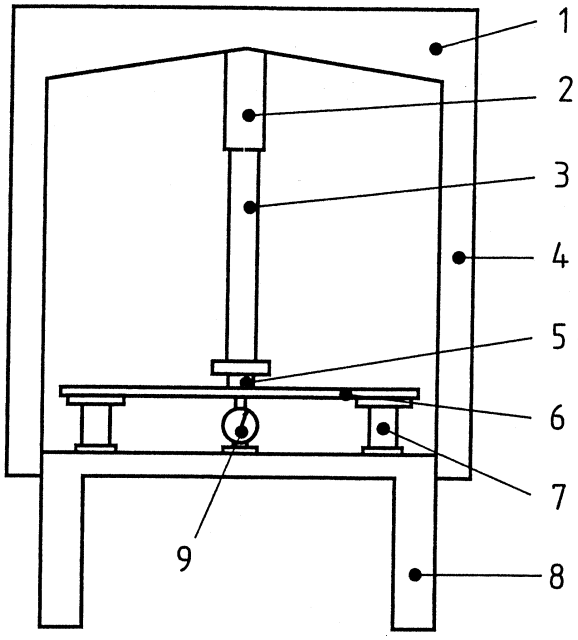
b) Square/Rectangular

Key

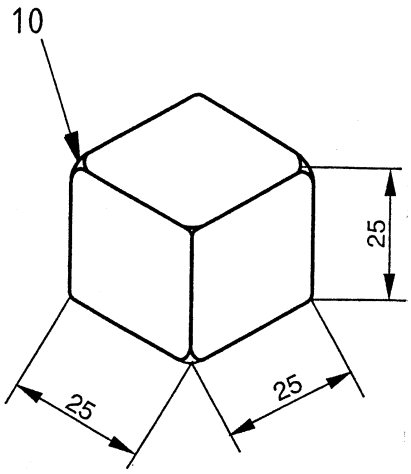
a **To the centre of the ATD**
b **To the centre edge of the ATD**
c **To the adjacent centre of edge of the ATD**
d **To a point along a diagonal half way from the edge to the centre**
e **To any other point on the ATD which the test authority may consider to be an area of weakness**

Figure 1 — Detail of applied static load positions for all grades of floor mounted air terminal devices (25 mm concentrated point load test)

Dimensions in millimetres



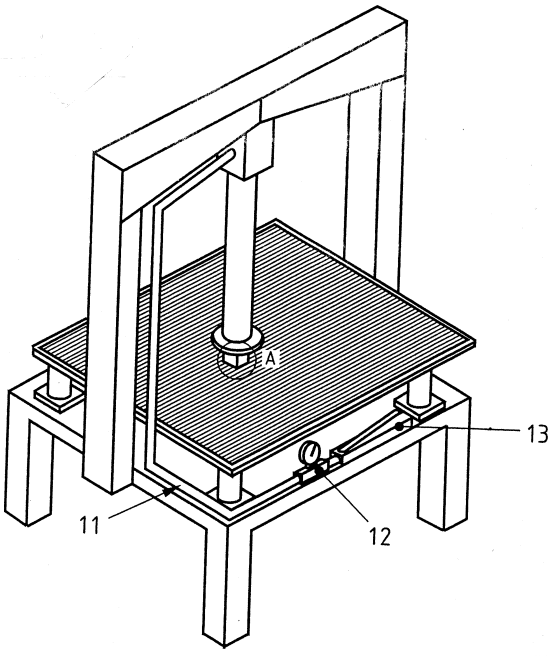
a) Front elevation
(Hydraulic supply omitted for clarit)



b) Detail A

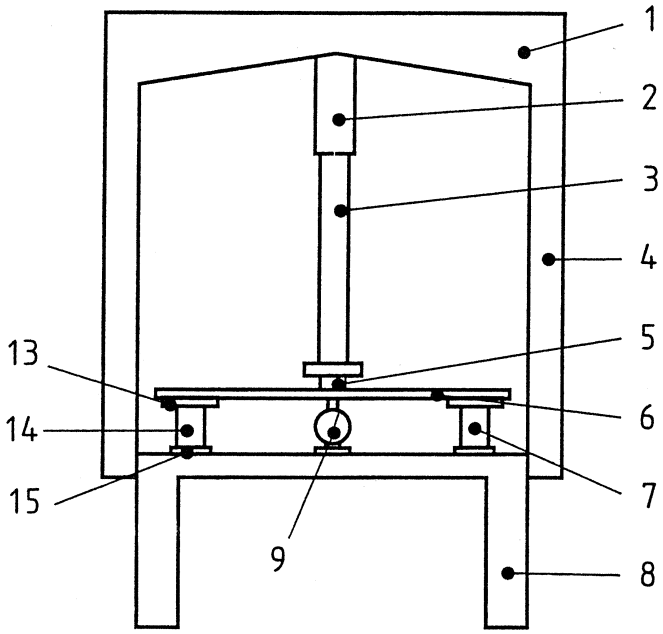
Key

1 Top frame
2 Spacer
3 Constant pressure ram
4 Support pillars
5 Indentor
6 Test ATD
7 Test ATD supports
8 Table
9 Deflection gauge
10 2 mm radius on all edges
11 Connection pipe
12 Control and supply valve and gauge
13 Suitable pressure loading device

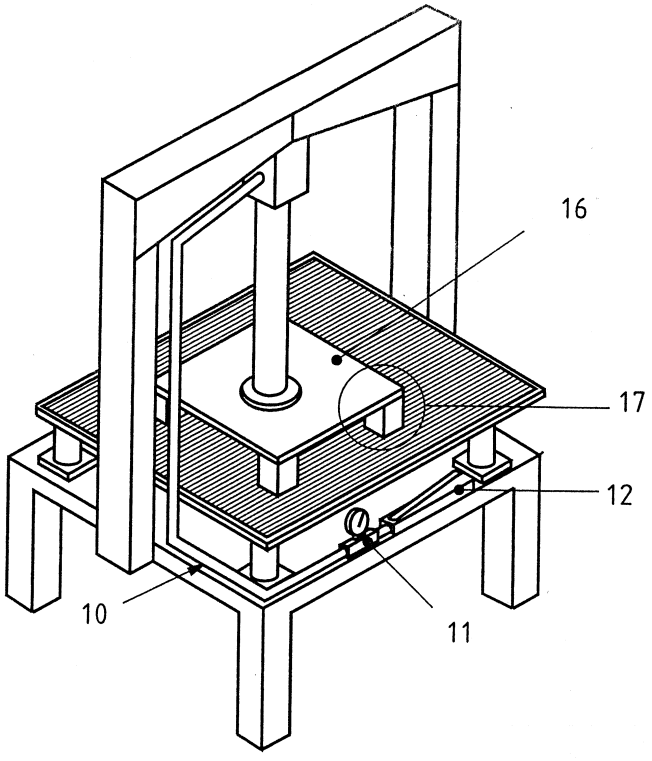


c) Isometric detail

Figure 2 — Static load and deflection test rig (25 mm square concentrated point load test)



a) Front elevation
(Hydraulic supply omitted for clarity)

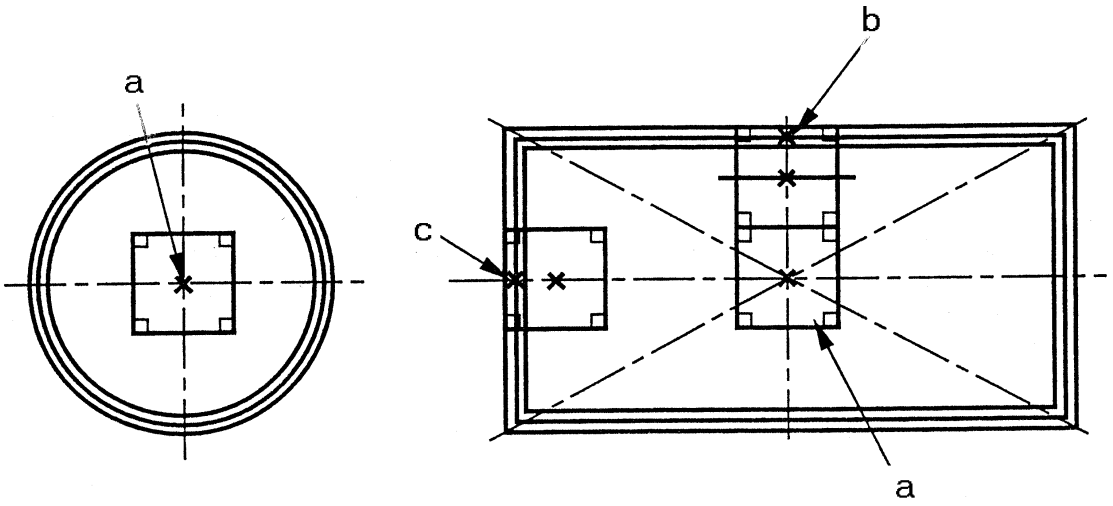


b) Isometric detail

Key

1 Top frame
2 Spacer
3 Constant pressure ram
4 Support pillars
5 Indentor
6 Test ATD
7 Test ATD supports
8 Table
9 Deflection gauge
10 Connection pipe
11 Control and supply valve and gauge
12 Suitable pressure loading device
13 Head
14 Column
15 Base
16 200 mm square steel plate
17 See Figure 1 for details

Figure 3 — Static load and deflection test rig (four point concentrated load test)



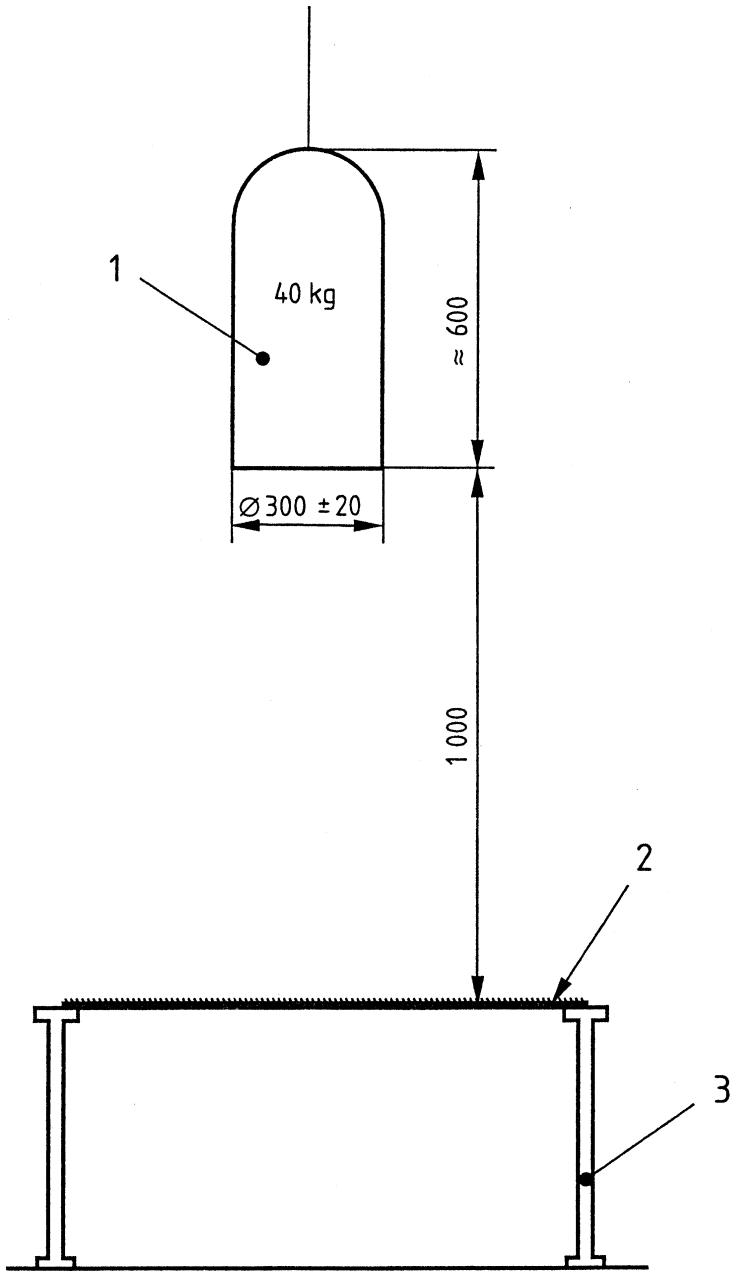
Key

a **To the centre of the ATD**
b **To the centre edge of the ATD (Square/Rectangular only)**
c **To the adjacent centre of edge of the ATD (Square/Rectangular only)**

a) Circular b) Square/rectangular

Figure 4 — Detail of applied static load positions for extra heavy grades of floor mounted air terminal devices (four point concentrated load test)

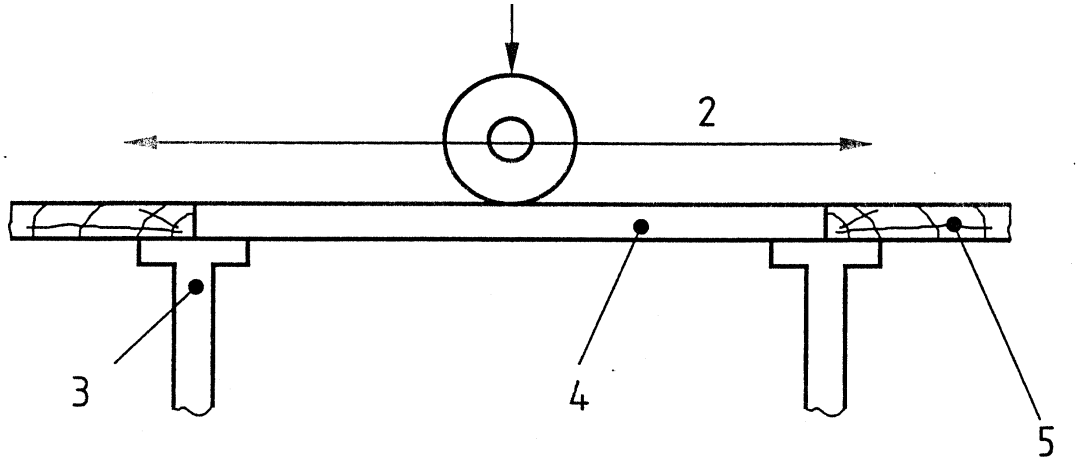
Dimensions in millimetres



Key

1 Flexible fabric bag filled with sand
2 ATD under test
3 Supports as recommended by manufacturer

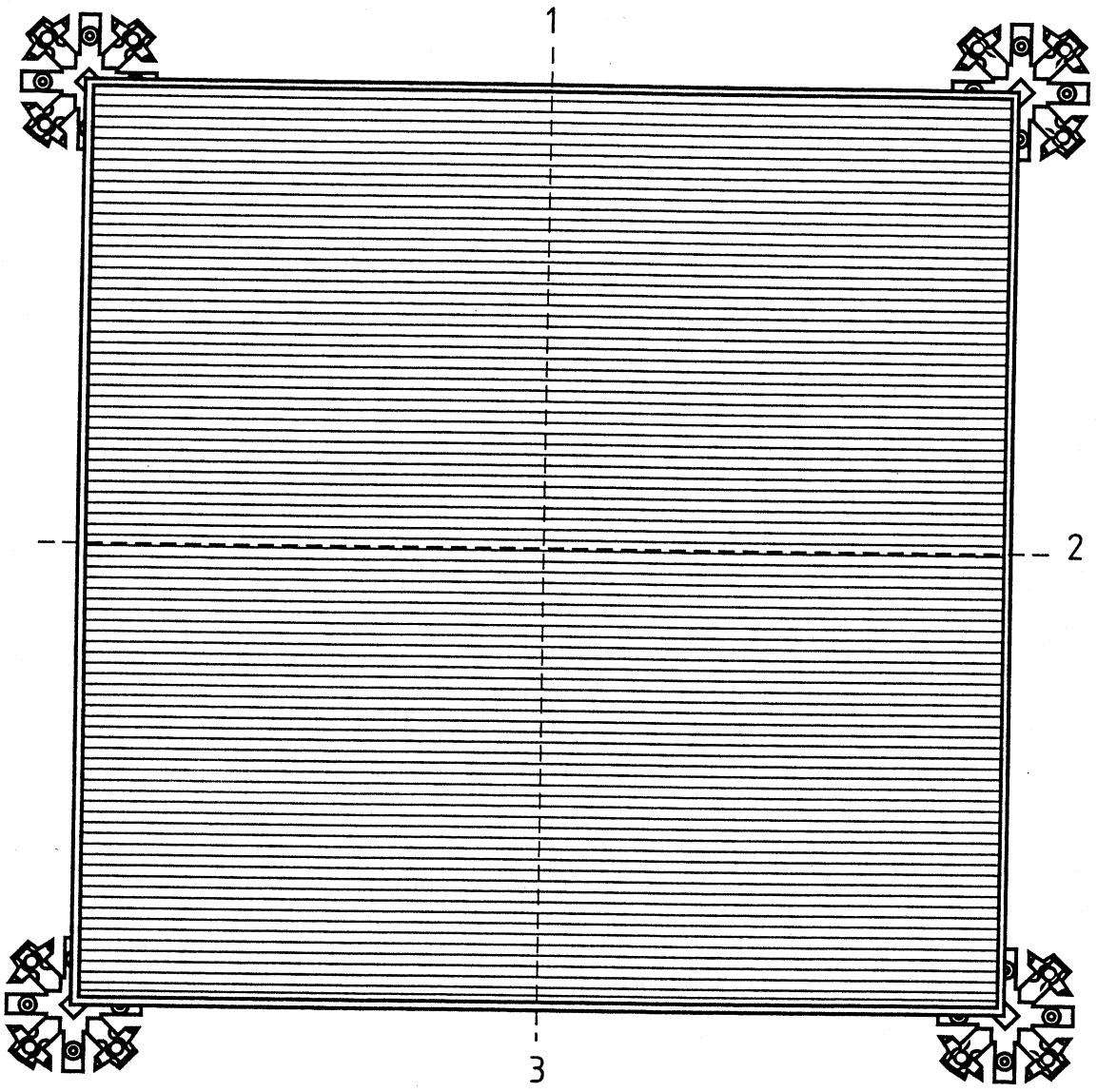
Figure 5 — Test installation for impact load test



Key

1 Applied load and wheel
2 Traversing movement of wheel
3 Supports
4 ATD under test
5 Extended surface sections of flooring

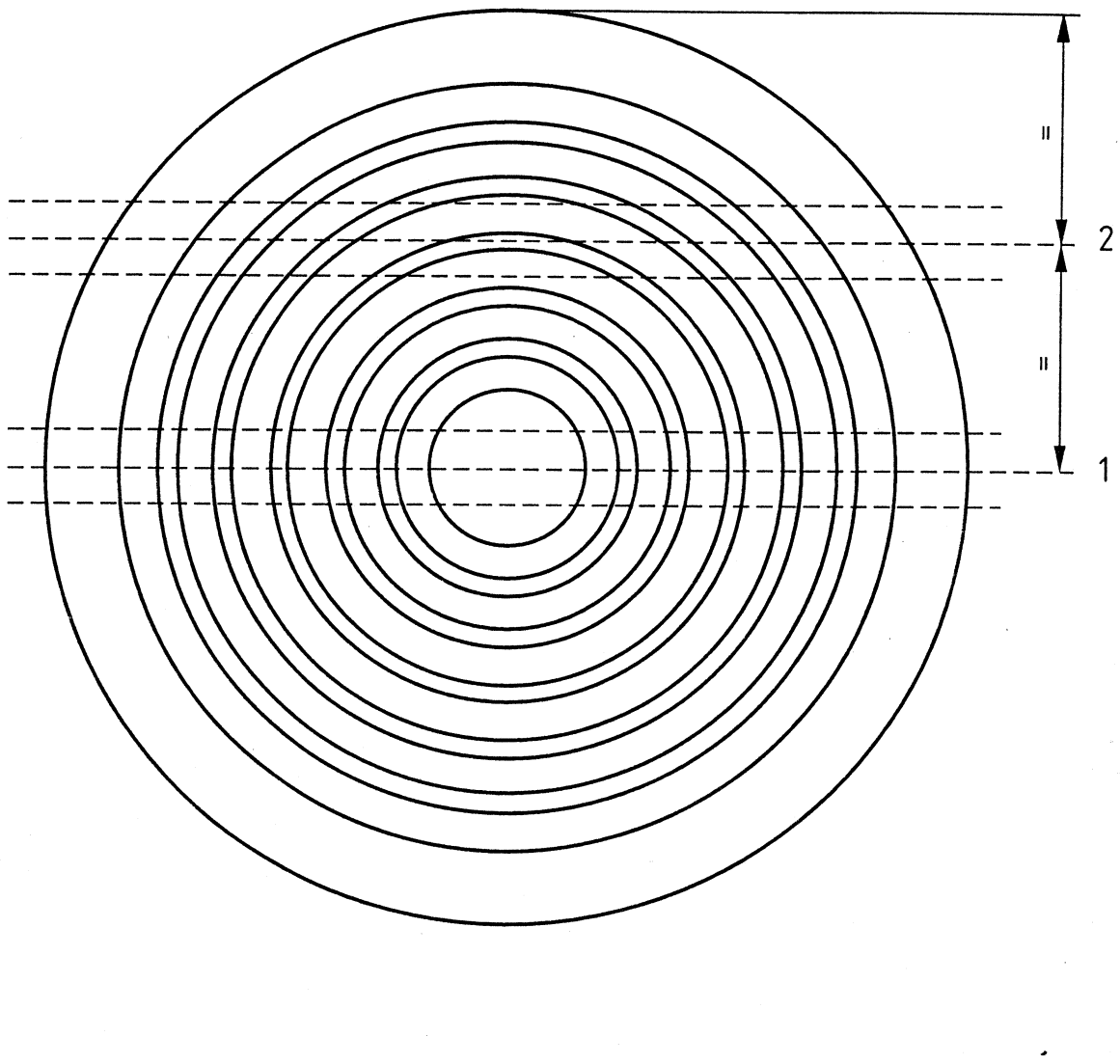
Figure 6 — Typical rolling load test arrangement



Key

1 Test 1
2 Test 2
3 Plan view of ATD under test

Figure 7 — Axes of traverses for rolling road test of square and rectangular floor mounted air terminal devices



Key

1 Test 1
2 Test 2
3 Plan view of ATD under test

Figure 8 — Axes of traverses for rolling load test for circular floor mounted air terminal devices

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