BS EN 1728:2012

Incorporating corrigendum July 2013

BSI Standards Publication

Furniture — Seating — Test methods for the determination of strength and durability

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National foreword

This British Standard is the UK implementation of EN 1728:2012, incorporating corrigendum July 2013. It supersedes BS EN 1728:2001 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee FW/0, Furniture, to Subcommittee FW/0/1, Common Test Methods for Furniture.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1728

July 2012

ICS 97.140

Incorporating corrigendum July 2013

English Version

Furniture - Seating - Test methods for the determination of strength and durability

Ameublement - Sièges - Méthodes d'essais pour la détermination de la résistance et de la durabilité

Möbel - Sitzmöbel - Prüfverfahren zur Bestimmung der Festigkeit und Dauerhaltbarkeit

This European Standard was approved by CEN on 9 June 2012.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1728:2012) has been prepared by Technical Committee CEN/TC 207 “Furniture”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by January 2013, and conflicting national standards shall be withdrawn at the latest by January 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1728:2000.

The main changes with respect to the previous edition are listed below.

— All test methods for seating used in European Standards for furniture have been collated in one document. The document now contains methods that were previously listed in EN 581-2, *Outdoor furniture*, EN 1335-3, *Office work chair*, and EN 15373, *Non-domestic seating*.

— A static load test for headrests has been included.

— Wherever possible test methods have been simplified and clarified for ease of use.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies test methods for the determination of strength and durability of the structure of all types of seating without regard to use, materials, design/construction or manufacturing process.

This European Standard does not apply to children's highchairs, table mounted chairs and bath seats which are covered by other European Standards.

Test methods for the assessment of ageing, degradation, ergonomics and electrical functions are not included.

The test methods are not intended to assess the durability of upholstery materials, such as upholstery filling materials and upholstery covers.

This European Standard does not include any requirements. Requirements for different end uses can be found in other Standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7619-2:2010, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 2: IRHD pocket meter method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
structure
load bearing parts of furniture such as the frame, seat, back and arm supports and suspension

3.2
leg rest
extension of the seat area intended to support the legs of the user

Note 1 to entry: A leg rest might or might not be permanently attached to the structure of the item of seating.

3.3
foot rest
part intended to support the feet of the user and which assists the user getting on or off an item of seating

Note 1 to entry: A foot rest might or might not be permanently attached to the structure of the item of seating.

3.4
work chair
chair, with or without arm rests, for use by one adult in the office or home office (for example working with a computer), whose upper part, which includes the seat and back, is supported on a single column and can rotate in the horizontal plane and is at least adjustable in height

3.5
back rest
element that supports the back of the user higher than 100 mm above the seat loading point

3.6
arm rest length
distance between vertical lines through the front and rear edges of the arm rest

4 General test conditions

4.1 Preliminary preparation

The furniture shall be tested as delivered. Knock-down furniture shall be assembled according to the instructions supplied. If the instructions allow the furniture to be assembled or combined in different ways, the most adverse combination shall be used for each test. Knock-down fittings shall be tightened before testing. Further tightening shall not take place unless specifically required by the manufacturer.

For seating that is designed to be fixed to the structure of a building, the unit shall be mounted according to the manufacturer's instructions to a structure representative of the service installation. This structure shall be sufficiently strong and stiff to eliminate the possibility of it affecting the results of the test.

Unless otherwise specified by the manufacturer, the sample for test shall be stored in indoor ambient conditions for at least 24 h immediately prior to testing.

The tests shall be carried out at indoor ambient conditions. However, if during a test the temperature is outside the range 15°C to 25°C, the maximum and/or minimum temperature shall be recorded in the test report.

4.2 Application of forces

The test forces in durability and static load tests shall be applied sufficiently slowly to ensure that negligible dynamic load is applied. The forces in durability tests shall be applied sufficiently slowly to ensure that kinetic heating does not occur.

Unless otherwise stated, static forces shall be maintained for (10 ± 2) s. Unless otherwise stated, durability forces shall be maintained for (2 ± 1) s.

The forces may be replaced by masses. The relationship 10 N = 1 kg shall be used.

4.3 Tolerances

Unless otherwise stated, the following tolerances are applicable to the test equipment:

— Forces: ± 5 % of the nominal force;

— Velocities: ± 5 % of the nominal velocity;

— Masses: ± 1 % of the nominal mass;

— Dimensions: ± 1 mm of the nominal dimension;

— Angles: ± 2^{o} of the nominal angle.

The accuracy for the positioning of loading pads and impact plates shall be 5 mm.

NOTE For the purposes of uncertainty measurement, test results are not considered to be adversely affected when the above tolerances are met.

5 Test equipment and apparatus

The equipment shall not inhibit deformation nor cause unnatural deformation of the unit/component, i.e. it shall be able to move so that it can follow the deformation of the unit/component during testing.

All loading pads shall be capable of pivoting in relation to the direction of the applied force. The pivot point shall be as close as practically possible to the load surface.

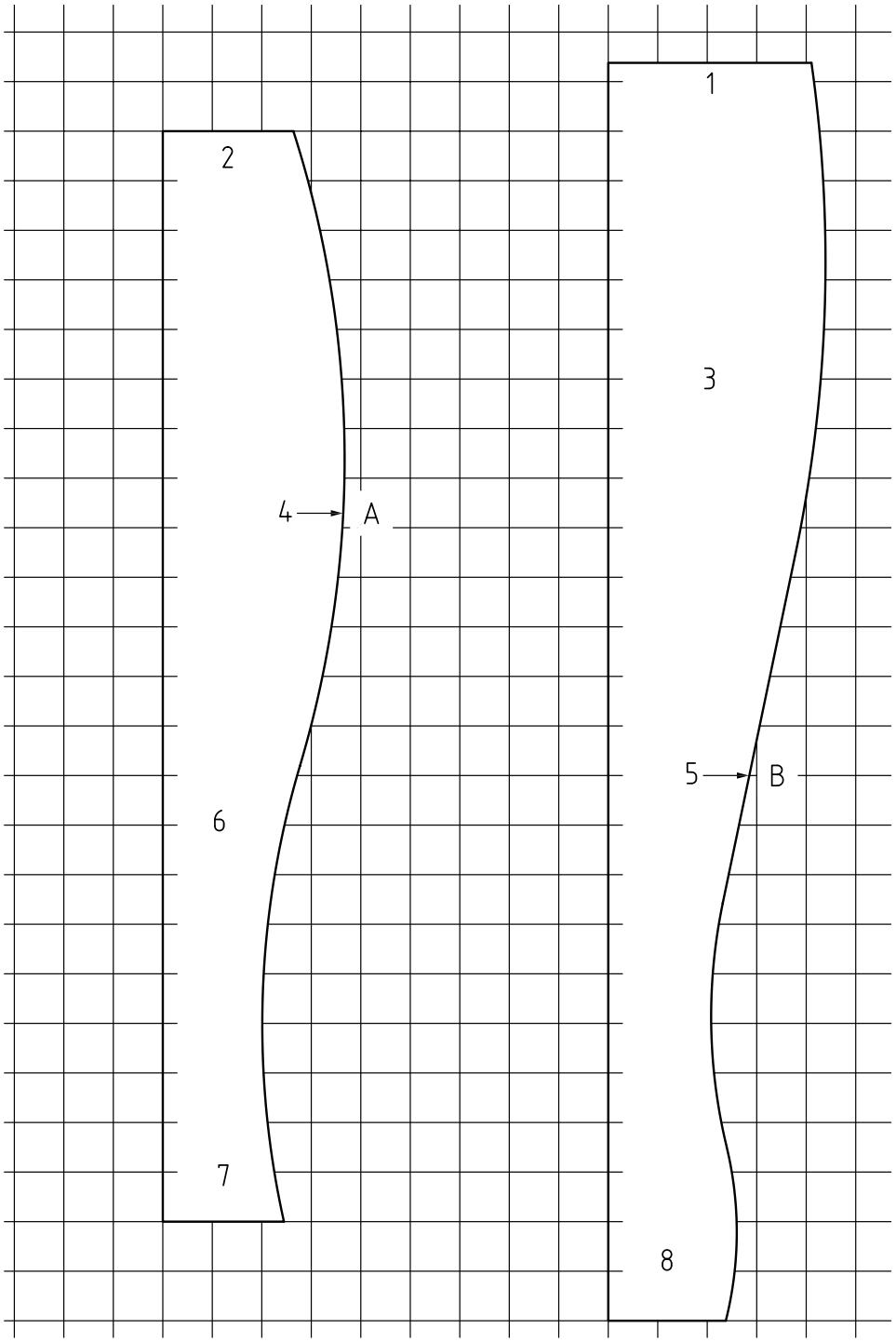
If a loading pad tends to slide, use a slip resistant material between the loading pad and the foam for loading pads (5.8).

The tests may be applied to any suitable device because results are dependent only upon correctly applied forces and not upon the apparatus. Exceptions include cases of impact tests where the apparatus described in 5.9 and 5.10 shall be used and the arm rest durability test where the apparatus described in 5.11 shall be used.

5.1 Loading point template, consisting of two shaped members (see Figure 1) fastened together by a pivot at one end.

The contours of the shaped surfaces are so devised as to sink into the upholstery. For this purpose, the loading point template, with an additional mass applied at the seat loading point, shall be 20 kg +1 kg, - 0 kg.

The apparatus is marked as shown in Figure 2.



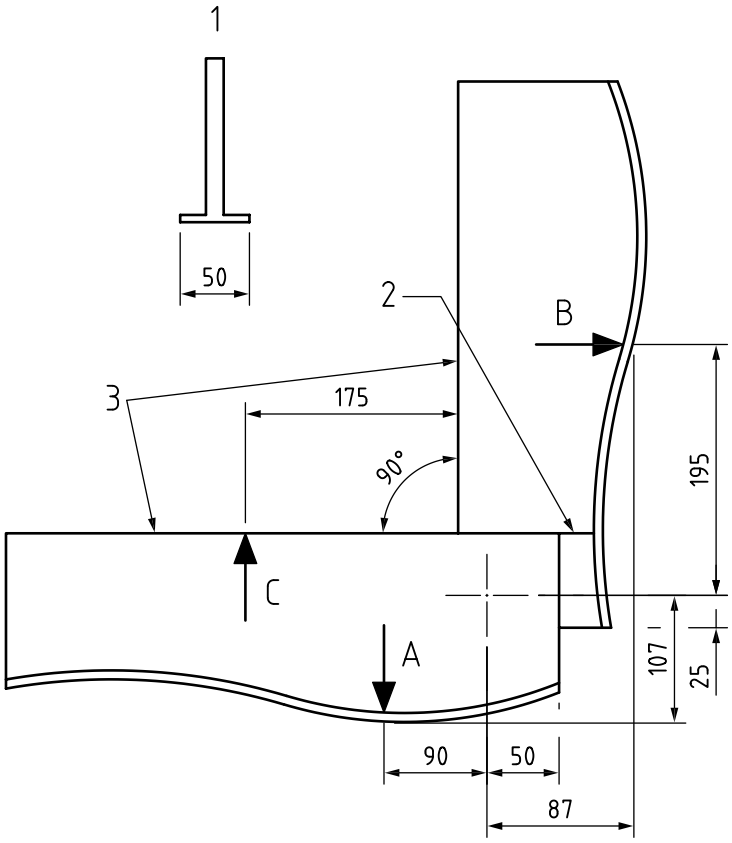
Scale: 1 square = 20 mm

Key

1	Top	4	Seat load	7	Front
2	Rear	5	Back load	8	Bottom
3	Back portion	6	Seat portion		

Figure 1 — Loading surface curves for seat and back loading point template

Dimensions in millimetres



Key

1 Typical section
2 Mark to fix 90º
3 Straight edge for the determination of seat or back inclination
A Seat load (chairs)
B Back load (chairs)
C Seat load (stools)

Figure 2 — Loading point template

So that the template can be positioned easily with the two members at 90° to each other, a line is drawn on the back portion.

5.2 Floor, which is horizontal, flat and rigid with a smooth surface.

For the back and arm rest impact tests (6.25 and 6.26), the drop (6.27) and the backwards fall test (6.28), the floor shall be faced with a 2 mm thick layer of rubber with a tests hardness of (85 ± 10) IRHD according to ISO 7619-2:2010.

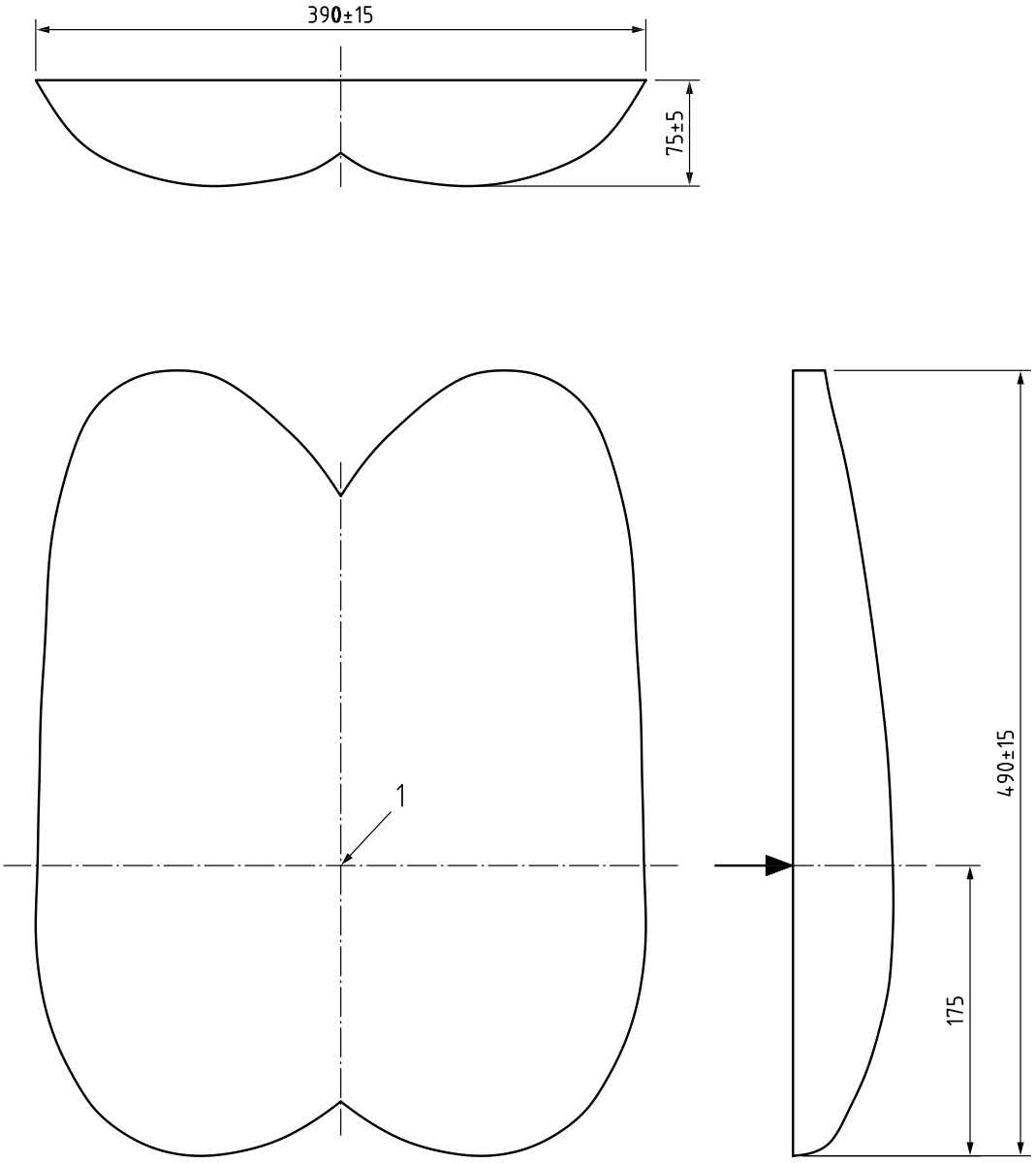
5.3 Stops.

Stops are used to prevent the item from sliding but not tilting no higher than 12 mm, except in cases where the design of the item necessitates the use of higher stops, in which case the lowest that will prevent the item from moving shall be used.

5.4 Seat loading pad, which is a naturalistically shaped rigid indenter with a hard, smooth surface having overall dimensions within the limits shown in Figure 3.

For details of design, see Annex A.

Dimensions in millimetres



Key

1 Seat loading point

Figure 3 — Seat loading pad – Overall dimensions

5.5 Smaller seat loading pad, which is a rigid circular object 200 mm in diameter, the loading surface of which has a convex spherical curvature of 300 mm radius with a 12 mm front edge radius (see Figure 4).

Dimensions in millimetres

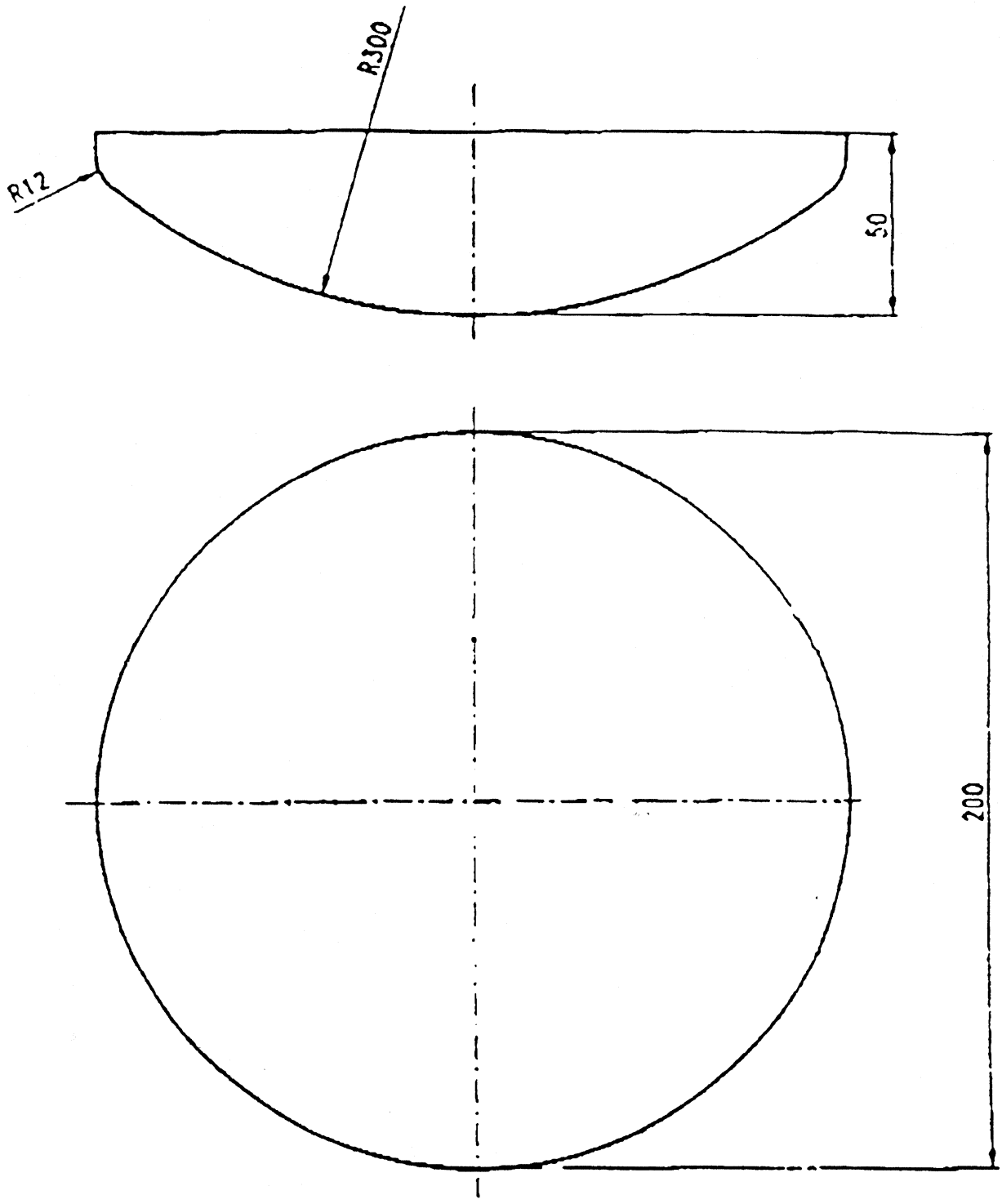


Figure 4 — Smaller seat loading pad

5.6 Back loading pad, which is a rigid rectangular object 200 mm high and 250 mm wide, the loading surface of which is curved across the width of the pad with a convex cylindrical curvature of 450 mm radius and with a 12 mm radius on all front edges (see Figure 5).

Dimensions in millimetres

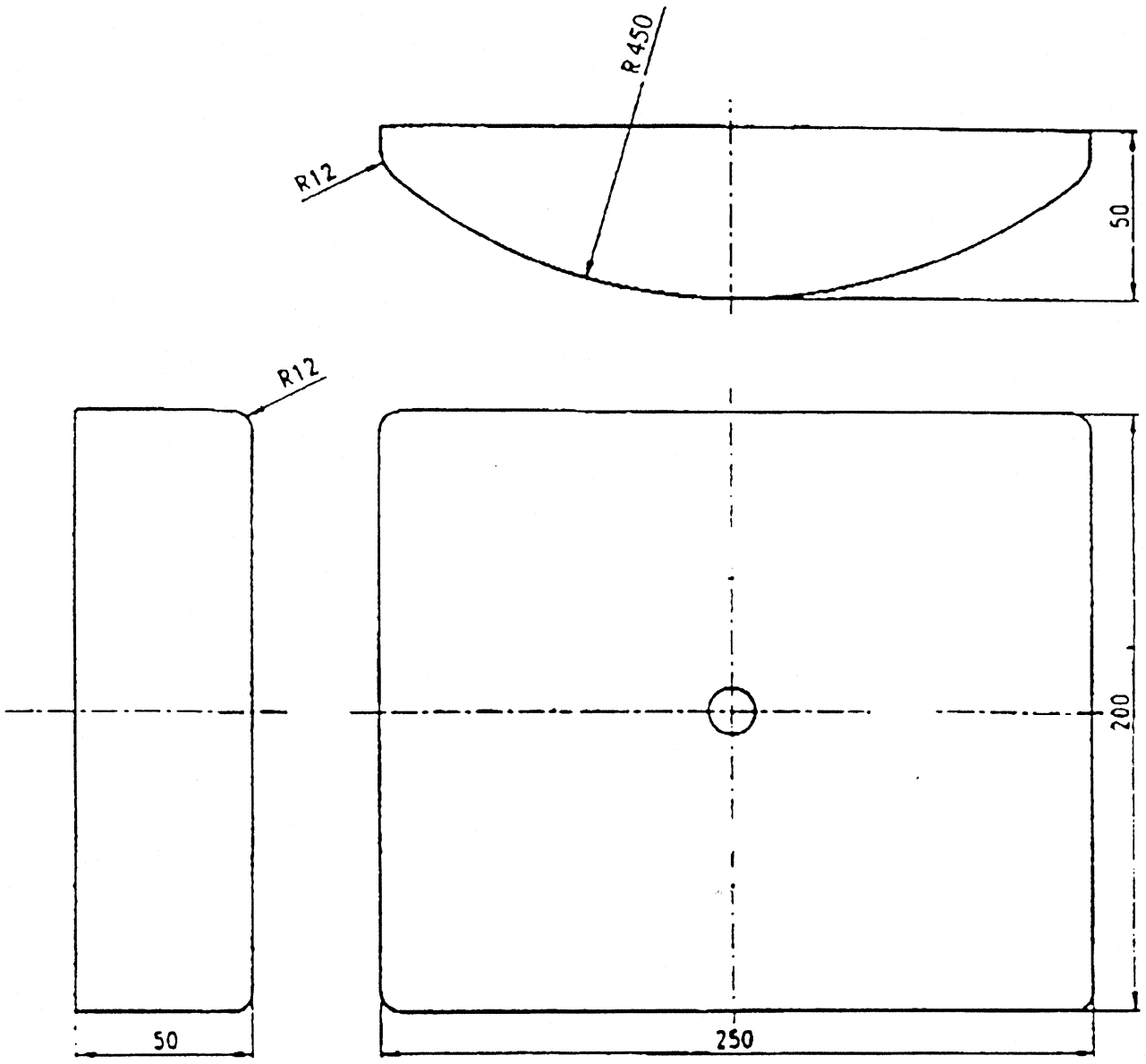


Figure 5 — Back loading pad

5.7 Local loading pad, which is a rigid cylindrical object 100 mm in diameter, with a flat face and a 12 mm edge radius.

5.8 Foam for use with loading pads.

A layer of flexible foam with a bulk density of (120 ± 25) kg/m^3, 25 mm or 10 mm thick. The foam shall be attached to the loading pads or alternatively positioned between the loading pad and the test structure.

5.9 Seat impactor.

The seat impactor is shown in Figure 6. The impactor is comprised of the following elements.

5.9.1 Circular body.

The circular body is 200 mm in diameter, separated from the striking surface by helical compression springs and free to move relative to it on a line perpendicular to the plane of the central area of the striking surface. The body and associated parts minus the springs shall have a mass of (17 ± 0,1) kg and the whole apparatus, including mass, springs and striking surface, shall have a mass of (25 ± 0,1) kg.

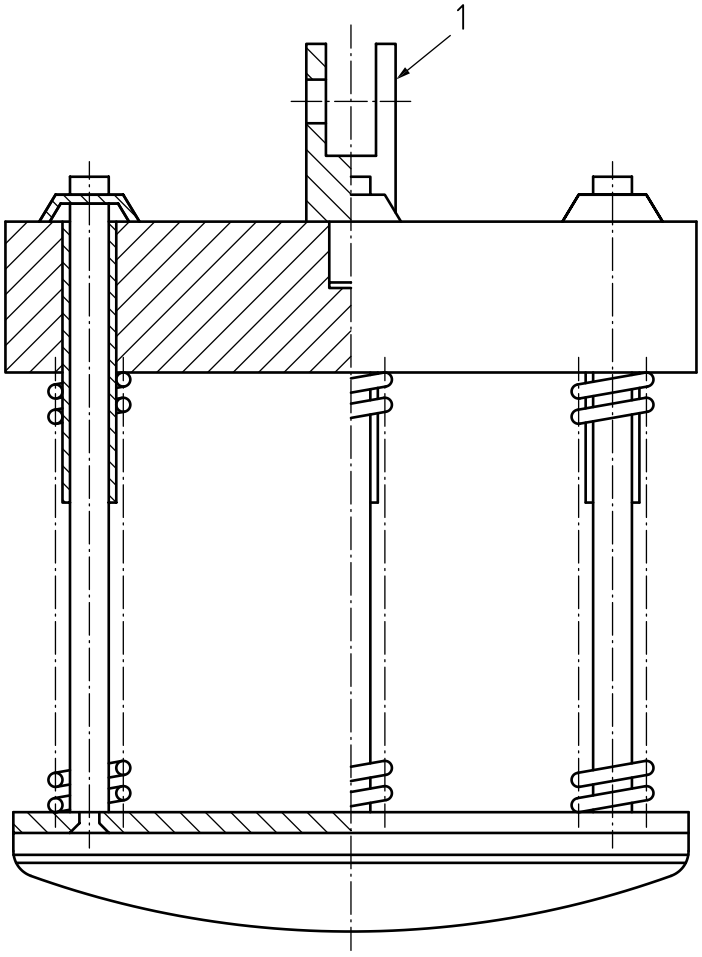
5.9.2 Springs.

The springs shall be such that the nominal spring rate of the combined spring system is (7 ± 2) N/mm and the total friction resistance of the moving parts is less than 1 N.

The spring system shall be compressed to an initial force of (1 040 ± 5) N (measured statically) and the amount of spring compression movement available from the initial compression point to the point where the springs become fully closed shall be not less than 60 mm.

5.9.3 Striking surface.

The striking surface shall be a rigid circular object, 200 mm in diameter, the face of which has a convex spherical curvature of 300 mm radius with a 12 mm front edge radius.



Key

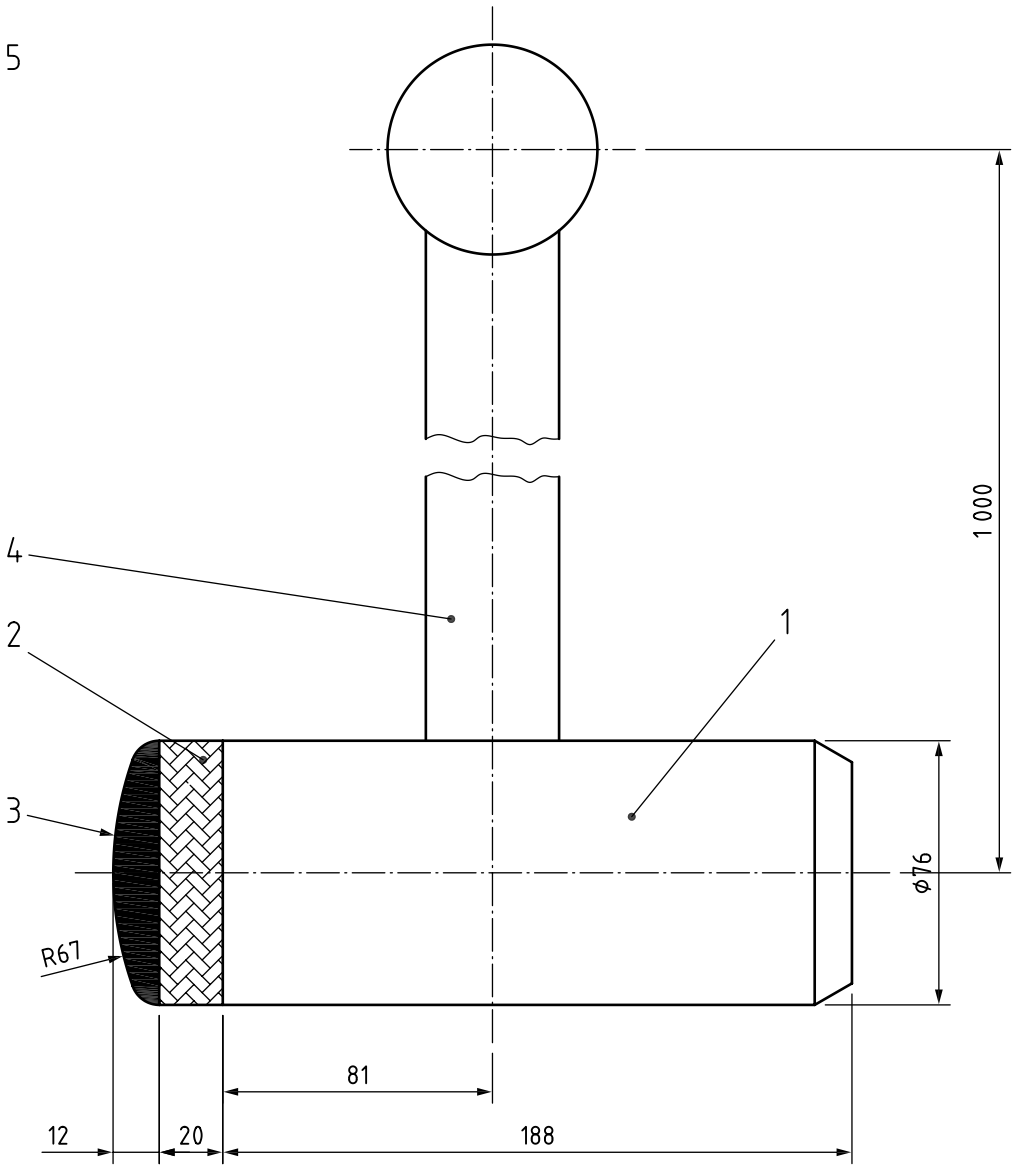
1 Joint of lifting device not inhibiting free fall

Figure 6 — Seat impactor

5.10 Impact hammer, with a cylindrical pendulum head having a mass of 6,5 kg, supported from a pivot by a steel tube of 38 mm in diameter and with a wall thickness of 2 mm.

The pendulum arm shall be pivoted by a low friction bearing (see Figure 7).

Dimensions in millimetres



Key

1 Pendulum head, steel mass 6,4 kg
2 Hard wood
3 Rubber (50 ± 10) IRHD according to ISO 7619-2:2010
4 Pendulum arm, length 950; steel tube ∅ 38 x 2; mass 2 kg ± 0,2 kg
5 Pivot point

Mass of assembly 1 + 2 + 3 = (6,5 ± 0,07) kg

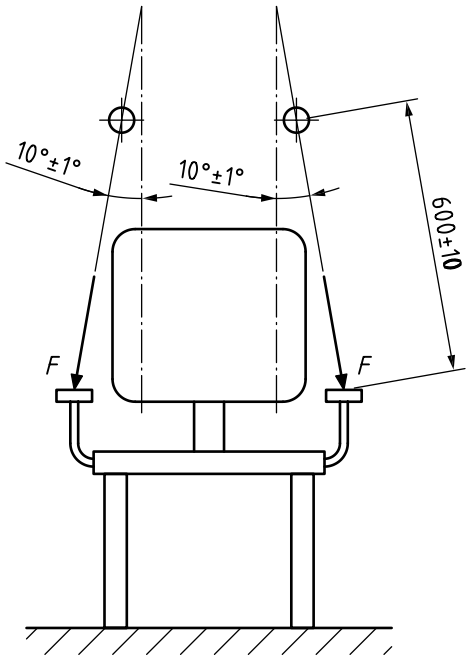
Figure 7 — Impact hammer

5.11 Arm rest durability test apparatus, capable of applying a cyclic force simultaneously to both arm rests of a seat.

The forces shall be applied through an arm rest loading device in principle operating as shown in Figure 8.

The apparatus shall be capable of applying forces at varying angles to the vertical. It shall be adjustable both vertically and horizontally, and set as specified in 6.20. The apparatus shall be capable of freely following the deformation of the arm rests during testing. The length of the loading pad shall be 100 mm with the force acting through the centre of its length.

Dimensions in millimetres



Key

F Force

Figure 8 — Arm rest durability test – Arm rest loading device

5.12 Test surface for castor testing, which is a horizontal, flat smooth and rigid steel surface.

5.13 Test weights drop test, which are discs with a mass of 10 kg each, diameter 350 mm and a thickness of 48 mm.

6 Test procedures - Chairs other than Work Chairs

6.1 General

Unless otherwise specified, the tests shall be carried out in the configuration most likely to cause failure.

If a test cannot be carried out as specified in this standard, e.g. because a loading pad cannot be used for the application of a force due to the design of a product, the test shall be carried out as far as possible as specified.

Except in the case of test 6.13, a layer of foam (5.8) shall be positioned between the loading pads and the test structure.

6.2 Determination of seat and back loading points

6.2.1 General

The seat and back loading points shall be determined using the template as specified in 5.1 in the manner specified in 6.2.2 or 6.2.3.

In some cases, it may not be possible to determine the loading points by means of the template.

In such cases, the seat loading point shall be 175 mm forward of the seat/back junction, or at the point closest to this that allows the seat force to be applied.

Where the geometry of the seat does not allow the back force to be applied at the point defined by the above method, the force shall be applied at the nearest point (up or down the back). The bending moment (back force, N x seat to back loading point distance, m) shall remain constant.

If the number of seats in the item 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.

6.2.2 Seating with a back rest

For seating with adjustable back rests, set the back rest to its most upright position.

Adjust the template such that the angle between the seat and back portions is 90º.

Position the loaded template (5.1) on the centreline of the seat as far towards the rear as possible.

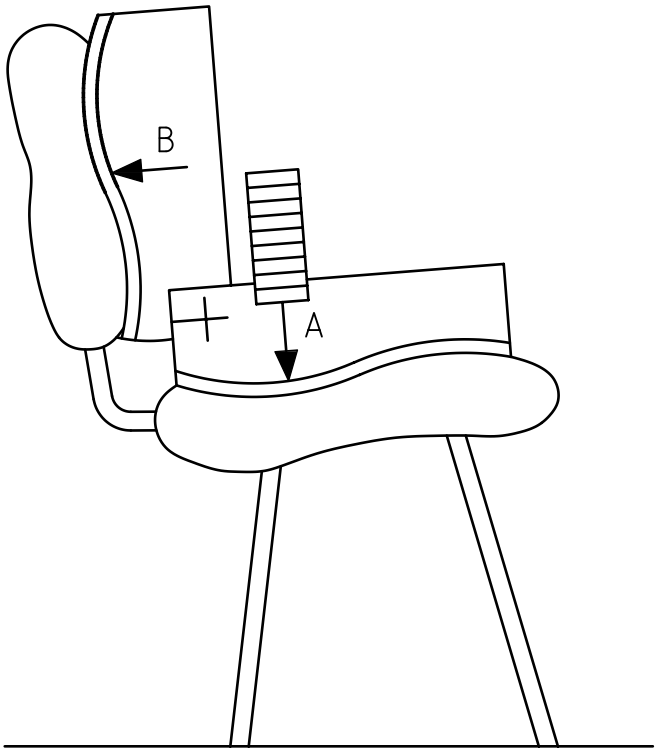
For upholstered and flexible seating, adjust the position of the template by pushing the back loading portion into the back of the seating so that it is fully in contact with the back rest, allowing the shape of the seat portion of the template to correlate with that of the seat (see Figure 9 a)).

For rigid seating, adjust the position of the template by pushing the back loading portion into the back so that it is fully in contact with the back rest whilst ensuring that point A on the template is in contact with the seating surface (see Figure 9 b)).

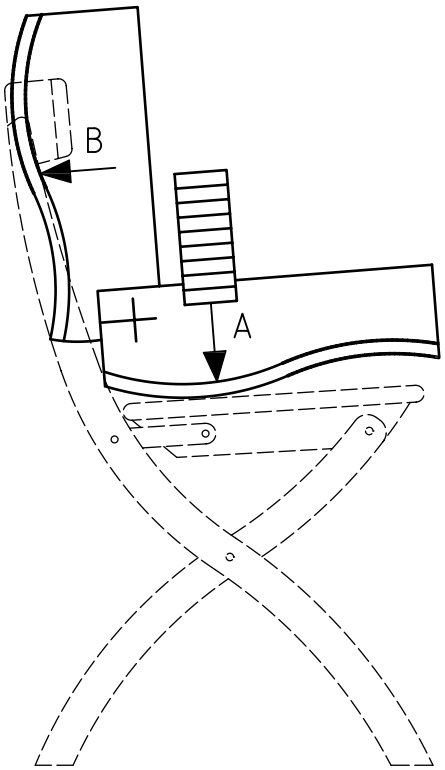
In cases where the template can be settled in more than one position, the position having the smallest angle between the seat and back portions of the template shall be used. The angle shall in no cases be less than 90°. Mark the required loading positions from the template. If relevant, repeat the procedures on the other seat(s).

6.2.3 Seating without a back rest

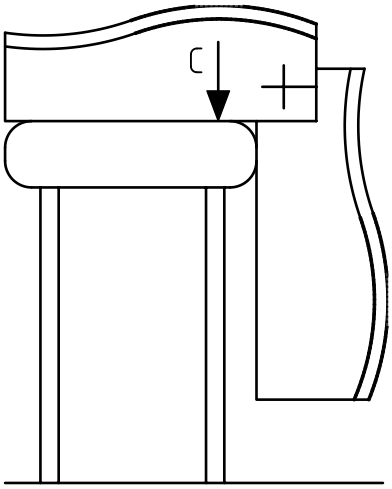
Set up the template (5.1) at 90° with the aid of the mark C as shown in Figure 2. Place it on each seating position as shown in Figure 9 c). Mark the required loading point from the template.



a) Upholstered/flexible seating with a back



b) Rigid seating with a back



c) Seating without a back/stools

Key

A Seat loading point – seating with backs
B Back loading point
C Seat loading point – seating without backs

Figure 9 — Determination of seat and back loading point

6.3 Determination of Back Angle

The angle of inclination of the back from the horizontal (∅) shall be measured by determining the slope of the straight edge of the relevant portion of the seat loading point template when it is correctly positioned (see Figure 10).

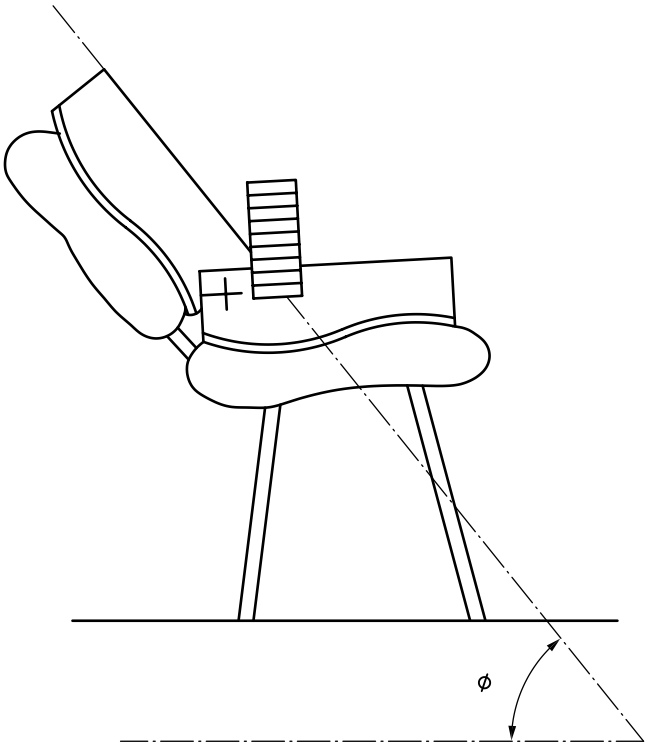


Figure 10 — Determination of back angle

6.4 Seat static load and back static load test

Only the vertical seat static force shall be applied to items without a back rest.

The test shall be carried out at the following positions:

a) on the seat of an item with a single seat;

b) simultaneously on both positions for an item with two seats;

c) simultaneously on two adjacent seats in most adverse combination for an item with three or more seats. If the most adverse position cannot be determined the test shall be carried out at a maximum of two locations.

During the test, load the seat(s) that are not being tested with the specified seat load. For parts not undergoing the test, the load shall be applied at the seat loading position.

Seating with a fixed back position, and seating with reclining mechanisms that cannot be locked into a fixed position, shall be tested for the number of cycles specified.

Seating fitted with a spring rocking action base or tilting mechanism that has a tension adjustment, shall be tested with the tension adjusted to its maximum value.

Seating with reclining mechanisms that can be set or locked in a number of positions shall be tested for half the number of cycles specified in the most upright position, and half the number of cycles specified in the most adverse reclined position.

NOTE The most adverse position is normally considered to be 10° above the fully reclined position for fully adjustable mechanisms, or one position up from fully reclined position for seating with multi-position back rests.

Prevent the item from moving rearwards by placing stops (5.3) behind the rear legs, feet or castors (see Figure 11).

Position the seat loading pad(s) (5.4) at the seat loading position(s) determined by the loading point template (5.1).

If the item has a back, position the centres of the back loading pad(s) (5.6), either at the back loading position as determined by the loading point template or at 100 mm below the top of the back, whichever is the lower.

All adjustable backs shall be set in the most adverse position.

The angle of back rest inclination Ø (6.3), in degrees shall be measured.

Table 1 — Determination of seat and back force

Angle of backrest inclination Ø	Seat force F_1 (N)	Back force F_2 (N)
Back rest set to an angle 70º or more to the horizontal	Specified seat force	Specified back force
Back rest set to an angle of less than 70º, but not less than 55º to the horizontal	Specified seat force x Sin (Ø)	((Ø/60°) – 0,166 6) Specified seat force x Cos Ø
Back rest set to an angle of less than 55º to the horizontal	0,75 x Specified seat force	0,75 x Specified seat force x Cos Ø

Apply the downward force F_1 (determined in Table 1) per seat loading pad (5.4) to the seats (see a), b) and c) above).

With the seat force maintained, apply the back force F_2 (determined in Table 1) per back loading pad (5.6). When fully loaded, the back force shall act at (90 ± 10)º to the back rest plane.

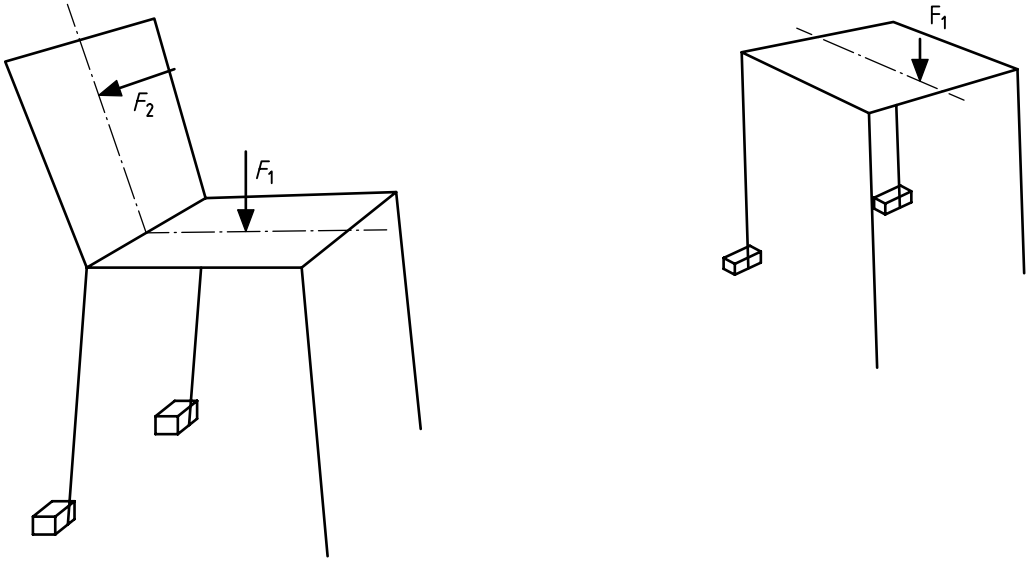
If the item tends to overturn, reduce F_2 to a magnitude that just prevents rearwards overturning. F_2 shall not be reduced below the minimum specified force. If the item tends to overturn at this force, the F_1 shall be increased until this tendency ceases.

Report the force(s) used.

Remove the F_2 and then the F_1. This constitutes one cycle.

F_1 shall be maintained as long as necessary for the F_2 to be applied (4.2).

For designs where it is not possible to carry out the above test procedure, the seat and back test may be performed by carrying out the seat test followed by the back test with a static load on the seat.



a) Example for chairs

b) Example for stools

Figure 11 — Seat and back static load test

6.5 Seat Front Edge Static Load

Apply the specified force using the seat loading pad (5.4) at a point on the seat centre line 100 mm inwards from the front edge of the structure.

For multiple seating units, the seat front edge static load test shall be carried out simultaneously on the same seats as used for the seat and back static load test (6.4). During the test, load the seat(s) that are not being tested with the specified seat load for parts not undergoing test, applied at the seat loading position.

If the seating tends to overturn, reduce the force(s) to a magnitude that just prevents overturning.

Record the actual force(s) used.

6.6 Vertical load on back rests

Apply the specified seat load to the seat loading point and maintain for the duration of the test.

Apply the specified downwards static force to the top of the back rest, on the centre line of the back. Apply the force through the seat loading pad (5.4). If it is not possible to use the seat loading pad, apply the force with the smaller seat loading pad (5.5).

For multiple seating units, the downwards static force shall be applied simultaneously on the same positions as used for the seat and back static load test (6.4). During the test, load the seat(s) that are not being tested with the specified seat load for parts not undergoing test, applied at the seat loading position.

If the seating tends to overturn, reduce the downwards static force(s) on the back rest to a magnitude that just prevents overturning.

Record the actual force(s) used.

6.7 Horizontal forward static load test on back rests

This test is only applicable to seating fixed to the floor.

Apply the specified horizontal static force on the back rest at a point 50 mm below the centre of the top of the back. Apply the force through the smaller seat loading pad (5.5) (see Figure 12).

For multiple seating units, the horizontal static force test shall be applied simultaneously to the same positions as used for the seat static load test (6.4).

Dimensions in millimetres

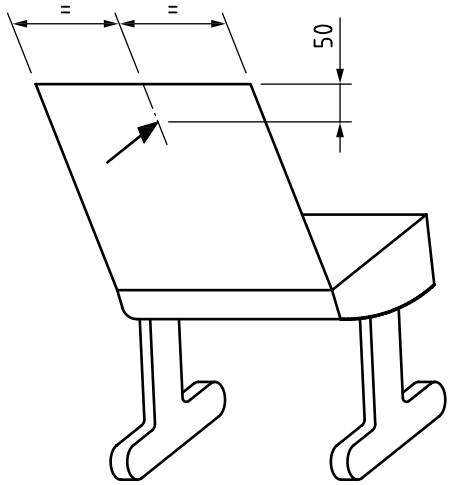


Figure 12 — Horizontal forward static load test on back rests

6.8 Foot rest static load test

Apply the specified downward force to the seat at the seat loading point.

Apply a vertical force by means of the local loading pad (5.7) acting 80 mm from front edge of the load bearing structure of the foot rest at those points most likely to cause failure. For round cross section ring shaped footrests, the force shall be applied through the centre of the ring cross section.

If the seating tends to overturn, increase the load on seat to a magnitude that just prevents overturning and record the load used.

6.9 Leg rest static load test

This test is only applicable to leg rests designed to support the full weight of the user.

Apply the specified downward force to the seat at the seat loading point.

Using the seat loading pad (5.4), apply the specified force 100 mm in from the outer edge of the leg rest at the point most likely to cause failure.

If the seating tends to overturn, increase the load on seat to a magnitude that just prevents overturning and record the load used.

6.10 Arm rest sideways static load test

For seating with one arm rest, apply an outward force as specified to the arm rest at the point along the arm rest most likely to cause failure, but not less than 100 mm from the end of the arm rest structure. Apply the force using the local loading pad (5.7).

If the item tends to overturn, apply a load on the side of the seat opposite to the arm rest under test large enough to prevent the item from overturning.

For seating with two arm rests, apply an outward force as specified to each arm rest of the unit simultaneously at the point along the arm rests most likely to cause failure, but not less than 100 mm from either end of the arm rest structure, (see Figure 13). Apply the force using the local loading pad (5.7).

For seating with three or more arm rests, carry out the test on one pair of adjacent arm rests. All different arm rest designs shall be tested.

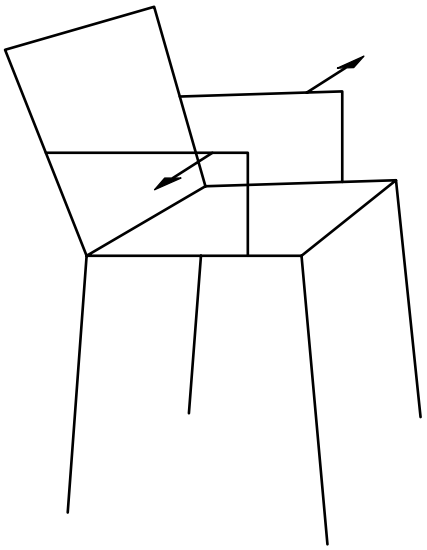


Figure 13 — Arm rest sideways static load test

6.11 Arm rest downwards static load test

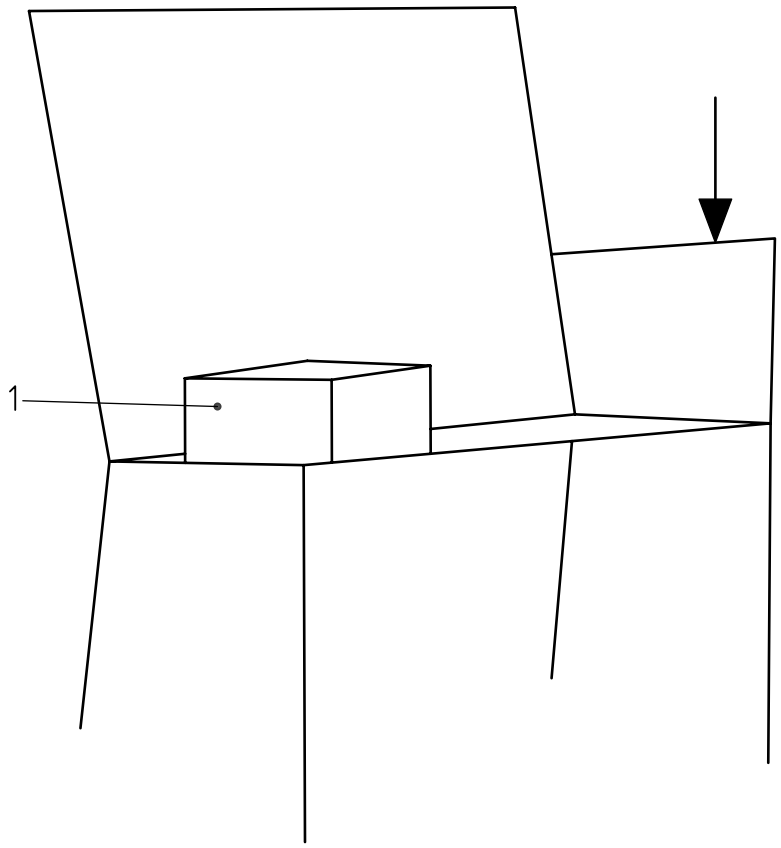
For seating which only has one arm rest, or which has two arm rests where the distance between the centre of the arm rests is more than 1000 mm, apply the specified vertical force at the points along the arm rest most likely to cause failure (see Figure 14), but not less than 100 mm from the end of the arm rest structure.

If the chair tends to overturn, apply a load on the side of the seat opposite to the arm rest under test large enough to prevent the chair from overturning.

For seating with two arm rests, where the distance between the centre of the arm rests is 1 000 mm or less, apply the specified vertical force simultaneously to both arm rests at the points along the arm rest most likely to cause failure, but not less than 100 mm from either end of the arm rest structure.

For seating with three or more arm rests, carry out the test on one pair of adjacent arm rests. All different arm rest designs shall be tested.

Apply the force through the smaller seat loading pad (5.5) or the local loading pad (5.7).



Key

1 Balancing load

Figure 14 — Arm rest downward static load test

6.12 Headrest static load test

Prevent the item from moving rearwards by placing stops behind the rear legs, feet or castors.

Seating with reclining mechanisms that can be set or locked in a number of positions shall be set to the most upright position.

Adjustable headrests shall be set to their highest position.

Apply the specified rearwards force at the centre of the headrest. Apply the force through the local loading pad (5.7). When fully loaded, the specified force shall act at (90 ± 10)° to the headrest plane.

If the seating tends to overturn, place a load on seat with a magnitude that just prevents overturning and record the load used.

6.13 Vertical upwards static load on arm rests

6.13.1 Seating which may be moved when occupied

This test is only applicable to seating where it is expected that it may be moved when occupied by lifting by the arm rests.

Place the seat load specified at the seat loading point.

Apply an upwards force simultaneously to both arms, at the balance point, sufficient to lift the seating. Lower the chair so that it rests on the floor.

6.13.2 Stacking seating

This test applies only to stacking seating units where the stack is moved by lifting by the arm rests. Normally this test does not apply when the manufacturer supplies devices for moving the seating or when the information for use includes instructions for moving the stack of chairs without lifting by the arm rests.

Load the chair with the specified load at the seat loading point.

Apply an upwards force sufficient to lift the seating simultaneously to both arms at the balance point. Lower the seating unit so that it rests on the floor.

6.14 Vertical static load on auxiliary writing surfaces

Load the chair with the specified load at the seat loading point.

Apply the specified downwards force, by means of the local loading pad (5.7) to the point on the writing surface furthest from any support, but not less than 100 mm from any edge of the writing surface.

If the seating tends to overturn, increase the load on seat to a magnitude that just prevents overturning and record the load used.

6.15 Leg forward static load test

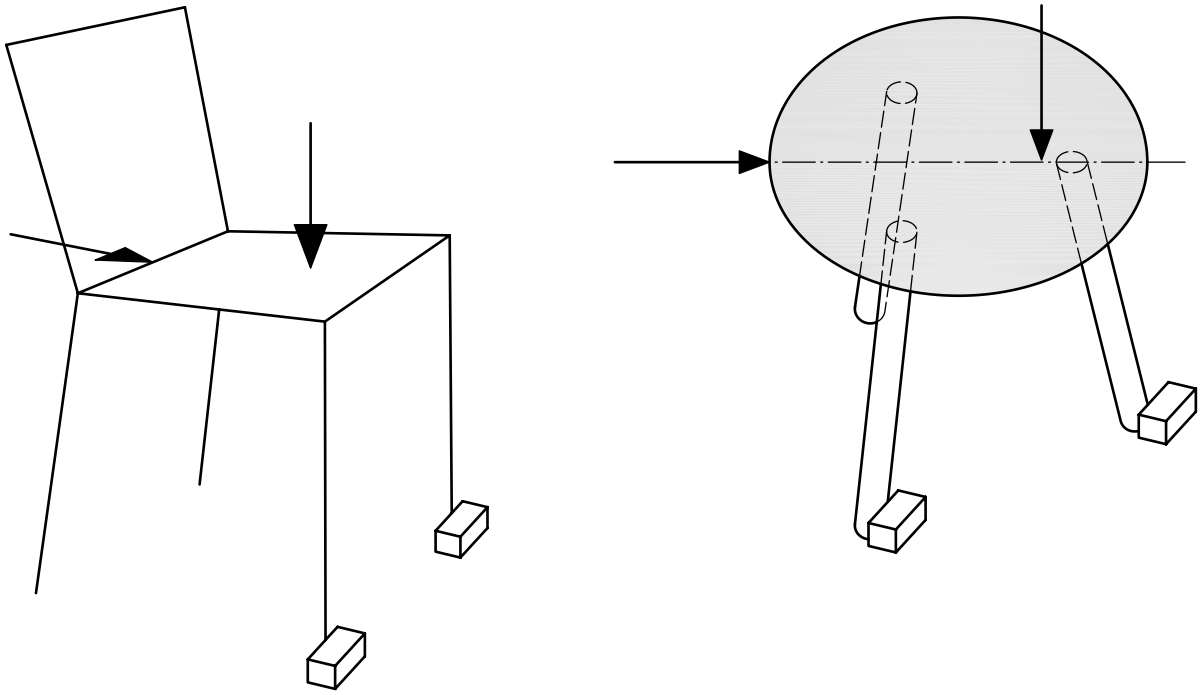
Prevent the unit from movement by stops (5.3) against the front legs.

Apply the specified seat load at the seat loading position determined by the loading point template (4.3) to all seat positions.

For seating with a single seat, apply a horizontal force centrally to the rear of the seat, at seat level, in a forward direction, (see Figure 15 a)), by means of the local loading pad (5.7).

For seating with multiple seating positions, apply the horizontal force centrally to the rear of the most adverse seat position, at seat level, in a forward direction, by means of the local loading pad (5.7). For seating with only three legs, one foot on the fore and aft centre line of the item of seating and one other foot shall be restrained by stops (see Figure 15 b)).

If the item tends to overturn before the specified force is reached, reduce the force to a magnitude that just prevents forward overturning, but not lower than the minimum specified force. Record the actual force used.



a) Example – four leg chair **b) Example – three leg stool**

Figure 15 — Legs forward static load

6.16 Leg sideways static load test

Prevent the unit from movement by stops (5.3) placed against one pair of front and rear feet.

Apply the vertical seat load specified at a suitable position across the seat but not more than 150 mm from the unloaded edge of the seat.

Apply a horizontal force centrally to the unrestrained side of the seat, at seat level, in a direction towards the restrained feet (see Figure 16).

For seating with only three legs, one foot on the fore and aft centre line of the item of seating and one other foot shall be restrained by stops.

If the item tends to tends to overturn with the vertical seat load in its furthermost position from the unloaded edge, reduce the horizontal force to a magnitude that just prevents sideways overturning, but not lower than the minimum specified force. Record the actual force used.

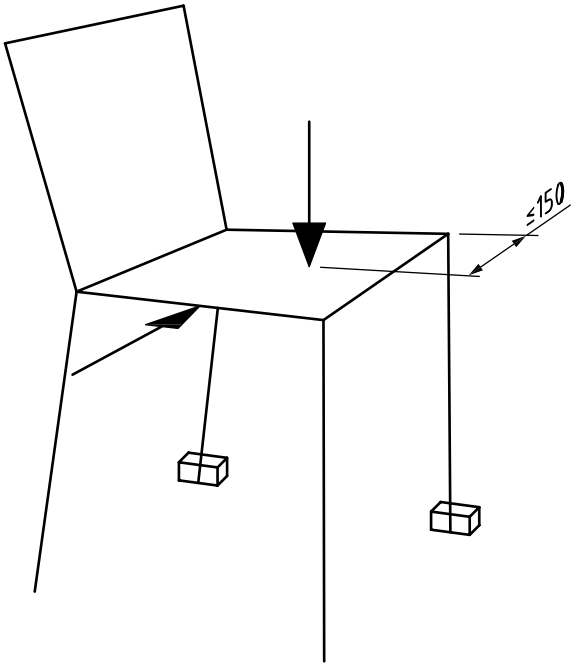


Figure 16 — Leg sideways static load test

6.17 Combined seat and back durability test

Only the vertical seat durability force shall be applied to items without a back rest.

The test shall be carried out on the same positions as used for the seat static load test (6.4).

During the test, load the seat(s) that are not being tested with the specified seat load for parts not undergoing test; the load shall be applied at the seat loading position.

Seating with a fixed back position, and seating with reclining mechanisms that cannot be locked into a fixed position, shall be tested for the number of cycles specified.

Seating fitted with a spring rocking action base or tilting mechanism that has a tension adjustment, shall be tested with the tension adjusted to its maximum value.

Seating with reclining mechanisms that can be set or locked in a number of positions shall be tested for half the number of cycles specified in the most upright position, and half the number of cycles specified in the most adverse reclined position.

NOTE The most adverse position is normally considered to be 10° above the fully reclined position for fully adjustable mechanisms, or one position up from fully reclined position for seating with multi-position back rests.

Prevent the item from moving rearwards by placing stops (5.3) behind the rear legs, feet or castors (see Figure 17).

Position the seat loading pad(s) (5.4) at the seat loading position(s) determined by the loading point template (5.1).

If the item has a back, position the centres of the back loading pad(s) (5.6), either at the back loading position as determined by the loading point template or at 100 mm below the top of the back, whichever is the lower.

All adjustable backs shall be set in the most adverse position.

The angle of back rest inclination Ø (6.3), in degrees shall be measured.

Table 2 — Determination of seat and back force

Angle of backrest inclination Ø	Seat force F_3 (N)	Back force F_4 (N)
Back rest set to an angle 70º or more to the horizontal	Specified seat force	Specified back force
Back rest set to an angle of less than 70º, but not less than 55º to the horizontal	Specified seat force x Sin (Ø)	((Ø/60°) – 0,166 6) Specified seat force x Cos Ø
Back rest set to an angle of less than 55º to the horizontal	0,75 x Specified seat force	0,75 x Specified seat force x Cos Ø

Apply the downward force F_3 (determined in Table 2) per pad to the seats (see a), b) and c) defined in 6.4).

With the seat force maintained, apply the back force F_4 (determined in Table 2) per pad. When fully loaded, the back force shall act at (90 ± 10)º to the back rest plane.

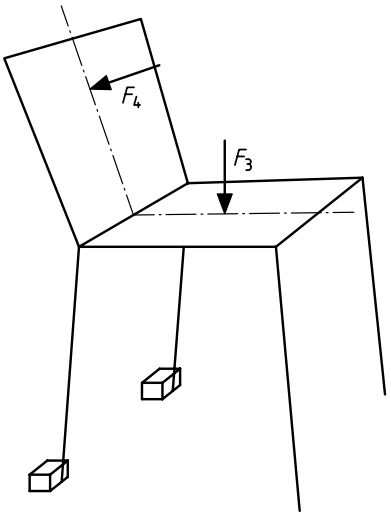
If the item tends to overturn, reduce F_4 to a magnitude that just prevents rearwards overturning. F_4 shall not be reduced below the minimum specified force. If the item tends to overturn at this force, the F_3 shall be increased until this tendency ceases.

Report the force(s) used.

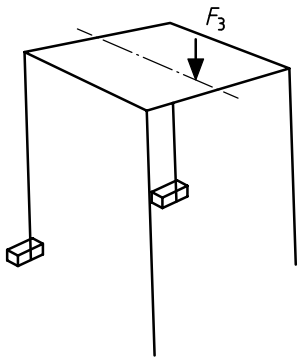
Remove the F_4 and then the F_3. This constitutes one cycle.

F_3 shall be maintained as long as necessary for the F_4 to be applied (4.2).

For designs were it is not possible to carry out the above test procedure the seat and back test may be performed by carrying out the seat test followed by the back test with a static load on the seat.



a) Example for chairs



b) Example for stools

Figure 17 — Seat and back durability test

6.18 Seat front edge durability test

Restrain the item by use of stops (5.3).

Apply the vertical seat durability force specified using the smaller seat loading pad (5.5) alternately on two points each 100 mm from the front edge of the seat structure and as near as possible to either side of the seat but not less than 100 mm from the edges. One cycle is one application of the specified force to each load position.

NOTE In some instances it might be appropriate to apply the force through the local loading pad (5.7).

For seating where it is not possible to apply the force at two points, the force shall be applied to a single position on the longitudinal axes at a point 100 mm from the front edge of the seat structure. One cycle is two applications of the specified force.

An example of an item of seating requiring one application point is shown in Figure 18.

Dimensions in millimetres

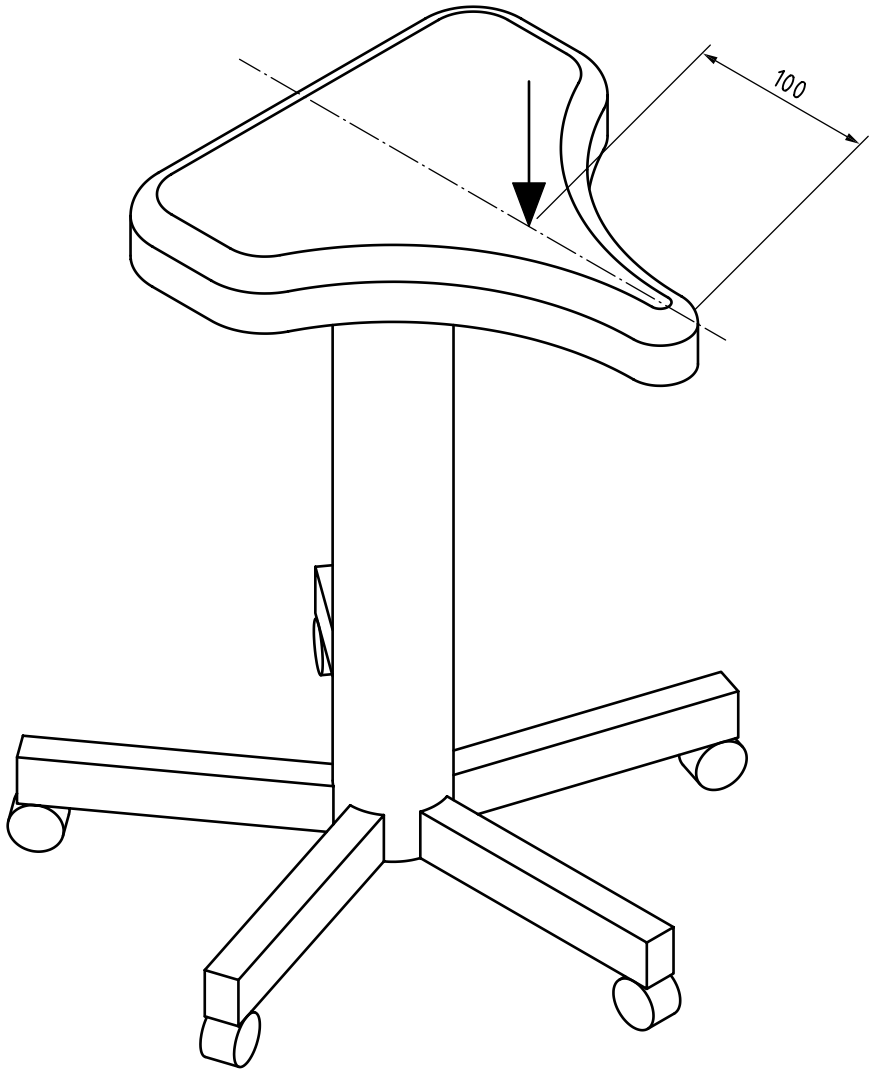


Figure 18 — Example of seating where a single force is required

For multiple seating units, the seat front edge durability test shall be carried out as above on one end seat. The test shall be repeated, with a single vertical seat durability force applied to one intermediate seat as used for the seat static load test.

If the item tends to overturn, reduce the force to a magnitude that just prevents overturning. Report the actual force used.

6.19 Durability test on seating with a multi-position back rest

This test is only applicable to seating with three or more manually adjustable reclined positions of the back rest.

Place the seating in normal use position, with the back rest in the most adverse position. If the most adverse position cannot be determined, carry out the test with the back rest in the mid position. Prevent the item of seating from moving rearwards by placing stops behind the rear feet, legs or castors.

Apply the specified load to the seat loading point.

The height of the back rest loading points shall be 100 mm above the back loading point (6.2). They shall be 50 mm from the right and left outer edges of the back rest.

Apply rearwards alternating forces perpendicularly to the back rest, as specified.

Carry out the test for the number of cycles specified.

1 cycle = 1 application of force on the right side and 1 application of force on the left side.

NOTE This test is often used for testing outdoor reclining seating.

6.20 Arm rest durability test

Place the chair on the test floor with stops against the outside of the legs, feet or castors. The test forces shall be applied simultaneously on each arm rest, at the point most likely to cause failure, but not less than 100 mm from the front or rear edge of the arm rest length (3.6) and through the centre of the width of the arm rest, but not more than 100 mm from the inner edge of the arm rest.

Using the arm rest durability test apparatus (5.11), adjust the apparatus so that with no load applied to arm rests the angle of load application arms is (10 ± 1)° to the vertical and the distance between the low friction pivots and the horizontal surface of the arm loading devices is (600 ± 10) mm. With the apparatus set as above, apply the specified load for the required number of cycles to both arm rests simultaneously for seating with only one seating position and to one arm rest only for seating with multiple seating positions.

6.21 Foot rest durability test

Apply the specified downward force to the seat at the seat loading point.

Apply a vertical force by means of the local loading pad (5.7) acting 80 mm from front edge of the load bearing structure of the foot rest at those points most likely to cause failure. For round cross section ring shaped footrests, the force shall be applied through the centre of the ring cross section.

If the seating tends to overturn, increase the load on seat to a magnitude that just prevents overturning and record the load used.

6.22 Auxiliary writing surfaces durability test

Apply the specified downward force to the seat at the seat loading point.

Apply a downwards vertical force at the same position as specified in 6.14 using the local loading pad (5.7) for the number of cycles specified.

If the seating tends to overturn, increase the load on seat to a magnitude that just prevents overturning and record the load used.

6.23 Tipping seat operation

If the seating unit features tip-up seats, one seat shall be operated for the specified number of cycles.

Moving of the seat from the fully closed to the fully open position, and then back to the fully closed position shall constitute one cycle. The maximum rate shall not exceed ten cycles per minute.

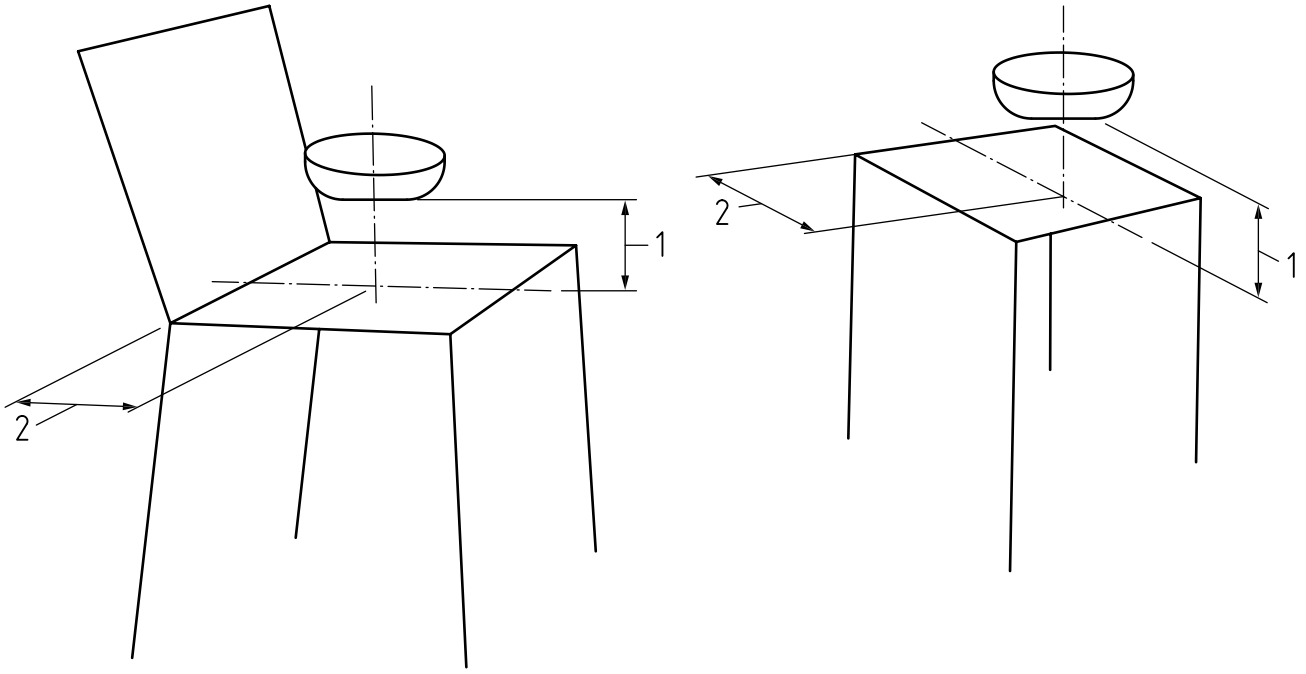
During each cycle, the seat shall be allowed to open or close freely under gravity if that is its correct mode of operation.

6.24 Seat impact test

Place one layer of 25 mm thick foam (5.8) on the seat. Determine the height of fall from the position of the impactor when it is resting on the surface of that layer of foam (5.8).

Place a second layer of 25 mm thick foam (5.8) between the striking surface and the chair seat for the test. Allow the seat impactor (5.9) to fall freely from the height specified onto the seat loading position, (see Figure 19), as specified by the loading point template (5.1). Repeat the test at one other position considered likely to cause failure, but not less than 100 mm from any edge of the seat.

For multiple seating units, apply the test to one end seat and an intermediate seating position.



a) Example – chair **b) Example – stool**

Key

1 Height of fall

2 Seat loading point according to template

Figure 19 — Seat impact test

6.25 Back impact test

This test is intended to be used for chairs that are not tested in accordance with 6.28.

Place the item with its front legs, feet or castors restrained by stops from moving forward. Strike the structure of the centre of the top outside of the back with the impact hammer (5.10) (see Figure 20a)). Drop the impact hammer through the height (or angle) specified at the following back positions:

a) on the centre of an item with one seat;

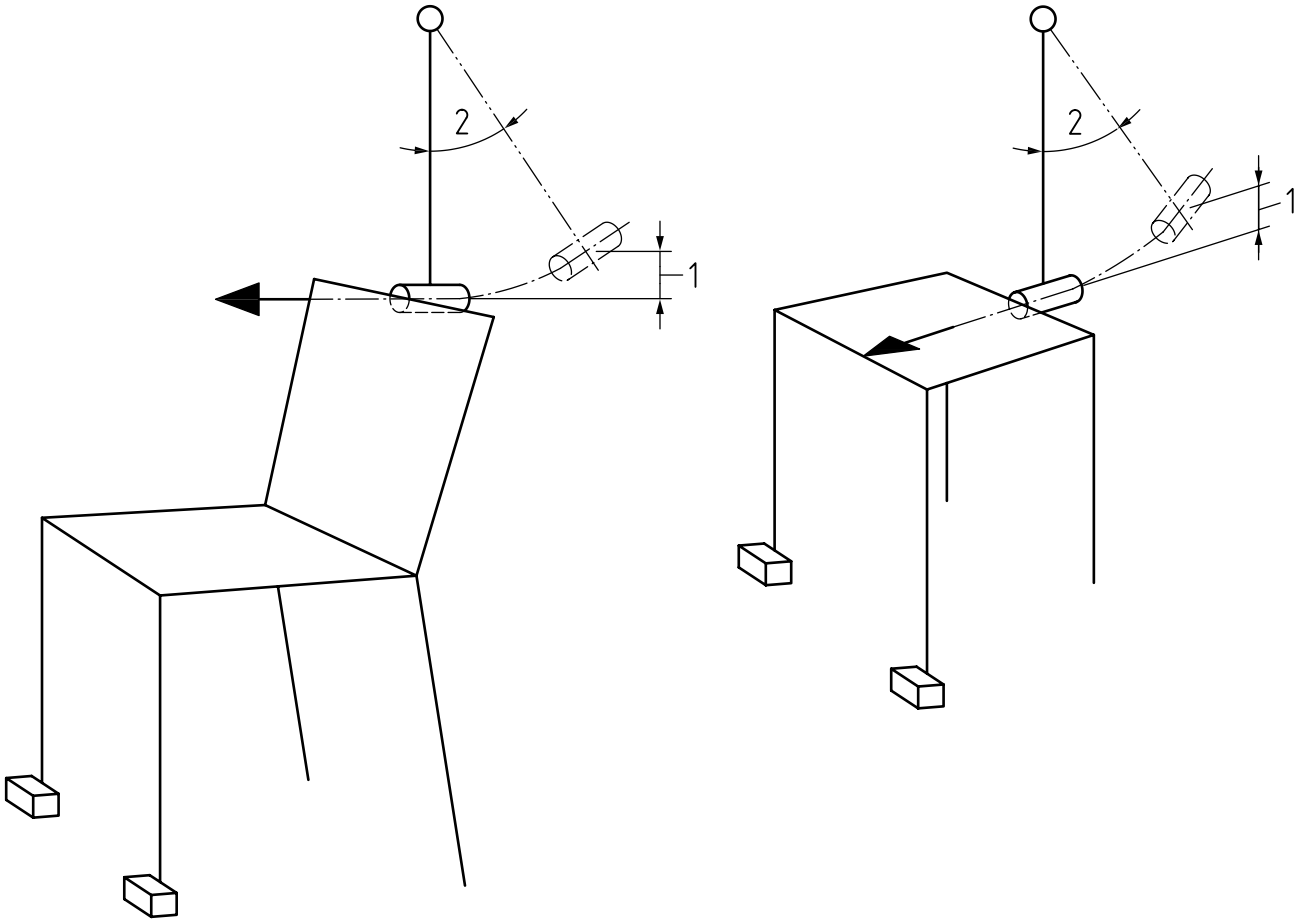
b) at both positions for items with two seats;

c) at one end position and one centre position for items with three or more seats.

If the item has no back, strike the centre of the seat rear edge.

If a stool or bench has no easily determined rear edge, apply the test in the direction most likely to cause failure (see Figure 20b)).

The item of seating shall not be prevented from overturning during the test, and shall be allowed to strike the rubber faced test floor (5.2).



a) Example – chairs **b) Example – stools**

Key

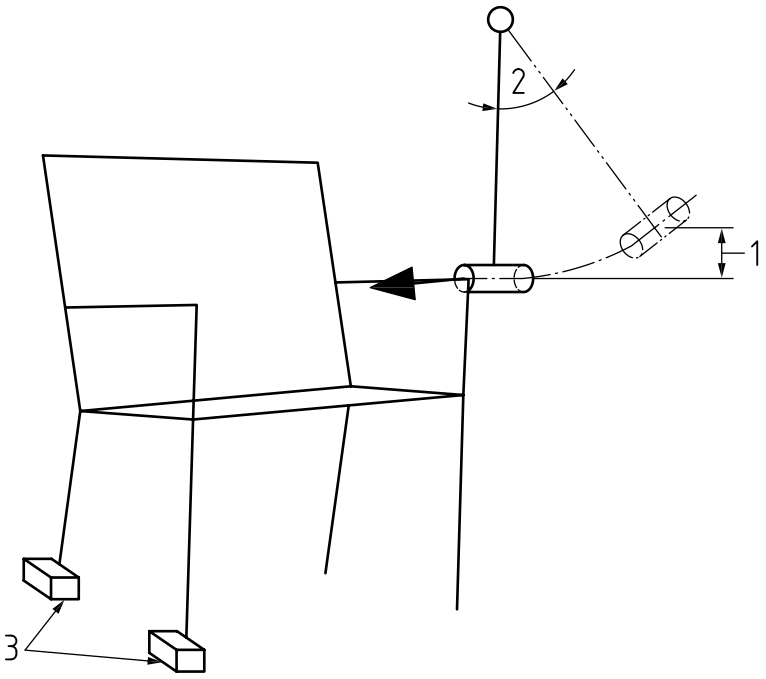
1 Vertical height of fall
2 Angle of fall

Figure 20 — Back impact test

6.26 Arm rest impact test

Place the item with one pair of front and rear legs, feet or castors restrained by stops from moving sideways. Strike the outside of one arm rest with the impact hammer (5.10) (see Figure 21). The arm rest shall be impacted at the position most likely to cause failure, but not less than 50 mm from the end of the arm rest.

The item of seating shall not be prevented from overturning during the test, and shall be allowed to strike the rubber faced test floor (5.2).



Key

1 Height of fall
2 Angle of fall
3 Stops

Figure 21 — Arm rest impact test

6.27 Drop tests

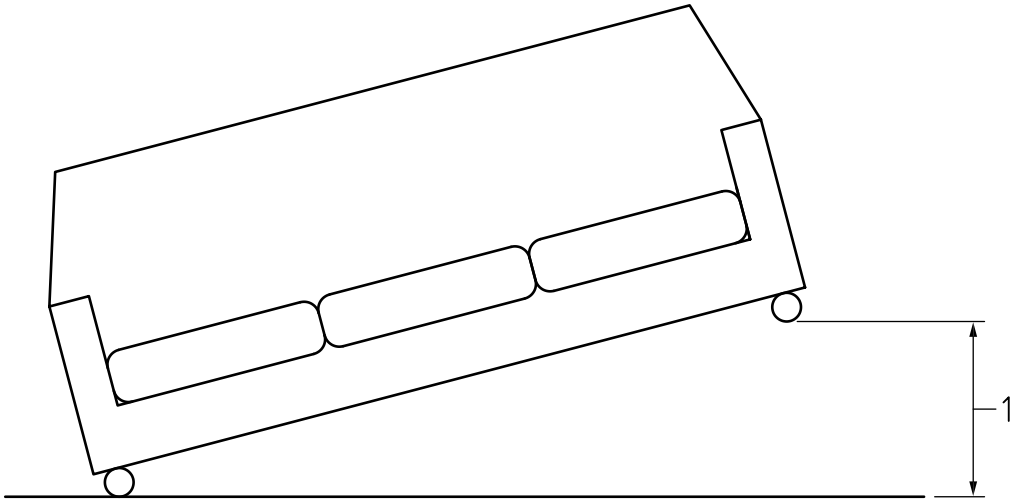
6.27.1 Drop test for multiple seat units

Measure the vertical force required to lift the right and left hand side of the item. This is determined as the lowest upwards vertical force to lift at least one end, or pair of legs, (10 ± 5) mm off the floor. Determine the drop height as a percentage of specified drop height according to the following calculation:

Mass of one end of multiple seating unit	Percentage of Specified Nominal Drop Height
0 – 10 kg	100
10 – 65 kg	100 – [90 x [Mass of one end of unit – 10]/55]
> 65 kg	10

Lift the item at one end/side and allow it to fall freely from the specified height so that the feet or castors strike the floor (5.2) (see Figure 22).

Repeat the test on the other end of the item.



Key

1 Drop height

Figure 22 — Drop test for multiple seat units

6.27.2 Drop test for stacking seating

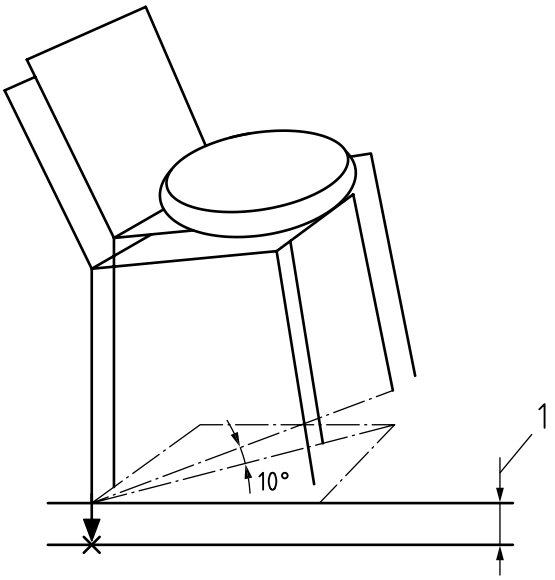
Using two chairs, stack one seating unit upon another and place one 10 kg loading disc (5.13) on the seat of the upper seating unit located as far towards the rear of the seat as possible. If the mass of the test stack exceeds 20 kg, replace the disc with bag weights (or similar) and reduce the additional load until the mass of the stack is 20 kg.

The weight shall be held in position by straps round the seat of the upper seating unit or both seating units if there is insufficient space for the straps between the two seating units. Alternative methods of restraining the loading disc are acceptable.

Support the bottom seating unit so that one leg is lifted to the specified drop height and the line joining that leg to the leg diagonally opposite is inclined 10^{o} to the horizontal (see Figure 23). The two remaining legs shall be maintained at the same level.

Drop it on the rubber faced test floor (5.2) for the number of times specified. The test shall be carried out on one front leg and one rear leg.

The test may be carried out by lifting the seating by means of three cords, which are adjusted in length so that the 10° angle is obtained.



Key

1 Drop height

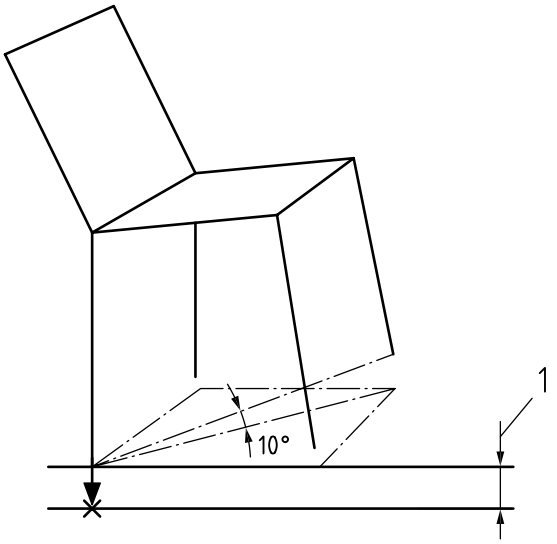
Figure 23 — Drop test for stacking seating

6.27.3 Drop test from the height of a table

This test is only applicable to seating that is designed to be placed at high level (e.g. on a table top during cleaning). Support the seating so that one leg is lifted to the specified drop height and the line joining that leg to the leg diagonally opposite is inclined 10° to the horizontal (see Figure 24). The two remaining legs shall be maintained at the same level.

Drop it on to the rubber faced test floor (5.2). The test shall be carried out on one front leg and on one rear leg.

The test may be carried out by lifting the seating by means of three cords, which are adjusted in length so that the 10° angle is obtained.



Key

1 Drop height

Figure 24 — Drop test from the height of a table

6.28 Backward fall test

Place the unloaded seating on the drop test floor (5.2) in normal use position.

Apply a rearward horizontal load to a point 50 mm below the top of the back rest in the centre of the back rest. Measure the force required to lift the front legs off the floor.

If the measured force is less than 30N, push the top of the back rest rearwards until it reaches the equilibrium point (see Figure 25). Allow it to fall freely on its back, onto the rubber faced test floor (5.2), without initial force or velocity.

Repeat for the number of cycles specified.

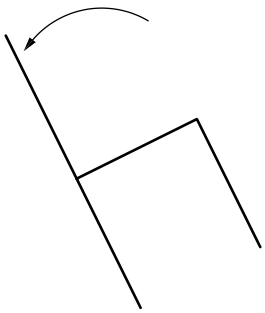


Figure 25 — Backward fall test

6.29 Castor and chair base durability

This test only applies to seating which is designed to be moved while occupied by the user.

This test does not apply to chairs with castors which are braked when the chair is loaded.

The chair shall be placed on a rotating table with a test surface (see 5.12) so that the rotating axis of the chair coincides with the rotating axis of the table. Load the seat with the specified load at the seat loading point. The item shall be loosely fixed in such a way that there is no rotation of the item but that the natural movements of the castors during testing are not prevented. The castors shall be left free to swivel and the table shall be rotated with a rate of six cycles per minute. The angle of rotation shall be from 0° to 180° and back. One rotation forward and one rotation backward constitutes one cycle.

Alternatively, attach the chair to a device that provides a linear movement of (1 000 ± 25) mm and a test surface (see 5.12). Load the seat in the seat loading point with the specified load. The item shall be loosely fixed in such a way that there is no rotation of the item but that the natural movements of the castors during testing are not prevented. The castors shall be left free to swivel and the device shall move with a rate of six cycles per minute.

One movement forward and one movement backward constitutes one cycle.

For both alternatives it is recommended to perform the test with a speed as slow as possible with a short break when the device changes direction.

6.30 Rolling resistance of the unloaded chair

The chair shall be placed on the test floor (see 5.12) and shall be pushed or pulled over a distance of at least 550 mm. A speed of (50 ± 5) mm/s shall be maintained over the measuring distance. The force shall be applied at a height of (200 ± 50) mm above the test surface.

Record the force used to push or to pull the chair over the distance from 250 mm to 500 mm as the rolling resistance.

NOTE This test is normally intended for seating for non-domestic single seating units.

7 Test procedures - Work Chairs

7.1 General

The chair and its components shall be configured as specified in Table 3.

If a test cannot be carried out as specified in this Standard, e.g. because a loading pad cannot be used for the application of a force due to the design of a product, the test shall be carried out as far as possible as specified.

Position the chair and its components as specified in Table 3 on the test surface (5.2).

Table 3 — Positioning of chair components

Clause	Test	Seat height	Seat	Back rest in height	Back rest in depth	Tilt tension adjustment	Castors and base	Arm rest	Foot rest
7.3	Seat front edge static load test	highest position	foremost position	---	---	---	least likely to cause overturning	---	---
7.4	Combined seat and back static load	highest position	most adverse position	highest position	rearmost position	mid range	least likely to cause overturning	---	---
7.5	Arm rest downward static load test – central	lowest position	Horizontal	---	---	---	---	most likely to cause failure	---
7.6	Arm rest downward static load test – front	lowest position	Horizontal	---	---	---	---	highest, widest, foremost position	---
7.7	Arm rest sideways static load test	lowest position	Horizontal	---	---	---	---	highest, widest position	---
7.8	Foot rest static load test	---	---	---	---	---	least likely to cause overturning	---	highest position
7.9	Seat and back durability	highest position	Horizontal, foremost position	highest position	most likely to cause failure	mid range	least likely to cause overturning	---	---
7.10	Arm rest durability	lowest position	Horizontal	---	---	maximum tension	---	highest, widest position	---
7.11	Swivel test	highest position	horizontal, foremost position	highest position	rearmost position	---	---	---	---
7.12	Footrest durability	---	---	---	---	---	least likely to cause overturning	---	lowest position
7.13	Castor durability	lowest position	Horizontal	---	---	---	---	---	---

7.2 Loading points

7.2.1 General

The loading points for work chairs are graphically shown in Figure 27.

7.2.2 Loading point A

The point in which the chair's axis of rotation intersects with the seat surface with the seat in a position as close as possible to the horizontal.

7.2.3 Loading point B

The point on the centreline of the back rest, 300 mm above loading point A (7.2.2) measured when the seat is loaded with 640 N through the seat loading pad.

7.2.4 Loading point C

A point in front of loading point A (7.2.2) along the centre line of the seat, 100 mm from the edge of the load bearing structure of the seat.

7.2.5 Loading point D

The point 150 mm to the right of loading point A (7.2.2), but not less than 100 mm from the edge of the seat structure.

7.2.6 Loading point E

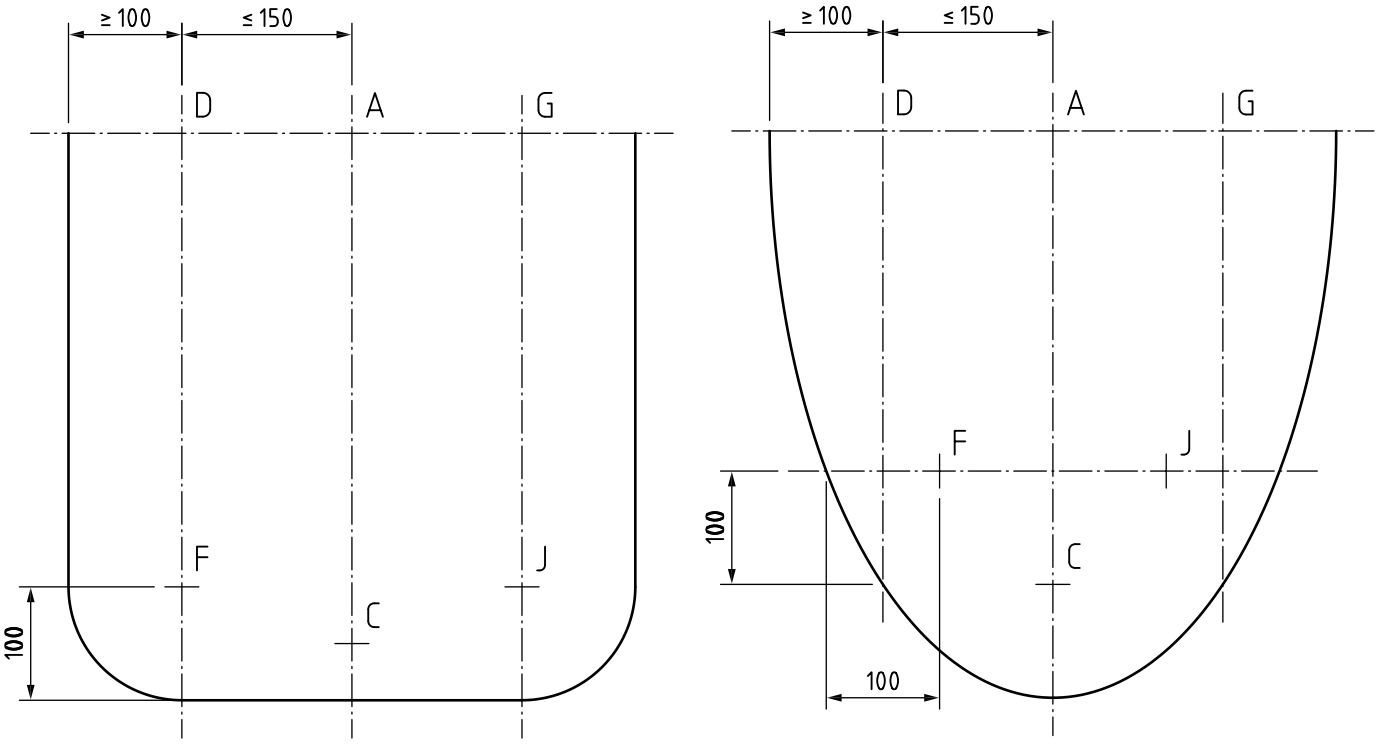
The point 50 mm to the right of loading point B (7.2.3).

7.2.7 Loading point F

A point in front of loading point D (7.2.5) on a line parallel to the centre line, 100 mm from the edge of the load bearing structure of the seat on that line.

If the distance from any edge of the structure is less than 100 mm, move the point inwards on a line parallel to the line intersecting points A, D and G such that the distance from the edge is 100 mm (see Figure 26).

Dimensions in millimetres



a) Example of loading points F & J **b) Example of loading points F & J**

Figure 26 — Determination of loading points F & J

7.2.8 Loading point G

The point 150 mm to the left of loading point A (7.2.2), but not less than 100 mm from the edge of the seat structure.

7.2.9 Loading point H

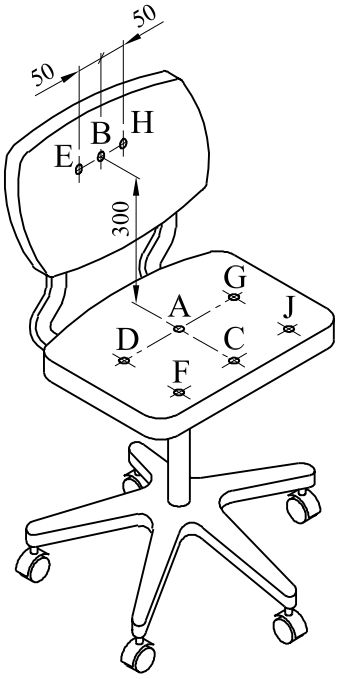
The point 50 mm to the left of loading point B (7.2.3).

7.2.10 Loading point J

A point in front of loading point G (7.2.8) on a line parallel to the centre line, 100 mm from the structure of the seat edge on that line.

If the distance from any edge of the structure is less than 100 mm, move the point inwards on a line parallel to the line intersecting points A, D and G such that the distance from the edge is 100 mm (see Figure 26).

Dimensions in millimetres



Key

A	loading point A	D	loading point D	G	loading point G
B	loading point B	E	loading point E	H	loading point H
C	loading point C	F	loading point F	J	loading point J

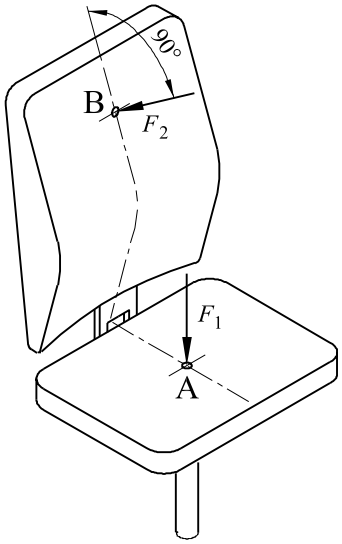
Figure 27 — Loading points

7.3 Combined seat and back static load test

Prevent the chair from moving rearwards by placing stops (5.3) behind two adjacent supporting points at the rear of the chair.

Chairs with a locking device(s) for seat and/or back rest angle movements shall be tested first with the device(s) locked for half of the cycles and then with the device(s) unlocked for the other half of the cycles. For the first half of the cycles the back rest shall be in the upright position.

Apply a vertical force F1 through the seat loading pad (5.4) at point A (7.2.2). Keep the seat loaded and apply a force F2 through the centre of the back loading pad (5.6) at point B (7.2.3). When fully loaded the force shall act at (90 ± 10)° to the back rest plane (see Figure 28). If the chair tends to overturn, reduce the back rest force and report the actual force. Remove the back force and then the seat force.



Key

A Seat loading point (7.2.2)
B Back loading point (7.2.3)
F_1 Perpendicular force
F_2 Vertical force

Figure 28 — Combined seat and back static load test

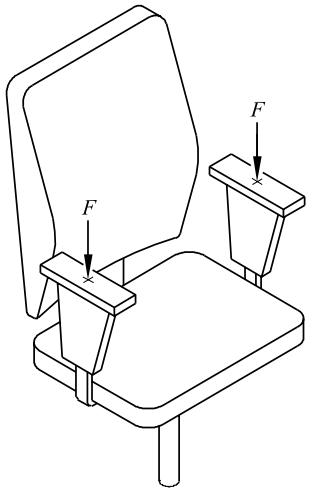
7.4 Seat front edge static load test

Position the smaller seat loading pad (5.5) at loading point F or J (7.2.7 or 7.2.10). Apply a vertical downward force through the centre of the loading pad.

7.5 Arm rest downward static load test – central

The arm rests shall be loaded vertically by means of the local loading pads (5.7). The loading points shall be at the mid point of the arm rest length and centred side to side. In the case of an arm rest which is not horizontal, or which is curved, the length is measured in a horizontal plane 20 mm below the highest point of the arm rest.

Apply the force to both arm rests simultaneously (see Figure 29).



Key

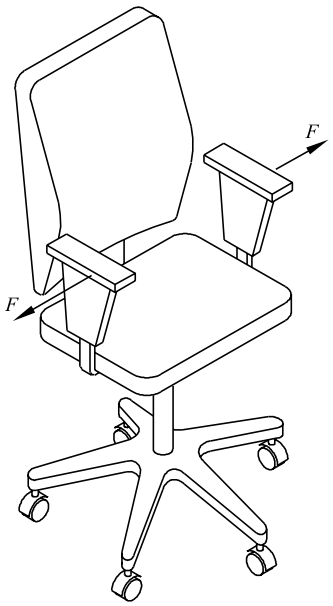
F Vertical force

Figure 29 — Arm rest downward static load test – central

7.6 Arm rest downward static load test – front

The arm rests shall be loaded vertically by means of the local loading pads (5.7). The loading points shall be 75 mm from the front edge and centred side to side.

Apply the force to both arm rests simultaneously (see Figure 30).



Key

F Vertical force

Figure 30 — Arm rest downward static load test – front

7.7 Arm rest sideways static load test

This test shall be carried out as described in 6.10.

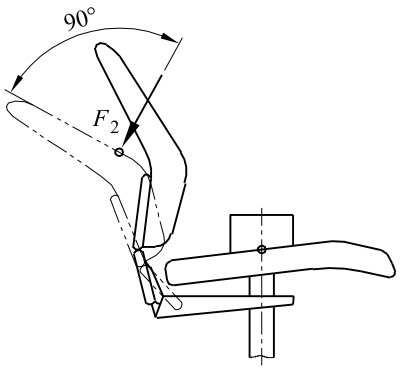
7.8 Foot rest static load test

This test shall be carried out as described in 6.8.

7.9 Seat and back durability

The upper part of the chair shall be positioned so that the centre of the back rest is midway between two adjacent supporting points of the base with stops (5.3) against these supporting points.

The seat load shall be applied vertically using the seat loading pad (5.4) in positions A and C, and using the smaller seat loading pad (5.5) in positions D, F, G and J. The back rest force shall be applied at an angle of (90 ± 10)° to the back rest when fully loaded (see Figure 31) using the back loading pad (5.6).



Key

F_2 Perpendicular force

Figure 31 — Back rest force application – principle

All chairs shall be tested to steps 1 to 5 (see Table 4).

Chairs with a locking device(s) for seat and/or back rest angle movements shall be tested in step 2, first with the device(s) locked for half of the cycles and then with the device(s) unlocked for the other half of the cycles. For the first half of the cycles, the back rest shall be in the upright position. In steps 3, 4 and 5 the mechanism shall be set free to move.

One cycle shall consist of the application and removal of the force(s) at the respective loading point(s).

Each step shall be completed before going to the next.

First the seat force shall be applied and maintained while the back rest force is applied.

If the back rest pad is pivoting around a horizontal axis above the height of the seat and is free to move, the horizontal force shall be applied on the axis. If height adjustable, the axis shall be set as close as possible to 300 mm above point A (7.2.2). If the axis cannot be adjusted to 300 mm, adjust the force to produce the same bending moment.

Table 4 — Seat and back durability test

Step	Loading point
1	A
2	C-B
3	J-E
4	F-H
5	D-G

7.10 Arm rest durability

The test shall be carried out as described in 6.20.

7.11 Swivel test

The base of the chair shall be secured on a rotating table with a test surface (see 5.2) so that the rotating axis of the chair coincides with the rotating axis of the table. The upper part of the chair shall be loosely fixed in such a way as not to hinder the rotation of the base. Load the seat in loading point A (7.2.2) with the specified and in loading point C (7.2.4) with the specified additional load, or any equivalent loading which will result in the same downwards force and bending moment on the chair. The angle of rotation shall be 360° at a rate of (10 ± 5) cycles/minute. Change direction after each rotation.

7.12 Foot rest durability

This test shall be carried out as described in 6.21.

7.13 Castor and chair base durability

This test does not apply to chairs with castors which are braked when the chair is loaded.

The chair shall be placed on a rotating table with a test surface (see 5.12) so that the rotating axis of the chair coincides with the rotating axis of the table. Load the seat at point A with the specified load. The base shall be loosely fixed in such a way that there is no rotation of the base but that the natural movements of the castors during testing are not prevented. The castors shall be left free to swivel and the table shall be rotated with a rate of six cycles per minute. The angle of rotation shall be from 0° to 180° and back.

One rotation forward and one rotation backward constitutes one cycle.

Alternatively attach the chair to a device that provides a linear movement of (1 000 ± 250) mm and a test surface (see 5.12). Load the seat at point A with the specified load. The base shall be loosely fixed in such a way that there is no rotation of the base but that the natural movements of the castors during testing are not prevented. The castors shall be left free to swivel and the device shall move with a rate of six cycles per minute.

One movement forward and one movement backward constitutes one cycle.

For both alternatives it is recommended to perform the test with a speed as slow as possible with a short break when the device changes direction.

7.14 Rolling resistance of the unloaded chair

This test shall be carried out as described in 6.30.

8 Test procedures – Loungers

8.1 General

The tests shall be carried out in the configuration most likely to cause failure.

If a test cannot be carried out as specified in this Standard, e.g. because a loading pad cannot be used for the application of a force due to the design of a product, the test shall be carried out as far as possible as specified.

8.2 Seat and back static load test

This test shall be carried out as described in 6.4.

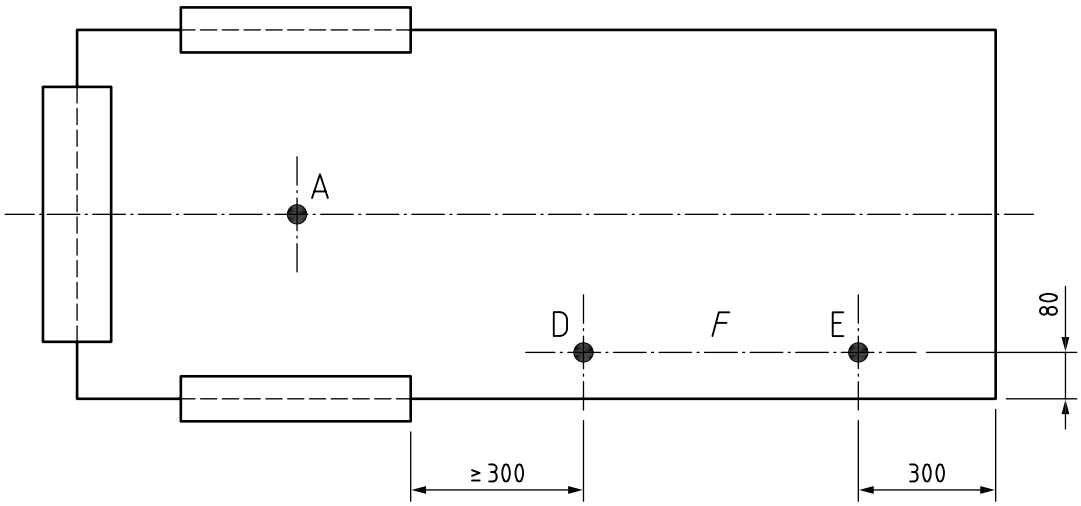
8.3 Additional seat and leg rest static load test

Load the seat with the specified seat load at the seat loading point (6.2) and maintain the load for the duration of the test.

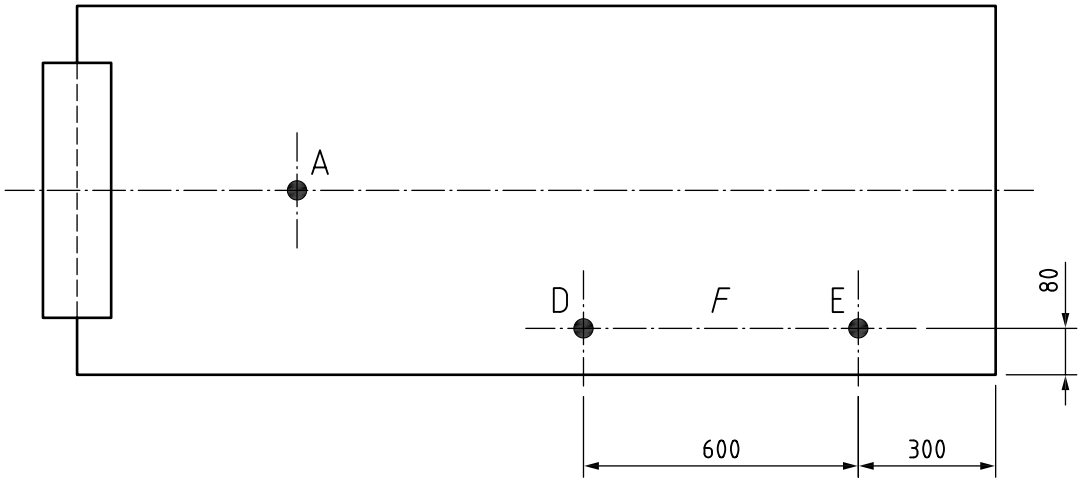
Using the seat loading pad (5.4), apply the specified force at the most adverse position between point D and E specified in Figure 32.

If the item tends to overturn, apply a load to the opposite side of to the most adverse load position, with a load just sufficient to prevent overturning.

Dimensions in millimetres



a) lounger with arm rest



b) lounger without arm rest

Key

A Seat loading point
D Location of point D
E Location of point E
F Location of static load application

Figure 32 — Static test

8.4 Seat and back durability test

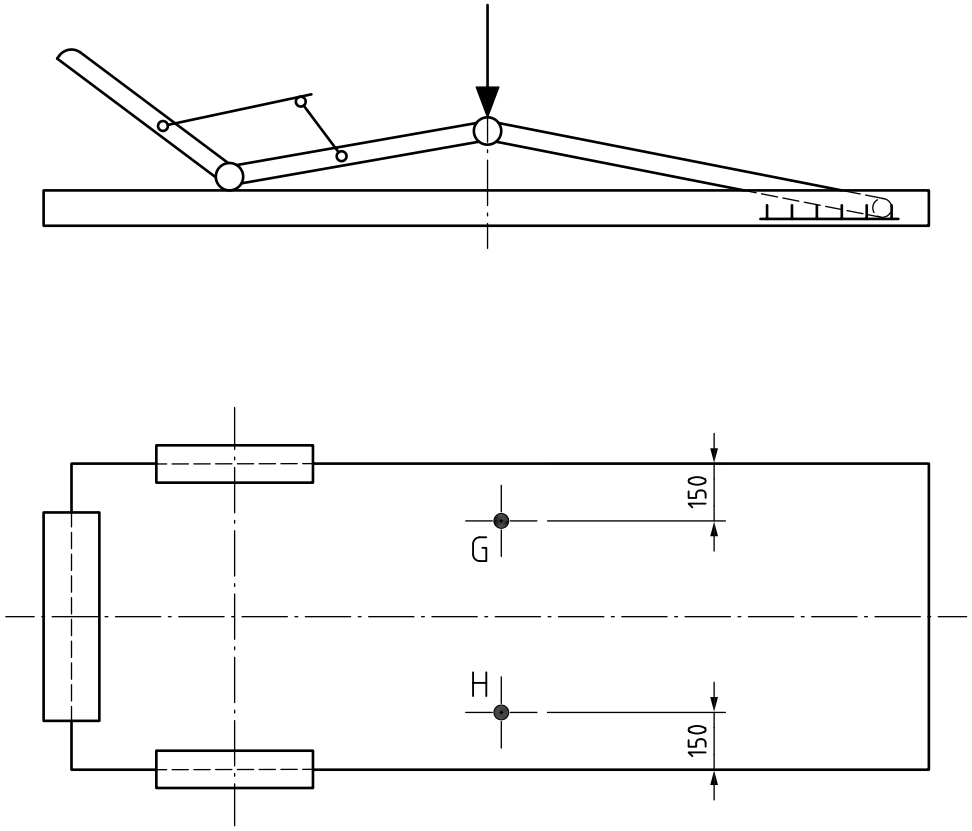
8.4.1 Seat and back durability test procedure

The test shall be carried out as described in 6.17.

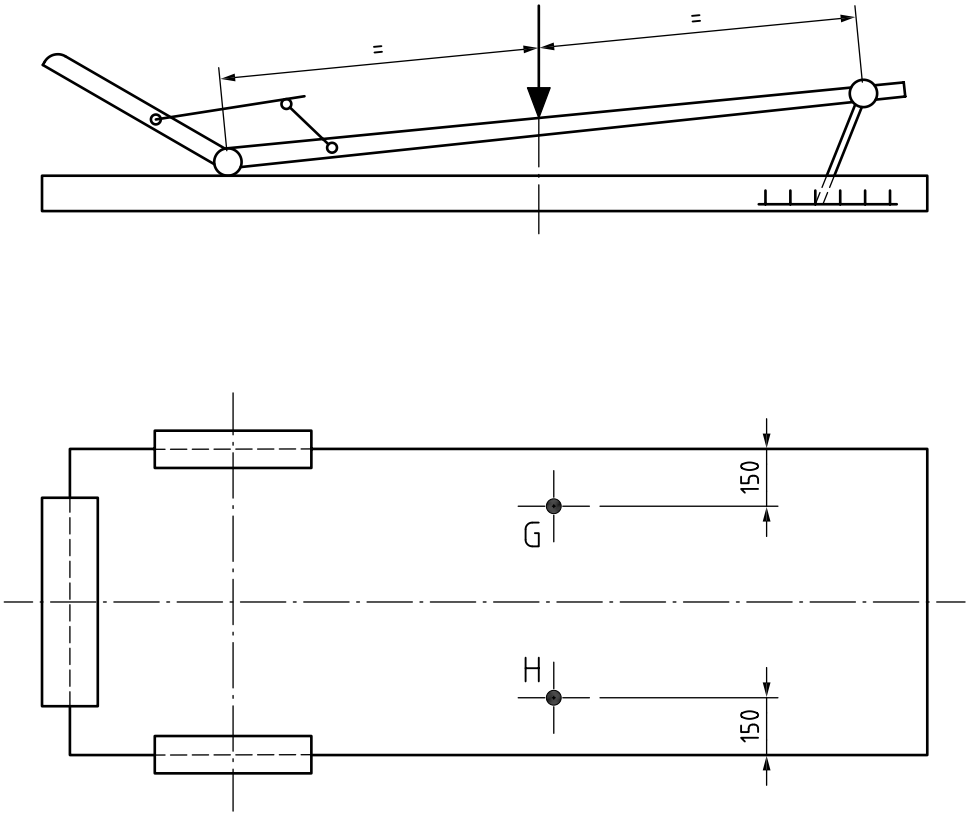
8.4.2 Additional seat durability test procedure

Apply the vertical seat durability load specified using the smaller seat loading pad (5.5) alternately at points G and H (see Figure 33).

Dimensions in millimetres



a) Lounger with adjustment



b) Lounger without adjustment

Key

G Loading point
H Loading point

Figure 33 — Seat fatigue test

8.5 Durability test on back rest mechanism

The test shall be carried out as described in 6.19.

8.6 Arm rest downwards static load test

This test shall be carried out as described in 6.11.

8.7 Arm rest durability test

This test shall be carried out as described in 6.20.

8.8 Impact test

With the exception of the application points specified below, the impact test procedure is performed in accordance in 6.24.

The application points shall be:

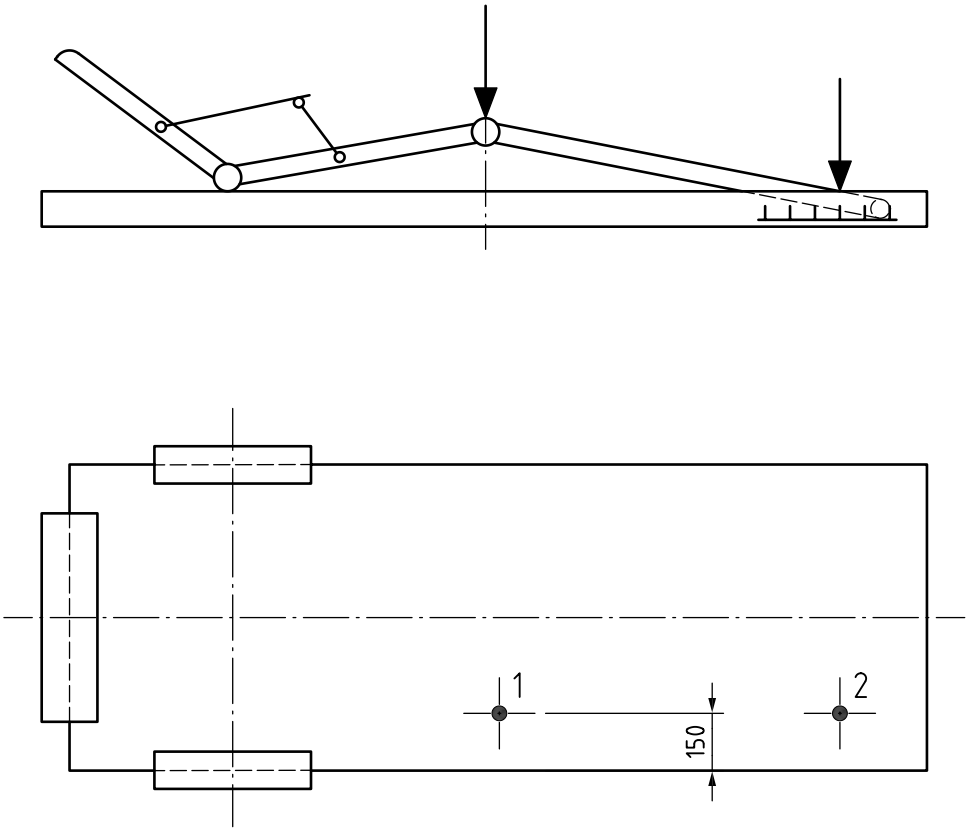
— the most adverse point on the seat-leg rest section,

— 150 mm in from the edge of the lounger, and,

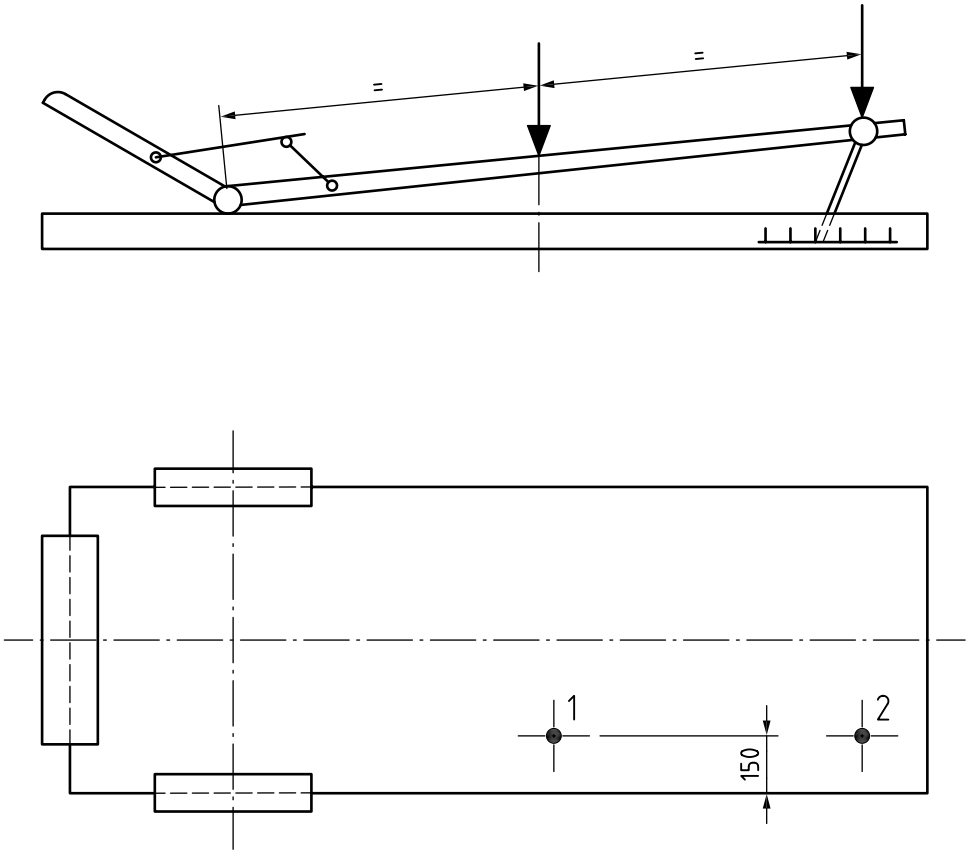
— directly on the end support,150 mm from any edge of the lounger (see Figure 34) on the same side of the lounger as the first impact position.

NOTE The most adverse point is normally over any adjustment mechanism, or the mid-point of the span between seat-leg rest section supports.

Dimensions in millimetres



a) Lounger with adjustment



b) Lounger without adjustment

Key

1 Impact point – most adverse position
2 Impact point – end support

Figure 34 — Impact test

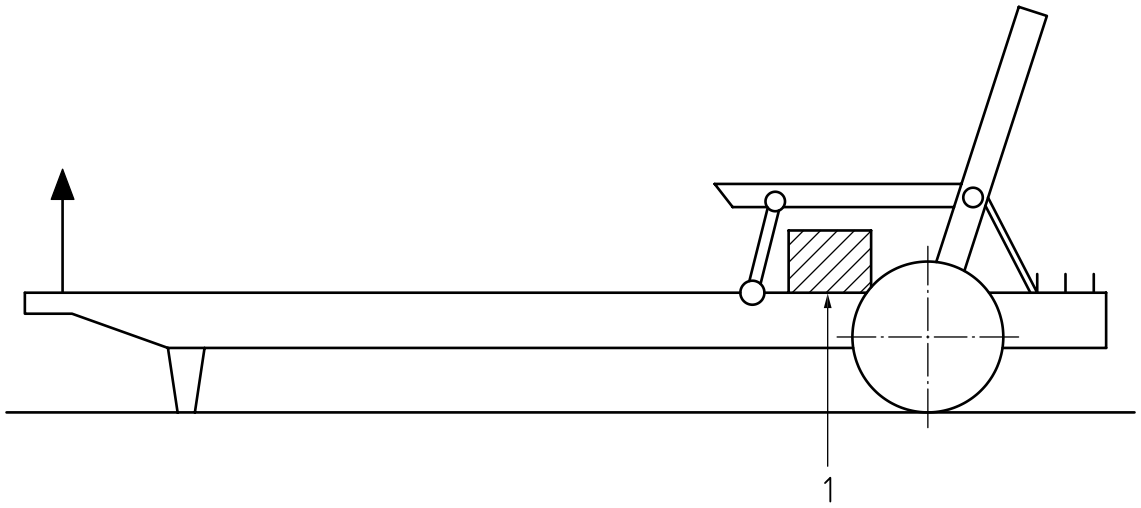
8.9 Lifting test for mobile loungers

This test is only applicable to mobile loungers that are designed to be moved whilst an occupant is seated.

Load the seat with the specified seat load at the seat loading point (6.2) and maintain the load for the duration of the test.

Lift the foot end of the lounger up to a height so that only the wheels are in contact with the floor surface for the specified number of cycles (see Figure 35).

Dimensions in millimetres



Key

1 Seat loading point (6.2)

Figure 35 — Lifting test

Annex A
(normative)

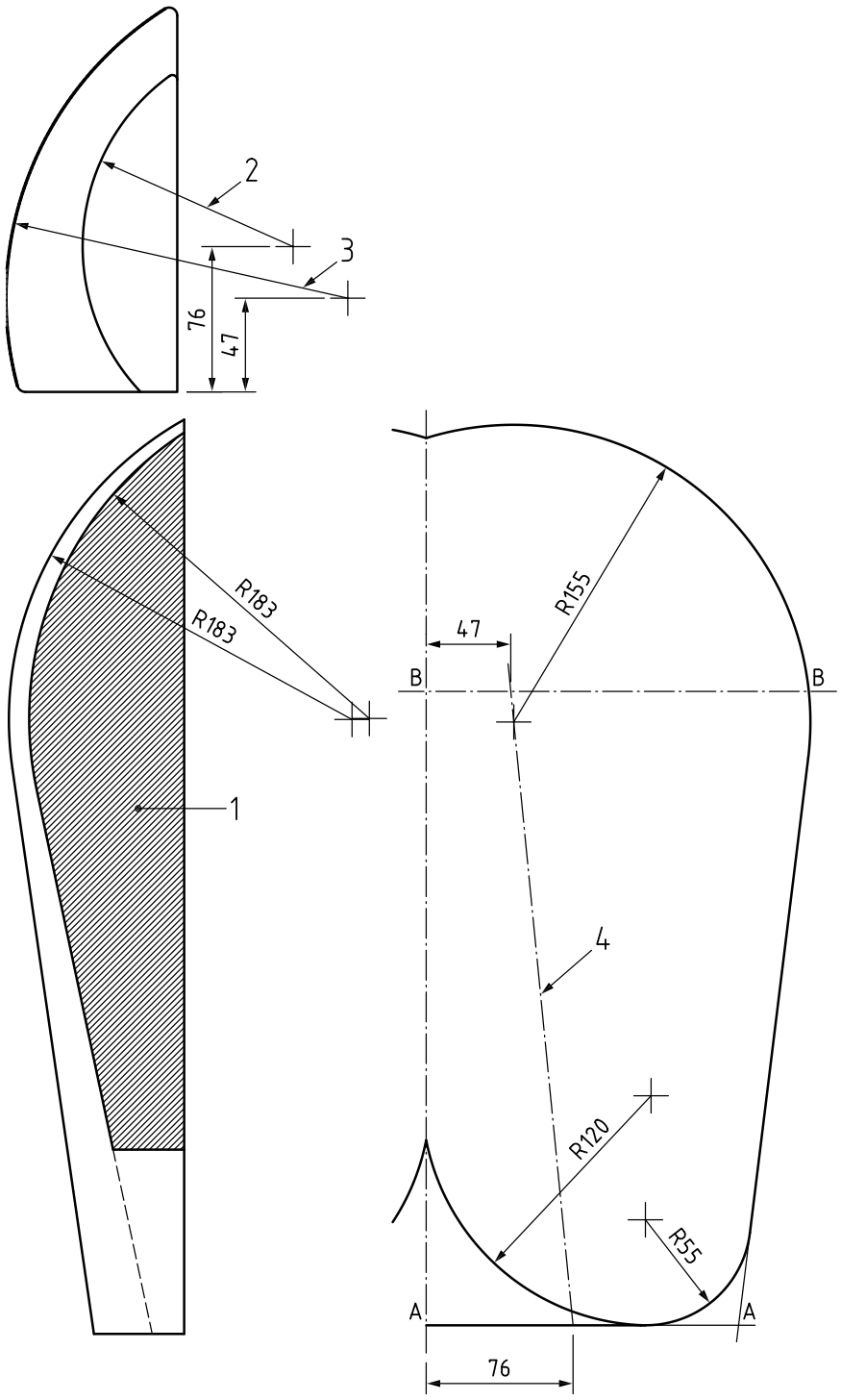
Seat loading pad data

The seat loading pad specified in 5.4 currently exists in two versions:

— machined seat loading pad, as shown in Figure A.1;

— moulded loading pad, as shown in Figure A.2.

Dimensions in millimetres
All dimensions: +/- 5 mm

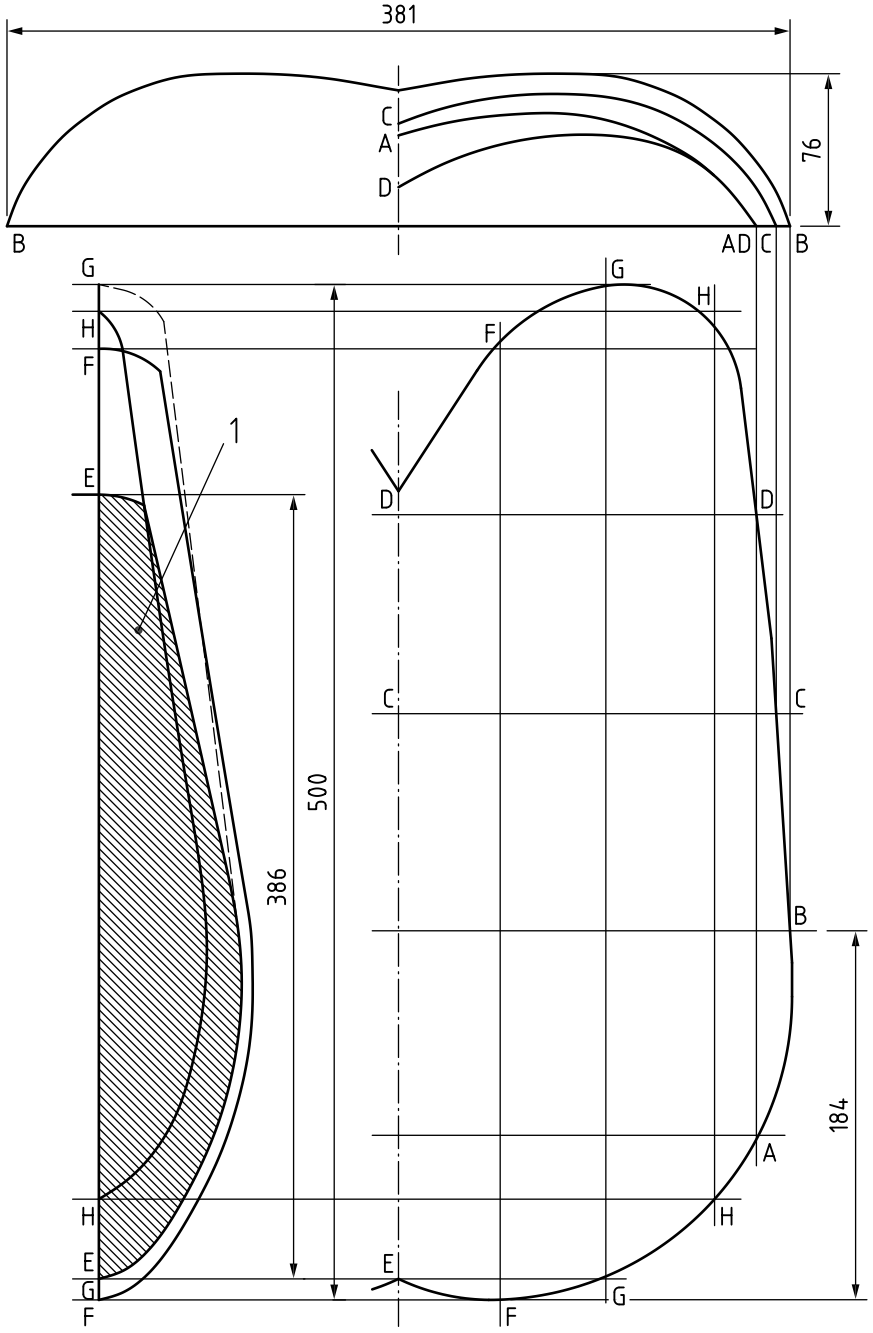


Key

1 Centre section cross hatched
2 R105 (section A-A, see the top view)
3 R183 (section B-B, see the top view)
4 Axis of the cone

Figure A.1 — Seat loading pad geometry – Machined construction

Dimensions in millimetres
All dimensions: +/- 5 mm



Key

1 Centre section cross hatched

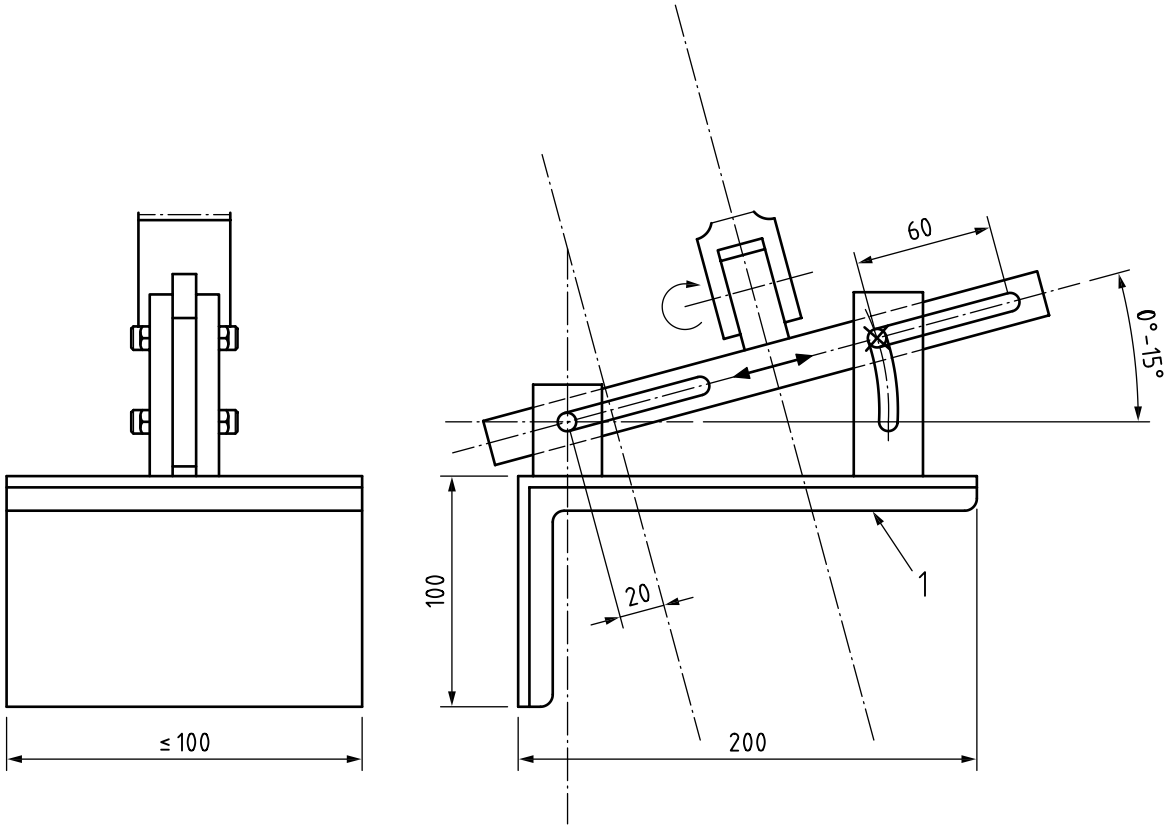
Figure A.2 — Seat loading pad geometry – Moulded construction

Annex B
(informative)

Arm rest loading pad details

The arm rest loading pad shown if Figure B.1 is an example of a loading pad that may be used to test the majority of arm rest designs used in furniture.

Dimensions in millimetres



Key

1 Nylon facing material

Figure B.1 — Example of arm rest loading pad

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