

Australian/New Zealand Standard™

Furniture — School and educational

**Part 2: Chairs — Strength, durability
and stability**



AS/NZS 4610.2:2020

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Australian/New Zealand Standard™

Furniture — School and educational

Part 2: Chairs — Strength, durability and stability

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS-088, Furniture — Domestic and Commercial, to supersede AS/NZS 4610.2:1999, *Furniture — School and educational, Part 2: Chairs — Strength, durability and stability*.

The objective of this Standard is to provide educational authorities, purchasers, specifiers, users, manufacturers and consumers with requirements for school and educational chairs that specify sizing, safety, strength, durability and stability requirements to assist in selection and evaluation.

This Standard is Part 2 of the AS/NZS 4610 series consisting of the following:

AS/NZS 4610.1, *Furniture — School and educational, Part 1: Tables — Strength, durability and stability*

AS/NZS 4610.2, *Furniture — School and educational, Part 2: Chairs — Strength, durability and stability* (this Standard)

AS/NZS 4610.3, *Furniture — School and educational, Part 3: Storage furniture — Strength, durability and stability*

The major changes in this revision are as follows:

- (a) Test level and dimensional size marks have increased from seven categories to eight and have changed from numerical to alphabetical designation.
- (b) A safety section has been added, see [Section 4](#).
- (c) Tests for durability of castors (see [Appendix V](#)) and writing tablets (see [Appendices T](#) and [U](#)) have been included.
- (d) Tests for leg strength and impact tests have been revised, see [Appendices K](#), [M](#), and [N](#).
- (e) Tests for pedestal style chairs only have been included, see [Appendix I](#).

The terms “normative” and “informative” are used in Standards to define the application of the appendix to which they apply. A “normative” appendix is an integral and mandatory part of the Standard, whereas an “informative” appendix is only for information and guidance.

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Australian/New Zealand Standard

Furniture — School and educational

Part 2: Chairs — Strength, durability and stability

Section 1 Scope and general

1.1 Scope

This Standard specifies sizing, safety, strength, durability and stability requirements for eight sizes of chairs for educational institutions.

Chairs may be —

- (a) fixed height;
- (b) height adjustable;
- (c) with arms;
- (d) without arms;
- (e) have fixed seats; or
- (f) swivel seats.

Chairs may have —

- (i) fixed or inclinable backrests of not more than 30° from vertical;
- (ii) fixed or inclinable single slope seats;
- (iii) a writing tablet; or
- (iv) a storage area, usually under the seat.

Where a chair includes a storage component, this Standard will not make any strength or durability assessment of that component.

Bases may be, but are not limited to —

- (A) discrete legs;
- (B) sled;
- (C) cantilever; or
- (D) pedestal types.

Bases may be fitted with —

- (1) wheels;
- (2) castors;
- (3) glides; or
- (4) ferrules.

NOTE 1 In this Standard, the term “chair” also includes stools.

This Standard does not cover the following:

- (aa) Chairs other than those with single-sloped seats and single-sloped seats with a forward inclination greater than 7° or a rearward inclination of greater than 5°.
- (bb) Double-sloped seats (i.e. a seat where approximately 30 % to 50 % of the seat depth slopes to the front and the remainder slopes to the rear of the seat).

NOTE 2 Double-sloped seats have a substantial apex height, see [Figure 1.1](#).

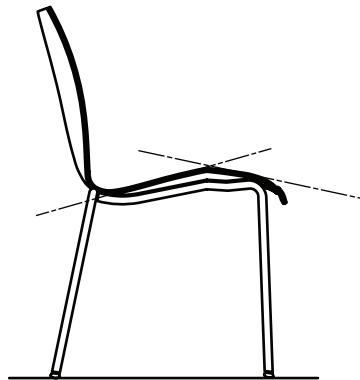


Figure 1.1 — Double-sloped seat

- (cc) Folding chairs.
- (dd) Benches or seating for more than one person.
- (ee) Outdoor and playground seating.
- (ff) Lounges and ottomans.
- (gg) Chairs intended for use by teachers, administration staff or management.
- (hh) Chairs for use in commercial environments.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 48-4:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)*

ISO 48-5:2018, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 5: Indentation hardness by IRHD pocket meter method*

EN 1729-1:2015, *Chairs and tables for educational institutions — Part 1: Functional dimensions*

1.3 Terms and definitions

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

1.3.1**accuracy**

degree of closeness to the true value or the specified value of whatever dimension is being measured, or force applied

1.3.2**accessible to the user**

features to which access can be easily gained by the user, when the seating is in its intended configuration for use, and for which the probability of unintentional contact is high

1.3.3**footrest**

chair component, for the purpose of providing a resting place for the user's feet

1.3.4**height adjustable**

chairs that can be adjusted in height without the need for special tools and be set at a minimum of two adjacent dimensional size marks

1.3.5**may**

indicates the existence of an option

1.3.6**median plane**

vertical plane running from front to back and passing through the centre of the seat

Note 1 to entry: See [Figure 1.3.6](#).

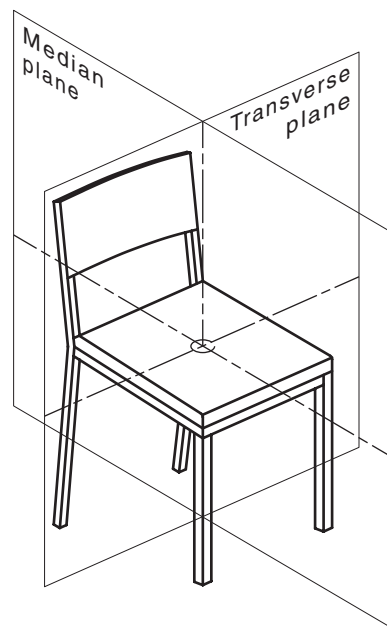


Figure 1.3.6 — Median and transverse planes

1.3.7**pedestal chair**

chairs with the seat and base attached to, and separated by, a single vertical column

1.3.8**precision**

degree to which repeated measurements show the same results

Note 1 to entry: Precision is usually expressed as a $\pm$ % about the true value or the specified value of whatever dimension is being measured, or force applied.

1.3.9**school chair measuring device****SCMD**

device used for determining Point S, buttock zone and chair dimensions of chairs in accordance with EN 1729-1

1.3.10**shall**

indicates that a statement is mandatory

1.3.11**sharp edges**

edges that are not rounded, chamfered or otherwise finished such that they are smooth and free from burrs

1.3.12**shear and squeeze zones**

zones where the distance between two accessible parts, moving relative to each other, is less than 25 mm or more than 7 mm in any position during movement, or where parts move in classic scissor action without any gap between them

1.3.13**should**

indicates a recommendation

1.3.14**single-sloped seat**

seat sloped (in a general sense) either in a forward or rearward direction and confirmed with the SCMD

Note 1 to entry: See [Figures 1.3.14\(A\)](#) and 1.3.14(B) .

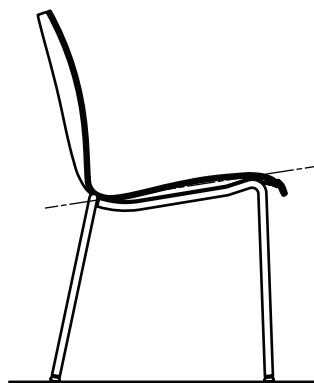


Figure 1.3.14(A) — Single-sloped seat (Negative angle)

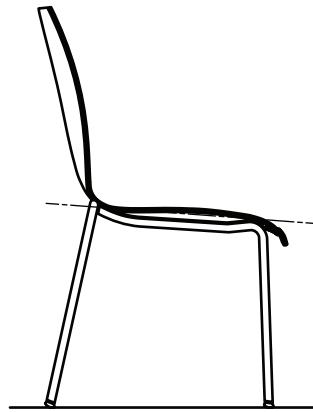


Figure 1.3.14(B) — Single-sloped seat (Positive angle)

1.3.15

size mark

marks have dual purposes and represent both —

- (a) alphabetic designation given to tables and chairs for the purpose of matching their heights to groups of users based upon ranges of user statures; and
- (b) level of strength, durability and stability testing appropriate to the user group.

1.3.16

stability

ability of a chair to withstand overbalancing when forces are applied to it

1.3.17

static loading

steady and gradual application, up to the maximum that the chair is required to withstand, of a loading repeated a sufficient number of times to test the static strength of the chair

1.3.18

stool

chair without a backrest or with a back not higher than 100 mm above the seat loading point

Note 1 to entry: Stools may be of any height and are often fitted with a footrest.

Note 2 to entry: See *tall chair* ([1.3.19](#)).

1.3.19

tall chair

chair or a stool higher than a sitting chair of the same dimensional size mark, and with a footrest

Note 1 to entry: See [Appendix B](#).

1.3.20

tolerance

allowable difference from a specified value

Note 1 to entry: Tolerance may be expressed as values or percentages.

1.3.21

transverse plane

any vertical plane perpendicular to the median plane

Note 1 to entry: See [Figure 1.3.6](#).

1.4 General

1.4.1 Testing laboratories

Other than for the requirements of measurement uncertainty, laboratories performing the tests outlined in this Standard shall meet the requirements of AS ISO/IEC 17025.

NOTE For example, accreditation bodies which are signatories to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for testing laboratories are able to offer accreditation against the requirements of AS ISO/IEC 17025. A listing of ILAC signatories is available from the ILAC website (www.ilac.org). In Australia and New Zealand, the National Association of Testing Authorities (NATA) and International Accreditation New Zealand (IANZ) are signatories to the ILAC MRA.

1.4.2 Materials

Chairs shall be tested as supplied or as assembled.

Where chairs are supplied other than fully assembled, clear and comprehensive assembly instructions shall be provided. The chair shall be assembled in accordance with the manufacturer's instructions. Where the instructions allow assembly in different ways, the method determined most adverse shall be used.

Fastenings shall not be re-tightened once testing has commenced.

1.4.3 Accuracy and precision

Unless otherwise stated, all forces shall have an accuracy of $\pm 2\%$ and a precision of $\pm 5\%$. Therefore, all force application devices shall be initially set to apply $\pm 2\%$ of the specified value. All subsequent applications of force shall fall within $\pm 5\%$ of the specified value. All masses shall have an accuracy of $\pm 2.0\%$. All dimensional measuring instruments shall have an accuracy of $\pm 1\text{ mm}$. All angular measuring instruments shall have an accuracy of $\pm 1^\circ$.

1.4.4 Loads and forces

In static load tests, unless otherwise stated, the loads or forces shall be applied for between 10 s and 15 s per application. There shall be negligible impact force.

In durability loading, unless otherwise stated, the rate of loading shall not exceed 20 cycles per minute. Forces shall be maintained for $2 \pm 1\text{ s}$. The forces shall be applied sufficiently slowly to ensure that kinetic heating does not occur.

Section 2 General inspection, failure criteria and test report

2.1 Pre and post-test inspection

Prior to commencing testing, the chair shall be inspected in accordance with [Appendix A](#).

After each test the chair shall be reinspected. The following attributes shall be reported:

- (a) Significant fractures or cracks.
- (b) Significant deformation that adversely affects the appearance or function of the chair.
- (c) Significant impairment of the operation of any mechanical part.
- (d) Loose joints intended to be tight.
- (e) Significantly loose or dislodged screws.

2.2 Failure criteria

2.2.1 Sections 3 and 4

Chairs shall meet the requirements as specified in each section.

2.2.2 Sections 6 and 7

After each test any product that fails to meet the specific requirements of that test (see [Sections 6](#) and [7](#)), or exhibits any of the attributes listed in [Clause 2.1](#), shall fail that test.

2.3 Test report

The test report shall include, at a minimum, the following:

- (a) Name and address of the test facility.
- (b) Date of test completion.
- (c) Reference to this Standard, e.g. AS/NZS 4610.2.
- (d) Details of the chair being tested and at a minimum one image.
- (e) Dimensional and test level size mark.

NOTE For test levels E, F, G and H, include the performance level “Normal” or “Severe” as applicable, see [Clause 3.1](#).

- (f) Details of any deviations from this Standard.
- (g) Results of the tests conducted.

Section 3 Size marks and functional dimensions

3.1 General

Chair sizes (size marks) are based on the seat height (and other functional dimensions) determined suitable for a given range of user statures. Chairs are allocated a size mark from A to H. Size mark A is the smallest and size mark H the largest.

Size marks referenced in this Standard have dual functions. They provide dimensional guidance for matching chair and table heights and additionally the appropriate levels of strength and durability testing for the intended users. The two shall be referred to as dimensional and test level size mark respectively.

Two performance levels are included for the larger test level size marks, “Normal” and “Severe”. “Normal” is for everyday use in supervised environments and “Severe” where an increased level of strength and durability may be required or in unsupervised environments where a higher level of misuse may be expected to occur.

NOTE In strength and durability testing the forces and/or cycles used at “Severe” level will typically be 25 % greater than those used at “Normal” level.

The applicable functional dimensions in this Standard are established according to EN 1729-1, and restricted to chairs with single-sloped seats between 7° forward and 5° rearward inclination.

3.2 Dimensional size mark

A chair shall initially be designated a dimensional size mark if it conforms to the seat height requirement of the functional dimensions in [Clause 3.4](#) and shown in [Table 3.2](#).

The designation of a dimensional size mark shall not constitute conformance to other functional dimensions appropriate to the designated size mark, see [Clause 3.4](#) for additional dimensions.

Height adjustable chairs shall conform to a minimum of two adjacent dimensional size marks. Where the adjustment covers more than two size marks they shall conform at each size mark covered by the adjustment.

Table 3.2 — Size mark seat heights

Dimensions in millimetres

Characteristic	Size mark							
	A	B	C	D	E	F	G	H
Height of seat ± 10	210	260	310	350	380	430	460	510

3.3 Test level size mark

For the purpose of strength and durability testing, unless otherwise stated, the minimum test level size mark shall be determined by the greatest dimensional size mark.

Chairs of dimensional size marks E, F, G and H have the option of being tested at either of the two available performance levels, Normal or Severe.

Chairs which do not conform to the applicable dimensional size mark requirements may be tested for the remaining requirements of this Standard at the nearest higher test level size mark.

Strength and durability may be tested to a greater test level size mark if required.

Height adjustable chairs shall be tested at the greatest dimensional size mark attainable by the adjustment.

3.4 Functional dimensions

When measured in accordance with [Appendix B](#), the applicable functional dimensional requirements shall conform to EN 1729-1 for chairs with single-sloped seats between 7° forward and 5° rearward inclination.

Height adjustable chairs shall conform to the functional dimensional requirements at each dimensional size mark covered by the available adjustment.

Section 4 Safety requirements

4.1 Corners and edges

- (a) There shall be no sharp edges accessible to the user, see *accessible to the user* (1.3.2) and *sharp edges* (1.3.11).
- (b) The ends of tubular components shall be capped or otherwise closed and finished smoothly.
- (c) All contact points with the floor shall be designed to militate against scratching, e.g. fitted with slides, glides, castors, ferrules, caps or similar.
- (d) Static reducing gaps such as “V” formations that may cause entrapment or laceration to the user or others in the immediate vicinity of the chair shall be closed. Alternatively, the edges forming the feature shall be a minimum of 3 mm thick, smooth and well-rounded such that injury is unlikely.

4.2 Adjusting devices

- (a) Movable and adjustable parts shall be manufactured so that inadvertent separation of parts is improbable.
- (b) Adjustment controls shall be easily adjustable by the occupant from the seated position.
- (c) There shall be no shear or squeeze zones created by parts accessible to the user moving relative to each other by forces applied during normal use, see *shear and squeeze zones* (1.3.12).

NOTE Shear and squeeze zones are not determined to exist when the user can reasonably be assumed to be in control of his/her movements and easily able to cease applying the force upon experiencing pain.

4.3 Soiling

Lubricated parts shall be protected from unintentional contact by the user when seated, i.e. parts of the chair that might easily come in contact with the user or the clothing of the user when seated.

Section 5 Test conditions, apparatus, loading points and test configurations

5.1 General

Before testing at least 4 weeks shall have elapsed between time of manufacture and testing.

5.2 Testing conditions

Testing shall be carried out in indoor ambient conditions between 15 °C and 30 °C.

5.3 Test apparatus and devices

The equipment shall not prevent deformation. Equipment shall be able to move so that it can follow the deformation of the chair during testing.

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

A layer of flexible foam with a bulk density of $120 \pm 25 \text{ kg/m}^3$, $25 \pm 5 \text{ mm}$ thick should be attached to the loading pads or alternatively positioned between the loading pad and the test structure.

The following apparatus is required:

- (a) *Back loading pad* — A rigid rectangular object 200 mm in height and 250 mm in width, whose face is curved across the width of the pad with a convex cylindrical curvature of 450 mm radius and with a 12 mm edge radius on all front edges.
- (b) *Edge detection devices* — Devices used to determine the front and side edges of the seat for stability tests, see [Clause W.4](#).
- (c) *Local loading pad* — A rigid cylindrical object 100 mm in diameter with a flat face and a 12 mm radius on the front edge.
- (d) *Seat loading pad (i.e. dummy buttock)* — A seat loading pad in the form of a buttock with a hard smooth surface, see [Figure 5.3](#).
- (e) *Smaller seat loading pad* — A rigid circular object 200 mm in diameter with a convex spherical curvature of 300 mm radius and a 12 mm front edge radius.
- (f) *Mini seat loading pad* — A rigid circular object 85 mm in diameter with a convex spherical curvature of 300 mm radius and a 5 mm front edge radius.
- (g) *School chair measuring device (SCMD)* — A device used for determining Point S, buttock zone and other chair dimensions as specified in EN 1729-1.
- (h) *Stops* — A straight object to prevent the chair from sliding but not tilting. Stops shall be not higher than 12 mm except where the design of the chair necessitates the use of higher stops, in which case the lowest height that will prevent the chair from moving shall be used.
- (i) *Test floor* — Unless otherwise stated the test surface shall be smooth, rigid, horizontal and flat.

Dimensions in millimetres

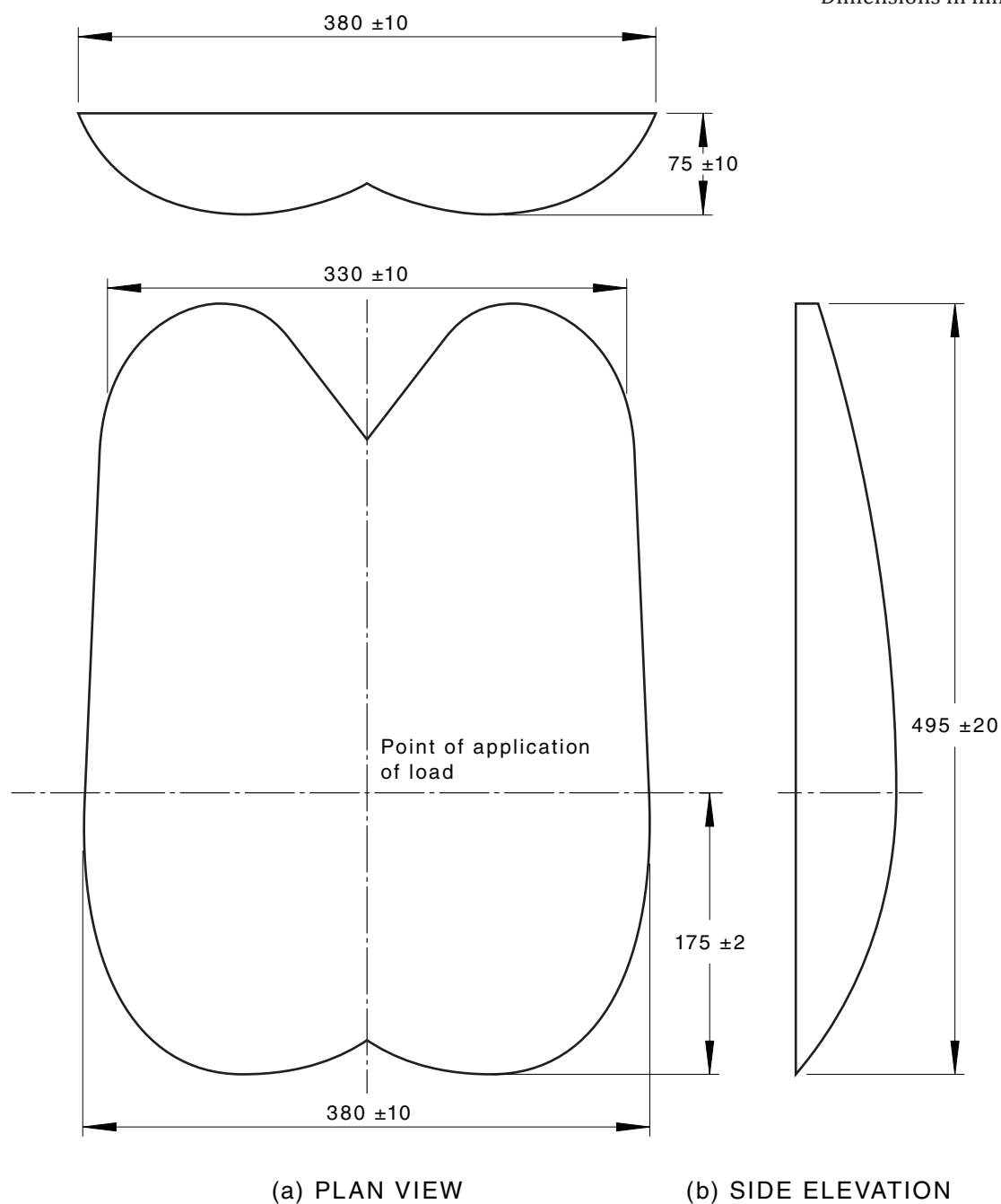


Figure 5.3 — Details of the seat loading pad (dummy buttock)

5.4 Loading points

5.4.1 Point S

Point S is the most forward point of the backrest and is established in [Appendix B](#) with the aid of the school chair measuring device (SCMD), see *school chair measuring device* ([1.3.9](#)) and [Figure 5.4.1](#).

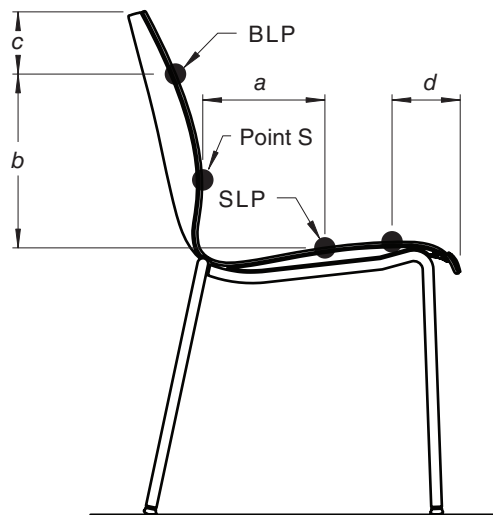


Figure 5.4.1 — Seat and back load points

5.4.2 Seat loading point (SLP)

The SLP is a point on the seat surface in the median plane forward of Point S by the applicable amount shown in [Table 5.4.2](#), see [Figure 5.4.1](#).

Table 5.4.2 — Loading positions

Dimensions in millimetres

Characteristic	Dimensional size mark							
	A	B	C	D	E	F	G	H
Point S to seat loading point (<i>a</i>), see Figure 5.4.1	120	120	130	145	160	175	185	185
Seat loading point to back loading point (<i>b</i>), see Figure 5.4.1	180	180	200	250	300	300	300	300
Minimum height below top of backrest (<i>c</i>), see Figure 5.4.1	60	65	70	75	80	90	100	100
Distance back from front edge of seat (<i>d</i>), see Figure 5.4.1	70	75	80	85	90	95	100	100
Distance from side of seat — Side to side durability, see Appendix I	70	75	80	85	90	95	100	100
Distance from side edge of seat — Legs sideways test, see Appendix K	65	75	85	95	130	130	130	130

5.4.3 Back loading point (BLP)

The back loading point shall be on the surface of the back rest the applicable distance (*b*) specified in [Table 5.4.2](#) vertically above the SLP or the applicable distance (*c*) specified in [Table 5.4.2](#) below the highest point of the back rest, whichever is the lower point. Where the loading pad cannot be positioned at the back loading point it shall be positioned at the closest higher point and the bending moment maintained, see [Figure 5.4.1](#).

Chairs with inclinable backrests shall be set as close to vertical as possible when establishing the back loading point.

5.5 Configuration of chairs with adjustable features

Unless otherwise advised chairs with adjustable features shall be configured for each test in the manner described in [Table 5.5](#).

Table 5.5 — Chair configurations for test

Appendix	Test	Seat height	Seat	Backrest height	Backrest tilt	Tilt stiffness	Castors and base	Armrest	Footrest	Tablet
C	Seat and front edge static load	Highest position	Most forward				Most stable			Stored position
D	Back static load	Highest position		Highest position	Mid-range	Mid-range	Most stable			Stored position
E	Armrest static load	Lowest position	Most horizontal				Most stable	Most adverse		Stored position
F	Seat durability	Highest position	Most forward				Most stable			Stored position
G	Back durability	Highest position		Highest position	Mid-range	Mid-range	Most stable			Stored position
F and G	Combined seat and back durability	Highest position	Most forward	Highest position	Mid-range	Mid-range	Most stable			Stored position
H	Seat front edge durability	Highest position	Most forward							Stored position
I	Seat side-to-side durability	Highest position	Most forward							Stored position
I	Armrest durability	Lowest position	Most horizontal				Most stable	Most adverse		Stored position
K	Leg strength	Highest position	Most horizontal				Most adverse			Stored position
L	Vertical seat impact	Highest position	Most forward				Most stable			Stored position
M	Horizontal seat impact	Mid position	Most forward							Stored position
N	Backrest impact	Mid position		Highest position	Most vertical	Mid-range				Stored position
O	Armrest impact	Mid position	Most horizontal					Most adverse		Stored position
P	Chair drop test	Lowest position	Most horizontal							Stored position
Q	Footrest static load							Most stable	Most adverse	Stored position
R	Footrest durability							Most stable	Most adverse	Stored position
S	Swivel durability	Highest position	Most forward				Most stable			

Table 5.5 (continued)

Appendix	Test	Seat height	Seat	Backrest height	Backrest tilt	Tilt stiffness	Castors and base	Armrest	Footrest	Tablet
T	Writing tablet static load						Most stable			Most adverse
U	Writing tablet durability						Most stable			Most adverse
V	Castor durability	Lowest position	Most horizontal				See Appendix V			
W.5.2	Forwards overbalancing	Highest position	Most forward	Highest position	Most vertical		Most adverse	Most forward	Most adverse	N/A
W.5.3	Forwards overbalancing with a footrest	Highest position	Most forward	Highest position	Most vertical		Most adverse	Most forward	Most adverse	N/A
W.5.4	Sideways overbalancing without armrests	Highest position	Most adverse	Highest position	Most vertical		Most adverse	N/A	Most adverse	N/A
W.5.5	Sideways overbalancing with armrests	Highest position	Most adverse	Highest position	Most vertical		Most adverse	Most adverse	Most adverse	N/A
W.5.6	Rearwards overbalancing with backs	Highest position	Most rearward	Highest position	Mid- range	Minimum	Most adverse	Most rearward	Most adverse	N/A
W.5.7	Rearwards overbalancing with backrest inclination	Highest position	Most rearward	Highest position	Most rearward	Minimum	Most adverse	Most rearward	Most adverse	N/A
W.5.8.2	Freestanding stability with tablet	Highest position	Most adverse	Highest position	Most vertical		Most adverse	Most adverse	Most adverse	See Clause W.5.8.2
W.5.8.3	Forwards overbalancing with tablet	Highest position	Most adverse	Highest position	Most vertical		Most adverse	Most adverse	Most adverse	See Clause W.5.8.3
W.5.9	Sideways overbalancing with tablet	Highest position	Most adverse	Highest position	Most vertical		Most adverse	Most adverse	Most adverse	See Clause W.5.9
W.5.11	Rearwards overbalancing with tablet	Highest position	Most rearward	Highest position	Most rearward	Minimum	Most adverse	Most adverse	Most adverse	See Clause W.5.11
W.5.11.1	Rearwards overbalancing with backrest inclination and with tablet	Highest position	Most rearward	Highest position	Most rearward	Minimum	Most adverse	Most adverse	Most adverse	See Clause W.5.11.1

Section 6 Strength and durability testing and specific requirements

6.1 General

The applicable tests in [Clause 6.2](#) shall be performed in clause sequence and on the same chair.

Chairs shall be tested as supplied. Where chairs are supplied other than fully assembled, clear and comprehensive assembly instructions shall be provided. The chair shall be assembled according to those instructions in a competent manner. Where instructions allow the chair to be assembled in different ways the one determined most adverse shall be used. Fastenings shall not be retightened once testing has commenced.

6.2 Chair strength and durability tests

Chairs shall be tested in accordance with the following:

- (a) Seat and front edge static load test, see [Appendix C](#).
- (b) Back static load test, see [Appendix D](#).
- (c) Armrest static load tests, see [Appendix E](#).
- (d) Seat durability test, see [Appendix F](#).
- (e) Back durability test, see [Appendix G](#).
- (f) Seat front edge durability test (non-pedestal chairs only), see [Appendix H](#).
- (g) Seat side-to-side durability test (pedestal chairs only), see [Appendix I](#).
- (h) Armrest durability test, see [Appendix J](#).
- (i) Leg strength tests (not applicable to chairs on a pedestal base), see [Appendix K](#).

Where if, after moving the loading pad 75 mm, the unrestrained legs do not lift and the applicable specified load has not been reached, the chair fails the test. Where the rear legs do lift but at greater than 80 % of the applicable specified load the chair passes the test.

- (j) Vertical seat impact test, see [Appendix L](#).
- (k) Horizontal seat impact tests, see [Appendix M](#).
- (l) Backrest impact test, see [Appendix N](#).
- (m) Armrest impact test, see [Appendix O](#).
- (n) Chair drop test (stacking chairs only), see [Appendix P](#).
- (o) Footrest static load test, see [Appendix Q](#).
- (p) Footrest durability test, see [Appendix R](#).
- (q) Swivel durability test, see [Appendix S](#).

The swivelling mechanism shall remain functional.

- (r) Writing tablet vertical static load test, see [Appendix T](#).
- (s) Writing tablet durability test, see [Appendix U](#).
- (t) Castor durability test, see [Appendix V](#).

Castors shall not have sustained damage and remain functional.

See [Table 6.2](#) for strength and durability requirements.

Table 6.2 — Requirements for strength and durability tests

Appendix	Test	Criteria	Chair test level size mark					
			A	B	C	D	E, F, G and H Normal	E, F, G and H Severe
C	Seat and front edge static load	Applications (each test)	10	10	10	10	10	10
		Force (N)	1 500	1 600	1 700	1 800	2 000	2 400
D	Back static load	Applications	10	10	10	10	10	10
		Horizontal force (N)	450	480	510	540	600	720
		Balancing force (N)	750	800	850	900	1 000	1 200
E	Arms sideways static load	Applications	10	10	10	10	10	10
		Force (N)	200	230	260	290	320	400
E	Arms downwards static load	Applications	10	10	10	10	10	10
		Force (N)	300	375	450	525	600	750
F	Seat durability	Applications	15 000	25 000	50 000	75 000	140 000	200 000
		Force (N)	675	720	760	810	950	1 200
G	Back durability	Applications	15 000	25 000	50 000	75 000	140 000	200 000
		Force (N)	240	250	270	285	330	410
H	Seat front edge durability	Applications	–	–	10 000	15 000	25 000	32 000
		Force (N)	–	–	470	505	600	750
I	Seat side-to-side durability	Applications	–	–	10 000	15 000	25 000	32 000
		Force (N)	–	–	470	505	600	750
J	Armrest durability	Applications	–	–	–	–	40 000	50 000
		Force (N)	–	–	–	–	320	400
K	Legs forwards	Applications	10	10	10	10	10	10
		Force (N)	200	230	260	290	320	400
		Load (N)	900	1 000	1 150	1 300	1 400	1 500
K	Legs sideways	Applications	10	10	10	10	10	10
		Force (N)	200	230	260	290	320	400
		Load (N)	900	1 000	1 150	1 300	1 400	1 500
L	Vertical seat impact	Applications	10	10	10	10	10	10
		Height (mm)	170	170	190	240	300	350
M	Horizontal seat impact	Applications	5	5	5	5	5	5
		Height (mm)	243	243	293	357	500	741
		Angle (degree)	40	40	45	50	60	75
N	Backrest impact — front and back	Applications	5	5	5	5	5	5
		Height (mm)	243	243	293	357	500	741
		Angle (degree)	40	40	45	50	60	75
N	Backrest impact — top	Applications	–	–	5	5	5	5
		Height (mm)	–	–	94	131	181	243
		Angle (deg)	–	–	25	30	35	40

Table 6.2 (continued)

Appendix	Test	Criteria	Chair test level size mark					
			A	B	C	D	E, F, G and H Normal	E, F, G and H Severe
Q	Armrest impact	Applications	–	–	10	10	10	10
		Height (mm)	–	–	293	357	500	741
		Angle (degree)	–	–	45	50	60	75
P	Drop test	Applications	–	–	5	5	5	5
		Height (mm)	–	–	500	550	600	750
Q	Footrest static load	Applications	10	10	10	10	10	10
		Force (N)	800	800	1 000	1 200	1 500	1 800
R	Footrest durability	Applications	–	–	20 000	30 000	40 000	50 000
		Force (N)	–	–	600	700	1 000	1 250
S	Swivel durability	Applications	80 000	80 000	80 000	80 000	80 000	100 000
		Force (N)	675	720	760	810	950	1 200
T	Writing tablet static load	Applications	10	10	10	10	10	10
		Load (N)	150	150	200	250	300	370
U	Writing tablet durability	Applications	–	–	–	20 000	30 000	40 000
		Load (N)	–	–	–	150	200	250
V	Castor durability	Applications	80 000	80 000	80 000	80 000	80 000	100 000
		Load / Force (N)	675	720	760	810	950	1 200

Section 7 Stability requirements

7.1 All chairs

When tested to the applicable tests, in accordance with [Appendix W](#), by either the experimental method or the calculative method the chair shall not overbalance at less than the minimum requirements specified in [Table 7.1](#)

Table 7.1 — Minimum overbalancing forces

Dimensions in newtons

Chair size mark	Overbalancing force (<i>F</i>)		
	Forward	Sideways (With and without arms)	Rearwards
A	20	20	50
B	20	20	70
C	25	25	95
D	25	25	120
E	25	25	150
F	30	30	180
G	30	30	180
H	30	30	180

7.2 Primary and secondary tipping points

Some chairs, in the forwards direction, may have an initial tipping point, but when the horizontal force is applied, roll onto subsequent points of contact. In such instances the chair shall not rotate by more than 5° from its initial position.

7.3 Chairs with backrest inclination and chairs with fixed backrests greater than 15° from the vertical

When tested in accordance with [Clause W.5.7](#), the chair shall not overbalance when loaded with the applicable number of discs as specified in [Table 7.3](#).

Table 7.3 — Rearwards overbalancing of chairs with backrest inclination

Chair size mark	A	B	C	D	E	F	G	H
Number of discs	–	–	–	–	10	11	12	13

Section 8 Labelling and markings

Each chair shall be clearly and durably marked, or have a durable label attached to show at a minimum the following information:

- (a) The Standard to which it was tested, i.e. AS/NZS 4610.2.
- (b) The test level size mark, additionally on chairs of size marks E, F, G and H, the words “Normal” or “Severe” as applicable.
- (c) The dimensional size mark(s) of the chair, where applicable, appended by the word “Tall”.
- (d) Where the chair is height adjustable, the range of dimensional size marks covered.
- (e) “Tall” chairs purpose built to match a table height shall indicate the table to which the chair is intended to be matched.

Appendix A (normative)

Chair description and pretest inspection

A.1 Principle

The chair is described for reference and inspected for defects.

A.2 Apparatus

There is no apparatus required for this test.

A.3 Procedure

The chair shall be inspected thoroughly for defects. At a minimum any of the following defects shall be recorded:

- (a) Significant fractures or cracks.
- (b) Significant deformation that adversely affects appearance or function.
- (c) Significant impairment of the operation of any mechanical part.
- (d) Loose joints intended to be tight.
- (e) Significantly loose or dislodged screws.

A.4 Pretest inspection report

The following shall be recorded, where applicable:

- (a) Name of the chair.
- (b) Date of inspection.
- (c) Structural form, e.g. four legged, cantilevered, pedestal or similar.
- (d) With or without arms.
- (e) With or without a writing tablet.
- (f) Support points with the floor, e.g. slides, glides, castors or similar.
- (g) Fixed or height adjustable.
- (h) Method of height adjustment, e.g. spring-loaded pins, gas lift, hand levers or similar.
- (i) Other useful descriptors.
- (j) Any defect observed in [Clause A.3](#).

Appendix B (normative)

Functional dimensions and test level size mark determination

B.1 Principle

The chair seat height is measured to establish a dimensional and test level size mark. Additional functional dimensions are measured and compared to requirements.

B.2 General

B.2.1 Chair dimensions

The functional dimensions of chairs shall be determined in accordance with Annexes A and F of EN 1729-1.

The following exceptions and variations to EN 1729-1 shall apply:

- (a) Dimensional size marks shall be designated A to H according to the cross-reference in [Table B.2.1](#).
- (b) Colour coding requirements shall not apply.
- (c) Distance from the backrest to the front edge of the armrest shall not apply.
- (d) Requirements for raised edges shall not apply.

Table B.2.1 — Size mark cross-reference

Standard	Size mark							
EN 1729-1	0	1	2	3	4	5	6	7
AS/NZS 4610.2	A	B	C	D	E	F	G	H

B.2.2 Tall chairs

Chairs with a footrest shall be measured and designated a dimensional and test level size mark based on the dimension from the top surface of the footrest to the height of the seat. Where the footrest is inclined it shall be measured at the mid-point of its width and depth.

Where the chair sits on a pedestal the footrest may be in the form of a ring attached to the column of the pedestal.

Chairs with a footrest shall be designated as “tall chairs” because they are higher off the floor than a chair of the same dimensional size mark without a footrest. Tall chair dimensional size marks are therefore unable to be used to match with a table of the same dimensional size mark. Tall chairs shall only be matched to tables when the distance between the height of the seat and the height of the table is as specified in [Table B.2.2](#).

Tall chairs shall have the word “Tall”, in brackets () appended to the dimensional size mark, e.g. Size mark F (Tall).

Where, in the case of a stool, the front is unable to be identified, and has footrests of differing heights on more than one side, each side shall be allocated a dimensional size mark. The stool shall be tested at

the test level indicated by the greatest of the dimensional size marks allocated. In rare cases it may be possible to have three sides with a footrest and one without. Where the one without a footrest conforms with a normal chair and the others as high chairs the appended word “Tall” shall appear against three sides and the standard designation against the fourth side.

It is possible that tall chairs, particularly those with height adjustment, may conform to various size marks in different categories of chair. Where identification is not clear it shall be the responsibility of the testing client to advise the testing laboratory of the categories and size marks for which testing is to be undertaken.

Table B.2.2 — Relativity of high sitting tables and tall chairs

Size mark	Distance between the height of the seat and top of table mm ± 10
A	140
B	145
C	160
D	175
E	195
F	215
G	240
H	250

Where tables have a shallow under drawer at the seated position up to 60 mm may be added to these dimensions.

B.3 Apparatus

The following apparatus is required:

- (a) School chair measuring device (SCMD) as detailed in Annex F of EN 1729 –1.
- (b) Means of measuring in millimetres.

B.4 Methods of measurement

Chairs shall be measured in accordance with the descriptors in Annex A of EN 1729-1, and where applicable, using the methods described in Annex F of EN 1729-1.

Table A1 of EN 1729-1 contains the dimensional requirements for each size mark.

B.5 Procedures

B.5.1 Dimensional size mark

B.5.1.1 Fixed height chairs (including fixed height tall chairs)

The procedure shall be as follows:

- (a) Measure and record the seat height. Where the measurement taken conforms to the dimensional size of any of the eight sizes of chair in [Table 3.2](#), report the actual sizes taken and the dimensional size mark to which it conforms.