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Chairs for office environments

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Chairs for office environments

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Chairs for office environments

1 Scope

This standard applies to chairs used in office environments including chairs for computer uses and non-computer (occasional) uses i.e. conference (w/Table) and guest applications (Side chair).

The dimensions given in this standard aim to respect generally accepted ergonomic guidelines and design requirements such as those of CAN/CSA-ISO 9241-5 and BIFMA G1-2013, along with the best practices and knowledge of the committee members.

The dimensions specified in this standard aim to address the needs of the 5th to 95th percentile of North American adult office workers when in the seated position using the Civilian American European Surface Anthropometry Resource (CAESAR) database. Designing products to fit the 5th percentile female body dimensions to the 95th percentile male body dimensions will accommodate a large number of users. It is important, however, to realize that furniture for the above range may not accommodate at least 5 % of the users for any particular dimension. In order to accommodate user characteristics falling outside the 5th to 95th percentile ranges, it may be necessary to purchase products that are not within that range. Be aware that some fixed chair features are not recommended for computer uses (See Annex A, Table A.1) as these dimensions will only accommodate or address the needs of a part the 5th to 95th percentile.

It is important that persons using this standard to purchase/specify products understand the task(s) to be performed by, the characteristics of the intended user population and the physical and organizational environment where the chairs will be deployed when selecting specific features. The configuration options available in this standard are complex and if not specified correctly, some combinations, while meeting the requirements of the standard, may result in chairs that are inappropriate for some users or applications. To minimize the possibility of incorrect specification, the user of this standard is encouraged to refer to Table A1 for recommended features.

Annex A is an informative annex that contains recommended features and specifications for general user profiles.

Quantities and dimensions used in this standard are given in metric units with imperial equivalents following in brackets where appropriate. The metric units shall be regarded as official in the event of dispute.

The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this National Standard of Canada. The referenced documents may be obtained from the sources noted below.

NOTE The addresses provided below were valid at the date of publication of this standard.

An undated reference is to the latest edition or revision of the reference or document in question, unless otherwise specified by the authority applying this standard. A dated reference is to the specified revision or edition of the reference or document in question.

2.1 Canadian Standards Association (CSA)

CAN/CSA-ISO 9241-5-00 (R2016) — *Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) — Part 5: Workstation Layout and Postural Requirements.*

2.1.1 Source

The above may be obtained from CSA Group, Standards Sales, 178 Rexdale Blvd., Toronto, Ontario M9W 1R3 Canada. Telephone 416-747-4044 or 1-800-463-6727. Fax 416-747-2510. E-mail sales@csagroup.org. Web site www.shopcsa.ca.

2.2 American National Standards Institute (ANSI)/BIFMA

ANSI/BIFMA X5.1-2017 — *Office Chairs*

ANSI/BIFMA X7.1 — *Standard for Formaldehyde and TVOC Emissions of Low-emitting Office Furniture Systems and Seating*

ANSI/BIFMA M7.1 — *Standard Test Method For Determining VOC Emissions from Office Furniture Systems, Components, and Seating.*

2.2.1 Source

The above may be obtained from BIFMA, 678 Front Avenue NW, Suite 150, Grand Rapids, MI 49504-5368, U.S.A, telephone 616-285-3963, e-mail email@bifma.org, Web site www.bifma.org.

2.3 Association for Contract Textiles (ACT)

Voluntary Performance Guidelines (January 2015).

2.3.1 Source

The above may be obtained from the Association for Contract Textiles, P.O. Box 101981, Fort Worth, TX 76185, U.S.A., telephone 1-817-924-8048, fax 1-817-924-8050, Web site www.contracttextiles.org.

2.4 ASTM International

ASTM D3574-11 — *Standard Test Methods for Flexible Cellular Materials — Slab, Bonded, and Molded Urethane Foams*.

2.4.1 Source

The above may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, U.S.A., telephone 610-832-9585, fax 610-832-9555, Web site www.astm.org, or from IHS Markit, 200-1331 MacLeod Trail SE, Calgary, Alberta T2G 0K3, telephone 613-237-4250 or 1-800-267-8220, fax 613-237-4251, Web site www.global.ihs.com.

2.5 BIFMA

BIFMA/CMD-1-2013 — *Universal Measurement Procedure for the Use of the BIFMA Chair Measuring Device (CMD)*

BIFMA G1-2013 — *Ergonomics Guideline for Furniture Used in Office Work Spaces Designed for Computer Use*.

2.5.1 Source

The above may be obtained from BIFMA, 678 Front Avenue NW, Suite 150 Grand Rapids, MI 49504-5368, U.S.A., telephone 616-285-3963, e-mail email@bifma.org, Web site www.bifma.org.

2.6 California Department of Consumer Affairs

California Technical Bulletin 117-2013 — *Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture*.

2.6.1 Source

The above may be obtained from the State of California, Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation, 3485 Orange Grove Avenue, North Highland, CA 95660-5595, U.S.A., Web site www.dca.ca.gov.

2.7 International Organization for Standardization (ISO)

ISO 24496:2017 — *Office furniture — Office chairs — Methods for the determination of dimensions*.

2.7.1 Source

The above may be obtained from IHS Markit, 200-1331 MacLeod Trail SE, Calgary, Alberta T2G 0K3, telephone 613-237-4250 or 1-800-267-8220, fax 613-237-4251, Web site www.global.ihs.com.

2.8 National Technical Information Service (NTIS)

CAESAR Final Report Vol. I
Civilian American and European Surface Anthropometry Resource (CAESAR) Final Report, Vol. I, Experimental Designs and Data Descriptions, June 2002.

CAESAR Final Report Vol. II
Civilian American and European Surface Anthropometry Resource (CAESAR) Final Report, Vol. II, Detailed Methodology and Descriptions, June 2002.

2.8.1 Source

The above may be obtained from NTIS, 5301 Shawnee Road, Alexandria, VA 22312, telephone 1-800-553-6847 or (703) 605-6900, fax (703) 605-6880, e-mail: orders@ntis.gov, Web site www.ntis.gov.

3 Terms and definitions

For the purposes of this National Standard of Canada, the terms and definitions in BIFMA CMD-1 or ISO 24496 apply.

4 General

4.1 Performance

The chairs shall pass the applicable tests and acceptance levels specified in ANSI/BIFMA X5.1.

4.2 Flammability

All applicable components shall comply with the requirements of California Technical Bulletin 117-2013.

4.3 Upholstery

The following option can be specified in the application of this standard. Whether the fabric used to upholster the chairs shall meet other than the heavy-duty abrasion resistance.

The fabric used to upholster the chairs shall meet the ACT *Voluntary Performance Guidelines* (see 2.3) for upholstery and shall pass its applicable testing requirements and acceptance levels. Unless otherwise specified, the fabric shall meet the heavy-duty rating for abrasion resistance. The Breaking Strength and Seam Slippage Tests in the ACT *Voluntary Performance Guidelines*, do not need to be performed on three-dimensional (stretchable in all directions) knit fabric.

4.4 Cushioning material

When foam cushioning materials are used in the seat and backrest, they shall be expanded flexible urethane foam of either flat slab, sculpted slab or molded construction. These foam materials shall comply with the requirements of Table 1.

Other cushioning materials are acceptable, as long as they have similar properties to provide adequate comfort and durability.

Table 1 — Foam cushioning material

Properties	Test method ASTM D3574	Requirements	
		HR I (High resilience) (Backrest)	HR II (High resilience) (Seat)
Indentation force deflection (IFD) at 25% IFD, N, min.	Test B_1, sections 16 to 22	89 N (20 lbf.)	106 N (24 lbf.)
Support factor, 65% IFD/25% IFD, min.	Test B_1, sections 16 to 22	1.8	2.3
Dynamic fatigue test by constant force pounding, loss of force support, 40% IFD, %, max.	Test I_3, procedure B, sections 95 to 103	30	20

4.5 Workmanship

The finished chair shall be uniform in quality, clean and free from any defects that may affect its appearance and serviceability. The external surfaces shall be smooth and all edges shall be rounded or bevelled. All accessible surfaces shall be free from sharp edges, burrs and any other safety hazards. The upholstery shall be properly positioned, clean and well-tailored in appearance. All excess upholstery material shall be neatly trimmed. Fastening devices such as staples shall not be visible under normal use of the chair. The bottom of the seat shall be finished without exposed edges.

4.6 Labelling

When the labelling legislation of the federal or provincial government applies to component parts of chairs, users of this standard should ensure that they are in compliance with the requirements of the legislation.

4.7 Marking

The chair shall be permanently and legibly marked on the under surface of the seat with the manufacturer's name or recognized trademark and the product number.

4.8 Operating instructions

Operating instructions in pictorial form or in both official languages of Canada shall be provided for each adjustable chair.

4.9 Controls for manually-adjustable features

The controls for all manually-adjustable features shall be accessible by the seated user, except the seat height and tilt tension may be adjusted by the user of the chair while seated, semi-seated or standing when the chair is in the normal use position.

All controls for manually-adjustable features shall be positioned where they cannot be activated inadvertently during normal use of the chair.

4.10 Seat rotation

Column-supported chairs shall have seats that rotate (swivel) independently of the base, unless specified as fixed.

4.11 Seat waterfall

The seat pad of the chair should have a rounded or declining front edge to reduce contact/pressure behind the knees.

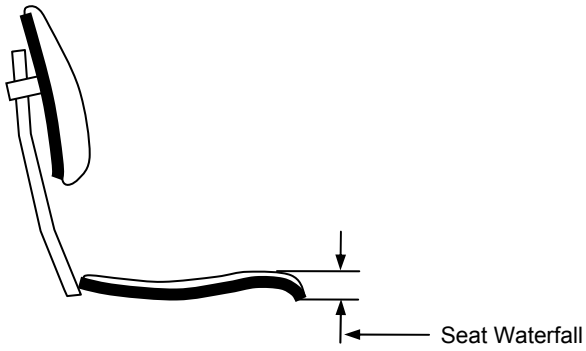

Figure 1 — Seat waterfall

4.12 Casters

If specified, casters shall be designated for use on either hard surfaces or carpeted surfaces.

4.13 Preparation for delivery

Preparation for delivery shall conform to normal commercial practice.

4.14 Environmental considerations

The chairs should be designed, and the materials should be selected, to minimize waste and environmental impact both during the production process and in the post-consumer stages.

The chairs should be designed to allow the disassembly of major components to accommodate reuse or recycling of materials for which there are proven recycling markets. The metal and the plastic components of a product should be composed of recycled materials whenever possible. Where possible, all major plastic components should be stamped with a composition code to facilitate recycling.

When specified, the chair shall meet the emissions requirements given in ANSI/BIFMA X7.1, as tested per ANSI/BIFMA M7.1 or comparable test methods[1].

5 Dimensions and adjustment ranges for chair features

This section provides the dimensions and adjustment ranges for the relevant features given in Annex A. Where choices appear for a given feature within the annex, users of the standard shall select one of the given options when specifying the chair.

5.1 Chair measuring technique

The chairs shall be measured using BIFMA/CMD-1-2013 or ISO 24496-2017. Unless otherwise specified, tolerances shall be as per chair measuring technique.

5.2 Seat width

The width of the seat cushion for the task and conference chairs shall not be less than 450 mm (17.7 in.). For the side/guest seating, the width of the seat cushion shall not be less than 400 mm (15.7 in.).

5.3 Seat depth

5.3.1 Fixed seat depths

A fixed seat depth shall be specified in accordance with one of the following classifications:

a) Shallow seat: A seat depth from 380 mm (15.0 in.) up to and including 420 mm (16.5 in.)

b) Medium seat: A seat depth greater than 420 mm (16.5 in.) up to and including 460 mm (18.1 in.)

c) Deep seat: A seat depth greater than 460 mm (18.1 in.).

[1] A comparable test method may include UL 2818-2013 *Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings*.

5.3.2 Adjustable seat depths

The seat depth shall be adjustable by at least 50 mm (2.0 in.) within the range of 420 mm (16.5 in.) to 460 mm (18.1 in.). It shall be lockable at multiple positions within that range.

5.4 Seat height

5.4.1 Fixed seat height

Fixed seat height shall fall within the range from 417 mm (16.4 in.) to 512 mm (20.2 in.).

5.4.2 Adjustable seat height

It shall conform to one of the following categories as follows:

a) Low seat height: A seat height that is adjustable from 376 mm (14.8 in.) or less to 439 mm (17.3 in.) or more.

b) Standard seat height: A seat height that is adjustable from 417 mm (16.4 in.) or less to 512 mm (20.2 in.) or more.

5.5 Seat angle

5.5.1 Fixed angle (not independently user-adjustable) – shall be within a range from 0º (horizontal) to 4º rearward.

5.5.2 Adjustable angle (independently adjusted by the user) ─ shall be user-adjustable by at least 4º, and the seat angle shall be lockable in at least one position in the range of 0 and 4º rearward.

5.6 Backrest width

The backrest width in the lumbar region shall be at least 360 mm (14.2 in.).

NOTE This measurement is based on Natick/TR-89/044, 1988, *Anthropometric survey of U.S. Army personnel: Methods and summary statistics*.

5.7 Backrest height

The top of the backrest shall have a minimum height based on the type of chair as follows:

— Side chairs: 354 mm (13.9 in.)

— Non-side chairs: 450 mm (17.7 in.).

5.8 Lumbar support height

5.8.1 Fixed lumbar support height

The height of the lumbar support shall fall within the range of 150 mm (5.9 in.) to 250 mm (9.8 in.) above the seat.

5.8.2 Adjustable lumbar support height

The height shall be adjustable by at least 50 mm (2 in.) within the range of 150 mm (5.9 in.) to 250 mm (9.8 in.) above the seat. Alternate methods other than those specified in BIFMA and ISO CMD methods for measuring lumbar height are allowed. Test data shall document the method used to determine lumbar height.

5.9 Backrest-to-seat angle

5.9.1 Fixed backrest

Fixed backrest to seat angle shall be between 90º and 103º.

5.9.2 Adjustable backrest

Adjustable backrest to seat angle shall be adjustable by the user a minimum of 15º within the range of 90º to 120º.

5.10 Backrest angle

5.10.1 Fixed backrest angle

The angle shall be between 90º and 103º from horizontal (inclusive).

5.10.2 Adjustable backrest angle

The angle shall be adjustable a minimum of 15º within a range of 90º to 120º from horizontal (inclusive). The backrest angle adjustment mechanism when unlocked and activated with a load shall allow the backrest to tilt rearward and when activated without a load shall allow the backrest to return to the forward position.

5.11 Armrests

If removable, armrests shall be detachable using commonly available tools.

5.11.1 Armrest height

5.11.1.1 Fixed height

Armrests shall have a height in the range of 200 mm to 250 mm (7.9 in. to 9.8 in.).

5.11.1.2 Adjustable height

Armrests shall be adjustable by at least 63 mm (2.5 in.) within the range of 176 mm to 289 mm (6.9 in. to 11.4 in.). The armrest shall adjust in increments not greater than 15 mm (0.6 in.).

5.11.2 Armrest length

Armrests shall have a total length of at least 180 mm (7.1 in.), and a minimum of 130 mm (5.1 in.) of the armrest length shall be within the armrest zone.

5.11.3 Inside distance between armrests

5.11.3. Fixed clearance

The clearance between armrests shall not be less than 450 mm (17.7 in.).

5.11.3.2 Lateral adjustment of armrest

The range of movement shall allow the arms to be adjusted within the range of 443 to 493 mm (17 to 19.4 in.). The range of lateral adjustment affecting the clearance between the two armrests shall be a minimum of 75 mm (3 in.), of which at least 43 mm (1.69 in.) shall be inward from the 493 mm (19.4 in.) clearance dimension.

5.11.4 Armrest width

The armrest width shall not be less than 45 mm (1.8 in.).

5.11.5 Horizontally swivelling adjustable armrest caps

If present, the armrest caps shall rotate laterally a minimum of 20° inwards and a minimum of 10° outwards.

5.11.6 Armrest setback

The armrest setback shall be at least 100 mm (3.9 in.).

5.12 Tilt mechanisms

If a tilt mechanism is specified, it shall be equipped with a tilt tension control or tension by weight activation.

Tilt mechanisms shall allow the backrest to tilt concurrently with the seat in a ratio not less than 1:1.

5.13 Seat and backrest locks

The seat and backrest shall be lockable or stoppable in at least the chair setup position as determined by using chair measuring technique.

5.14 Column clearance

When the chair is loaded with the chair measuring device (CMD), the clearance between the seat column and the floor shall not be less than 7 mm (0.28 in.).

6 Reporting of tests

As a minimum, the test report shall include the following information:

— Title

— Name and address of the laboratory

— Unique identification of the report (such as serial number)

— Name and address of the client (where applicable)

— Series

— Model number

— Description and unambiguous identification of the test item

— Characterization and condition of the test item

— Date of receipt of the test item

— Date(s) of the performance of test

— Identification of the test methods used

— Any additions to, deviations from, or exclusions from the test method (such as environmental conditions)

— Signature and title, or an equivalent identification of the person(s) accepting responsibility for the content of the report

— Date of issue of the report

— Test results, including all relevant test data, diagrams, charts and photographs

— Statement that the certificate or report shall not be reproduced except in full without the written approval of the laboratory.

Annex A
(informative)

Recommended features and specifications for general user profiles

A.1 The following table offers guidance on how chairs may be configured based on the intended use. This table is designed to support users of the standard in ensuring that the essential features for a user population will be present. Users of the standard are always responsible to evaluate the needs of their user population and to select the features in chairs that will best meet their organization's needs.

Features are **Recommended** when they are expected to be suitable for a user population, and should be regarded as a minimum requirement based on the intended use.

Features are **Optional** when they may offer value in some situations, and should be reviewed by users of the standard to ensure a fit for their user population and organization.

Features are **Not Recommended** when they should not be needed, or are not generally available.

Table A.1 — Recommended features and specifications for general user profiles

Features	Type of use		
	Computer use	Non-computer use	
		Conference room (w/table)	Side chair
Seat rotates (independent of base)	R[a]	O[b]	O
Seat waterfall	R	R	R
Casters	R	O	O
Seat width	R	R	R
Seat depth – Fixed	⊘[c]	R	R
Seat depth – Adjustable	R	O	⊘
Seat height – Fixed	⊘	O	R
Seat height adjustable	R	O	⊘
Seat pan tilt – fixed	R	R	R
Seat pan tilt – Independently adjustable	O	⊘	⊘
Backrest width	R	R	R
Backrest height	R	R	R
Lumbar support height – Fixed	O	R	R

Features	Type of use		
	Computer use	Non-computer use	
		Conference room (w/table)	Side chair
Lumbar support height – Adjustable	R	O	O
Backrest to seat angle – fixed	⊘	R	R
Backrest to seat angle – adjustable (or synchro-tilt)	R	O	⊘
Armrests (if present):			
Armrest fixed height	⊘	R	R
Adjustable height	R	O	⊘
Armrest cap length	R	R	⊘
Armrest cap width	R	R	⊘
Clearance between armrests	R	R	R
Lateral adjustment of armrest	R	O	⊘
Removable	O	⊘	⊘
Horizontally swivelling adjustable armrest caps	O	⊘	⊘
Tilt mechanism	R	O	⊘
Seat pan angle lockable in one position rearward of horizontal	R	O	⊘
Backrest lockable or stoppable in multiple positions	R	O	⊘
Column clearance (if column is present)	R	R	R

[a] R = Recommended (expected to be suitable for a user population, and should be regarded as a minimum requirement based on the intended use).

[b] O = Optional (may offer value in some situations, and should be reviewed by users of the standard to ensure a fit for their user population and organization).

[c] ⊘ = Not recommended (should not be needed, or are not generally available).