



National Public Seating
149 Entin Road,
Clifton, NJ 07014
United States

Attn: Elchonon Jacobson

This test report supersedes SGS test report 5029664-TL-01-R1 due to update of product photographs.

Test Report No: 5029664-TL-01-R2

Date: April 20, 2023
Revised: April 25, 2023

SAMPLE ID: CTS Full Function Chair (Swivel), Black

DATE OF RECEIPT: March 24, 2023

TESTING PERIOD: March 24 – April 19, 2023

TESTS REQUESTED: The submitted samples were tested for the following tests in accordance with the procedures outlined in the ANSI/ BIFMA X5.1 – 2017 (R2022).
Note: Testing for all cyclic tests were completed for only 50% of total cycles.

TEST RESULTS: See pages below

PREPARED BY: Signed for and on Behalf of SGS North America, Inc.

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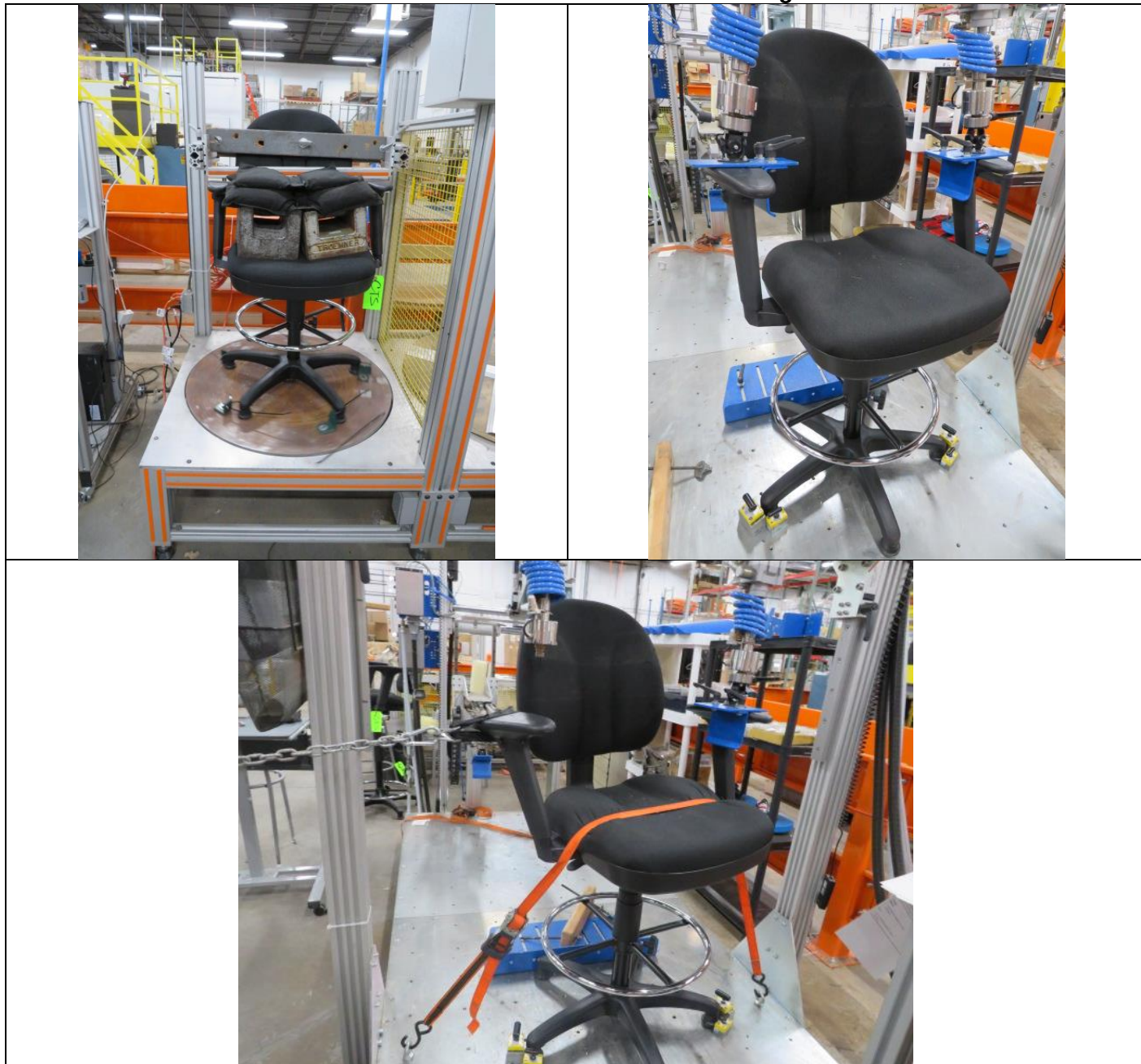
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Photograph Section:

Submitted Samples



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ANSI/BIFMA X5.1 – 2017 (R2022); Summary of Results

Test No.	Description	Results
5	Backrest Strength Test- Static- Type I & II	Not Applicable
6	Backrest Strength Test – Static – Type III	PASS
7	Drop Test- Dynamic	PASS
8	Swivel Test- Cyclic	PASS*
9	Tilt Mechanism Test- Cyclic	Not Applicable
10	Seating Durability Tests- Cyclic & Front Corner Load- Ease	PASS*
11	Stability Tests	PASS
12	Arm Strength Test-Vertical- Static	PASS
13	Arm Strength Test- Horizontal- Static	PASS
14	Backrest Durability Test- Cyclic- Type I	Not Applicable
15	Backrest Durability Test- Cyclic Type II and III	PASS*
16	Caster/Chair Base Durability Test- Cyclic	Not Applicable
17	Leg Strength Test- Front and Side Application	PASS
18	Footrest Static Load Test- Vertical	PASS
19	Footrest Durability Test- Vertical-Cyclic	PASS*
20	Arm Durability Test- Cyclic	PASS*
21	Out Stop Test for Chairs with Manually Adjustable Seat Depth	Not Applicable
22	Tablet Arm-Chair Static Load Test	Not Applicable
23	Tablet Arm-Chair Static Load Ease Test- Cyclic	Not Applicable
24	Structural Durability Test- Cyclic	Not Applicable

*Per request all cyclic tests were performed for only 50% of the cycles required in the standard.

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Test Item	Test Method & Requirements	Result
5	Backrest Strength Test- Static- Type I and II	
Applicability:	This backrest strength test shall be performed on Type I and II chairs. For chairs with tilt locks, locking the chair changes the chair type (see section 4) and must also be tested according to Section 6 in the upright locked position. An additional chair may be used for the Section 6 testing. Note: This test does not apply to chairs with backrest height less than 200mm (7.9 in).	
Purpose of Tests The purpose of this test is to evaluate the ability of the chair to withstand stresses such as those caused by the user exerting a rearward force on the backrest of the chair.		
Setup		
5.3.1	The chair shall be placed on a test platform in an upright position and the base shall be restrained from movement, but shall not restrict movement of the backrest or arms of the chair. Figure 5f shows one acceptable method of restraining the chair. Note: For this test, the test platform may be placed at an angle to facilitate testing/load application.	
5.3.2	If adjustable features are available, all adjustments shall be set at normal use conditions, except for height-adjustable pivoting backrests which shall have the pivot point set at its maximum height or 406 mm (16.0 in.) whichever is less.	
5.3.3	After making the above adjustments, determine points 406 mm (16 in.) and 452 mm (17.8 in.) above the seat. (See Figure 5a and Section 3.5). Mark these points on the vertical centerline of the backrest. a) If the top of the load-bearing structure/surface of the backrest is greater than or equal to 452 mm (17.8 in.) above the seat, position the center of the form-fitting device (See Definition 2.10) 406 mm (16 in.) above the seat. (See Figure 5b). b) If the top of the load-bearing structure/surface of the backrest is less than 452 mm (17.8 in.) above the seat, position the top of the form-fitting device even with the top of the load-bearing structure/surface. (See Figure 5c). c) If the unit has a pivoting backrest that stops at a position less than or equal to 20 degrees rearward (See Figures 5d and 5e), position the form-fitting device as directed in a) or b). If the unit has a pivoting backrest that stops at a position greater than 20 degrees rearward of the backrest, position the center of the form-fitting device at the height of the pivoting point. (See Figures 5d and 5e).	
5.3.4	Attach a loading device (front push or back pull) to the horizontal center of the backrest as determined above. With the backrest at its back stop position, apply a force that is initially 70 degrees ± 10 degrees to the plane of the backrest. (See Figures 5f and 5g). The force is not intended to be maintained at 70 degrees ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. Note: Where the design of the chair does not allow the transfer of force(s) from the form-fitting device to the load-bearing structure/surface, then a bridging device 38 mm to 102 mm (1.5 in. to 4 in.) in height may be used to span the width of the load-bearing structure/surface. For backrests with complex or varying contours, the plane of the backrest may be defined by the front of the CMD upright.	
Test		
5.4.1	Functional Load a) A force of 667 N (150 lbf.) shall be applied to the backrest at the backstop position for one (1) minute. If the backrest/tilt lock mechanism will not accept the load due to gradual slipping of the adjustment mechanism during the load application, set the backrest to its most rearward (stopped) position, then apply the specified load(s). b) Remove the load.	
5.4.2	Proof Load a) A force of 1001 N (225 lbf.) shall be applied to the backrest at the backstop position for one (1) minute. If the backrest/tilt lock mechanism will not accept the load due to gradual slipping of the adjustment mechanism during the load application, set the backrest to its most rearward (stopped) position, then apply the specified load(s). b) Remove the load.	
Acceptance level	Functional Load: There shall be no loss of serviceability to the chair	Not Applicable
Acceptance level	Proof Load: There shall be no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	Not Applicable

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Test Item	Test Method & Requirements	Result
6	Backrest Strength Test- Static- Type III	
Applicability:	This backrest strength test shall be performed on Type III chairs with backrests greater than 200 mm (7.9 in.) in height.	
Purpose of Tests The purpose of this test is to evaluate the ability of the chair to withstand stresses such as those caused by the user exerting a rearward force on the backrest of the chair.		
Setup 6.3.1 The chair shall be placed on a test platform in an upright position and the base shall be restrained from movement, but shall not restrict movement of the backrest or arms of the chair. Figure 6d shows one acceptable method of restraining the chair. 6.3.2 If adjustable features are available, all adjustments shall be set at normal use conditions, except for height-adjustable pivoting backrests which shall have the pivot point set at its maximum height or 406 mm (16.0 in.) whichever is less. 6.3.3 After making the above adjustments, determine points 406 mm (16 in.) and 452 mm (17.8 in.) above the seat. (See Figure 6a and Section 3.5). Mark these points on the vertical centerline of the backrest. a) If the top of the load-bearing structure/surface of the backrest is greater than or equal to 452 mm (17.8 in.) above the seat, position the center of the form-fitting device (See Definition 2.10) 406 mm (16 in.) above the seat. (See Figure 6b). b) If the top of the load-bearing structure/surface of the backrest is less than 452 mm (17.8 in.) above the seat, position the top of the form-fitting device even with the top of the load-bearing structure/surface. (See Figure 6c). 6.3.4 Attach a loading device (front push or back pull) to the horizontal center of the backrest as determined above. With the backrest at its back stop position, apply a force that is initially 90 degrees $\pm$ 10 degrees to the plane of the backrest (see Figure 6d). The force is not intended to be maintained at 90 $\pm$ 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. The angle of the backrest plane may be determined by the angle of the plane of the front of the CMD upright. Note: Where the design of the chair does not allow the transfer of force(s) from the form-fitting device to the load-bearing structure/surface, then a bridging device 38 mm to 102 mm (1.5 in. to 4 in.) in height may be used to span the width of the load-bearing structure/surface. For backrests with complex or varying contours, the plane of the backrest may be defined by the front of the CMD upright.		
Test 6.4.1 Functional Load a) A force of 667 N (150 lbf.) shall be applied to the backrest at the backstop position for one (1) minute. If the backrest/tilt lock mechanism will not accept the load due to gradual slipping of the adjustment mechanism during the load application, set the backrest to its most rearward (stopped) position, then apply the specified load(s). b) Remove the load.		
6.4.2 Proof Load a) A force of 1001 N (225 lbf.) shall be applied to the backrest at the backstop position for one (1) minute. If the backrest/tilt lock mechanism will not accept the load due to gradual slipping of the adjustment mechanism during the load application, set the backrest to its most rearward (stopped) position, then apply the specified load(s). b) Remove the load.		
Acceptance level	Functional Load: A functional load applied once shall cause no loss of serviceability to the chair.	PASS
Acceptance level	Proof Load: A proof load applied once shall cause no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
7	Drop Test- Dynamic	
Applicability:	This test applies to all chair types.	
Purpose of Tests		
The purpose of this test is to evaluate the ability of the chair to withstand heavy and abusive impact forces on the seat.		
Setup		
a) The unit shall be placed on a test surface. Note: Care should be taken not to perform this test on platforms or other surfaces that may deform and/or lessen the impact. i) For the functional load test, clearance shall be provided such that the center column, if applicable, shall not touch the test platform (support the base on blocks or provide a clearance hole in the test platform). ii) For the proof load test, place the unit directly on the test platform. Additional clearance shall not be provided. Note: The chair base (center structure) may touch the test platform as a result of the impact load. b) For chairs with a seat height adjustment feature, set the adjustment to its highest position. For chairs with glides that adjust greater than 50 mm (2.0 in), set them at 13 mm (0.5 in.) from their highest position. If other adjustable features are available, set these adjustments at normal use conditions. Casters, if present, shall be initially placed at the apparent worst-case position (typically at a position 90 degrees to the base leg). For pedestal base chairs, one of the base legs shall be set in the forward position (reference Figure 10b). Note: For chairs with lockable seat angles, the seat shall be tested in the unlocked position. c) A 406 mm ± 13mm (16 in. ± 0.5 in.) diameter test bag containing appropriate media (steel shot, slugs, punches are typical – see Appendix A) weighing 102 kg (225 lb.) shall be attached to a device permitting a free fall to the seating position as shown in Figure 7. d) The bag shall be centered side-to-side on the seat and shall be positioned 13 mm (0.5 in.) ± 13 mm (0.5 in.) from the most forward surface of the backrest during free fall. The bag shall not contact the backrest during the free fall.		
Test		
7.4.1	Functional Load Test	
a) The test bag shall be raised 152 mm (6 in.) above the uncompressed seat and released one time. The free fall distance shall be measured at the center of the drop bag. (See Figure 7). b) Remove the bag. c) For chairs with seat height adjustment features, set height to its lowest position and repeat a) and b).		
7.4.2	Proof Load Test	
a) Repeat setup in 7.3 and increase the weight of the test bag to a proof load of 136 kg (300 lb.). b) The test bag shall be raised 152 mm (6 in.) above the uncompressed seat and released one time. (See Figure 7). c) Remove the bag. d) For chairs with height adjustments, set seat height to its lowest position and repeat a) through c). A second chair may be used for testing the chair in the lowest position.		
Note: If a second chair is used for the proof load test, it must also be subjected to the functional load impact per Section 7.4.1 while in its lowest position.		
Acceptance level	Functional Load: There shall be no loss of serviceability.	PASS
Acceptance level	Proof Load: There shall be no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
8	Swivel Test - Cyclic	
Applicability	This test applies to all chair types with a swivel seat.	
Purpose of Tests		
The purpose of this test is to evaluate the ability of the chair to withstand stresses and wear of repeated swiveling.		
Test Setup		
a) The chair shall be restrained on a surface. Either the seat or the surface shall be restrained from rotation. Figure 8 shows one acceptable method of restraint. b) If the seat height is adjustable, set it to the maximum seat height position. Set all other adjustable features to the normal use condition. c) A 122 kg (270 lb.) load shall be placed on the seat such that the center of gravity of the load is 51 to 64 mm (2 to 2.5 in.) forward of the centerline of the rotational axis as shown in Figure 8. d) The cycling device shall be adjusted to rotate the lesser of the following: the available range of rotation or 360 degrees ± 10 degrees. If the available range of rotation is less than 360 degrees, the rotation of the test machine shall be adjusted such that the swivel mechanism touches but does not override the stops. The rotation may be either bi- directional (alternating) or unidirectional. e) For chairs that swivel 360 degrees, a cycle is one full rotation. For chairs that swivel less than 360 degrees, one cycle is rotating from one stop to the other stop.		
Test Procedure		
a) The seat or platform shall rotate for 60,000 cycles at a rate between 5 and 15 rotations per minute. b) If the seat height is adjustable set the height to its lowest position. c) For all chairs, continue the test for an additional 60,000 cycles to a total of 120,000 cycles.		
Acceptance level	There shall be no loss of serviceability.	PASS

Comments: Only 50% of cycles were completed.

Test Item	Test Method & Requirements	Result
9	Tilt Mechanism Test- Cyclic	
Applicability	This test shall be performed on Type I and Type II chairs with tilting backrests	
Purpose of Tests The purpose of this test is to evaluate the ability of the tilt mechanism to withstand the fatigue stresses and wear caused by repeated tilting.		
Test Setup a) The chair or fixture with attached tilt mechanism shall be restrained on a test surface. Figure 9 shows one acceptable method of restraint. b) If adjustable features are available, all adjustments shall be set at normal use conditions. c) A cycling device shall be attached to the chair or fixture at any location appropriate to apply a controlled (push and/or pull) motion. A test load of 109 kg (240 lbs.) shall remain on the center of the seat (or equivalent location on the fixture) and secured if necessary. Adjust the cycling device to move the mechanism between the front and back stops, without overriding or impacting either stop.		
Test Procedure The unit shall be cycled for 300,000 cycles at a rate between 10 and 30 cycles per minute. The tilt mechanism and/or cycling device should be checked and readjusted as needed to maintain the original conditions specified.		
Acceptance level	There shall be no loss of serviceability to the tilt mechanism.	Not Applicable

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Test Item	Test Method & Requirements	Result
10	Tilt Mechanism Test- Cyclic	
Applicability	These tests apply to all chair types.	
Purpose of Tests		
The purpose of these tests is to evaluate the ability of chairs to withstand fatigue stresses and wear caused by downward vertical force(s) on the seat		
Impact Test		
a) The unit shall be placed on a test platform and be restrained in a manner that will maintain the impact location on the seat. The method of restraint shall not add support or structure to the chair, or inhibit movement of the chair response to the impact. For pedestal base chairs, one of base legs shall be maintained in the forward position throughout the test (see Figure 10b). Casters, if present, shall be initially placed at the apparent worst-case position (See Fig. 10b). For four-leg-base chairs, initially position the casters parallel to the front to rear centerline of the chair in their most outward position. (See Fig. 10c). b) If adjustable features are available, all adjustments shall be set at normal use conditions. Note: For chairs with lockable seat angles, the seat shall be tested in the unlocked position. c) Chairs with less than 44 mm (1.75 in.) of cushioning materials in the seat shall have foam added to bring total cushioning thickness to 50 mm ± 6 mm (2 in. ± 0.25 in.). Any additional foam added to the top of the seat shall have a 25% Indentation Force Deflection (IFD) of 200 N ± 22 N (45 lbf. ± 5 lbf.).¹ Note: Flexible seat surfaces (i.e., mesh, flexible plastic, etc.) are not considered cushioning materials; foam shall be added to these surfaces. d) A 406 mm ± 13mm (16 in. ± 0.5 in.) diameter test bag containing metal media weighing 57 kg (125 lb.) shall be attached to a cycling device, permitting a free fall to the seat as shown in Figure 10a. The drop height and/or seat height shall be adjusted during the test if the drop height changes by more than 13 mm (0.5 in.). The cycling device shall be set at a rate between 10 and 30 cycles per minute. e) The bag shall be centered side-to-side on the seat and shall be 13 mm (0.5 in.) ± 13 mm (0.5 in.) from the most forward surface of the backrest during free fall. The bag shall not contact the backrest during the free fall. f) The free fall shall begin after lifting the test bag 36 mm (1.4 in.) above the uncompressed surface on the seat (or uncompressed top of the foam, if added), as measured at the center of the drop bag.		
10.3.2 Test Procedure		
The chair shall be tested to 100,000 cycles		
10.4	Front Corner Load-ease Test- Cyclic- Off center	
Test Setup		
After completing the impact test in Section 10.3, apply a force of 890 N (200 lbf.) through a 203 mm ± 13 mm (8 in. ± 0.51 in.) diameter loading device at one front corner flush to each structural edge. If arms interfere with the placement of the loading device and are intended to be removable, they shall be removed for this test. If arms interfere but are not removable (or adjustable) the loading device shall be positioned to avoid interference. If cushion material was used during impact testing (10.3.1c) it may remain in place during this testing to avoid uneven/point loading of the seat.		
Test Procedure		
Raise the loading device from the seat and lower completely, without impact to the seat so that it takes the entire load without any support from the cycling device, at a rate of 10 to 30 cycles per minute. Test for 20,000 cycles. Reposition the load to the other front corner and perform the test for an additional 20,000 cycles. Note: Applying the loads in an alternating sequence to attain a total of 40,000 cycles is an acceptable method of performing this test.		
Acceptance level	There shall be no loss of serviceability to the chair after completion of both the impact and load-ease tests. If applicable, the chair base (center structure) shall not touch the test platform as a result of the impact loads.	PASS

Comments: Only 50% of cycles were completed.

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Test Item	Test Method & Requirements	Result
11.3.1	Rear Stability Test for Type III Chairs (See Figures 11a and 11b) Note: If a chair needs to be tested as more than one type, it is recommended that it be tested in the sequence given. If tested out of sequence (or individually by type) all weights must be entirely removed from the chair before starting each test.	
Applicability:	The stability tests shall be performed on all types of chairs. Note: Rearward stability tests apply only to chairs with backrests greater than 200 mm (7.9in.) in height as measured with the CMD (see section 3.5)	
Purpose of Test The purpose of these tests is to evaluate the front rear stability of chairs		
Test Setup - The unit shall be placed on a test platform. - On units with adjustable features, all adjustments shall be set at the apparent least stable condition for rearward stability such as, - maximum height of seat or backrest, or both, - rearmost seat or backrest position, or both, - the least stable condition of casters or glides and tilt mechanism. - For chairs with casters, a block or obstruction 13 mm (0.5 in.) in height shall be affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. The block shall prevent sliding but not interfere with the caster hood such that it restricts the unit from tipping – in such cases, a lower height obstruction may be used as long as it prevents sliding. On units that rotate, the bases and casters, if any, shall be positioned to offer the least resistance to backward tipping of the unit. - For chairs without casters, a block or obstruction 13 mm (0.5 in.) in height shall be affixed to the test platform. On units that rotate, the base shall be positioned to offer the least resistance to backward tipping of the unit. - For chairs with tilt locks, locking the mechanism in the near upright position changes the chair type (See Section 4: Chair Types) and the chair shall be tested in the locked (near upright) condition and in the unlocked (reclined) condition as per Section 11.3.2. - Place the first disk into the seat using the Template from Appendix G. Make a mark on the seat at the Rear Stability mark on the template. Remove the template and place the front of the first disk at this mark. See Figure 11a. If the seat depth does not allow for direct transfer of the mark on the template to the seat, use alternate means to properly determine the correct disk placement. - Place a support fixture made of a 1.5 mm ± 0.15 mm (0.060 in. ± 0.006 in.) thick polypropylene, 356 mm (14 in.) wide and 711 mm (28 in.) tall against the chair back so that it approximates the contour of the back.		
Test Procedure - Load the chair with the remaining 5 disks (See Appendix B). Place the second disk on the seat so it touches the support fixture. As each disk is added to the stack slide it along the lower disk until it contacts the support fixture as shown in Figure 11b. As each disk is added, the backrest may move such that the lower disks do not remain against the support fixture; this is acceptable, do not reposition the disks. Note: For chairs that do not allow the disk to settle evenly into the plane of the seat (e.g. deeply contoured hard plastic seat pans), up to 25 mm (1 in.) of foam (25% Indentation Force Deflection (IFD) of 200 N ± 22 N (45 lbf. ± 5 lbf.) may be placed under the first disk. - Apply a rearward force parallel to the top surface of the highest disk. The location of the force application is 6 mm (0.25 in.) from the top of the disk. (See Figure 11b). For chairs with seat height (as measured at the front of the bottom of the lowest disk when all disks are in the chair) less than 710 mm (28.0 in.), calculate the force as follows: $F = 0.1964 (1195 - H) \text{ Newton. } H \text{ is the seat height in mm. } (F = 1.1 (47 - H) \text{ pounds force. } H \text{ is the seat height in inches.)}$ For chairs with seat height equal to or greater than 710 mm (28.0 in.), a fixed force of 93 N (20.9 lbf.) shall be applied.		
Acceptance level	The chair shall not tip over.	PASS

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Test Item	Test Method & Requirements	Result
11.3.2	Rear Stability Test for Type I and II Chairs (Figures 11a and 11b) Note: For chairs with tilt locks, locking the chair changes the chair type (See Section 4) and must also be tested according to Section 11.3.1 in the upright locked position. Test Setup - The chair shall be placed on a test platform. A block, obstruction or other restraining device 13 mm (0.5 in.) in height shall be affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. On chairs that rotate, the base and casters shall be positioned to offer the least resistance to rearward tipping of the chair. - On chairs with adjustable features, all adjustments shall be set at the apparent least stable condition for rearward stability, such as: - maximum height of seat or backrest, or both, - minimum tension of tilt mechanism, - rearmost seat or backrest position, or both, - Place the first disk into the seat using the Template from Appendix G. Make a mark on the seat at the Rear Stability mark on the template. Remove the template and place the front of the first disk at this mark. See Figure 11a. Note: Use of the Template is preferred; however, it is acceptable to estimate the location of the first disk by placing it in the seat without the template. The first disk should touch the support fixture per 11.3.2.1.d. - Place a support fixture made of a 1.5 mm $\pm$ 0.15 mm (0.060 in. $\pm$ 0.006 in.) thick polypropylene, 356 mm (14 in.) wide and 711 mm (28 in.) tall so that it touches the seat, back side of the first loading disk and touches the chair back. The intent of the support fixture is to allow the disks to place a load on the chair back in a way that would simulate a person leaning on the back. When loaded, there should be no significant gaps between the chair back and the support fixture. Test Procedure Place the second disk in the chair until it touches the plastic. Tilt the chair to its approximate tilt stop (most rearward position). Pull back on the backrest until it reaches its full-tilt position, then load the chair with the remaining 11 disks (for a total of 13 disks). As each disk is added to the stack slide it along the lower disk until it contacts the support fixture as shown in Figure 11b. Do not allow the momentum of the mass during disk application to cause tip over of the chair. Only the mass in the chair at the tilt stop position shall determine the pass/fail condition of the chair. If the chair does not tip over and the tilt mechanism does not remain tilted as a result of the additional force to position the chair at its most rearward position (i.e., at its tilt stop) when the disks are placed in the chair, the chair shall also be tested according to 11.3.1 with the chair in the unlocked position. Note: For chairs that do not allow the disk to settle evenly into the plane of the seat (e.g. deeply contoured hard plastic seat pans), up to 25 mm (1 in.) of foam (25% Indentation Force Deflection (IFD) of 200 N $\pm$ 22 N (45 lbf. $\pm$ 5 lbf.) may be placed under the first disk.	
Acceptance level	The chair shall not tip over.	Not Applicable

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Test Item	Test Method & Requirements	Result
11.4	Front Stability Front stability shall be determined by either the method described in Sections 11.4.1 and 11.4.2 or 11.4.1 and 11.4.3.	
Test Setup a) The unit shall be placed on a test platform. b) On units with adjustable features, all adjustments shall be set at the apparent least stable condition for forward stability, such as, maximum height of seat or backrest, or both, most forward seat or backrest position or both, and at the least stable condition of casters, glides and tilt mechanism. c) For chairs with casters, a block or obstruction 13 mm (0.5 in.) in height shall be affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. The block shall prevent sliding but not interfere with the caster hood such that it restricts the unit from tipping – in such cases, a lower height obstruction may be used as long as it prevents sliding. On units that rotate, the bases and casters, if any, shall be positioned to offer the least resistance to forward tipping of the unit. d) For chairs without casters, a block or obstruction 13 mm (0.5 in.) in height shall be affixed to the test platform. On units that rotate, the base shall be positioned to offer the least resistance to forward tipping of the unit. Test Procedure (See Figures 11c and 11d). a) Apply a vertical load of 61 kg (135 lb.), through the front-stability loading disk (See Figure 11e), so that the center of the disk portion is 60 mm (2.4 in.) from the front center edge of the load-bearing surface of the seat. Note: It is recommended that the fixture/method shown in Appendix D be used to assist in locating the 60 mm (2.4 in.) loading dimension. If using the fixture, the vertical height of the fixture should allow contact at the approximate center of the sloped face of the fixture with the tangent (touch point) on the front of the seat. b) Apply a horizontal force of 20 N (4.5 lbf.) at the same height that the vertical force is applied (at the point of contact of the loading fixture). The force shall be coincident (in-line) with the side-to-side centerline of the seat. Test Procedure - Alternate (See Figures 11f and 11g) a) This alternate method may be used on chairs that have a seat surface that will support the stability loading fixture without the use of the front-stability loading disk (i.e., hard surfaced seats or seats with minimal cushion). b) Apply a vertical load of 61 kg (135 lb.), by means of the front stability loading fixture shown in Figure 11g at a point 60 mm (2.4 in.) from the front center edge of the load-bearing surface of the chair. Note: It is recommended that the fixture/method shown in Appendix D be used to assist in locating the 60 mm (2.4 in.) loading dimension. c) Apply a horizontal force of 20 N (4.5 lbf.) at the same height that the vertical force is applied (at the point of contact of the loading fixture). The force shall be coincident (in-line) with the side-to-side centerline of the seat.		
Acceptance level	The chair shall not tip over as the result of the force application.	PASS

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Test Item	Test Method & Requirements	Result
12	Arm Strength Test- Vertical- Static	
Applicability:	This test applies to all chairs with arms	
Purpose of Test		
The purpose of this test is to evaluate the ability of a chair to withstand stresses caused by applying vertical forces on the arm(s)		
Test Setup		
a) The chair shall be placed on a test platform and restrained from movement, including rotational movement of the seat. Blocking movement of the chair shall not provide a counterbalancing force that aids the support structure of the armrest under load and/or chair control/tilt mechanism. Type III chairs may be restrained using the seating surface (see Figure 12a). b) If adjustable features are available, all adjustments shall be set at normal use conditions c) A loading adapter that is 127 mm (5 in.) long and at least as wide as the width of the arm shall be attached to the top of the arm rest structure such that the load will be applied at the apparent weakest point that is forward of the front of the chair's backrest (at the height of the top of the armrest). d) Apply an initially vertical pull force to the load adapter using a mechanism, such as a cable and pulley, having a pivot point 762 mm (30 in.) or greater below the arm. The attachment to the load adapter shall not be greater than 50 mm (2 in.) above the top of the armrest (See Figure 12b). The mechanism must allow the arm to deflect or pivot as a result of the load application. If the chair design does not allow pull force application, other methods of applying the load are acceptable as long as they allow the arm to deflect or pivot as a result of the load application.		
Test Procedure		
Functional Load		
a) A force of 750 N (169lbf.) shall be applied for one (1) minute. b) Remove the force.		
Proof Load		
a) A force of 1125 N (253 lbf.) shall be applied for 15 seconds. b) Remove the force.		
Acceptance level	Functional Load There shall be no loss of serviceability. For a height adjustable arm, failure to hold its height adjustment position to within 6 mm (0.25 in.) from its original set position as the result of the loading is considered a loss of serviceability.	PASS
Acceptance level	Proof Load There shall be no sudden and major change in the structural integrity of the chair. For a height adjustable arm, a sudden drop in height of greater than 25 mm (1 in.) does not meet this requirement. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
13	Arm Strength Test- Horizontal – Static	
Applicability:	This test applies to all chairs with arms	
Purpose of Test		
The purpose of this test is to evaluate the ability of a chair to withstand stresses caused by applying outward forces to the arm(s).		
Test Setup		
a) The chair shall be placed on a test platform. Restrain the chair from horizontal movement and tipping including rotational movement of the seat. Blocking movement of the chair shall not provide a counterbalancing force that aids the support structure of the armrest under load and/or chair control/tilt mechanism. The restraints shall not restrict the chair arm movement. Figure 13 shows one acceptable method of restraining the chair. For four-leg chairs, restraining across the seat is acceptable (see Figure 12a). b) If adjustable features are available, all adjustments shall be set at normal use conditions. c) A loading device or strap, not greater than 25 mm (1 in.) in horizontal width, shall be attached to the arm so that the load is initially applied horizontally to the armrest structure at the apparent weakest point. For armrests that pivot in the horizontal plane, apply the load at the pivot point. d) Apply an initially horizontal pull force to the load adapter using a mechanism such as a cable and pulley or other mechanism having a pivot point 762 mm (30 in.) or greater from the arm. The mechanism must allow the arm to deflect as a result of the load application.		
Test Procedure		
Functional Load		
a) A force of 445 N (100 lbf.) shall be applied for one (1) minute in the outward direction. b) Remove the force.		
Proof Load		
a) A force of 667 N (150 lbf.) shall be applied for 15 seconds in the outward direction. b) Remove the force.		
Acceptance level	Functional Load A functional load applied once shall cause no loss of serviceability	PASS
Acceptance level	Proof Load A proof load applied once shall cause no sudden and major change in the structural integrity of the unit. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
14	Backrest Durability Test- Cyclic- Type I	
Applicability:	This test shall be performed on Type I tilting chairs with backrests greater than 200 (7.9 in.) in height	
Purpose of Test		
The purpose of this test is to evaluate the ability of the chairs to withstand fatigue stresses and wear caused by rearward force on the backrest of the chair.		
Test Setup		
The chair shall be placed on a test platform in an upright position with the base/legs restrained from movement. If pushing on the backrest with the test device, the chair must be restricted from rotating. Clamping shall be done so as not to restrict the movement of the backrest(s) or arm(s) of the chair.		
If adjustable features are available, all adjustments shall be set at normal use conditions.		
Note: For chairs with tilt mechanisms that lock, locking the mechanism changes the classification of the chair. (See Section 4). Chairs with tilt mechanisms in an unlocked position shall be tested according to this section and an additional test shall be performed according to Section 15. When testing in accordance with Section 15, the chair shall be tested in the upright locked position.		
Determine points 406 mm (16 in.) and 452 mm (17.8 in.) above the seat (See Section 3.5). Mark these points on the vertical centerline of the backrest.		
a) If the top of the load-bearing structure/surface of the backrest is greater than or equal to 452 mm (17.8 in.) above the seat, position the center of the form-fitting device (See Definition 2.10) 406 mm (16 in.) above the seat. (See Figure 14b).		
b) If the top of the load-bearing structure/surface of the backrest is less than 452 mm (17.8 in.) above the seat, position the top of the form-fitting device even with the top of the load-bearing structure/surface. (See Figure 14c).		
c) If the unit has a pivoting backrest that stops at a position less than or equal to 20 degrees rearward (See Figure 14d), position the form-fitting device as directed in a) or b). If the unit has a pivoting backrest that stops at a position greater than 20 degrees rearward of the backrest, position the center of the form-fitting device at the height of the pivoting point. (See Figure 14d).		
Attach a loading device (front push or back pull) to the horizontal center of the backrest as determined above. With the backrest at its back stop position, apply a force that is initially 90 degrees ± 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 degrees ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. The angle of the backrest plane may be determined by the angle of the plane of the front of the CMD upright. (See Figure 14a).		
Note: Where the design of the chair does not allow the transfer of force(s) from the form-fitting device to the load-bearing structure/surface, then a bridging device 38 mm to 102 mm (1.5 in. to 4 in.) in height may be used to span the width of the load-bearing structure/surface.		
A weight of 109 kg (240 lbs.) shall remain in the center of the seat and be secured if necessary. (See Figure 14d and 14e).		
The loading device shall be adjusted to apply a 445 N (100 lbf.) force to the backrest. (See Figure 14e).		
The loading device shall be set at a rate between 10 and 30 cycles per minute.		
Test Procedure		
14.4.1 For chairs with backrest widths less than or equal to 406 mm (16 in.) at the height of the loading point, apply the load to the backrest for 120,000 cycles.		
14.4.2 For chairs with backrest widths greater than 406 mm (16 in.) at the height of the loading point, apply the load to the backrest for 80,000 cycles.		
a) Keeping the load at the height determined above, reposition the load 102 mm (4 in.) to the right of the vertical centerline. The load shall be applied through a form-fitting device or bridging device if appropriate – see Note in 14.3.4. (See Figure 14f and 14g). With the backrest at its back stop position, apply a force that is initially 90 degrees ± 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 degrees ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. Apply this load for 20,000 cycles.		
b) Keeping the load at the height determined above, reposition the load 102 mm (4 in.) to the left of the vertical centerline. The load shall be applied through a form-fitting device or bridging device if appropriate – see Note in 14.3.4. (See Figure 14f and		

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14g). With the backrest at its back stop position, apply a force that is initially 90 degrees $\pm$ 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 degrees $\pm$ 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. Apply this load for 20,000 cycles.

Acceptance level	There shall be no loss of serviceability.	Not Applicable
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Test Item	Test Method & Requirements	Result
15	Backrest Durability Test- Cyclic- Type II & III	
Applicability:	This test shall be performed on Type II and III chairs.	
Purpose of Test The purpose of this test is to evaluate the ability of the chairs to withstand fatigue stresses and wear caused by rearward force on the backrest of the chair.		
Test Setup The chair shall be placed on a test platform in an upright position with the base/legs restrained from movement. If pushing on the backrest with the test device, the chair must be restricted from rotating. Clamping shall be done so as not to restrict the movement of the backrest(s) or arm(s) of the chair. If adjustable features are available, all adjustments shall be set at normal use conditions. Note: For chairs with tilt mechanisms that lock, locking the mechanism changes the classification of the chair. (See Section 4). Chairs with tilt mechanisms in an unlocked position shall be tested according to Section 14 and an additional test shall be performed according to Section 15. When testing in accordance with Section 15, the chair shall be tested in the upright locked position. Determine points 406 mm (16 in.) and 452 mm (17.8 in.) above the seat (See Section 3.5). Mark these points on the vertical centerline of the backrest. a) If the top of the load-bearing structure/surface of the backrest is greater than or equal to 452 mm (17.8 in.) above the seat, position the center of the form-fitting device (See Definition 2.9) 406 mm (16 in.) above the seat. (See Figure 15b). b) If the top of the load-bearing structure/surface of the backrest is less than 452 mm (17.8 in.) above the seat, position the top of the form-fitting device even with the top of the load-bearing structure/surface. (See Figure 15c). c) If the unit has a pivoting backrest that stops at a position less than or equal to 20 degrees rearward (See Figure 15d), position the form-fitting device as directed in a) or b). If the unit has a pivoting backrest that stops at a position greater than 20 degrees rearward of the backrest, position the center of the form-fitting device at the height of the pivoting point. (See Figure 15d). Attach a loading device (front push or back pull) to the horizontal center of the backrest as determined above. With the backrest at its back stop position, apply a force that is initially 90 degrees ± 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. The angle of the backrest plane may be determined by the angle of the plane of the front of the CMD upright. (See Figure 15a). Note: Where the design of the chair does not allow the transfer of force(s) from the form-fitting device to the load-bearing structure/surface, then a bridging device 38 mm to 102 mm (1.5 in. to 4 in.) in height may be used to span the width of the load-bearing structure/surface. A weight of 109 kg (240 lbs.) shall remain in the center of the seat and be secured if necessary. (See Figure 15d and 15e). The loading device shall be adjusted to apply a 334 N (75 lbf.) total force to the backrest. If the backrest/tilt lock mechanism will not accept the load due to gradual slipping of the adjustment mechanism during the load application, set the backrest to its most rearward (stopped) position, then apply the specified load(s). The loading device shall be set at a rate between 10 and 30 cycles per minute.		
Test Procedure For chairs with backrest widths less than or equal to 406 mm (16 in.) at the height of the loading point, apply the load to the backrest for 120,000 cycles. For chairs with backrest widths greater than 406 mm (16 in.) at the height of the loading point, apply the load to the backrest for 80,000 cycles. a) Keeping the load at the height determined above, reposition the load 102 mm (4 in.) to the right of the vertical centerline (See Figure 15f and 15g). With the backrest at its back stop position, apply a force that is initially 90 degrees ± 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 degrees ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. Apply this load for 20,000 cycles. b) Keeping the load at the height determined above, reposition the load 102 mm (4 in.) to the left of the vertical centerline (See Figure 15f and 15g). With the backrest at its back stop position, apply a force that is initially 90		

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degrees ± 10 degrees to the plane of the backrest. The force is not intended to be maintained at 90 degrees ± 10 degrees throughout the loading of the backrest. If applying the load with a cable and pulley system, the cable must initially be a minimum of 762 mm (30 in.) in length from the attachment point to the pulley. Apply this load for 20,000 cycles.

Acceptance level There shall be no loss of serviceability.

PASS

Comments: Only 50% of cycles were completed.

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Test Item	Test Method & Requirements	Result
16	Caster/Chair Base Durability Test- Cyclic	
Applicability:	This test applies to pedestal base chairs with casters.	
Purpose of Test The purpose of this test is to evaluate the ability of the chair base and casters to withstand fatigue stresses and wear caused by moving the chair back and forth		
Test Setup a) The chair, or chair base with casters, shall be attached to a cycling device similar to Figure 16c. When testing a full chair, set all adjustments to midpoint. b) The chair shall be cycled on a smooth hard surface (steel preferred) with three obstacles as shown in Figure 16a in accordance with the obstacle layout as shown in Figure 16b. c) If a complete chair is to be tested, place a 122 kg (270 lb.) load on the seat of the chair. If a fixture is used, the weight of the test assembly (base assembly, fixture and weights) shall be equivalent to 122 kg (270 lb.) plus the weight of the chair in its fully assembled configuration. (See Figure 16c). The base and casters shall be free to rotate and swivel. d) The stroke of the cycling device shall be adjusted to 762 +/- 50 mm (30 +/- 2 in.) of travel. The stroke shall be oriented so the casters roll across the test platform and obstacles as shown in Figure 16b. e) The cycling device shall be operated at a rate of 10 ± 2 cycles per minute. One cycle shall consist of a forward and backward stroke of the cycling device.		
Test Procedure a) The chair or chair base shall be cycled 2,000 cycles over the obstacles as shown in Figure 16b and then 98,000 cycles on a smooth, hard surface (steel preferred) without obstacles. b) At the conclusion of cycling, a 22 N (5 lbf.) pull force shall be applied to each caster in line with the caster stem centerline.		
Acceptance level	There shall be no loss of serviceability. No part of the caster shall separate from the chair as a result of the application of the 22 N (5lbf.) force.	Not Applicable

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Test Item	Test Method & Requirements	Result
16.2	Caster/Chair Frame Durability Test for Non-pedestal Chairs with Casters	
Applicability:	This test applies to chairs with legs and casters.	
Purpose of Test		
The purpose of this test is to evaluate the ability of the chair frame and casters to withstand fatigue stresses and wear caused by moving the chair back and forth.		
Test Setup		
a) The chair, or chair frame with casters, shall be attached to a cycling device similar to Figure 16e. The cycling device shall be attached to apply the horizontal motion at the highest point that does not cause the chair to tip or lift the casters entirely off the platform during the test but not any higher than 25 mm (1 in.) above the bottom of the applied weight. b) The chair shall be cycled on a smooth hard surface (steel preferred) with two obstacle layout as shown in Figure 16d and 16e in accordance with the obstacle detail as shown in Figure 16a. c) Place and secure a distributed 122 kg (270 lb.) on the center of seat of the chair or chair base. The casters shall be free to rotate and swivel. Note: Some chairs of this type have fixed rear casters. If that is the case, the casters should roll freely. d) The stroke of the cycling device shall be adjusted to 762 +/- 50 mm (30 +/- 2 in.) of travel. The stroke shall be set and the obstacles shall be oriented such that the casters roll across the test platform and obstacles, and that each caster travels beyond the obstacle by 200 to 400 mm (8 to 15.5 in.) in each direction as shown in Figure 16e. During one cycle, each caster shall cross a threshold twice (once in the forward direction and once in the return direction); the obstacles shall be spaced such that the leading and following sets of casters do not cross the thresholds simultaneously. e) The cycling device shall be operated at a rate of 10 ± 2 cycles per minute. One cycle shall consist of a forward and backward stroke of the cycling device. f) For units with caster and glide combinations, the legs without casters may be raised a maximum of 51 mm (2 in.) above the test platform (supported by the attachment device) during this test. The casters shall be free to rotate and swivel where applicable. There shall be no load placed on the seat of the unit or unit base.		
Test Procedure		
a) The chair or chair base shall be cycled for 2,000 cycles over the obstacles as shown in Figures 16d and 16e and then 98,000 cycles on a smooth hard surface (steel preferred) without obstacles. b) At the conclusion of cycling, a 22 N (5 lbf.) pull force shall be applied to each caster in line with the caster stem centerline.		
Acceptance level	There shall be no loss of serviceability. No part of the caster shall separate from the chair as a result of the application of the 22 N (5 lbf.) force.	Not Applicable

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Test Item	Test Method & Requirements	Result
17	Leg Strength Test- Front Application	
Applicability:	This test applies to all chairs with legs, including leg bases.	
Purpose of Test		
The purpose of this test is to evaluate the ability of legs to withstand horizontal forces.		
Test Setup		
Front Load Test		
a) The chair shall be placed on a test platform, with the back legs restrained by a block 11 to 38 mm (.44 to 1.50 in.) high. Figure 17a shows one acceptable method of restraining the chair. b) If adjustable features are available, all adjustments shall be set at normal use conditions. c) The loading device shall be attached to the chair so that an initially horizontal force is applied inward and parallel to the front-to-rear axis of the chair, between 13 mm (0.5 in.) and 38 mm (1.5 in.) from the bottom of a leg as shown in Figure 17a. For chairs with casters, apply the load to the chair leg, but not more than 13 mm (0.5 in.) from the point of caster attachment (bottom of the leg). The load shall be applied to the apparent weakest point of the leg. Where the apparent weakest point is the left or right edge of the leg, apply the load so that it is no greater than 25 mm (1.0 in.) from the edge.		
Test Procedure		
Functional Load Test		
a) A force of 334 N (75 lbf.) shall be applied once to each front leg individually for one (1) minute. b) Remove the force.		
Proof Load Test		
a) A force of 503 N (113 lbf.) shall be applied once to each front leg individually for one (1) minute. b) Remove the force.		
Acceptance level	Functional Load Functional load(s) shall cause no loss of serviceability.	
Acceptance level	Proof Load Proof load(s) shall cause no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	

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Test Item	Test Method & Requirements	Result
17	Leg Strength Test- Side Application	
Side Load Tests Note: A separate chair may be used for the side load portion of the test. Note: Informative Appendix H offers a test for Simultaneous Side Leg strength. It is acceptable to perform the test in Appendix H in lieu of 17.4.2.1. The Proof Load shall be conducted on the product regardless of testing to 17.4.2.1 or Appendix H		
Test Setup a) The chair shall be placed on a test platform with the side leg(s) restrained by a block 11 to 38 mm (.44 to 1.50 in.) high. Figure 17b shows one acceptable method of restraining the chair. b) If adjustable features are available, all adjustments shall be set at normal use conditions. c) The loading device shall be attached to the chair so that an initially horizontal force is applied inward and parallel to the side-to-side axis of the chair, between 13 mm (0.5 in.) and 38 mm (1.5 in.) from the bottom of a leg as shown in Figure 17b. For chairs with casters, apply the load to the chair leg, but not more than 13 mm (0.5 in.) from the point of caster attachment (bottom of the leg). The load shall be applied to the apparent weakest point (front-to-back) of the leg. Where the apparent weakest point is the front or rear edge of the leg, apply the load so that it is no greater than 25 mm (1.0 in.) from the edge		
Test Procedure Functional Load Test a) A force of 334 N (75 lbf.) shall be applied once to a front and rear leg individually for one (1) minute. b) Remove the force.		
Proof Load Test a) A force of 503 N (113 lbf.) shall be applied once to a front and rear leg individually for one (1) minute. b) Remove the force.		
Acceptance level	Functional Load Functional load(s) shall cause no loss of serviceability.	PASS
Acceptance level	Proof Load Proof load(s) shall cause no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
18	Footrest Static Load Test- Vertical	
Applicability:	The footrest static load test shall be performed on all chairs with a footrest feature and a seat height equal to or greater than (or can be adjusted to) 610 mm (24 in.).	
Purpose of Test		
The purpose of this test is to evaluate the ability of the footrest to withstand static loading stresses.		
Test Setup		
Functional Load Test		
a) The chair shall be placed on a test platform and restrained as shown in Figure 18.		
b) On chairs with adjustable features, all adjustments shall be set at normal use position. The seat and upper structure shall be restrained as necessary to prevent rotation during the test. Chair cushions and/or other components not related to the structure of the footrest may be removed to facilitate load application.		
Note: This test is not intended to evaluate the performance of casters or glides. Casters may be removed, left in place or replaced by spacers to provide clearance if necessary.		
Test Procedure		
Static Load Test – Functional Load		
a) Apply a force F1 of 445 N (100 lbf.) uniformly along a 102 mm (4 in.) distance along the footrest but not greater than 51 mm (2 in.) from the outside edge at the apparent weakest point of the structure for one (1) minute in the vertical downward direction. (See Figure 18: Top View of Footrest). If the footrest adjusts in height relative to the seat and allows for a force application 180 degrees (on the opposite side of the chair) from the primary force application, maintain force F1 and apply an additional force F2 of 445 N (100 lbf.) to the footrest at the opposing position for an additional one (1) minute. The F2 force shall also be applied uniformly along a 102 mm (4 in.) distance along the footrest but not greater than 51 mm (2 in.) from the outside edge.		
b) If applicable, remove force F2.		
c) Increase the force F1 to 200 lbf. for one (1) minute.		
Static Load Test – Proof Load		
Apply a force of 1334 N (300 lbf.) uniformly along a 102 mm (4 in.) distance along the footrest but not greater than 51 mm (2 in.) from the outside edge at the apparent weakest point of the structure for one (1) minute in the vertical downward direction.		
Acceptance level	Functional Load There shall be no loss of serviceability or sudden loss of footrest height.	PASS
Acceptance level	Proof Load The load applied once shall cause no sudden and major change in the structural integrity of the unit. Loss of serviceability is acceptable.	PASS

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Test Item	Test Method & Requirements	Result
19	Footrest Durability Test- Vertical- Cyclic	
Applicability:	The footrest durability test shall be performed on all chairs with a footrest feature and a seat height equal to or greater than (or can be adjusted to) 610 mm (24 in.)	
Purpose of Test The purpose of this test is to evaluate the ability of the footrest to withstand stresses that occur as a result of repetitive loading.		
Test Setup a) The chair shall be placed on a test platform and restrained as shown in Figure 19. b) On chairs with adjustable features, all adjustments shall be set at normal use position. The seat and upper structure shall be restrained as necessary to prevent rotation during the test. Chair cushions and/or other components not related to the structure of the footrest may be removed to facilitate load application. Note: This test is not intended to evaluate the performance of casters or glides. Casters may be removed, left in place or replaced by spacers to provide clearance if necessary.		
Test Procedure a) A 890 N (200-lbf.) force shall be applied uniformly along a 102 mm (4 in.) distance along the footrest but not greater than 51 mm (2 in.) from the outside edge at the apparent weakest point of the structure. (See Figure 18: Top View of Footrest). When the weakest position is not obvious, several load application positions may be necessary to properly test the product. If the footrest moves more than 25 mm (1 in.) within the first 500 cycles, discontinue testing (See 19.5 Acceptance level). If the footrest moves throughout the remainder of the test, reset it to its original position when it is within 12 mm (0.5 in.) from its lowest position. b) The force shall be applied and removed 50,000 cycles at a rate between 10 and 30 cycles per minute.		
Acceptance level	There shall be no loss of serviceability. Adjustable footrests that move more than 25 mm (1 in.) in the first 500 cycles shall be considered to have lost their serviceability.	PASS

Comments: Only 50% of cycles were completed.

Test Item	Test Method & Requirements	Result
20	Arm Durability Test- Cyclic	
Purpose of Test The purpose of this test is to evaluate the ability of the chair armrests to withstand stresses that occur as a result of repetitive loading that can be imposed on the armrest structure. Loading of this type is the result of using the armrests as a support when getting into or out of the chair.		
Test Setup a) The chair shall be placed on a test platform in an upright position as shown in Figure 20b. If necessary, the seat may be restrained from rotational movement. Clamping shall be done in such a manner as not to restrict the arms of the unit. b) Height-adjustable arms must be set at the apparent weakest position. When the weakest position is not obvious, several load applications positions may be necessary to properly test the product. c) Width-adjustable arms must be set at the apparent weakest position. d) Unrestrained pivoting armrests (i.e., the armrest cap pivots freely) shall be loaded in line with the pivot point. e) The arm loading device shall distribute the load over a length of 100 mm (4 in.) on the arm pad. Center of load shall not be applied more than 25 mm (1.0 in.) in from the inside edge of the arm pad. One suggested arm loading device is shown in Figure 20a. Position the arm loading device on the armrest structure at its apparent weakest point consistent with using the armrest as a support for entering or exiting the chair		
Test Procedure Simultaneously apply a force of 400 N (90 lbf.) to each arm initially at a 10 degrees $\pm$ 1 degree angle as shown in Figure 20b. The arm loading device must follow the arm (allow fore and aft, side-to-side and rotational movement) as it deflects or pivots. If using a test device similar to that shown in Figure 20b, the load application distance must initially be the length specified in the figure. Other methods of applying the load are acceptable if the force and angle applications are equivalent. The force shall be applied and removed for 60,000 cycles at a rate between 10 and 30 cycles per minute.		
Acceptance level	There shall be no loss of serviceability to the chair.	PASS

Comments: Only 50% of cycles were completed.

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Test Item	Test Method & Requirements	Result
21	Out Stop Tests for Chairs with Manually Adjustable Seat Depth	
Purpose of Test The purpose of this test is to evaluate the ability of the seat slide out stops to withstand excessive impact forces that may result from user adjustment of the seat depth. Note: This test does not apply to chairs where seat depth adjustments must occur with the user out of the chair		
Test Setup a) The chair shall be placed on a test platform and restrained to prevent it from moving. The method of securing shall not interfere with the operation of the seat slide being tested. For chairs with an adjustable seat angle, set the angle to its most forward (negative seat slope) angle. Disable any seat depth adjustment locks or interim stops. b) A stranded metallic cable or equivalent shall be attached to the most rigid point of the vertical centerline of the seat. This may be accomplished by means of a clamp or similar device that does not affect the test results. c) The opposite end of the cable shall extend in line forward from the seat and in line with the plane of the seat movement to a pulley and then downward to an attached weight of 25 kg (55 lb.). Place the seat in its most rearward position and restrain. d) Place a 74 kg (163 lb.) rigid mass in the center of the seat.		
Test Procedure The seat with the hanging weight shall be held at its most rearward position, then released, permitting it to move forward rapidly and impact the out stops. Repeat this procedure for a total of 25 cycles.		
Acceptance level	There shall be no loss of serviceability to the unit.	Not Applicable

Comments:

Test Item	Test Method & Requirements	Result
22	Tablet Arm Chair Static Load Test	
Purpose of Test The purpose of this test is to evaluate the ability of the unit equipped with a tablet arm or other attached auxiliary writing/laptop surface to withstand stresses caused by vertical loading.		
Test Setup a) The unit shall be leveled in its normal operating position. The unit shall be placed on a test platform and restrained to prevent movement. Any height adjustment of the chair and/or tablet arm shall be set at the midpoint of adjustment. b) Apply the load through a 203 mm $\pm$ 13 mm (8.0 in. $\pm$ 0.5 in.) diameter area 25 mm (1 in.) from the edge of the tablet surface at its apparent weakest point. When the weakest point is not obvious, several load applications may be necessary to properly test the product. If required to prevent tipping of the chair, a counterbalancing force may be applied to the chair seat.		
Test Procedure Apply a load of 68 kg. (150 lb.) at the location described in 22.2 b) for on (1) minute and remove the load.		
Acceptance level	The load applied once shall cause no sudden and major change in the structural integrity of the chair. After performing the test, the tablet arm must allow egress from the unit; other losses of serviceability are acceptable.	Not Applicable

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Test Item	Test Method & Requirements	Result
23	Tablet Arm Chair Load Ease Test- Cyclic	
Purpose of Test The purpose of this test is to evaluate the durability of the tablet arm-chair to withstand cyclic loading of the tablet.		
Test Setup - The unit shall be leveled in its normal operating position. The unit shall be placed on a test platform and restrained to prevent movement. Any height adjustment of the chair and/or tablet arm shall be set at the midpoint of adjustment. - Apply a load of 25 kg (55 lb.) through a 203 mm $\pm$ 13 mm (8.0 in. $\pm$ 0.5 in.) diameter area 25 mm (1 in.) from the edge of the surface at its apparent weakest point. When the weakest point is not obvious, several load applications may be necessary to properly test the product. If required to prevent tipping of the chair, a counterbalancing force may be applied to the chair seat. - The cycling device shall be set to operate at a rate of 14 $\pm$ 6 cycles per minute. Test Procedure - The load shall be raised until the entire load is off the tablet surface and then eased (without impact) onto the surface, so that it takes the entire load without any support from the cycling device. - Repeat Step (a) for a total of 100,000 cycles.		
Acceptance level	There shall be no loss of serviceability to the unit.	Not Applicable

Comments:

Test Item	Test Method & Requirements	Result
24	Structural Durability Test- Cyclic	
Applicability:	This test applies to chairs that do not swivel. It does not apply to chairs with casters or products with seat heights greater than 24 inches.	
Purpose of Test The purpose of this test is to evaluate the ability of the unit to withstand fatigue stresses and wear caused by side-to-side forces on the structural frame.		
Test Setup - The unit base shall be restrained from horizontal movement on a test surface. Figure 24 shows one acceptable method of restraining the unit. All four corners of the base shall be restrained in both directions. - If adjustable features are available, all adjustments shall be set at normal use conditions. - Place a weight of 109 kg (240 lb.) in the center of the seat. If necessary to keep the weight in position, the weight may be secured. - A cycling device shall be attached to the unit frame midway between front and rear of the seat at the height of the midpoint of the seat frame structure. Note: Where design of the unit does not permit attachment at the midpoint as specified above, a bridging device may be used. - The cycling device shall be adjusted to apply a "push-pull" action, or alternately may be applied by alternating pull (or push) force application on alternating sides of the unit. One cycle shall consist of one outward force application and removal and one inward force application and removal. - Apply a force of 334 N (75 lbf.) at an appropriate rate between 10 and 30 cycles per minute. Test Procedure The device shall be cycled for 25,000 cycles.		
Acceptance level	There shall be no loss of serviceability.	Not Applicable

Comments:
*****End of Report*****

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