

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

Attn.: Avi Goldberg

This test report supersedes SGS test report 4977344-TL-01 due to revision of Sample ID.

Test Report No: 4977344-TL-01-R1	Date: November 11, 2022 Revised: November 15, 2022
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SAMPLE ID: LuvraFlex Stack Chair

DATE OF RECEIPT: November 1, 2022

TESTING PERIOD: November 1 – 11, 2022

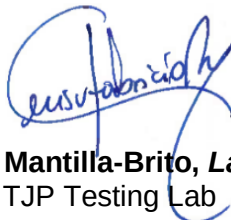
TESTS REQUESTED: The submitted samples were tested for the following tests in accordance with the procedures outlined in ANSI/BIFMA X5.1-2017 (R2022)

TEST RESULTS: See pages below

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



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

Test No.	Description	Result
6	Backrest Strength Test – Static – Type III	PASS
7	Drop Test- Dynamic	PASS
10	Seating Durability Tests- Cyclic & Front Corner Load- Ease	PASS
15	Backrest Durability Test- Cyclic Type II and III	PASS
17	Leg Strength Test- Front and Side Application	PASS
24	Structural Durability Test- Cyclic	PASS

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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.					
Acceptance level	Functional Load: A functional load applied once shall cause no loss of serviceability to the chair. 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.		P	F	NA
			X		
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 ± 10 degrees to the plane of the backrest (see Figure 6d). 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. 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.				

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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.				
Acceptance level	Functional Load: There shall be no loss of serviceability. Proof Load: There shall be no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	P X	F	NA
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.				

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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.		P	F
			X	N/A

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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.				
Acceptance level	There shall be no loss of serviceability.	P X	F	NA
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.				

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- 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 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.

Test Item	Test Method & Requirements	Result		
17	Leg Strength Test- Front and Side 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.				
Acceptance level	Functional Load Functional load(s) shall cause no loss of serviceability. Proof Load Proof load(s) shall cause no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	P X	F	NA
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.				

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Test Item	Test Method & Requirements	Result		
17	Leg Strength Test- Front and 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				
Acceptance level	Functional Load Functional load(s) shall cause no loss of serviceability. Proof Load Proof load(s) shall cause no sudden and major change in the structural integrity of the chair. Loss of serviceability is acceptable.	P X	F	NA
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.				

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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.				
Acceptance level	There shall be no loss of serviceability.	P X	F	NA
Test Setup a) 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. b) If adjustable features are available, all adjustments shall be set at normal use conditions. c) 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. d) 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. e) 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. f) 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.				

*****End of Report*****

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