



Test Report

No.: SHHL2303008219FT

Date: MAY 25, 2023

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ZENITH (SHANGHAI) HIGH-TECH CO., LTD
L1, BLDN 2, 1788 HANGTANG RD, JINHUI TOWN, FENGXIAN SHANGHAI 201405 CHINA

Sample Description : DENN CHAIR

Source of Sample : SENT BY CLIENT.

Sample Receiving Date : MAR. 03, 2023

Testing Period : MAR. 03, 2023 TO MAY 25, 2023

Testing Location : 3RD. BUILDING, LANE 3999, XIUPU RD., PUDONG DISTRICT,
SHANGHAI, CHINA

Test Requested	Result
ANSI/BIFMA X5.1-2017 (R2022): GENERAL-PURPOSE OFFICE CHAIR-AMERICAN NATIONAL STANDARD FOR OFFICE FURNITURE	PASS
ARM STRENGTH TEST VERTICAL – STATIC(ANSI/BIFMA X5.1 -2017 (R2022) CLAUSE 12)	PASS
ARM STRENGTH TEST HORIZONTAL – STATIC(ANSI/BIFMA X5.1 -2017 (R2022) CLAUSE 13)	PASS
ARM DURABILITY TEST – CYCLIC(ANSI/BIFMA X5.1 -2017 (R2022) CLAUSE 20)	PASS

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.



Jack Zheng
Authorized Signatory



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Test Report

No.: SHHL2303008219FT

Date: MAY 25, 2023

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Test Conducted:

For sample 1

ANSI/BIFMA X5.1-2017 (R2022): General-Purpose Office Chair– American National Standard For Office Furniture

Testing Condition : All the physical test is carry out in indoor ambient.

Nos. of Specimen : 13 pcs.

Type of Chair : Type I

Test Result : PASS

Test Property	Test Method	Test Principle / Requirements	Results
Back Strength Test - Static -Type I & II (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 5	No loss of serviceability when 667 N (150 lbs.) is applied for 1 min. Applied 70° to the back at 16 in. above the seat.	Pass
Back Strength Test - Static -Type I & II (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 5	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 1001 N (225 lbs.) is applied for 1 min. Applied 70° to the back at 16 in. above the seat.	Pass
Back Strength Test – Static – Type III (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 6	No loss of serviceability when 667 N (150 lbs.) is applied for 1 min. Applied 90° to the back at 16 in. above the seat.	N/A See note 1
Back Strength Test – Static – Type III (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 6	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 1001 N (250 lbs.) is applied for 1 min. Applied 90° to the back at 16 in. above the seat.	N/A See note 1
Drop Test – Dynamic (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 7	No loss of serviceability when 102kg (225 lbs.) weight free falls from 6 in height to the center of the seat.	Pass
Drop Test – Dynamic (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 7	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 136kg (300 lbs.) weight free falls from 6 in height to the center of the seat.	Pass
Swivel Test – Cyclic	ANSI/BIFMA X5.1 -2017 (R2022) Clause 8	No loss of serviceability after 60,000 cycles of rotation (360°) under a 122kg (270 lbs.) load on the seat at its max. height. Seat shall then withstand another 60,000 cycles of rotation at its lowest seating position. Total 120,000 cycles.	Pass



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Test Property	Test Method	Test Principle / Requirements	Results
Tilt Mechanism Test – Cyclic – Type I & II	ANSI/BIFMA X5.1 -2017 (R2022) Clause 9	No loss of serviceability after 300,000 cycles under a 109kg (240 lbs.) load to the center of the seat	Pass
Impact test	ANSI/BIFMA X5.1 -2017 (R2022) Clause 10.3	No loss of serviceability in 100,000 cycles impact. A weight of 57kg (125 lbs.) free falls onto the seat from 1.4 in. height.	Pass
Front Corner Load Ease Test – Cyclic – Off Center	ANSI/BIFMA X5.1 -2017 (R2022) Clause 10.4	No loss of serviceability after load each seat front corner with 890N (200 lbs.) for 20,000 cycles, total 40,000 cycles. Note: this test is done after “Impact test” on the same sample.	Pass
Stability Test - Rear Stability for Type III Chairs	ANSI/BIFMA X5.1 -2017 (R2022) Clause 11.3.1	Load the chair with 6 disks, apply a horizontal force to the highest disk, The location of the force application is 6 mm (0.25 in.) from the top of the disk. For chairs with seat height less than 710 mm (28.0 in.), calculate the force as follows: <ul style="list-style-type: none"> • $F = 0.1964 (1195 - H)$ Newton. H is the seat height in mm. • $[F = 1.1 (47 - H)$ pounds force.]. H 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. The chair shall not tip over.	N/A See note 1
Stability Test - Rear Stability for Type I and II Chairs	ANSI/BIFMA X5.1 -2017 (R2022) Clause 11.3.2	Load the chair with 13 disks, place the first disk on the seat so it touches the support fixture. The chair shall not tip over.	Pass
Stability Test – Front Stability	ANSI/BIFMA X5.1 -2017 (R2022) Clause 11.4	The chair is obstructed with a 13mm (½ in.) obstruction to the chair casters/legs. A downward load of 61kg (135 lbs.) is centered 60mm (2.4 in.) from the seat front center edge. The seat shall withstand a 20N (4.5 lbf.) horizontally from the front seat edge without tipping.	Pass
Arm Strength Test Vertical – Static (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 12	No loss of serviceability when 750N (169 lbs.) is applied for 1 min. The vertical load is uniformly applied along a 127mm (5 in.) length at the apparent weakest point.	Pass



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Test Property	Test Method	Test Principle / Requirements	Results
Arm Strength Test Vertical –Static (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 12	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 1125N (253 lbs.) is applied for 15 seconds. The vertical load is uniformly applied along a 127mm (5 in.) length at the apparent weakest point.	Pass
Arm Strength Test Horizontal – Static (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 13	No loss of serviceability when 445N (100 lbs.) for 1 min. is applied horizontally outward to the armrest at the most forward point of the armrest.	Pass
Arm Strength Test Horizontal – Static (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 13	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 667N (150 lbs.) for 15 seconds. is applied horizontally outward to the armrest at the most forward point of the armrest.	Pass
Back Durability Test – Cyclic – Type I	ANSI/BIFMA X5.1 -2017 (R2022) Clause 14	No loss of serviceability in 120,000 cycles with a 109kg (240 lbs.) in the center of the seat and a 445N (100 lbf.) 90° to the center of the chair back. For chairs with a back width greater than 406mm (16 in.), test at the center of chair back for 80,000 cycles and then 102mm (4 in.) off-center 40,000 cycles, half to each side.	Pass
Back Durability Test – Cyclic – Type II & III	ANSI/BIFMA X5.1 -2017 (R2022) Clause 15	No loss of serviceability in 120,000 cycles with a 109kg (240 lbs.) in the center of the seat and a 334N (75 lbf.) 90° to the center of the chair back. For chairs with a back width greater than 406mm (16 in.), test at the center of chair back for 80,000 cycles and then 102mm (4 in.) off-center 40,000 cycles, half to each side.	N/A See note 1
Caster / Chair Base Durability Test For Pedestal Base Chair	ANSI/BIFMA X5.1 -2017 (R2022) Clause 16.1	No loss of service after 2,000 cycles over a hard surface with 3 obstacles and 98, 000 cycles over a smooth hard surface without obstacles under a 122kg (270 lbs.) load on the seat. Test stroke is 762mm (30 in.) minimum. The caster should not separate under 22N (5 lbs.) pulling force in line with the caster stem after the cycling test.	Pass



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Test Property	Test Method	Test Principle / Requirements	Results
Caster / Chair Base Durability Test For Chairs with Legs	ANSI/BIFMA X5.1 -2017 (R2022) Clause 16.2	No loss of service after 2,000 cycles over a hard surface with 2 obstacles and 98, 000 cycles over a smooth hard surface without obstacles under a 122kg (270 lbs.) load on the seat. Test stroke is 762mm (30 in.) minimum. The caster should not separate under 22N (5 lbs.) pulling force in line with the caster stem after the cycling test.	N/A See note 1
Leg Strength Test – Front Load (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 17.3	No loss of serviceability when a force of 334N (75 lbf.) is applied to each front leg individually for 1 minute.	N/A See note 1
Leg Strength Test – Front Load (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 17.3	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when a force of 503N (113 lbf.) is applied to each front leg individually for 1 minute.	N/A See note 1
Leg Strength Test – Side Load (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 17.4	No loss of serviceability when a force of 334N (75 lbf.) is applied once to each front and rear leg individually for 1 minute.	N/A See note 1
Leg Strength Test – Side Load (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 17.4	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when a force of 503N (113 lbf.) is applied once to the front and rear leg individually for 1 minute.	N/A See note 1
Footrest Static Load Test – Vertical-Functional load (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 18.4.1	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, 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. There shall be no loss of serviceability or sudden loss of footrest height.	N/A See note 1



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Test Property	Test Method	Test Principle / Requirements	Results
Footrest Static Load Test – Vertical-Proof load (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 18.4.3	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. The load applied once shall cause no sudden and major change in the structural integrity of the unit. Loss of serviceability is acceptable.	N/A See note 1
Footrest Durability Test – Vertical – Cyclic (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 19	No loss of serviceability after 50,000 cycles of a 890N (200 lbf) load vertical along 102mm (4 in.) length of the footrest at the apparent weakest point of the structure.	N/A See note 1
Arm Durability Test – Cyclic	ANSI/BIFMA X5.1 -2017 (R2022) Clause 20	No structural breakage or loss of serviceability when a force of 400N (90 lbf.) is applied to each arm at a 10° angle ±1° for 60,000 cycles	Pass
Out Stop Tests For Chairs With Manually Adjustable Seat Depth (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 21	Place 74 kg (163 lb.) rigid mass in the center of the seat, 25 kg (55lbf.) hanging weight shall be held at its most rearward position, then released, permitting it to move forward rapidly and impact the out stops. Repeat for a total of 25 cycles. There shall be no loss of serviceability to the unit.	Pass
Tablet Arm Static Load Test (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 22	Apply a load of 68 kg (150 lb.) through a 203 mm diameter area 25 mm from the edge of the surface at its apparent weakest point, for one (1) minutes. Shall cause no sudden and major change in the structural integrity of the chair at the first load, and after performing the test, the tablet arm must allow egress form the unit; other losses of serviceability are acceptable.	N/A See note 1
Tablet Arm Load Ease Test – Cyclic (If applicable)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 23	A 25kg (55 lb.) bag shall be raised until the entire weight is off the tablet surface and then eased (without impact) onto the surface, repeat for a total of 100,000 cycles without loss of serviceability to the unit.	N/A See note 1



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Test Property	Test Method	Test Principle / Requirements	Results
Structural Durability Test – Cyclic	ANSI/BIFMA X5.1 -2017 (R2022) Clause 24	Place a weight of 109kg (240lbf) in the center of the seat. Apply a force of 334N (75lbf) at an appropriate for 25000cycles by a cycling device. There shall be no loss of serviceability	N/A See note 1
Informative - Base Test – Static	ANSI/BIFMA X5.1 -2017 (R2022) Appendix C	No sudden and major change in the structural integrity under 11,120 N (2500 lbs.) compression for 1 min. The weight is then removed and reapplied for 1 min. The center column may not touch the test platform during load applications.	Pass
Informative – Simultaneous side legs strength test	ANSI/BIFMA X5.1 -2017 (R2022) Appendix H	The chair shall be placed on a test platform with the side legs restrained by a block 11 to 38mm high. All adjustments shall be set at normal use conditions. A force of 334N (75lbs.) per leg shall be applied once to a front and rear leg simultaneous for one minute. Remove force, there shall be no loss of serviceability.	N/A See note 1

Note : # 1- N/A means not applicable to this product design.



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Test Report

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For sample 2

ANSI/BIFMA X5.1-2017 (R2022): General-Purpose Office Chair– American National Standard For Office Furniture

Testing Condition : All the physical test is carry out in indoor ambient.

Nos. of Specimen : 2 pcs.

Type of Chair : Type I

Test Result : PASS

Test Property	Test Method	Test Principle / Requirements	Results
Arm Strength Test Vertical – Static (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 12	No loss of serviceability when 750N (169 lbs.) is applied for 1 min. The vertical load is uniformly applied along a 127mm (5 in.) length at the apparent weakest point.	Pass
Arm Strength Test Vertical –Static (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 12	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 1125N (253 lbs.) is applied for 15 seconds. The vertical load is uniformly applied along a 127mm (5 in.) length at the apparent weakest point.	Pass
Arm Strength Test Horizontal – Static (Functional Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 13	No loss of serviceability when 445N (100 lbs.) for 1 min. is applied horizontally outward to the armrest at the most forward point of the armrest.	Pass
Arm Strength Test Horizontal – Static (Proof Load)	ANSI/BIFMA X5.1 -2017 (R2022) Clause 13	No sudden and major change in the structural integrity (loss of serviceability is acceptable) when 667N (150 lbs.) for 15 seconds. is applied horizontally outward to the armrest at the most forward point of the armrest.	Pass
Arm Durability Test – Cyclic	ANSI/BIFMA X5.1 -2017 (R2022) Clause 20	No structural breakage or loss of serviceability when a force of 400N (90 lbf.) is applied to each arm at a 10° angle ±1° for 60,000 cycles	Pass



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Statements of conformity are reported as:

Passed - The measured values were observed in tolerance at the points tested.

Failed - One or more measured values were observed out of tolerance at the points tested.



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Sample Photo:

Received sample 1 (view 1)



Received sample 1 (view 2)



Received sample 2 (view 1)



Received sample 2 (view 2)



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End of Report



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