SGS

CLIENT: **HUMANSCALE CORPORATION**
220 Circle Drive
Piscataway, NJ 08854
Attn: Garrick Goh

Test Report No: 150197	**Date: October 29, 2004**

The following sample was submitted by the Client as:

SAMPLE DESCRIPTION: Office Chair

DATE OF RECEIPT: September 9, 2004

TESTING PERIOD: September 13, 2004 to October 27, 2004

AUTHORIZATION: Client's Purchase Order Number 0021590

TEST(S) REQUESTED: CAN/CGSB 44.232-2002 – T ASK CHAIRS

TEST RESULTS: The submitted sample **did not comply** with applicable requirements of the referenced specification.

PREPARED BY:

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Products Evaluation

SIGNED FOR AND ON BEHALF OF SGS U.S. TESTING COMPANY INC.

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TEST PROCEDURE AND RESULTS:

The following test program was conducted in a laboratory environment maintained at 70°F and 50% Relative Humidity. Each sample was individually tested after conditioning in the test environment for at least 48 hours prior to conducting the test.

The complete detailed procedures may be found in the referenced specification and are only summarized herein. The results obtained for each of the applicable tests are presented in their respective section describing the procedure below:

CERTIFICATE OF COMPLIANCE: GENERAL REQUIREMENTS
CAN/CGSB-44.232-2002

Model Number:

Ref. #	Test Name	Requirements	Actual Dimensions mm	Meets	Does Not Meet
5.0	**Detailed Requirements**				
5.1	**All Chairs**				
5.1.1	Seat Width	The seat cushion shall not be less than 450 mm (17.7") wide	541 mm (21.3")	√	
5.1.2	Column Clearance	When the chair is loaded with the seat measuring device, the clearance between the seat column and the floor shall not be less than 7 mm (0.28")	7.6 mm (0.3")	√	
5.1.3	Seat Waterfall	When measured without compression, the vertical height of the seat front edge curve shall not be less than 40 mm (1.6"), and the front edge curve shall not be less than 40 mm (1.6") or greater than 120 mm (4.7")	59.7 mm (2.35")	√	
5.1.4	Backrest Width	The backrest cushion width shall not be less than 350 mm (13.8")	535.9 mm (21.1")	√	

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

5.1.6	Chair Dimensions	The chairs shall meet the dimensional requirements of the standard as measured using BIFMA CMD-1			
5.2	**Fixed**	The following fixed dimensions are mandatory only when specified in a specific application of the standard			
5.2.1	Seat Depths	When a fixed seat depth is specified, it shall be specified as one of the following classifications: Shallow Seat – A seat depth from 380 mm (15.0") up to and including 420 mm (16.5") Medium Seat – A seat depth greater than 420 mm (16.5") up to and including 460 mm (18.1") Deep Seat – A seat depth greater than 460 mm (18.1")	495.3 mm (19.5") Deep Seat	√	
5.2.2	Backrest Height	The backrest height shall be classified as follows: Standard Back – The t op of the backrest shall not be less than 450 mm (17.7") and not greater than 550 mm (21.7") High Back – The t op of the backrest shall be at least 75 mm (3.0") greater than the standard back in the same series	Hi: 520.7 mm (20.5") Lo: 450.9 mm (17.75") Standard Back	√	
5.2.3	Armrest Height	The height of fixed armrests shall not be less than 190 mm (7.5") and not greater than 250 mm (9.8")	N/A Adjustable Armrests		
5.2.4	Armrest Length	The total length of the armrest shall not be less than 180 mm (7.1"), and a minimum of 130 mm (5.1") of the armrest length shall be within the armrest zone as defined in CMD-1	248.9 mm (9.8")	√	

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

5.2.5	Armrest Setback	The armrest setback shall be at least 150 mm (5.9")	150 mm (5.9")	√	
5.2.6	Clearance Between Armrests (including armrest supports	The clearance between armrests shall not be less than 450 mm (17.7")	452 mm (17.8")	√	
5.2.7	Armrest Width	The armrest width shall not be less than 45 mm (1.8")	86.4 mm (3.4")	√	
5.2.8	Lumbar Support	The height of the lumbar support shall fall within the range of 150 mm (5.9") to 250 mm (9.8") above the seat	Hi: 215.9 mm (8.5") Lo: 139.7 mm (5.5")		√
5.2.9	Backrest-to-Seat Angle	At chair set-up, the backrest-to-seat angle shall not be less than 93° or geater than 103°	94°	√	
5.3	**Adjustable Components**	The following adjustable requirements are mandatory only when specified in a specific application of the standard			
5.3.1	Seat Height Adjustment Ranges	The seat height adjustment ranges shall be classified as follows: Low Seat Height – A seat height that is adjustable from 380 mm (15.0") or less to 450 mm (17.7") or more Standard Seat Height – The seat height shall be adjustable by at least 90 mm within the range of 400 mm to 560 mm	Hi: 552.5 mm (21.75") Lo: 425.5 mm (16.75") Standard Seat Height	√	
5.3.2	Lumbar Support	The lumbar support height shall be adjustable by at least 50 mm (2") within the range of 150 mm (5.9") to 250 mm (9.8") above the seat	76.2 mm (3") Range: 215.9 mm to 139.7 mm	√ Adjustable	√ Range

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

5.3.3	Armrest Height Adjustment	The armrest height adjustment range shall be adjustable by at least 50 mm (2") and include the range from 190 mm (7.5") to 240 mm (9.4"). The armrest height shall be lockable in at least increments of no greater than 13 mm (0.5")	144.8 mm (5.7") Hi: 241.3 mm (9.5") Lo: 71.1 mm (2.8")	√	
5.3.4	Lateral Adjustment of Armrest (including armrest supports)	The range of lateral adjustment affecting the clearance between the two armrests shall be a minimum of 50 mm (2"). Whether the clearance between armrests is adjustable inwards or outwards, it shall include a clearance of 450 mm (17.7")	N/A		
5.3.5	Horizontally Swiveling Adjustable Armrest Caps	The armrest caps shall rotate laterally a minimum of 20° inwards and a minimum of 10° outwards	N/A		
5.3.6	Adjustable Seat Depth	The seat depth shall be adjustable by at least 50 mm (2") and shall include the range from 420 mm (16.5") to 460 mm (18.1"). It shall be lockable at multiple positions within that range	N/A		
5.4	**Seat and Back Controls**	The following control requirements are mandatory only when specified in a specific application of the standard			
5.4.1	Seat Pan Angle	When the seat pan angle is adjustable, it shall be adjustable to a minimum of 3° brward and 4° earward from the horizontal position and as a minimum shall be lockable at one forward position, and lockable at one rear horizontal position	N/A		

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

5.4.2	Backrest Angle to the Vertical	The backrest angle shall be adjustable a minimum of 10° within a range of 93° to 113°. The backrest angle adjustment mechanism when unlocked and activated with a load shall allow the backrest to tilt rearward and when activated without a load shall allow the backrest to return to the forward position	N/A		
5.4.3	Backrest-to-Seat Angle	When the backrest-to-seat angle is adjustable, the adjustment range shall be a minimum of 10° within a range of 93° to 113°	N/A		
5.4.4	Tilt Mechanisms	When the chair has a tilt mechanism, it shall either allow the backrest to tilt concurrently with the seat in a ratio of not less than 1.5:1, so that the backrest reclines at least 1.5° when the seat reclines 1° (synchro mechanism) or allow the seat and backrest to tilt in unison rearward while the occupant's feet remain flat on the floor (knee tilt mechanism). The tilt mechanism may also be such that the synchro mechanism allows the chair to tilt backward from a forward pivot point (behind the knees) while the occupant's feet remain flat on the floor.	N/A		
5.4.5	Seat and Backrest Locks	Seat and backrest shall be lockable in at least the chair set-up position as determined using BIFMA CMD-1. Alternatively, the seat and backrest may be lockable or stoppable at multiple positions within the adjustment ranges	N/A		

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

SUMMARY OF RESULTS FOR ANSI/BIFMA X5.1-2002

Test No.	Description	Results
5	Back Strength Test – Static – Type 1	Complies
7	Base Test – Static	Complies
8	Drop Test – Dynamic	Complies
9	Swivel Test – Cyclic	Complies
10	Tilt Mechanism Test – Cyclic	Complies
11	Seating Durability Tests – Cyclic	Complies
12	Stability Test	Complies
13	Arm Strength Test - Vertical - Static	Complies
14	Arm Strength Test - Horizontal - Static	Complies
15	Back Durability Test – Cyclic – Type I	Complies
17	Caster/Chair Base Durability Test - Cyclic	Complies
20	Arm Durability Test - Cyclic	Complies

5. Back Strength Test – Static – Type 1

Procedure

The chair was placed on a platform in its upright position, and the base was restrained from movement. Any adjustable features were set at normal use positions, except for height adjustable pivoting backs, which have the pivot set at maximum height or 16", whichever is less. The load device was positioned per spec.

A functional load of 200 lbf was applied 90° to the plane of the back for 1 minute and maintained until deflection was reasonably stabilized. The load was released and then a proof load of 300 lbf was applied.

Results

The chair was capable of withstanding the loads with no structural breakage or loss of serviceability.

CLIENT: Humanscale Corporation

TEST PROCEDURE AND RESULTS: Continued

7. Base Test – Static

PROCEDURE

The base was placed on a test platform with blocks or supports under the base arms, to allow for lateral movement as load was applied.

A 2500 lbf load was applied for one minute and removed after which a second 2500 lbf load was applied and maintained for one additional minute.

Result

The base withstood the applied loads without structural breakage or loss of serviceability.

8. Drop Test - Dynamic

Procedure

The chair was placed on the test surface with adjustable features set to their normal or midpoint positions as applicable. Casters were turned 90° to the base legs as viewed from above.

A test bag approximately 16 inches in diameter weighing 225 pounds was allowed to free-fall 6 inches to the center of the seat.

The weight of the bag was then increased to 300 pounds and the test repeated.

Results

The chair was capable of withstanding the impacts with no structural breakage or loss of serviceability.

9. Swivel Test – Cyclic

Procedure

The chair was restrained on a platform and the seat was restrained from rotation. The seat height was set to maximum as applicable. A 225 pound load was positioned on the seat such that its center of gravity was 2 – 2.5" forward of the spindle centerline. The chair was rotated 360° for 60,000 cycles at a rate of between 5 and 15 rotations per minute.

Results

No structural breakage, loss of serviceability to the chair or failure that in any way would cause personal injury to the occupant was observed.

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TEST PROCEDURE AND RESULTS: Continued

10. Tilt Mechanism Test - Cyclic

Procedure

The unit was clamped on a test platform with adjustable features set at midpoint of adjustment.

A cycling device was attached to the back with a 225-pound weight placed at the center of the seat.

The cycling device stroke was set to touch the front and rear stops without overriding either, allowing the unit to snap back.

The unit was cycled for 300,000 cycles at a rate of 10 to 30 cycles per minute.

Results

No structural breakage or loss of serviceability was apparent.

11. Seating Impact Test - Cyclic

11.4 Seat Impact Procedure

The unit was secured to a test platform. All adjustments were set at midpoint (where applicable).

A test bag 16 inches (406mm) in diameter and weighing 125 pounds was attached to a cycling device, permitting a free-fall to the center of the seat from a height of 1 inch above the uncompressed surface of the seat.

The seat was subjected to 100,000 such impacts at a rate of 10 and 30 cycles per minute.

Results

No structural breakage or loss of serviceability was apparent.

11.6 Front Corner Load Ease Procedure

After the completion of 11.4, a load of 165 lbf was applied to each front corner of the chair, flush to each structural edge, through an 8" diameter loading device. The loads were applied in an alternating sequence for a total of 40,000 cycles, at a rate of between 10 and 30 cpm.

Results

No structural breakage or loss of serviceability was apparent.

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TEST PROCEDURE AND RESULTS: Continued

12. Stability Test - Dynamic

Rear Stability: Procedure

The chair was placed on the test platform with the prescribed 173-pound weight strapped in the seat. All adjustments were set to provide the most unstable conditions for rearward stability.

A 1/2-inch obstruction was fixed against the rear legs and a rearward force was applied in the plane of the top of the weight until the total load was transferred to the rear supports.

Results

The unit complied with the minimum requirement of 35 lb. The front supports lifted off the platform at a rearward force of 66.8 lbf.

Front Stability: Procedure

A vertical load of 134.8 lbf was applied through a 200 mm disk, the center of which was 60 mm from the front center edge. A horizontal force of 4.5 lbf was applied at the same level of the plane of the top of the seat.

Results

The unit complied with this requirement.

13. Arm Strength Test - Vertical - Static

Procedure

The unit was placed on a test platform and clamped.

The vertical loads noted below were applied uniformly through a 5-inch long area along the width and length of one arm at the weakest point.

A functional load of 200 lbf was first applied for 1 minute after which a proof load of 300 lbf was applied for 1 minute.

Results

The arm was capable of supporting the loads with no structural breakage or loss of serviceability to the units.

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TEST PROCEDURE AND RESULTS: Continued

14. Arm Strength Test - Horizontal – Static

Procedure

The chair was placed on a test platform and clamped in position.

A loading device was attached so that a horizontal load is applied in the outward direction at the apparent weakest point.

A functional load of 100 lbf was applied for 1 minute and released.

A proof load of 150 lbf was then applied for 1 minute and released.

Results

The arm was capable of supporting the loads applied with no structural breakage or loss of serviceability.

15. Back Durability Test - Cyclic - Type I

Procedure

The unit was placed on a test platform in an upright position and restrained from movement. A 225 lb dead load was placed on the seat.

If adjustable features were available, all adjustments were set at the midpoint of the normal range.

A cycling device was attached to the center of the back 16 inches above the seat. The cycling device was adjusted to apply a force of 100 lbs at the loading point, 90° to the plane of the back. For chairs with backrest width less than 16 inches the device was cycled for 120,000 cycles at a rate of 10 to 30 cycles per minute. For chairs with backrest width greater than 16 inches the device was cycled for 80,000 cycles by applying the load at the horizontal center of the backrest and then 20,000 cycles each at the right and left of the centerline at a rate of 10 to 30 cycles per minute.

Results

No structural breakage or loss of serviceability resulted.

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TEST PROCEDURE AND RESULTS: Continued

17. Caster/Chair Base Durability Test - Cyclic

Procedure:

The chair base with casters was attached to a cycling device with a dead load of 225 pounds applied to the base while allowing freedom to rotate and swivel.

The stroke was adjusted to ensure 30 inches of travel in the forward and rearward directions at the rate of 10 ± 2 cpm for 100,000 cycles. The first 2000 cycles were performed over obstacle as described in the test procedure.

Results:

At the conclusion of durability cycling, a 5-pound force applied to each caster in line with the caster stem centerline did not cause the casters to separate and the unit continued to function normally.

20. Arm Durability Test – Cyclic

Procedure

The chair was placed on a platform and clamped in its upright position. The seat was restrained from rotational movement. Height and width adjustable arms were set at their apparent weakest position, as applicable. A force of 90 lbf was applied simultaneously to each arm initially at a 10° ± 1° angle using an arm loading device. The load was applied for 60,000 cycles at a rate of between 10 and 30 cpm.

Results

No failure that in any way would cause personal injury to the occupant resulted and no loss of serviceability was observed.

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END OF REPORT