

16 September 2008

Page No.1 of 10
Doc. No. V080304/9

MATERIAL EVALUATION REPORT

Client: SCHIAVELLO (VIC) PTY LTD

Address: 1 SHARPS RD TULLAMARINE 3043

Subject: [EVALUATION OF LIBERTY MESH CHAIR \(5 POINT OFFICE ADJUSTABLE HEIGHT CHAIR WITHOUT ARMS\)](#)

Client Reference: Mr. B MISSEN

Order No.: 251452

Correlation/Report No.: V080304/9

1.0 INTRODUCTION.

It was requested that a **Liberty Mesh 5 point adjustable height office chair** be tested in accordance with **level 6 of AS 4438 - "Height Adjustable Swivel Chairs" - 1997**. The chair as supplied was tested in the as received condition and was nominally a **type 4 chair** (see figure below).





2.0 DIMENSIONAL TESTS.

The as-submitted chair was measured for the following dimensions as per AS4438-1997, "Height Adjustable Swivel Chairs", section 3.3.

Dimension	Measurement	Allowable range	Result
a	415mm (lowest)	420mm (max)	Complies
	530mm (highest)	515mm (min)	Complies
	115mm	100mm (min)	Complies
b	436mm	380 - 440mm	Complies
c	512mm	380mm (min)	Complies
d	542mm	430mm (min)	Complies
e	0 (forwards)	3 (min)	Complies+
	2.5° (backwards)	10° (max)	Complies+
f	172mm	170 - 220mm	Complies
g	504mm	220mm (min)	Complies
h	548mm	360mm (min)	Complies
i	515mm	360mm (min)	Complies
k	>400mm +	400mm (min)	Complies
l	Concave (horizontal)	Concave	Complies
	Convex (vertical)	Convex	Complies
m	282mm	355mm (max)	Complies
t	265mm	195mm (min)	Complies
w	326mm	No requirement	
λ	355mm	365mm (max)	Complies

+ For type 4 chairs the nominal ranges may be exceeded.

The chair as submitted complied with the dimensional requirements measured.



3.0 SEAT STATIC LOAD TESTING.

The as submitted chair was subjected to the seat static load tests in accordance with appendix B of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Load mechanism: Hydraulic
Load measurement: Gedge 0-1200 kg load cell 94580 (Cal 356-Z-4)
Chair position: Lowest height setting with the back upright.
Load pad: Seat #1
Load applied: 204 kg
Load duration: 10 seconds per application
Load cycles: 10 cycles per location.
Location of tests: Seat Loading Point (SLP - Vs) and 100mm from front edge (V's)
Date of test: 4/04/2008

After loading in both locations the chairs rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**

4.0 BACK STATIC LOAD TESTING.

The as submitted chair was subjected to the back static load test and flexibility assessments in accordance with appendix C of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Load mechanism: Hydraulic
Load measurement: Laurel 0-5000 kg load cell (Cal 356-4H-2)
Chair position: Lowest height setting with the back upright.
Load applied - Back: 78 kg
 - Seat: 204 kg
Load Pad: Back #1
Load duration: 10 seconds per application
Load cycles: 10 cycles per location.
Location of tests: Back Loading Point (BLP - Hs) and Seat loading Point (SLP - Vs)
Flexibility quotient: 0.51
Date of test: 04/04/2008

After loading the chairs rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**



5.0 SEAT AND BACK FATIGUE TESTS

The as submitted chair was subjected to the back and seat fatigue load tests in accordance with appendix F of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Load mechanism: Pneumatic
Load system: Chair fatigue rig #1 (Seat pad #1 and back pad #2)
Load measurement: Laurel 0-5000 kg load cell (Cal 356-4H-2)
Gedge 0-1200 kg load cell (Cal 356-Z-4)
Chair position: 440mm seat height back tilt at lowest setting.
Load applied - Back: 42 kg
- Seat: 122 kg
Load duration: 200000 cycles
Load speed: 10 cycles per minute.
Location of tests: Back Loading Point (BLP - Hs) and Seat loading Point (SLP - Vs)
Date of test: 5/05/2008 – 21/05/2008

After loading the chairs rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**

6.0 SEAT IMPACT TEST

The as submitted chair was subjected to the seat impact tests in accordance with appendix G of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Load system: Seat Impact unit #1
Chair position: Maximum height and minimum heights.
Drop height: 350mm
Drop location: Seat Loading Position (SLP - Vs) and front edge
Drop cycles: 5 impacts per location per height (20 impacts in total).
Date of test: 22/05/2008

After impacts on the chairs the rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**



7.0 BACK IMPACT TESTS

The as submitted chair was subjected to the back impact tests in accordance with appendix H of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Load system:	Impact hammer #1
Chair position:	Maximum height.
Drop height:	620mm (relative) and 68° to the horizontal
Impact location:	Top centre of chair back
Impact cycles:	10 impacts total.
Date of test:	23/05/2008

After impacts on the chairs the rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**

8.0 DROP TESTS

The as submitted chair was subjected to the drop tests in accordance with appendix J of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Chair position:	Maximum height.
Load position:	450mm
Drop angle:	10°
Impact location:	Single rear leg
Impact cycles:	10 impacts total.
Drop mat:	2mm rubber 60 Shore A
Date of test:	30/05/2008

After the drop tests on the chairs the rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**



9.0 SWIVELLING TEST

The as submitted chair was subjected to the swivelling tests in accordance with appendix K of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Swivel system:	Swivel test rig #1
Chair position:	Maximum height.
Load used:	122 kg
Load pad:	Seat pad #2
Load position:	Seat loading position (SLP - Vs)
Swivel angle:	45° (minimum)
Swivel cycles:	100,000.
Date of test:	30/05/2008 - 6/05/2008

After the swivelling tests on the chair the rolling ability, height adjustment and tilt were all assessed with no evidence of any lack of functionality. **No evidence of any fractured or distorted components indicating loss of serviceability was observed and no defects considered likely to result in injury to the user were observed** - **Complies.**

10.0 REARWARDS OVERTURNING TEST

The as submitted chair was subjected to the rearwards overturning tests in accordance with appendix L of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Chair position:	Maximum height.
Load used:	61 kg
Load pad:	Seat pad #1
Load position:	Seat loading position (SLP - Vs)
Measured seat height:	500mm
Overturning load used:	14.6 kg
Back rest angle:	20°
Date of test:	10/06/2008

No overturning of the chair was observed: - **Complies.**



11.0 REARWARDS OVERTURNING OF TILTING / RECLINING CHAIRS

The as submitted chair was subjected to the rearwards overturning tests in accordance with appendix M of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Chair position: Maximum height.
Load disks used: Disks 1 – 11
Date of test: 10/06/2008

No overturning of the chair was observed:

- Complies.

12.0 ACCIDENTAL REARWARDS OVERTURNING

The as submitted chair was subjected to the accidental rearwards overturning tests in accordance with appendix N of **AS4438** using the class **six (6S)** requirements. The following test parameters were used;

Chair position: Maximum height.
Horizontal movement: 100mm
Date of test: 10/06/2008

No overturning of the chair was observed:

- Complies.



Appendix A

This section covers the non NATA endorsed assessments and general requirements as per sections 2, 3 and 6 of AS 4438.

1.0 GENERAL REQUIREMENTS

1.1 Components and Materials

- 1.1.1 The chair and controls shall be designed so as not to cause injury. **- Complies**
- 1.1.2 Chair components shall meet the general requirements of **AFRDI 109-D9-96 part 1**.
Not assessed
- 1.1.3 Fittings, castors and gas springs shall meet the type prequalification requirements detailed in **AFRDI 109-D9-96 parts 2, 4 and 6** respectively. **Not assessed**
- 1.1.4 The actuating mechanism and control levers shall meet the prequalification requirements detailed in **AFRDI 109-D9-96 part 5**. **Not assessed**
- 1.1.5 The pedestal base shall meet the prequalification requirements detailed in **AFRDI 109-D9-96 part 3**. **Not assessed**
- 1.1.6 Timber shall be free of cracks and internal stresses with a moisture content appropriate for the application. **Not assessed**
- 1.1.7 All metal components shall be suitably protected from corrosion and have adequate resistance to wear **- Complies**
- 1.1.8 Covering materials and filling materials shall meet the burning behaviour performance requirements as set out in **AS 4088.1**. **Not assessed**
- 1.1.9a Polyurethane foam used at durability levels 4, 5 and 6 shall comply with **AS 2281 type HR**. **Not assessed**
- 1.1.9b Polyurethane foam used as a seat cushioning at durability levels 4, 5 and 6 shall have a minimum density of 38 kg/m³. **- Complies**
- 1.1.9c Polyurethane foam used as a back cushioning at durability levels 4, 5 and 6 shall have a minimum density of 38 kg/m³. **- Complies**
- 1.1.10 Upholstered chairs shall be labelled according to the care labelling requirements of **AS 1957**. **Not assessed**

1.2 Specific Requirements Related to End Use

- 1.2a All chairs shall meet the relevant functional and dimensional requirements as specified in section 3. **- Complies**
- 1.2b All chairs shall meet the appropriate level of durability based on their intended application and as specified in section 4. **-Complies**
- 1.2c All chairs shall meet the stability requirements of section 5. **- Complies**
- 1.2d All chairs shall be marked, labelled and have instructions as specified in section 6. **Not assessed**

2.0 FUNCTIONAL CRITERIA

2.1 General

2.1.1 Postural Support

- 2.1.1a The seat surfaces and backrest shall be formed and related to each other in such a manner that a firm and comfortable sitting posture is achieved: **- Complies**
- 2.1.1b Lockable inclinable backrests and seat designs shall provide firm support for the lower lumbar spinal area at all angle of the backrest. The construction of lockable, inclinable backrests shall ensure that they do not spring forward or backward without undue force when the restraining device has been released. **Not assessed**
- 2.1.1c Chairs should provide support to the lumbar region with sufficient height and depth to provide all users according to their height with a sitting position suited to their activity. **- Complies**



2.1.2 Corners and Edges

2.1.2a There shall be no sharp projections or other features that constitute a risk to users or other persons moving in the vicinity of the chair - **Complies**

2.1.2b There shall be no sharp edges, rough surfaces or features that may trap clothing or cause injury. - **Complies**

2.1.2c Edges normally accessible to users should be rounded with a minimum radius of 2mm. Where the material thickness does not permit this, the edges shall be smooth and free of burrs. - **Complies**

2.1.2d The ends and feet of tubular metal components shall be capped or otherwise closed and finished smoothly. **Not assessed**

2.1.3 Adjusting Devices

Movable and adjustable parts shall be made so that injuries are avoided and inadvertent separation of the parts is impossible. Adjustment controls shall be easily adjusted by the occupant from the seated position. - **Complies**

2.1.4 Connections

It shall not be possible for any part of the chair to be accidentally detached. - **Complies**

2.1.5 Soiling

All lubricated parts shall be protected from contact by users during normal use. - **Complies**

2.1.6 Underframe and Base

All chairs shall have pedestal bases with five or more support points or be equivalent stability. Either castors or glides may be used. If castors are used they shall be of identical construction and meet the performance requirements of **AS 4438**. Permanently braked castors shall not be fitted. - **Complies**

2.1.7 Upholstery and Covering

2.1.7a Upholstery shall have adequate air and water permeability except where nonpermeability is required for hygiene or ease of cleaning. **Not assessed**

2.1.7b The upholstery filling in the seat shall be structured to prevent bottoming: - **Complies**

2.1.7c Materials shall meet the appropriate burning behaviour and care criteria as specified in **AS 4438 sections 2.1.8 and 2.1.10** respectively. **Not assessed**

2.1.8 Seat Height Adjustment

Self supporting seat height adjustment components shall comply with **AFRDI 109-D9-96 part 6**. They may only be incorporated in chairs for which they are suited on the basis of the gas spring cone classification in **AS4438 table 3.1**. **Not assessed**

3.0 MARKING AND INSTRUCTIONS

3.1 All chairs shall be adequately and clearly marked and supplied with full operating instructions.

6.2 Instruction for Use

3.2a Each chair shall have instructions on the use of the adjusting mechanisms - **Complies**

3.2b Each chair shall have instructions on the upkeep and maintenance of the chair. - **Complies**

3.2c Each chair shall have and outline on ergonomic back and seating height. - **Complies**

3.2d Each chair shall have the manufacturers or importers name and address supplied - **Complies**

3.2e Each chair shall have instructions on care, flammability ratings listed and summarized operating details. - **Complies**



6.3 Marking

6.3.1 All chairs shall be marked with the manufacturers or importers name and address.

- **Complies**

6.3.2 All chairs shall be marked with the year of manufacture.

- **Complies**

6.3.3 All chairs shall have a label stating "Hard tyred castors are unsuitable for use on hard floors or firm chairmats in which case soft-tyred castors should be used. Soft tyred castors are distinguishable by the tyre being a different colour to the body of the castor".

- **Complies**