



SEATING INC.  
Date: January 7, 2005  
P.O. No.: Doug 24

Report No.: 04-1007-2865  
Page 1 of 23

**Test Report For:**

**SEATING INC.**

**GSA FNEW 83-269E  
Performance Test Method For Intensive Use  
Chairs**

**Smart 247 Series Chair**



**James Jantz  
Project Manager**

**Martin Bender  
Project Manager/cm**

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Page 2 of 23

Attention: Doug Hart  
SEATING INC.  
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Nunda, NY 14517  
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**DATE RECEIVED:** 10/07/04  
**DATES TESTED:** 10/12/04 – 12/23/04

**DESCRIPTION OF SAMPLES:**

**Part Description:** Smart 247 Series Chair

**WORK REQUESTED/APPLICABLE DOCUMENTS:**

To test the submitted sample per the GSA FNEW 83-269E for the following test program:

<u>Test Number</u>	<u>Test Description</u>
4.1	Cyclic Back Tilt
4.2	Cyclic Increasing Back Load
4.4	Cyclic Vertical Arm Load
4.5	Cyclic Horizontal Arm Load
4.6	Vertical Seat, Base and Caster Load
4.7	Cyclic Fatigue to Swivel Bearing
4.8	Pneumatic Height Adjustment
4.9	Front Stability
4.10	Rear Stability
4.11	Caster Durability

**CONCLUSION:**

The submitted samples meet the acceptance criteria for the tests listed above.

**TEST EQUIPMENT:**

Fairbanks Scale:	Asset No.: 138012
Force Gauge (0-100lbs.):	Asset No.: 138133
Load Cell (0-1000lbs.):	Asset No.: 138032.2
Force Indicator (0-1000lbs.):	Asset No.: 138032.1
Strain Gauge (0-1000lbs.):	Asset No.: 138022.2
Force Indicator (0-1000lbs.):	Asset No.: 138022.1

**BACK LOAD AND TILT MECHANISM FATIGUE TEST:**

Date Received: 10/07/04  
Dates Tested: 10/12/04 – 11/26/05

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.1

Test Method:

Applies only to chairs with spring type tension controls. The entire chair shall be attached to a test platform via the base to prevent the chair from sliding backwards or overturning. Loads may be applied either with a pushing load-head or a pulling harness. A front-to-back load shall be applied to the back of the chair at a point 16 inches above the seat or to the top of the back if the back is lower than 16 inches. The load is applied in a manner so the load is normal to the plane of the back at the back stop position. The tilt mechanism shall be adjusted so that the top of the back moves 4 inches  $\pm$  1 inch rearward under the action of a 40 pound load. The test is carried out at a 50 pound load level at 20 cycles per minute and is continued until the back or tilt mechanism suffers disabling damage or meets the required acceptance level.

Number of Samples Tested: One (1)

Acceptance Criteria:

Complete 1,000,000 cycles without suffering disabling damage.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 1 for photograph.

**CYCLIC INCREASING BACK LOAD TEST:**

Date Received: 10/07/04  
Dates Tested: 10/14/04 – 11/15/05

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.2

Test Method:

The entire chair shall be attached to a test platform via the base to prevent the chair from sliding or overturning. Loads may be applied either with a pushing load-head or a pulling harness. A front-to-back load shall be applied to the back of the chair at a point 16 inches above the seat or to the top of the back if the back is lower than 16 inches. The load is applied in a manner so the load is normal to the plane of the back at the backstop position. If the chair uses a spring type tension control, the control shall be adjusted to its loosest position. If the chair uses an air cylinder or other mechanism, which locks the chair inclination in a fixed position, the control shall be adjusted to the far backward position. The test shall begin at the 75-pound load level with the load increased in increments of 25 pounds after 25,000 cycles have been completed at the preceding load level. Testing continues until some type of disabling damage occurs or the chair meets the required acceptance level.

Number of Samples Tested: One (1)

Acceptance Criteria:

Complete 175 lb. load level (125,000 cycles) without suffering disabling damage.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 2 for photograph.

**CYCLIC VERTICAL LOAD TEST ON ONE ARM:**

Date Received: 10/07/04  
Dates Tested: 10/21/04 –10/27/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.4

Test Method:

The entire chair shall be attached to a test platform via the base to prevent the chair from overturning. A vertical downward load shall be applied to the approximate center of one arm rest of a chair at a cyclic rate of 20 cycles per minute. The test is begun at a load level of 100 pounds and increased in increments of 50 pounds after 25,000 cycles have been completed at the preceding load level. Loads are increased every 25,000 cycles until the chair suffers disabling damage or meets the required acceptance level.

Acceptance Criteria:

To complete the 250 lb. load level (100,000 cycles) without suffering disabling damage.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 3 for photograph.

**CYCLIC SIDE THRUST ON ARMS:**

Date Received: 10/07/04  
Dates Tested: 10/28/04 – 11/22/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.5

Test Method:

The entire chair shall be attached to a test platform via the base to prevent the chair from sliding sideways, overturning, or rotating in the direction of the load. The seat shall be restrained in a manner so that the arm is not supported. A cyclic outward side thrust load shall be applied to an arm of the chair at a rate of 20 cycles per minute. The load shall be applied to the approximate midpoint on the length of the arm normal to the vertical plane of the arm. The test shall be begun at the 50 pound load level. Loads are increased in increments of 25 pounds after 25,000 cycles have been completed at each preceding load level. Loads are increased every 25,000 cycles until the chair suffers disabling damage or meets the required acceptance level.

Number of Samples Tested: One (1)

Acceptance Criteria:

Complete 200 lb. level (175,000 cycles) without suffering disabling damage.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 4 for photograph.

**CYCLIC VERTICAL LOAD TO SEAT, BASE AND CASTERS:**

Date Received: 10/07/04  
Dates Tested: 10/22/04 – 11/15/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.6

Test Method:

The entire chair shall be attached to a test platform via indentations that contain the casters and prevent them from rolling or rotating on the spindle. A vertical load shall be applied to the seat at a rate of 20 cycles per minute. Loads are applied 2 inches in front of the longitudinal axis of the spindle with a circular load-head 6 to 8 inches in diameter. The test is started at the 200 pound load level and loads are increased in increments of 100 pounds after each 25,000 cycles have been completed at the preceding load level. The casters shall be turned at right angles to the legs so that all legs are subjected to torsional forces. Testing continues until some type of disabling damage occurs or the chair meets the required acceptance level.

Number of Sample Tested: One (1)

Acceptance Criteria:

Complete 1300 lb. load level (300,000 cycles) without suffering disabling damage.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 5 for photograph.

**CYCLIC FATIGUE TO SWIVEL BEARING:**

Date Received: 10/07/04  
Dates Tested: 11/10/04 – 12/05/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.7

Test Method:

The chair minus the seat structure shall be secured to a platform that is rotated back and forth 360 degrees each cycle. The platform is cycled 10 times per minute. A static load of 200 pounds is placed on the chair so that its center of gravity is located 4 inches in front of the longitudinal axis of the spindle. The load is increased every 25,000 cycles by 25 pounds. The rotating platform secured to the chair base is rotated beneath the seat side of the chair control while the seat side of the control is loaded vertically and secured to prevent it from rotating. The amount of torque required to cause the chair to rotate from a stopped position is measured every 25,000 cycles. The static load is also applied when the torque measurement is taken. The testing is continued until the torque rises above the acceptance level or the chair completes the required load level in the acceptance level.

Number of Samples Tested: One (1)

Acceptance Criteria:

Maximum 150 in.lb. at 300 lb. level (125,000 cycles).

Results:

The submitted sample meets the acceptance level criteria for the test described above. The final torque value was 119 in.lbs. Refer to Figure 6 for photograph.

**CYCLIC PNEUMATIC HEIGHT ADJUSTMENT:**

Date Received: 10/07/04  
Dates Tested: 11/24/04 – 12/23/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.8

Test Method:

The entire chair shall be attached to a test platform via the base to prevent the chair from shifting position during the test. The height adjustment mechanism shall be tested using a four part cycle as follows:

- A. Seat is loaded with 250 pounds.
- B. Load is removed.
- C. Load is reapplied and adjustment mechanism is activated.
- D. Load is removed and adjustment mechanism remains activated until seat ascends to highest position whereupon it is unactivated.

The entire cycle is repeated at a rate of 5 cycles per minute. The test is continued until some part of the adjustment system malfunctions or the chair meets the required acceptance level.

Number of Samples Tested: One (1)

Acceptance Criteria:

To complete 125,000 cycles without sustaining a height adjustment system malfunction.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 7 for photograph.

**FRONT STABILITY:**

Date Received: 10/07/04  
Date Tested: 11/24/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.9

Test Method:

The front stability test shall be conducted as follows:

- A. Chair is placed on a level test platform at lowest height setting.
- B. The base and casters are placed in their most unstable position.
- C. A downward vertical load applied to the front center edge of the seat. The load in pounds required to just lift the rear caster off the test platform is recorded as the measure of front stability.

Number of Samples Tested: One (1)

Acceptance Criteria:

The downward vertical load to lift the rear casters shall not be less than 125lbf.

Results:

The submitted sample meets the acceptance level criteria for the test describe above. The required force to lift was above 325 lbs. Refer to Figure 8 for photograph.

**BACK STABILITY:**

Date Received: 10/07/04  
Date Tested: 11/24/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.10

Test Method:

The back stability test shall be conducted as follows:

- A. Chair is placed on a level test platform at lowest height setting.
- B. The base and casters are placed in their most unstable position.
- C. A 1-inch high obstruction is placed behind the two rearward casters.
- D. The front edge of the seat is loaded with 50 pounds applied in a similar manner as in the front stability test.
- E. A horizontal front-to-back load is applied to the top of the backrest. The force required to overturn the chair multiplied by the height from the floor to the top of the backrest is recorded as the measure of back stability.

Number of Samples Tested: One (1)

Acceptance Criteria:

The minimum force to tip the chair shall not be less than 1,450 in. lbs.

Results:

The submitted sample meets the acceptance level criteria. The measured force to tip was 1764 in. lbs. Refer to Figure 9 for photograph.

**CASTER AND BASE DURABILITY:**

Date Received: 10/07/04  
Dates Tested: 11/15/04 – 12/15/04

Description of Samples:

Part Description: Smart 247 Series Chair

Test Procedure:

GSA FNEW 83-269E, Section 4.11

Test Method:

A chair with casters mounted shall be placed onto the obstacle layout as indicated in Figure 1. A 300pound load shall be applied to the chair seat as indicated in Figure 1 with the chair spindle fully extended. The base shall be attached to a mechanical device which shall exert a horizontal push and pull from 30 inches to 34 inches as illustrated in the figure. The base and casters shall be free to rotate and swivel. The machine shall operate continuously at a rate of 8 to 10 cycles per minute with a maximum speed of 50 feet per minute. Once cycle shall consist of a forward and backward.

Number of Samples Tested: One (1)

Acceptance Criteria:

The sample must complete 36,000 cycles without suffering structural breakage, loss of serviceability, or any failure that could cause personal injury to the occupant.

Results:

The submitted sample meets the acceptance level criteria for the test described above. Refer to Figure 10 for photograph.