

# Central Coast Testing

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## Bariatric Wheelchair Seat Cushion Testing Report - Increased Load to 350 Pound User - Simulated Use Increased to 36 Months

### CUSHION INFORMATION

Manufacturer	Action Products	Manufacture Date	January 2005
Manufacturer's Lot #	O77P2	Serial Number	XC2020
Product Line Name	XACT	Model Name	Classic
Maximum recommended user weight (lbs)	<b>350 lbs</b>		
HCPCS Seat Cushion Code	E2607 Skin Protection and Positioning Cushion		

### CUSHION DIMENSIONS

Width (IN)	19.75 in	Length (in)	20.125 in
Thickness (in)	5.2 in	Weight (lbs)	9.7 lbs

### METHODOLOGY

Loaded Contour testing and structural characteristic assessment were conducted according to the DMERC – Local Medical Review Policy – Final – Wheelchair Seating, Spring 2004<sup>1</sup>. Simulation testing was modified following guidelines under development within the ISO 16840 working group that is developing Wheelchair Seating Standards. In this test a 20-inch wide LCJ indenter was used for loaded contour testing. In addition, the simulated use testing incorporated a 20-inch wide RCLI indenter that was loaded to represent a 350 pound user.

CLI used 40 mm Date(s) of tests September 13-19 2005

### RESULTS- SUMMARIZED

Prior to simulated use testing:

Loaded contour depth test .....  **PASSED**

Overload test for measuring bottoming out .....  **PASSED**

After simulated use testing:

Loaded contour depth test .....  **PASSED**

Overload test for measuring bottoming out .....  **PASSED**

Simulation tests demonstrated a loaded contour depth of at least 40 mm with an overload deflection of at least 5 mm. Following testing simulating 36 months of use at an increased load, simulation tests demonstrated a loaded contour depth of at least 40 mm with an overload deflection of at least 5 mm.

Positioning cushions minimum structural characteristics assessment...  **PASSED**  FAILED  N/A

Report prepared by: Allen Siekman, Testing Supervisor 20 September 2005

## RESULTS- DETAILED

### Positioning Cushion Structural Characteristics

The positioning cushion exhibited the following structural characteristic(s):

- Two lateral pelvic supports
- A medial thigh support
- Two lateral thigh supports

\* If the cushion is coded as E2605, E2606, E2607, and E2608 and has two or more structural characteristics or two or more air compartments, then the cushion is determined to have passed the structural characteristic assessment.

### Cushion Loading Indenters

A 20-inch wide Loaded Contour Jig (LCJ) cushion-loading indenter (CLI) was used to test the cushion. In this test, the LCJ met the specific design features of acceptable CLIs as developed by the ISO working group developing Wheelchair Seating Standard ISO 16840. The results obtained with the LCJ are reported in the *Summary of Results* on page 1.

### Results – Prior to Simulated Use

**Test Date: 09/13/2005**

Testing room conditions: Temperature (F) 70 F Relative Humidity (%) 52%

<b>Loaded Contour Depth with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
Lateral buttons of the CLI contacted the cushion when loaded to 140 N (31 lb)	Yes	Yes	Yes	<b>PASS</b>

<b>Overload Test with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
1) Height of CLI when loaded to 140 N (31 lb) (standard load) (mm)	44.82	44.17	44.07	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	41.49	41.08	41.04	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	3.33	3.09	3.03	---
4) Value in #3 rounded to the nearest 5 mm (mm)	5	5	5	---
5) Overload deflection* (mm) (median of the 3 values in #4)	---	---	---	<b>PASS</b>

\* If the overload deflection is greater than or equal to 5 mm, then the cushion is determined not to have bottomed out during the test.

### Simulated Use Procedure

**Test Date: 09/13/2005**

To simulate cushion use, the test cushion was subjected to cyclic loading in a heated chamber. In this test, the cushion was subjected to 18 months of simulated use, tested for load and overload and then subjected to an additional 18 months of use and retested for load and overload. For each simulated use

test, the test cushion was preconditioned for 30 minutes in a test chamber maintained at 70 ±2 degrees C. The test cushion was then loaded to 1092 ±10 Newtons for 22,000 cycles for each 18 month simulated use cycle. The cushion was loaded with the increased load at a rate of 30 times per minute using the RCLI in the test chamber maintained at 70 ±2 degrees C.

The number of cycles was determined as follows:

For testing simulating 18 months of use (22,000 cycles):

40 pressure reliefs per day x 30 days per month x 18 months x RF ≈ 11,000 cycles  
 where RF = 0.5, the reduction factor for testing at an elevated temperature.

This cushion was tested to a total of **44,000** cycles.

Cushion Preconditioning Time 1000 hrs Test chamber temperature (deg C) 70

Time test started 1030 hrs

**Results – After 18 Months of Simulated Use** **Test Date: 09/14/2005**

Testing room conditions: Temperature (F) 68 F Relative Humidity (%) 52%

Loaded Contour Depth with LCJ indenter	Test #1	Test #2	Test #3	Result
Lateral buttons of the CLI contacted the cushion when loaded to 140 N (31 lb)	Yes	Yes	Yes	<b>PASS</b>

Overload Test with LCJ indenter	Test #1	Test #2	Test #3	Result
1) Height of CLI when loaded to 140 N (31 lb) (standard load) (mm)	41.86	40.37	39.86	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	38.18	37.52	37.10	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	3.68	2.85	2.76	---
4) Value in #3 rounded to the nearest 5 mm (mm)	5	5	5	---
5) Overload deflection* (mm) (median of the 3 values in #4)	---	---	---	<b>PASS</b>

- If the overload deflection is greater than or equal to 5 mm, then the cushion is determined not to have bottomed out during the test.

**Simulated Use to 24 Months**

Cushion Preconditioning Time 0800 hrs Test chamber temperature (deg F) 158

Time test started 0830 hrs Date: 14 September 2005

**Results – After 24 Months of Simulated Use****Test Date: 09/14/2005**Testing room conditions: Temperature (F) 68 F Relative Humidity (%) 52%

<b>Loaded Contour Depth with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
Lateral buttons of the CLI contacted the cushion when loaded to 140 N (31 lb)	Yes	Yes	Yes	<b>PASS</b>

<b>Overload Test with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
1) Height of CLI when loaded to 140 N (31 lb) (standard load) (mm)	41.06	39.52	39.90	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	37.20	36.45	36.82	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	3.86	3.07	3.08	---
4) Value in #3 rounded to the nearest 5 mm (mm)	5	5	5	---
5) Overload deflection* (mm) (median of the 3 values in #4)	---	---	---	<b>PASS</b>

**Simulated Use to 36 Months**Cushion Preconditioning Time 1730 hrs Test chamber temperature (deg F) 158FTime test started 1800 hrs Date: 14 September 2005**Results – After 36 Months of Simulated Use****Test Date: 09/15/2005**Testing room conditions: Temperature (C) 20.0 Relative Humidity (%) 53

<b>Loaded Contour Depth with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
Lateral buttons of the CLI contacted the cushion when loaded to 140 N (31 lb)	Yes	Yes	Yes	<b>PASS</b>

<b>Overload Test with LCJ indenter</b>	Test #1	Test #2	Test #3	Result
1) Height of CLI when loaded to 140 N (31 lb) (standard load) (mm)	39.45	38.25	38.67	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	35.71	35.31	35.64	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	3.74	2.94	3.03	---
4) Value in #3 rounded to the nearest 5 mm (mm)	5	5	5	---
5) Overload deflection* (mm) (median of the 3 values in #4)	---	---	---	<b>PASS</b>

## COMMENTS

This testing protocol subjected the test cushion to loads over twice as great as the standard testing performed for DMERC Cushion Code Review. In addition, the increased duration of the Simulated Use test (36 months) is double the required amount. Testing the cushion in this manner assures that the cushion far exceeds the performance requirements outlined in the standard cushion testing protocol. This may be a significant factor when using the cushion for Bariatric clients.

After simulated use equal to 36 months, the cushion showed no signs of failure or premature wear.

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DMERC – Local Medical Review Policy – Final – Wheelchair Seating, Spring 2004 (n.d.). Retrieved March 18, 2004, from Palmetto GBA Web site: [http://www.palmettogba.com/palmetto/lmrps\\_dmerc.nsf/final/2A0A7017B7FBE65585256D1E0044C7BB?OpenDocument](http://www.palmettogba.com/palmetto/lmrps_dmerc.nsf/final/2A0A7017B7FBE65585256D1E0044C7BB?OpenDocument)