

# Central Coast Testing

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## Wheelchair Seat Cushion Testing Report

### CUSHION INFORMATION

Manufacturer Action Products Manufacture Date January 2005  
Manufacturer's Lot # XD1618 Serial Number 076P5  
Product Line Name XACT Model Name Individual  
Maximum recommended user weight (kg) 113.4 (250 lb)  
HCPCS Seat Cushion Code E2609 Custom Fabricated cushion, any size

### CUSHION DIMENSIONS

Width (cm) 40.6 (16 in) Length (cm) 45.7 (18 in)  
Thickness (cm) 19.0 (7 in) Weight (gm) 3,538

### METHODOLOGY

Simulation testing and structural characteristic assessment were conducted according to the DMERC – Local Medical Review Policy – Final – Wheelchair Seating, Spring 2004<sup>1</sup>.

CLI used 40 mm Date(s) of tests 03-04 February 2005

### RESULTS- SUMMARIZED

Prior to simulated use testing:

Loaded contour depth test .....  PASSED  FAILED  
Overload test for measuring bottoming out .....  PASSED  FAILED

After simulated use testing:

Loaded contour depth test .....  PASSED  FAILED  
Overload test for measuring bottoming out .....  PASSED  FAILED

Simulation tests demonstrated a loaded contour depth of at least 40 mm with an overload deflection of at least 5 mm.

Following testing simulating 18 months of use, 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:  07 February 2005  
Allen Siekman, Testing Supervisor

## 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

The Loaded Contour Jig (LCJ) cushion-loading indenter(s) (CLIs) was used to test the cushion. The LCJ met the specific design features of acceptable CLIs as specified in the SADMERC Wheelchair Cushion Testing Methodology<sup>2</sup>. The results obtained with the LCJ are reported in the *Summary of Results* on page 1.

### Results – Prior to Simulated Use

**Test Date: 02/03/2005**

Testing room conditions: Temperature (C) 21.1 Relative Humidity (%) 46

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	Pass

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)	46.67	45.20	44.24	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	43.75	41.84	41.33	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	2.92	3.36	2.91	---
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)	---	---	---	5 Pass

\* 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: 02/03/2005**

To simulate cushion use, the test cushion was subjected to cyclic loading in a heated chamber. 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 500 ±10 Newtons for 22,000 cycles 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 12 months of use:

40 pressure reliefs per day x 30 days per month x 12 months x RF ≈ 7,500 cycles

For testing simulating 18 months of use:

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 **22,000** cycles.

Cushion Preconditioning Time 1530 hrs Test chamber temperature (deg C) 70

Time test started 1600 hrs

**Results – After Simulated Use**

**Test Date: 02/04/2005**

Testing room conditions: Temperature (C) 20.0 Relative Humidity (%) 43

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	Pass

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)	40.80	40.22	40.35	---
2) Height of CLI when loaded to 187 N (41 lb) (overload) (mm)	38.07	37.45	37.51	---
3) Height at standard load (#1) minus height at overload (#2) (mm)	2.73	2.77	2.84	---
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)	---	---	---	5 Pass

\* 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.

**COMMENTS**

This is a custom cushion – a sample of the optional shapes and contours was submitted for testing. This sample is representative of the cushion construction and materials.

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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)

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<sup>2</sup> ISO/DIS 16840-2, Test methods for determining the physical and mechanical characteristics of devices intended to manage tissue integrity – Part 2 Seat cushions [working draft] (2003-10-30). Retrieved March 18, 2004, from the University of Pittsburgh Wheelchair Standards Information Web site: [http://www.wheelchairstandards.pitt.edu/WCS\\_S/WCS\\_S\\_ISO/WCS\\_S\\_ISO\\_WG11/WCS\\_S\\_ISO\\_WG11\\_pdf/WCS\\_S\\_ISO\\_WG11\\_Stds\\_pdf/ISO\\_16840\\_2\\_DIS.pdf](http://www.wheelchairstandards.pitt.edu/WCS_S/WCS_S_ISO/WCS_S_ISO_WG11/WCS_S_ISO_WG11_pdf/WCS_S_ISO_WG11_Stds_pdf/ISO_16840_2_DIS.pdf)