

REPORT NUMBER: SNCAP-CAL-07-07

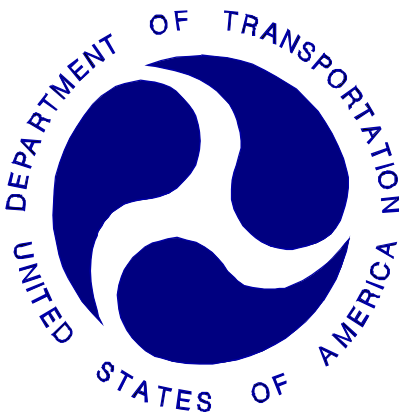
**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT TEST**

GRACO SAFE SEAT INFANT RESTRAINT / CARRIER

NHTSA NUMBER: M70107

CALSPAN TEST NUMBER: 8765-SNCAP-24

CALSPAN
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225



February 2, 2007

FINAL REPORT

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U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
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WASHINGTON, D.C. 20590**

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Approval Date: _____

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15. Supplementary Notes			
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) 55/28 kph 90° Impact Moving Deformable Barrier NCAP Side Impact Test. A Graco Safe Seat Infant Restraint / Carrier rearward facing infant restraint was secured in Position 3 (P3) with the LATCH system. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on February 2, 2007.			
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SECTION 1

PURPOSE AND SUMMARY OF TEST M70107

The purpose of this test was to obtain CRS performance data in a side impact NCAP condition. These data constitute part of the general consumer information collected by the New Car Assessment Program (NCAP).

The 61.08 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) Side Impact NCAP Laboratory Test Procedure.

SUMMARY

The child dummy was instrumented with head and chest triaxial accelerometers. In addition, redundant head z acceleration, upper six axial neck force and moment transducers were utilized.

The right rear (Position 3) child dummy (serial no. 102) was calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC (15 ms) was 62.0, maximum chest deceleration over 3 ms was 22.0 g's.

SECTION 2
DATA SHEET NO. 1
CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS
ATD Type/Serial No.	CRABI/102
Restraint System:	Graco Safe Seat Infant Restraint / Carrier

Number of Data Channels 17
Number of Cameras: 1 Real Time
1 High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Doors remained closed and latched	Doors remained closed and latched
Right Side Doors	Doors remained closed and latched	Doors remained closed and latched
Hatch/Other Door	Doors remained closed and latched	

POST TEST SEAT DATA

LOCATION	SEAT MOVEMENT (mm)	SEAT BACK FAILURE
P1 (Left Front)	0	None
P2 (Right Front)	0	None
P3 (Right Rear)	0	None
P4 (Left Rear)	0	None

VISIBLE DUMMY CONTACT POINTS

	Position #3 CRS
Head Contact:	CRS right side fabric
Upper Torso Contact:	CRS right side fabric
Lower Torso Contact:	CRS right side fabric
Left Knee Contact:	Right Knee
Right Knee Contact:	CRS right side fabric , Right toe hit seat back

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: _Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 2218 kg (A)

AS TESTED WEIGHT OF VEHICLE (2 ATDs + 2 CRABI w/ CRS +CARGO + EQUIPMENT & INSTRUMENTATION):

Left Front	=	<u>679</u>	kg	Left Rear	=	<u>636</u>	kg
Right Front	=	<u>591</u>	kg	Right Rear	=	<u>581</u>	kg
TOTAL FRONT	=	<u>1270.0</u>	kg	TOTAL REAR	=	<u>1217.0</u>	kg
TOTAL TEST WEIGHT	=	<u>2487.0</u>	kg				

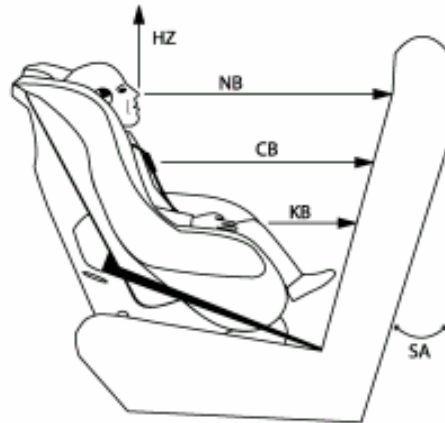
DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107

Dummy Measurements for Rear-facing CRS Passengers



X—Z View

HZ	-	Head to Roof
NB	-	Nose to Front of Back Seat
CB	-	Chest to Front of Back Seat
KB	-	Knee to Front of Back Seat
SA	-	Seat Back Angle

Measurement	Millimeters unless noted
	P3 CRS (102)
SA	20°
HZ	442
NB	486
CB	386
KB – LEFT	176
KB – RIGHT	176

All dimensions in mm (unless noted)
P3 – Right Rear Passenger (CRS #1)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107

HEAD INJURY CRITERIA (HIC)

	HIC15				HIC36			
	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂	HIC	t ₁ (msec)	t ₂ (msec)	Average Acceleration t ₁ to t ₂
Position #3 - Right	62.0	89.0	104.0	28.0	72.7	81.7	110.2	23.0

CLIP SUMMARY*

	CLIP (g's)	t ₁ (msec)	t ₂ (msec)	CSI
	Position #3 - Right	22.0	73.0	76.0

* The maximum chest resultant acceleration is defined as the maximum acceleration which exceeds 0.003 seconds in duration.

DATA SHEET NO. 5

CRS PERFORMANCE DATA

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107

		MAXIMUM VALUE			
DESCRIPTION	Unit	Positive	Time (ms)	Negative	Time (ms)
P3 CRS X	g	6.6	47.0	-7.2	62.4
P3 CRS Y	g	18.9	56.3	-9.3	72.0
P3 CRS Z	g	10.3	72.8	-9.9	59.9
P3 CRS Resultant	g	20.5	56.8	0.0	-17.8

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107

POSITION #3 CRS POST-TEST INSPECTION (Model No. JJ0802060583)

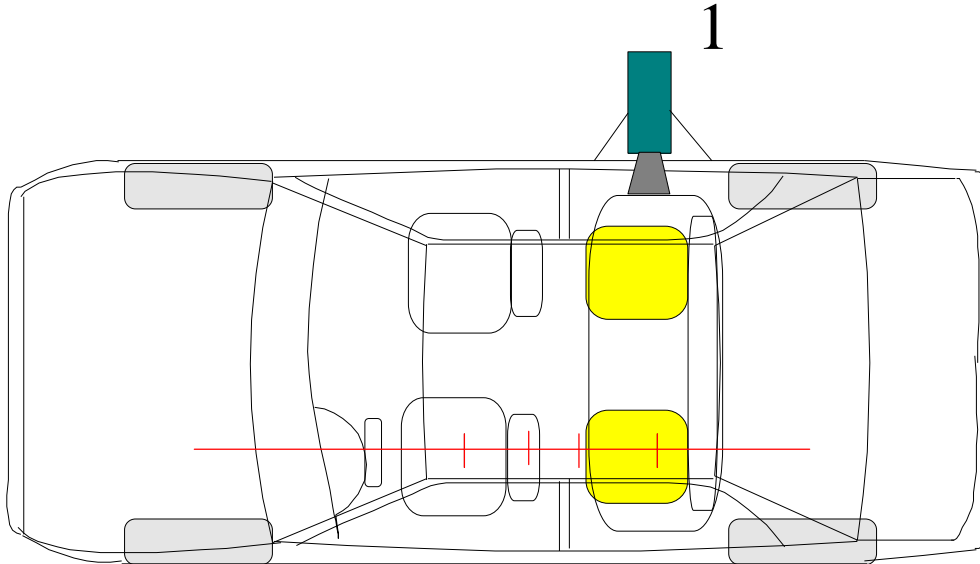
LOCATION	DAMAGE	REMARKS
Upper Tether Strap	N/A	N/A
Upper Tether Buckle	N/A	N/A
Upper Tether Hook	N/A	N/A
Vehicle Upper Tether Anchor	N/A	N/A
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
Five Point Harness Connections	No	None
Cracks on CRS	No	None
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None
Child Dummy	No	None

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Right side CRS lateral view	1802	1563	-1371	-38.5	12.5	1000

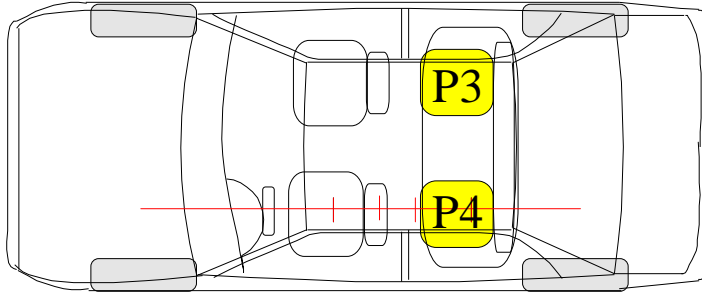
* Reference (from point of impact); all measurements accurate to within ± 6 mm.
 X = + Forward
 Y = + To Right
 Z = + Up

DATA SHEET NO. 7

CRS ANCHIOR DATA

CRS: Graco Safe Seat Infant Restraint / Carrier

NHTSA No. M70107



Description	P3		
	X*	Y*	Z*
Outboard Seatbelt floor anchor	1688	-734	491
Inboard Seatbelt buckle anchor	1696	-247	691
D-Ring Anchor	1544	-689	1427
Inboard LATCH anchor	1675	-282	715
Outboard LATCH anchor	1673	-543	720
Top Tether anchor	1543	-419	862

* Reference (from rear bumper centerline); all measurements accurate to within ± 6 mm.

- X = + Forward
- Y = + To Right
- Z = + Up

SECTION 3

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Figure 3-1: CLOSE-UP VIEW OF POSITION 3CRS BASE LABEL



Figure 3-2: CLOSE-UP VIEW OF POSITION 3CRS CARRIER LABEL



Figure 3-3: PRE-TEST FRONTAL VIEW OF POSITION 3CRS



Figure 3-4: POST-TEST FRONTAL VIEW OF POSITION 3CRS



Figure 3-5: PRE-TEST REAR VIEW OF POSITION 3CRS



Figure 3-6: POST-TEST REAR VIEW OF POSITION 3CRS



Figure 3-7: PRE-TEST LEFT SIDE VIEW OF POSITION 3CRS



Figure 3-8: PRE-TEST LEFT SIDE VIEW OF POSITION 3CRS



Figure 3-9: PRE-TEST RIGHT SIDE VIEW OF POSITION 3CRS



Figure 3-10: POST-TEST RIGHT SIDE VIEW OF POSITION 3CRS



Figure 3-11: PRE-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-12: POST-TEST POSITION 3 LEFT SIDE VIEW



Figure 3-13: PRE-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-14: POST-TEST POSITION 3 RIGHT SIDE VIEW



Figure 3-15: PRE-TEST POSITION 3 REAR VIEW



Figure 3-16: POST-TEST POSITION 3 REAR VIEW

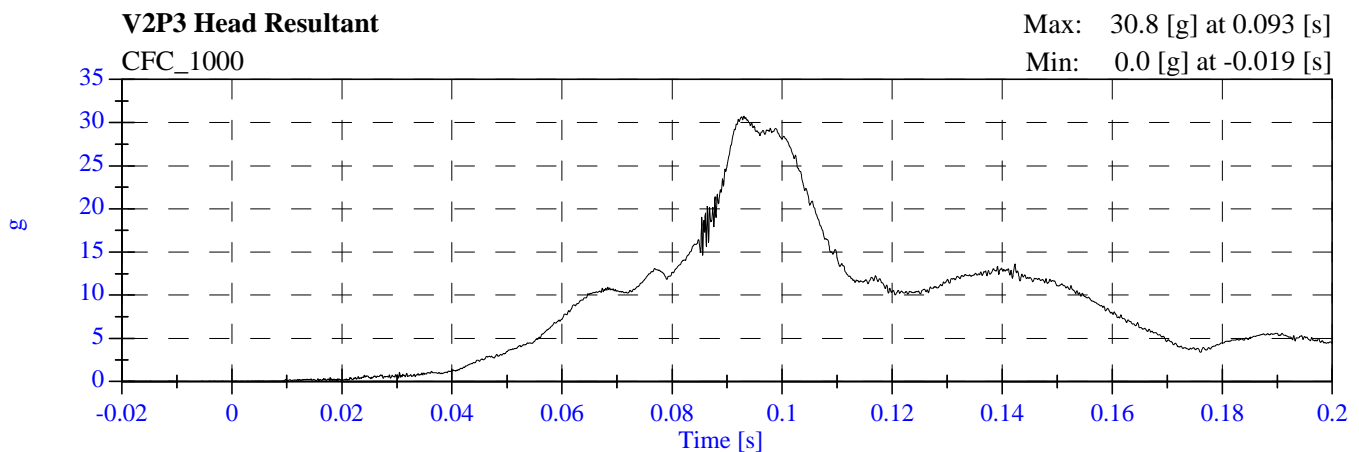
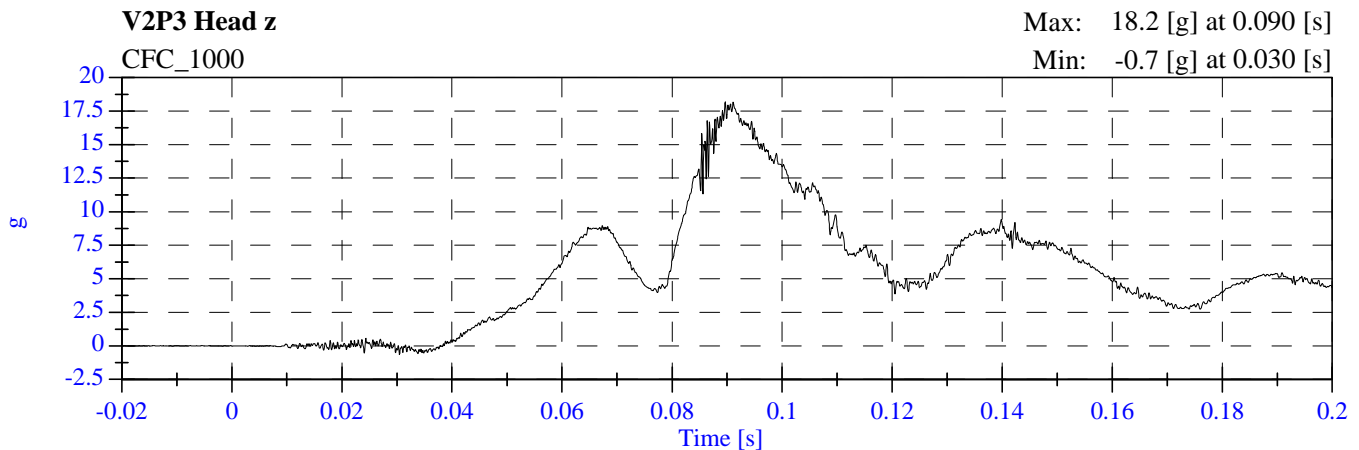
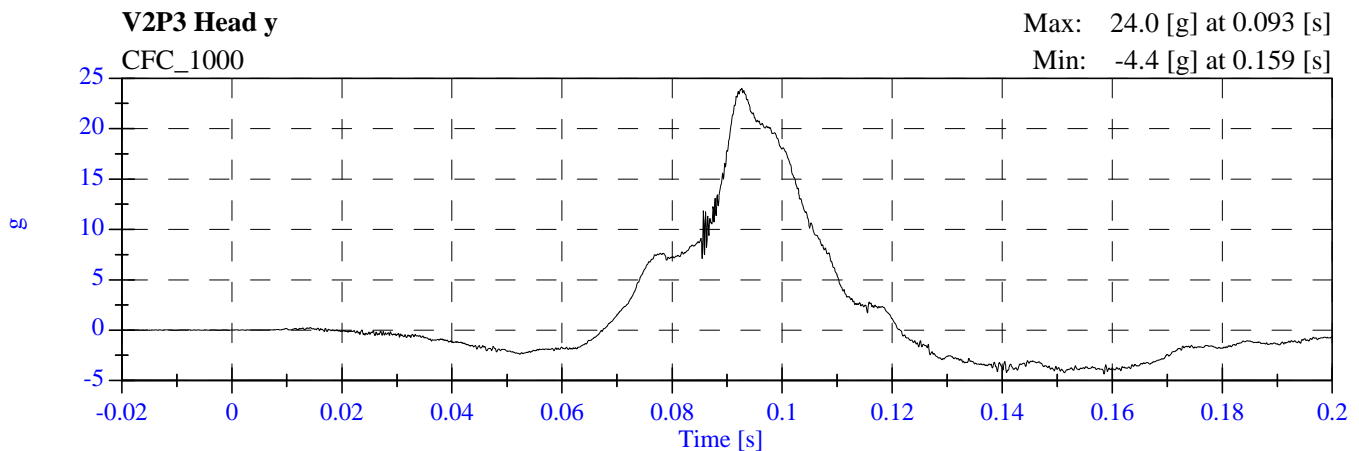
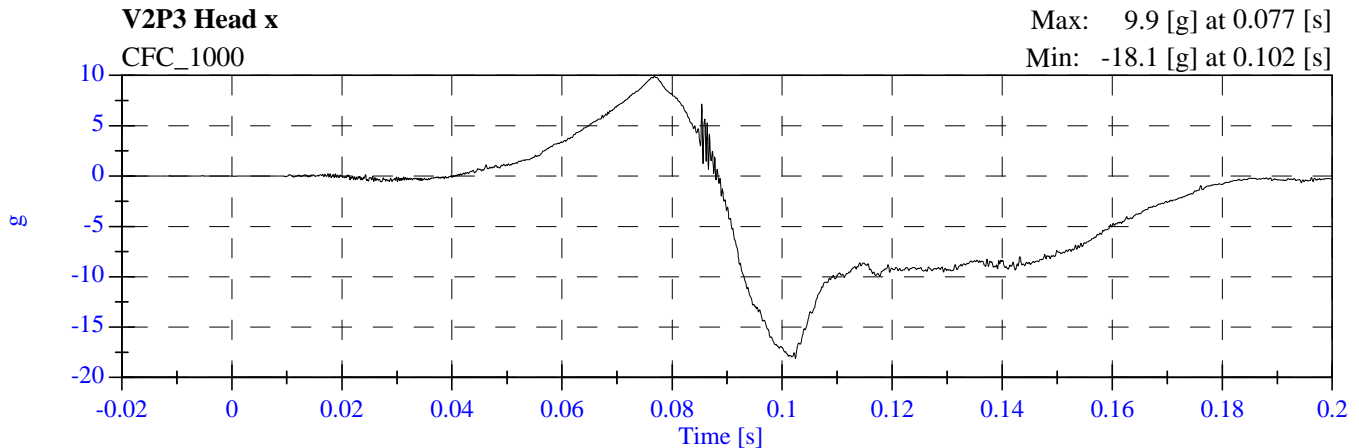
SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

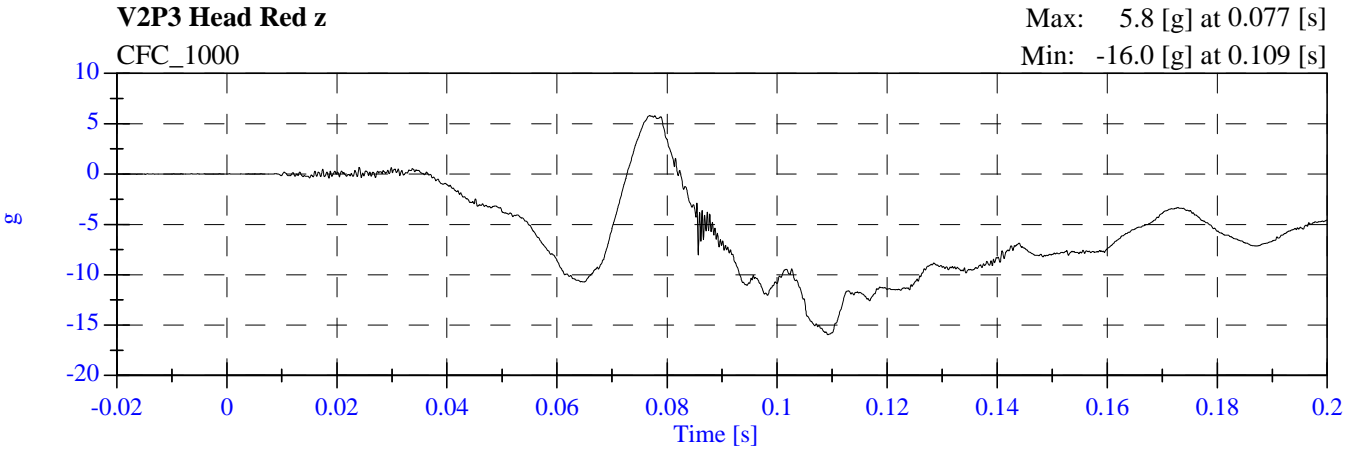
TABLE OF DATA PLOTS

PLOT	PLOT NAME [UNITS, FILTER CLASS]	PAGE
1	P3 Head x [g, CFC_1000]	4-3
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5	P3 Head Red z [g, CFC_1000]	4-4
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8	P3 Chest z [g, CFC_180]	4-5
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10	P3 Child Seat x [g, CFC_60]	4-6
11	P3 Child Seat y [g, CFC_60]	4-6
12	P3 Child Seat z [g, CFC_60]	4-6
13	P3 Child Seat Resultant [g, CFC_60]	4-6

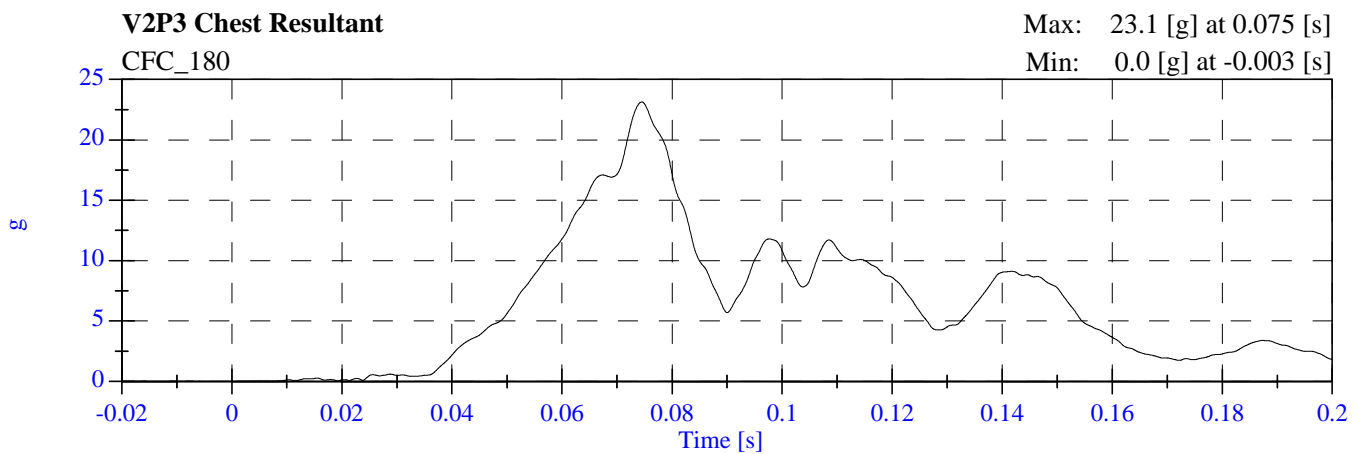
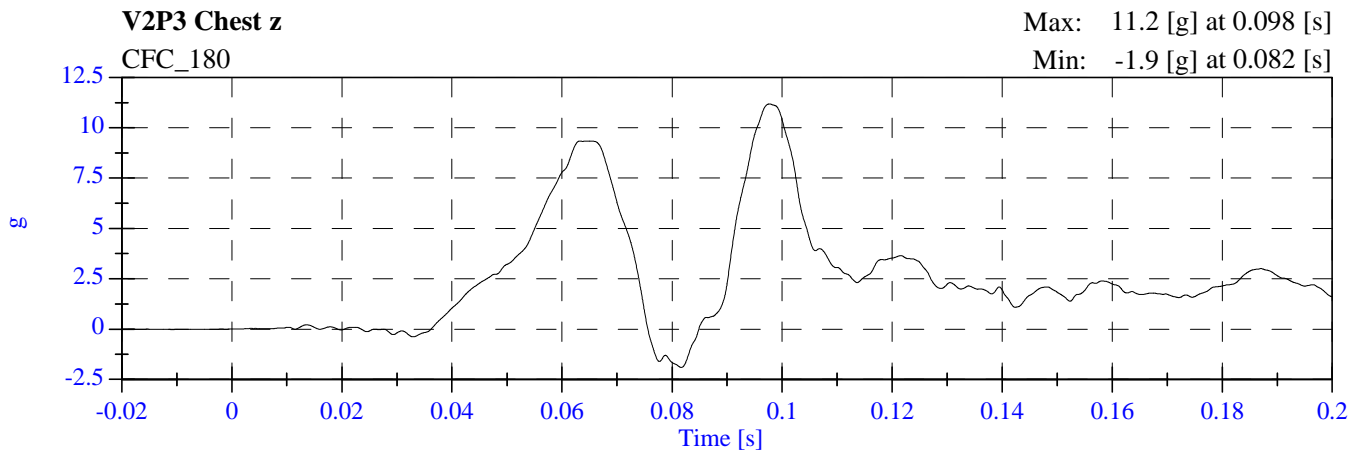
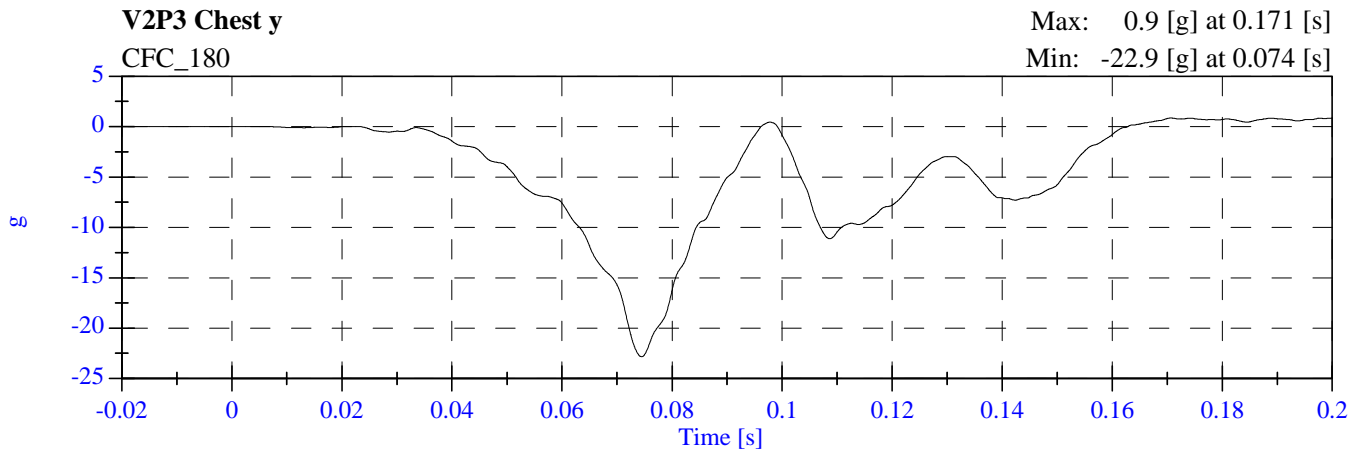
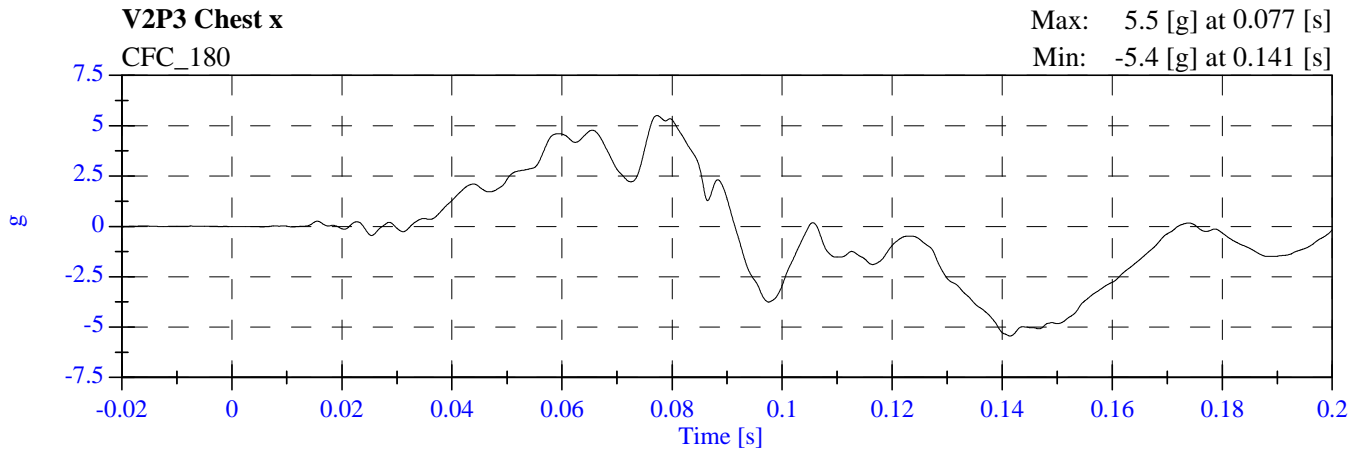
2007 SNCAP Test 7 2007 Saturn Outlook M70107 - February 02, 2007



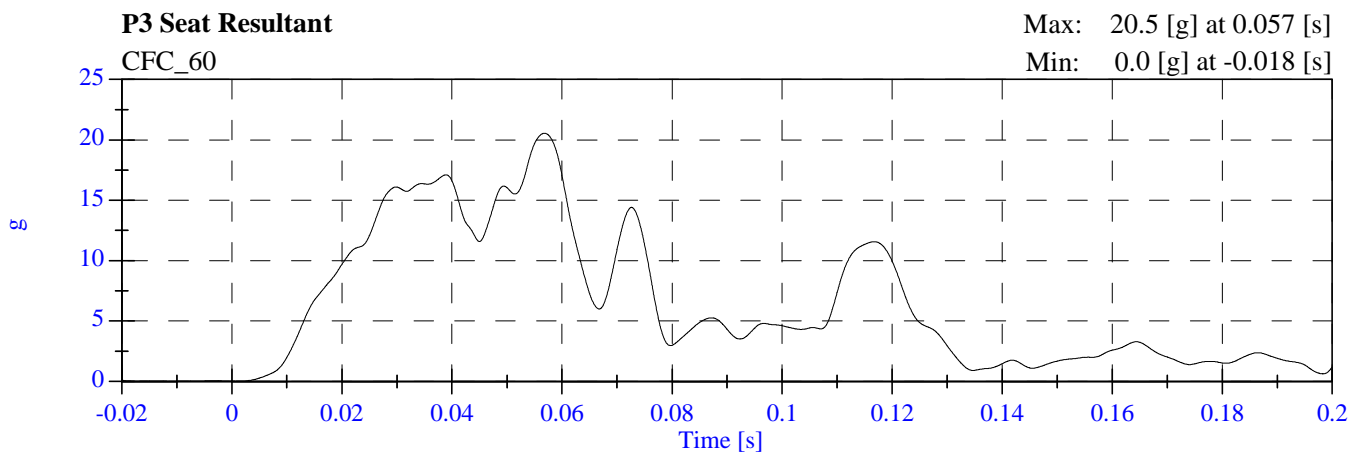
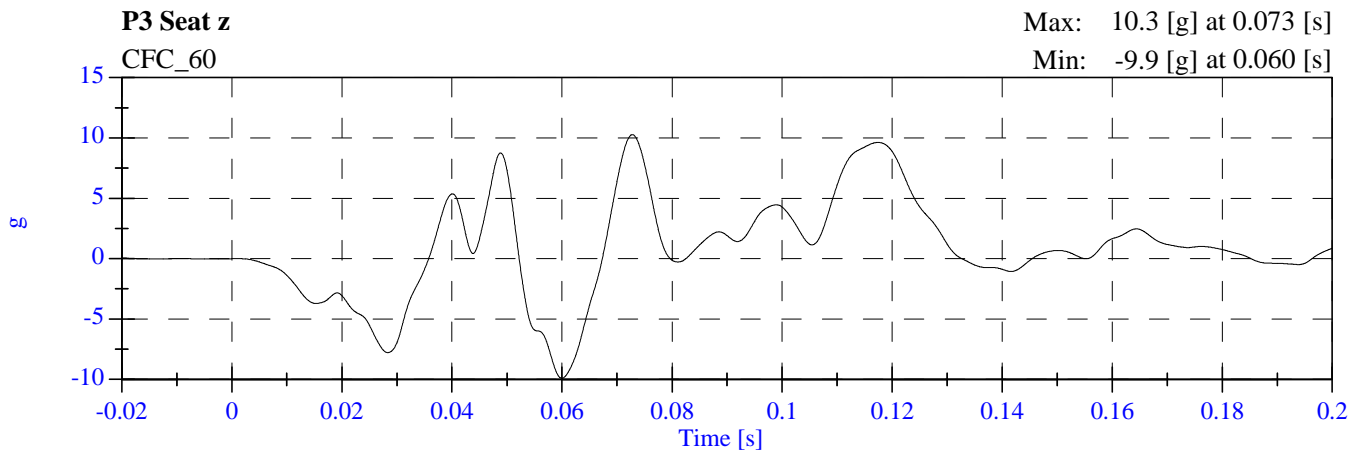
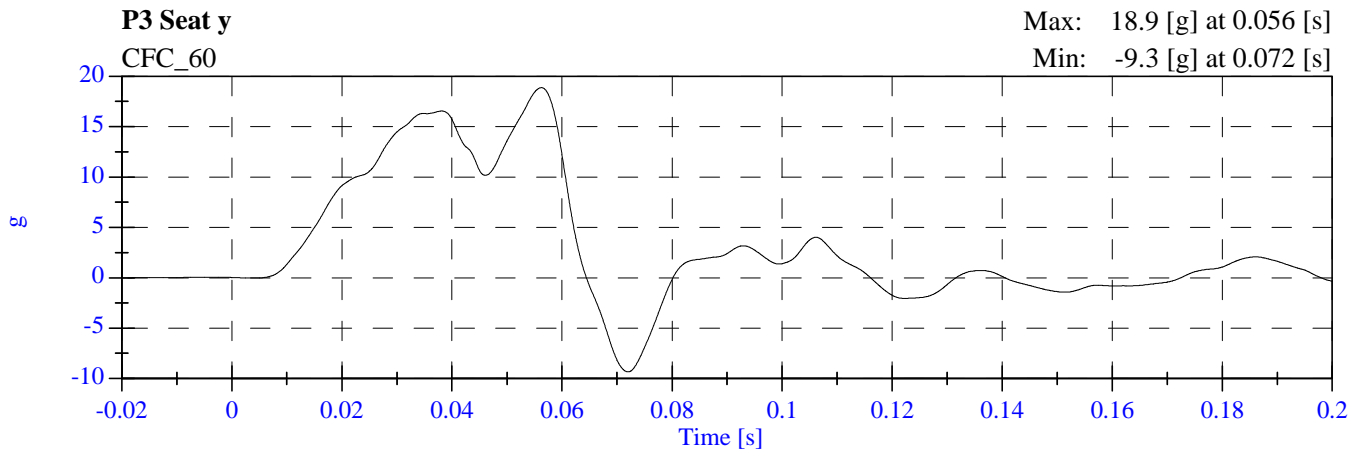
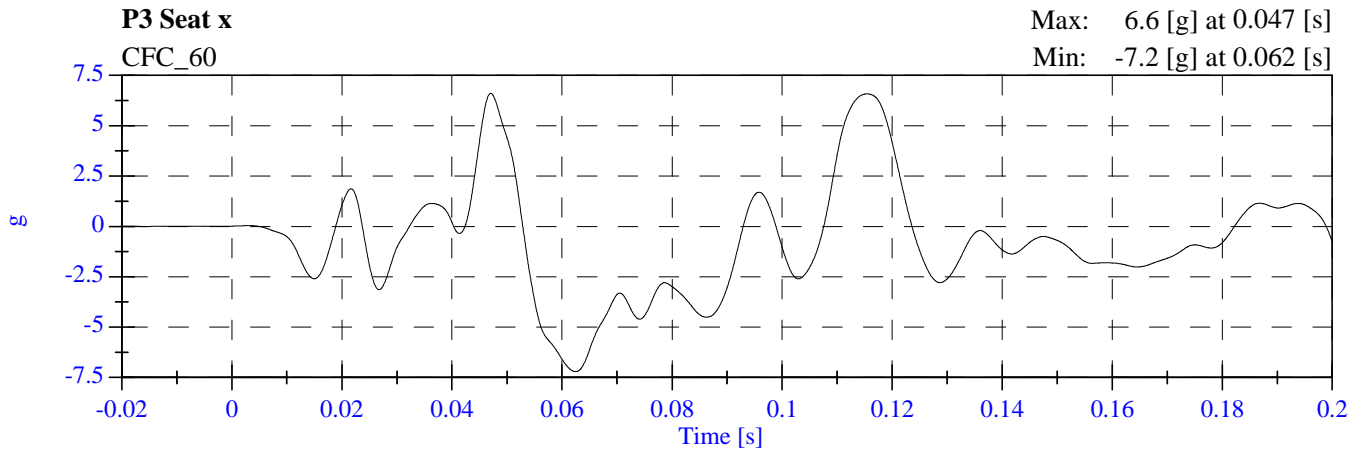
**2007 SNCAP Test 7 2007 Saturn Outlook
M70107 - February 02, 2007**



2007 SNCAP Test 7 2007 Saturn Outlook M70107 - February 02, 2007



2007 SNCAP Test 7 2007 Saturn Outlook M70107 - February 02, 2007



SECTION 5

CHILD DUMMY CALIBRATION INFORMATION

Head Drop Frontal

Part 572R Frontal Head Drop

Calibration Date: 01-15-07

Serial No: 102

Work File: Crabi_102_HD1_01-15

-----TEST RESULTS-----

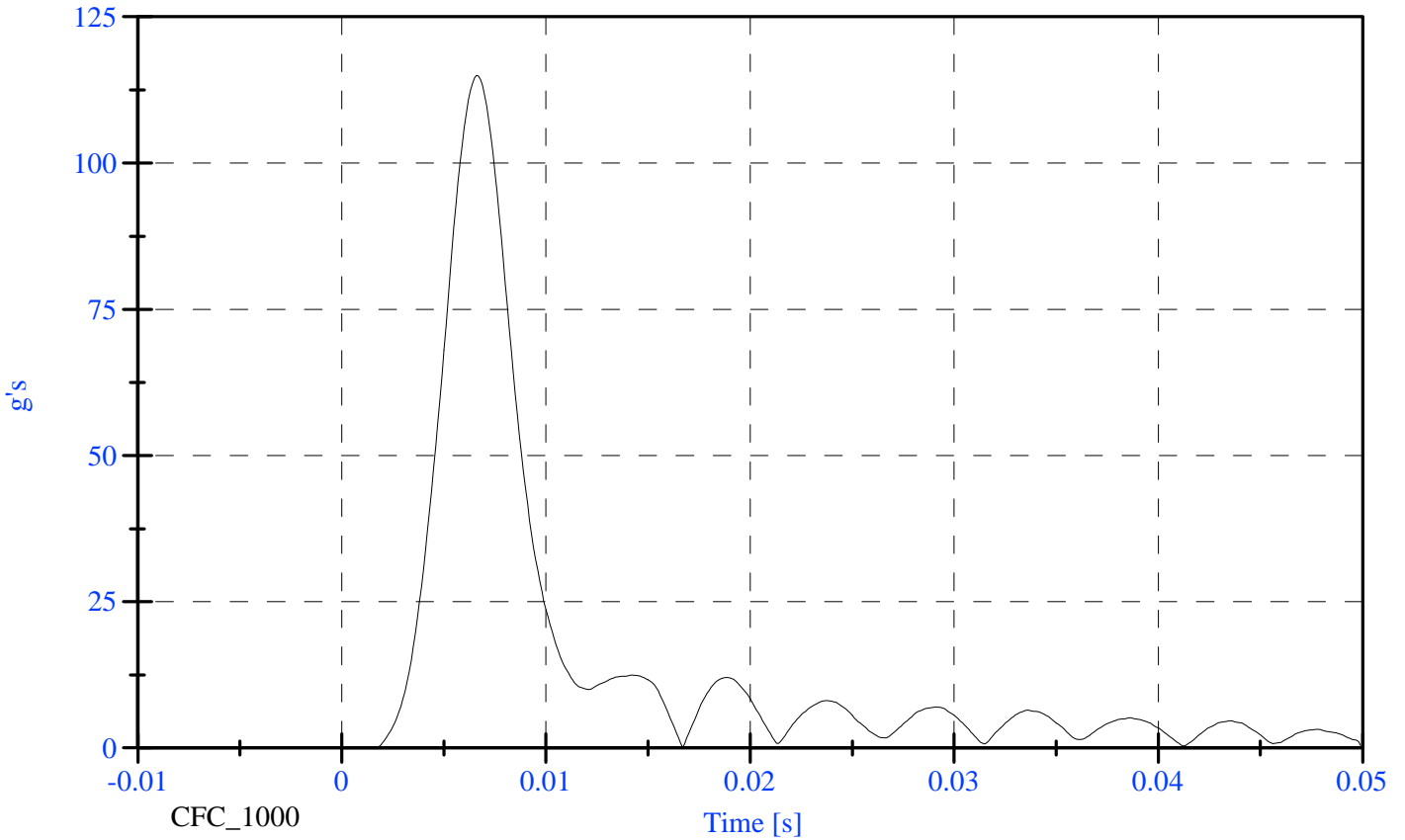
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	18.9-25.6 C	21.1 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	100-120 Gs	114.95 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	13.62 Gs	Passed
Curve PerCent NonModal:	< 17%	10.85 %	Passed

Head Drop Frontal

Head Resultant

Max: 114.9 [g's] at 0.007 [s]

Min: 0.0 [g's] at -0.010 [s]



Head Drop Rear

Part 572R Rear Head Drop

Calibration Date: 01-15-07

Serial No: 102

Work File: Crabi_102_HD_Rear_01-15-07

-----TEST RESULTS-----

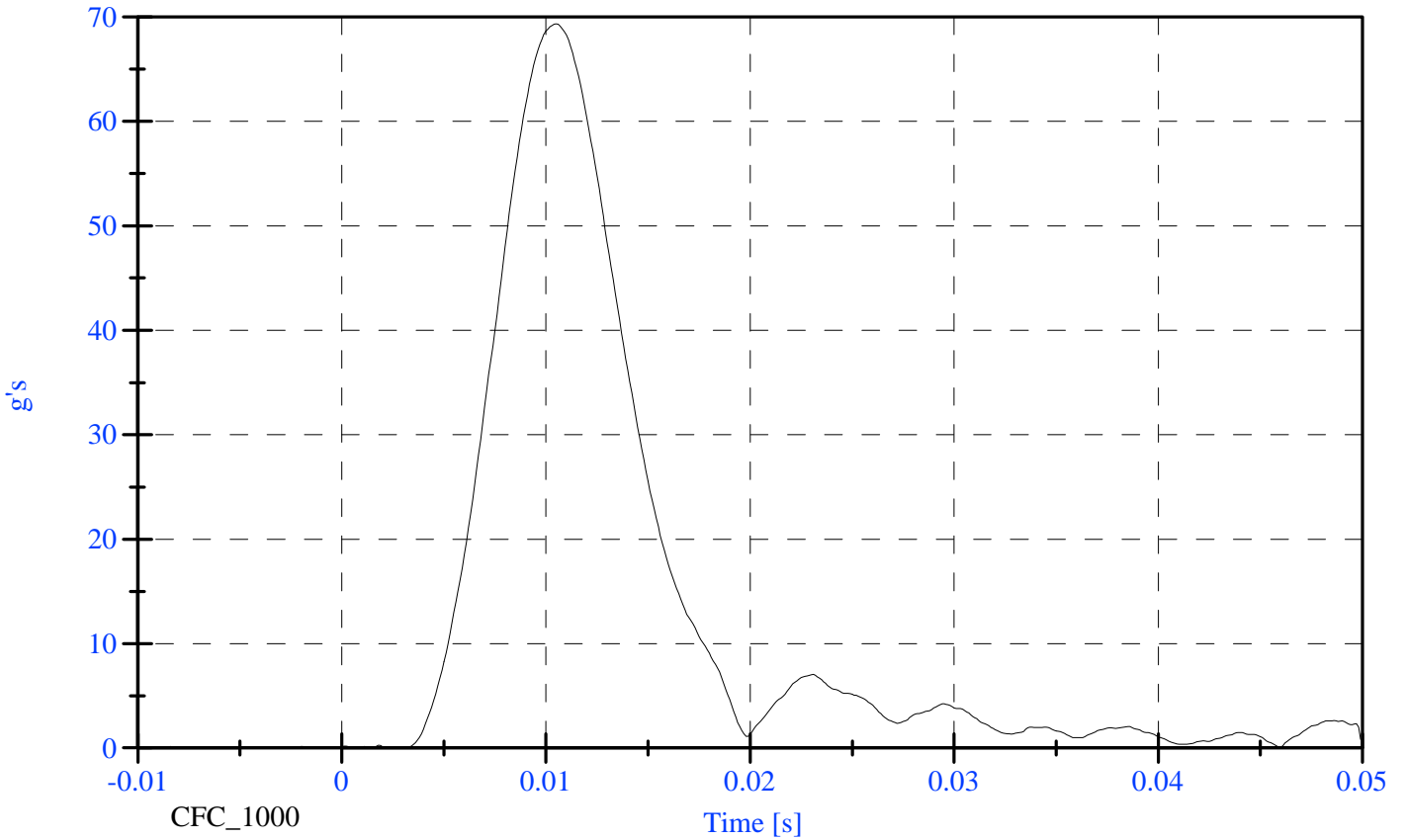
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	55-71 Gs	69.35 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	7.02 Gs	Passed
Curve PerCent NonModal:	< 17%	10.15 %	Passed

Head Drop Rear

Head Resultant

Max: 69.3 [g's] at 0.011 [s]

Min: 0.0 [g's] at 0.001 [s]



Neck Flexion

Part 572R

Neck Flexion Test

Calibration Date:

01-15-07

Serial No:

102

Work File:

Crabi_102_NF1_01-15-

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Test Pendulum Speed:	5.10- 5.30 m/s	5.25 m/s	Passed

-----PENDULUM PULSE-----

Pulse at 10 ms:	1.60- 2.30 m/s	1.79 m/s	Passed
Pulse at 20 ms:	3.40- 4.20 m/s	3.77 m/s	Passed
Pulse at 25 ms:	4.30- 5.20 m/s	4.58 m/s	Passed

-----D PLANE ROTATION-----

Maximum Rotation:	75.0-86.0 Deg	85.14 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	36.00- 45.00 N-m	42.67 N-m	Passed
Occipital Moment Decay:	60.0-80.0 ms	74.00 ms	Passed

FM-ATDLAB-572.143E-0005-R00

Neck Extension

Part 572R Neck Extension Test Calibration Date: 01-15-07
Serial No: 102 Work File: Crabi_102_NE_01-15-0

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	69.0-72.0 F	70.00 F	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Test Pendulum Speed:	7.90- 8.50 ft/s	7.95 ft/s	Passed

-----PENDULUM PULSE-----

Pulse at 6 ms:	2.60- 3.90 ft/s	2.80 ft/s	Passed
Pulse at 10 ms:	4.90- 6.90 ft/s	5.28 ft/s	Passed
Pulse at 14 ms:	7.20- 9.50 ft/s	8.02 ft/s	Passed

-----D PLANE ROTATION-----

Maximum Rotation:	80.0-92.0 Deg	80.60 Deg	Passed
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-----MOMENT ABOUT THE OCCIPITAL CONDYLE-----

Max Occipital Moment:	-23.00--12.00 N-m	-12.85 N-m	Passed
Occipital Moment Decay:	76.0-90.0 ms	86.10 ms	Passed

FM-ATDLAB-572.143E-0005-R00

Thorax Impact

Part 572R Thorax Impact

Calibration Date: 01-16-07

Serial No: 102

Work File: Crabi_102_T2_01-16-07

-----TEST RESULTS-----

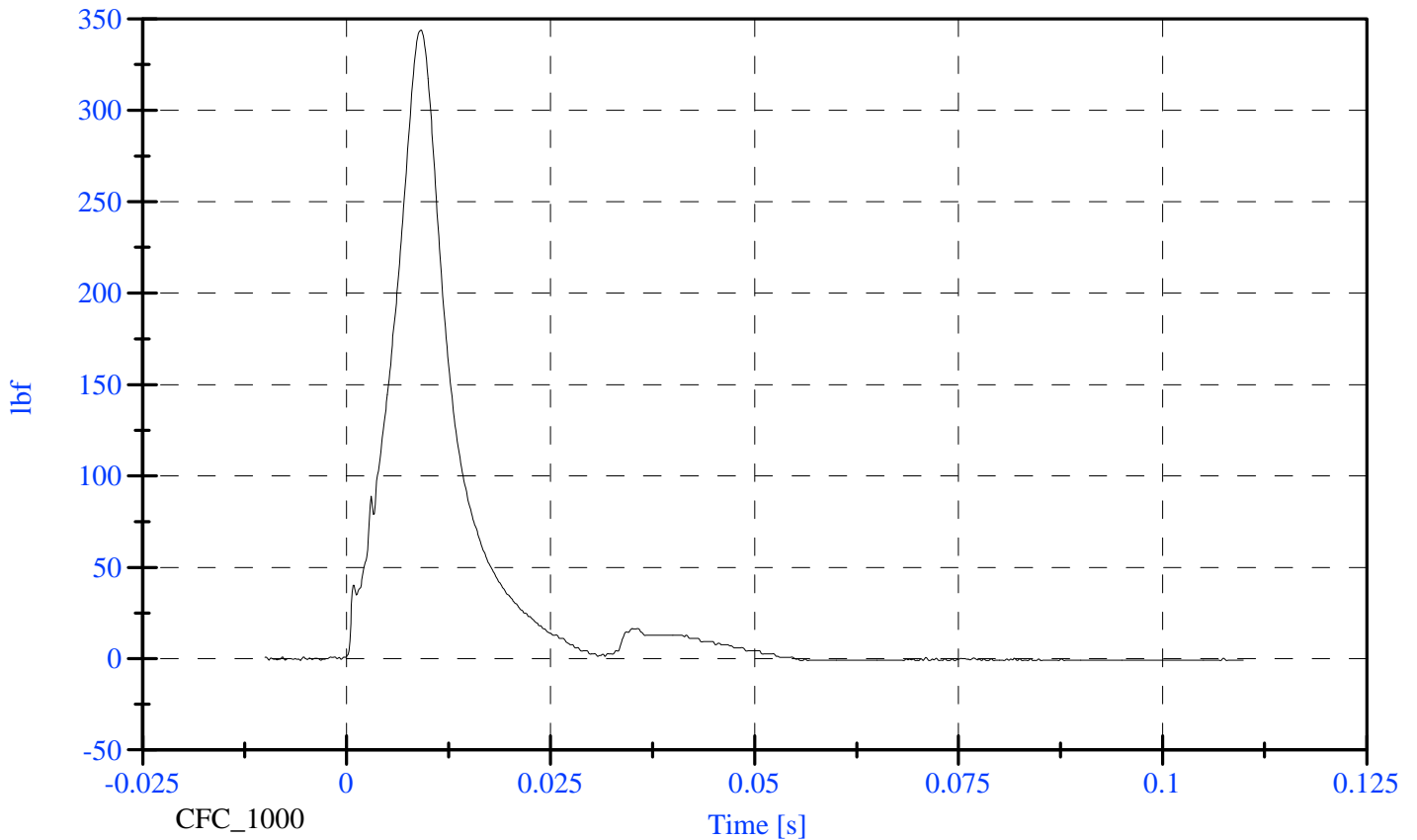
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	69.0-72.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Pendulum Velocity:	16.20-16.80 ft/s	16.42 ft/s	Passed
Maximum Res. Force:	340.70- 404.10 lbf	344.01 lbf	Passed

Thorax Impact

Probe Force vs. Time

Max: 344.0 [lbf] at 0.009 [s]

Min: -1.1 [lbf] at 0.082 [s]



SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572R INSTRUMENTATION

	POSITION #3 (RIGHT) SERIAL NO.: 102		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-P51288	ENDEVCO	11-Jan-07
HEAD AY	AC-P51295	ENDEVCO	09-Jan-07
HEAD AZ	AC-P51282	ENDEVCO	09-Jan-07
HEAD RAZ	AC-P51298	ENDEVCO	09-Jan-07
UPPER NECK FX	AC-B02A18-N21	ENTRAN	09-Jan-07
UPPER NECK FY	AC-99H30-Z14	ENTRAN	09-Jan-07
UPPER NECK FZ	AC-00L13-F39	ENTRAN	09-Jan-07
UPPER NECK MX	LC-231Fx	DENTON	11-Jan-07
UPPER NECK MY	LC-231Fy	DENTON	11-Jan-07
UPPER NECK MZ	LC-231Fz	DENTON	11-Jan-07
CHEST AX	LC-231Mx	DENTON	11-Jan-07
CHEST AY	LC-231My	DENTON	11-Jan-07
CHEST AZ	LC-231Mz	DENTON	11-Jan-07

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

VEHICLE AND CRS INSTRUMENTS			
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS (X)	AC-P16625	ENDEVCO	15-Jan-07
P3 CRS (Y)	AC-J32838	ENDEVCO	15-Jan-07
P3 CRS (Z)	AC-P17237	ENDEVCO	15-Jan-07

REMARKS: None