REPORT NUMBER: CAL-08-03

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

GRACO SNUGRIDE REAR-FACING
COMBI CONNECTION REAR-FACING

NHTSA NUMBER: M80104

CALSPAN TEST NUMBER: 8806-NCAP/CRS-15

CALSPAN
TRANSPORTATION SCIENCES CENTER
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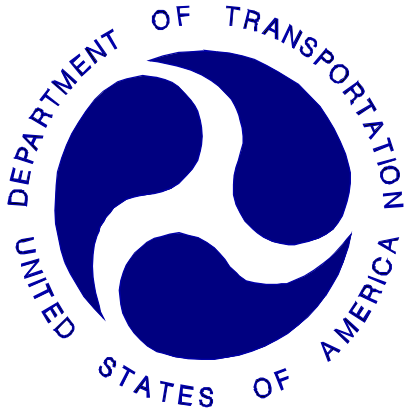

September 25, 2007

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Rulemaking
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave SE, Room W43-410
Washington, DC 20590

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Transportation Sciences Center

Approval Date: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. NCAP-CAL-08-03	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of Graco Snugride Rear-Facing and Combi Connection Rear-Facing NHTSA No.: M80104		5. Report Date September 25, 2007	
		6. Performing Organization Code CAL	
7. Author(s) James Czarnecki, Project Engineer David Travale, Program Manager		8. Performing Organization Report No. 8806-NCAP/CRS-15	
9. Performing Organization Name and Address Calspan Corporation Transportation Sciences Center P.O. Box 400 Buffalo, New York 14225		10. Work Unit No.	
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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards Mail Code: NVS-111 400 Seventh, SW, Room 5311 Washington, D.C. 20590		13. Type of Report and Period Covered Final Report, September and October 2007	
		14. Sponsoring Agency Code NVS-111	
15. Supplementary Notes			
16. Abstract This CRS test was performed in conjunction with a New Car Assessment Program (NCAP) load cell barrier test. An Graco Snugride rearward facing infant restraint was secured in Position 3 (P3) with the LATCH system. An Combi Connection rearward facing infant restraint was secured in Position 4 (P4) with the LATCH system. This test was conducted at the Calspan Corporation Crash Test Facility in Buffalo, New York, on September 25, 2007.			
17. Key Words New Car Assessment Program (NCAP)		18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, DC 20590	
19. Security Classification of Report UNCLASSIFIED	20. Security Classification of Page UNCLASSIFIED	21. No. of Pages 56	22. Price

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SECTION 1

PURPOSE AND SUMMARY OF TEST M80104

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

The 56.17 kph NCAP frontal impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

Both child dummies were 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) and left rear (Position 4) child dummy (serial no. 103) were calibrated previous to this test. Child dummy certification information is found in section 5.

The right rear child dummy's HIC (15 ms) was 696.8; maximum chest deceleration over 3 ms was 56.2 g's. The left rear child dummy's HIC (15 ms) was 547.0; maximum chest deceleration over 3 ms was 48.7 g's.

SECTION 2

DATA SHEET NO. 1

CRASH TEST SUMMARY

TEST DUMMY INFORMATION:

DESCRIPTION	Position #3 CRS	Position #4 CRS
ATD Type/Serial No.	CRABI/102	CRABI /103
Restraint System:	Graco Snugride Rear-Facing	Combi Connection Rear-Facing

Number of Data Channels 76

Number of Cameras: 1 Real Time

2 High Speed

POST TEST DOOR OPENING

DESCRIPTION	FRONT	REAR
Left Side Doors	Locked, Closed and Operable without tools	Closed and Operable without tools
Right Side Doors	Locked, Closed and Operable without tools	Closed and Operable without tools
Hatch/Other Door	Closed and Operable without tools	

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	Position #4 CRS
Head Contact:	Back of head to CRS, Face to vehicle seat back	Back of head to CRS
Upper Torso Contact:	None	None
Lower Torso Contact:	None	None
Left Knee Contact:	None	None
Right Knee Contact:	None	None

DATA SHEET NO. 2

CRS PARAMETER DATA

CRS: Graco Snugride and Combi Connection NHTSA No. M80104

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Delivered Weight of Vehicle with Maximum Fluids = 1867 kg (A)

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

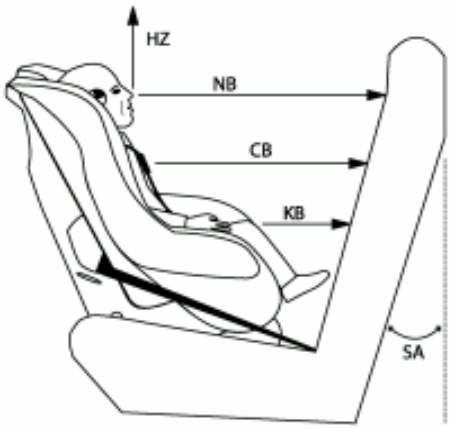
Left Front	=	575	kg	Left Rear	=	475	kg
Right Front	=	595	kg	Right Rear	=	438	kg
TOTAL FRONT	=	1170.0	kg	TOTAL REAR	=	913.0	kg
TOTAL TEST WEIGHT	=	2083.0	kg				

DATA SHEET NO. 3

CHILD DUMMY POSITIONING IN VEHICLE

CRS: Graco Snugride and Combi Connection NHTSA No. M80104

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)	P4 CRS (103)
SA	36.0º	20.0º
HZ	462	489
NB	525	514
CB	439	393
KB – LEFT	205	163
KB – RIGHT	205	160

All dimensions in mm (unless noted)
P3 – Right Rear Passenger (CRS #1)
P4 – Left Rear Passenger (CRS #2)

DATA SHEET 4

CHILD DUMMY INJURY CRITERIA VALUES (CONTINUED)

CRS: Graco Snugride and Combi Connection NHTSA No. M80104

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	696.8	65.8	80.8	73.6	1064.0	54.5	90.5	61.4
Position #4 - Left	547.0	66.0	81.0	66.8	947.3	57.5	93.5	93.5

	CLIP SUMMARY*			
	CLIP (g's)	t_1 (msec)	t_2 (msec)	CSI
Position #3 - Right	56.2	57.2	60.2	766.2
Position #4 - Left	48.7	74.3	77.3	654.3

* 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 Snugride and Combi Connection NHTSA No. M80104

		MAXIMUM VALUE			
DESCRIPTION	**Unit**	**Positive**	**Time (ms)**	**Negative**	**Time (ms)**
P3 CRS X	**g**	7.1	158.7	-61.3	52.9
P3 CRS Y	**g**	18.6	60.9	-16.6	112.2
P3 CRS Z	**g**	16.6	61.5	-24.8	52.8
P3 CRS Resultant	**g**	66.3	52.9	0.0	-35.0
P4 CRS X	**g**	12.0	202.4	-43.4	52.4
P4 CRS Y	**g**	13.1	53.5	-14.3	58.5
P4 CRS Z	**g**	19.5	231.0	-34.9	50.2
P4 CRS Resultant	**g**	52.9	50.6	0.1	-1.0

DATA SHEET NO. 5

CRS PERFORMANCE DATA (CONTINUED)

CRS: Graco Snugride and Combi Connection NHTSA No. M80104

POSITION #3 CRS POST-TEST INSPECTION (Model No. 8465DEN3)

LOCATION	DAMAGE	REMARKS
Upper Tether Strap	None	N/A
Upper Tether Buckle	None	N/A
Upper Tether Hook	None	N/A
Vehicle Upper Tether Anchor	None	N/A
Lower Anchor Strap	None	N/A
Lower Anchor Buckle	None	N/A
Lower Anchor Hooks	None	N/A
Vehicle Lower CRS Anchors	None	N/A
Five Point Harness Connections	None	N/A
Cracks on CRS	None	N/A
Fabric Tears on CRS	None	N/A
Vehicle Seat Structure	None	N/A
Vehicle Seat Fabric Tears	None	N/A
Child Dummy	None	N/A

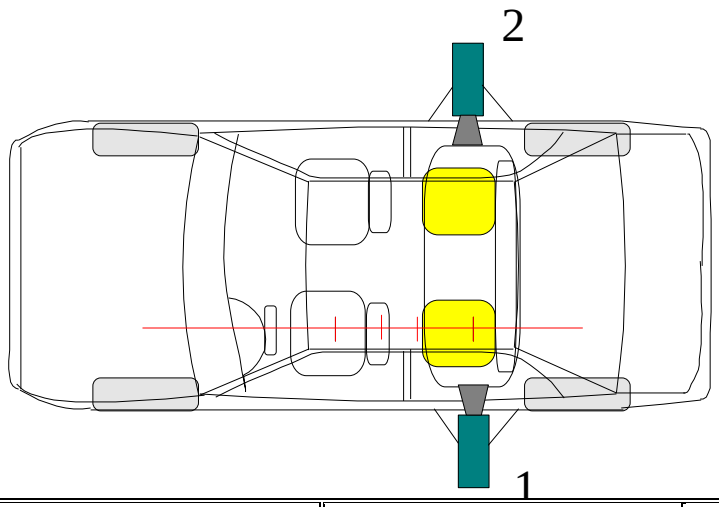
POSITION #4 CRS POST-TEST INSPECTION (Model No. XCC-022686)

LOCATION	DAMAGE	REMARKS
Upper Tether Strap	None	N/A
Upper Tether Buckle	None	N/A
Upper Tether Hook	None	N/A
Vehicle Upper Tether Anchor	None	N/A
Lower Anchor Strap	Yes	Latch belt caused scratches to plastic guide on CRS base
Lower Anchor Buckle	None	N/A
Lower Anchor Hooks	None	N/A
Vehicle Lower CRS Anchors	None	N/A
Five Point Harness Connections	None	N/A
Cracks on CRS	None	N/A
Fabric Tears on CRS	None	N/A
Vehicle Seat Structure	None	N/A
Vehicle Seat Fabric Tears	None	N/A
Child Dummy	None	N/A

DATA SHEET NO. 6

CRS CAMERA DATA

CRS: Graco Snugride and Combi Connection NHTSA No. M80104



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left side CRS lateral view	3283	2551	2351	31.3	28	1000
2	Right side CRS lateral view	3021	2558	2190	24.1	28	1000

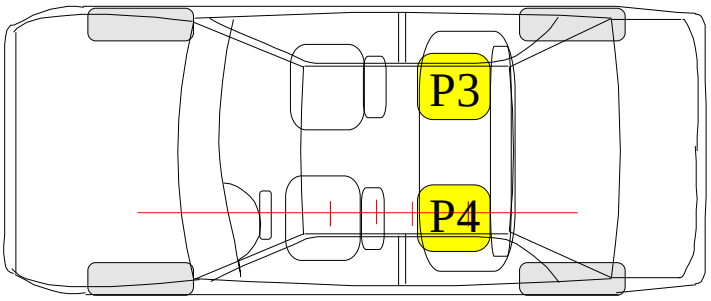
* Reference (from point of impact); all measurements accurate to within ±6 mm.

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

DATA SHEET NO. 7

CRS ANCHIOR DATA

CRS: Graco Snugride and Combi Connection NHTSA No. M80104



Description	P3			P4		
	X*	Y*	Z*	X	Y	Z
Outboard Seatbelt floor anchor	1349	619	-570.1	1349	-625.5	-568.1
Inboard Seatbelt buckle anchor	1335	178.2	-628.3	1299	-167	-615.9
D-Ring Anchor	1129	621.8	-1367	1123	-625.6	-1361
Inboard LATCH anchor	1288	508.8	-673.8	1281	-486.8	-676.3
Outboard LATCH anchor	1287	245.8	-675.7	1280	-216.3	-676.3

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

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

SECTION 3

PHOTOGRAPHS

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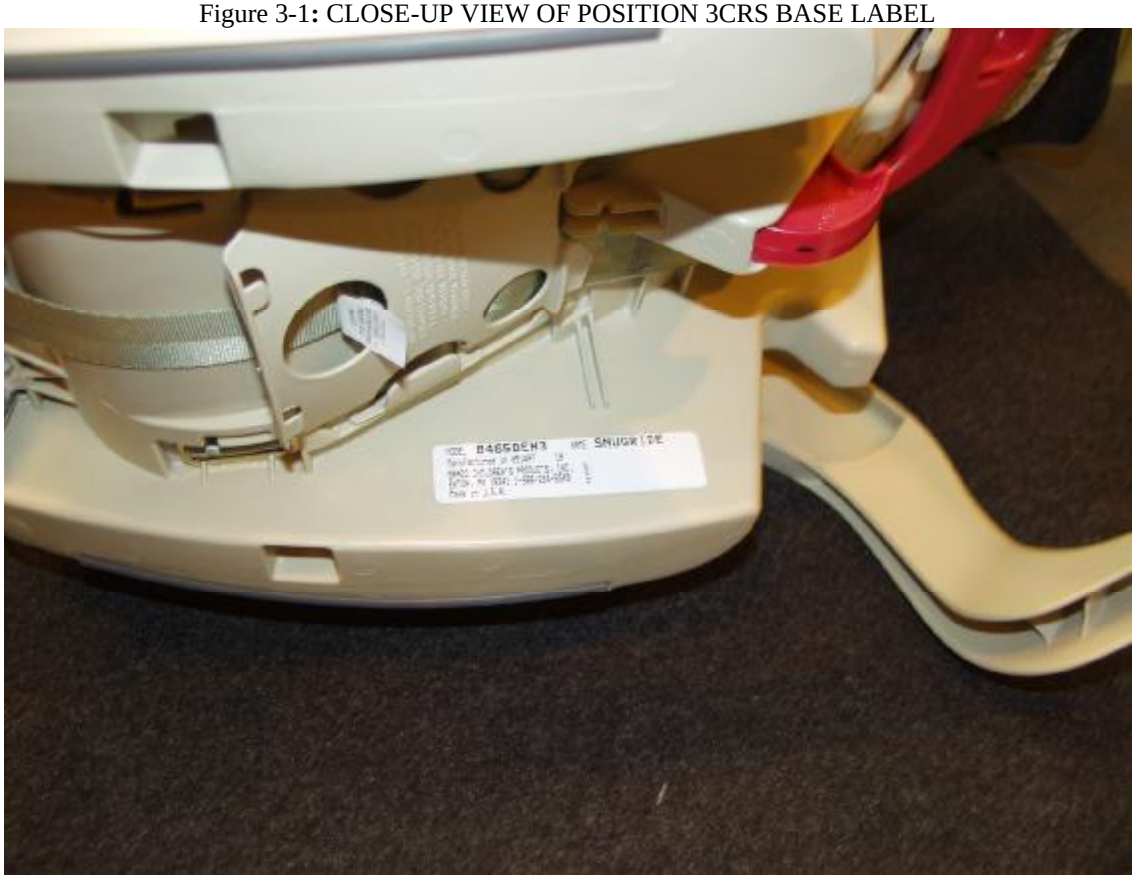


Figure 3-2: CLOSE-UP VIEW OF POSITION 3CRS CARRIER LABEL

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

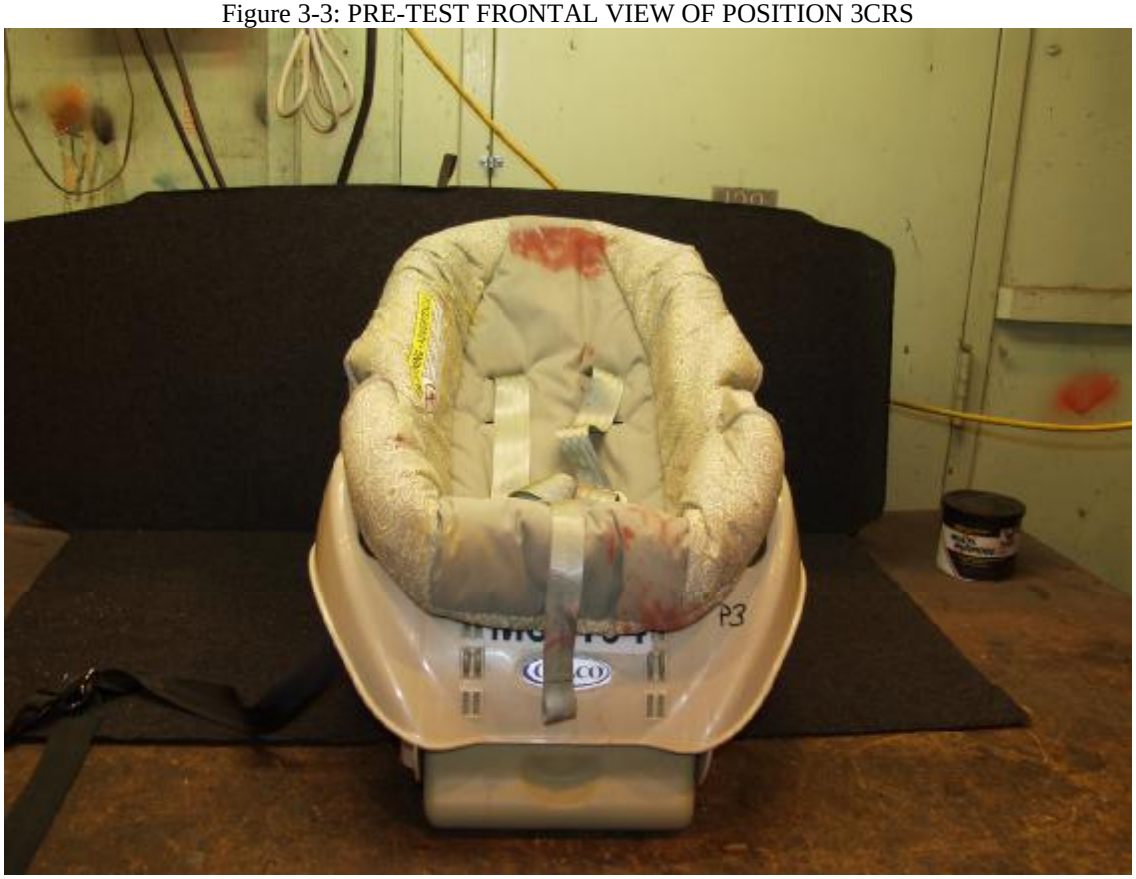


Figure 3-4: POST-TEST FRONTAL VIEW OF POSITION 3CRS

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

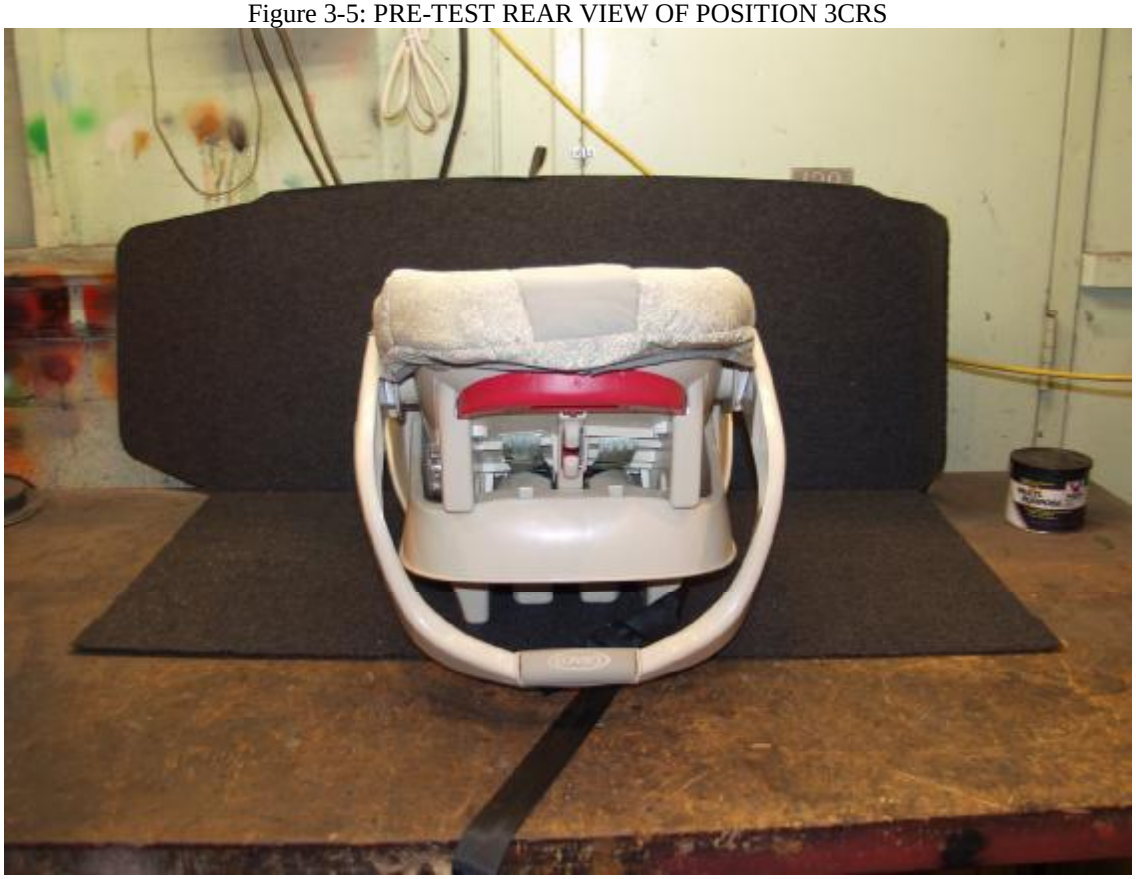


Figure 3-6: POST-TEST REAR VIEW OF POSITION 3CRS

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

Figure 3-8: POST-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: CLOSE-UP VIEW OF POSITION 4CRS BASE LABEL


Figure 3-12: CLOSE-UP VIEW OF POSITION 4CRS CARRIER LABEL

Figure 3-13**:** PRE-TEST FRONTAL VIEW OF POSITION 4CRS


Figure 3-14: POST-TEST FRONTAL VIEW OF POSITION 4CRS

Figure 3-15: PRE-TEST REAR VIEW OF POSITION 4CRS

Figure 3-16: POST-TEST REAR VIEW OF POSITION 4CRS

Figure 3-17: PRE-TEST LEFT SIDE VIEW OF POSITION 4CRS

Figure 3-18: POST-TEST LEFT SIDE VIEW OF POSITION 4CRS

Figure 3-19: PRE-TEST RIGHT SIDE VIEW OF POSITION 4CRS

Figure 3-20: POST-TEST RIGHT SIDE VIEW OF POSITION 4CRS

Figure 3-21: PRE-TEST POSITION 3 LEFT SIDE VIEW


Figure 3-22: POST-TEST POSITION 3 LEFT SIDE VIEW

Figure 3-23: PRE-TEST POSITION 3 RIGHT SIDE VIEW

Figure 3-24: POST-TEST POSITION 3 RIGHT SIDE VIEW

Figure 3-25**:** PRE-TEST POSITION 3 REAR VIEW

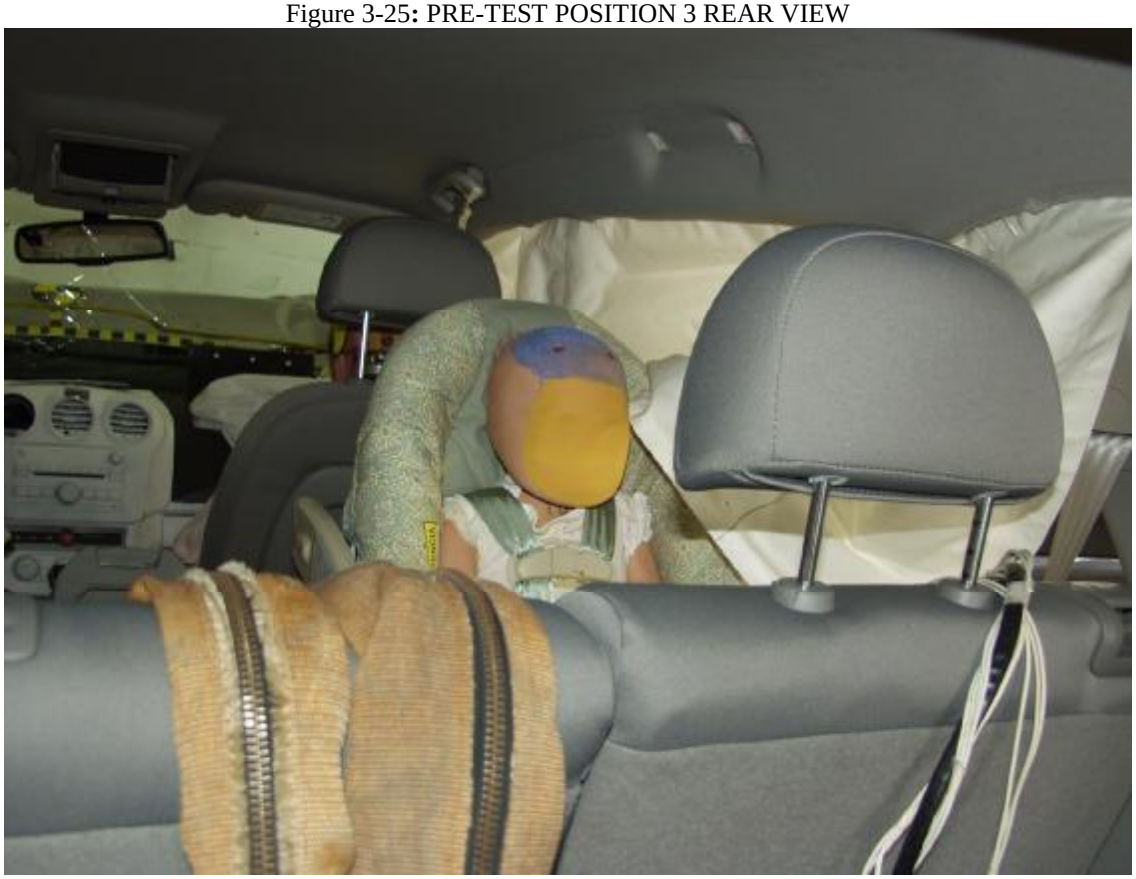


Figure 3-26**:** POST-TEST POSITION 3 REAR VIEW

Figure 3-27**:** PRE-TEST POSITION 4 LEFT SIDE VIEW

Figure 3-28**:** POST-TEST POSITION 4 LEFT SIDE VIEW


Figure 3-29: PRE-TEST POSITION 4 RIGHT SIDE VIEW


Figure 3-30: POST-TEST POSITION 4 RIGHT SIDE VIEW

Figure 3-31**:** PRE-TEST POSITION 4 REAR VIEW

Figure 3-32: POST-TEST POSITION 4 REAR VIEW

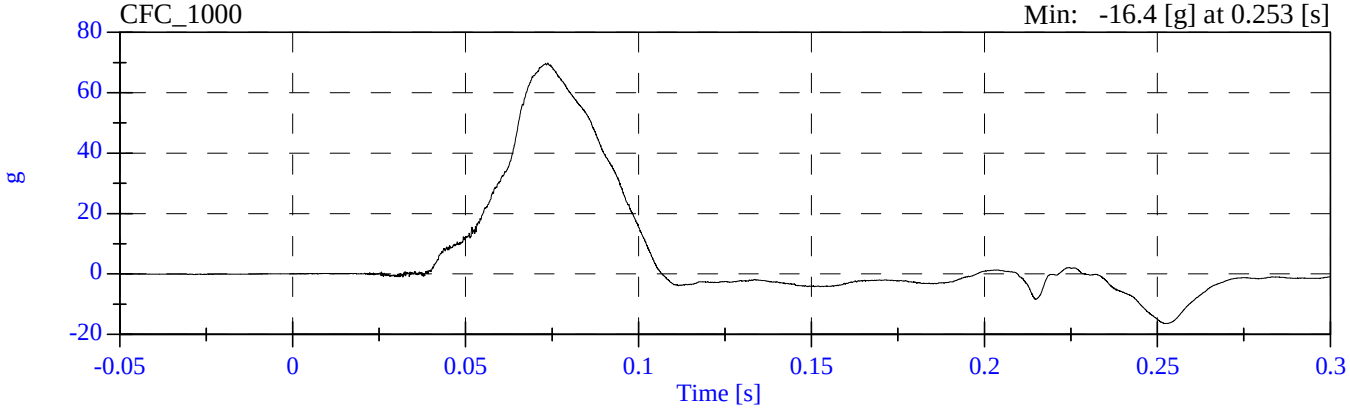
SECTION 4

CHILD DUMMY RESPONSE AND CRS DATA TRACES

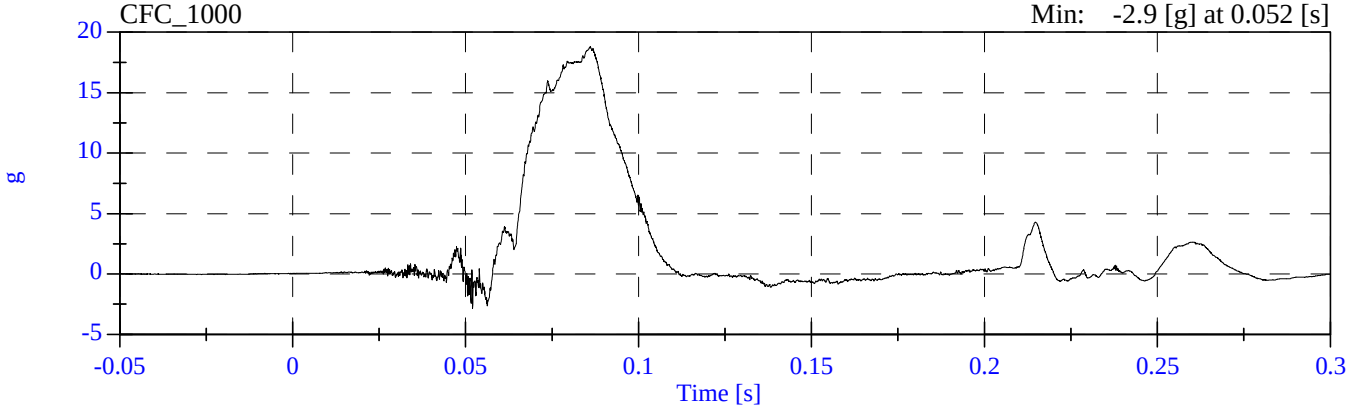
TABLE OF DATA PLOTS

2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

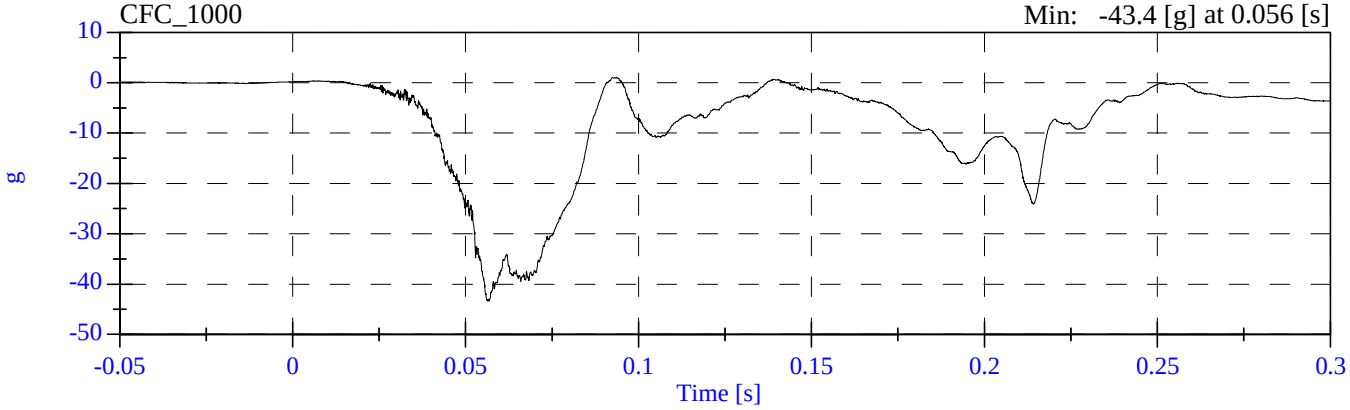
V1P3 Head x
CFC_1000
Max: 69.9 [g] at 0.074 [s]
Min: -16.4 [g] at 0.253 [s]



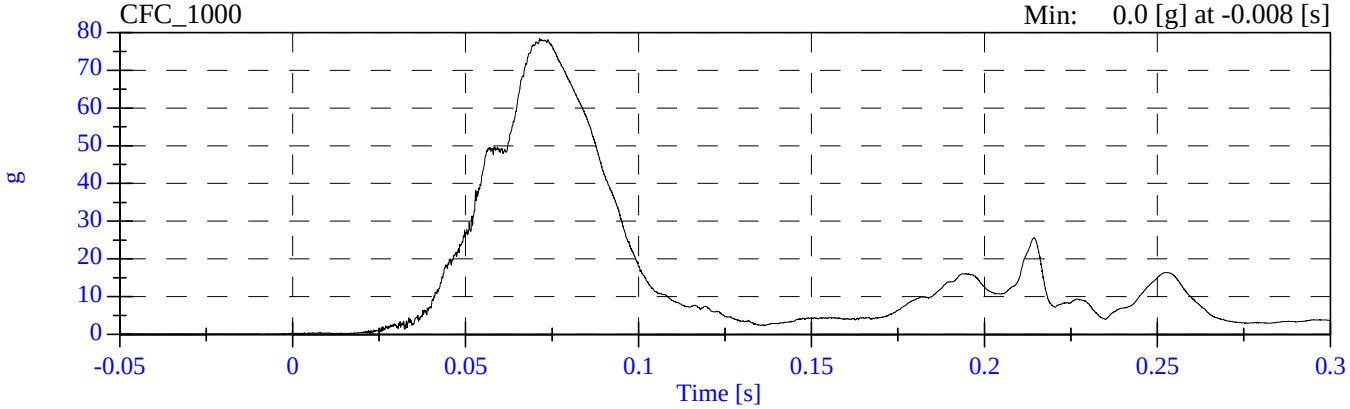
V1P3 Head y
CFC_1000
Max: 18.8 [g] at 0.086 [s]
Min: -2.9 [g] at 0.052 [s]



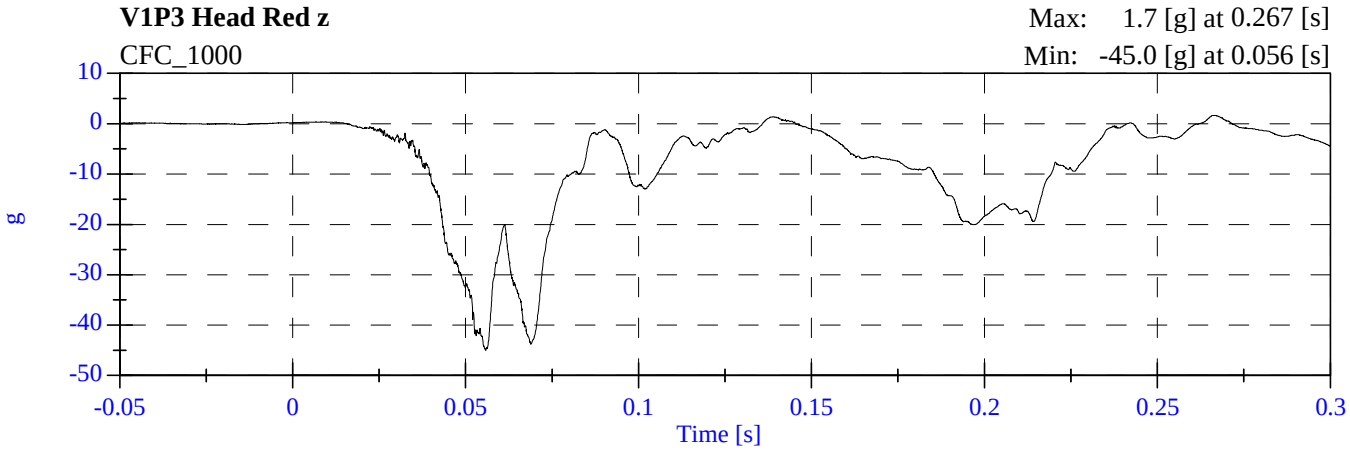
V1P3 Head z
CFC_1000
Max: 1.1 [g] at 0.094 [s]
Min: -43.4 [g] at 0.056 [s]



V1P3 Head Resultant
CFC_1000
Max: 78.2 [g] at 0.071 [s]
Min: 0.0 [g] at -0.008 [s]

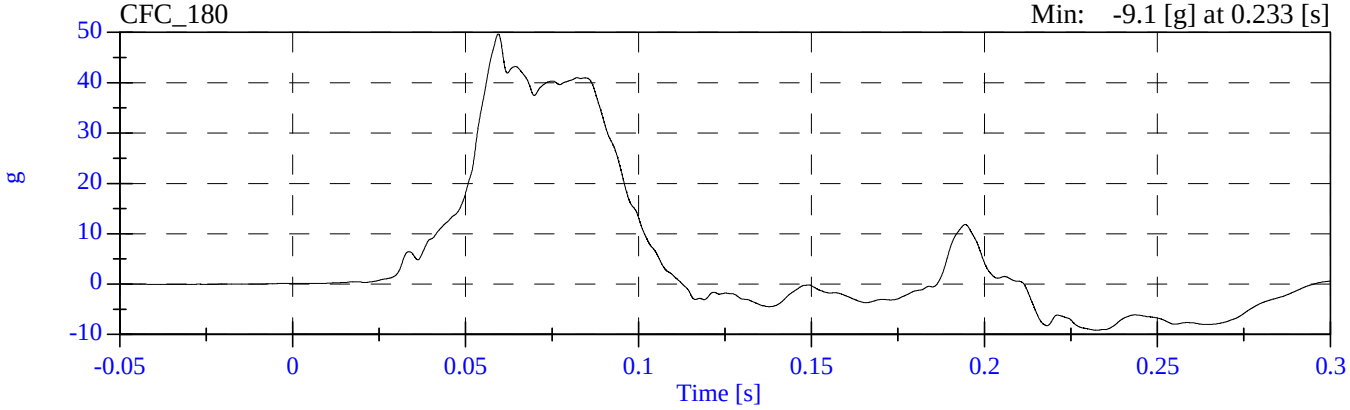


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

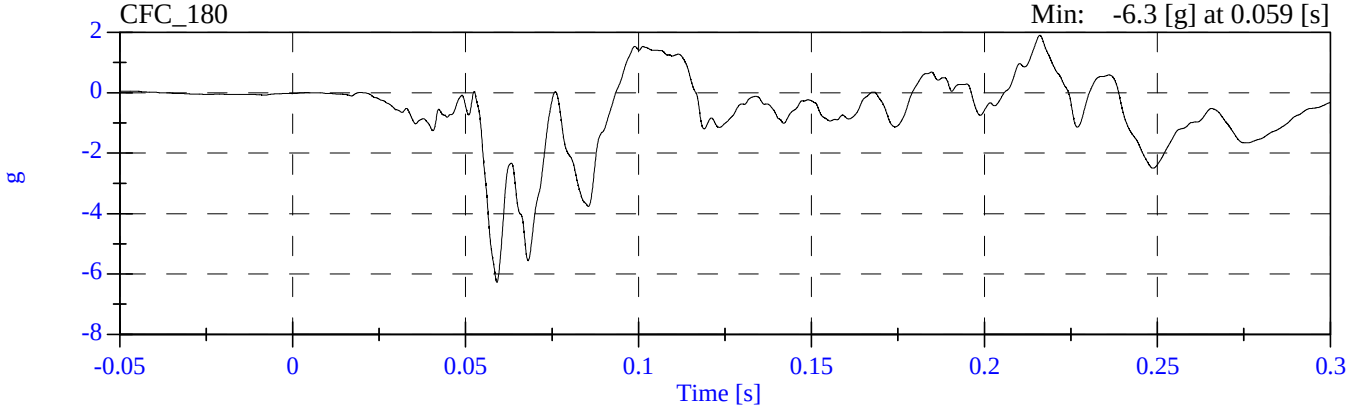


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

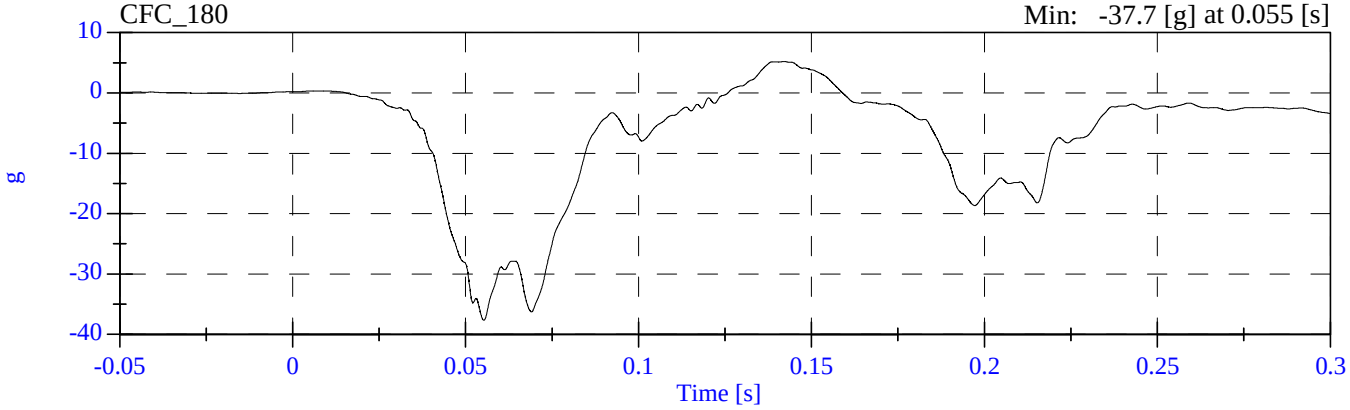
V1P3 Chest x
CFC_180
Max: 49.7 [g] at 0.059 [s]
Min: -9.1 [g] at 0.233 [s]



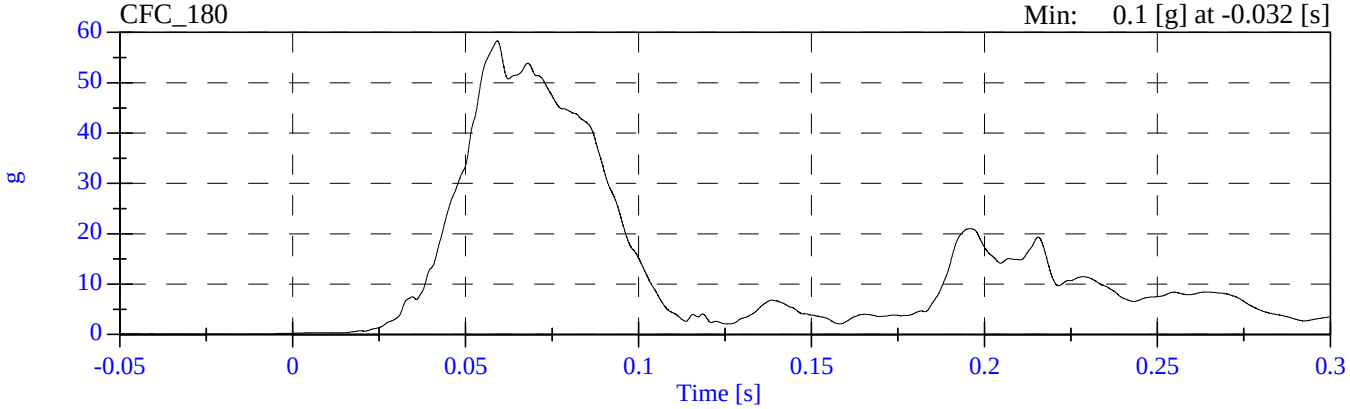
V1P3 Chest y
CFC_180
Max: 1.9 [g] at 0.216 [s]
Min: -6.3 [g] at 0.059 [s]



V1P3 Chest z
CFC_180
Max: 5.2 [g] at 0.142 [s]
Min: -37.7 [g] at 0.055 [s]

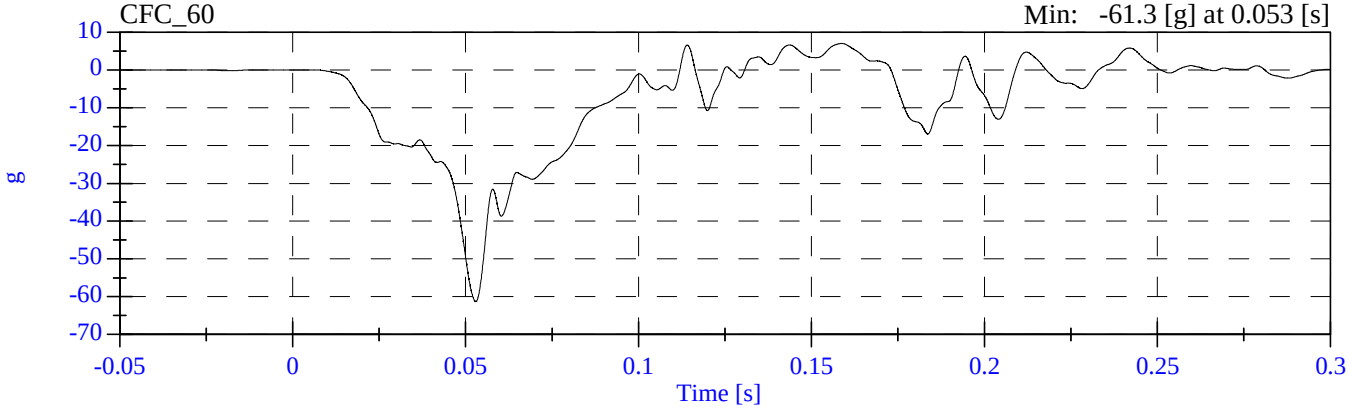


V1P3 Chest Resultant
CFC_180
Max: 58.3 [g] at 0.059 [s]
Min: 0.1 [g] at -0.032 [s]

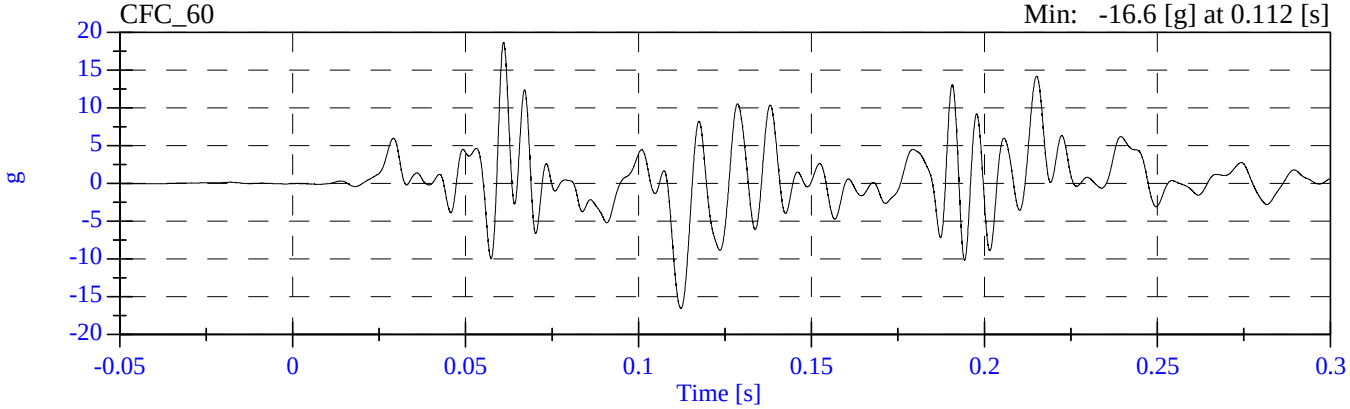


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

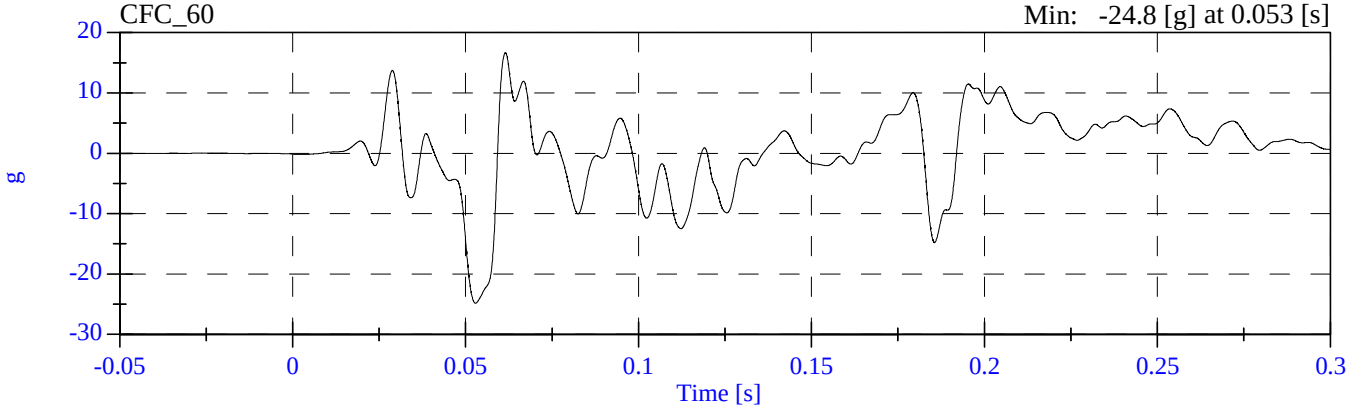
V1 P3 CRS x
CFC_60
Max: 7.1 [g] at 0.159 [s]
Min: -61.3 [g] at 0.053 [s]



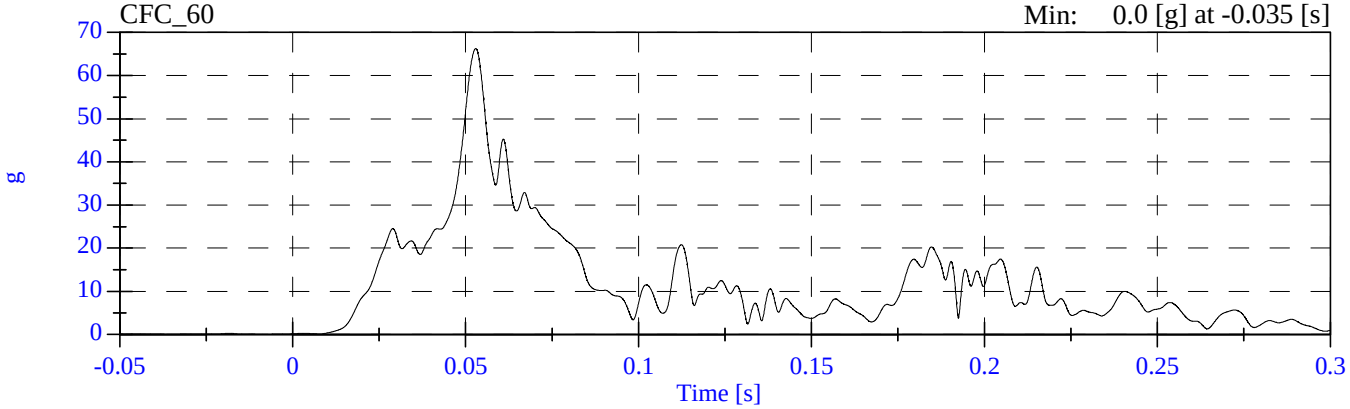
V1 P3 CRS y
CFC_60
Max: 18.6 [g] at 0.061 [s]
Min: -16.6 [g] at 0.112 [s]



V1 P3 CRS z
CFC_60
Max: 16.6 [g] at 0.061 [s]
Min: -24.8 [g] at 0.053 [s]

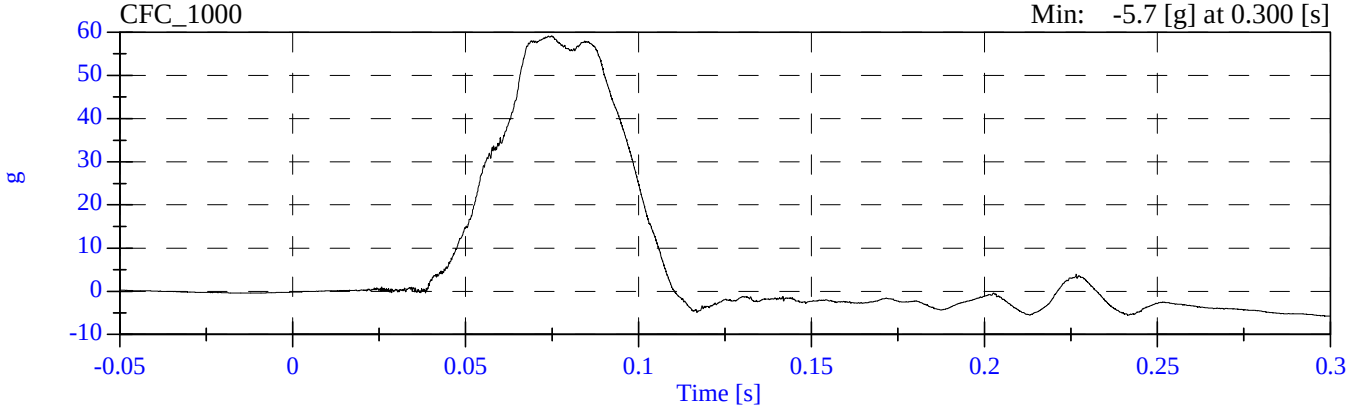


V1 P3 CRS Resultant
CFC_60
Max: 66.3 [g] at 0.053 [s]
Min: 0.0 [g] at -0.035 [s]

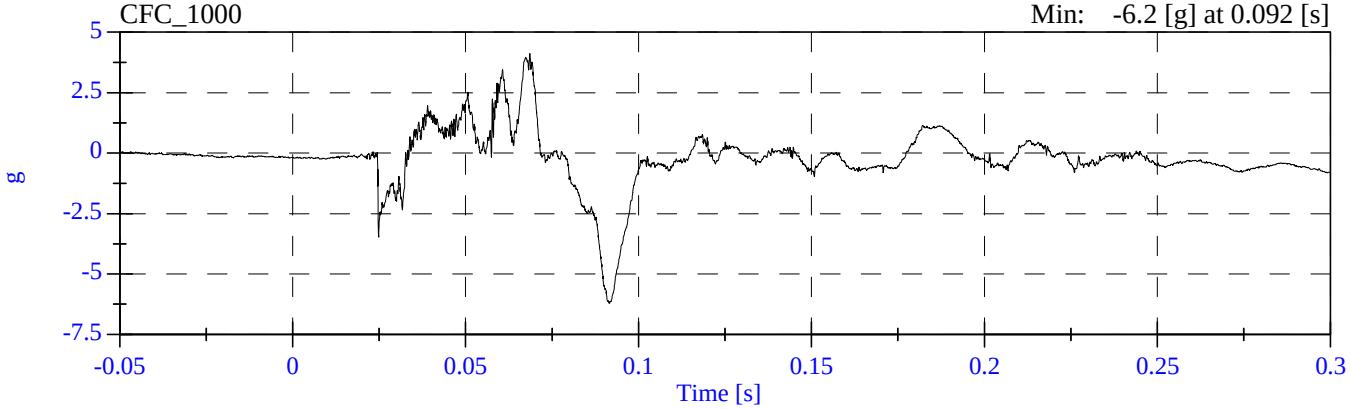


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

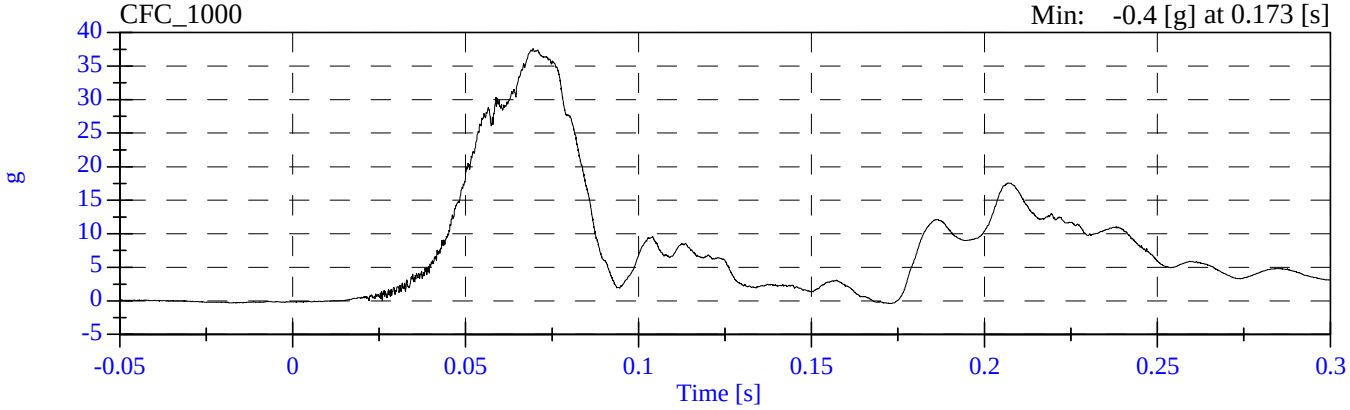
V1P4 Head x
CFC_1000
Max: 59.2 [g] at 0.075 [s]
Min: -5.7 [g] at 0.300 [s]



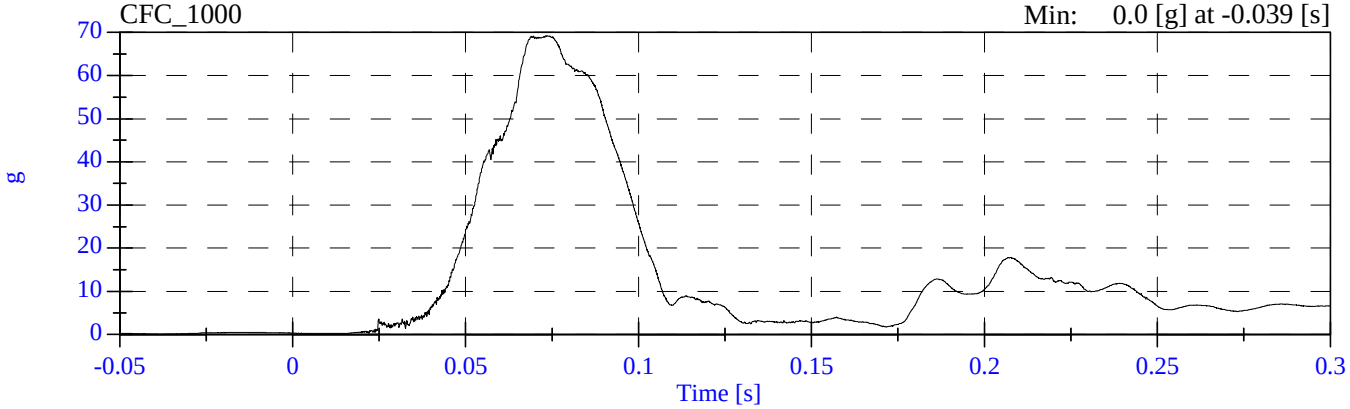
V1P4 Head y
CFC_1000
Max: 4.1 [g] at 0.069 [s]
Min: -6.2 [g] at 0.092 [s]



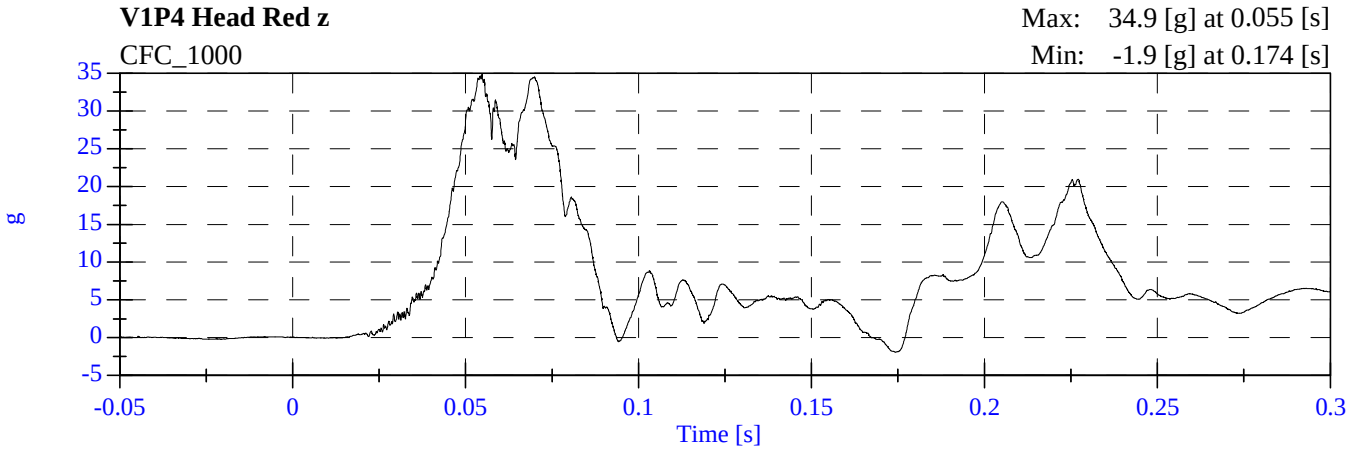
V1P4 Head z
CFC_1000
Max: 37.6 [g] at 0.070 [s]
Min: -0.4 [g] at 0.173 [s]



V1P4 Head Resultant
CFC_1000
Max: 69.3 [g] at 0.073 [s]
Min: 0.0 [g] at -0.039 [s]

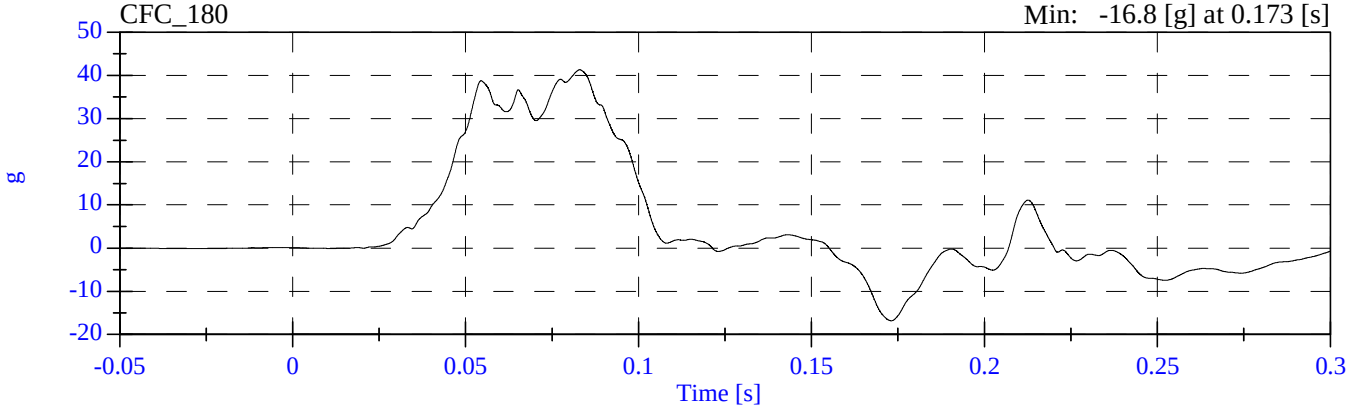


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

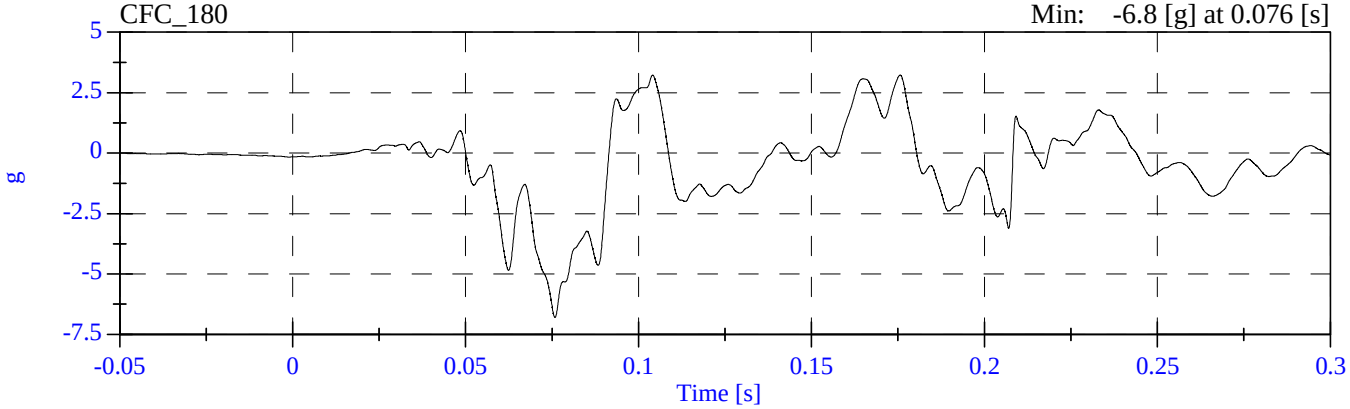


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

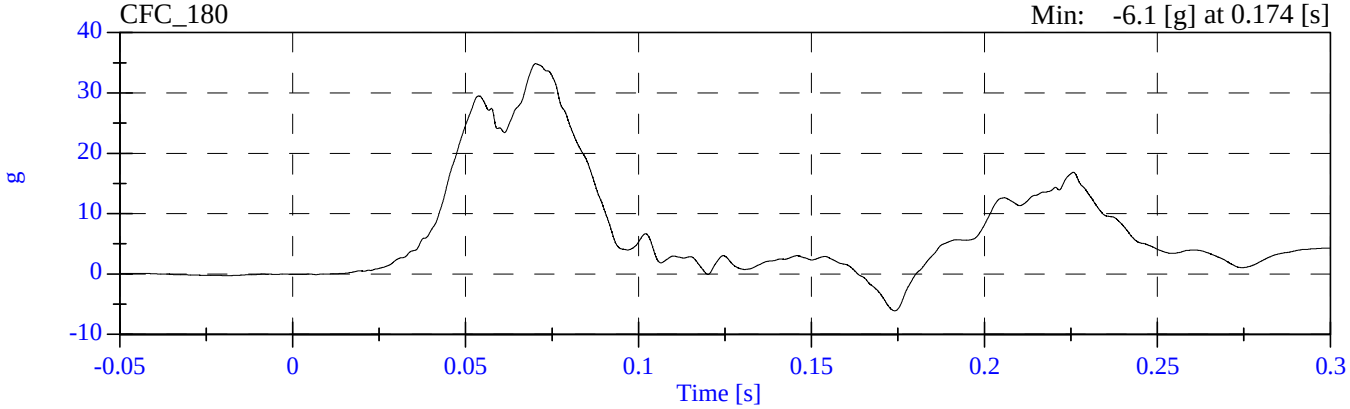
V1P4 Chest x
CFC_180
Max: 41.3 [g] at 0.083 [s]
Min: -16.8 [g] at 0.173 [s]



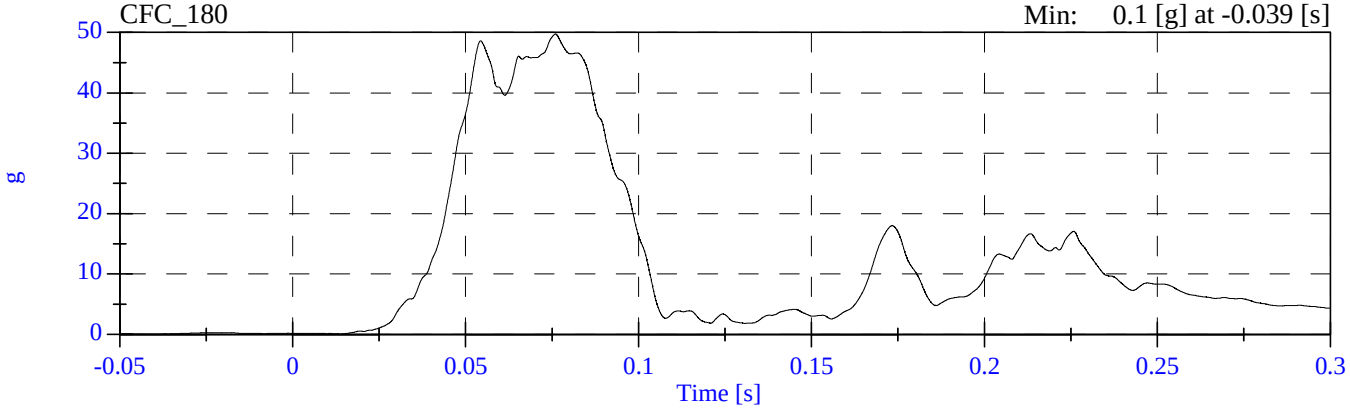
V1P4 Chest y
CFC_180
Max: 3.2 [g] at 0.176 [s]
Min: -6.8 [g] at 0.076 [s]



V1P4 Chest z
CFC_180
Max: 34.8 [g] at 0.070 [s]
Min: -6.1 [g] at 0.174 [s]

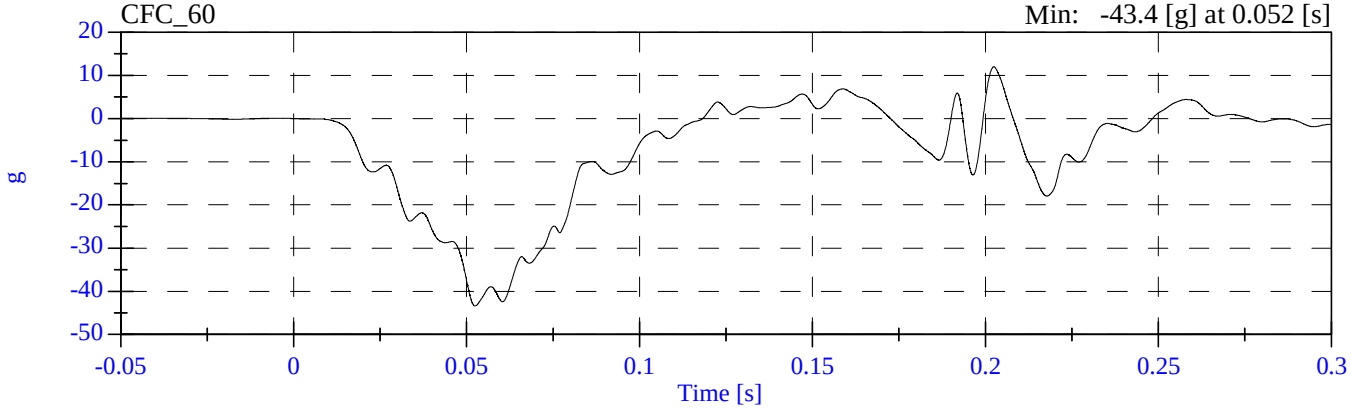


V1P4 Chest Resultant
CFC_180
Max: 49.7 [g] at 0.076 [s]
Min: 0.1 [g] at -0.039 [s]

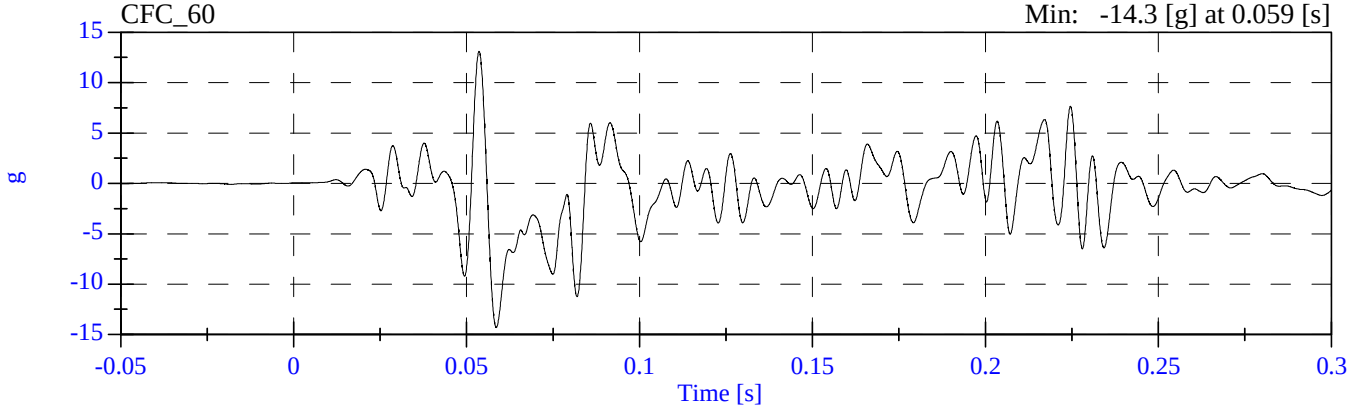


2008 NCAP Test 15 2008 Saturn Vue
M80104 - September 25, 2007

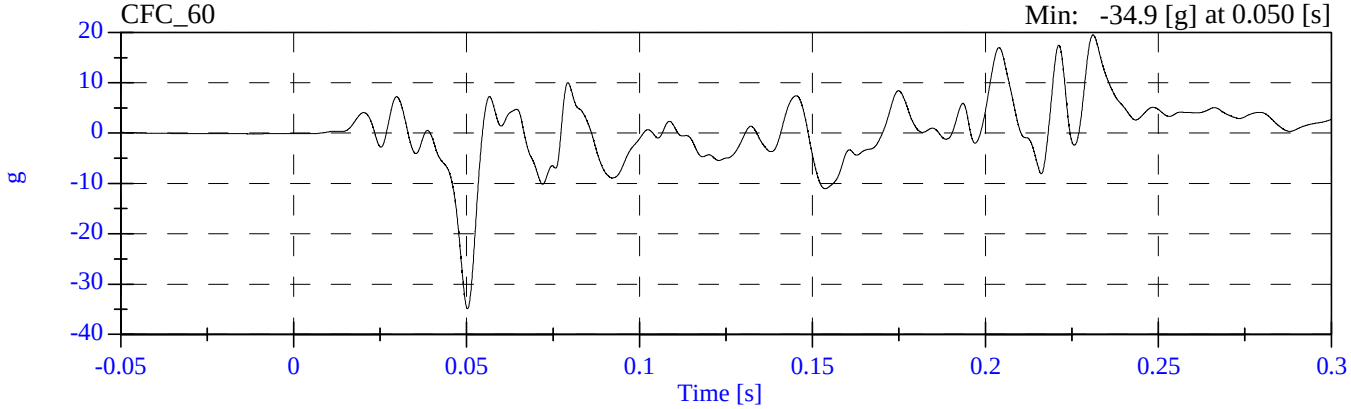
V1 P4 CRS x
CFC_60
Max: 12.0 [g] at 0.202 [s]
Min: -43.4 [g] at 0.052 [s]



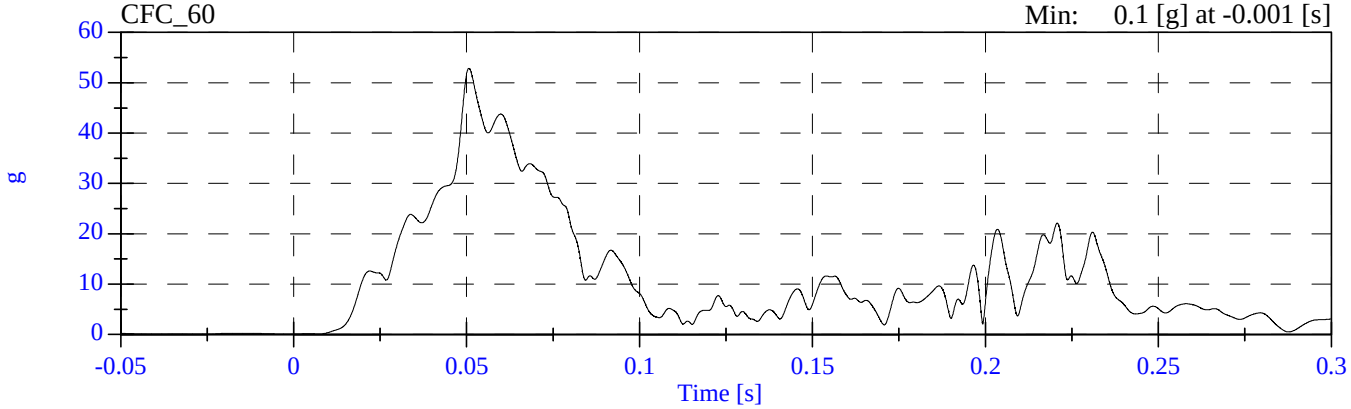
V1 P4 CRS y
CFC_60
Max: 13.1 [g] at 0.054 [s]
Min: -14.3 [g] at 0.059 [s]



V1 P4 CRS z
CFC_60
Max: 19.5 [g] at 0.231 [s]
Min: -34.9 [g] at 0.050 [s]



V1 P4 CRS Resultant
CFC_60
Max: 52.9 [g] at 0.051 [s]
Min: 0.1 [g] at -0.001 [s]



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**----------

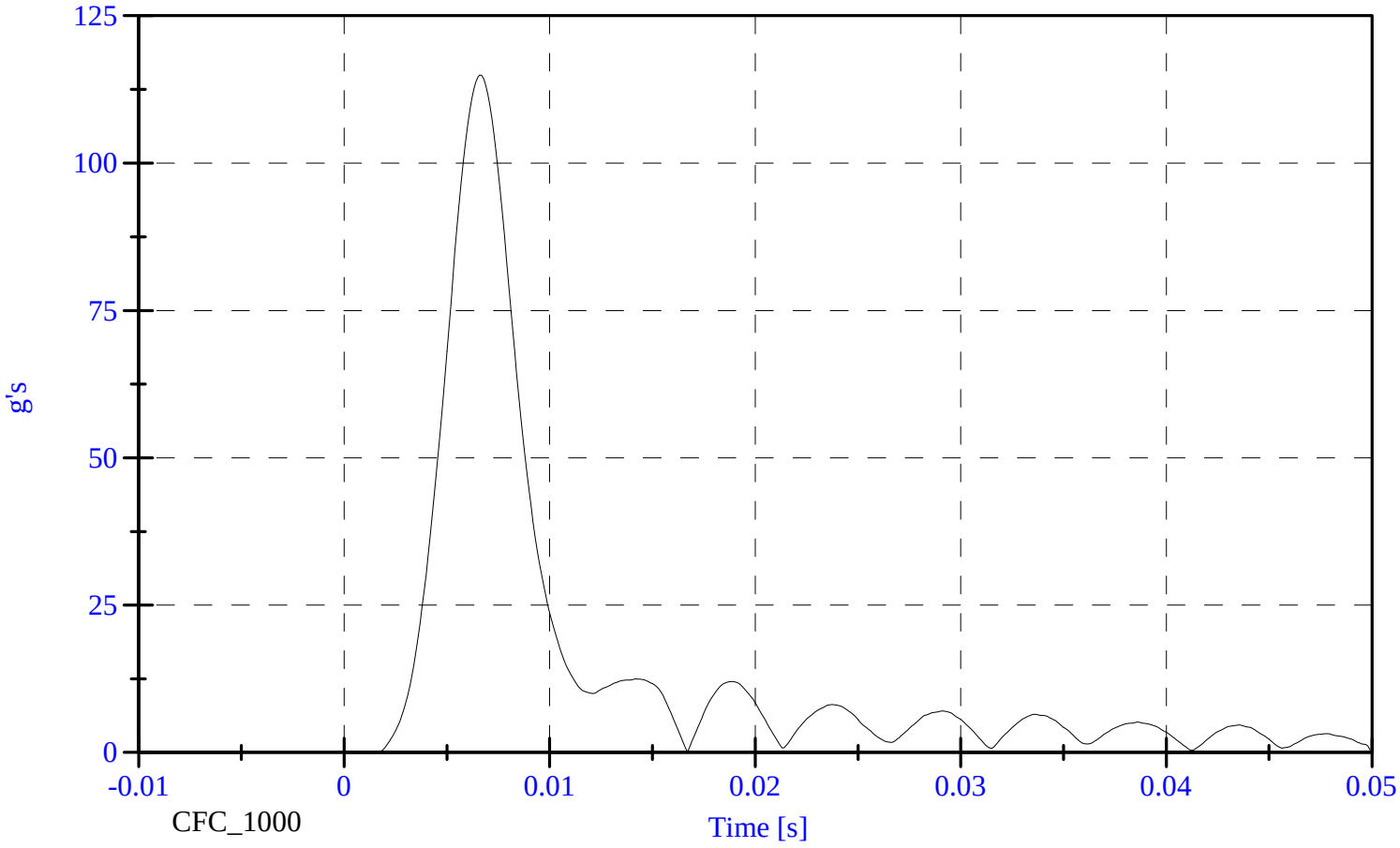
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.1 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	100-120 Gs	114.95 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	13.62 Gs	Passed
Curve PerCent NonModal:	< 17%	10.85 %	Passed

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**----------

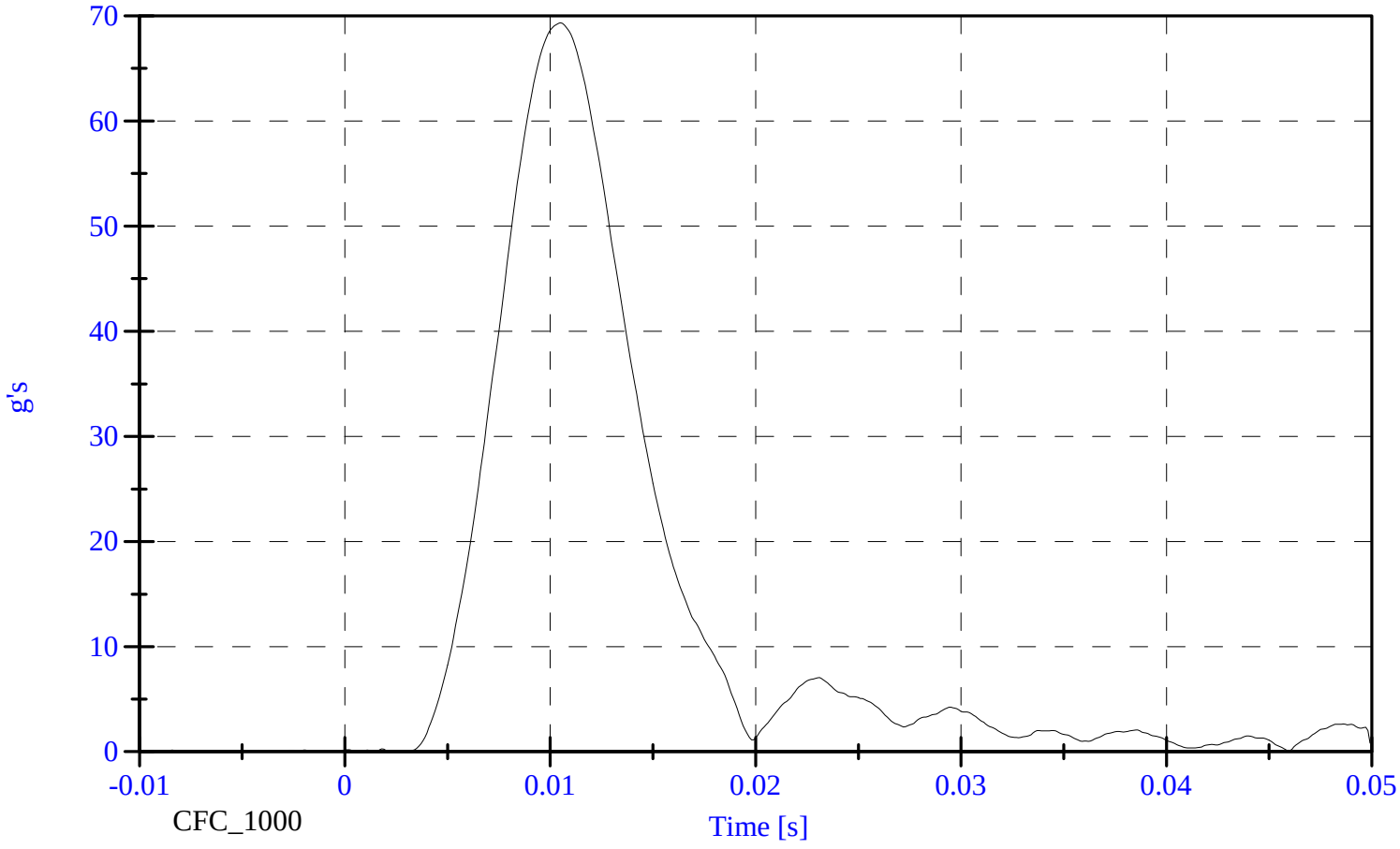
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	66.0-78.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	55-71 Gs	69.35 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	7.02 Gs	Passed
Curve PerCent NonModal:	< 17%	10.15 %	Passed

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----------

TEST CONDITION	PARAMETERS	RESULTS	STATUS
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
----------MOMENT ABOUT THE OCCIPITAL CONDYLE----------			
Max Occipital Moment:	36.00- 45.00 N-m	42.67 N-m	Passed
Occiptal Moment Decay:	60.0-80.0 ms	74.00 ms	Passed

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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----------

TEST CONDITION	PARAMETERS	RESULTS	STATUS
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
----------MOMENT ABOUT THE OCCIPITAL CONDYLE----------			
Max Occipital Moment:	-23.00--12.00 N-m	-12.85 N-m	Passed
Occiptal Moment Decay:	76.0-90.0 ms	86.10 ms	Passed

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Thorax Impact

Part 572R Thorax Impact | Calibration Date: 01-16-07

Serial No: 102 | Work File: Crabi_102_T2_01-16-0

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

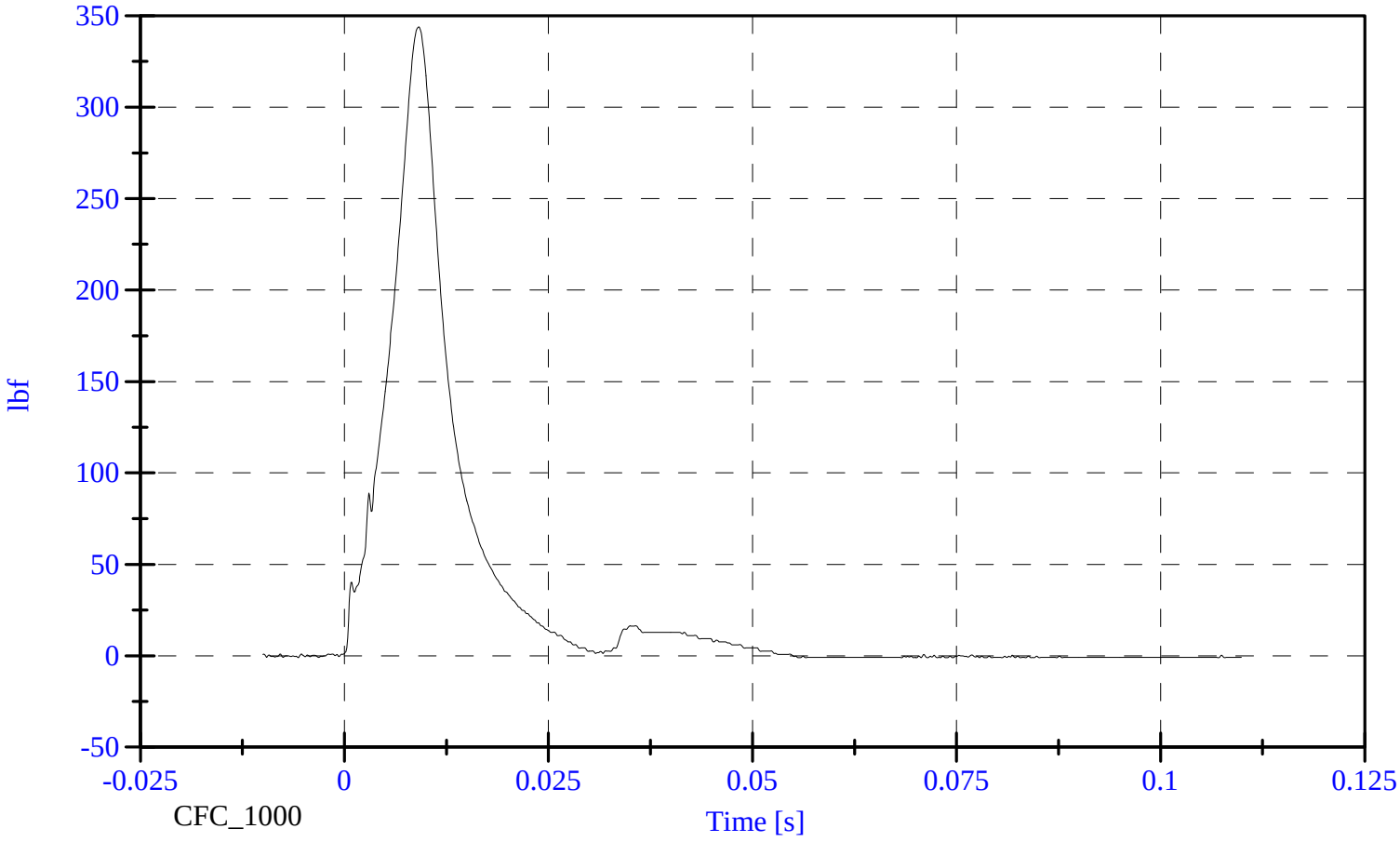
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	69.0-72.0 F	70.0 F	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Pendulum Velocity:	16.20-16.80 ft/s	16.42 ft/s	Passed
Maximum Res. Force:	340.70- 404.10 lbf	344.01 lbf	Passed

Thorax Impact

Probe Force vs. Time

Max: 344.0 [lbf] at 0.009 [s]

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



Head Drop Frontal

Part 572R Frontal Head Drop | Calibration Date: 01-15-07

Serial No: 103 | Work File: Crabi_103_HD_Front_

----------**TEST RESULTS**----------

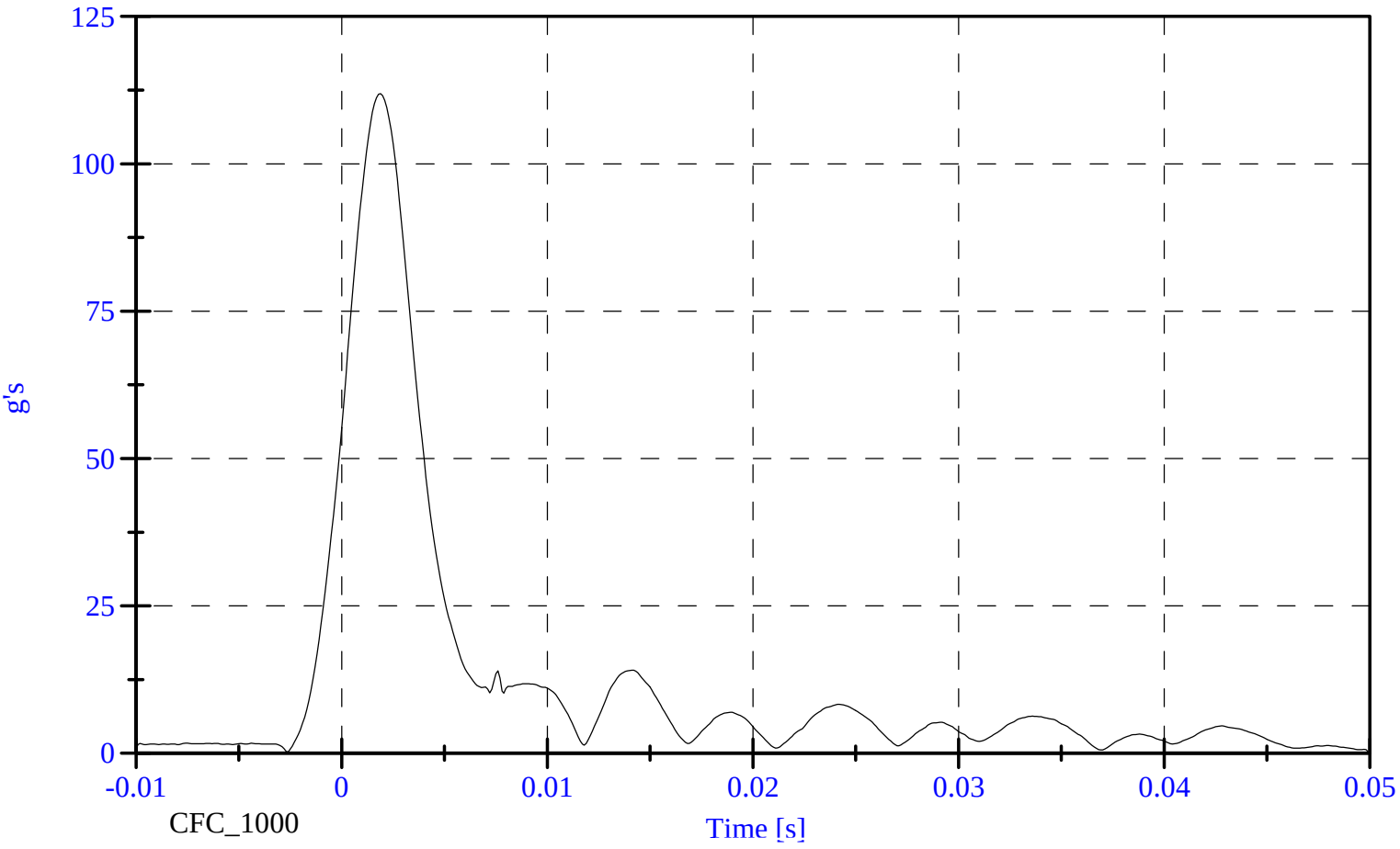
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.1 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	100-120 Gs	111.95 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	13.03 Gs	Passed
Curve PerCent NonModal:	< 17%	12.59 %	Passed

Head Drop Frontal

Head Resultant

Max: 112.0 [g's] at 0.002 [s]

Min: 0.2 [g's] at -0.003 [s]



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Head Drop Rear

Part 572R Rear Head Drop

Calibration Date: 01-15-07

Serial No: 103

Work File: Crabi_103_HD_Rear_01-15-07

----------**TEST RESULTS**----------

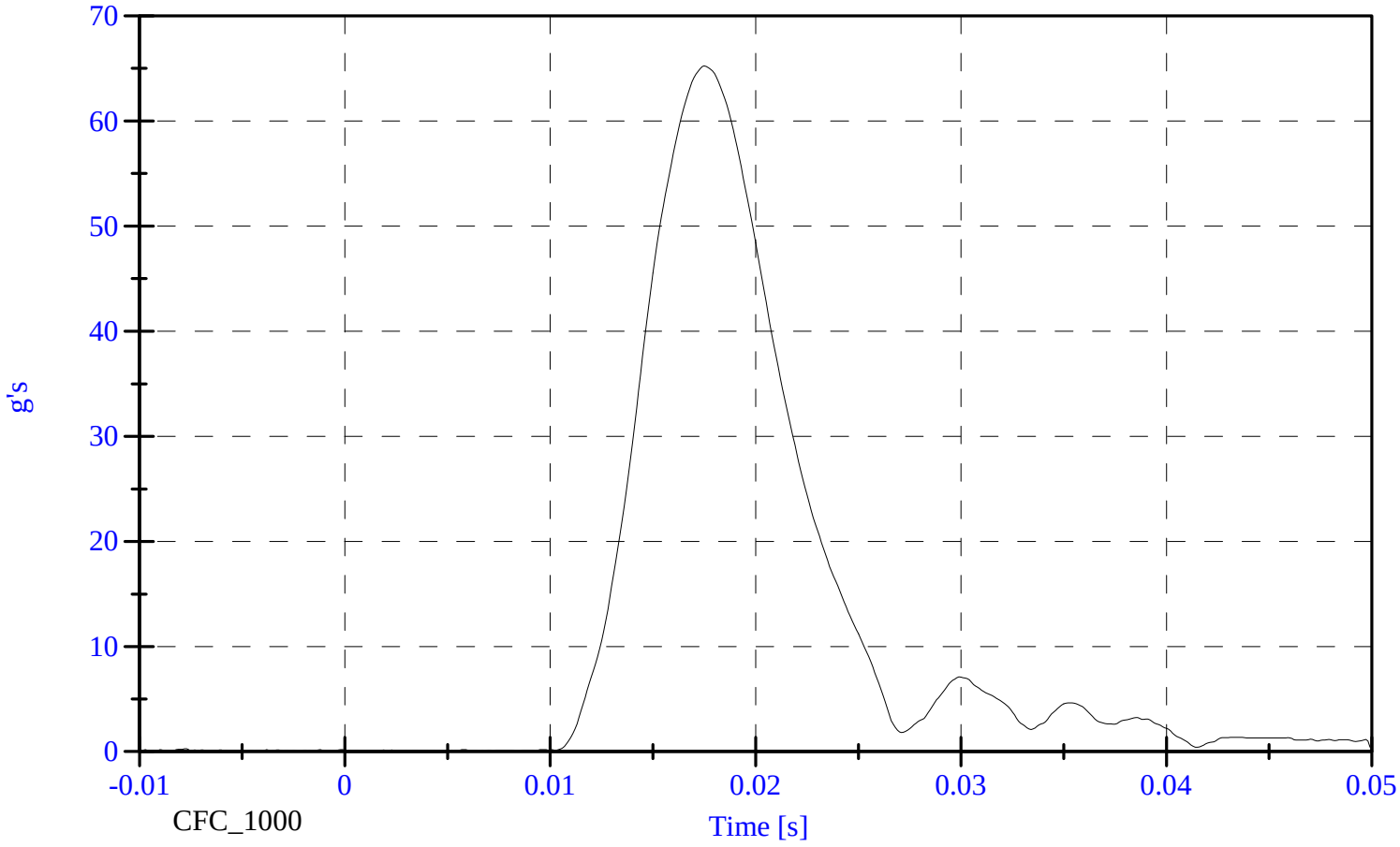
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.1 C	Passed
Lab Humidity:	10-70 %	36.00 %	Passed
Peak Resultant Accel.:	55-71 Gs	65.22 Gs	Passed
Peak Lateral Accel.:	15 Gs Max	2.91 Gs	Passed
Curve PerCent NonModal:	< 17%	10.88 %	Passed

Head Drop Rear

Head Resultant

Max: 65.2 [g's] at 0.018 [s]

Min: 0.0 [g's] at -0.005 [s]



Neck Flexion

Part 572R	Neck Flexion Test	Calibration Date:	01-15-07
Serial No:	103	Work File:	Crabi_103_NF_01-15-0

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

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	37.00 %	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	1.78 m/s	Passed
Pulse at 20 ms:	3.40- 4.20 m/s	3.75 m/s	Passed
Pulse at 25 ms:	4.30- 5.20 m/s	4.59 m/s	Passed
----------D PLANE ROTATION----------			
Maximum Rotation:	75.0-86.0 Deg	84.66 Deg	Passed
----------MOMENT ABOUT THE OCCIPITAL CONDYLE----------			
Max Occipital Moment:	36.00- 45.00 N-m	39.67 N-m	Passed
Occiptal Moment Decay:	60.0-80.0 ms	76.00 ms	Passed

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Neck Extension

Part 572R	Neck Extension Test	Calibration Date:	01-15-07
Serial No:	103	Work File:	Crabi_103_NE1_01-15-

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

TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.11 C	Passed
Lab Humidity:	10-70 %	37.00 %	Passed
Test Pendulum Speed:	2.40- 2.60 m/s	2.43 m/s	Passed
----------PENDULUM PULSE----------			
Pulse at 6 ms:	0.80- 1.20 m/s	0.83 m/s	Passed
Pulse at 10 ms:	1.50- 2.10 m/s	1.62 m/s	Passed
Pulse at 14 ms:	2.20- 2.90 m/s	2.50 m/s	Passed
----------D PLANE ROTATION----------			
Maximum Rotation:	80.0-92.0 Deg	80.83 Deg	Passed
----------MOMENT ABOUT THE OCCIPITAL CONDYLE----------			
Max Occipital Moment:	-23.00--12.00 N-m	-15.61 N-m	Passed
Occiptal Moment Decay:	76.0-90.0 ms	83.10 ms	Passed

FM-ATDLAB-572.143E-0005-R00

Thorax Impact

Part 572R Thorax Impact | Calibration Date: 01-16-07

Serial No: 103 | Work File: Crabi_103_T3_01-16-0

----------**TEST RESULTS**----------

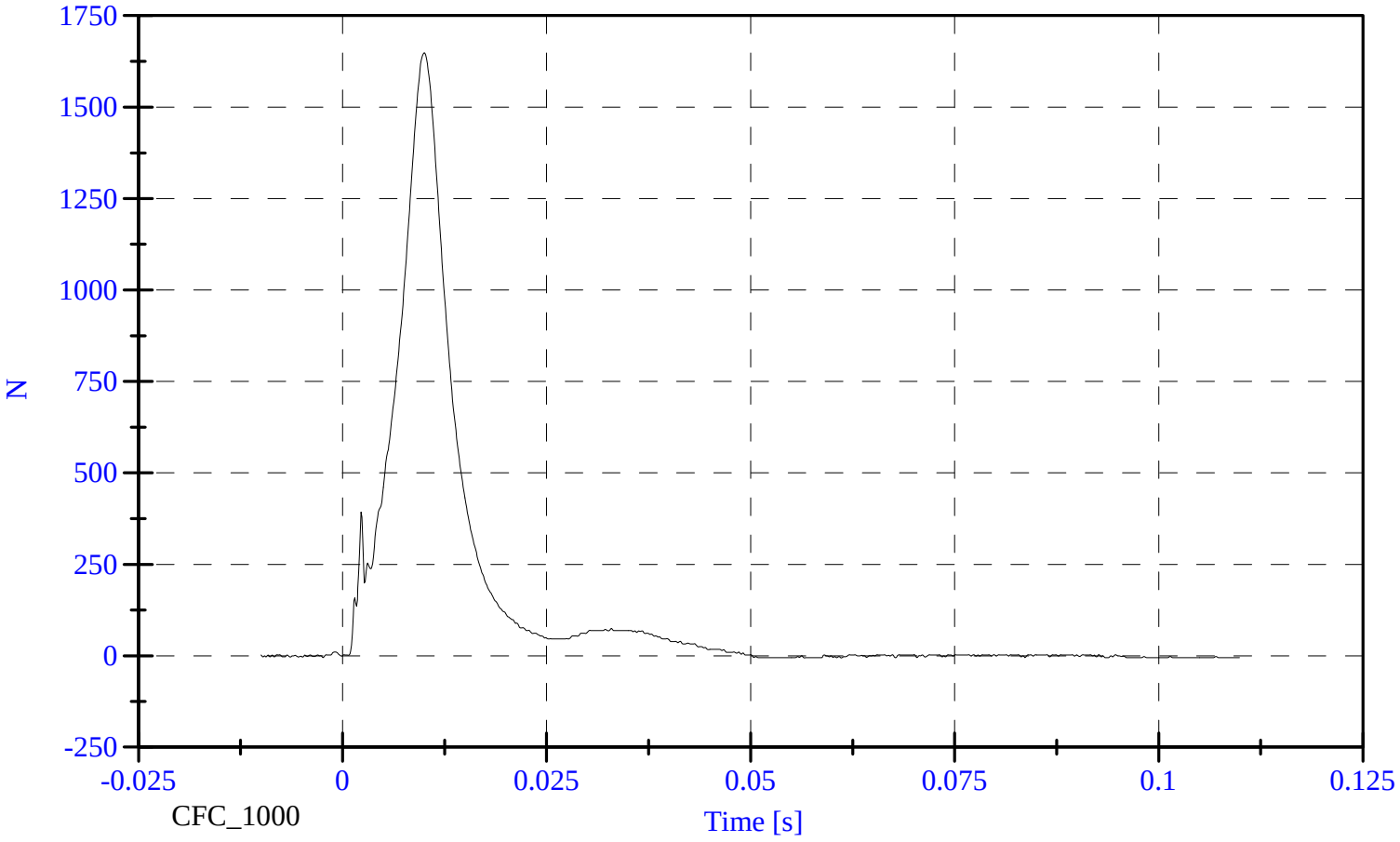
TEST CONDITION	PARAMETERS	RESULTS	STATUS
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	35.00 %	Passed
Pendulum Velocity:	4.90- 5.10 m/s	5.01 m/s	Passed
Maximum Res. Force:	1514.00-1796.00 N	1648.54 N	Passed

Thorax Impact

Probe Force vs. Time

Max: 1648.5 [N] at 0.010 [s]

Min: -5.5 [N] at 0.061 [s]



CFC_1000

SECTION 6

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572C 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	LC-231Fx	DENTON	11-Jan-07
UPPER NECK FY	LC-231Fy	DENTON	11-Jan-07
UPPER NECK FZ	LC-231Fz	DENTON	11-Jan-07
UPPER NECK MX	LC-231Mx	DENTON	11-Jan-07
UPPER NECK MY	LC-231My	DENTON	11-Jan-07
UPPER NECK MZ	LC-231Mz	DENTON	11-Jan-07
CHEST AX	AC-B02A18-N21	ENTRAN	09-Jan-07
CHEST AY	AC-99H30-Z14	ENTRAN	09-Jan-07
CHEST AZ	AC-00L13-F39	ENTRAN	29-Jan-07

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

P572C INSTRUMENTATION

	POSITION #4 (LEFT) SERIAL NO.: 103		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD AX	AC-03E03E20-N04	ENTRAN	09-Jan-07
HEAD AY	AC-02A18-N01	ENTRAN	09-Jan-07
HEAD AZ	AC-B02A25-N01	ENTRAN	09-Jan-07
HEAD RAZ	AC-03D03D09-N08	ENTRAN	09-Jan-07
UPPER NECK FX	LC-211Fx	DENTON	08-Jan-07
UPPER NECK FY	LC-211Fy	DENTON	08-Jan-07
UPPER NECK FZ	LC-211Fz	DENTON	08-Jan-07
UPPER NECK MX	LC-211Mx	DENTON	08-Jan-07
UPPER NECK MY	LC-211My	DENTON	08-Jan-07
UPPER NECK MZ	LC-211Mz	DENTON	08-Jan-07
CHEST AX	AC-98H14-K15	ENTRAN	09-Jan-07
CHEST AY	AC-98H10-F02	ENTRAN	09-Jan-07
CHEST AZ	AC-P50093	ENDEVCO	09-Jan-07

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

VEHICLE AND MDB INSTRUMENTATION

	VEHICLE AND CRS INSTRUMENTS		
	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
P3 CRS (X)	P18948	ENDEVCO	8/9/2007
P3 CRS (Y)	P14965	ENDEVCO	8/9/2007
P3 CRS (Z)	P17563	ENDEVCO	8/9/2007
P4 CRS (X)	P23939	ENDEVCO	8/9/2007
P4 CRS (Y)	P23999	ENDEVCO	8/9/2007
P4 CRS (Z)	P23993	ENDEVCO	8/9/2007

REMARKS: None