REPORT NUMBER: NCAP-MGA-2012-047

NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test

CHRYSLER GROUP LLC
2012 Ram 1500 SLT Crew Cab 4x4
NHTSA No.: MC0306

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: December 27, 2011

Final Report Date: January 9, 2012

FINAL REPORT

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

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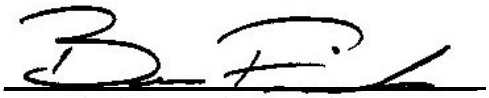
Approved by: 
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Approval Date: January 9, 2012

FINAL REPORT ACCEPTANCE BY OCWS:

_____
Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

_____
COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-06-D-00028
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15. Supplementary Notes		

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on the 2012 Ram 1500 SLT Crew Cab 4x4 in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on December 27, 2011.

The impact velocity was 56.5 km/h and the ambient temperature at the barrier face at the time of impact was 21.5°C. The target vehicle post-test maximum crush was 616 mm located at the vehicle's centerline. The test vehicle's performance was as follows:

Measurement Description	Units	Threshold		Driver ATD	Passenger ATD
		50th	5th		
Head Injury Criteria (HIC_{15})	N/A	700	700	185	304
Maximum Chest Compression	mm	63	52	30	11
Nij	N/A	1	1	0.30	0.41
Neck Tension	N	4170	2620	1765	1021
Neck Compression	N	4000	2520	263	426
Left Femur Force	N	10008	6805	3236	2692
Right Femur Force	N	10008	6805	1711	1426

17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE, Room E12-100 Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833	
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SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00028. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure.

SUMMARY

A load cell barrier was impacted by a 2012 Ram 1500 SLT Crew Cab 4x4 at a velocity of 56.5 kph. The test was performed at MGA Research Corporation on December 27, 2011. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two real-time cameras and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female test device (ATD) was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading.

The driver (position 1) ATD (Serial No. 351) and the right-front passenger (position 2) ATD (Serial No. 634) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 228 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy head, chest displacement, neck, and femur response data traces.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 616 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee bolster. The passenger's visible contact points were as follows: The passenger's head and chest contacted the airbag. The passenger's head also contacted the headrest. The passenger's knees contacted the glovebox.

The occupant data is summarized below:

ATD position	HIC_{15}	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50^{th})	185	0.30	1765	263	41	30	3236	1711
Passenger (5^{th})	304	0.41	1021	426	38	11	2692	1426

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

There was no valid data collected for:
Top of Engine after 31 msec.
Load Cell 5-12 is questionable.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC0306	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Ram	Automatic Door Locks (ADLs)	Yes
Model	1500 Crew	Power Window Auto-Reverse	No
Body Style	4x4	Other Optional Feature	N/A
VIN	1C6RD7LTXCS114260	Driver Front Airbag	Yes
Body Color	Silver Metallic	Driver Curtain Airbag	Yes
Odometer (km/mi)	116 / 72	Driver Head/Torso Airbag	No
Engine Displacement (L)	5.7	Driver Torso Airbag	No
Type/No. Cylinders	8	Driver Torso/Pelvis Airbag	No
Engine Placement	Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Pass. Front Airbag	Yes
Overdrive	Yes	Pass. Curtain Airbag	Yes
Final Drive	4WD	Pass. Torso Airbag	No
Roof Rack	No	Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Pass. Seat Belt Pretensioner	Yes
Power Seats	Yes - Driver Seat Only	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Pass. Load Limiter	Yes
All-Wheel Drive (AWD)	4WD	Other Safety Restraint	N/A
Does owner's manual provide instructions to turn off automatic door locks?			Yes

DATA FROM CERTIFICATION LABEL

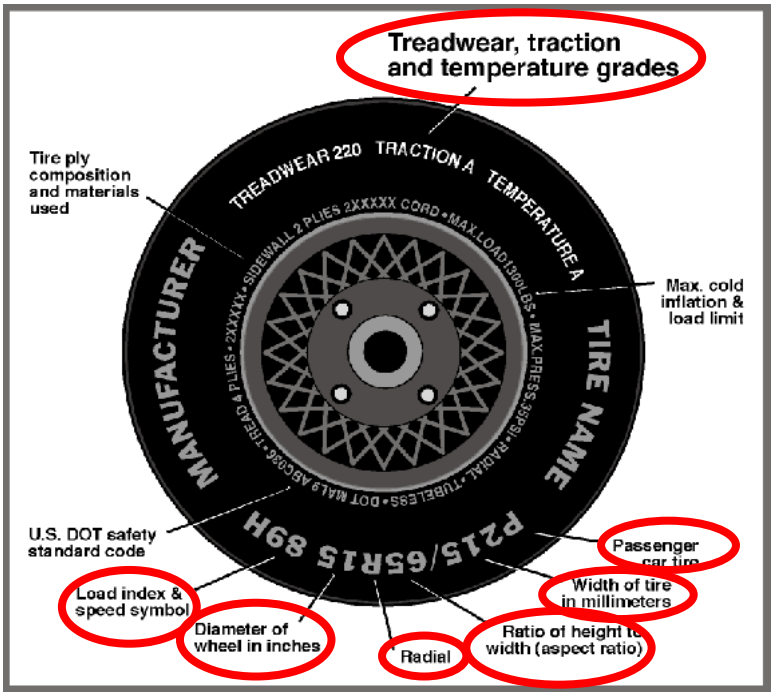
Manufactured By	Chrysler Group LLC	GVWR (kg)	3085
Date of Manufacture	8-11	GAWR Front (kg)	1770
Vehicle Type	Truck	GAWR Rear (kg)	1770

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Split Bench	Split Bench		
Designated Seating Capacity (DSC)	3	3		6
Capacity Weight (VCW) (kg)				627
Cargo Weight (RCLW) (kg)				219

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	276	276
Recommended Tire Size	P265/70R17	P265/70R17

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Tire Size on Vehicle	265/70R17	265/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Name	Wrangler SR-A	Wrangler SR-A
Tire Type	Passenger	Passenger
Tire Width	265	265
Aspect Ratio	70	70
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index/Speed Symbol	113R	113R
Treadwear	500	500
Traction Grade	A	A
Temperature Grade	B	B
Tire Material	Rubber	Rubber

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	717.6	545.2		750.3	655.0	
Right	kg	705.4	505.3		723.9	614.2	
Ratio	%	57.5	42.5		53.7	46.3	
Totals	kg	1423.0	1050.5	2473.5	1474.2	1269.2	2743.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2473.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	136
Calculated Vehicle Target Weight (TVTW)	kg	2750.1

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	908	916	981	1000	1515
As Tested	mm	911	919	948	956	1651
Post Test	mm	873	885	953	965	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3568
Total Vehicle Length at Left Side	mm	5410
Total Vehicle Length at Centerline	mm	5825
Total Vehicle Length at Right Side	mm	5410
Weight of Ballast in Cargo Area	kg	108.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	91.5

List of components removed: None

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

TARGET VEHICLE STRUCTURAL MEASUREMENT

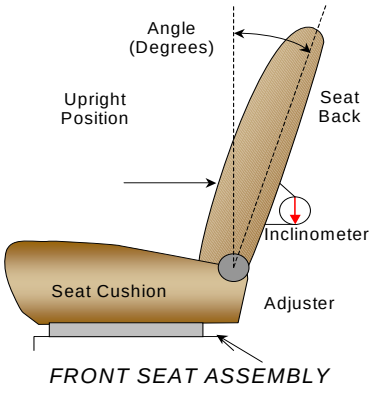
	Elements	Pre-Test (mm)
1	Total Length	5825
2	Total Width	2030
3	Bumper Top Height	644
4	Bumper Bottom Height	498
5	Longitudinal Member Top Height	634
6	Distance between Longitudinal Members	786
7	Longitudinal Member Width	66
8	Engine Top Height	1159
9	Engine Bottom Height	351
10	Engine and Gearbox Width	1205
11	Front Bumper-Engine Distance	595
12	Front Shock Absorber Fixing Height	764
13	Bonnet Leading Edge Height	1177
14	Front Shock Absorber Fixing Width	1164
15	Front Bumper – Front Axle Distance	1144
16	Front Axle – A-Pillar Distance	565
17	A-Pillar – B-Pillar Distance	1120
18	B-Pillar – Rear Axle Distance	1884
19	B-Pillar – C-Pillar Distance	965
20	Roof Sill Bottom Height	1749
21	Roof Sill Top Height	1854
22	Floor Sill Bottom Height	374
23	Floor Sill Top Height	518

DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned as close as possible to the manufacturer's design angle. For the passenger seat back, seat back is adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.



SEAT BACK ANGLE	Degrees
Driver Seat Back Angle	3.9° on headrest post
Passenger Seat Back Angle	-2.7° on headrest post

SEAT FORE/AFT POSITIONS

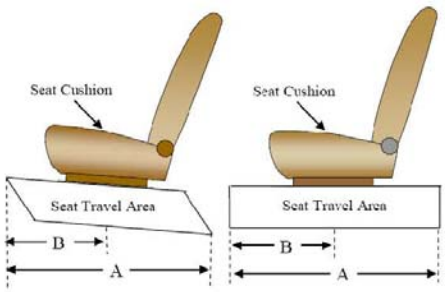
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Dummy Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	255 mm	128 mm (forward-most as 0)
Passenger Seat	22 detents	0 detent (forward-most as 0)

SEAT BELT UPPER ANCHORAGES

The seat belt upper anchorages are positioning following the manufacturer's specified position as listed in Form 1.

	Total # of Positions	Placed in Position #
Driver Seat	5 (1st as 1)	0 (uppermost as 0)
Passenger Seat	5 (1st as 1)	0 (uppermost as 0)



DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

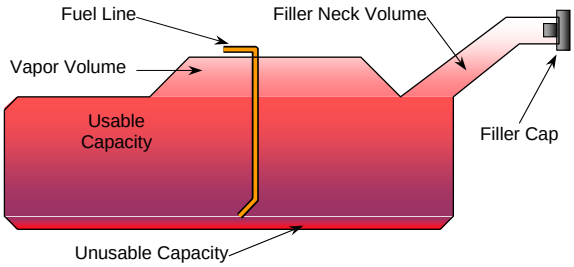
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	
92-94% of Usable Capacity	90.5 to 92.5
Actual Amount of Solvent used	91.5
1/3 of Usable Capacity	32.8

FUEL PUMP

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

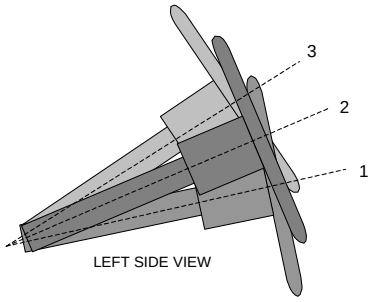
The vehicle is equipped with an electric fuel pump. The pump starts pumping fuel when the Ignition key is in and turned to the run position. The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



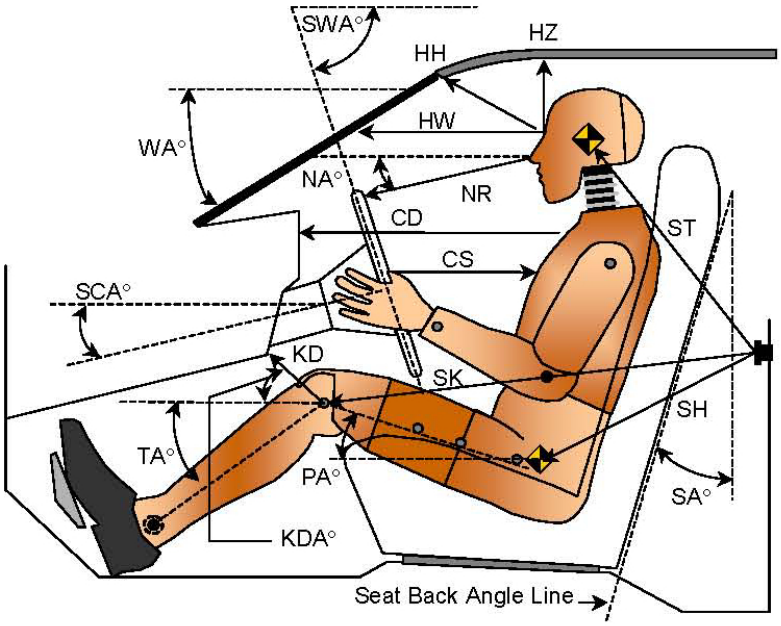
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	75.3	
Geometric Center – Position 2	67.0	
Uppermost – Position 3	58.7	
Telescoping Steering Wheel Travel		
Test Position	67.0	

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

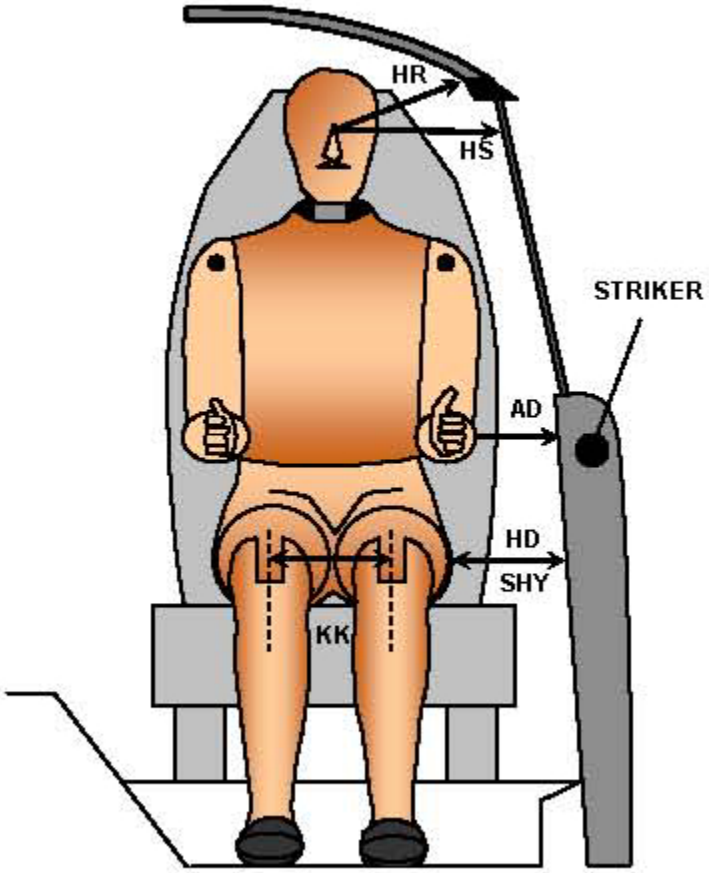


LEFT SIDE VIEW

Code	Measurement Description	Driver S/N 351		Passenger S/N 634	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		31.5		
SWA°	Steering Wheel Angle		67.0		
SCA°	Steering Column Angle		23.8		
SA°	Seat Back Angle (on headrest post)		3.9		-2.7
HZ	Head to Roof (Z)	253	90	246	90
HH	Head to Header	442	22.6	362	38.8
HW	Head to Windshield	702	0	666	0
NR	Nose to Rim	413	13.5		
CD	Chest to Dash	562		431	
CS	Chest to Steering Hub	316	6.6		
RA	Rim to Abdomen	198	0		
KDL	Left Knee to Dash	153	18.3	62	30.3
KDR	Right Knee to Dash	131	18.7	76	28.8
PA°	Pelvic Angle		22.8		21.3
TA°	Tibia Angle		58.7		62.3
SK	Striker to Knee	594	102.5	675	94.1
ST	Striker to Head	665	4.5	607	22.0
SH	Striker to H-Point	203	93.2	335	93.7

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

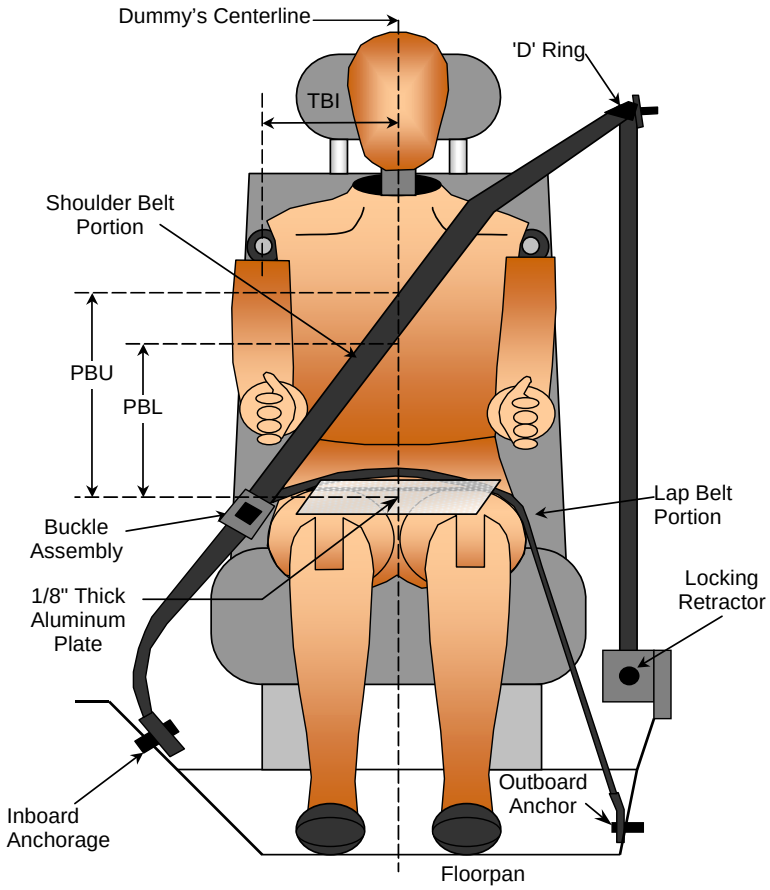


FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 351	Passenger S/N 634
		Length (mm)	
AD	Arm to Door	139	90
HD	H-Point to Door	144	156
HR	Head to Side Header	213	247
HS	Head to Side Window	308	322
KK	Knee to Knee	310	231
SHY	Striker to H-Point (Y Direction)	284	305
AA	Ankle to Ankle	275	144

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	390	320
PBL - Top surface of reference to belt lower edge	mm	310	220

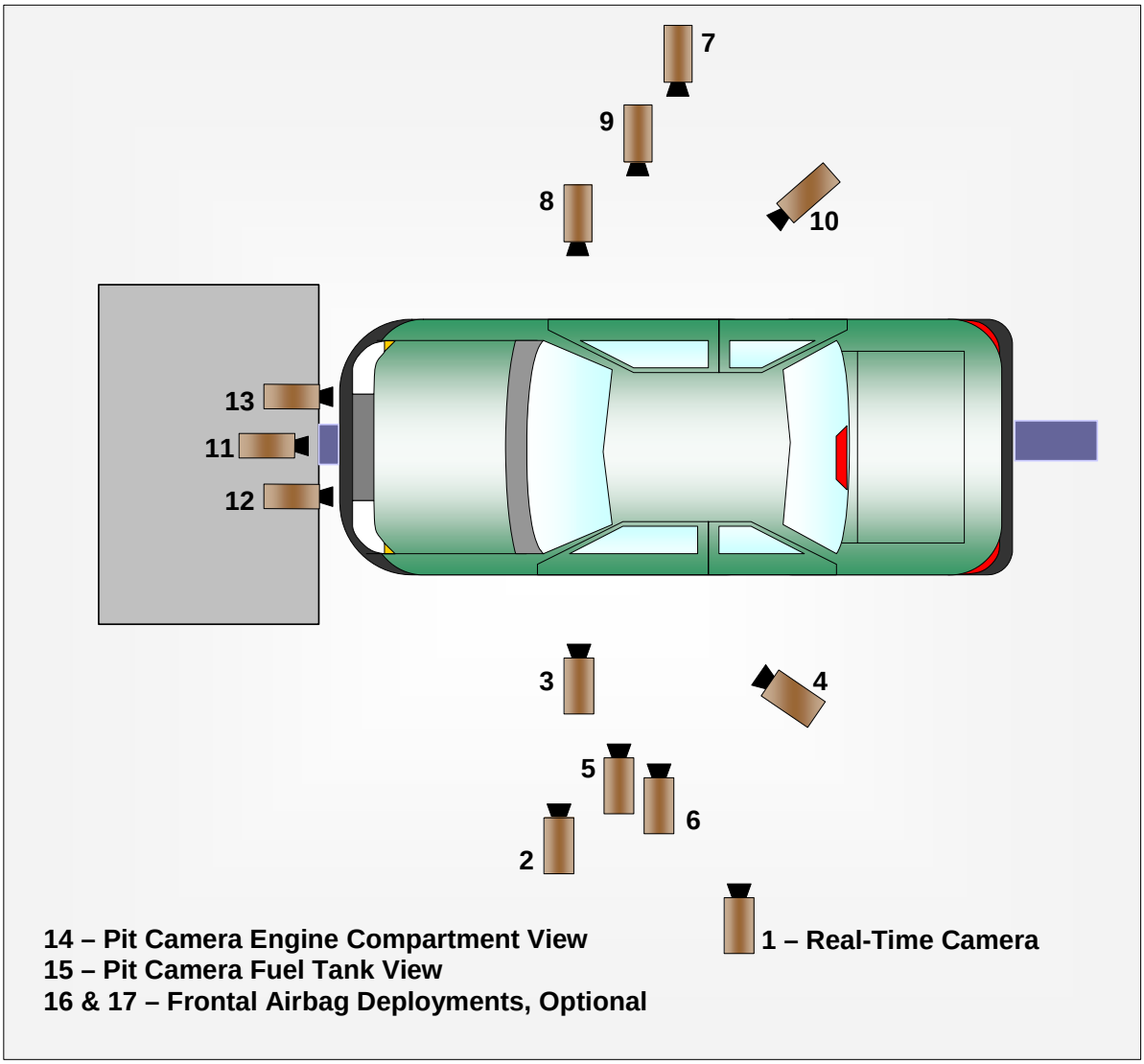
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	830	910
Lap Belt Length as measured on ATD	mm	865	945
Remainder of belt on reel	mm	1885	1745
Total Belt Length for Continuous Webbing Systems	mm	3580	3600

DATA SHEET NO. 6
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2012 Ram 1500 SLT Crew Cab 4x4	NHTSA No.:	MC0306
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	12/27/2011

CAMERA POSITIONS FOR FRONTAL IMPACTS



14 – Pit Camera Engine Compartment View
15 – Pit Camera Fuel Tank View
16 & 17 – Frontal Airbag Deployments, Optional

1 – Real-Time Camera

DATA SHEET NO. 6 (CONTINUED)
CAMERA LOCATIONS AND DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Overall					30
2	Driver Close-Up	1550	-7110	-1830	35	1000
3	Left Front Half	1220	-5670	-1390	24	1000
4	Left Angle	5430	-5100	-1930	50	1000
5	Steering Column - Top	480	-5540	-1230	24	1000
6	Steering Column - Bottom	450	-5520	-830	24	1000
7	Right Overall	2860	6760	-1070	20	1000
8	Passenger Close-Up	1830	7000	-1850	35	1000
9	Right Front Half	1480	5740	-1380	24	1000
10	Right Angle	5690	4700	-1940	50	1000
11	Windshield	-130	0	-2810	24	1000
12	Driver Windshield	-250	-450	-2030	12.5	1000
13	Passenger Windshield	-250	450	-2030	12.5	1000
14	Pit Front	1080	0	3150	24	1000
15	Pit Rear	2920	0	3150	24	1000
16	Onboard Driver Side (optional)					
17	Onboard Passenger Side (optional)					
18	Real-Time Pan View					30

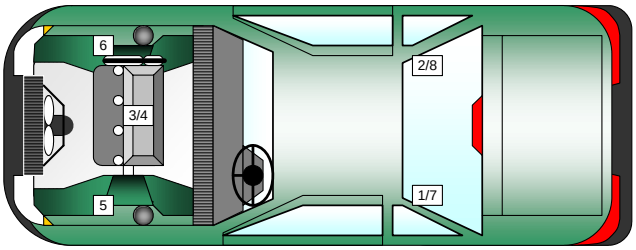
*COORDINATES:

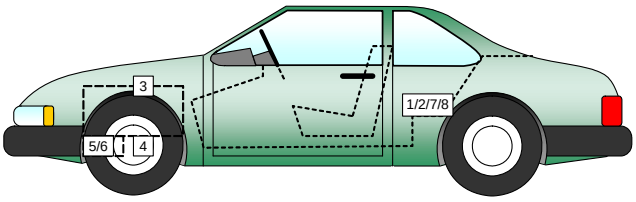
+X = forward of impact plane
+Y = right of monorail centerline
+Z = below ground level

Cameras 16 & 17 were not used for this test.

DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

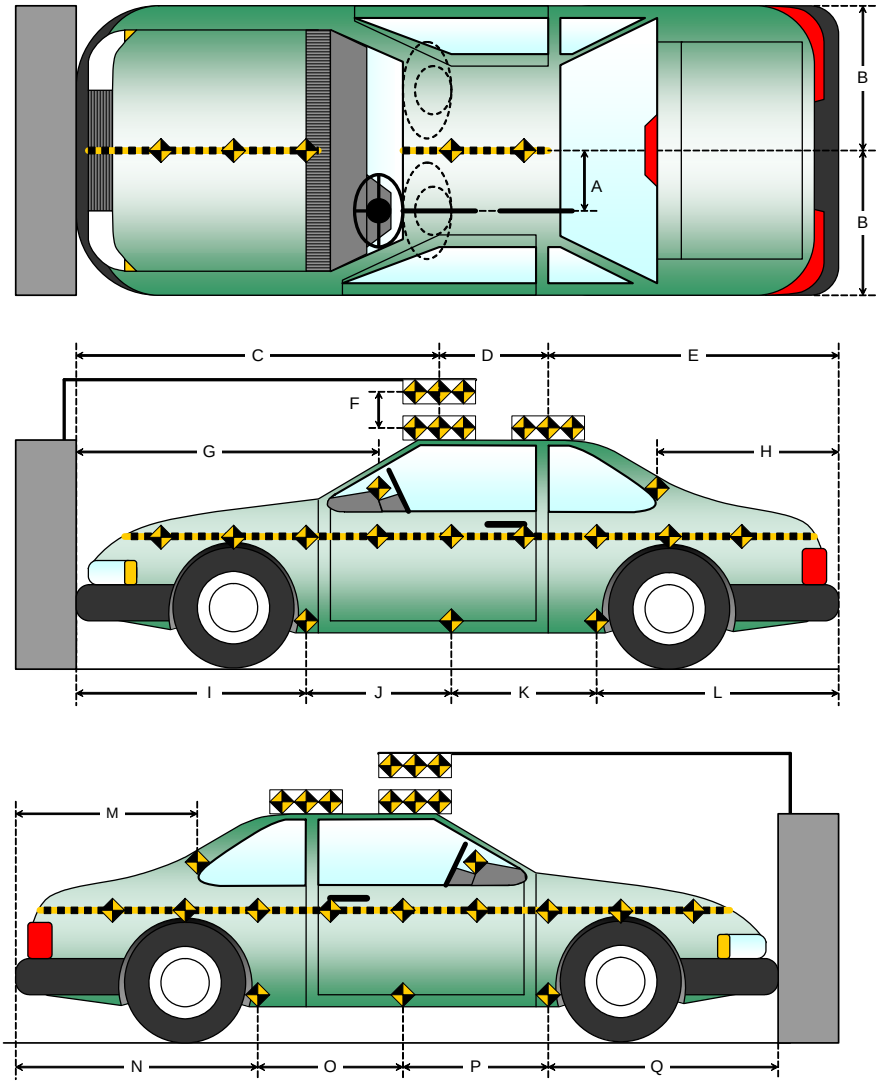
No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2682	-455	-603
2	Right Rear Accelerometer – X Direction	2682	460	-620
3	Engine Top X	4790	24	-1139
4	Engine Bottom X	4541	0	-341
5	Left Brake Caliper X	4618	-725	-334
6	Right Brake Caliper X	4618	725	-305
7	Left Rear Accelerometer Redundant – X Direction	2682	-455	-603
8	Right Rear Accelerometer Redundant – X Direction	2682	460	-620

Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

Item	Value (mm)
A	485
B	1015
C	2480
D	675
E	2670
F	51
G	
H	2142
I	1690
J	1002
K	1002
L	2131
M	2142
N	2131
O	1002
P	1002
Q	1690



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

Advanced Research Load Cell Barrier

1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10	1-11	1-12	1-13	1-14	1-15	1-16
2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	2-9	2-10	2-11	2-12	2-13	2-14	2-15	2-16
3-1	3-2	3-3	3-4	3-5	3-6	3-7	3-8	3-9	3-10	3-11	3-12	3-13	3-14	3-15	3-16
4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8	4-9	4-10	4-11	4-12	4-13	4-14	4-15	4-16
5-1	5-2	5-3	5-4	5-5	5-6	5-7	5-8	5-9	5-10	5-11	5-12	5-13	5-14	5-15	5-16
6-1	6-2	6-3	6-4	6-5	6-6	6-7	6-8	6-9	6-10	6-11	6-12	6-13	6-14	6-15	6-16
7-1	7-2	7-3	7-4	7-5	7-6	7-7	7-8	7-9	7-10	7-11	7-12	7-13	7-14	7-15	7-16
8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
9-1	9-2	9-3	9-4	9-5	9-6	9-7	9-8	9-9	9-10	9-11	9-12	9-13	9-14	9-15	9-16
10-1	10-2	10-3	10-4	10-5	10-6	10-7	10-8	10-9	10-10	10-11	10-12	10-13	10-14	10-15	10-16
11-1	11-2	11-3	11-4	11-5	11-6	11-7	11-8	11-9	11-10	11-11	11-12	11-13	11-14	11-15	11-16

Load Cells are 121 mm x 121 mm with a 7 mm gap in between each load cell.

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

INSTRUMENTATION

Driver Dummy Data Channels	46
Passenger Dummy Data Channels	46
Vehicle Structure Accelerometers	8
Barrier Channels	128
Total	228

CAMERA COVERAGE

High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time	2
Total	16

DATA SHEET NO. 11
POST-TEST OBSERVATIONS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / 634
Head Contact	Airbag, Headrest	Airbag, Headrest
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Front Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Rear Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

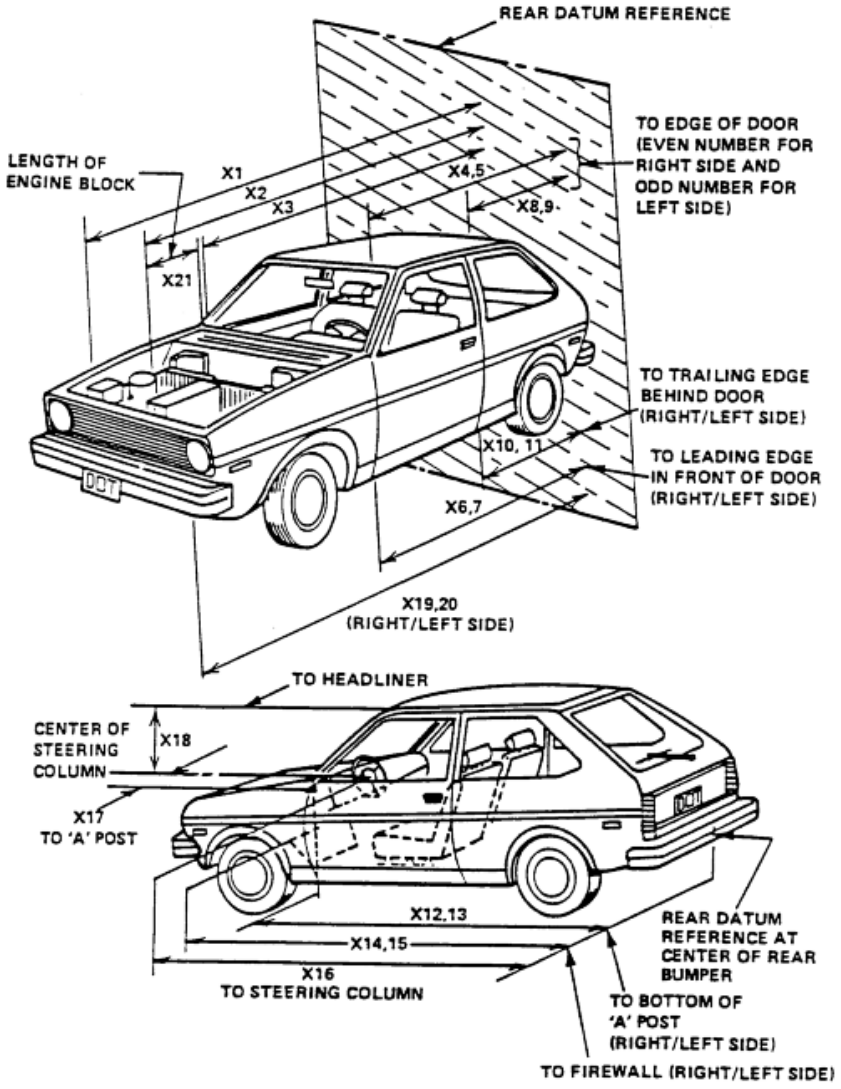
Measured Parameter	Units	Value
Left Side	mm	510
Center	mm	487
Right Side	mm	490
Average	mm	496

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Right Front (Passenger)	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Knee Airbag	No		No	
Curtain Side Airbag	Yes	No	Yes	No
Torso Side Airbag	No		No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	5825	5209	616
2	RSOV to Front of Engine	mm	5059	4970	89
3	RSOV to Firewall	mm	4668	4661	7
4	RSOV to Upper Leading Edge of Right Door	mm	4231	4232	-1
5	RSOV to Upper Leading Edge of Left Door	mm	4231	4230	1
6	RSOV to Lower Leading Edge of Right Door	mm	4175	4173	2
7	RSOV to Lower Leading Edge of Left Door	mm	4175	4175	0
8	RSOV to Upper Trailing Edge of Right Door	mm	3101	3102	-1
9	RSOV to Upper Trailing Edge of Left Door	mm	3101	3101	0
10	RSOV to Lower Trailing Edge of Right Door	mm	3102	3102	0
11	RSOV to Lower Trailing Edge of Left Door	mm	3102	3102	0
12	RSOV to Bottom of “A” Post of Right Side	mm	4170	4170	0
13	RSOV to Bottom of “A” Post of Left Side	mm	4170	4170	0
14	RSOV to Firewall, Right Side	mm	4622	4618	4
15	RSOV to Firewall, Left Side	mm	4640	4635	5
16	RSOV to Steering Column	mm	3725	3740	-15
17	Center of Steering Column to “A” Post	mm	405	430	-25
18	Center of Steering Column to Headliner	mm	470	502	-32
19	RSOV to Right Side of Front Bumper	mm	5410	5180	230
20	RSOV to Left Side of Front Bumper	mm	5410	5210	200
21	Length of Engine Block	mm	507	507	0
RD	RSOV to Right Side of Dash Panel	mm	3990	3995	-5
CD	RSOV to Center of Dash Panel	mm	3910	3910	0
LD	RSOV to Left Side of Dash Panel	mm	3998	4002	-4

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

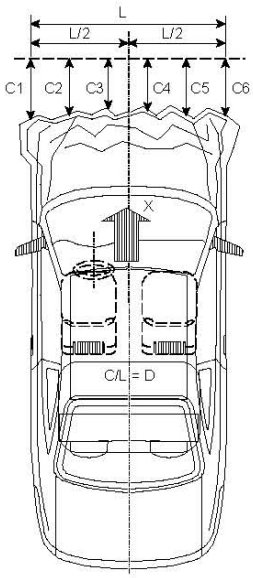
Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

VEHICLE INFORMATION

VIN: 1C6RD7LTXCS114260 Wheelbase (mm): 3568
Vehicle Size Category: Truck Test Weight (kg): 2743.4

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.5
Velocity Change (km/h): 60.9
Time of Separation (msec): 114.1



CRUSH PROFILE

Collision Deformation Classification: Frontal
Midpoint of Damage: Centerline
Damage Region Length (mm): 2260
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	5410	5210	200
C2	Crush zone 2 at left side	mm	5699	5195	504
C3	Crush zone 3 at left side	mm	5790	5225	565
C4	Crush zone 4 at right side	mm	5790	5240	550
C5	Crush zone 5 at right side	mm	5699	5225	474
C6	Crush zone 6 at right side	mm	5410	5180	230
L	C1 TO C6	mm	2260	2110	150

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

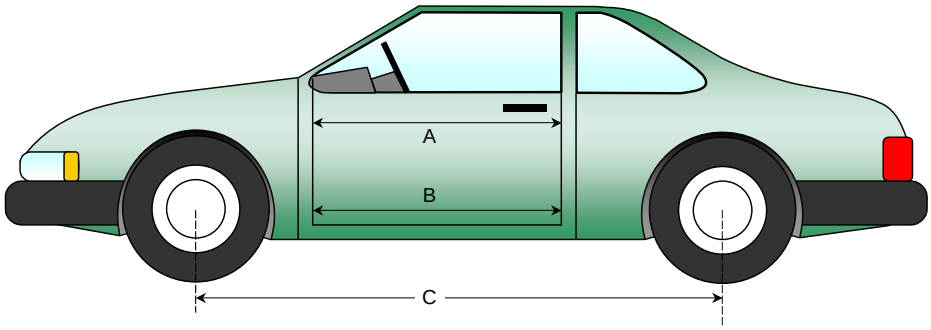
Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

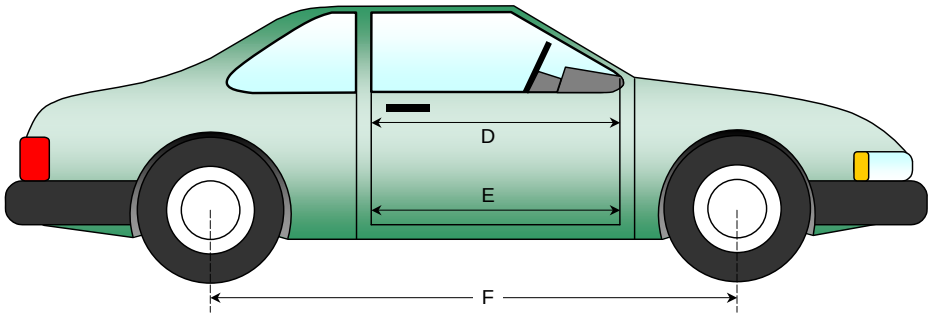
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	971	970	1
B	Left Side Lower	mm	941	941	0
D	Right Side Upper	mm	971	971	0
E	Right Side Lower	mm	941	942	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3568	3535	33
F	Right Side Wheelbase	mm	3568	3530	38





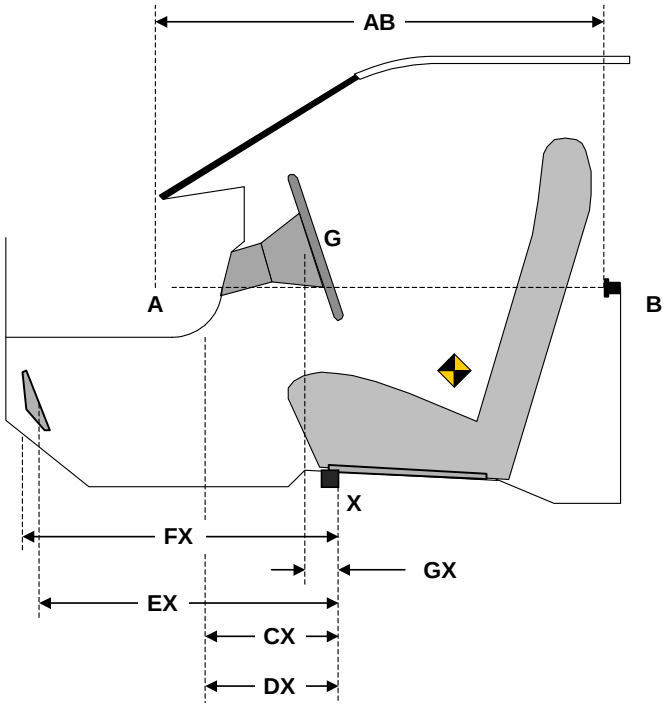
DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	782	782	0
CX	Left Knee Bolster to X	mm	310	303	7
DX	Right Knee Bolster to X	mm	314	260	54
EX	Brake Pedal to X	mm	530	510	20
FX	Foot Rest to X	mm	672	665	7
GX	Center of Steering Column Wheel Hub to X	mm	71	85	-14

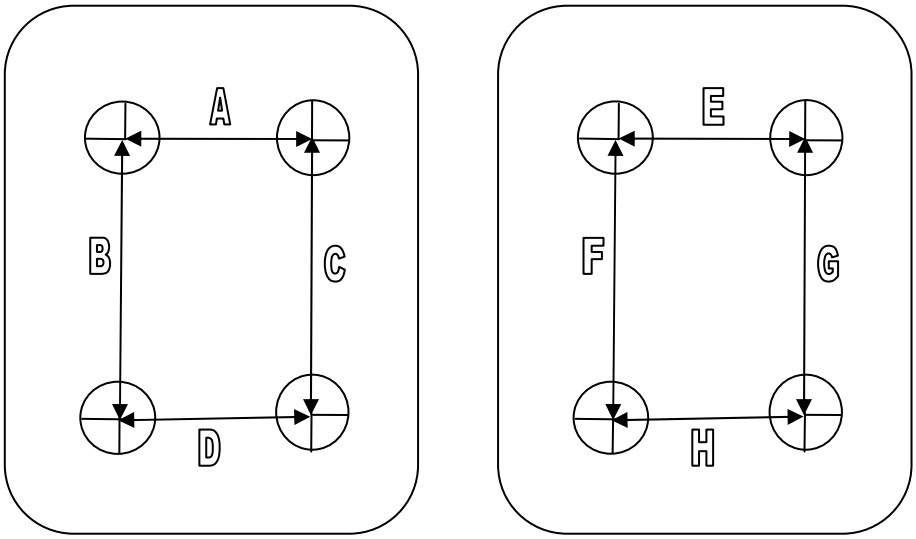
X = Front of Seat Track (stationary)



DRIVER COMPARTMENT

DATA SHEET NO. 14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011



Driver Passenger

TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Units	Pre-Test	Post-Test	Difference
A	mm	200	200	0
B	mm	300	300	0
C	mm	300	300	0
D	mm	200	200	0
E	mm	200	200	0
F	mm	300	300	0
G	mm	300	300	0
H	mm	200	200	0

DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

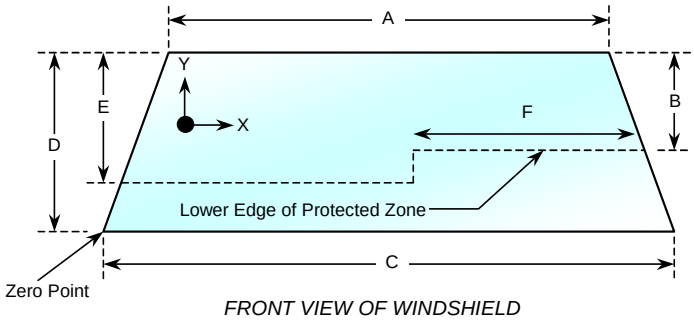
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles, which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.5°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2299	2299	100
Right Side	2299	2299	100
Total	4598	4598	100



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1396
B	mm	449
C	mm	1638
D	mm	782
E	mm	522
F	mm	479

AREA OF PROTECTED ZONE FAILURES - NONE

A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 15 (CONTINUED)
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

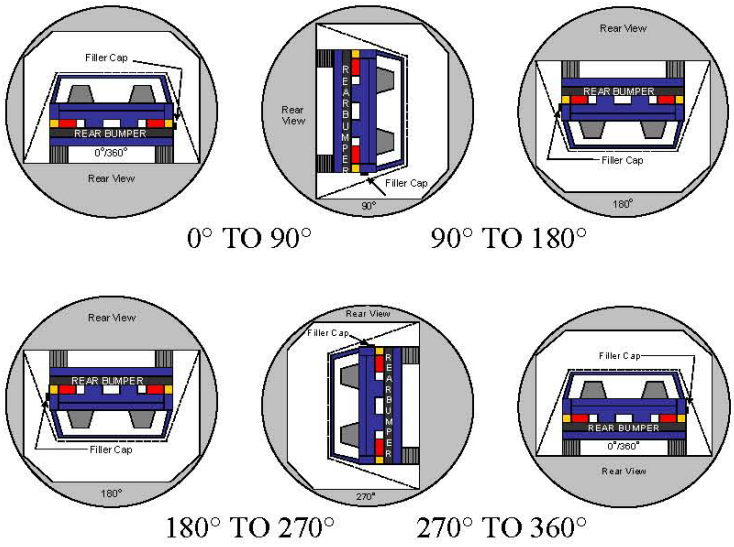
Test Time: 10:19 am Temperature: 21.5° C

A. From impact until vehicle motion ceases: 0 oz.
(Maximum Allowable = 1 ounce)
B. For the 5 minute period after motion ceases: None
(Maximum allowable = 5 ounces)
C. For the following 25 minutes: None
(Maximum allowable = 1 oz./minute)
D. Spillage Details: None

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage: **None**



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	160	300	460
90° to 180°	140	300	440
180° to 270°	143	300	443
270° to 360°	174	300	474

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

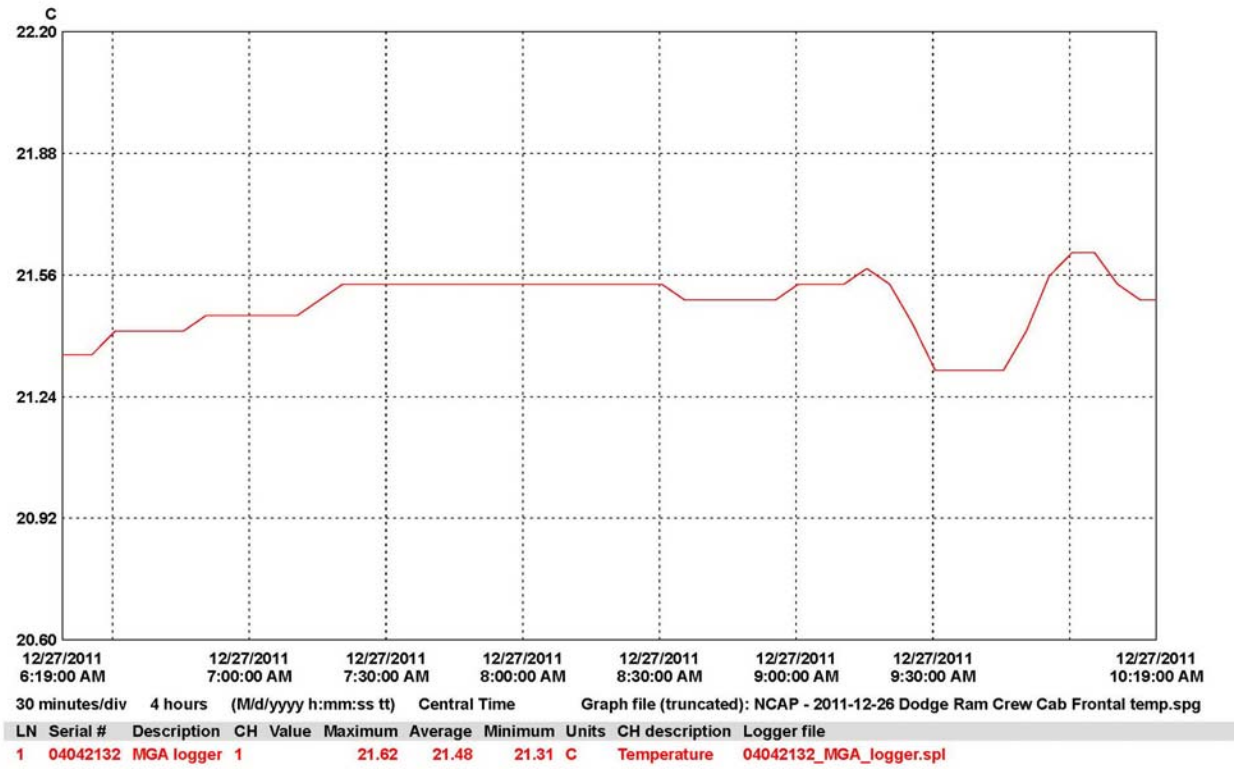
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2012 Ram 1500 SLT Crew Cab 4x4 NHTSA No.: MC0306
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/27/2011

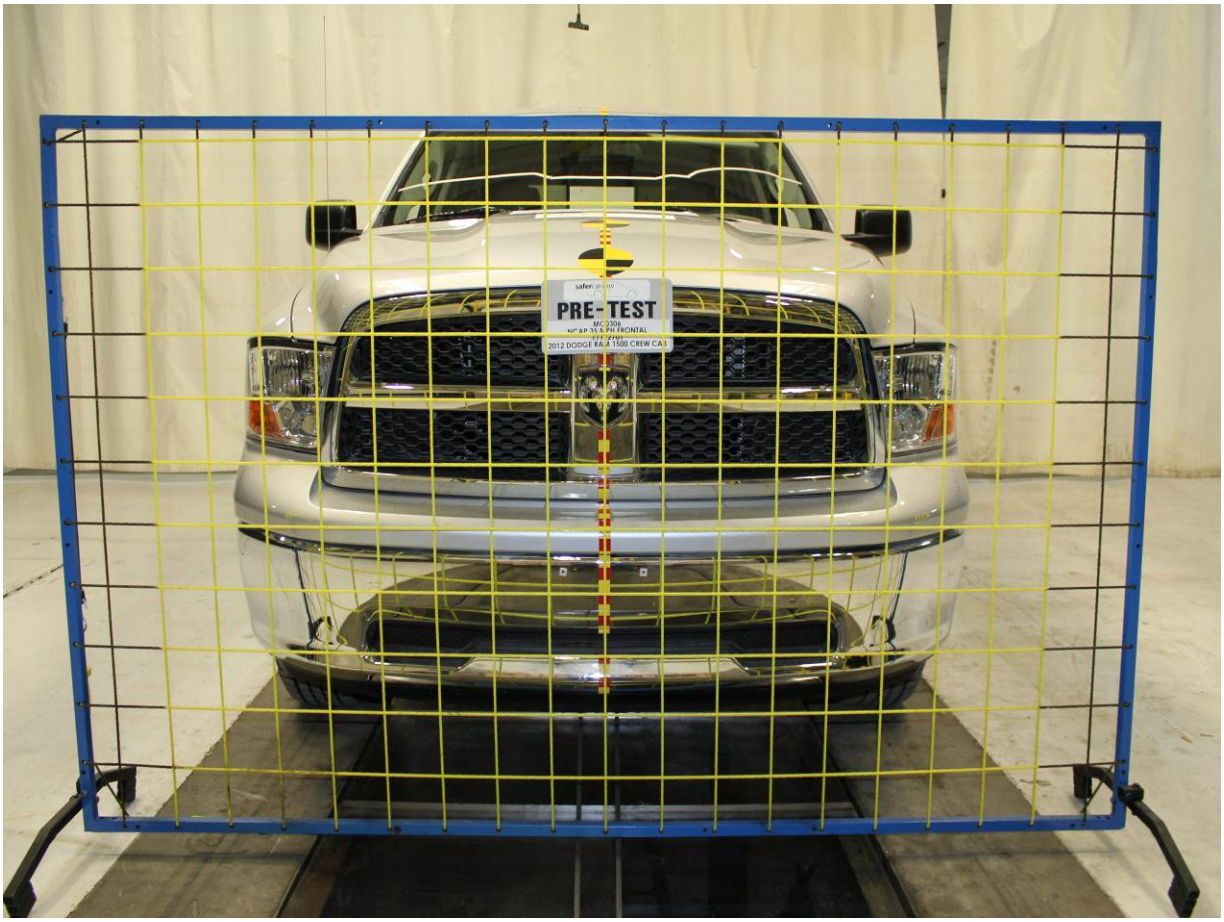


LN	Serial #	Description	CH	Value	Maximum	Average	Minimum	Units	CH description	Logger file
1	04042132	MGA logger	1		21.62	21.48	21.31	C	Temperature	04042132_MGA_logger.spl

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS



Load Cell Location

Load Cell Wall

Manufacturer's Label

Tire Placard

2012 Ram 1500 Crew Cab 4x4 Frontal As Delivered

Left Rear Three-Quarter View, As Received

Pre-Test Front View of Test Vehicle

Post-Test Front View of Test Vehicle

Pre-Test Left View of Test Vehicle

Post-Test Left View of Test Vehicle

Pre-Test Right View of Test Vehicle

Post-Test Right View of Test Vehicle

Pre-Test Right Front Three-Quarter View

Post-Test Right Front Three-Quarter View

Pre-Test Left Rear Three-Quarter View

Post-Test Left Rear Three-Quarter View

Pre-Test Windshield View

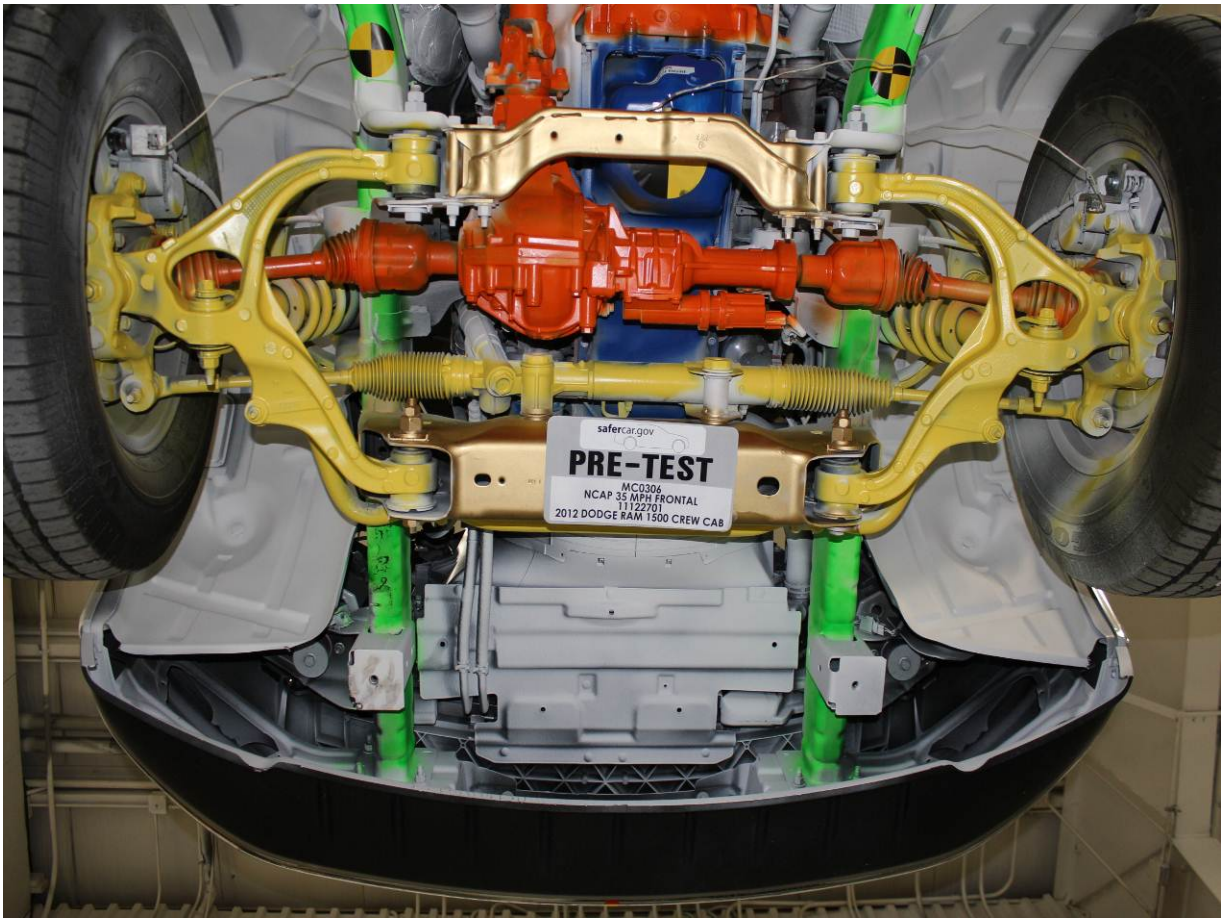
Post-Test Windshield View

Pre-Test Engine Compartment View

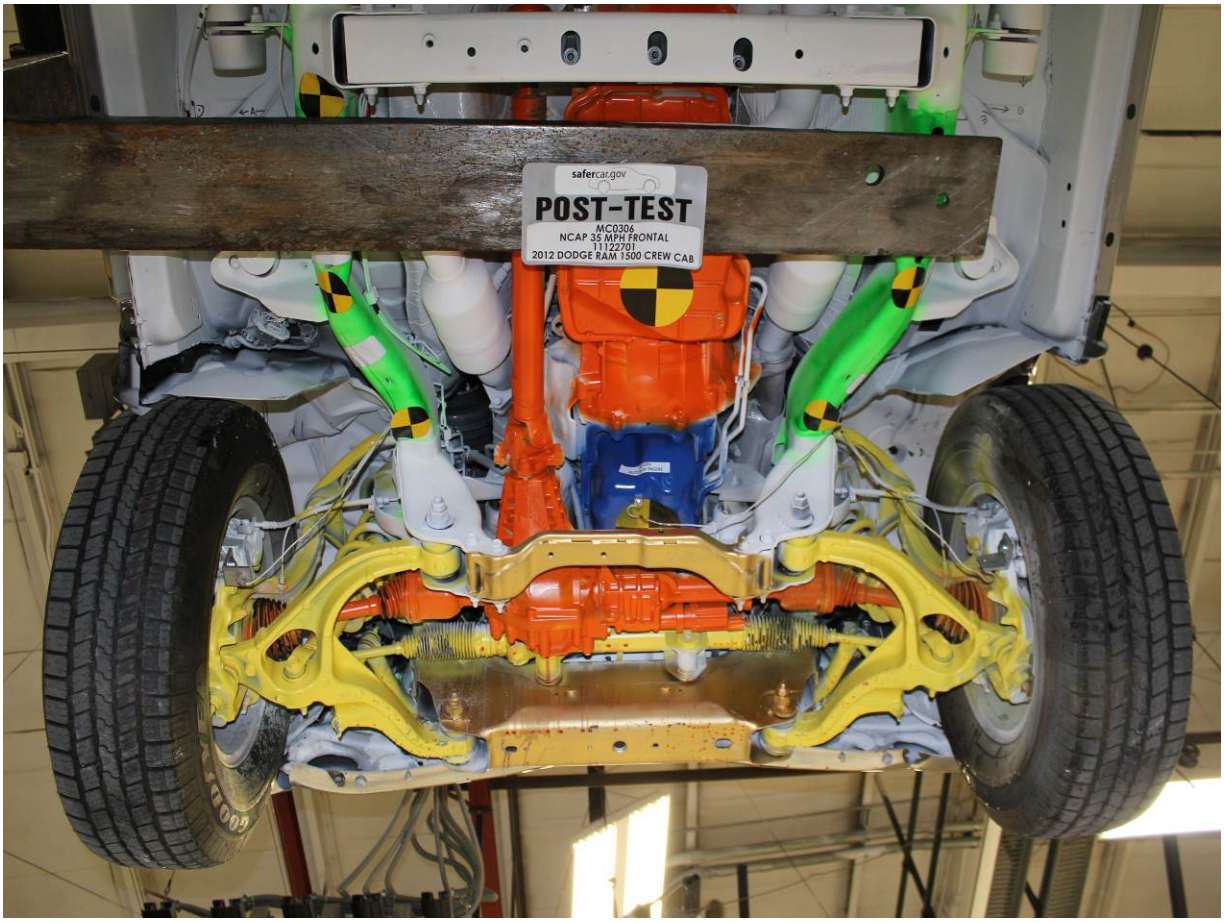
Post-Test Engine Compartment View

Pre-Test Fuel Filler Cap View

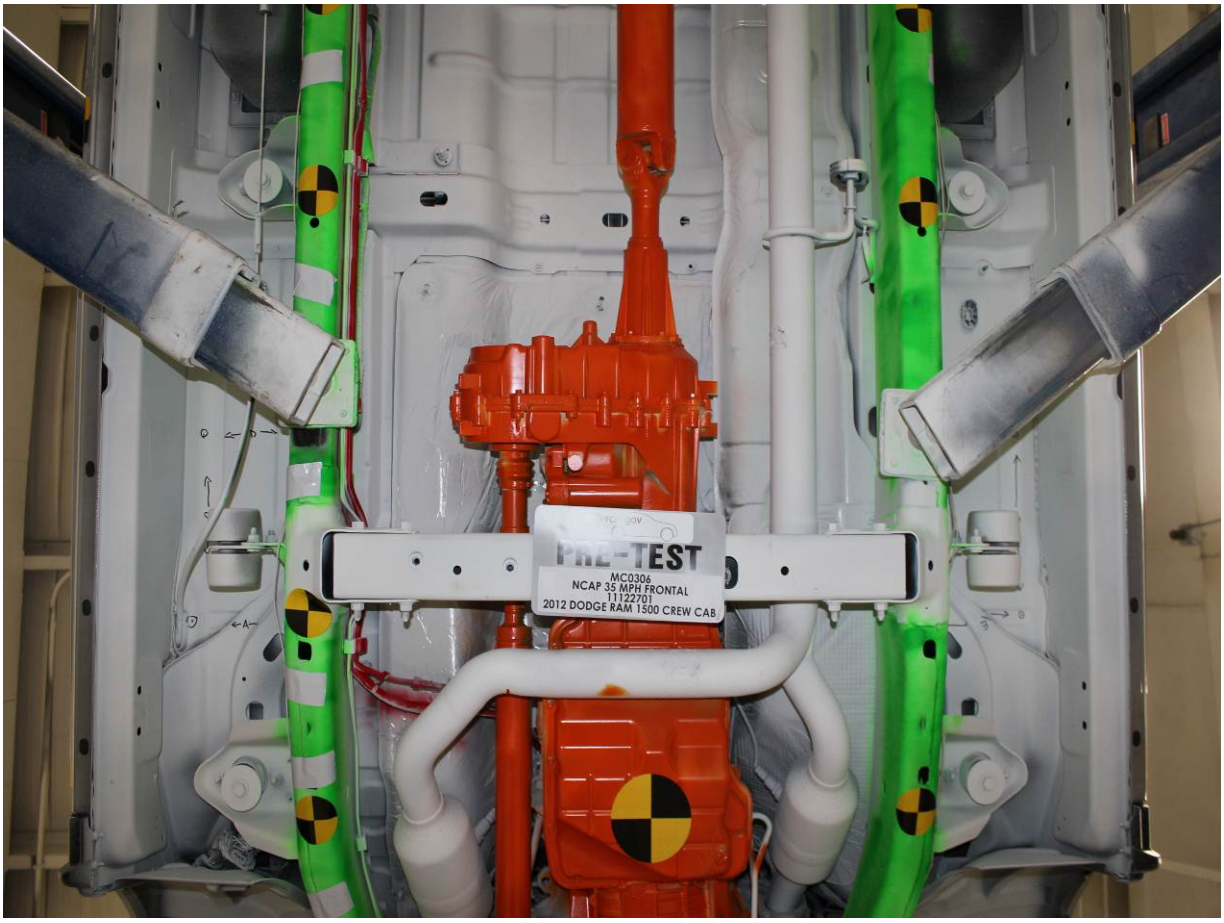
Post-Test Fuel Filler Cap View



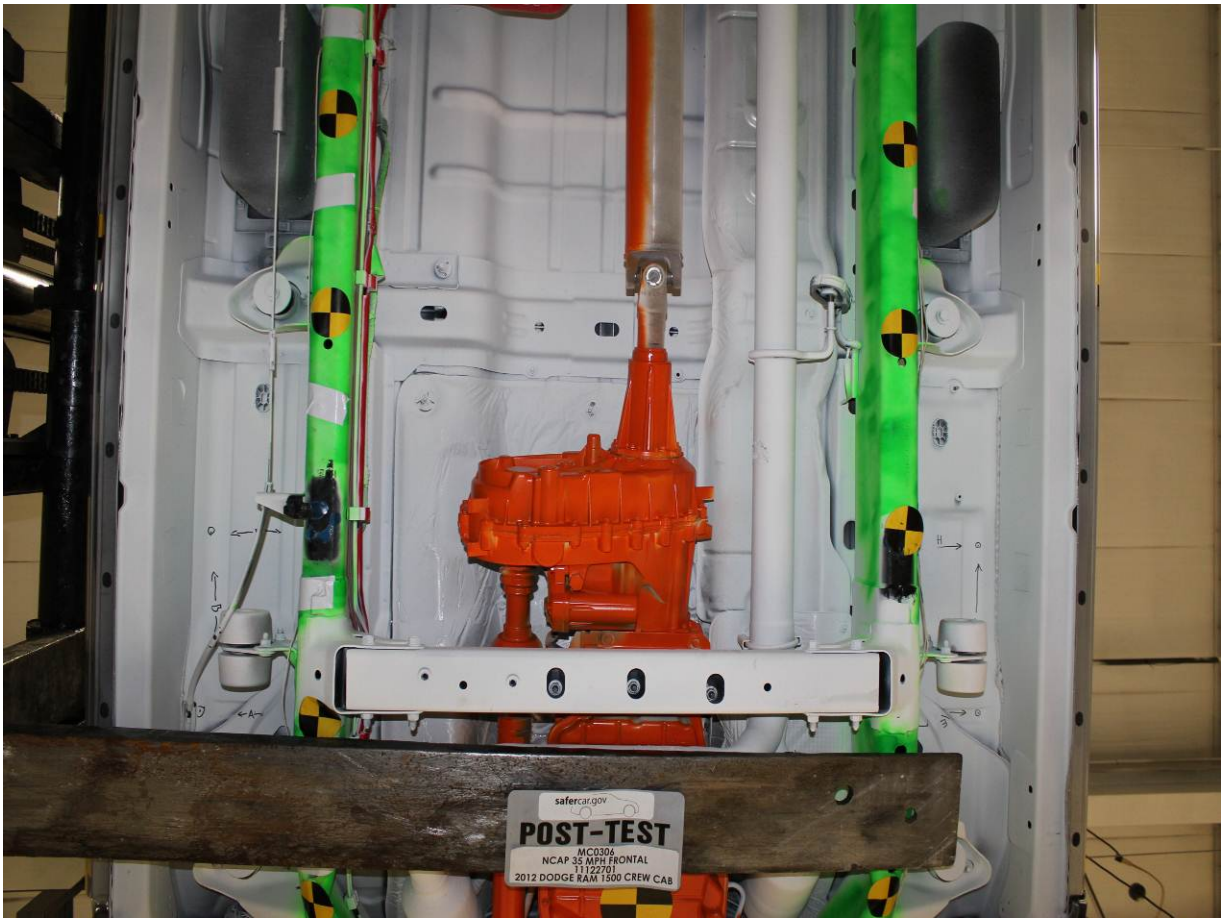
Pre-Test Front Underbody View



Post-Test Front Underbody View

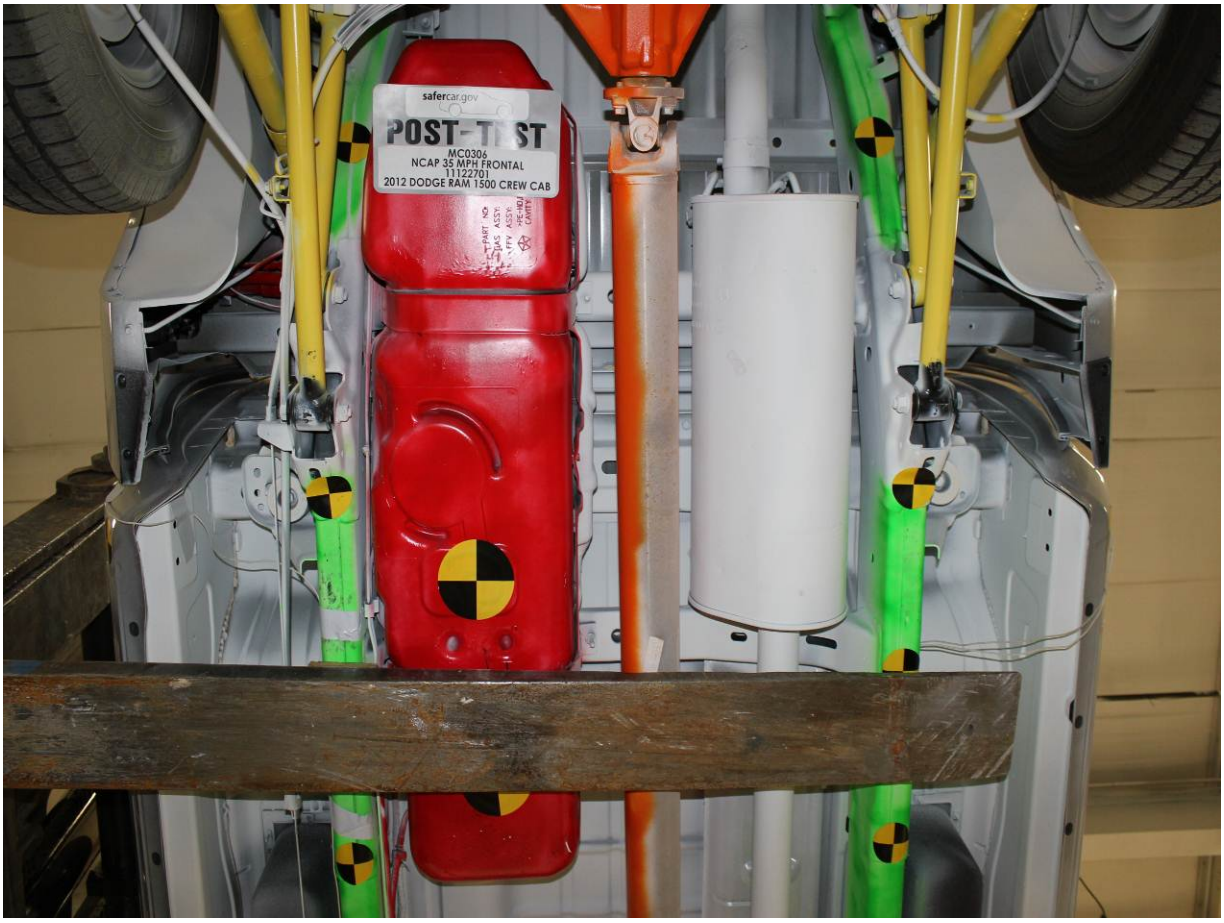


Pre-Test Mid Front Underbody View



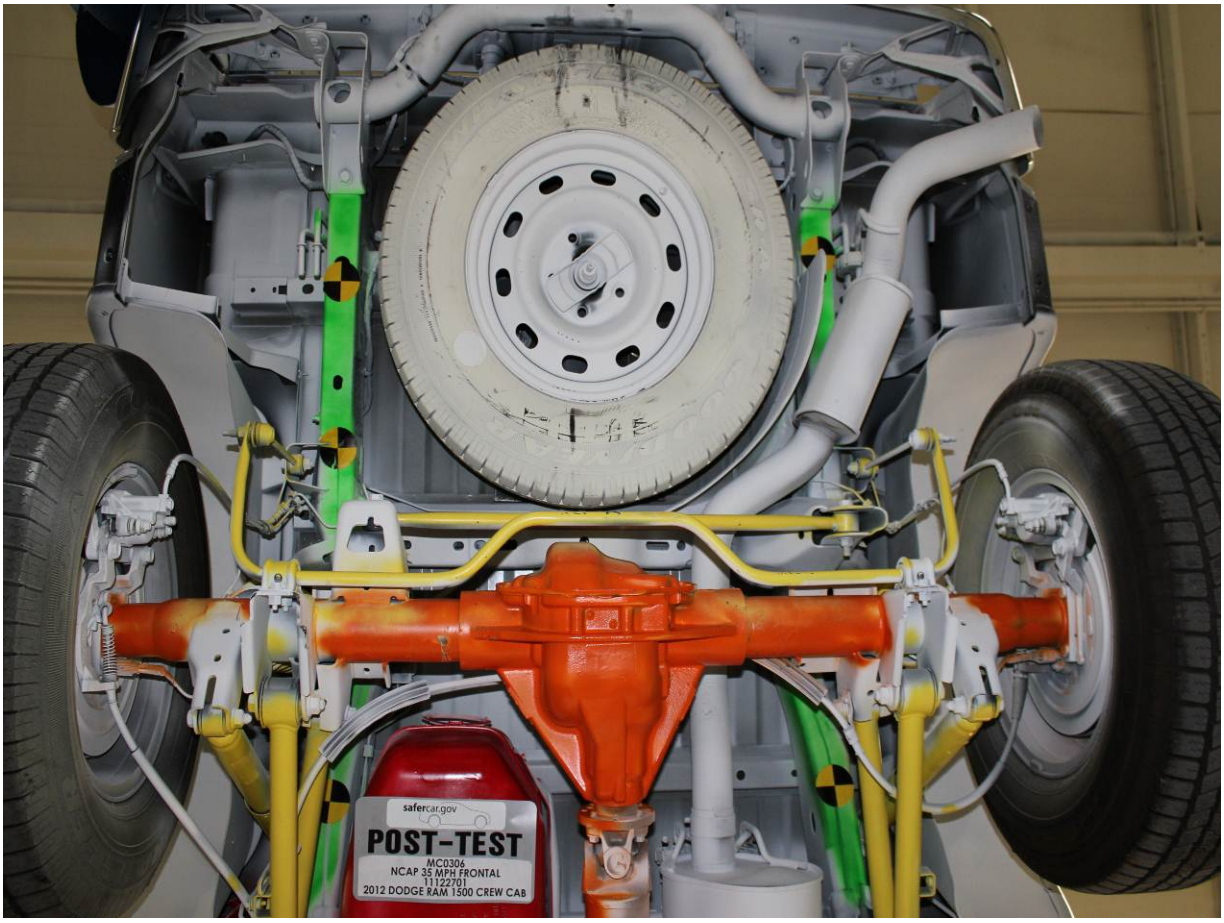
Post-Test Mid Front Underbody View

Pre-Test Mid Rear Underbody View



Post-Test Mid Rear Underbody View

Pre-Test Rear Underbody View



Post-Test Rear Underbody View

Pre-Test Dummy Cable Routing

Post-Test Dummy Cable Routing

Pre-Test Driver Dummy Front View

Post-Test Driver Dummy Front View

Pre-Test Driver Dummy Window View

Post-Test Driver Dummy Window View

Pre-Test Driver Dummy and Vehicle Interior (Door Open)

Post-Test Driver Dummy and Vehicle Interior (Door Open)

Pre-Test Driver's Seat Fore-Aft Markings

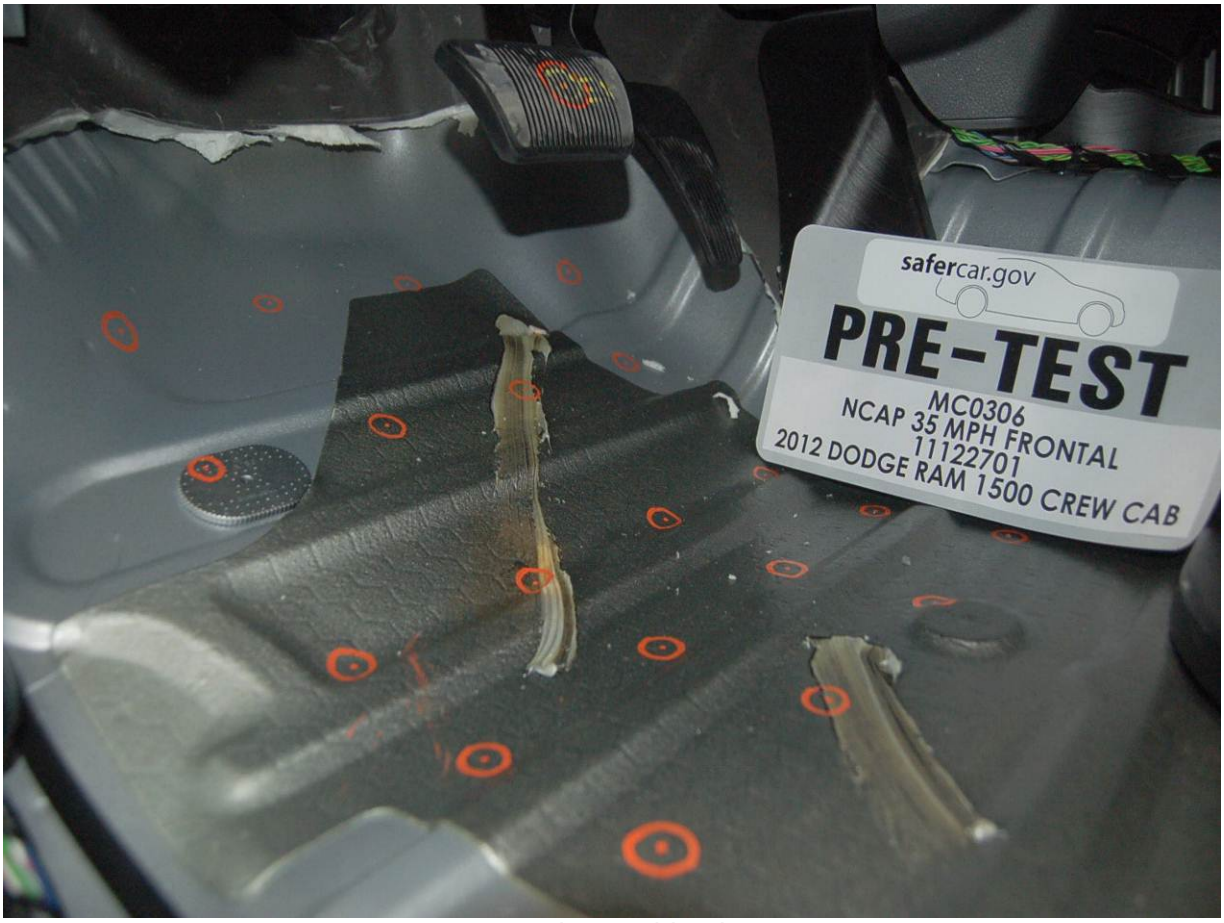
Post-Test Driver's Seat Fore-Aft Markings

Pre-Test Driver Dummy Feet

Post-Test Driver Dummy Feet

Pre-Test Driver's Side Knee Bolster (without dummy)

Post-Test Driver's Side Knee Bolster (without dummy)



Pre-Test Driver's Side Floorpan

Post-Test Driver's Side Floorpan

Post-Test Driver Dummy Face

Post-Test Driver Dummy Contact with Airbag

Post-Test Driver Dummy Contact with Headrest

Post-Test Driver Dummy Contact with Knee Bolster

Pre-Test View of the Steering Wheel

Post-Test View of the Steering Wheel

Pre-Test Passenger Dummy Front View

Post-Test Passenger Dummy Front View

Pre-Test Passenger Dummy Window View

Post-Test Passenger Dummy Window View

Pre-Test Passenger Dummy and Vehicle Interior (Door Open)

Post-Test Passenger Dummy and Vehicle Interior (Door Open)

Pre-Test Passenger's Seat Fore-Aft Markings

Post-Test Passenger's Seat Fore-Aft Markings

Pre-Test Passenger Dummy Feet

Post-Test Passenger Dummy Feet

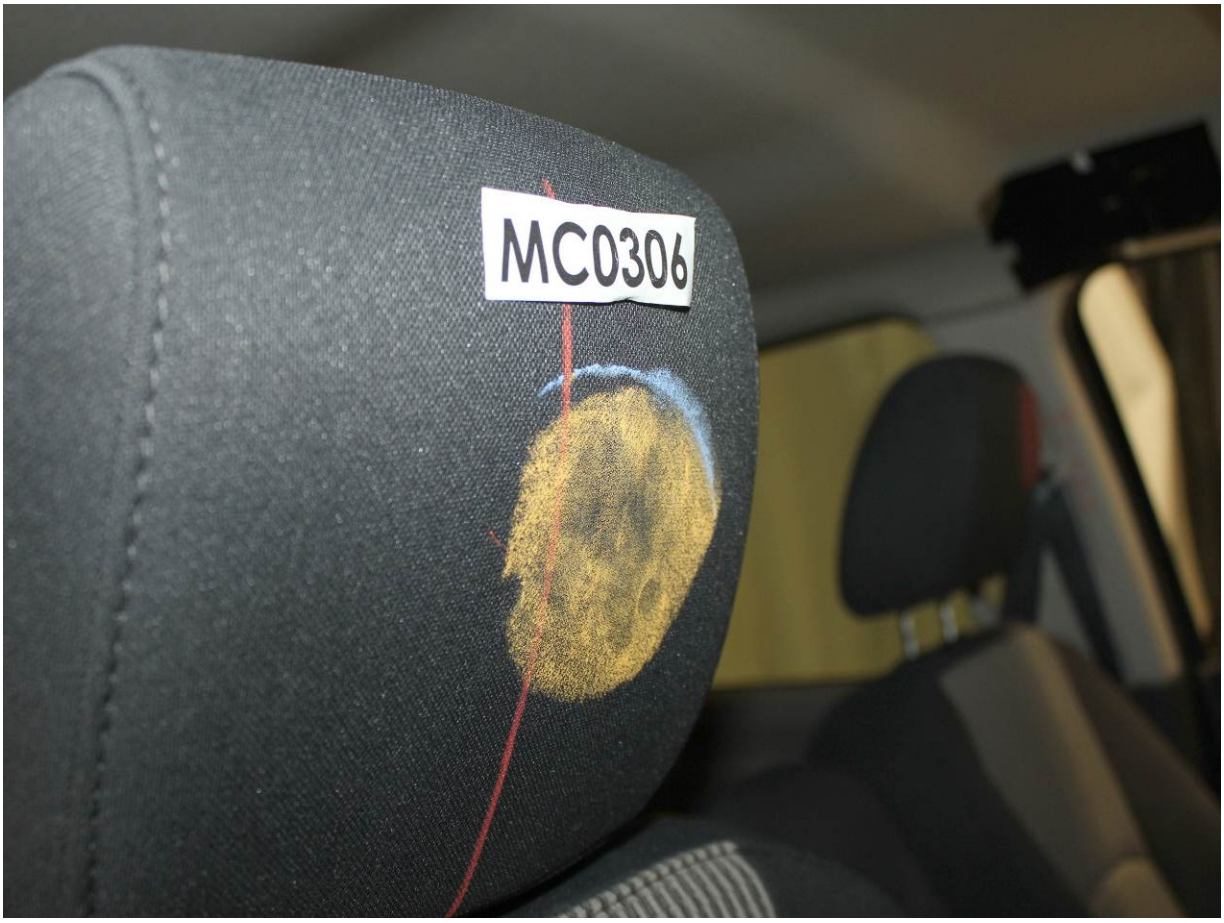
Pre-Test Passenger's Side Knee Bolster (without dummy)

Post-Test Passenger's Side Knee Bolster (without dummy)

Pre-Test Passenger's Side Floorpan

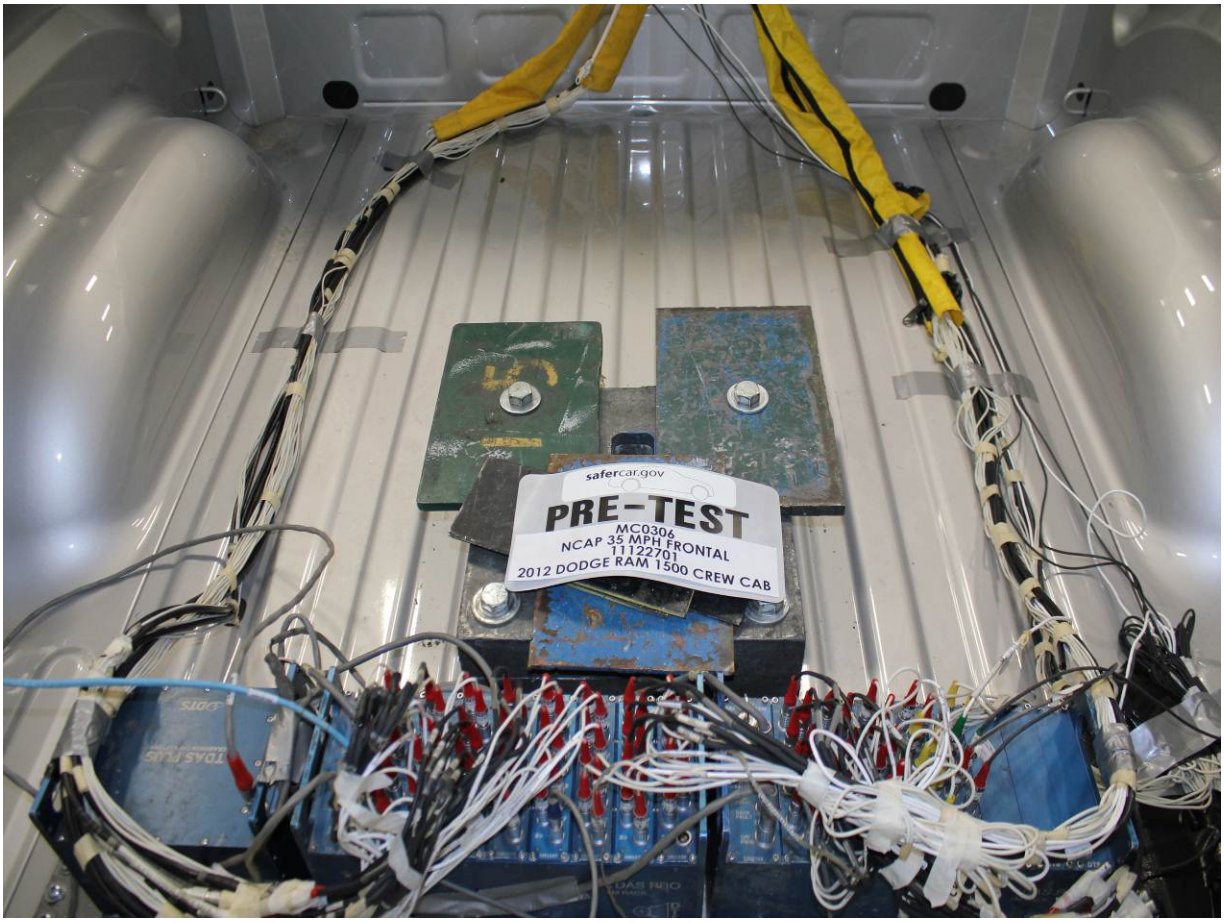
Post-Test Passenger's Side Floorpan

Post-Test Passenger Dummy Contact with Airbag



Post-Test Passenger Dummy Contact with Headrest

Post-Test Passenger Dummy Contact with Knee Bolster



Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

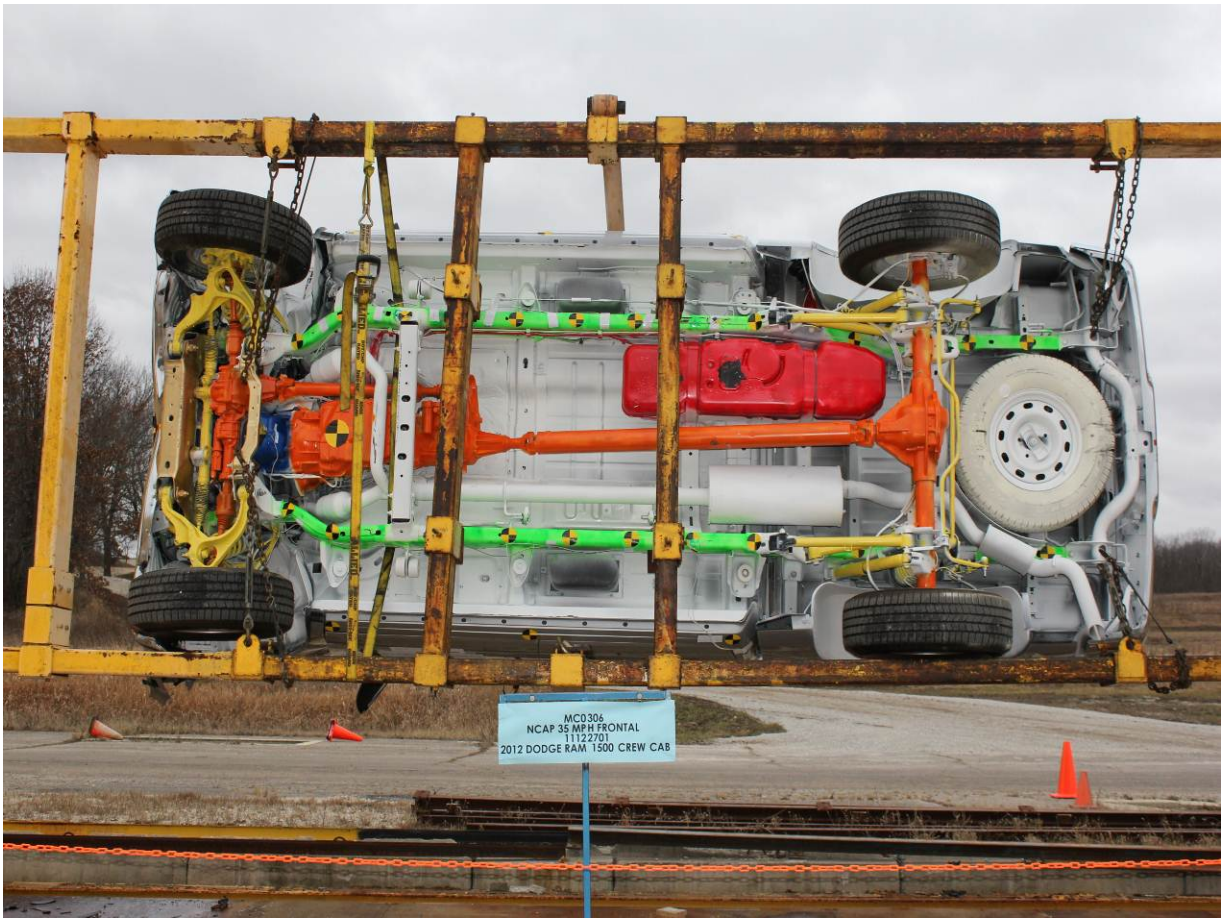
Post-Test Stoddard Solvent Spillage Location View

Post-Test Speed Trap Read-Out

Vehicle at 0 Degrees on Static Rollover Device

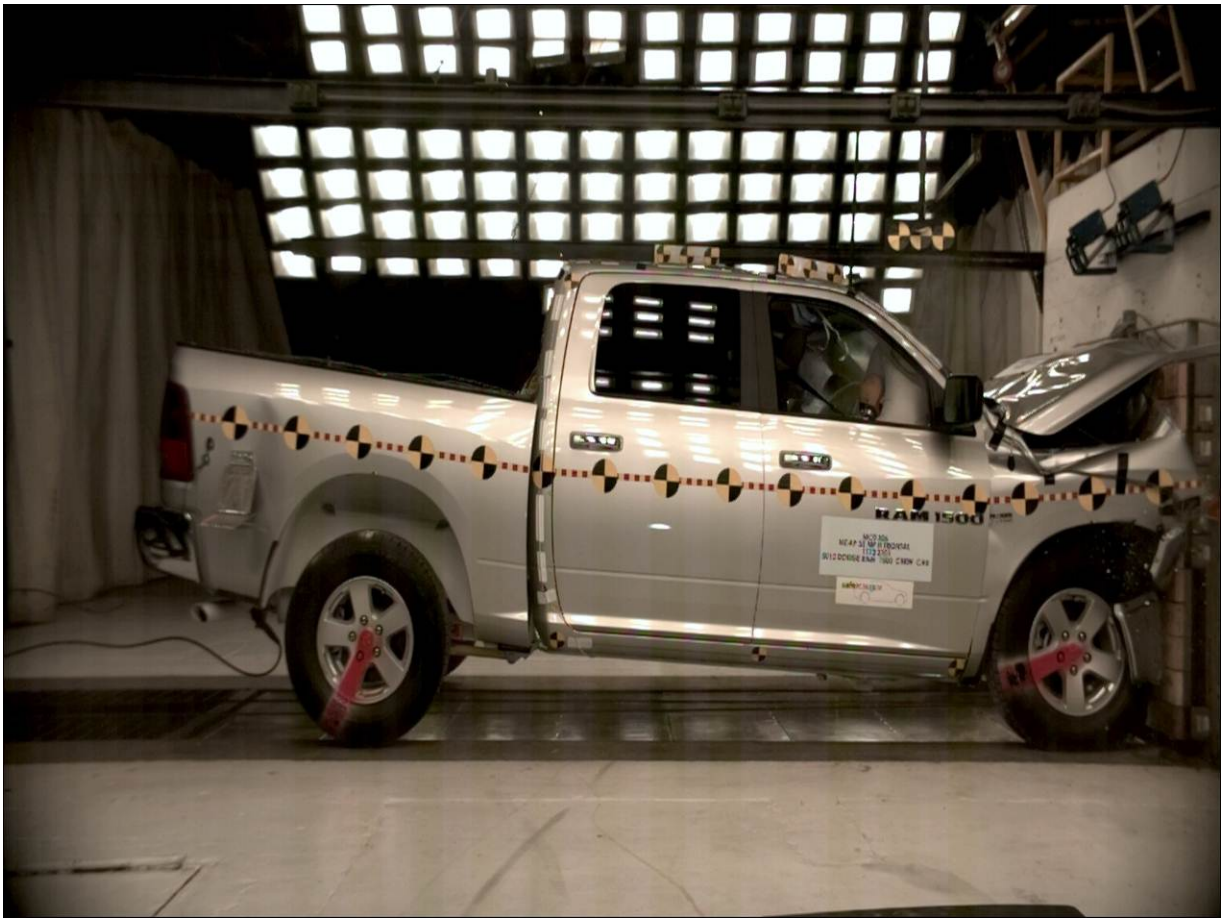
Vehicle at 90 Degrees on Static Rollover Device

Vehicle at 180 Degrees on Static Rollover Device

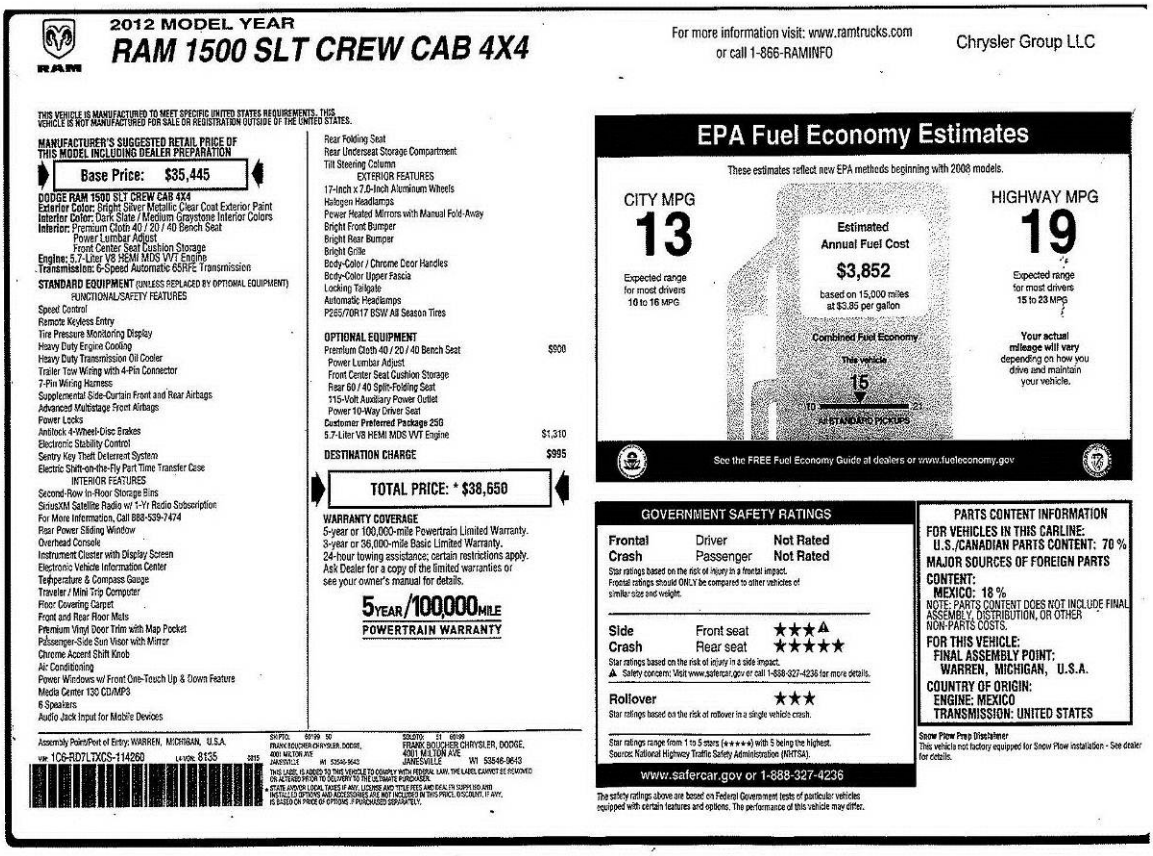


Vehicle at 270 Degrees on Static Rollover Device

Vehicle at 360 Degrees on Static Rollover Device



2012 Ram 1500 Crew Cab 4x4 Frontal Impact Event



2012 MODEL YEAR

RAM 1500 SLT CREW CAB 4X4

For more information visit: www.ramtrucks.com
or call 1-866-RAMINFO

Chrysler Group LLC

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: $35,445

DODGE RAM 1500 SLT CREW CAB 4X4
Exterior Color: Bright Silver Metallic Clear Coat Exterior Paint
Interior Color: Dark Slate / Medium Graystone Interior Colors
Interior: Premium Cloth 40 / 20 / 40 Bench Seat
Power Lumbar Adjust
Front Center Seat Cushion Storage
Engine: 5.7-Liter V8 HEMI MDS VVT Engine
Transmission: 6-Speed Automatic 65RFE Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
Speed Control
Remote Keyless Entry
Tire Pressure Monitoring Display
Heavy Duty Engine Cooling
Heavy Duty Transmission Oil Cooler
Trailer Tow Wiring with 4-Pin Connector
7-Pin Wiring Harness
Supplemental Side-Curtain Front and Rear Airbags
Advanced Multistage Front Airbags
Power Locks
Antilock 4-Wheel-Disc Brakes
Electronic Stability Control
Sentry Key Theft Deterrent System
Electric Shift-on-the-Fly Part Time Transfer Case

INTERIOR FEATURES
Second-Row In-Floor Storage Bins
SiriusXM Satellite Radio w/ 1-Yr Radio Subscription
For More Information, Call 888-539-7474
Rear Power Sliding Window
Overhead Console
Instrument Cluster with Display Screen
Electronic Vehicle Information Center
Temperature & Compass Gauge
Traveler / Mini Trip Computer
Floor Covering Carpet
Front and Rear Floor Mats
Premium Vinyl Door Trim with Map Pocket
Passenger-Side Sun Visor with Mirror
Chrome Accent Shift Knob
Air Conditioning
Power Windows w/ Front One-Touch Up & Down Feature
Media Center 130 CD/MP3
6 Speakers
Audio Jack Input for Mobile Devices
Rear Folding Seat
Rear Underseat Storage Compartment
Tilt Steering Column

EXTERIOR FEATURES
17-Inch x 7.0-Inch Aluminum Wheels
Halogen Headlamps
Power Heated Mirrors with Manual Fold-Away
Bright Front Bumper
Bright Rear Bumper
Bright Grille
Body-Color / Chrome Door Handles
Body-Color Upper Fascia
Locking Tailgate
Automatic Headlamps
P265/70R17 BSW All Season Tires

OPTIONAL EQUIPMENT

Premium Cloth 40 / 20 / 40 Bench Seat Power Lumbar Adjust Front Center Seat Cushion Storage Rear 60 / 40 Split-Folding Seat 115-Volt Auxiliary Power Outlet Power 10-Way Driver Seat	$900
Customer Preferred Package 25G 5.7-Liter V8 HEMI MDS VVT Engine	$1,310
DESTINATION CHARGE	$995

TOTAL PRICE: * $38,650

WARRANTY COVERAGE
5-year or 100,000-mile Powertrain Limited Warranty.
3-year or 36,000-mile Basic Limited Warranty.
24-hour towing assistance; certain restrictions apply.
Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

5 YEAR / 100,000 MILE
POWERTRAIN WARRANTY

Assembly Point/Port of Entry: WARREN, MICHIGAN, U.S.A.

VIN: 1C6-RD7LTXCS-114260 LA-VOL: 8135 2015

SHIPTO: 69199 50
FRANK BOUCHER CHRYSLER, DODGE,
4001 MILTON AVE
JANESVILLE WI 53546-9643

SOLDTO: 51 69199
FRANK BOUCHER CHRYSLER, DODGE,
4001 MILTON AVE
JANESVILLE WI 53546-9643

THIS LABEL IS AFFIXED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.
• STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTIONS, IF PURCHASED SEPARATELY.

EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

CITY MPG **13**
Expected range for most drivers 10 to 16 MPG

Estimated Annual Fuel Cost
$3,852
based on 15,000 miles at $3.85 per gallon

Combined Fuel Economy
This vehicle: 15
10 — 21
All STANDARD PICKUPS

HIGHWAY MPG **19**
Expected range for most drivers 15 to 23 MPG

Your actual mileage will vary depending on how you drive and maintain your vehicle.

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

GOVERNMENT SAFETY RATINGS

Frontal Crash — Driver: **Not Rated** — Passenger: **Not Rated**
Star ratings based on the risk of injury in a frontal impact.
Frontal ratings should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front seat: ★★★▲ — Rear seat: ★★★★★
Star ratings based on the risk of injury in a side impact.
▲ Safety concern: Visit www.safercar.gov or call 1-888-327-4236 for more details.

Rollover ★★★
Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

The safety ratings above are based on Federal Government tests of particular vehicles equipped with certain features and options. The performance of this vehicle may differ.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 70 %
MAJOR SOURCES OF FOREIGN PARTS CONTENT:
MEXICO: 18 %
NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.
FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
WARREN, MICHIGAN, U.S.A.
COUNTRY OF ORIGIN:
ENGINE: MEXICO
TRANSMISSION: UNITED STATES

Snow Plow Prep Disclaimer
This vehicle not factory equipped for Snow Plow installation - See dealer for details.

Monroney Label

APPENDIX B

DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force Y

Driver Upper Neck Moment X

Driver Upper Neck Moment Z

Driver Chest X Redundant

Driver Chest Y Redundant

Driver Chest Z Redundant

Driver Pelvis X

Driver Pelvis Y

Driver Pelvis Z

Driver Left Femur Redundant

Driver Right Femur Redundant

Driver Left Upper Tibia Moment X

Driver Left Upper Tibia Moment Y

Driver Left Upper Tibia Force Z

Driver Left Lower Tibia Moment X

Driver Left Lower Tibia Moment Y

Driver Left Lower Tibia Force Z

Driver Right Upper Tibia Moment X

Driver Right Upper Tibia Moment Y

Driver Right Upper Tibia Force Z

Driver Right Lower Tibia Moment X

Driver Right Lower Tibia Moment Y

Driver Right Lower Tibia Force Z

Driver Left Foot Fore Z

Driver Left Foot Aft X

Driver Left Foot Aft Z

Driver Right Foot Fore Z

Driver Right Foot Aft X

Driver Right Foot Aft Z

Driver Lap Belt Force

Driver Shoulder Belt Force

Passenger Head X Redundant

Passenger Head Y Redundant

Passenger Head Z Redundant

Passenger Upper Neck Force Y

Passenger Upper Neck Moment X

Passenger Upper Neck Moment Z

Passenger Chest X Redundant

Passenger Chest Y Redundant

Passenger Chest Z Redundant

Passenger Pelvis X

Passenger Pelvis Y

Passenger Pelvis Z

Passenger Left Femur Redundant

Passenger Right Femur Redundant

Passenger Left Upper Tibia Moment X

Passenger Left Upper Tibia Moment Y

Passenger Left Upper Tibia Force Z

Passenger Left Lower Tibia Moment X

Passenger Left Lower Tibia Moment Y

Passenger Left Lower Tibia Force Z

Passenger Right Upper Tibia Moment X

Passenger Right Upper Tibia Moment Y

Passenger Right Upper Tibia Force Z

Passenger Right Lower Tibia Moment X

Passenger Right Lower Tibia Moment Y

Passenger Right Lower Tibia Force Z

Passenger Left Foot Fore Z

Passenger Left Foot Aft X

Passenger Left Foot Aft Z

Passenger Right Foot Fore Z

Passenger Right Foot Aft X

Passenger Right Foot Aft Z

Passenger Lap Belt Force

Passenger Shoulder Belt Force

Left Rear Seat Crossmember X

Right Rear Seat Crossmember X

Vehicle Engine Top X

Vehicle Engine Bottom X

Vehicle Left Brake Caliper X

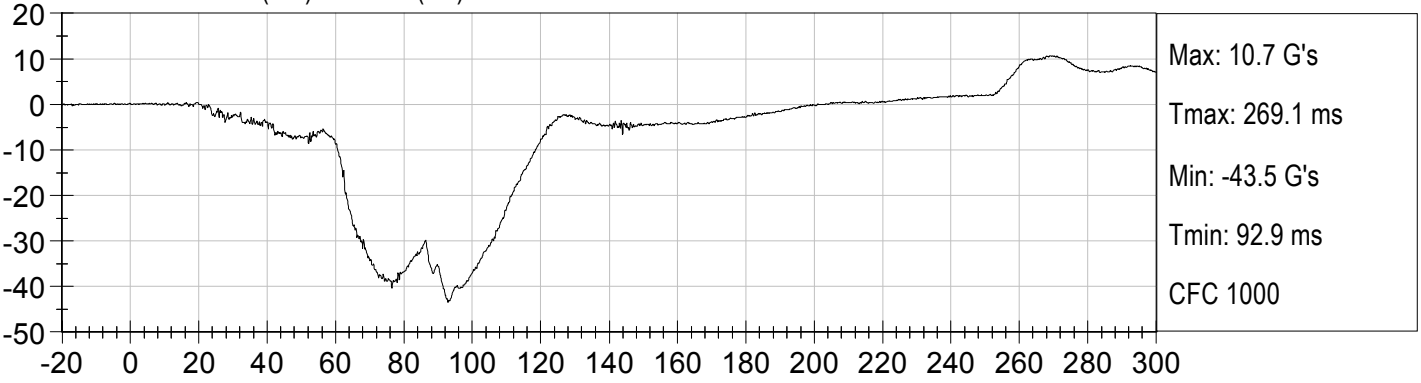
Vehicle Right Brake Caliper X

Left Rear Seat Crossmember Xr

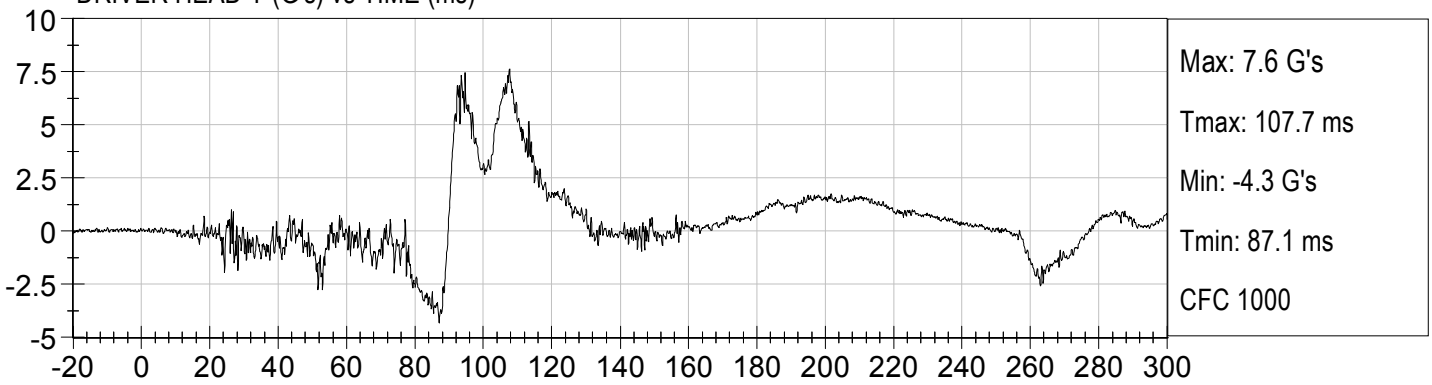
Right Rear Seat Crossmember Xr

Advanced Research Load Cell Barrier – 128 channels

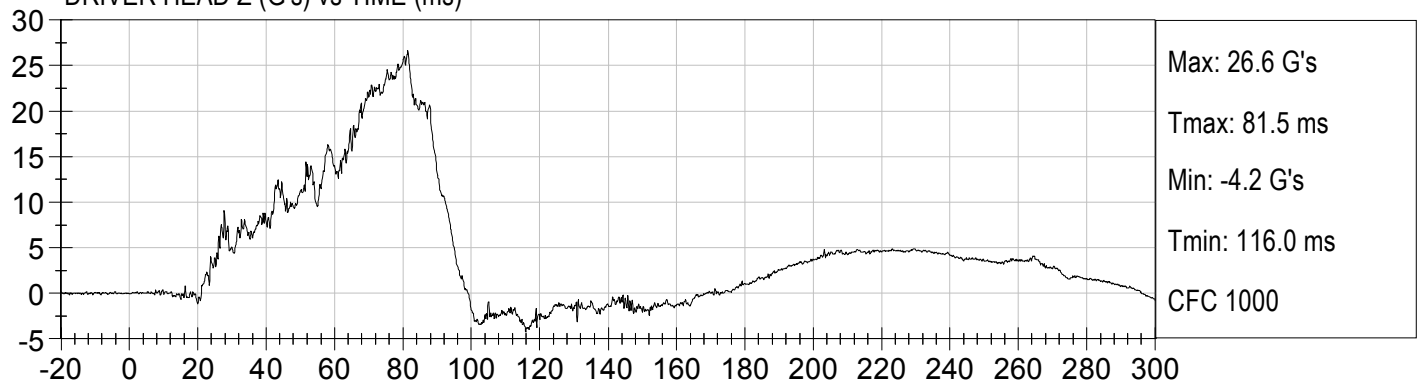
DRIVER HEAD X (G's) vs TIME (ms)



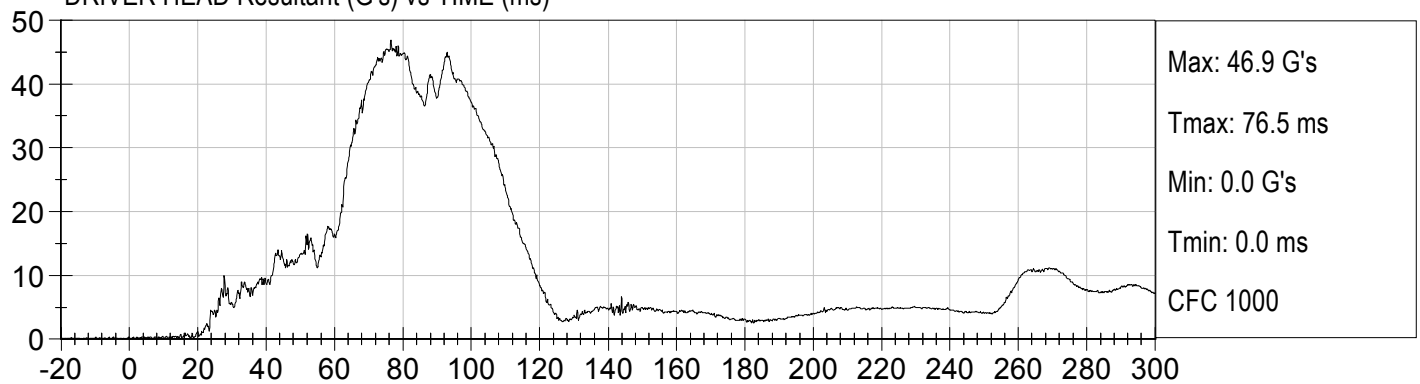
DRIVER HEAD Y (G's) vs TIME (ms)



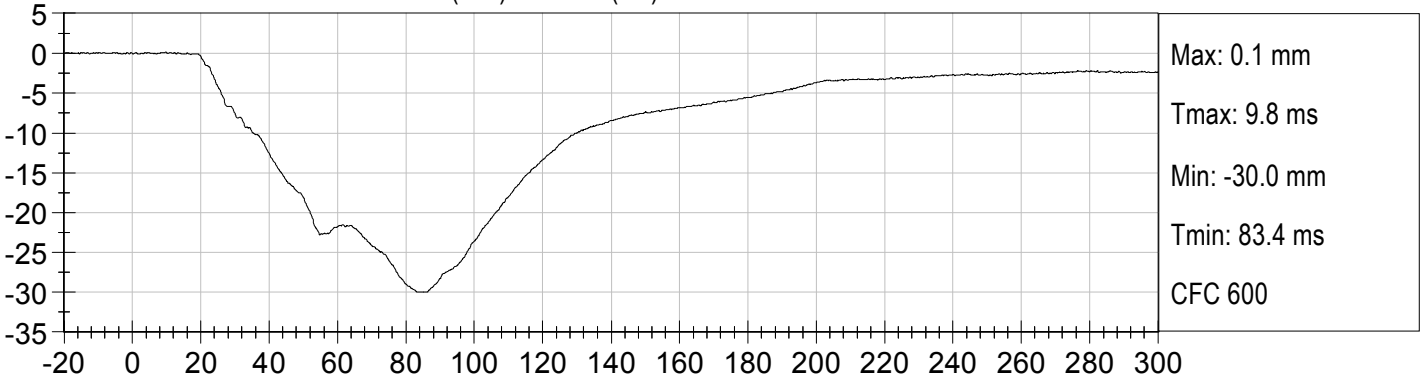
DRIVER HEAD Z (G's) vs TIME (ms)



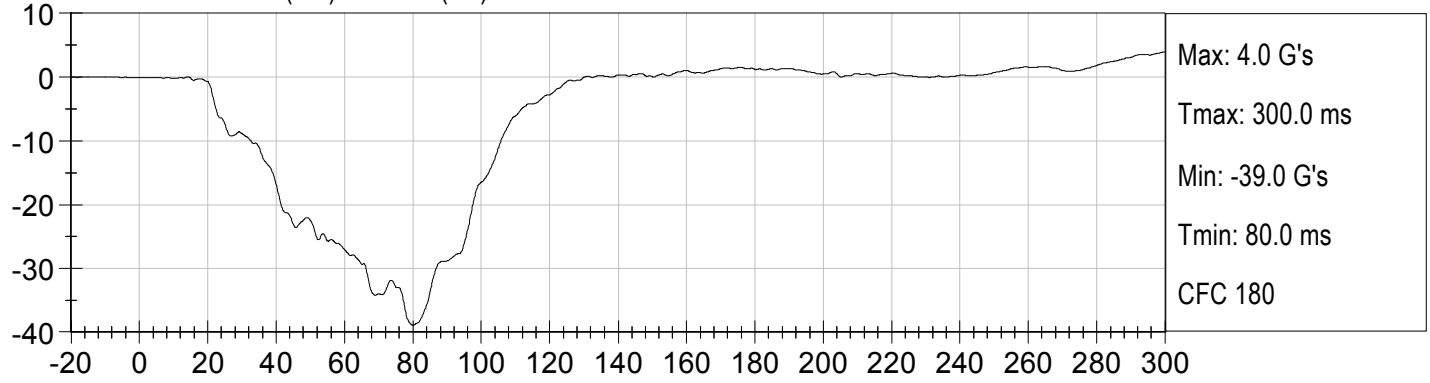
DRIVER HEAD Resultant (G's) vs TIME (ms)



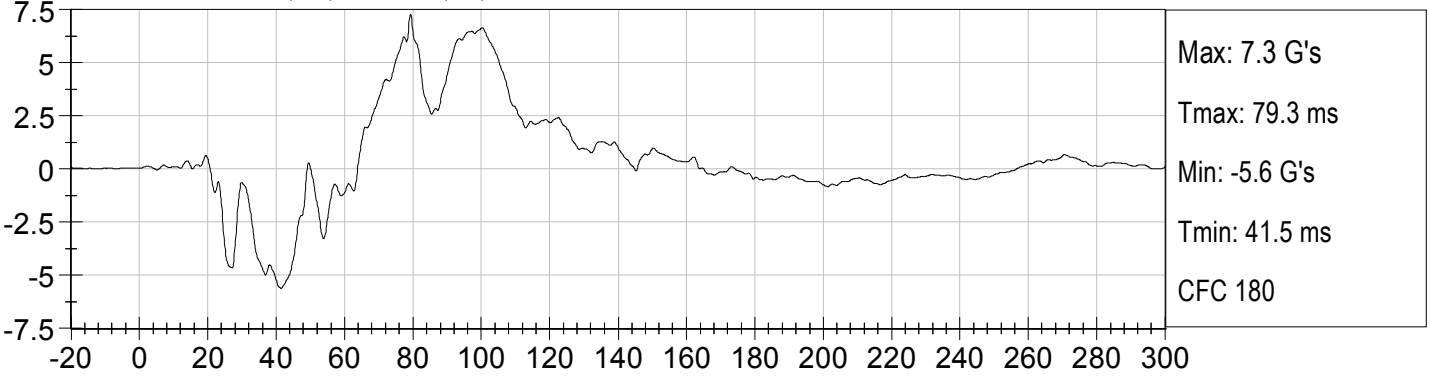
DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)



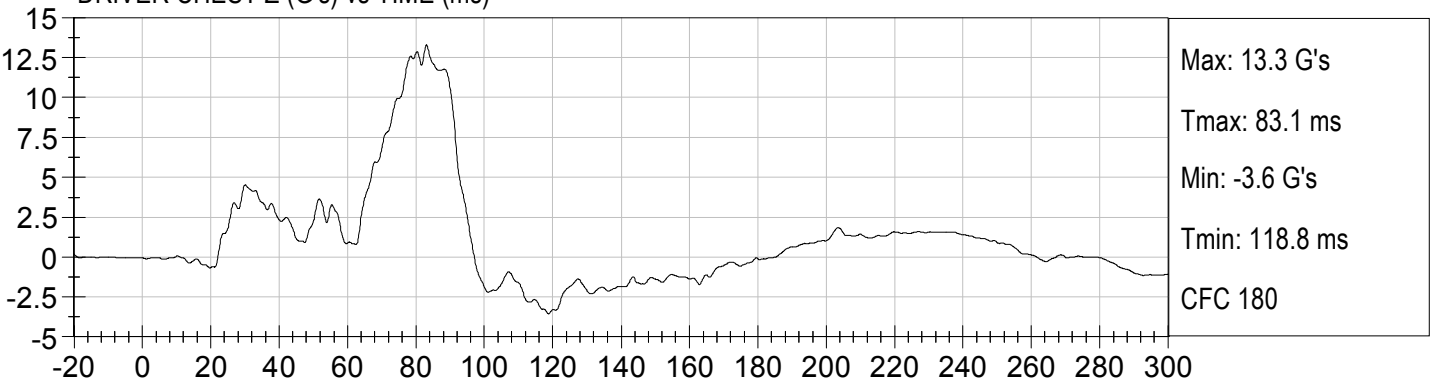
DRIVER CHEST X (G's) vs TIME (ms)



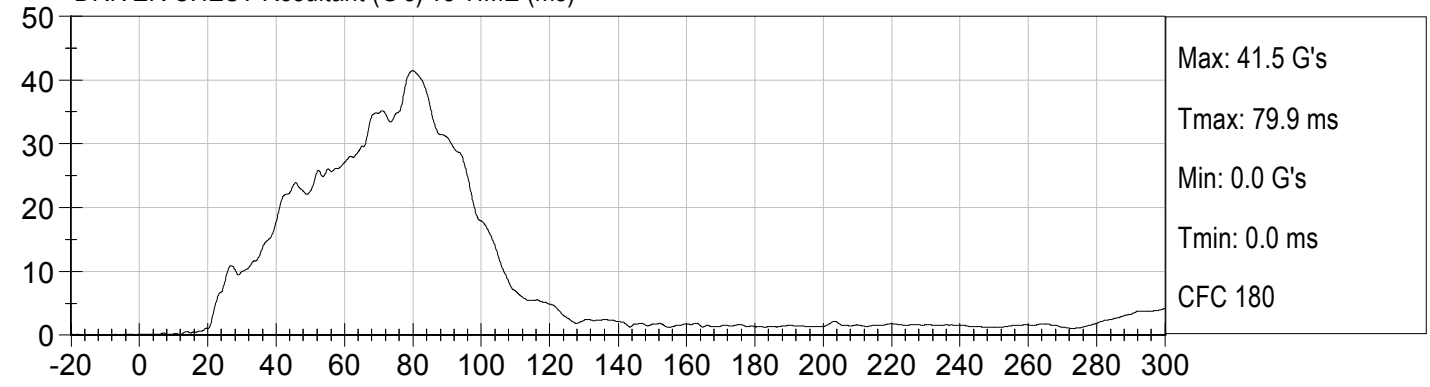
DRIVER CHEST Y (G's) vs TIME (ms)



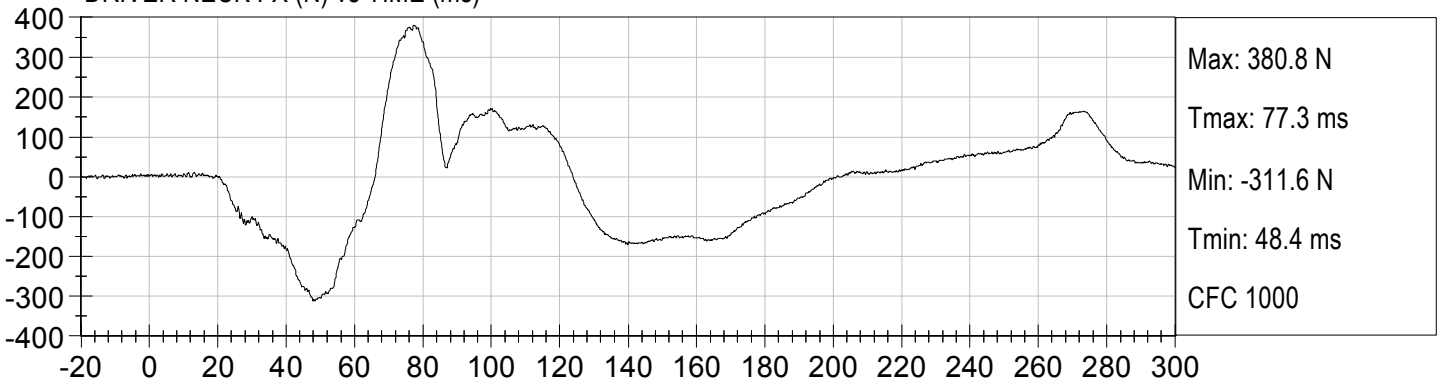
DRIVER CHEST Z (G's) vs TIME (ms)



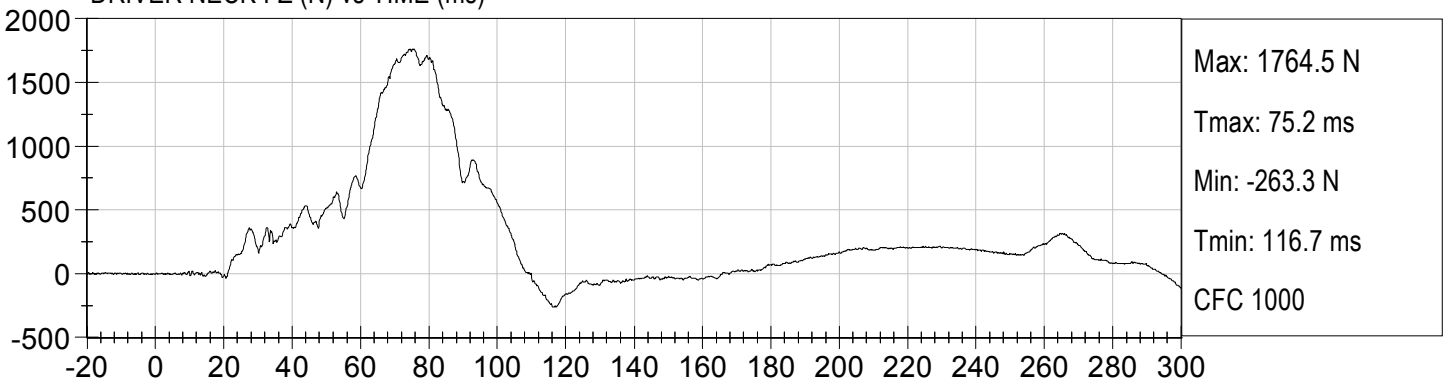
DRIVER CHEST Resultant (G's) vs TIME (ms)



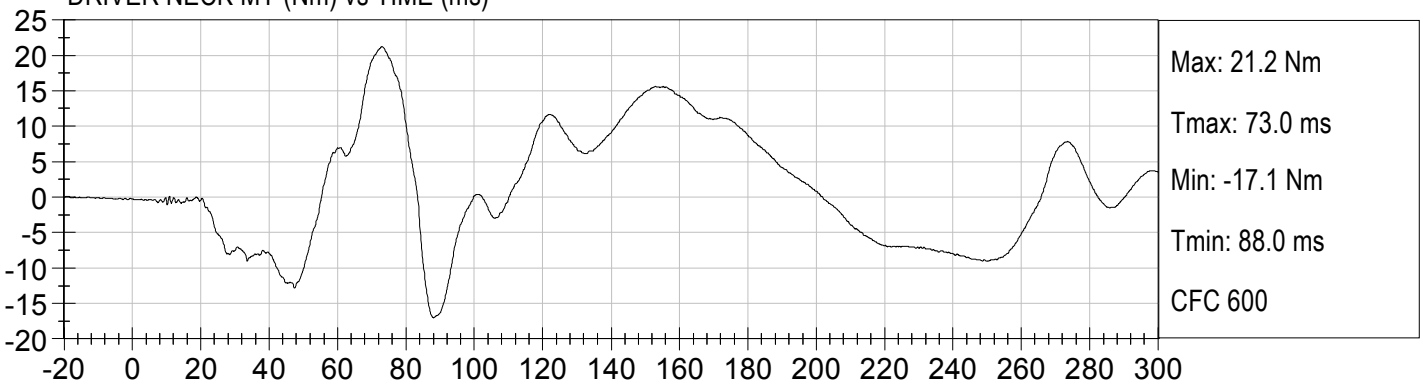
DRIVER NECK FX (N) vs TIME (ms)



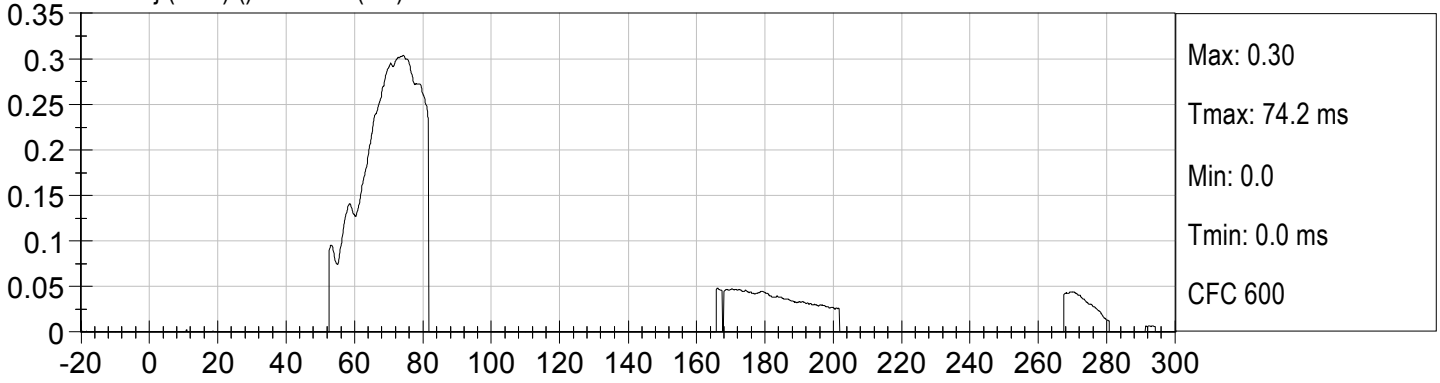
DRIVER NECK FZ (N) vs TIME (ms)



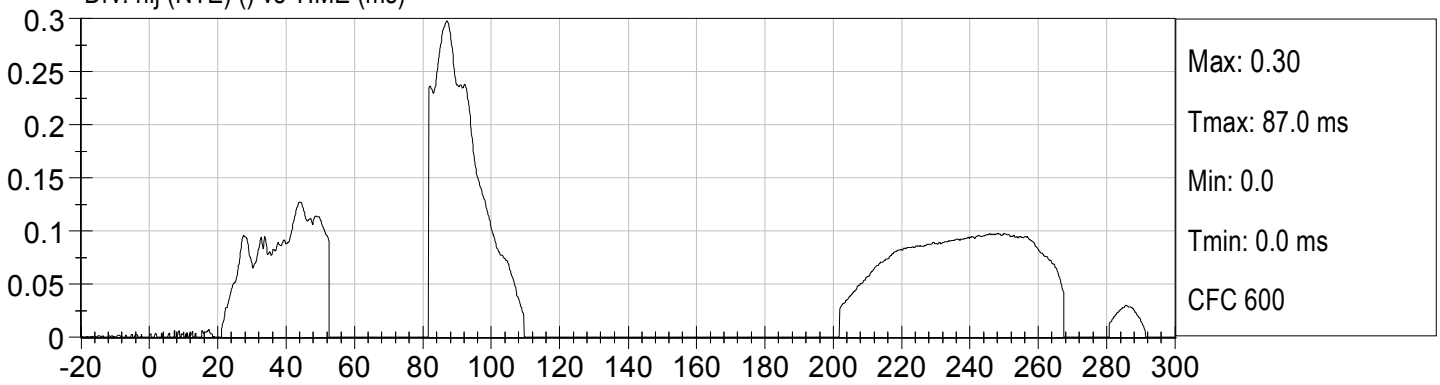
DRIVER NECK MY (Nm) vs TIME (ms)



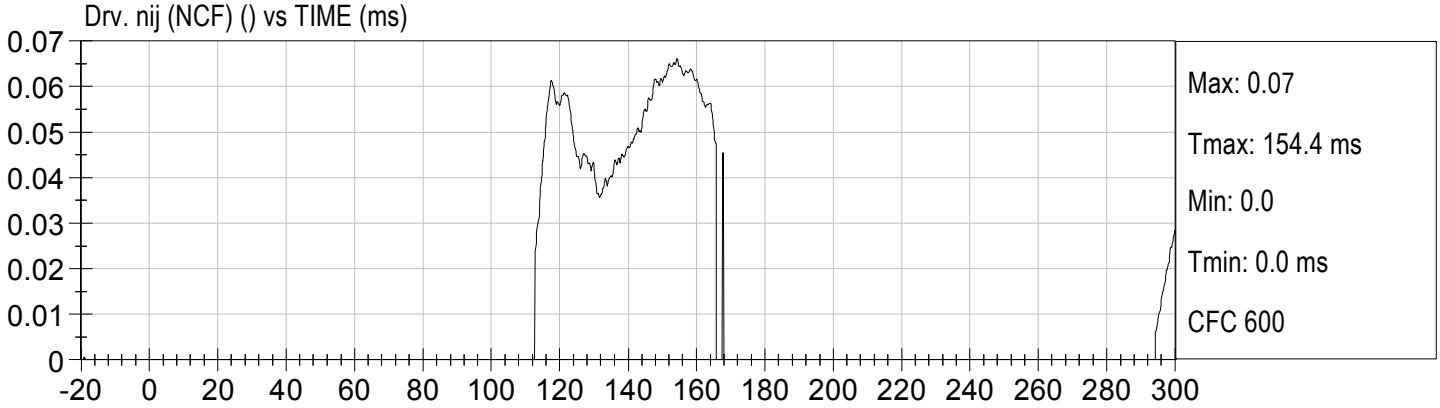
Drv. nij (NTF) () vs TIME (ms)



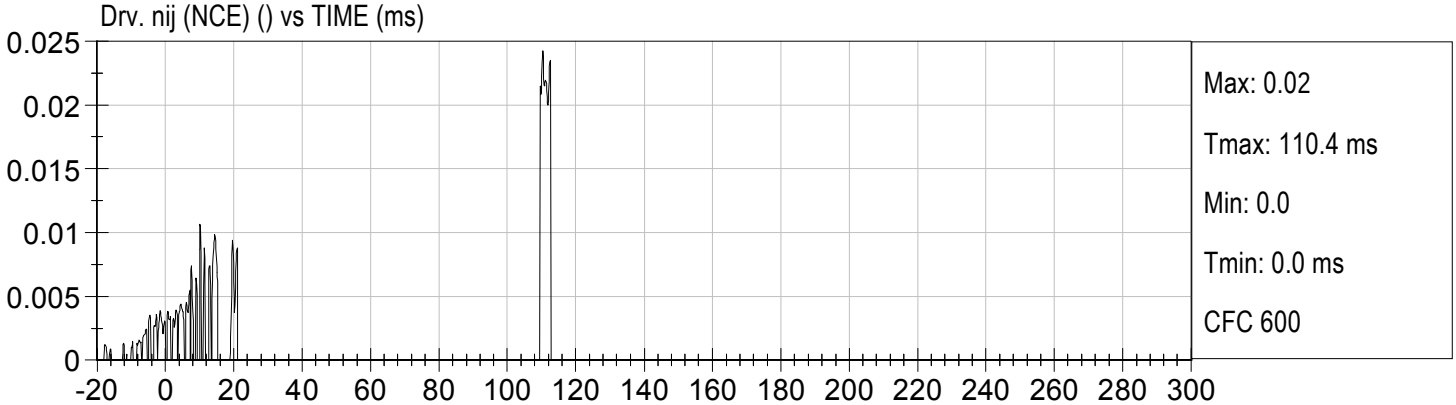
Drv. nij (NTE) () vs TIME (ms)



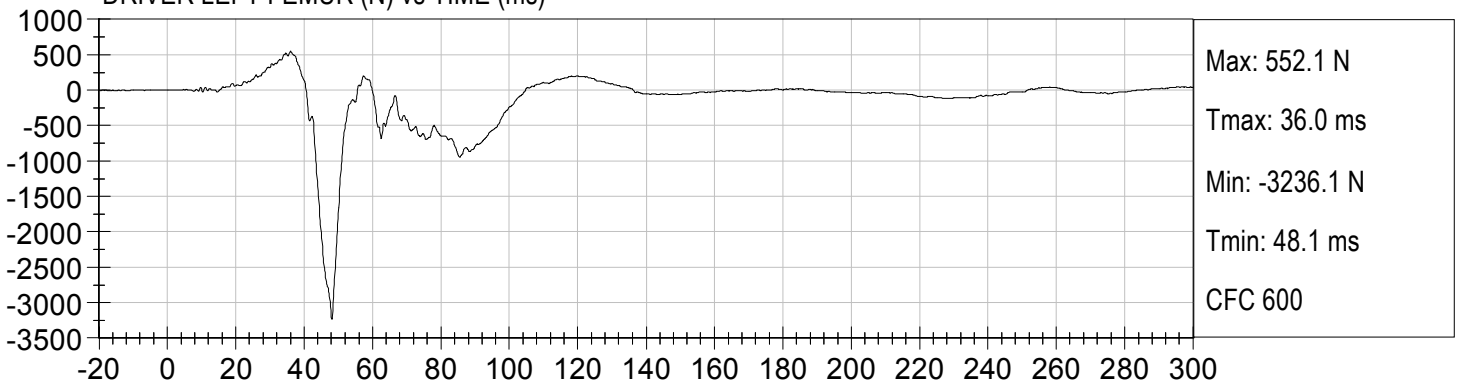
Drv. nij (NCF) () vs TIME (ms)



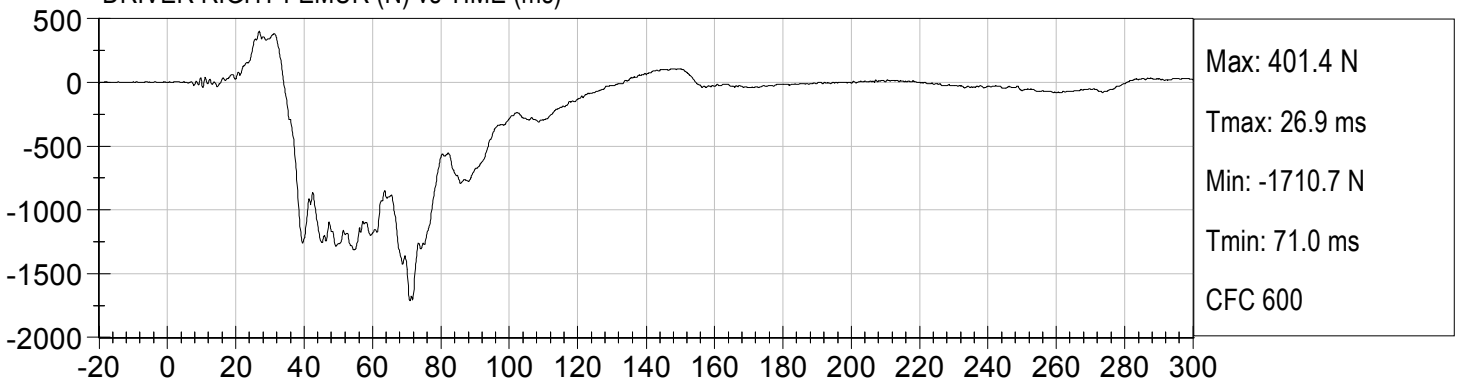
Drv. nij (NCE) () vs TIME (ms)



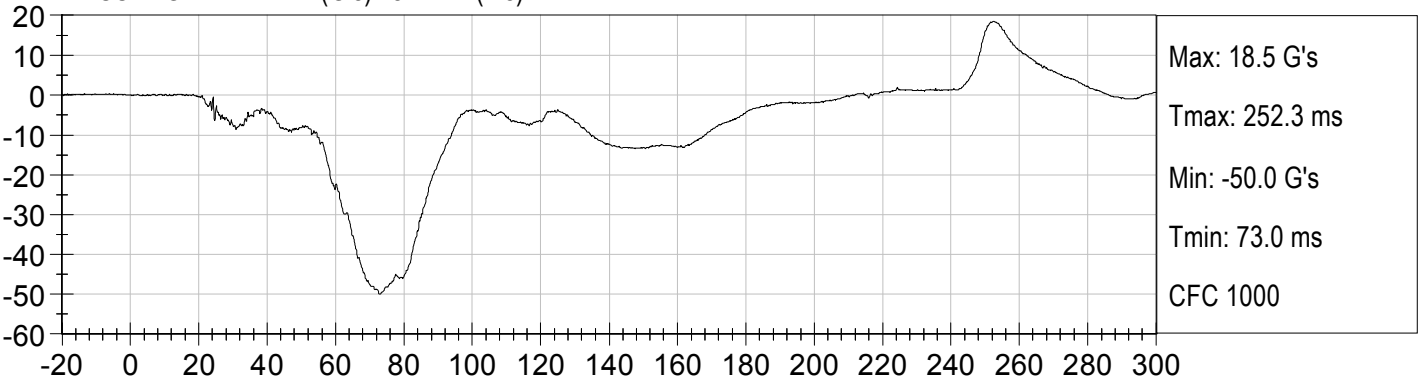
DRIVER LEFT FEMUR (N) vs TIME (ms)



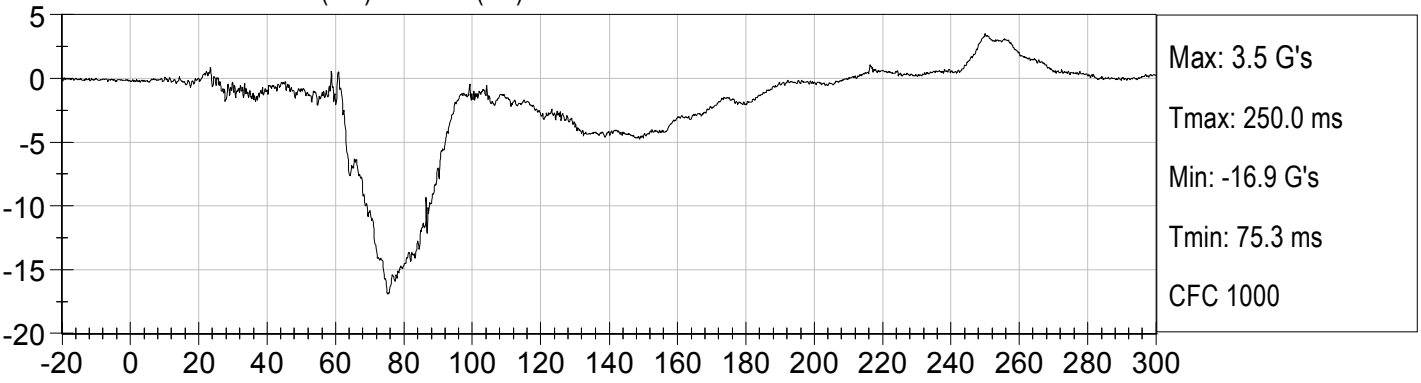
DRIVER RIGHT FEMUR (N) vs TIME (ms)



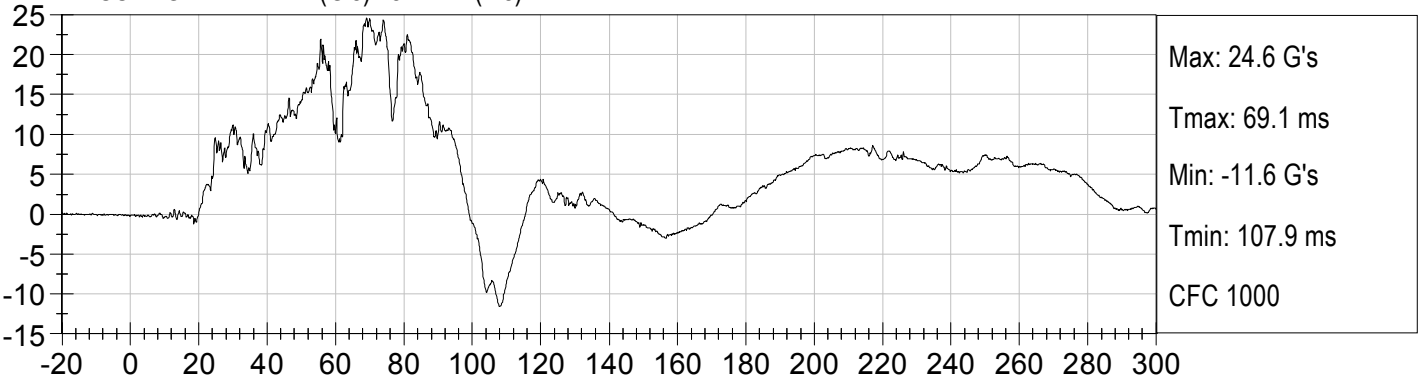
PASSENGER HEAD X (G's) vs TIME (ms)



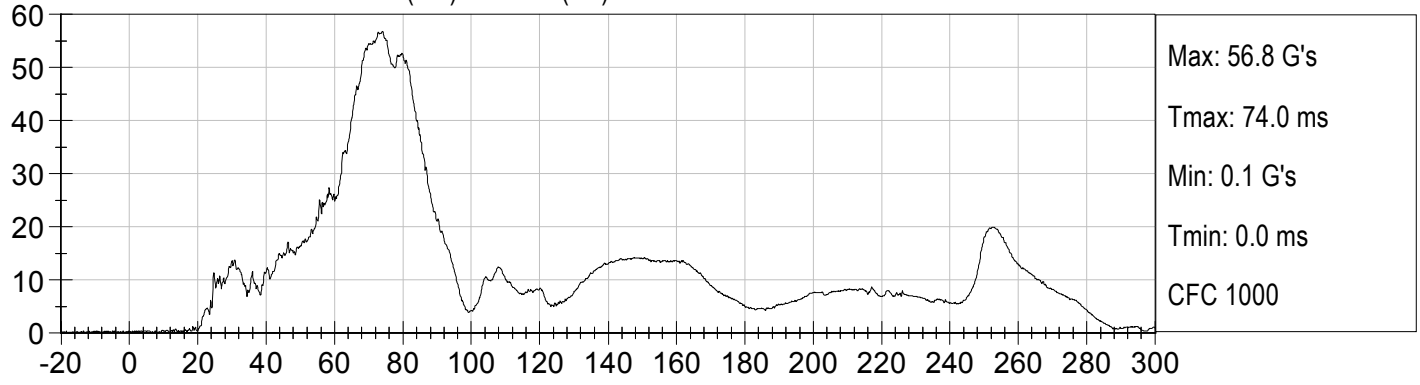
PASSENGER HEAD Y (G's) vs TIME (ms)

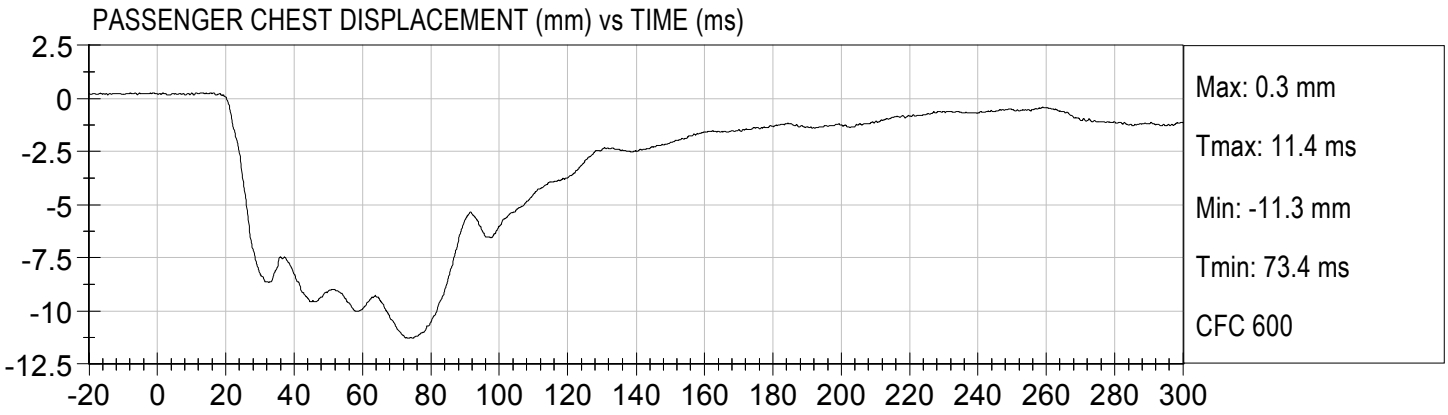


PASSENGER HEAD Z (G's) vs TIME (ms)

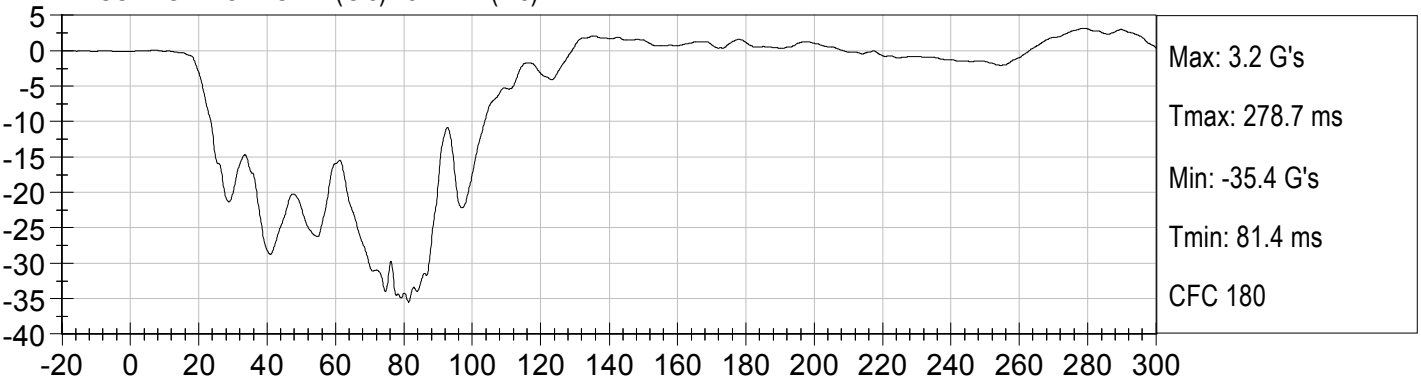


PASSENGER HEAD Resultant (G's) vs TIME (ms)

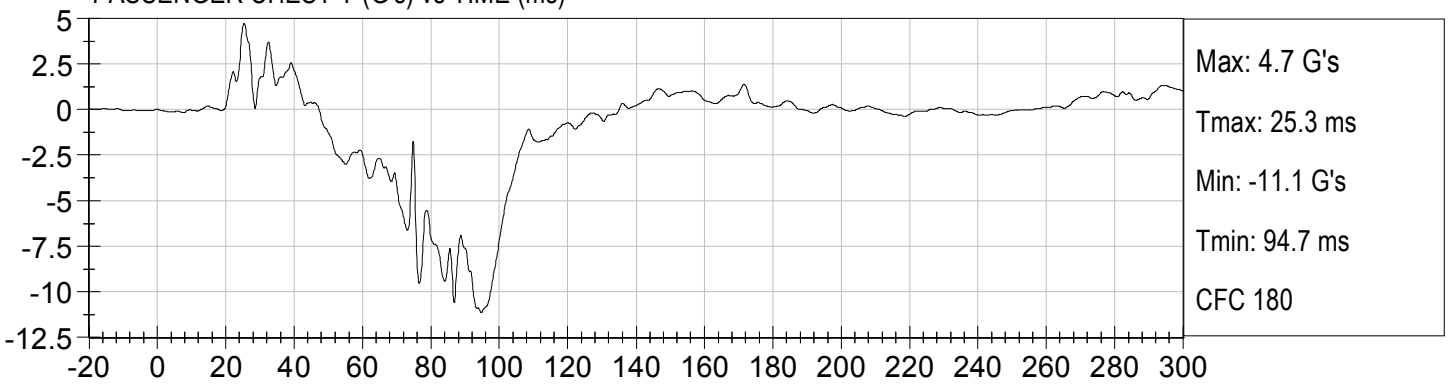



PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)
2.5
0
-2.5
-5
-7.5
-10
-12.5
-20
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Max: 0.3 mm
Tmax: 11.4 ms
Min: -11.3 mm
Tmin: 73.4 ms
CFC 600

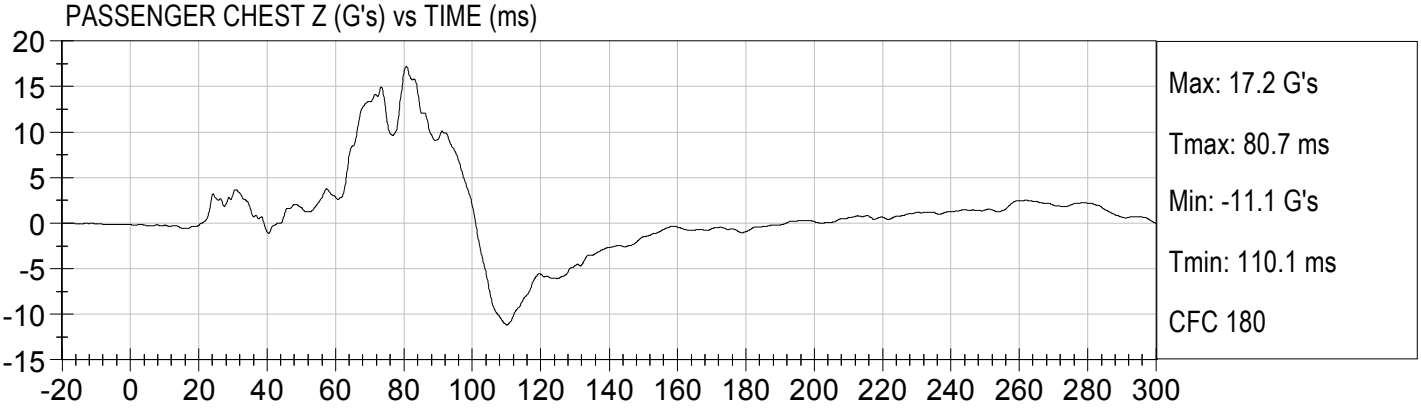
PASSENGER CHEST X (G's) vs TIME (ms)



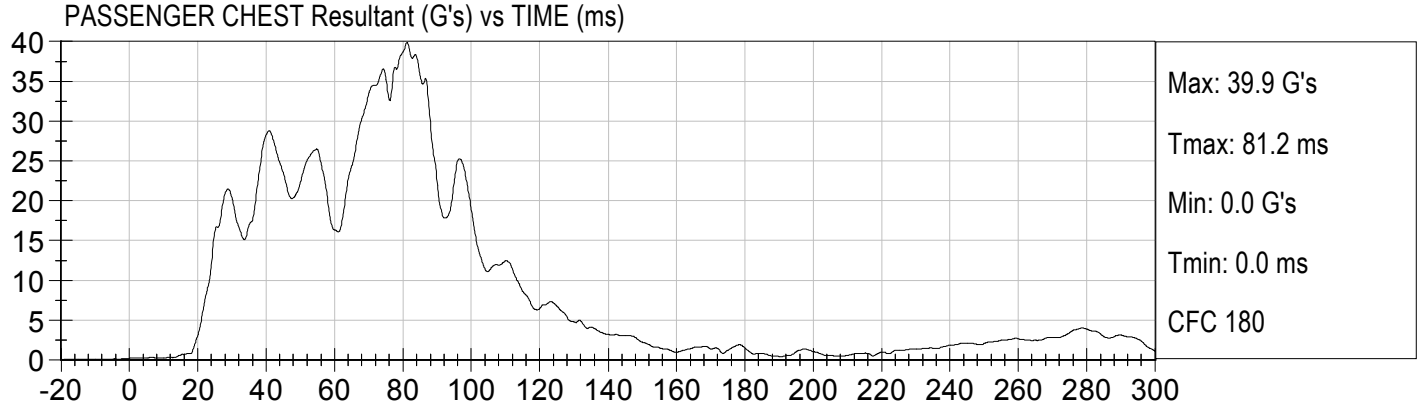
PASSENGER CHEST Y (G's) vs TIME (ms)



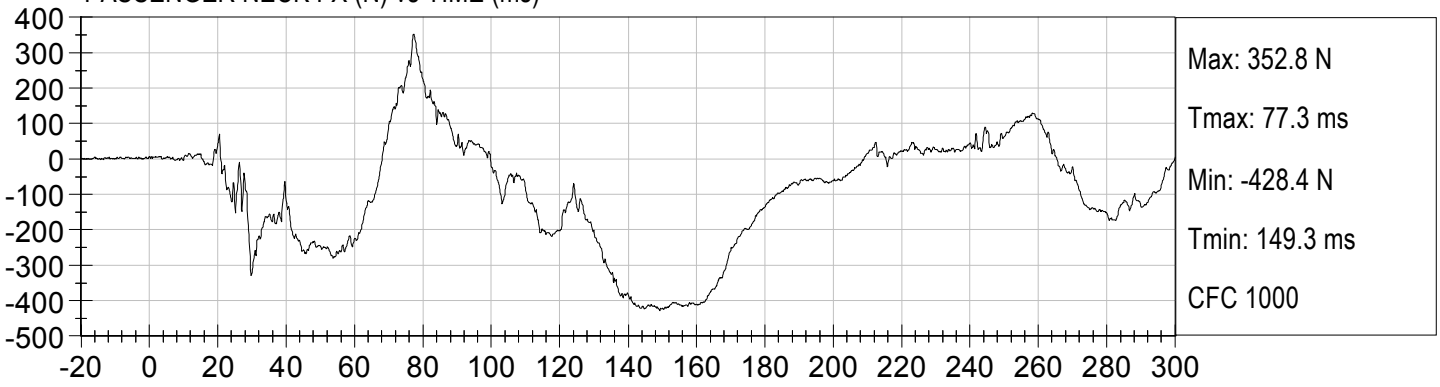
PASSENGER CHEST Z (G's) vs TIME (ms)



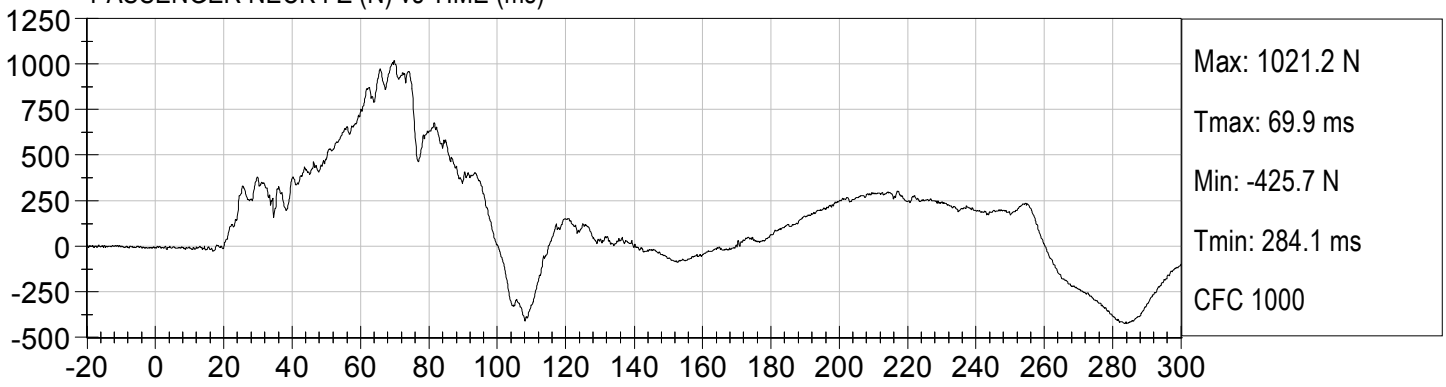
PASSENGER CHEST Resultant (G's) vs TIME (ms)



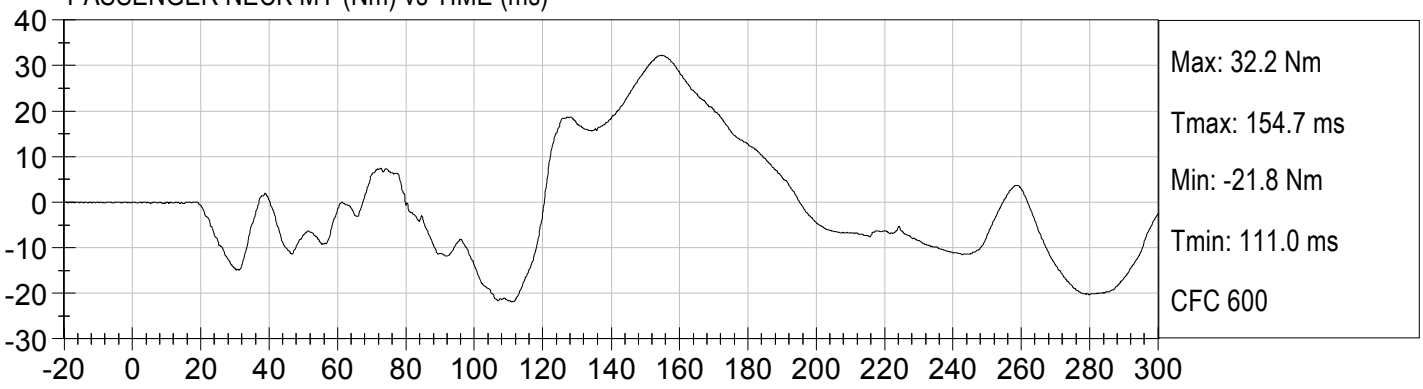
PASSENGER NECK FX (N) vs TIME (ms)



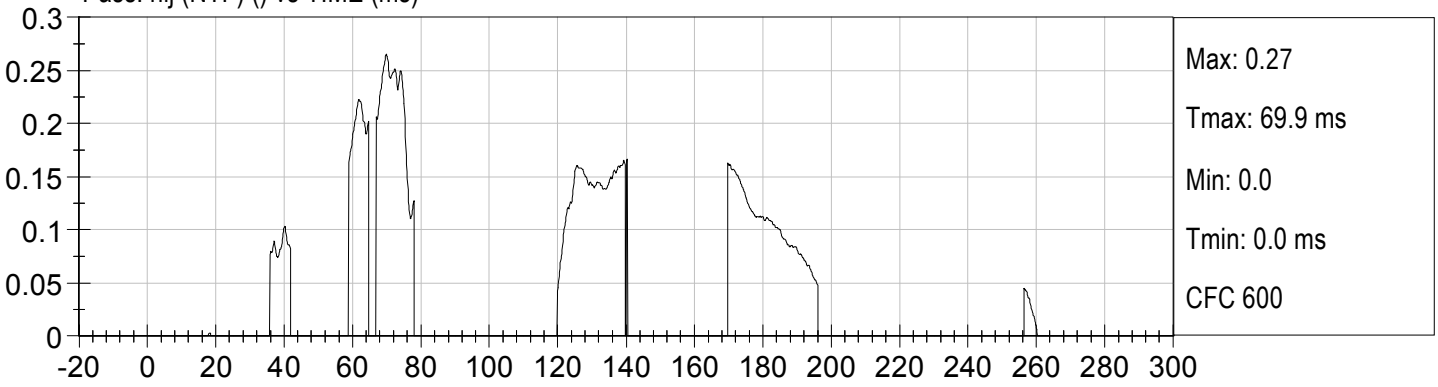
PASSENGER NECK FZ (N) vs TIME (ms)



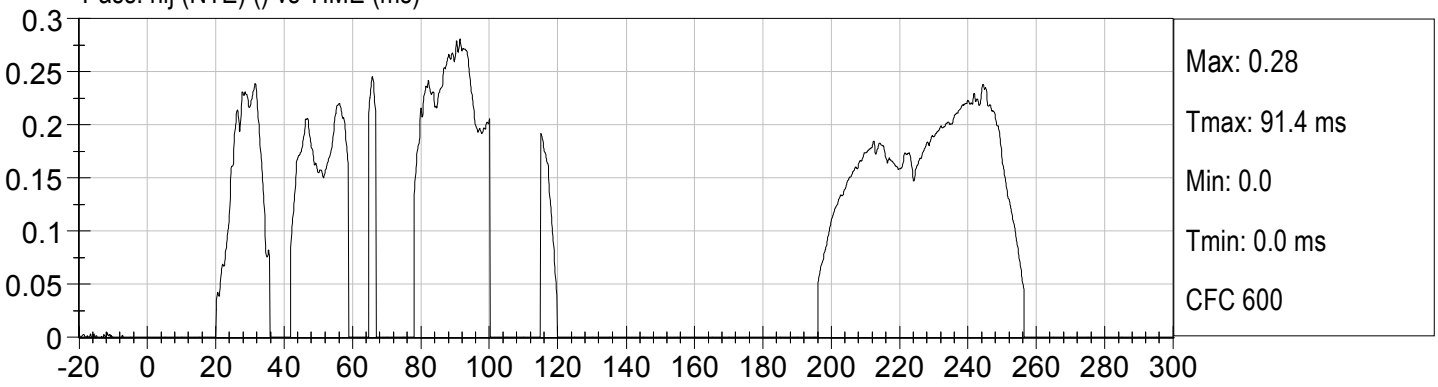
PASSENGER NECK MY (Nm) vs TIME (ms)



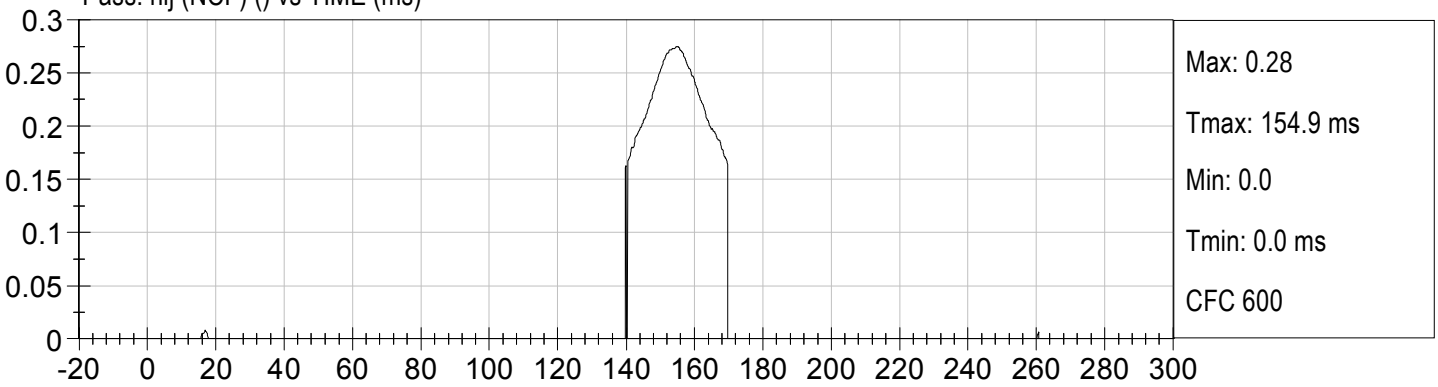
Pass. nij (NTF) () vs TIME (ms)



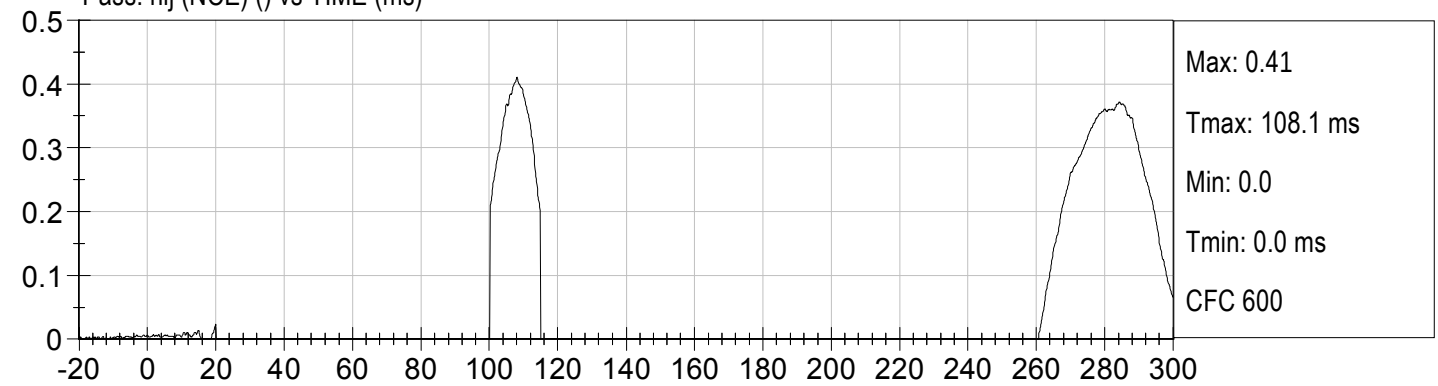
Pass. nij (NTE) () vs TIME (ms)



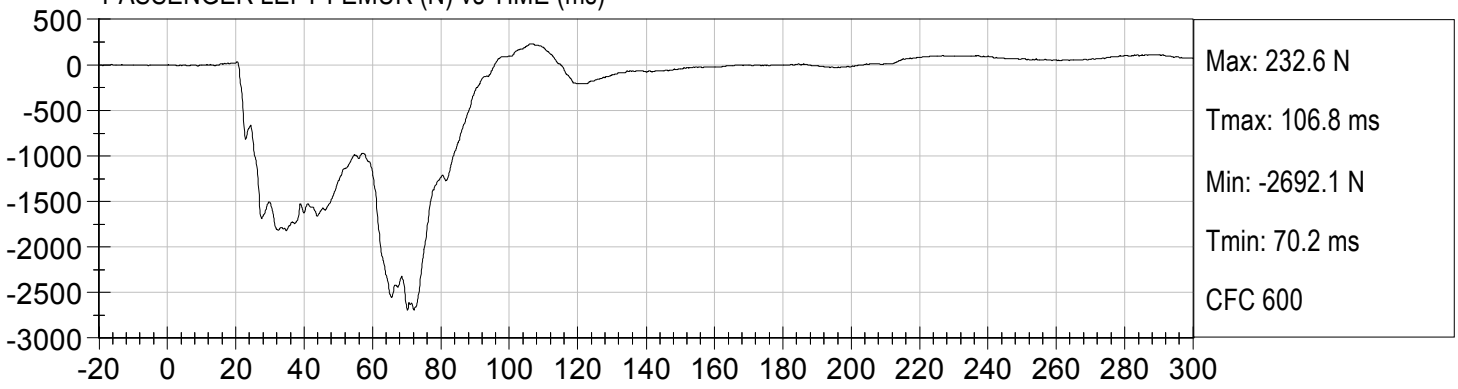
Pass. nij (NCF) () vs TIME (ms)



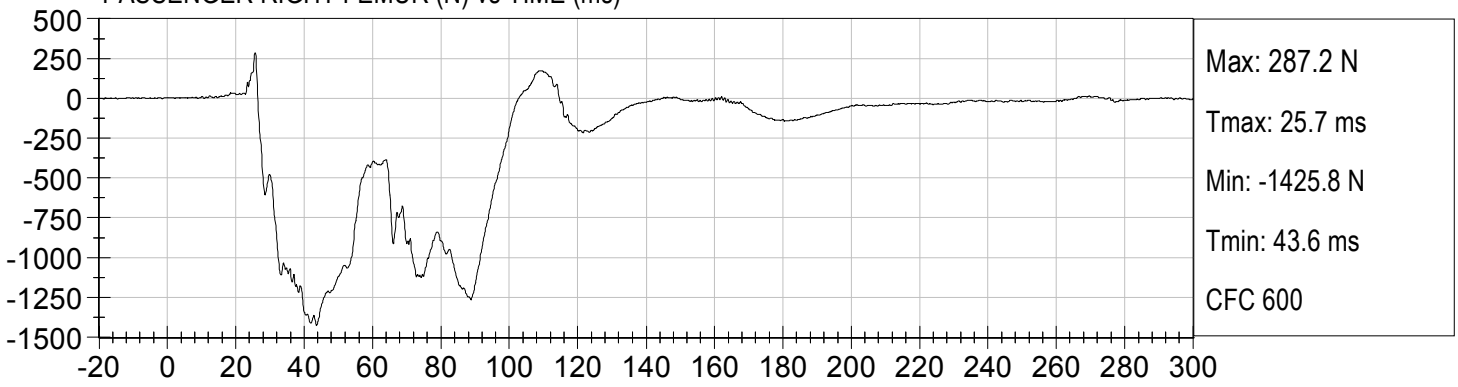
Pass. nij (NCE) () vs TIME (ms)



PASSENGER LEFT FEMUR (N) vs TIME (ms)



PASSENGER RIGHT FEMUR (N) vs TIME (ms)



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

Hybrid III, 5th External Measurements
SN: 634

HYBRID III, PART 572, SUBPART O EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	774.7-800.1	784.6
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	431.8-457.2	449.0
C	H-POINT HEIGHT	Reference	81.3-86.3	85.0
D	H-POINT LOCATION FROM BACKLINE	Reference	144.8-149.8	145.0
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	68.6-83.8	79.2
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	119.4-134.6	125.6
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	243.9-259.1	253.4
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	43.2-48.2	45.0
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	276.8-297.2	277.8
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	182.8-203.2	197.5
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	520.7-546.1	541.4
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	355.6-376.0	362.1
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	393.7-419.1	400.4
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. “K”.	414-439.4	428.6

HYBRID III, SUBPART O EXTERNAL DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (mm)	ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 304.8 ± 5.1 mm above seat surface	175.3-190.5	181.6
P	FOOT LENGTH	Tip of toe to rear of heal	218.5-233.7	224.7
Q	STANDING HEIGHT	(THEORETICAL)	1501.1	N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	457.2-482.6	482.0
S	HEAD BREADTH	The widest part of the head	137.1-147.3	139.6
T	HEAD DEPTH	Back of the head to the forehead	177.8-188.0	179.2
U	HIP BREADTH	The widest part of the hip	299.7-314.9	306.1
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	350.5-365.7	355.5
W	FOOT BREADTH	The widest part of the foot	78.8-94.0	90.0
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. “T”	528.3-548.7	540.6
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 345.4 ± 12.7 mm above seat surface	850.9-881.3	868.7
Z	WAIST CIRCUMFERENCE	Measured 165.1 ± 5.1 mm above seat surface	759.5-789.9	786.8
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	332.7-358.1	345.4
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	160.1-170.2	165.1

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D114361

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Peak Resultant Acceleration	G's	250 to 300	295	Pass
Peak Lateral Acceleration	G's	+/- 15	-4.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

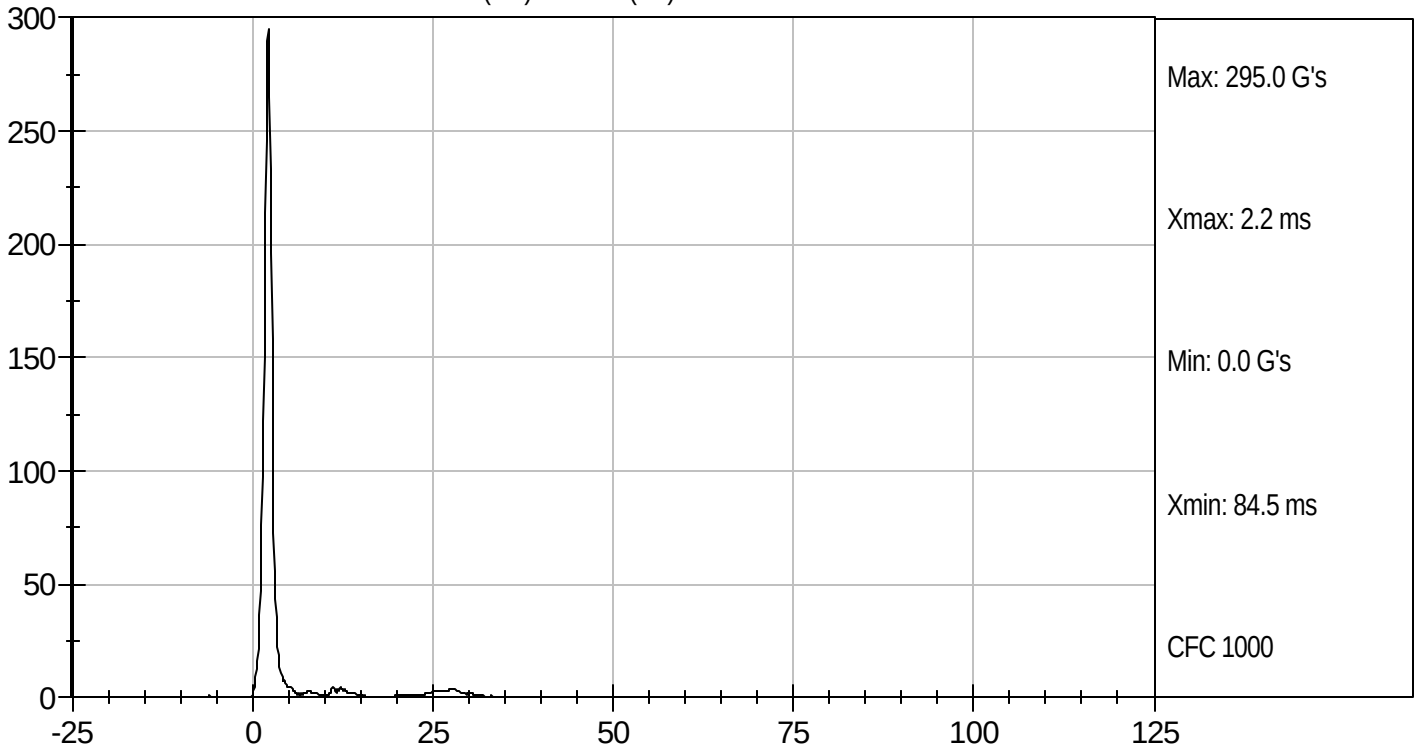
12/21/11
Test Date

David Winkelbauer
Approved By

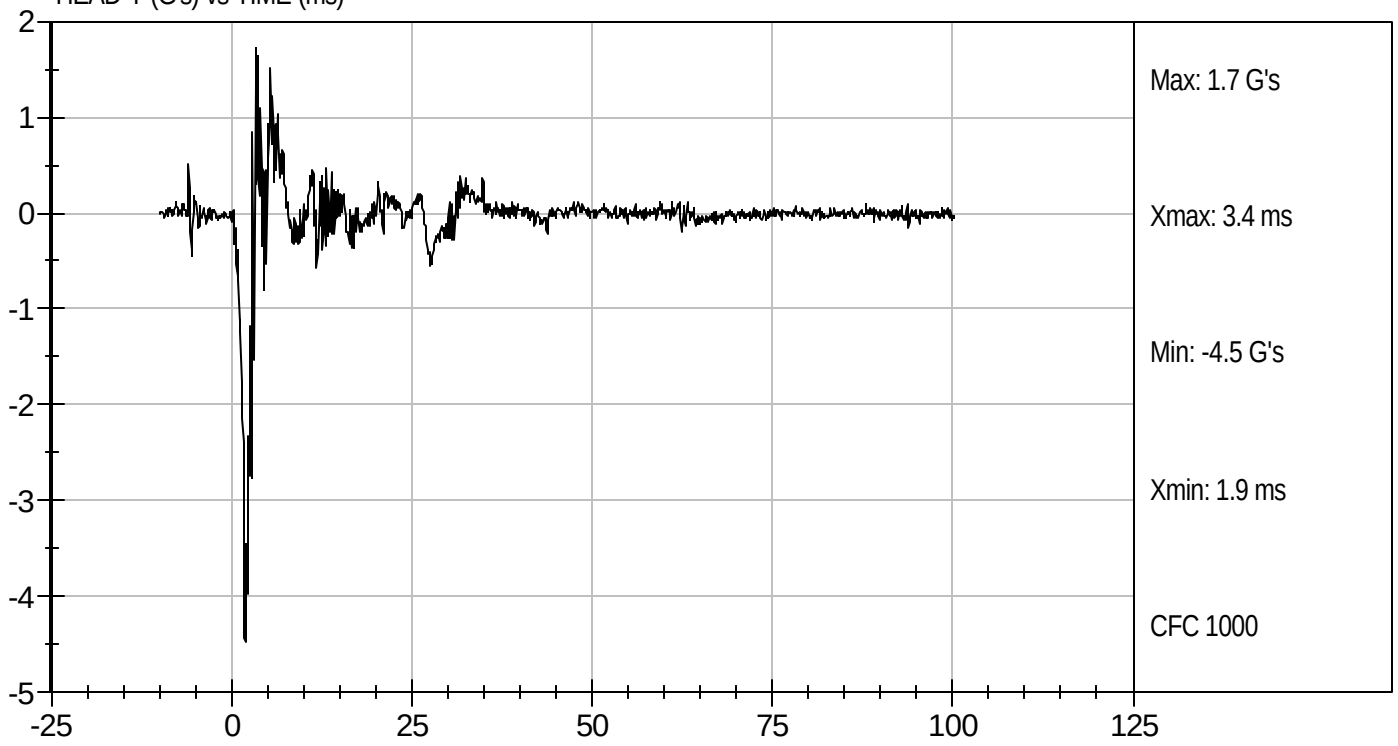
Test Desc: Head Drop
Component ID: D114361

Test Date: 12/21/11
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114362

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	28	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Pulse	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.6	Pass
	30 ms	m/s	5.8 to 7.0	6.4	Pass
D Plane Rotation	Max	deg	77 to 91	78	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	69 to 83	70	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	83	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

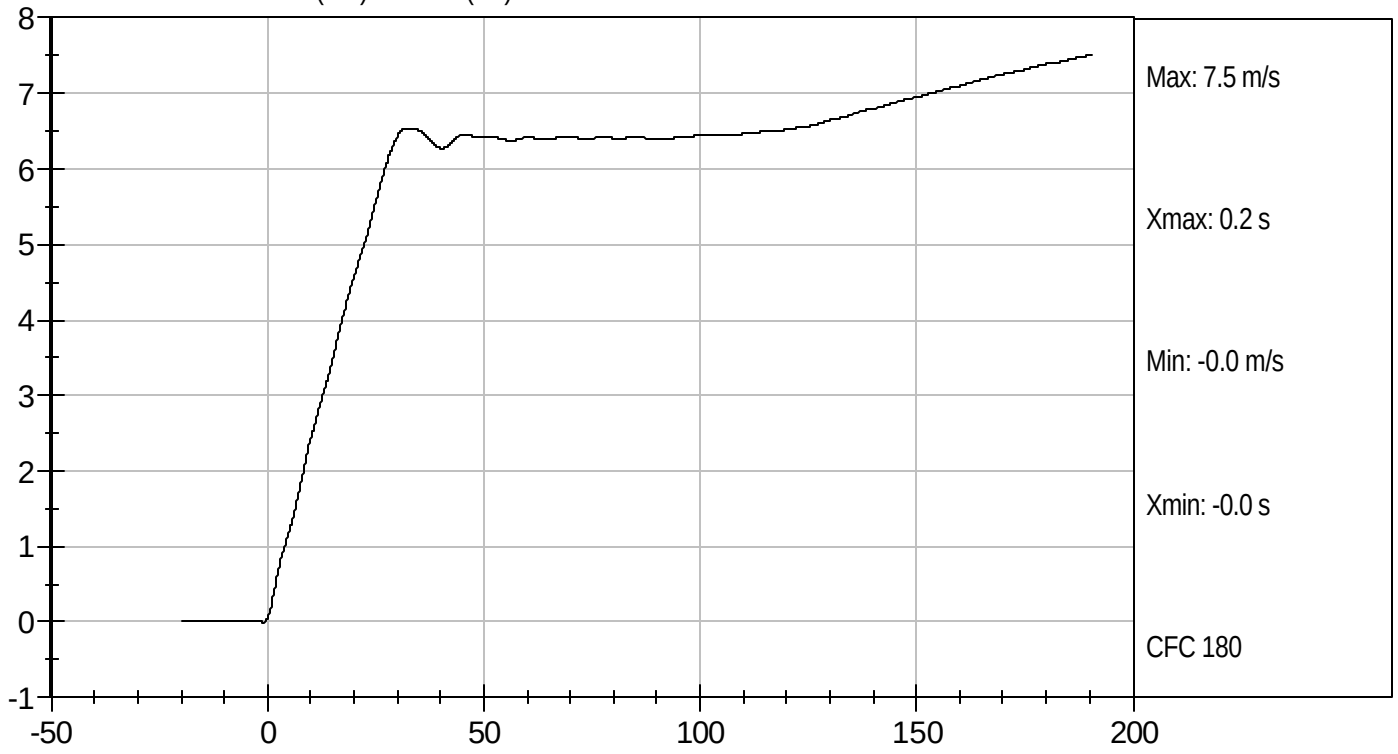
12/22/11
Test Date

David Winkelbauer
Approved By

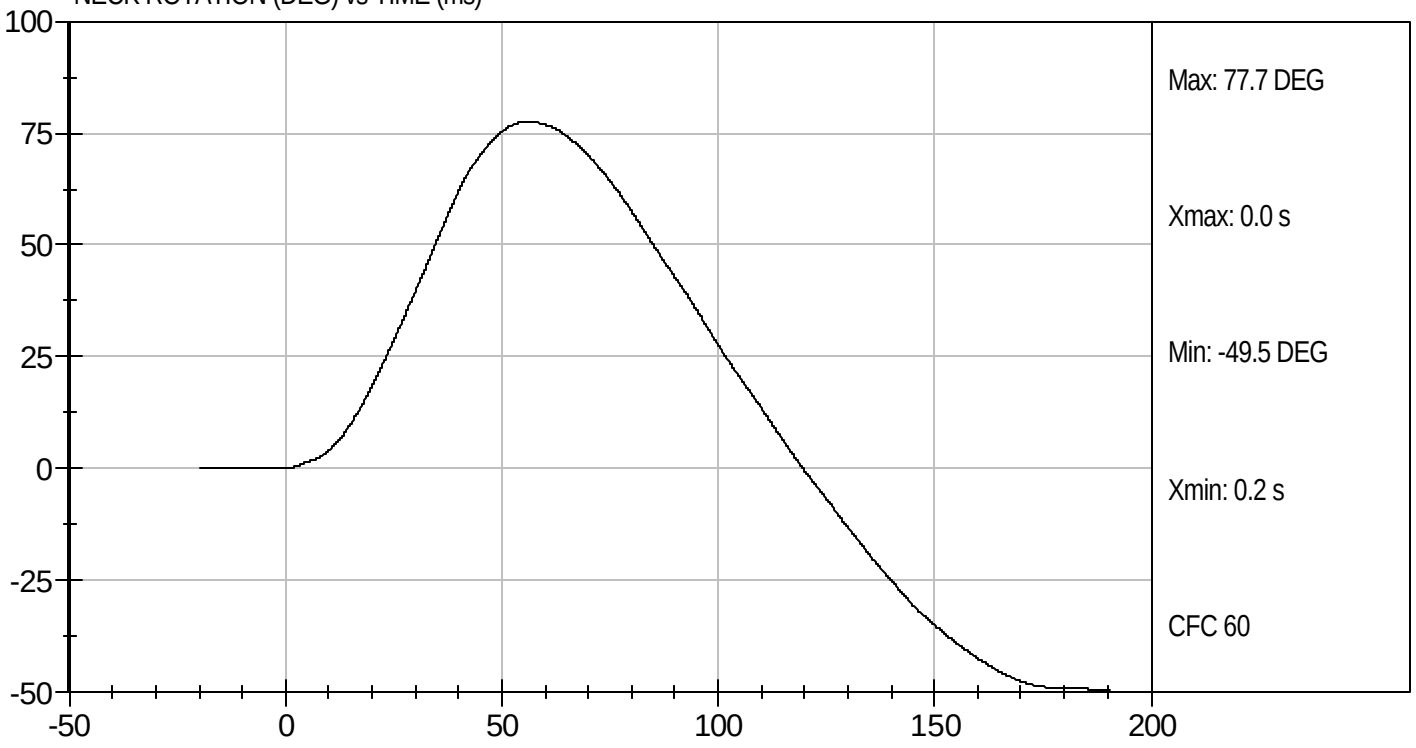
Test Desc: Neck Flexion
Component ID: D114362

Test Date: 12/22/11
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM VELOCITY (m/s) vs TIME (ms)

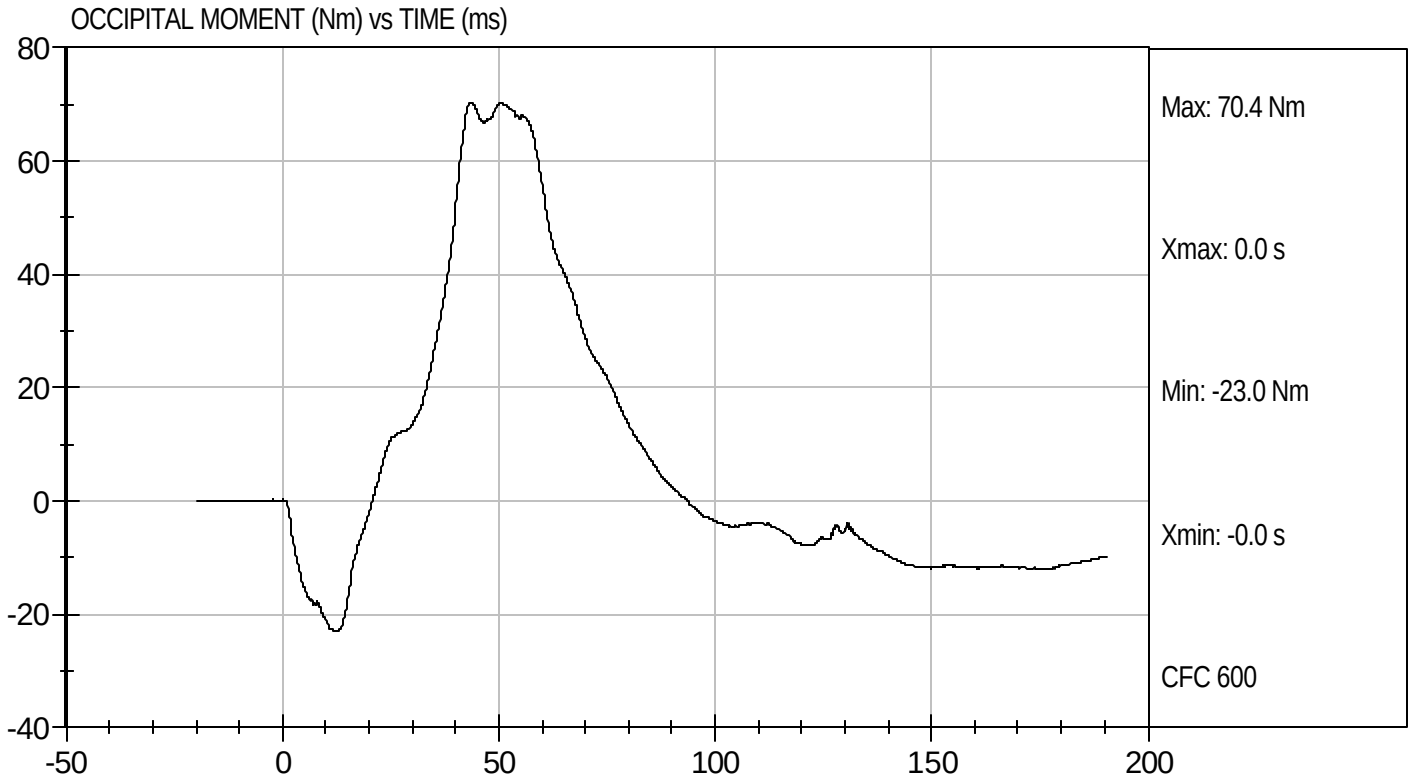


NECK ROTATION (DEG) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D114362

Test Date: 12/22/11
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114363

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity		%	10 to 70	28	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Pulse	10 ms	m/s	1.5 to 1.9	1.7	Pass
	20 ms	m/s	3.1 to 3.9	3.4	Pass
	30 ms	m/s	4.6 to 5.6	4.8	Pass
D Plane Rotation	Max	deg	99 to 114	100	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	-65 to -53	-53	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	103	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

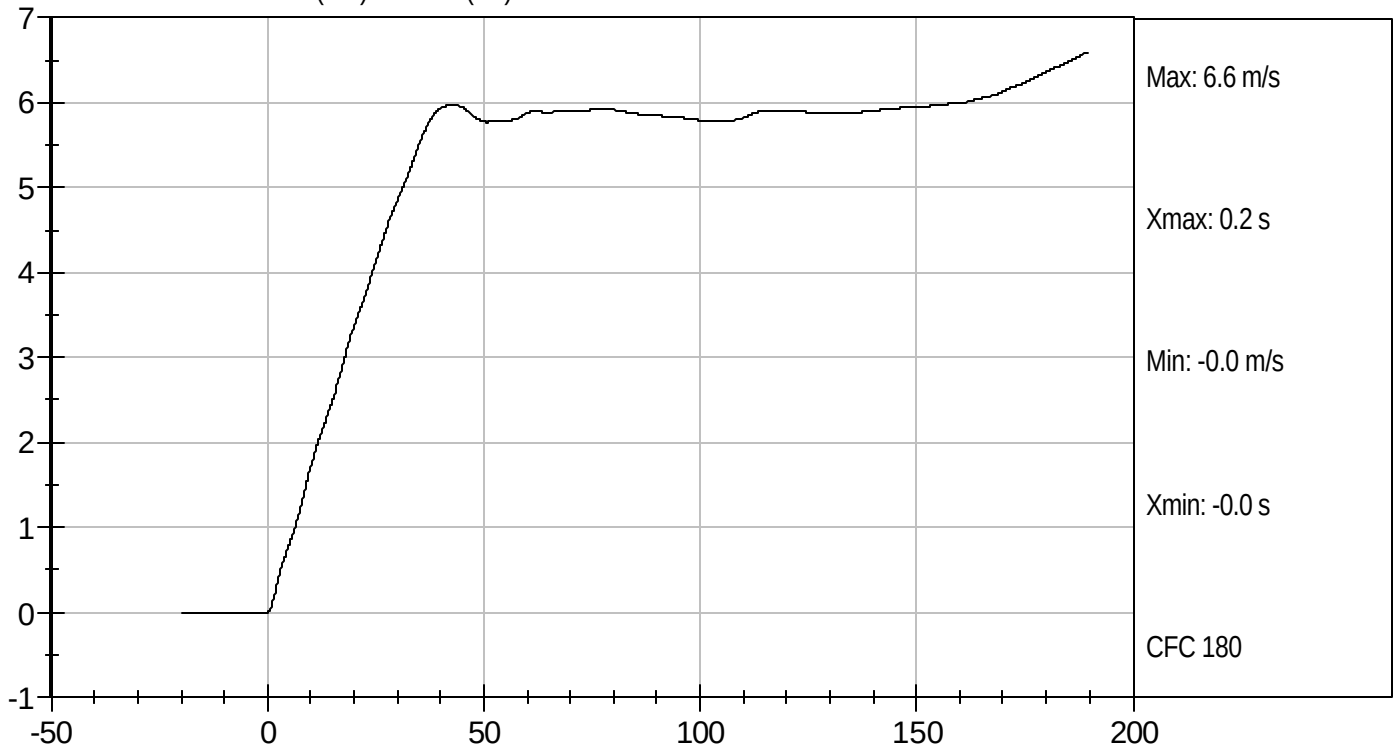
12/22/11
Test Date

David Winkelbauer
Approved By

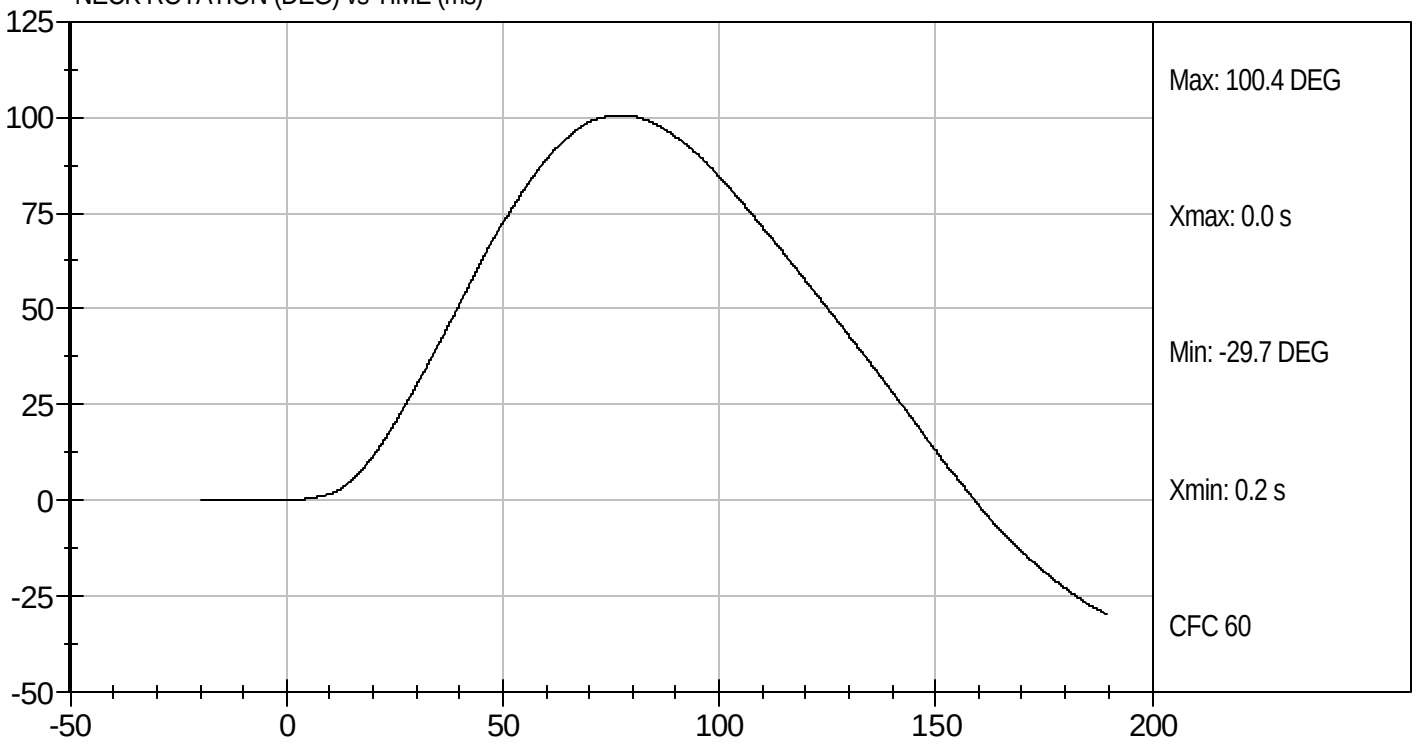
Test Desc: Neck Extension
Component ID: D114363

Test Date: 12/22/11
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM VELOCITY (m/s) vs TIME (ms)

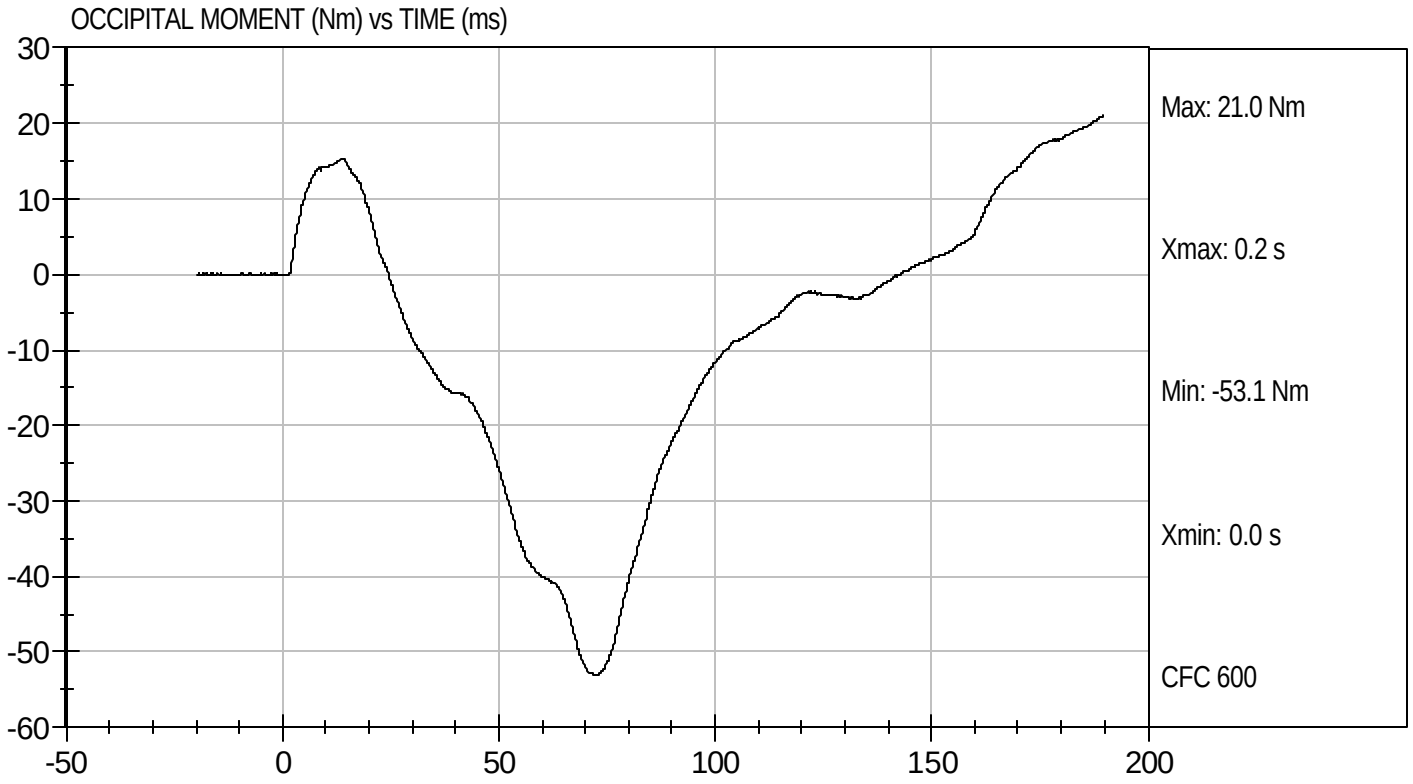


NECK ROTATION (DEG) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D114363

Test Date: 12/22/11
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114364

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	52	Pass
Peak Resistive Force w/in Deflection Corridor	kN	3.9 to 4.4	4.19	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4,600 N	4191	Pass
		Overall Test Results		Pass

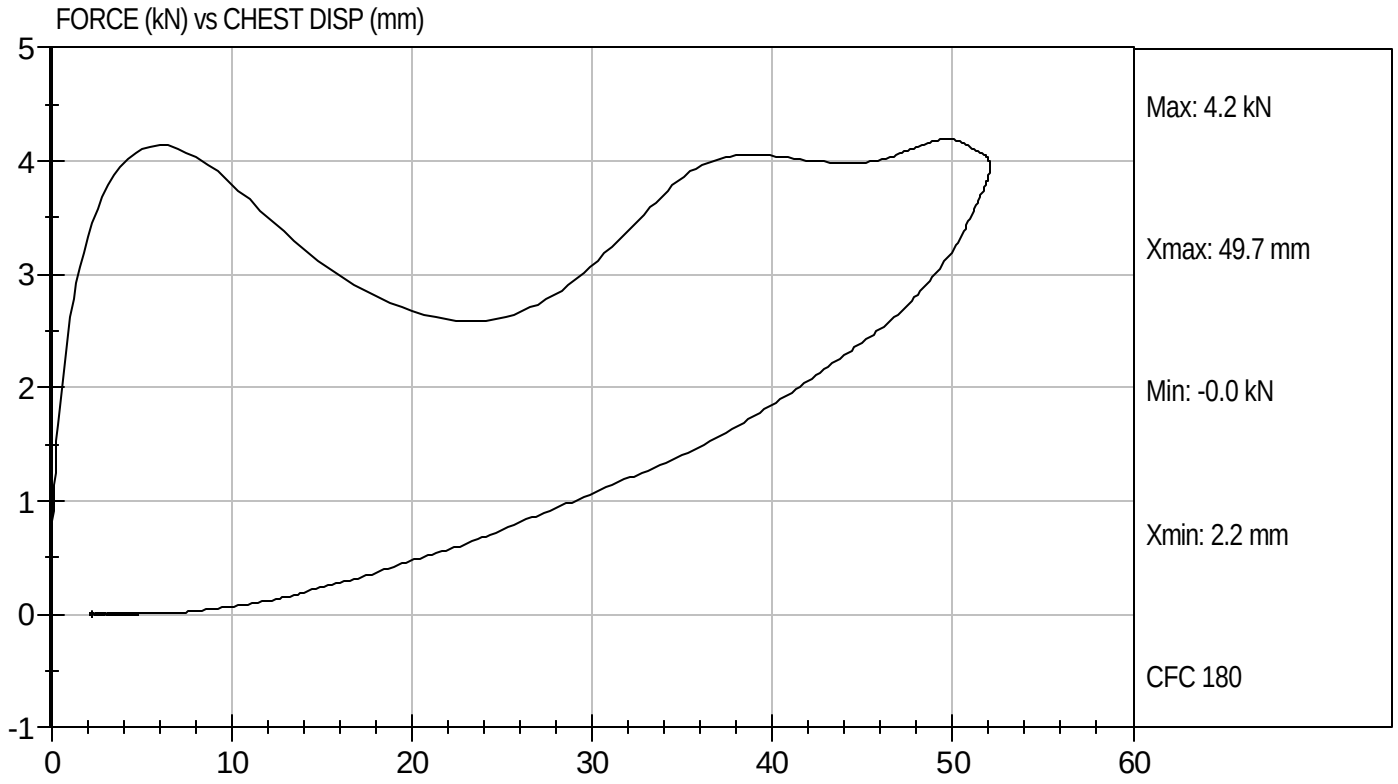
Jessica Gall
Laboratory Technician

12/22/11
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D114364

Test Date: 12/22/11
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114365

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	kN	3.45 to 4.06	3.91	Pass
		Overall Test Results		Pass

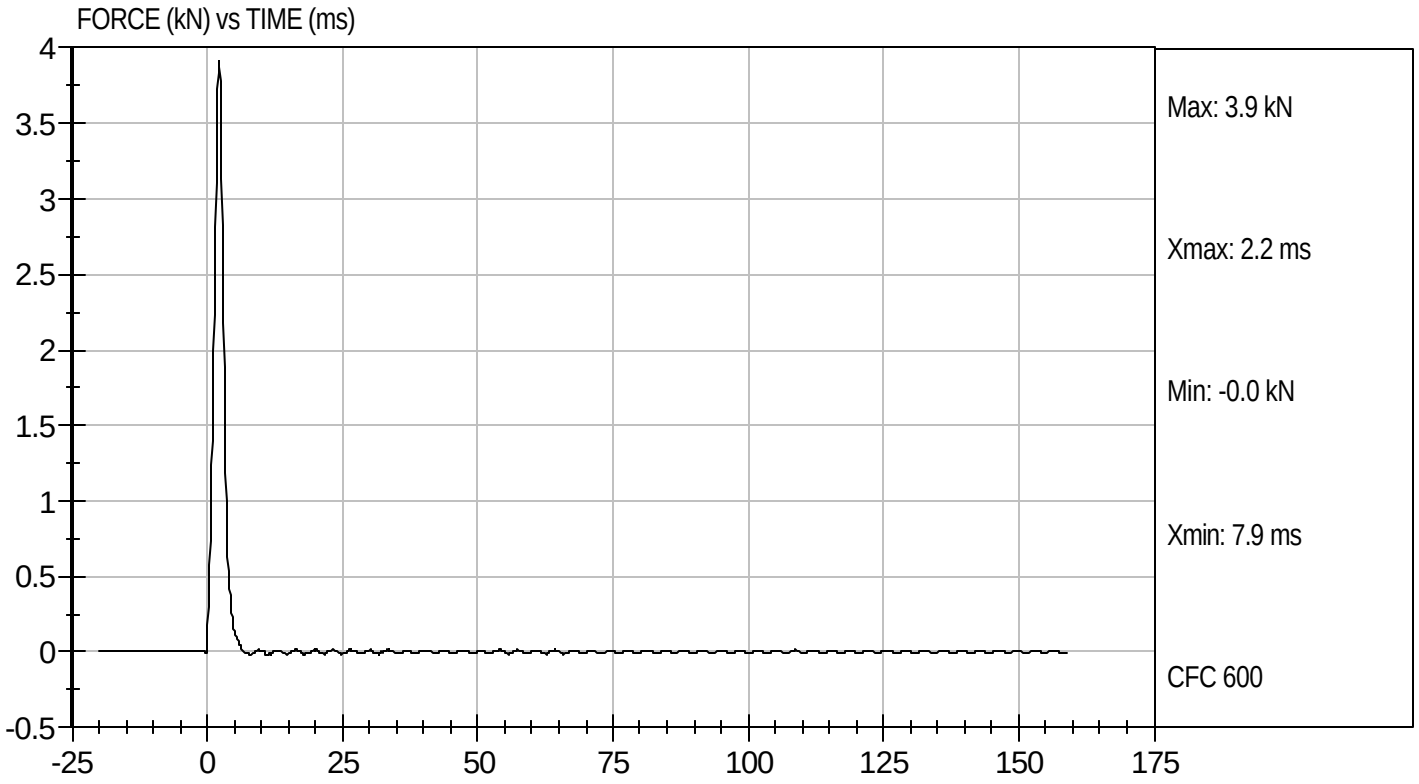
Jessica Hall
Laboratory Technician

12/21/11
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D114365

Test Date: 12/21/11
Velocity: 6.97 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114366

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	kN	3.45 to 4.06	3.69	Pass
		Overall Test Results		Pass

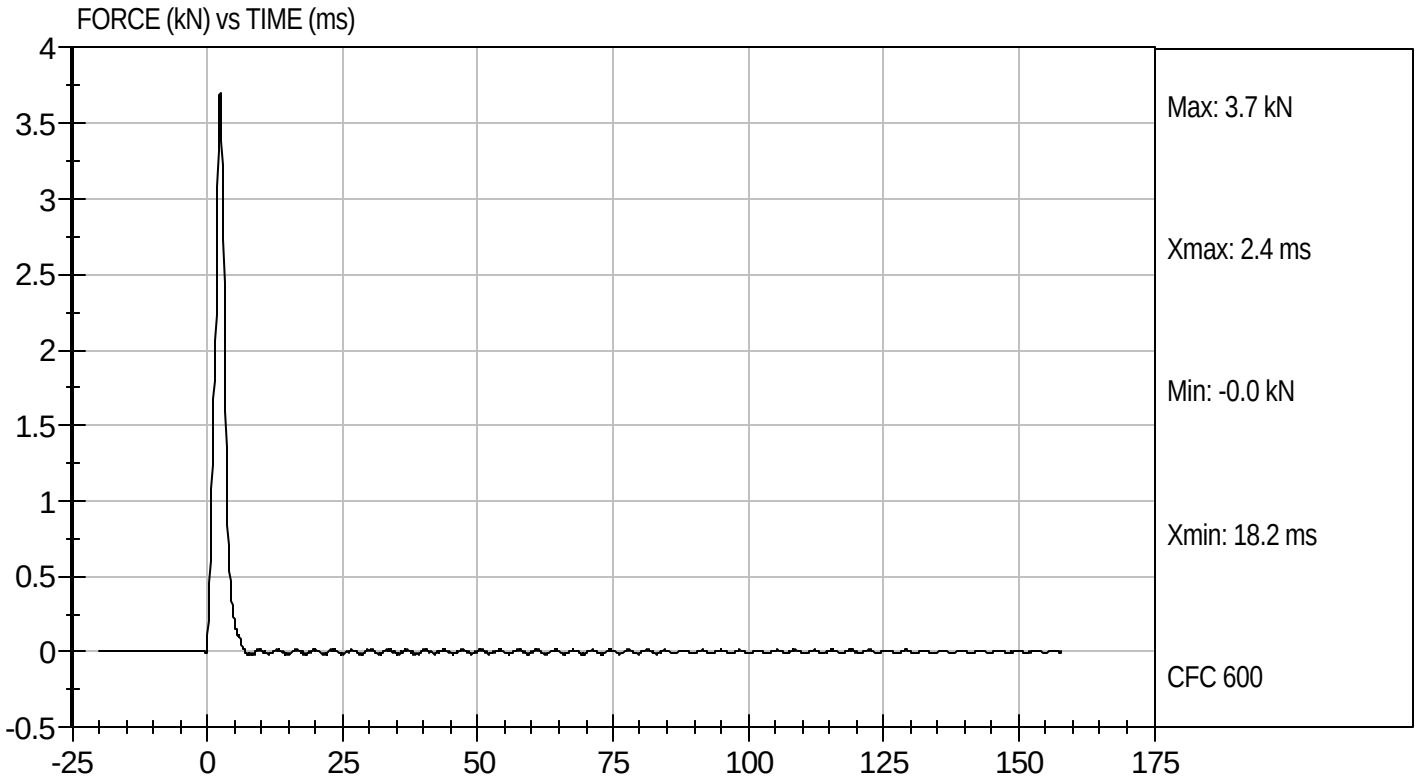
Jessica Hall
Laboratory Technician

12/21/11
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D114366

Test Date: 12/21/11
Velocity: 6.97 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114367

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Initial Angle	deg	0 to 20	13	Pass
Return Angle	deg	+/- 8	6	Pass
Force at 45 deg	N	320 to 390	388	Pass
Upper Torso Deflection Rate	Deg/sec	0.5 to 1.5	1.0	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

12/22/11
Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D114431

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	250 to 300	270	Pass
Peak Lateral Acceleration	G's	+/- 15	8.7	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

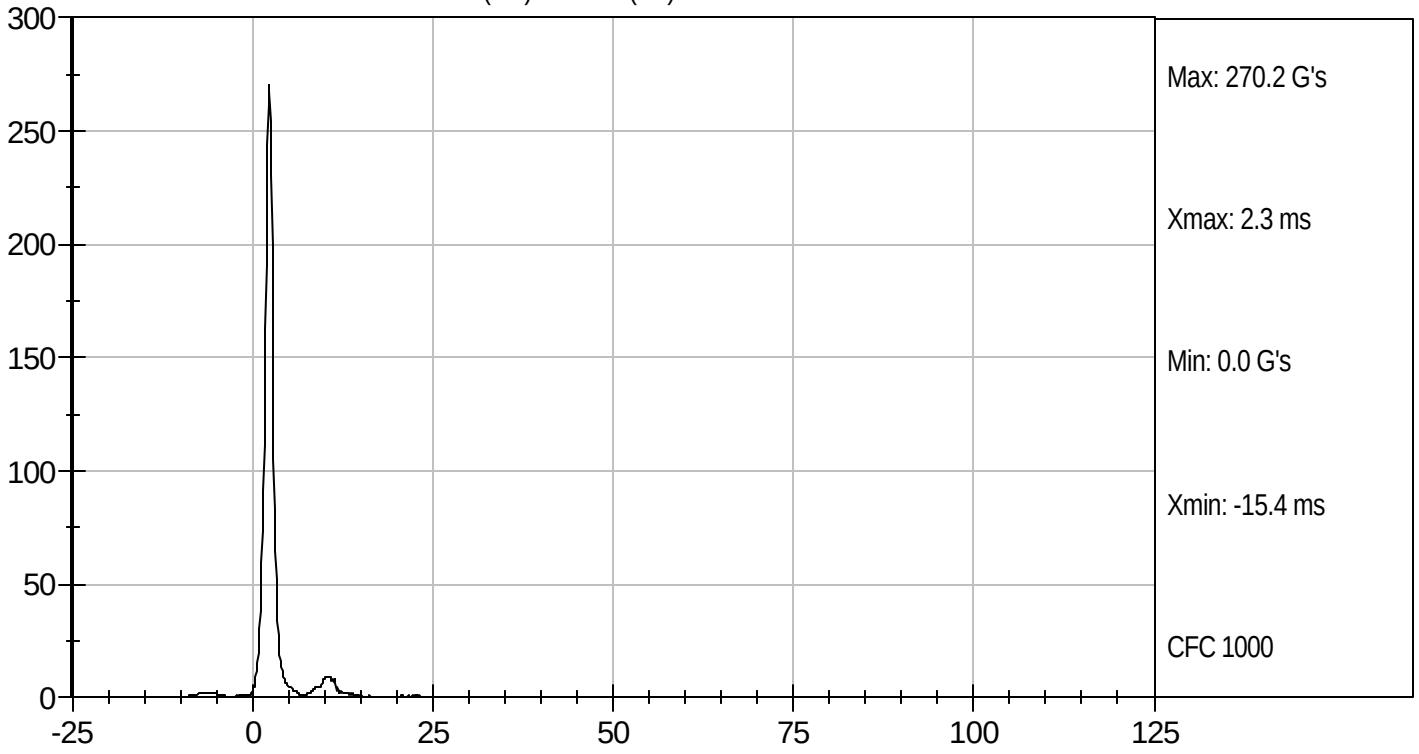
12/28/11
Test Date

David Winkelbauer
Approved By

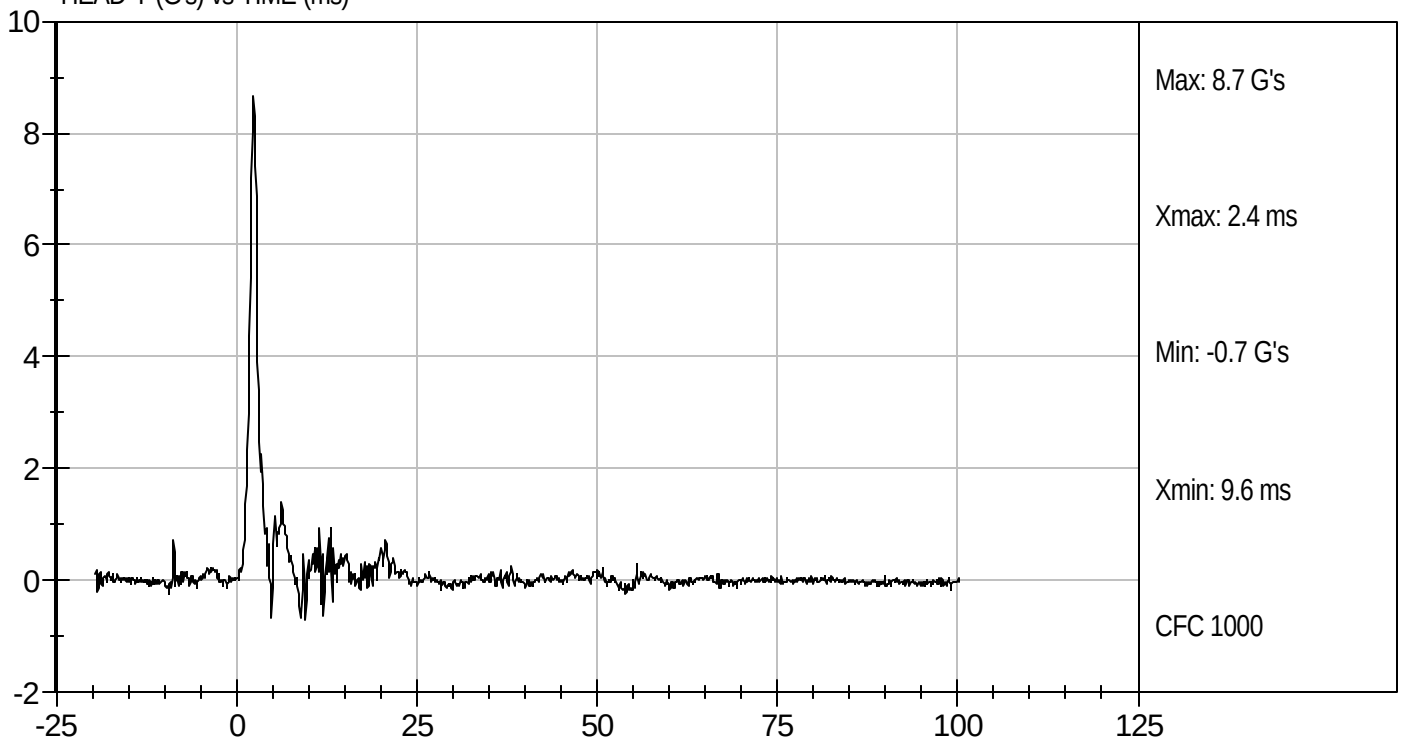
Test Desc: Head Drop
Component ID: D114431

Test Date: 12/28/11
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114432

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity		%	10 to 70	17	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.06	Pass
Pendulum Pulse	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.8	Pass
	30 ms	m/s	5.8 to 7.0	6.1	Pass
D Plane Rotation	Max	deg	77 to 91	79	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	69 to 83	71	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	83	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

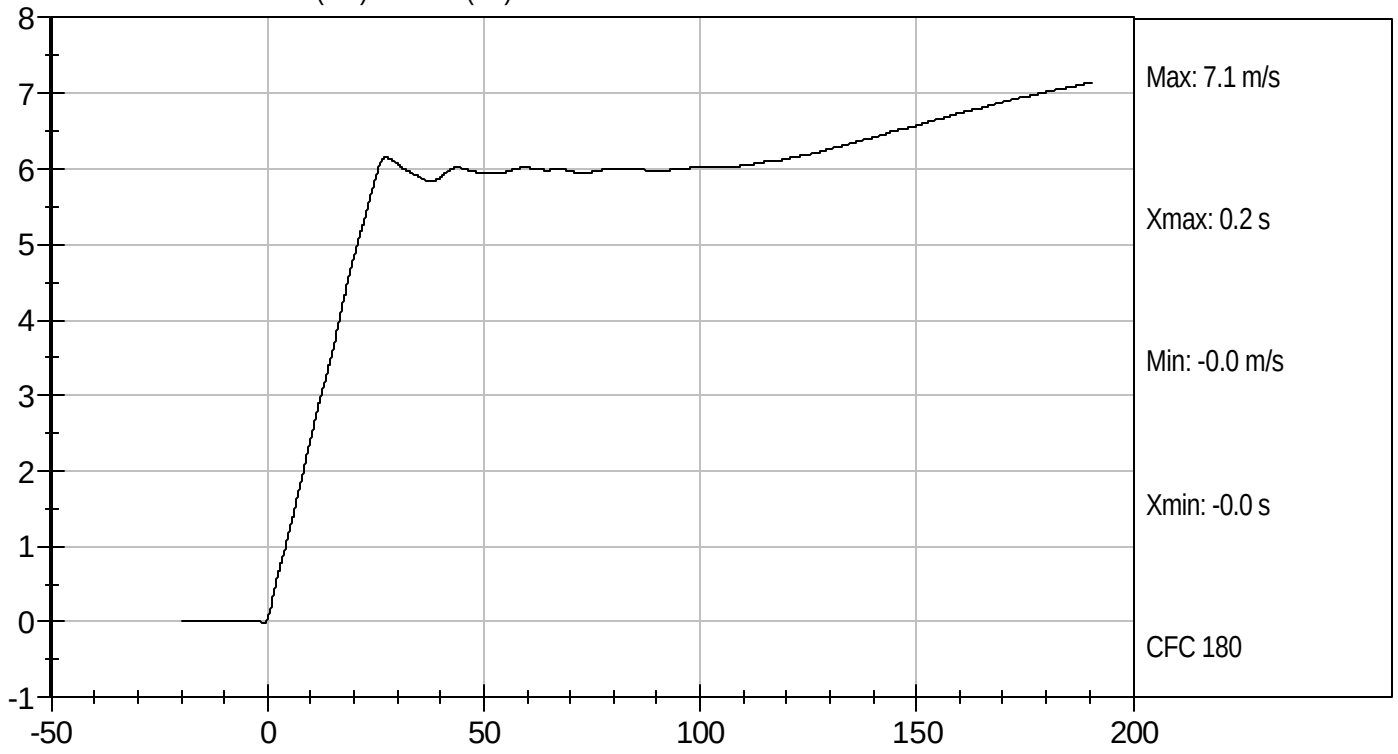
12/28/11
Test Date

David Winkelbauer
Approved By

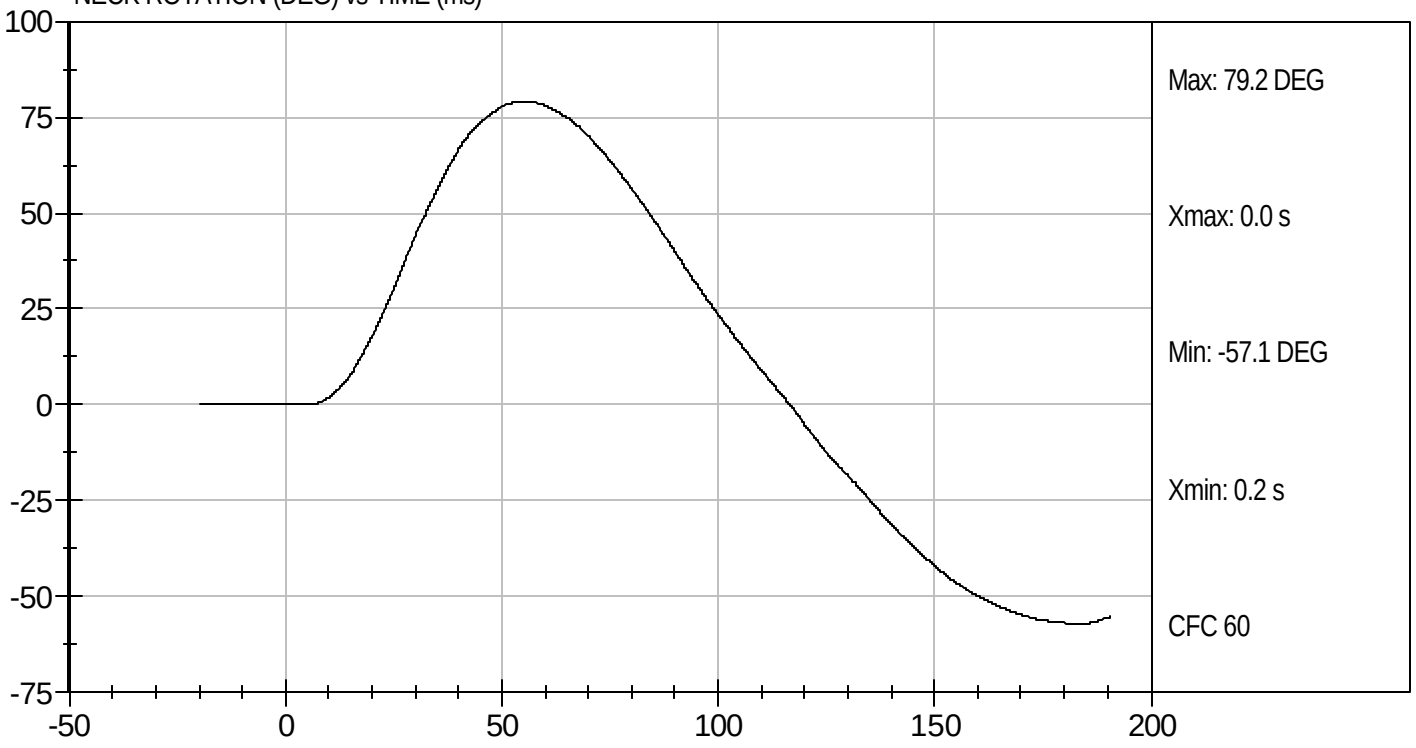
Test Desc: Neck Flexion
Component ID: D114432]

Test Date: 12/28/11
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM VELOCITY (m/s) vs TIME (ms)

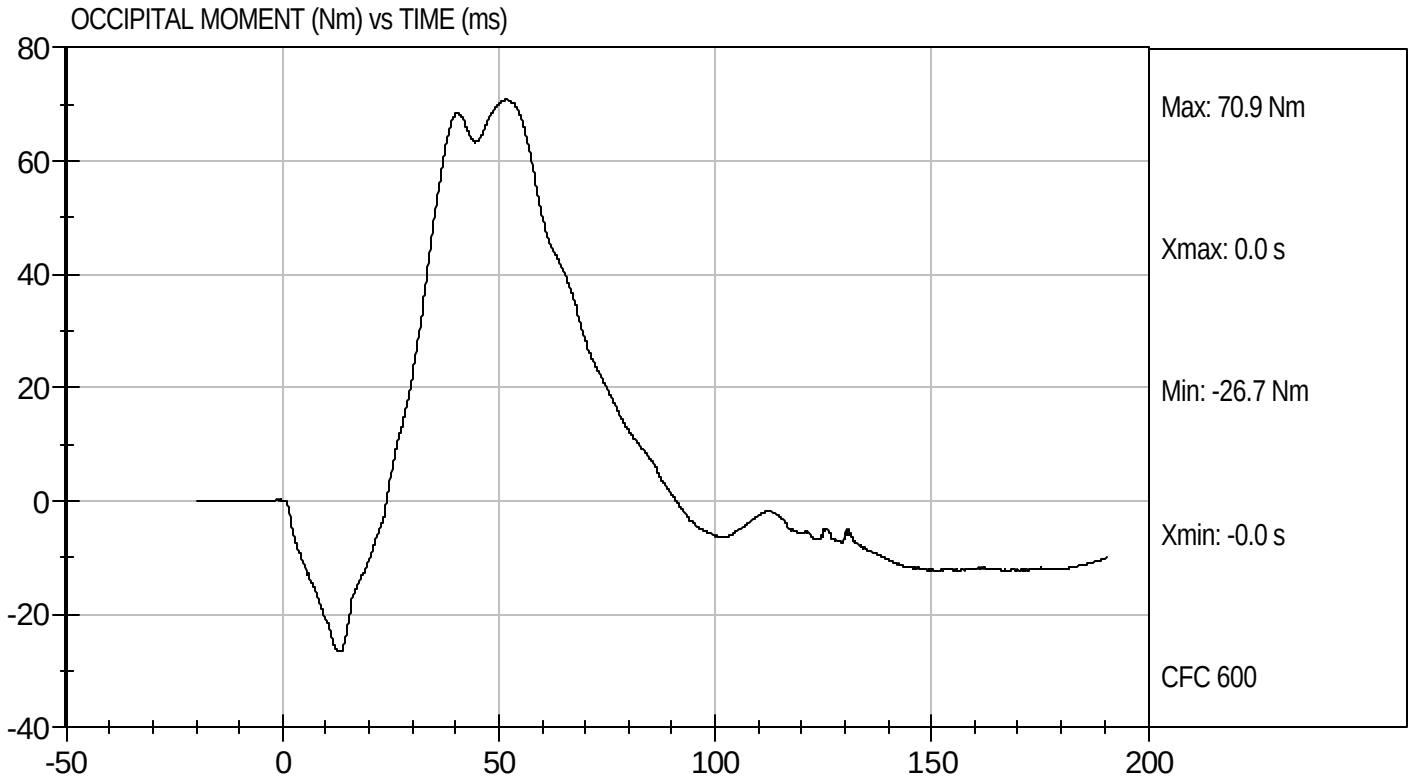


NECK ROTATION (DEG) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D114432]

Test Date: 12/28/11
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114433

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	19	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Pulse	10 ms	m/s	1.5 to 1.9	1.9	Pass
	20 ms	m/s	3.1 to 3.9	3.7	Pass
	30 ms	m/s	4.6 to 5.6	5.3	Pass
D Plane Rotation	Max	deg	99 to 114	105	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	-65 to -53	-54	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	100	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

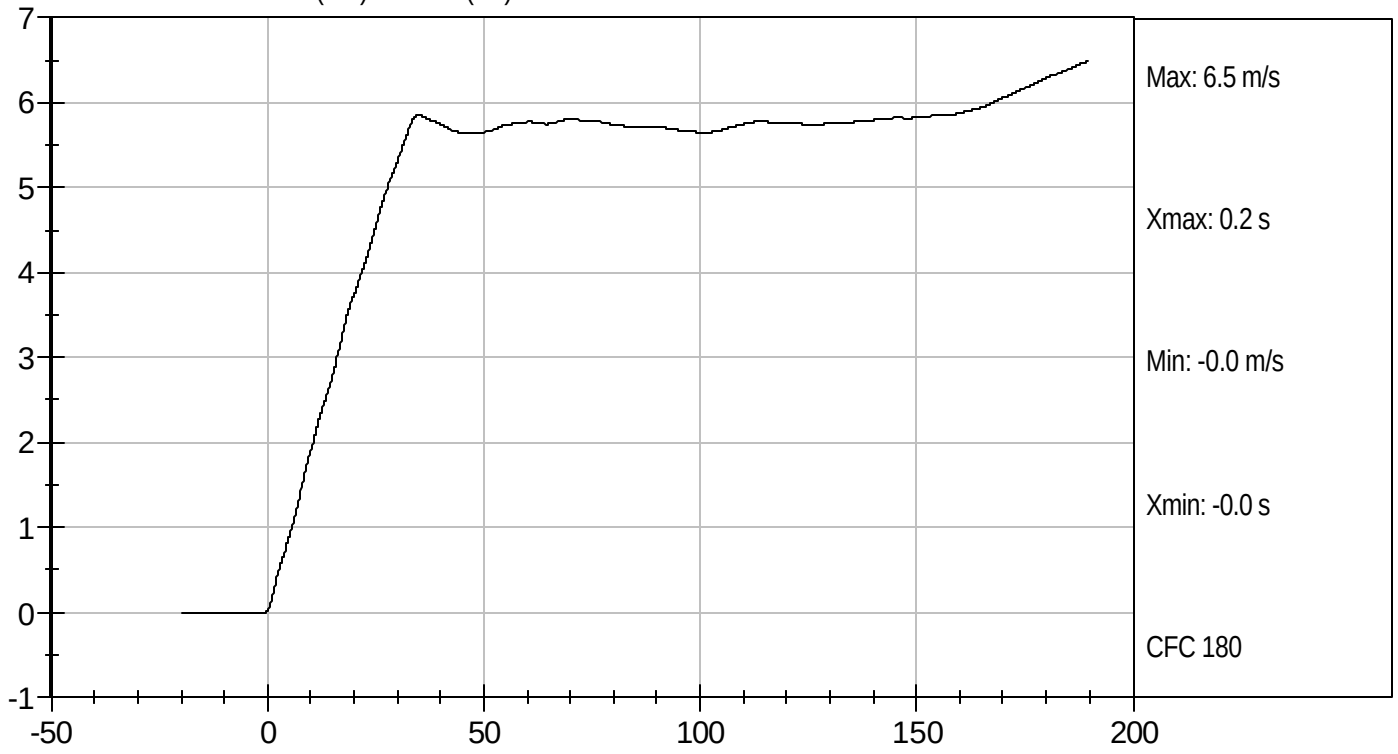
12/28/11
Test Date

David Winkelbauer
Approved By

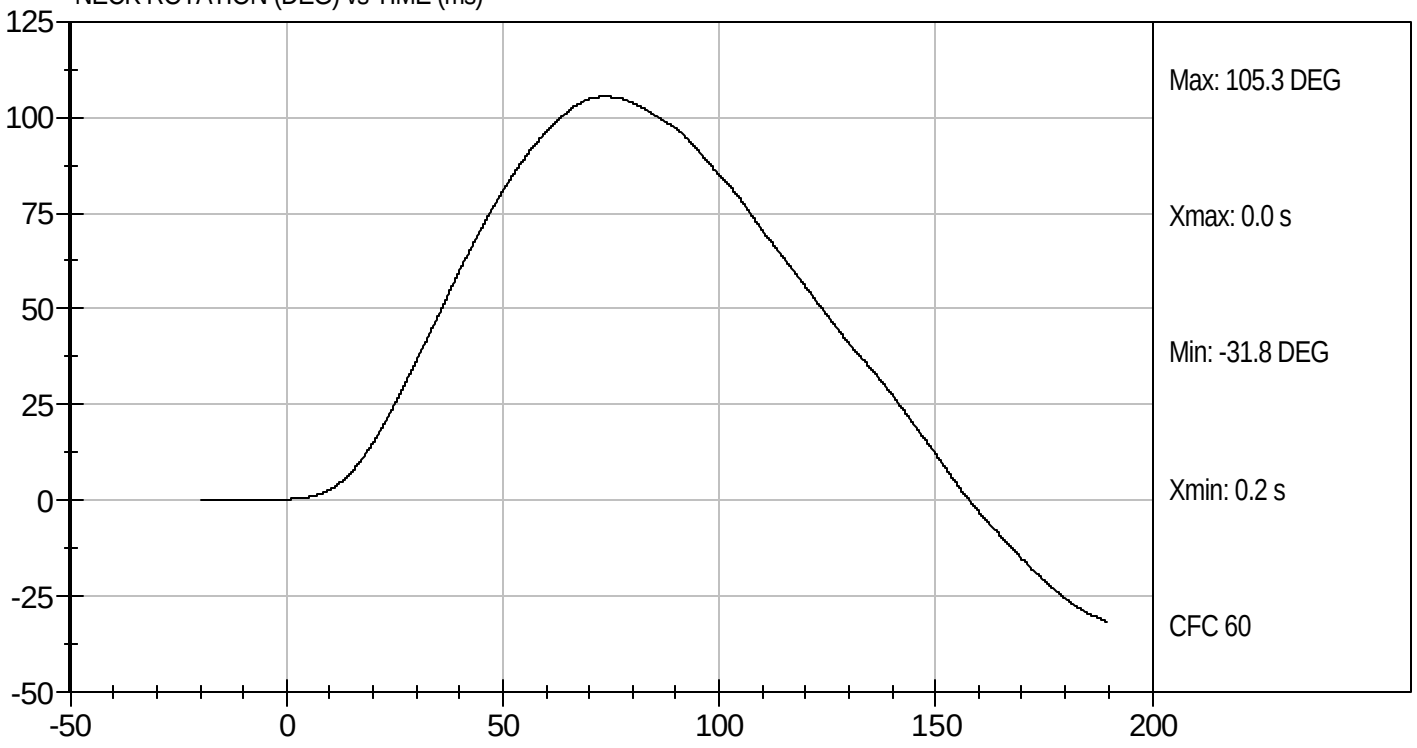
Test Desc: Neck Extension
Component ID: D114433

Test Date: 12/28/11
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM VELOCITY (m/s) vs TIME (ms)

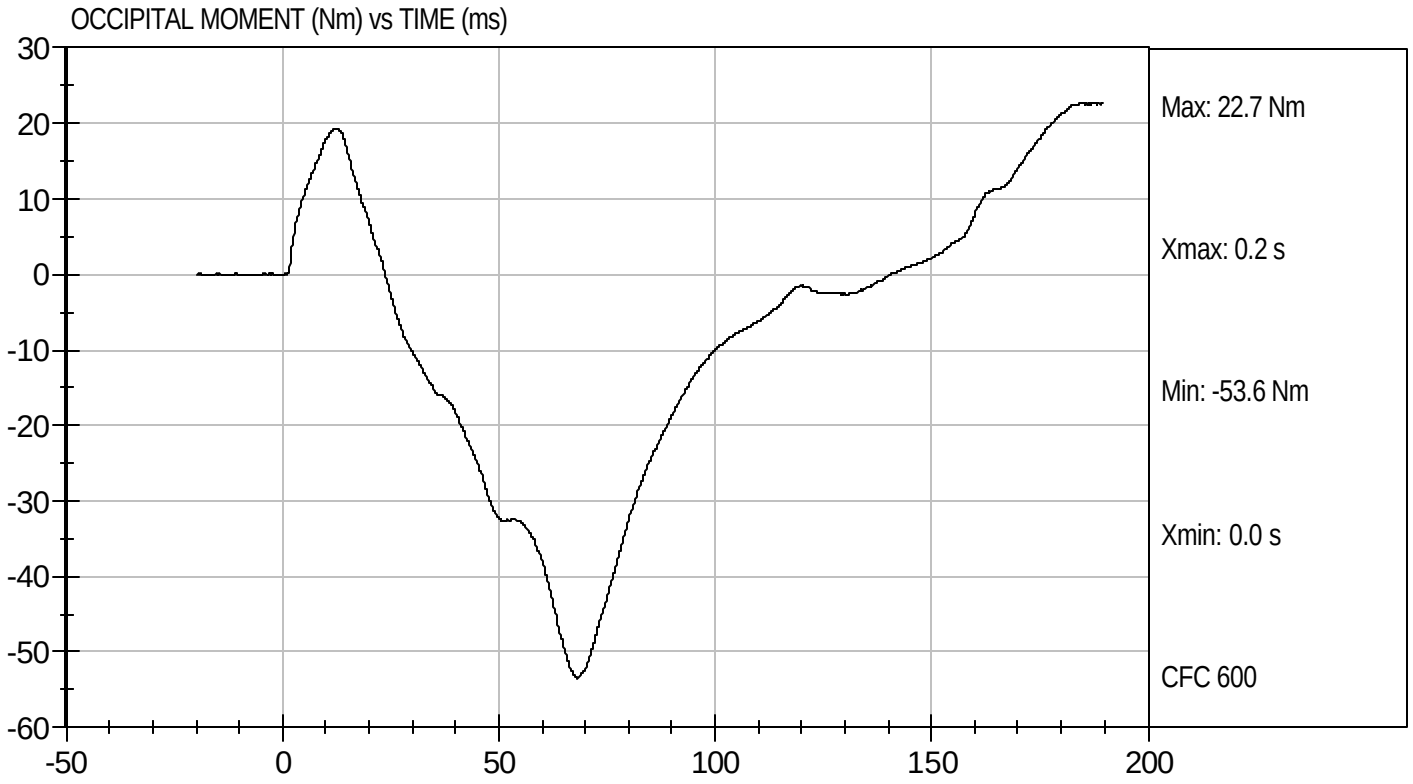


NECK ROTATION (DEG) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D114433

Test Date: 12/28/11
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114434

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	22.0	Pass
Relative Humidity	%	10 to 70	13	Pass
Probe Speed	m/s	6.59 to 6.83	6.77	Pass
Peak Deflection	mm	50 to 58	52	Pass
Peak Resistive Force w/in Deflection Corridor	kN	3.9 to 4.4	4.28	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4,600 N	4304	Pass
		Overall Test Results		Pass

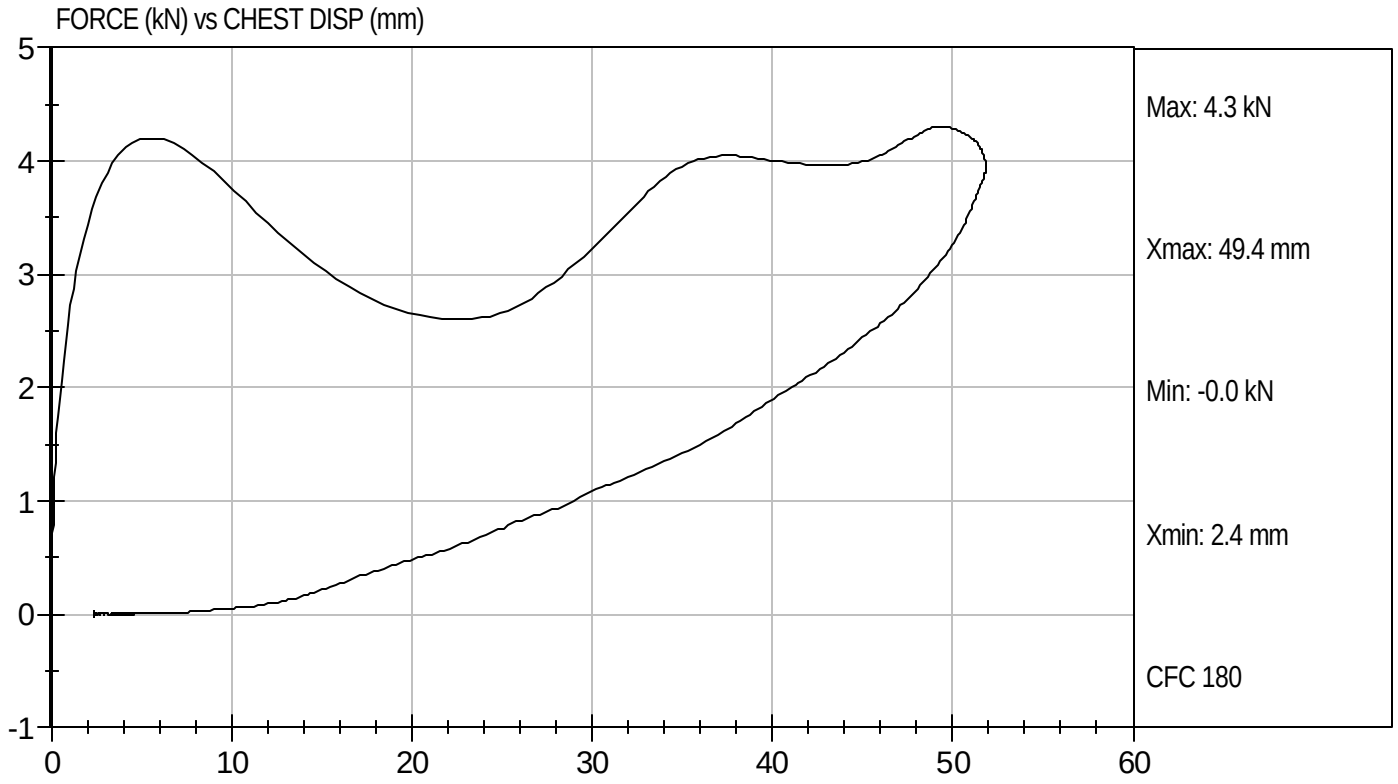
Jessica Gall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D114434

Test Date: 12/28/11
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114435

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	kN	3.45 to 4.06	3.85	Pass
		Overall Test Results		Pass

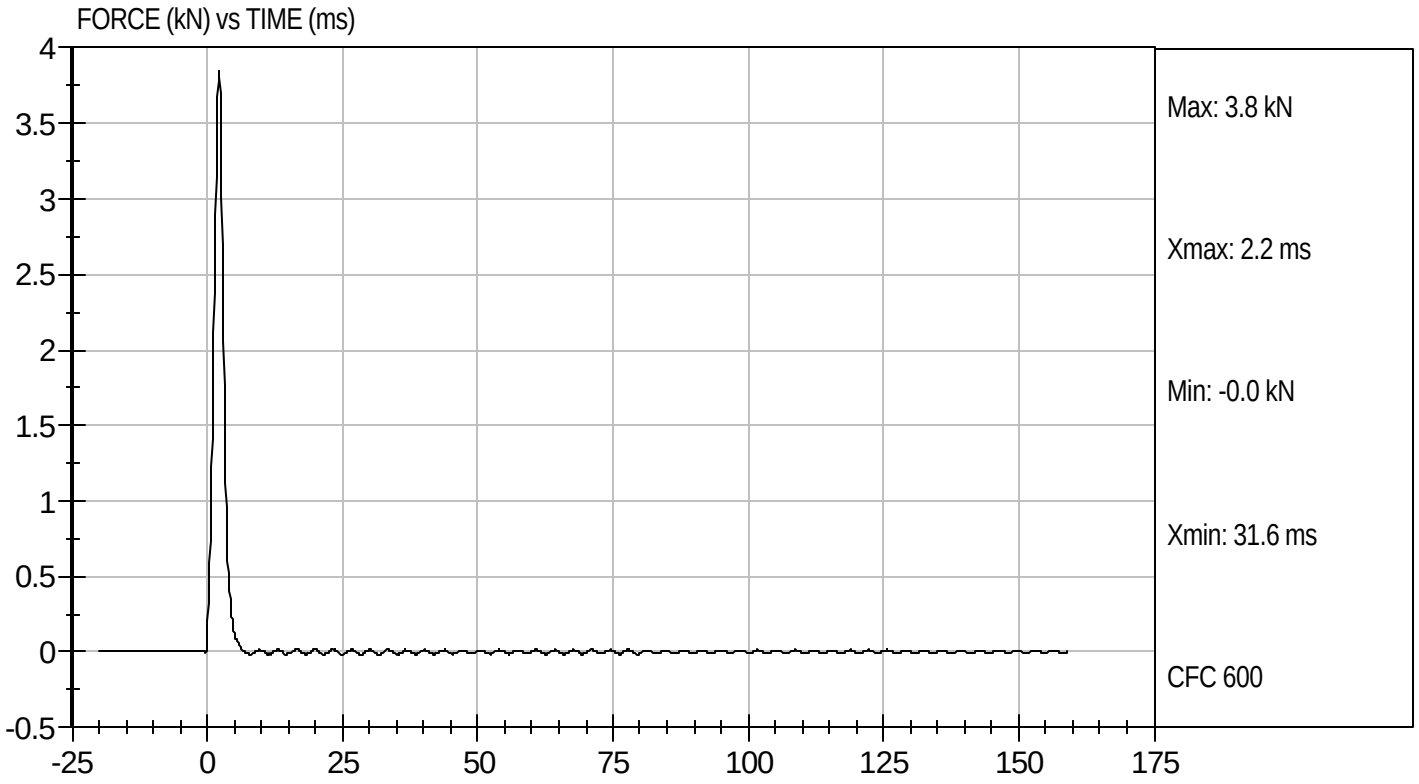
Jessica Hall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D114435

Test Date: 12/28/11
Velocity: 6.97 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114436

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	kN	3.45 to 4.06	3.71	Pass
		Overall Test Results		Pass

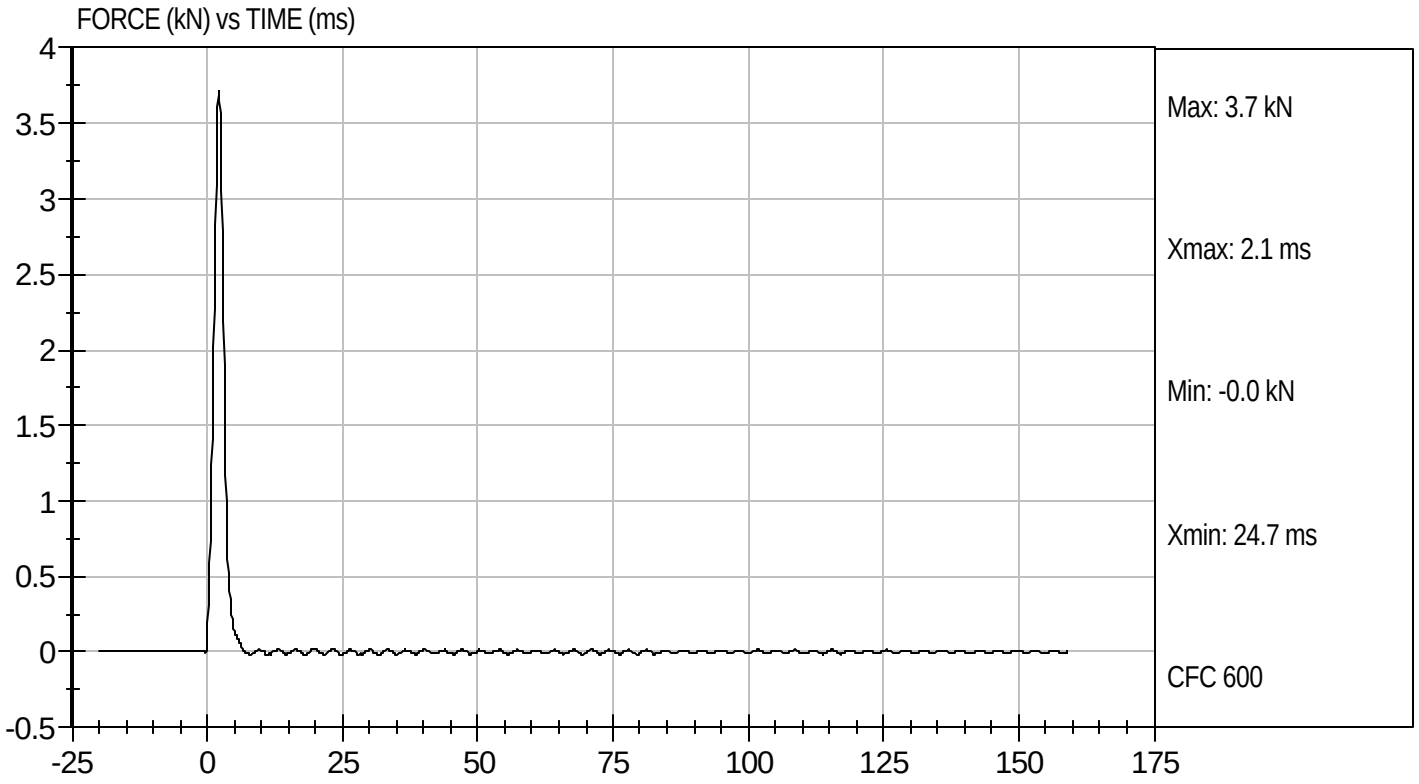
Jessica Hall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D114436

Test Date: 12/28/11
Velocity: 6.97 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D114437

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	4	Pass
Force at 45 deg	N	320 to 390	367	Pass
Upper Torso Deflection Rate	Deg/sec	0.5 to 1.5	1.0	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Hybrid III, 50th External Measurements
SN: 351

HYBRID III, PART 572, SUBPART E EXTERNAL DIMENSIONS				
DIMENSION	DESCRIPTION	DETAILS	ASSEMBLY DIMENSION (inches)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	34.6–35.0	34.8
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	19.9-20.5	20.0
C	H-POINT HEIGHT	Reference	3.3-3.5	3.4
D	H-POINT LOCATION FROM BACKLINE	Reference	5.3-5.5	5.5
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	3.3-3.7	3.5
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	5.5-6.1	6.0
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	11.4-12.0	11.8
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	1.6-1.8	1.7
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the shoulder clevis to the lowest part of the flesh on the elbow in line with the elbow pivot bolt.	13.0-13.6	13.3
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	7.5-8.3	7.8
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	22.8-23.8	23.8
L	POPLITEAL HEIGHT	Seat surface to the plane of the horizontal plane of the bottom of the feet.	16.9-17.9	17.0
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	19.1-19.7	19.5
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. “K”.	17.8-18.8	18.8

HYBRID III, SUBPART E EXTERIOR DIMENSIONS, continued				
DIMENSION	DESCRIPTION	DETAILS		ACTUAL MEASUREMENT
O	CHEST DEPTH WITHOUT JACKET	Measured 16.9-17.1 in. above seat surface	8.4-9.0	8.5
P	FOOT LENGTH	Tip of toe to rear of heal	9.9-10.5	10.3
V	SHOULDER BREADTH	Outside edges of right and left shoulder clevises	16.3-17.2	16.5
W	FOOT BREADTH	The widest part of the foot	3.6-4.2	4.0
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 16.9-17.1 in. above seat surface	38.2-39.4	39.2
Z	WAIST CIRCUMFERENCE	Measured 8.9-9.1 in. above seat surface	32.9-34.1	33.7
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	16.9-17.1	17.0
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference	8.9-9.1	9.0

NOTE: THE H-POINT IS LOCATED 1.83 INCHES FORWARD AND 2.57 INCHES DOWN FROM THE CENTER OF THE PELVIS ANGLE REFERENCE HOLE.

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D114351

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	28	Pass
Peak Resultant Acceleration	G's	225 - 275	249	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-9.1	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

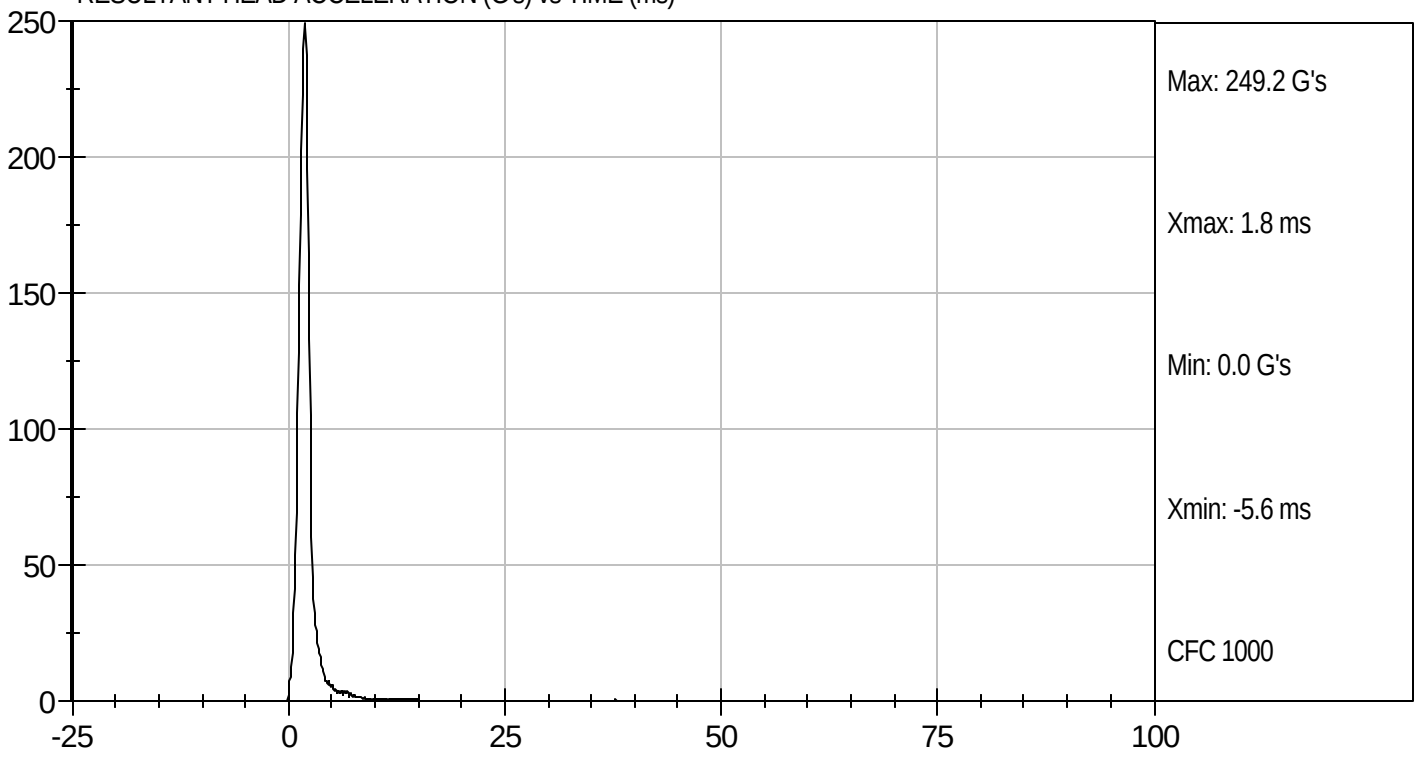
12/21/11
Test Date

David Winkelbauer
Approved By

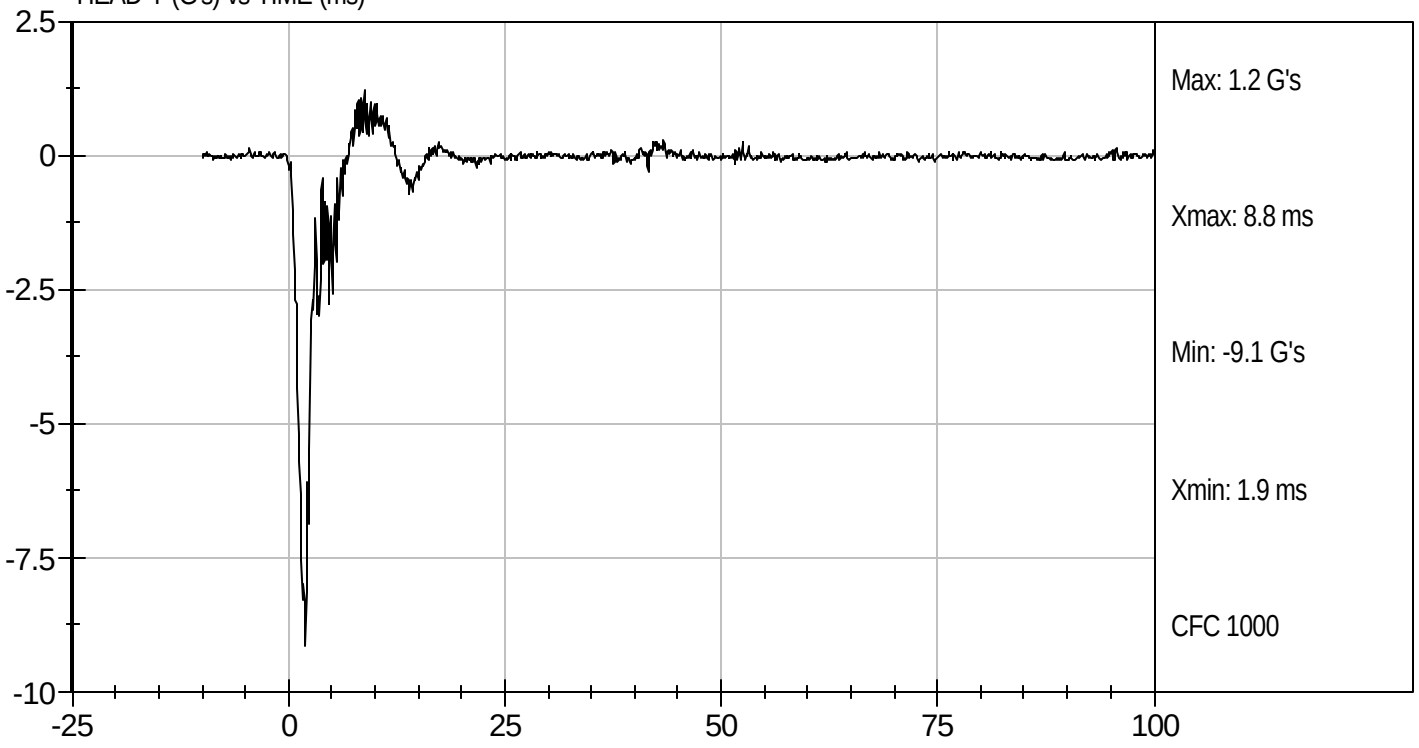
Test Desc: Head Drop
Component ID: D114351

Test Date: 12/21/11
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114352

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	22	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.12	Pass
	20 ms	G's	17.60 to 22.60	19.09	Pass
	30 ms	G's	12.50 to 18.50	13.83	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	13.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	35.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	69.4	Pass
	Time	ms	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	115.3	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	91.5	Pass
	Time	ms	47.0 to 58.0	48.4	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	97.3	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

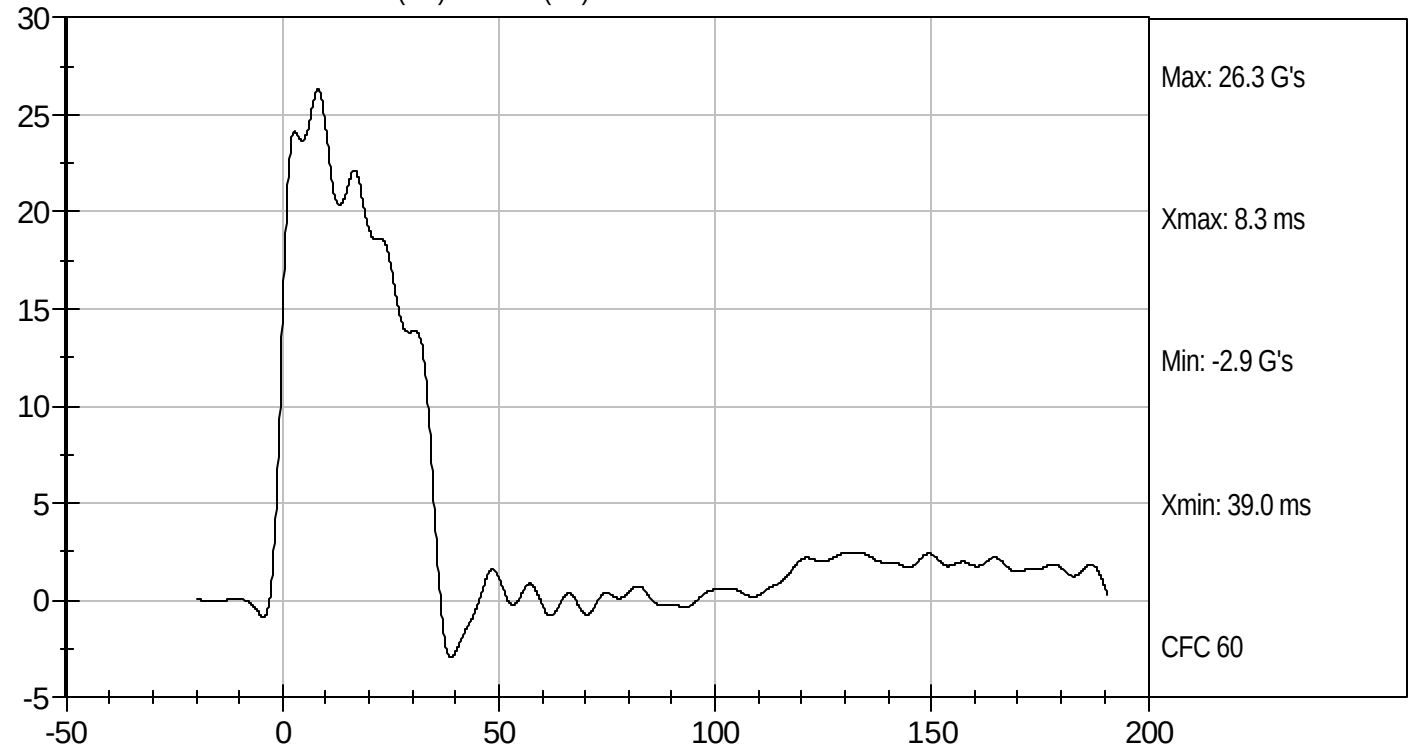
12/22/11
Test Date

David Winkelbauer
Approved By

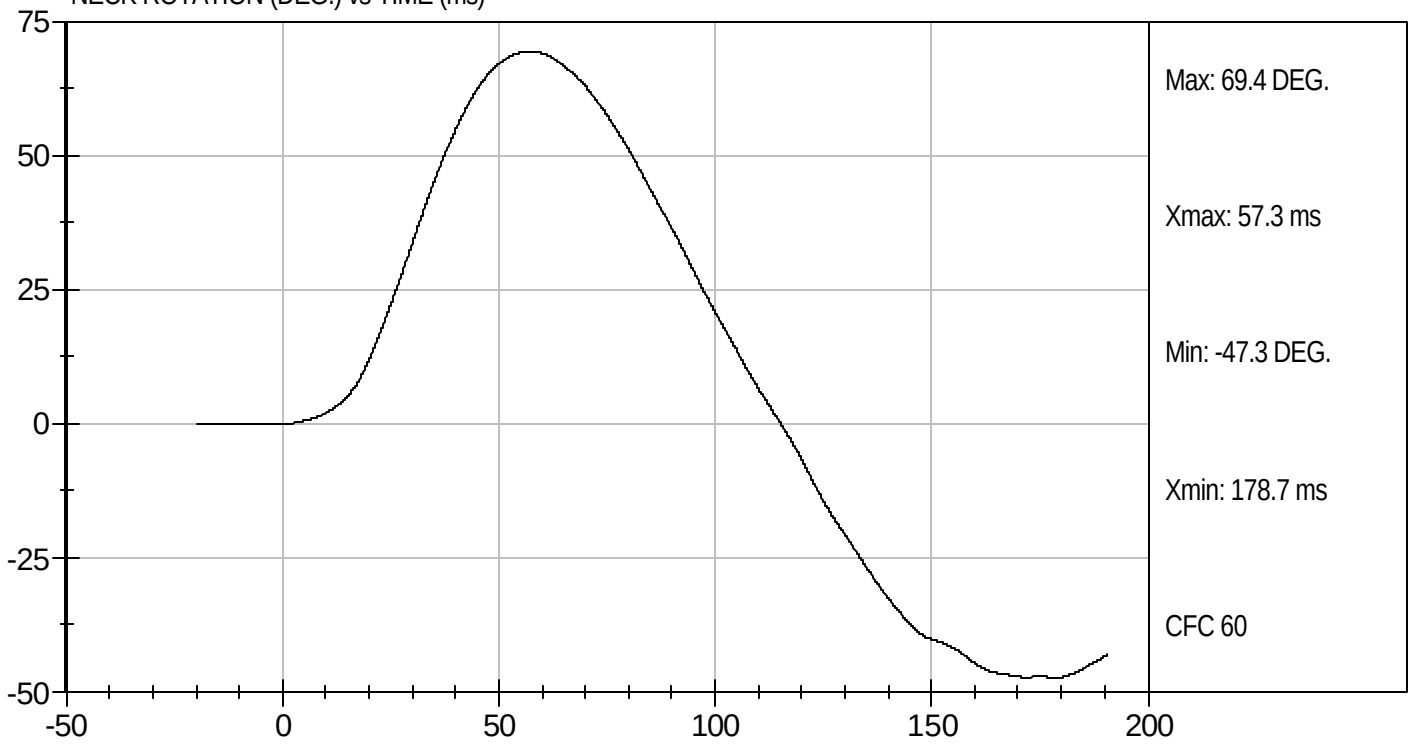
Test Desc: Neck Flexion
Component ID: D114352

Test Date: 12/22/11
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

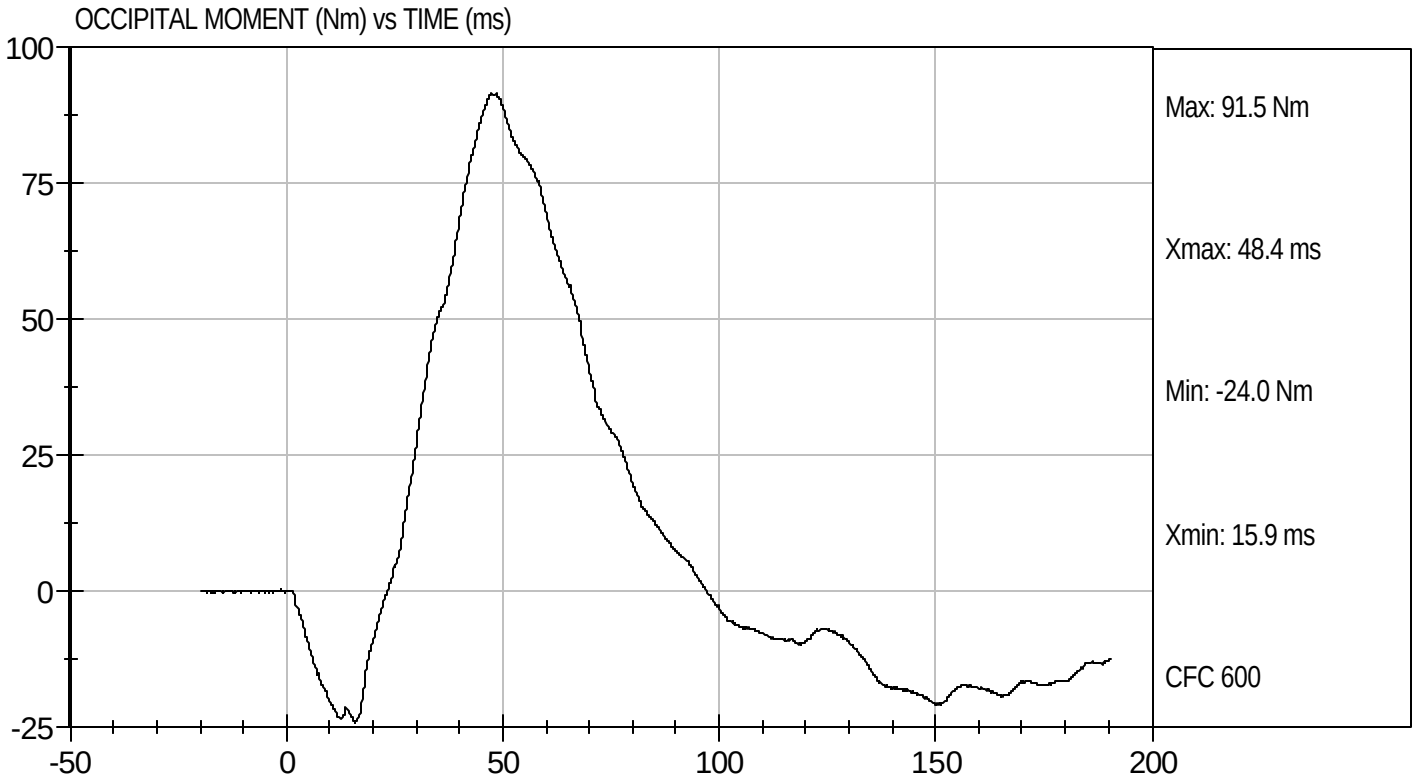


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D114352

Test Date: 12/22/11
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114353

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity		%	10 to 70	23	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	18.58	Pass
	20 ms	G's	14.00 to 19.00	16.26	Pass
	30 ms	G's	11.00 to 16.00	12.97	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	15.1	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	38.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	94.7	Pass
	Time	ms	72.0 to 82.0	76.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	156.7	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-59.0	Pass
	Time	ms	65.0 to 79.0	69.8	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	143.5	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

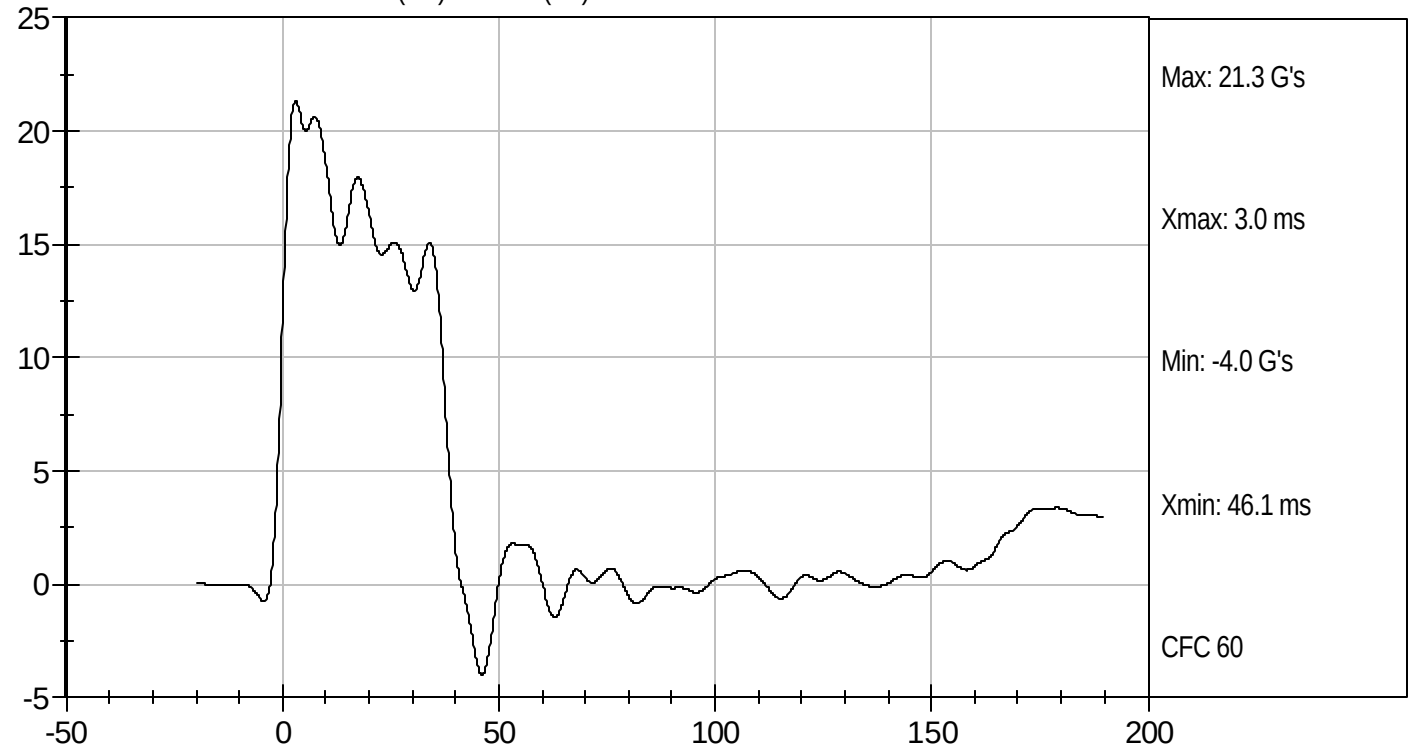
12/22/11
Test Date

David Winkelbauer
Approved By

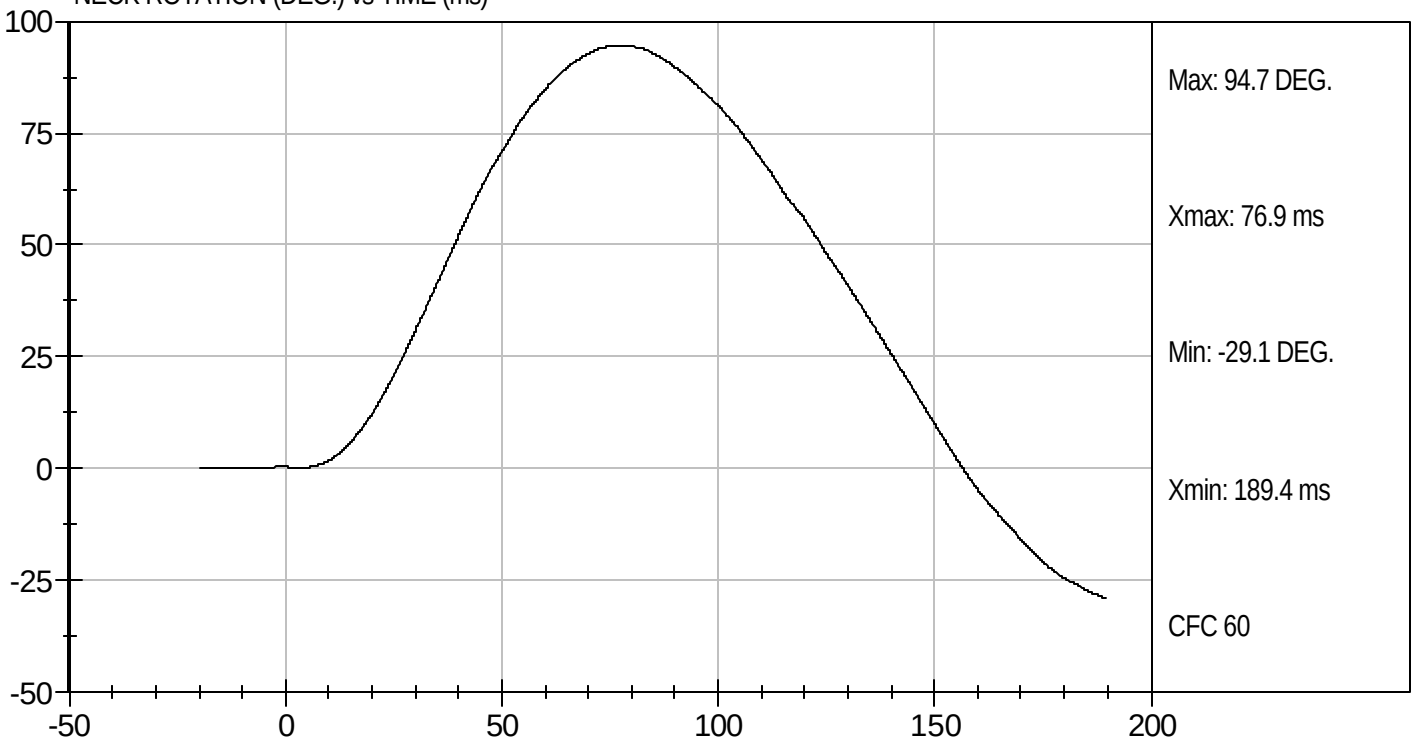
Test Desc: Neck Extension
Component ID: D114353

Test Date: 12/22/11
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

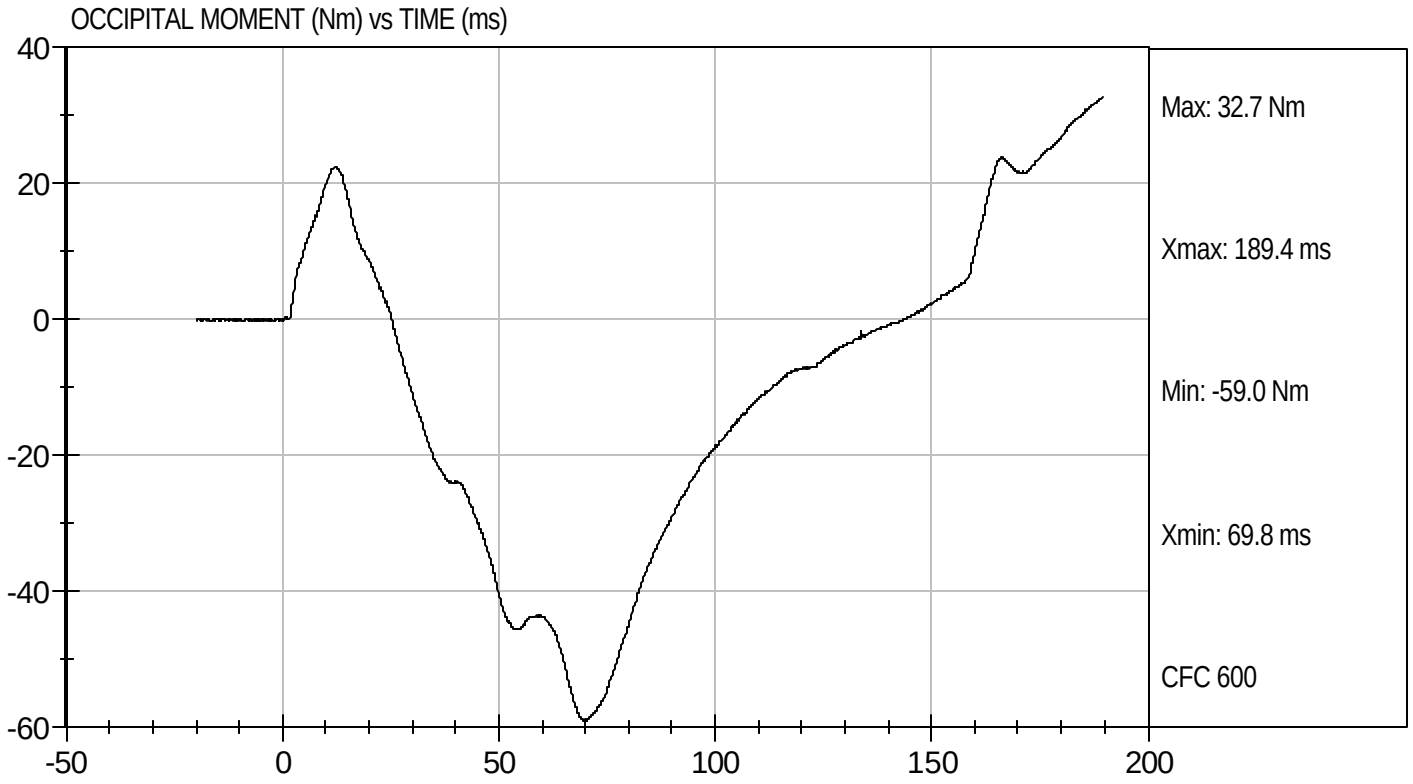


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D114353

Test Date: 12/22/11
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114354

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,395	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.49	Pass
Internal Hysteresis	%	69 to 85	70	Pass
		Overall Test Results		Pass

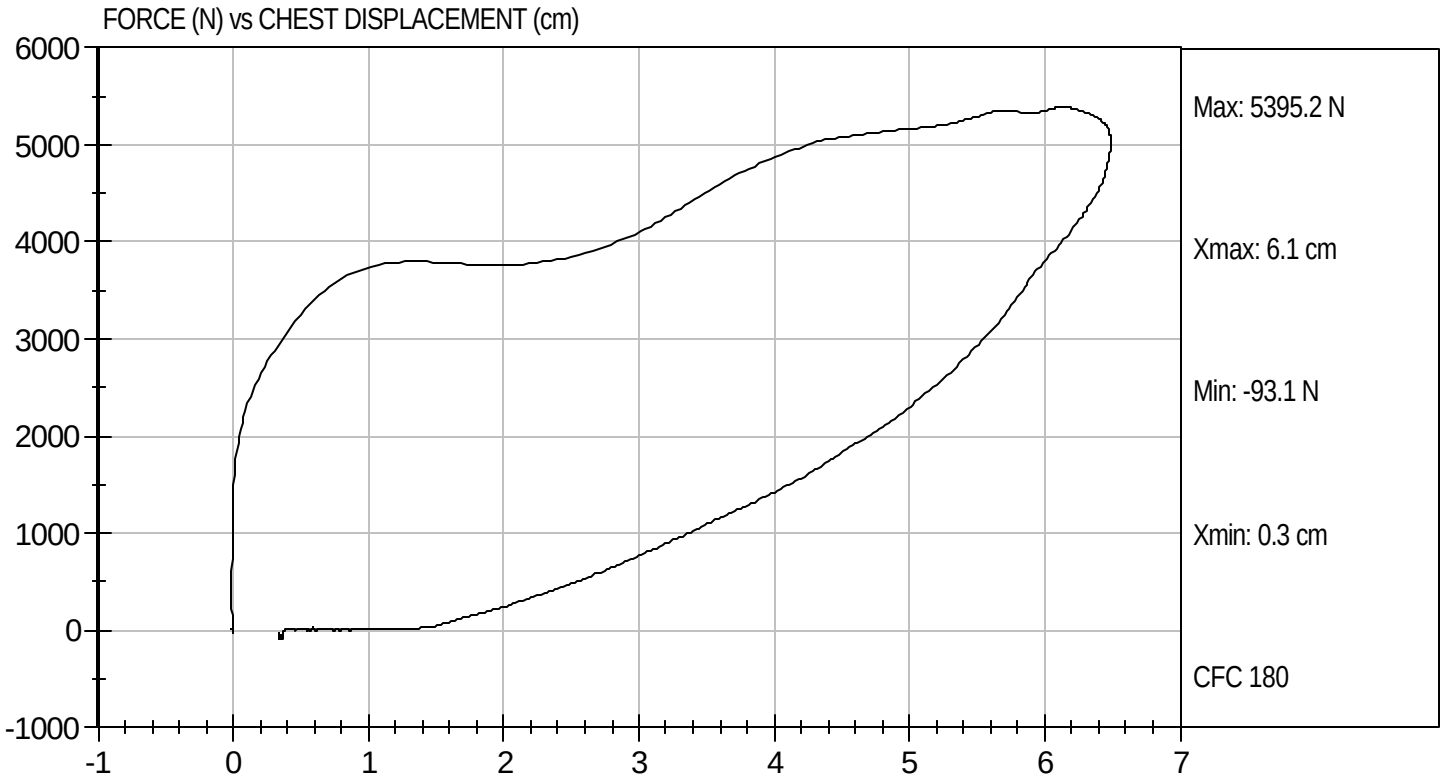
Jessica Gall
Laboratory Technician

12/22/11
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D114354

Test Date: 12/22/11
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114355

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	5,270	Pass
		Overall Test Results		Pass

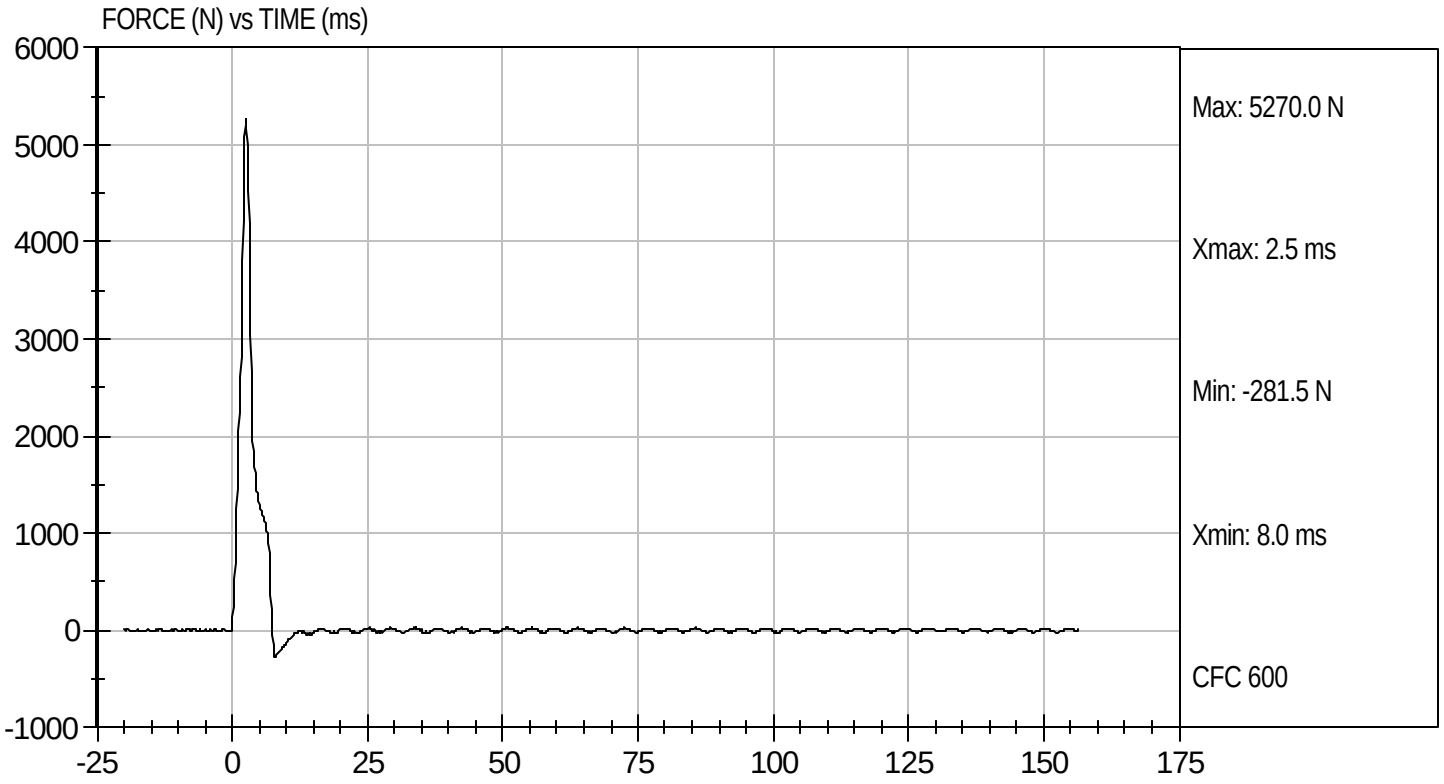
Jessica Hall
Laboratory Technician

12/21/11
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D114355

Test Date: 12/21/11
Velocity: 6.85 ft/s, 2.09 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114356

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,121	Pass
		Overall Test Results		Pass

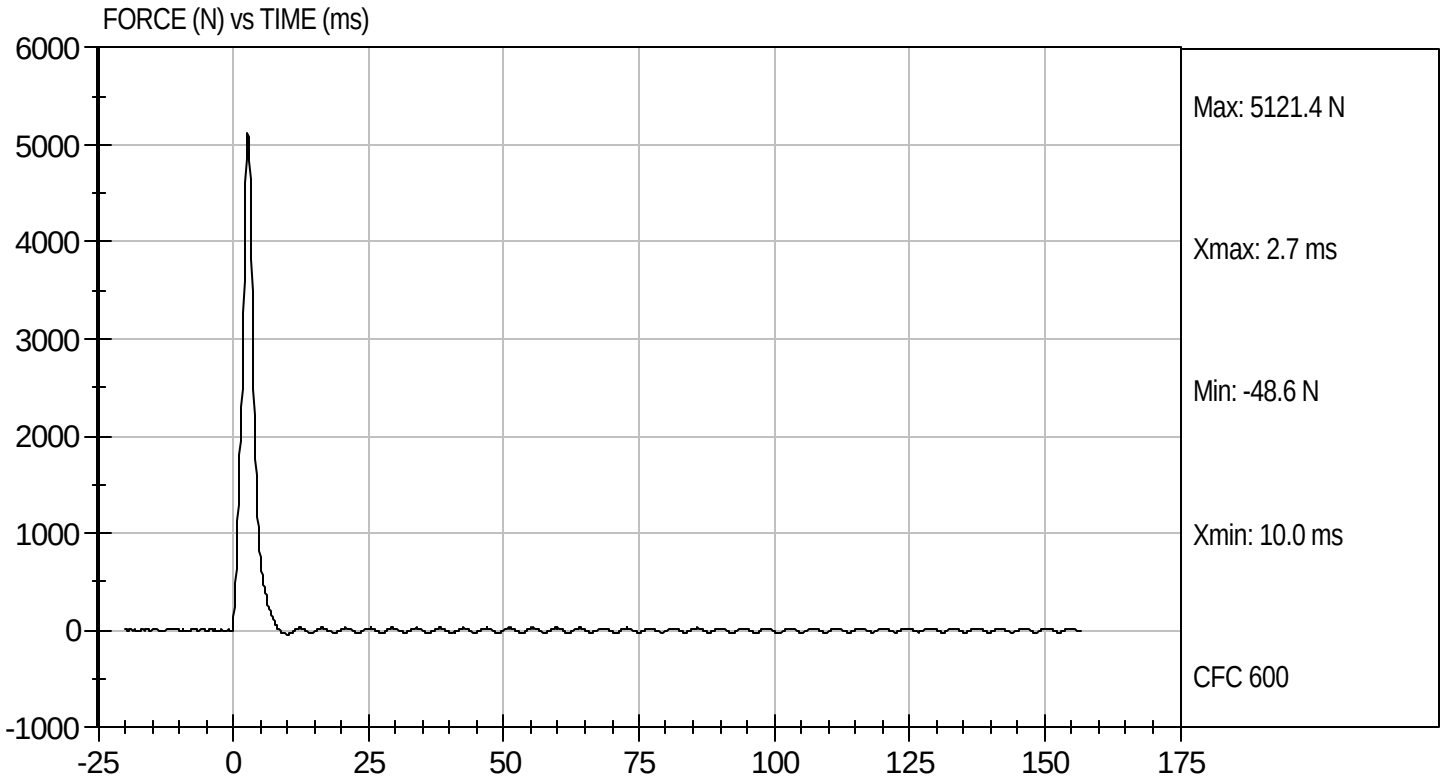
Jessica Hall
Laboratory Technician

12/21/11
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D114356

Test Date: 12/21/11
Velocity: 6.89 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114350

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	28	28	Pass
Rotation Rate	deg/s	5.0 -10.0	5.7	5.7	Pass
30 Degrees	Nm	94.9 Nm Max	61.2	61.1	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 - 50.0 Degree Max Rotation	42.7	41.9	Pass
		Overall Test Results			Pass

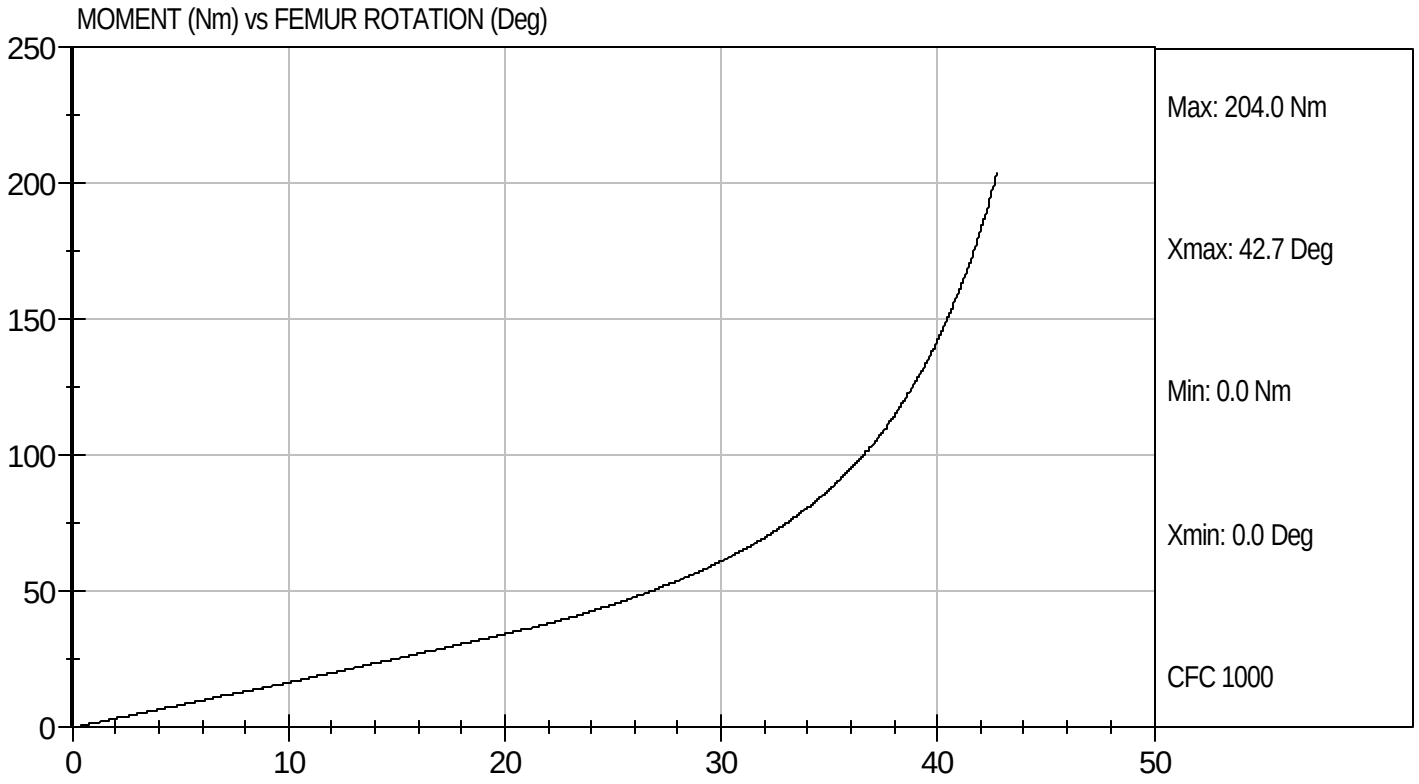
Jessica Gall
Laboratory Technician

12/21/11
Test Date

David Winkelbauer
Approved By

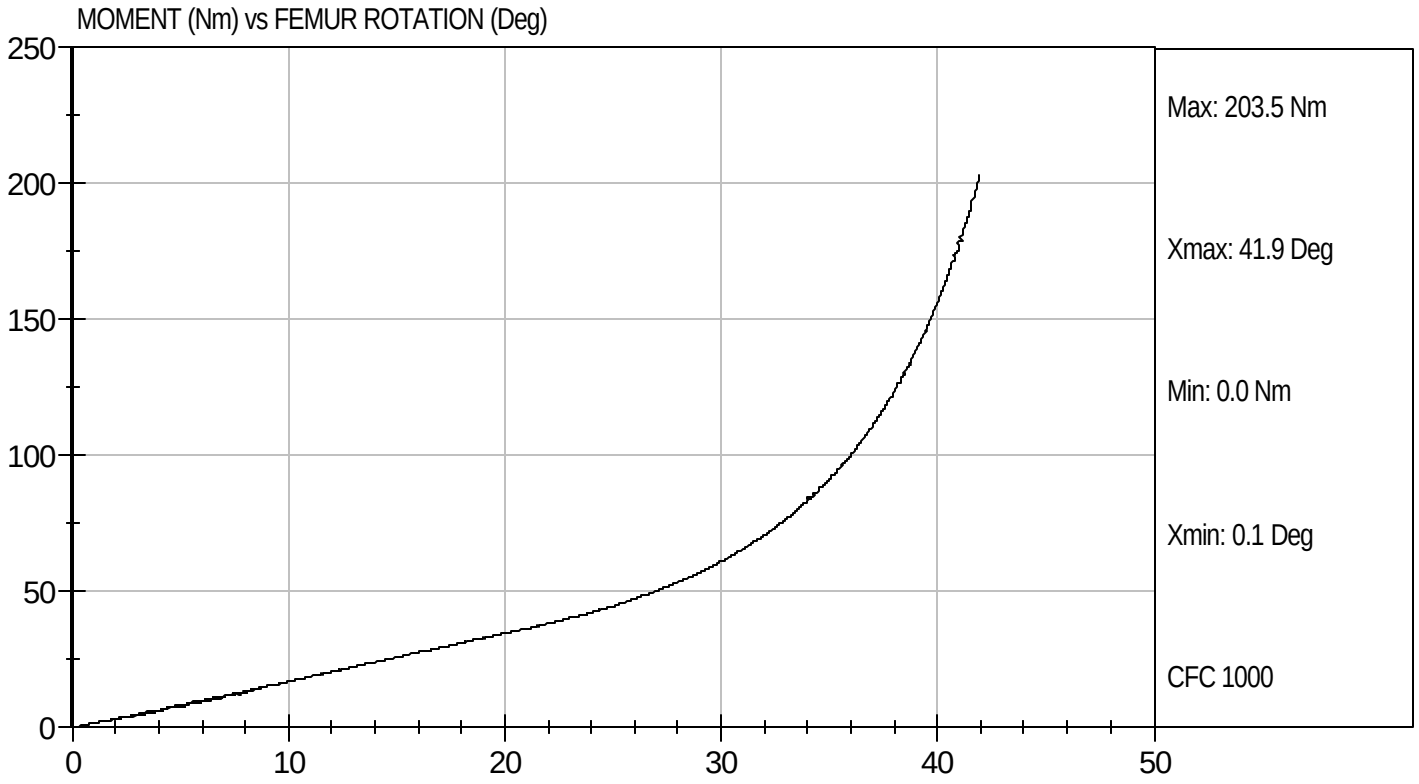
Test Desc: Hip Femur Flexion
Component ID: D114359

Test Date: 12/21/11
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D114350

Test Date: 12/21/11
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D114421

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Peak Resultant Acceleration	G's	225 - 275	267	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	3.6	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

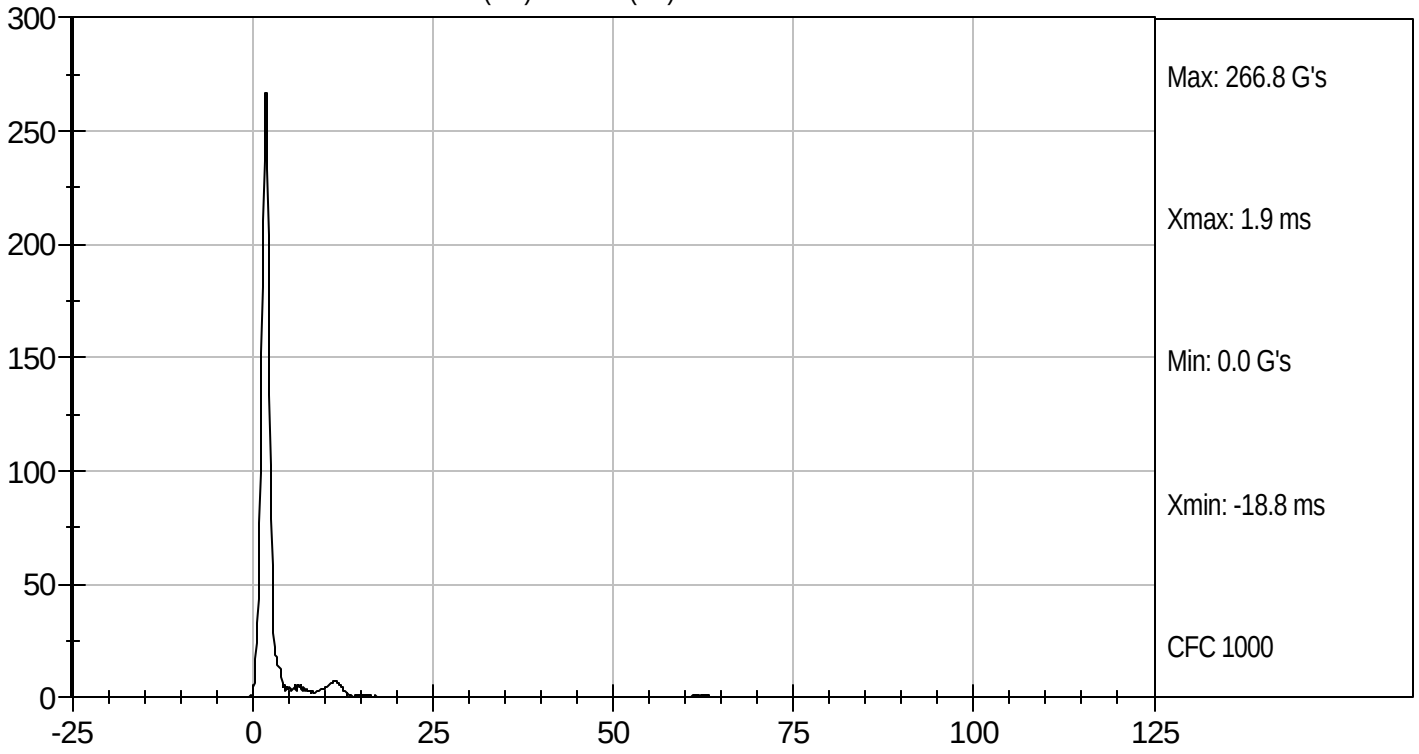
12/28/11
Test Date

David Winkelbauer
Approved By

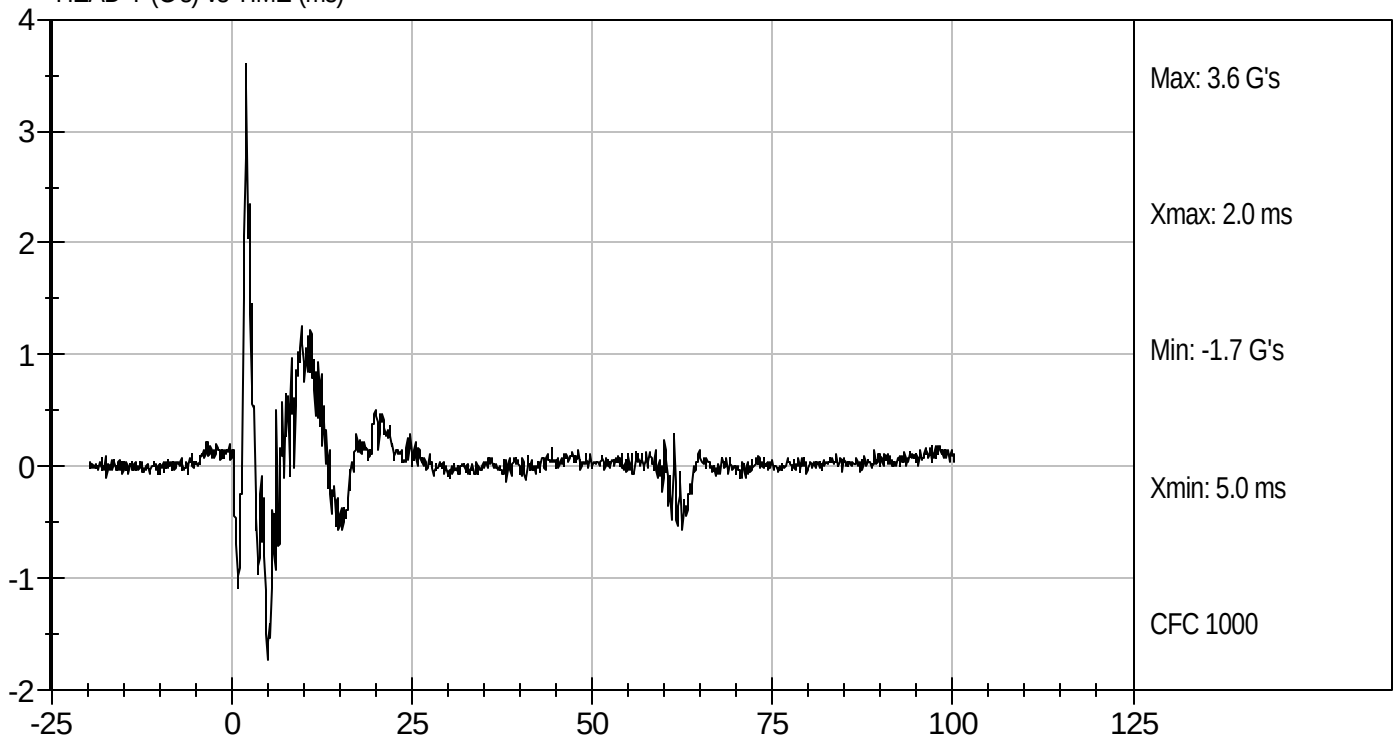
Test Desc: Head Drop
Component ID: D114421

Test Date: 12/28/11
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114422

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	24	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	25.40	Pass
	20 ms	G's	17.60 to 22.60	20.40	Pass
	30 ms	G's	12.50 to 18.50	18.42	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	18.3	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	34.2	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	70.3	Pass
	Time	ms	57.0 to 64.0	57.3	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	117.0	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	98.2	Pass
	Time	ms	47.0 to 58.0	47.3	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	99.4	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

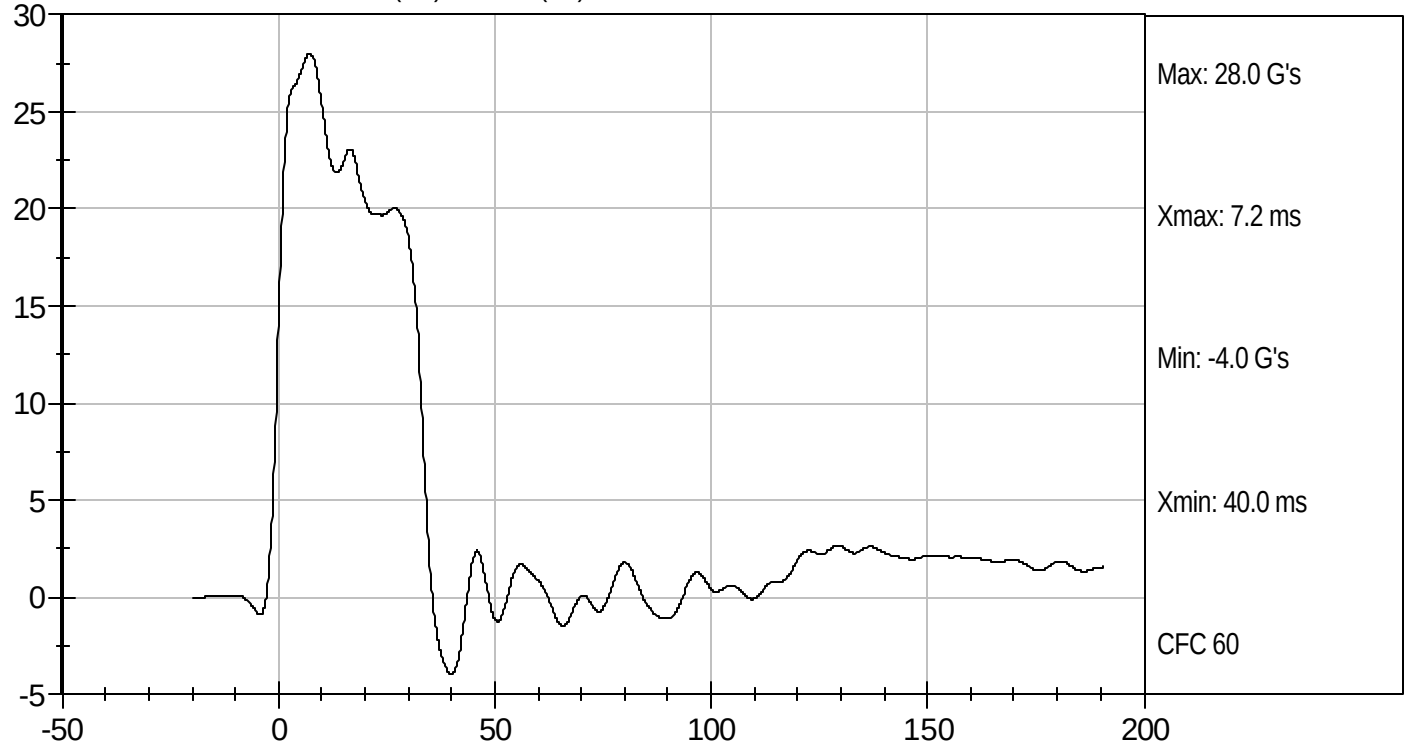
12/27/11
Test Date

David Winkelbauer
Approved By

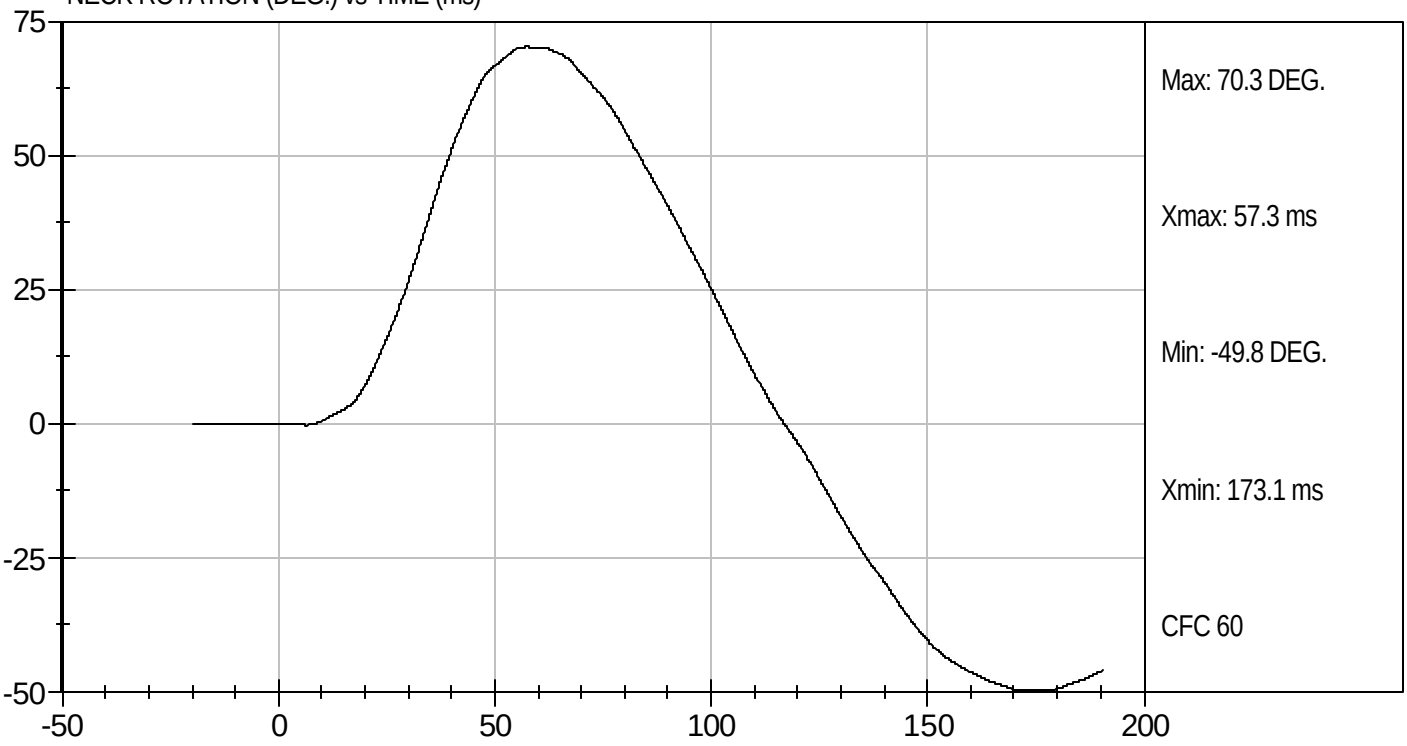
Test Desc: Neck Flexion
Component ID: D114422

Test Date: 12/27/11
Velocity: 23.15 ft/s, 7.06 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

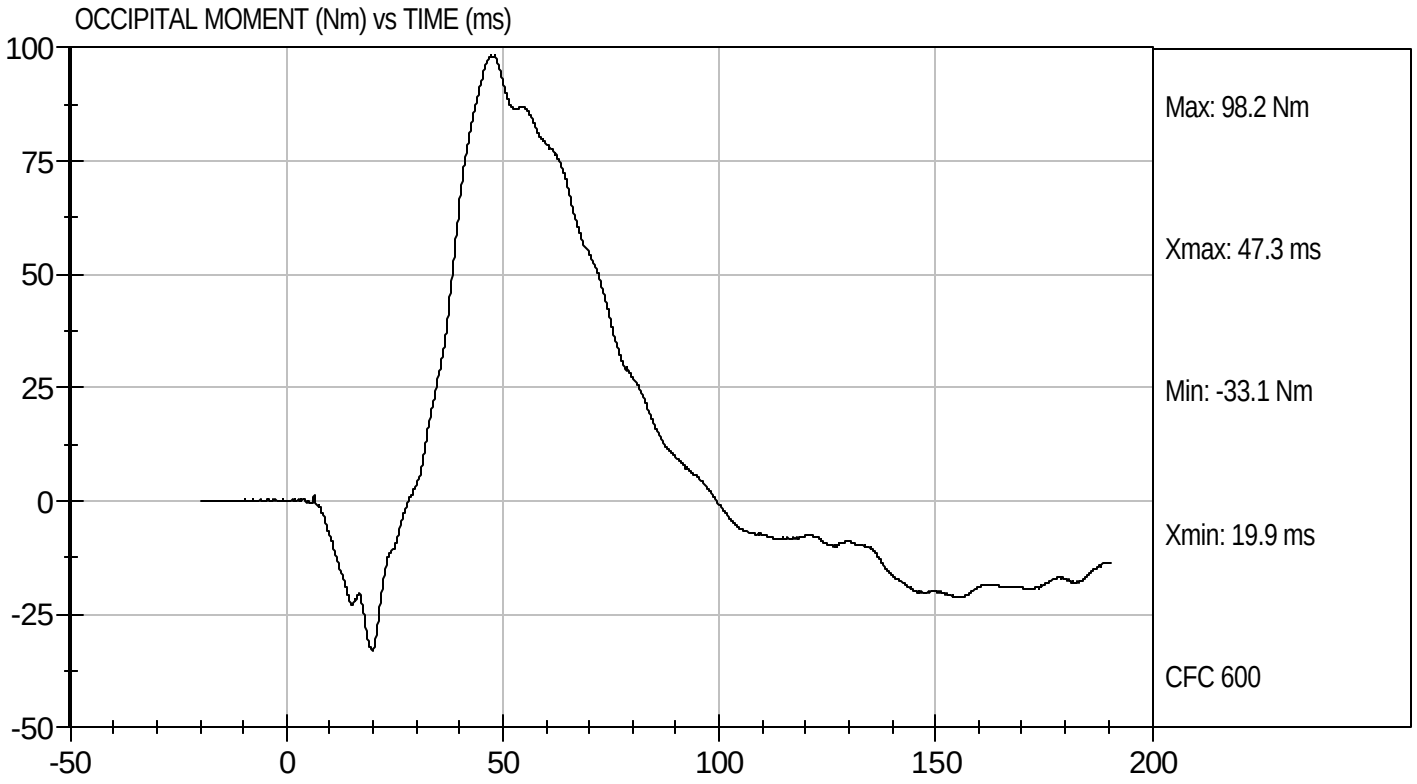


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D114422

Test Date: 12/27/11
Velocity: 23.15 ft/s, 7.06 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114423

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	24	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.85	Pass
	20 ms	G's	14.00 to 19.00	18.48	Pass
	30 ms	G's	11.00 to 16.00	15.01	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	14.9	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	38.6	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.4	Pass
	Time	ms	72.0 to 82.0	73.5	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	154.0	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-65.7	Pass
	Time	ms	65.0 to 79.0	69.3	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	141.0	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

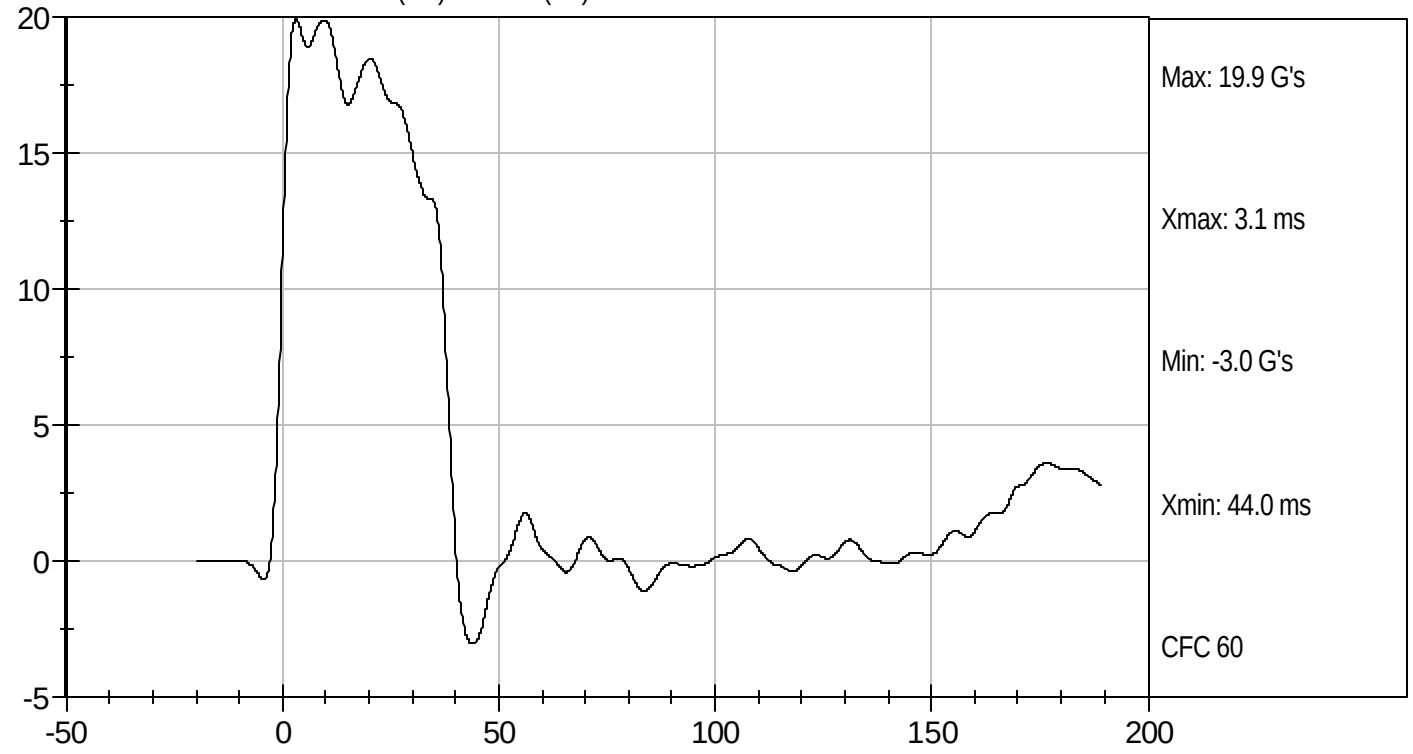
12/27/11
Test Date

David Winkelbauer
Approved By

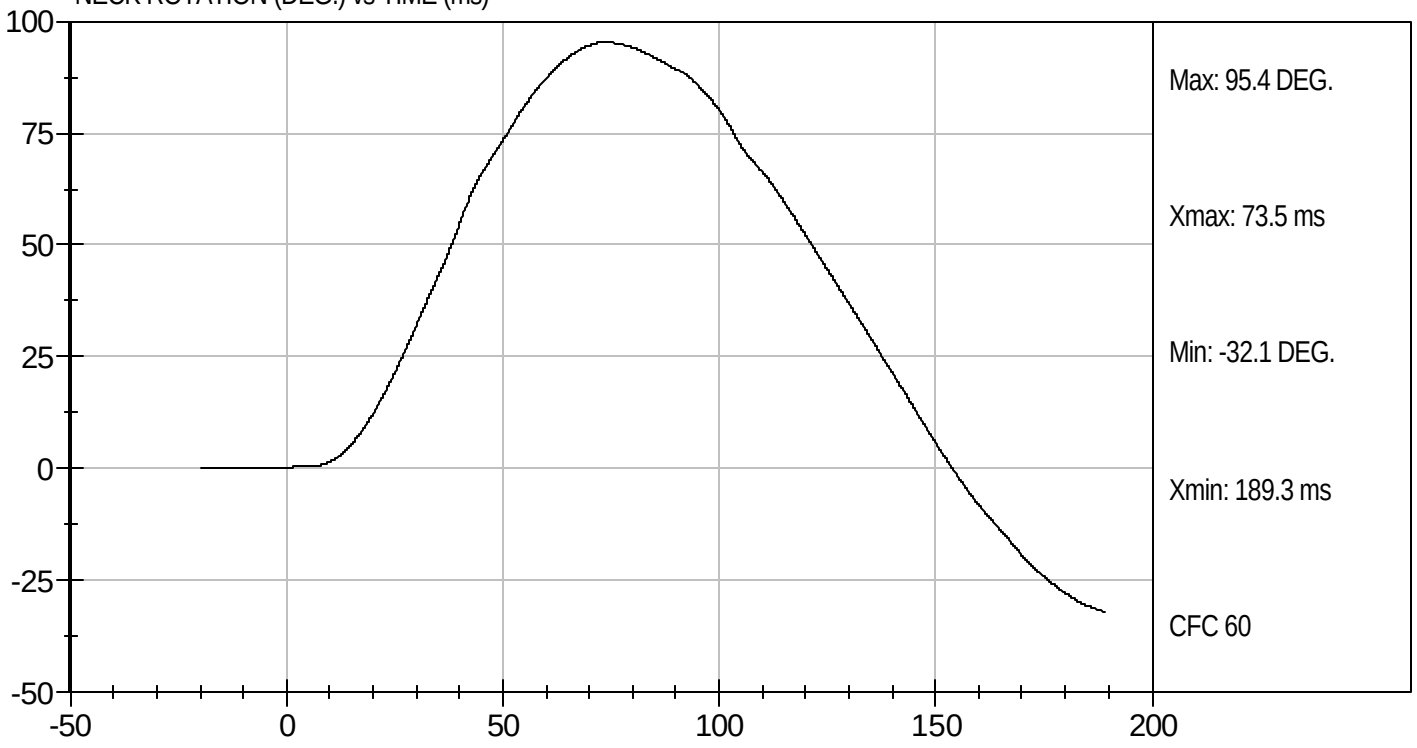
Test Desc: Neck Extension
Component ID: D114423

Test Date: 12/27/11
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

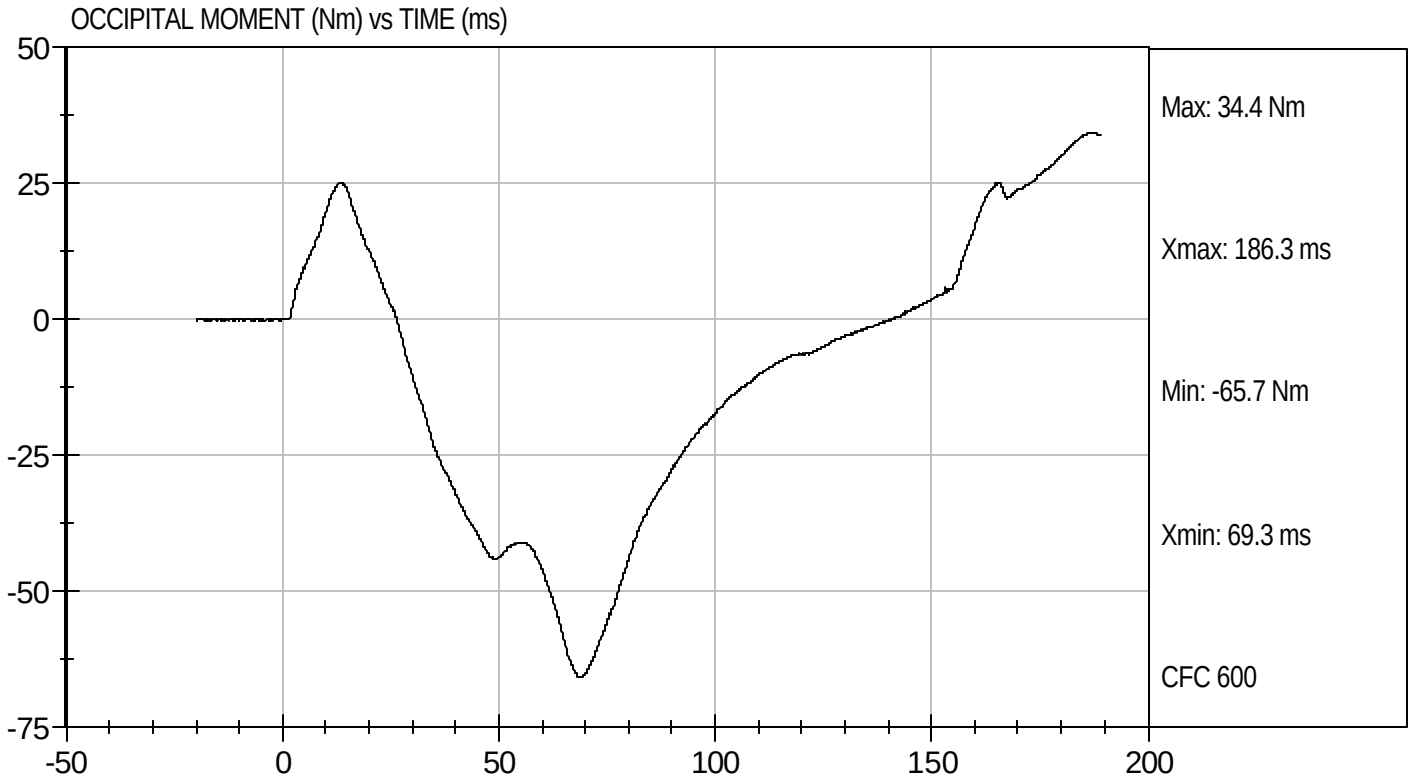


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D114423

Test Date: 12/27/11
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114424

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	13	Pass
Probe Velocity	m/s	6.58 to 6.82	6.77	Pass
Peak Probe Force	N	5159 to 5893	5,322	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.43	Pass
Internal Hysteresis	%	69 to 85	71	Pass
		Overall Test Results		Pass

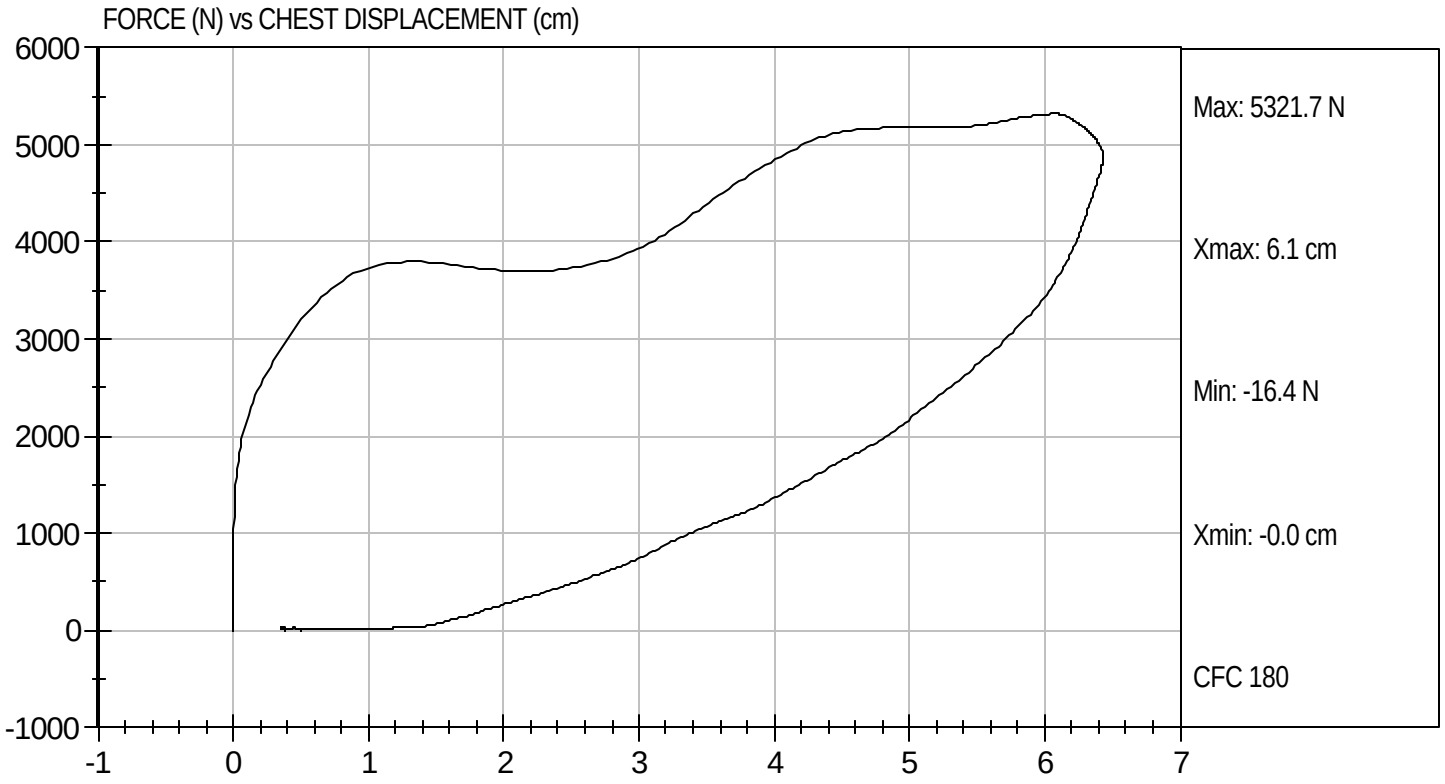
Jessica Hall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D114424

Test Date: 12/28/11
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114425

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5,401	Pass
		Overall Test Results		Pass

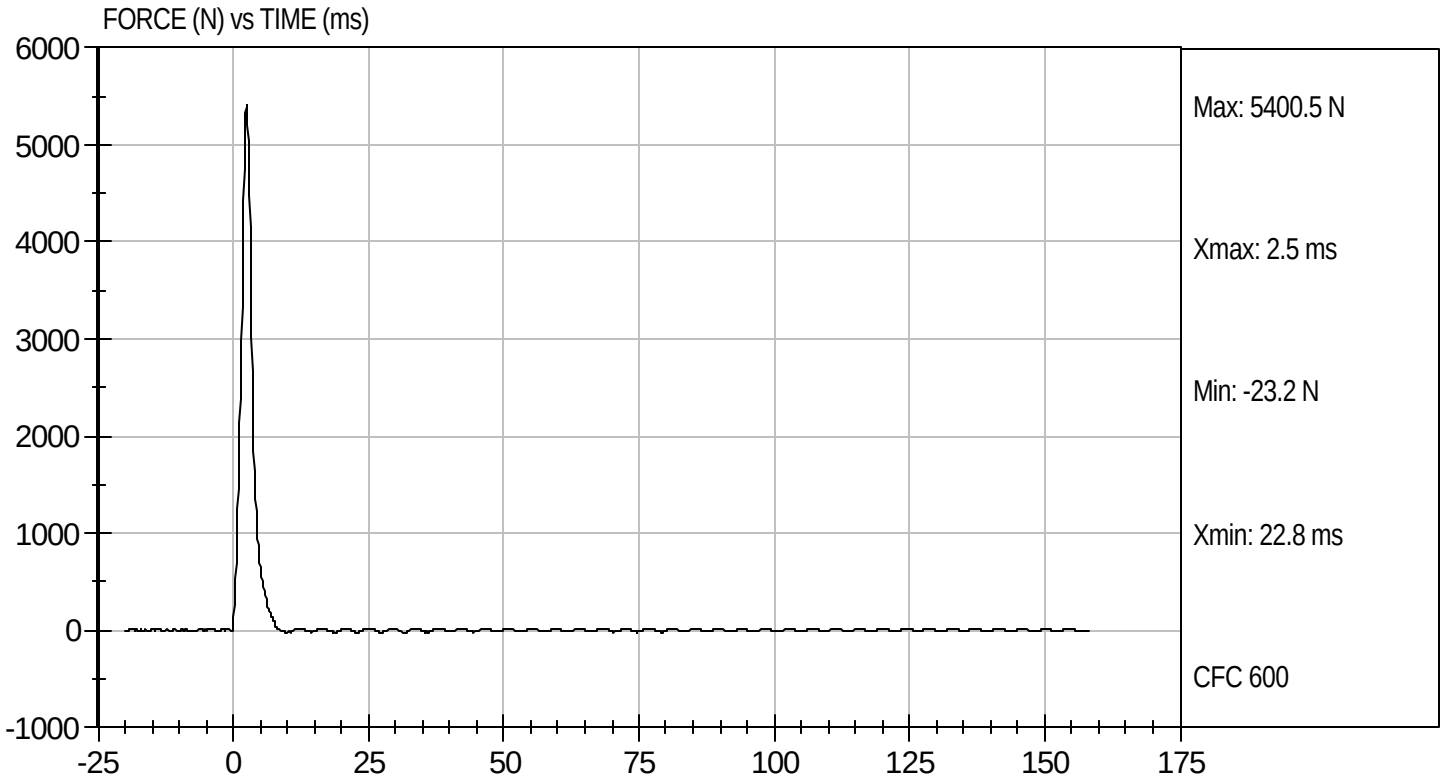
Jessica Hall
Laboratory Technician

12/27/11
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D114425

Test Date: 12/27/11
Velocity: 6.94 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114426

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	19	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,294	Pass
		Overall Test Results		Pass

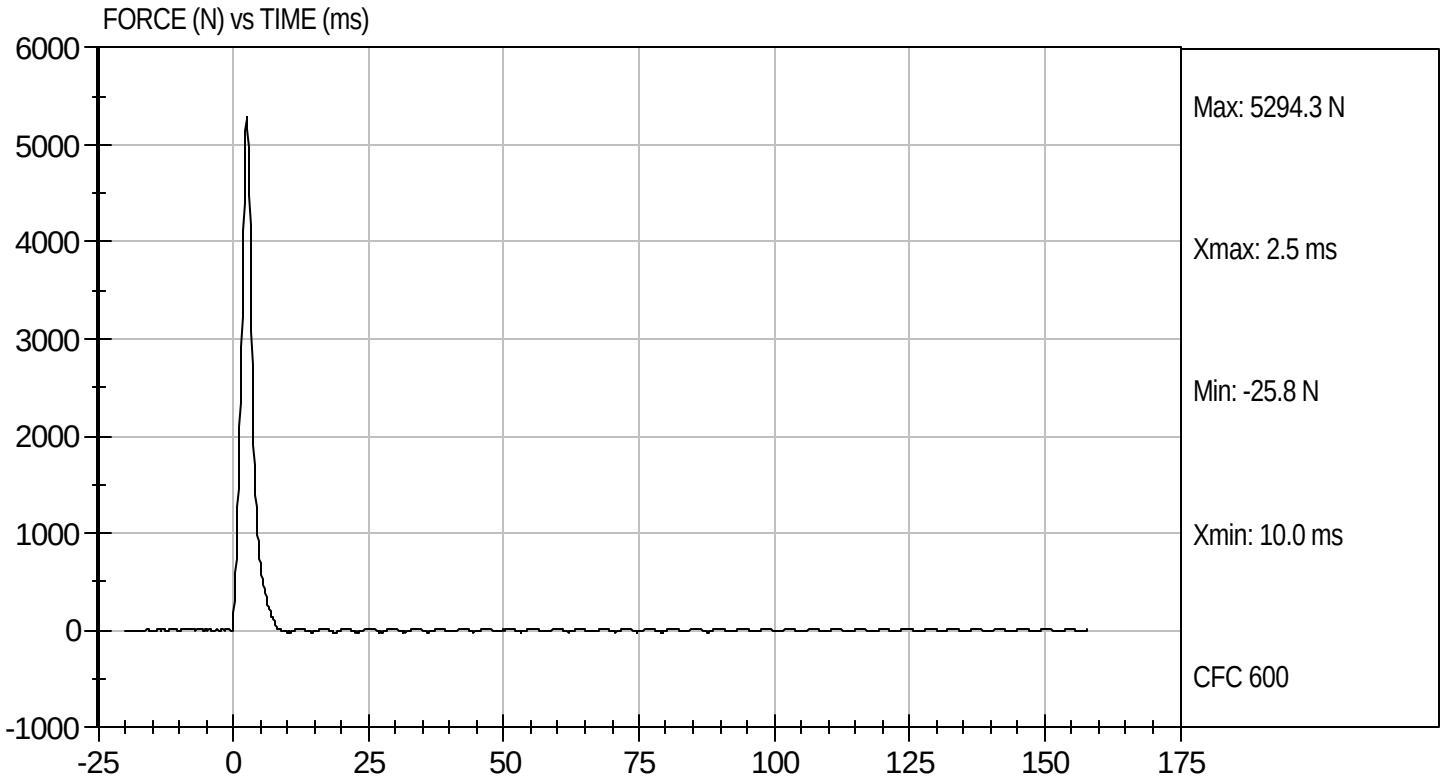
Jessica Hall
Laboratory Technician

12/27/11
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D114426

Test Date: 12/27/11
Velocity: 6.89 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D114420

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.9	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	16	16	Pass
Rotation Rate	deg/s	5.0 -10.0	5.7	5.7	Pass
30 Degrees	Nm	94.9 Nm Max	62.0	60.9	Pass
150 ft-lbf / 203.4 Nm	Deg	40.0 - 50.0 Degree Max Rotation	43.0	42.2	Pass
		Overall Test Results			Pass

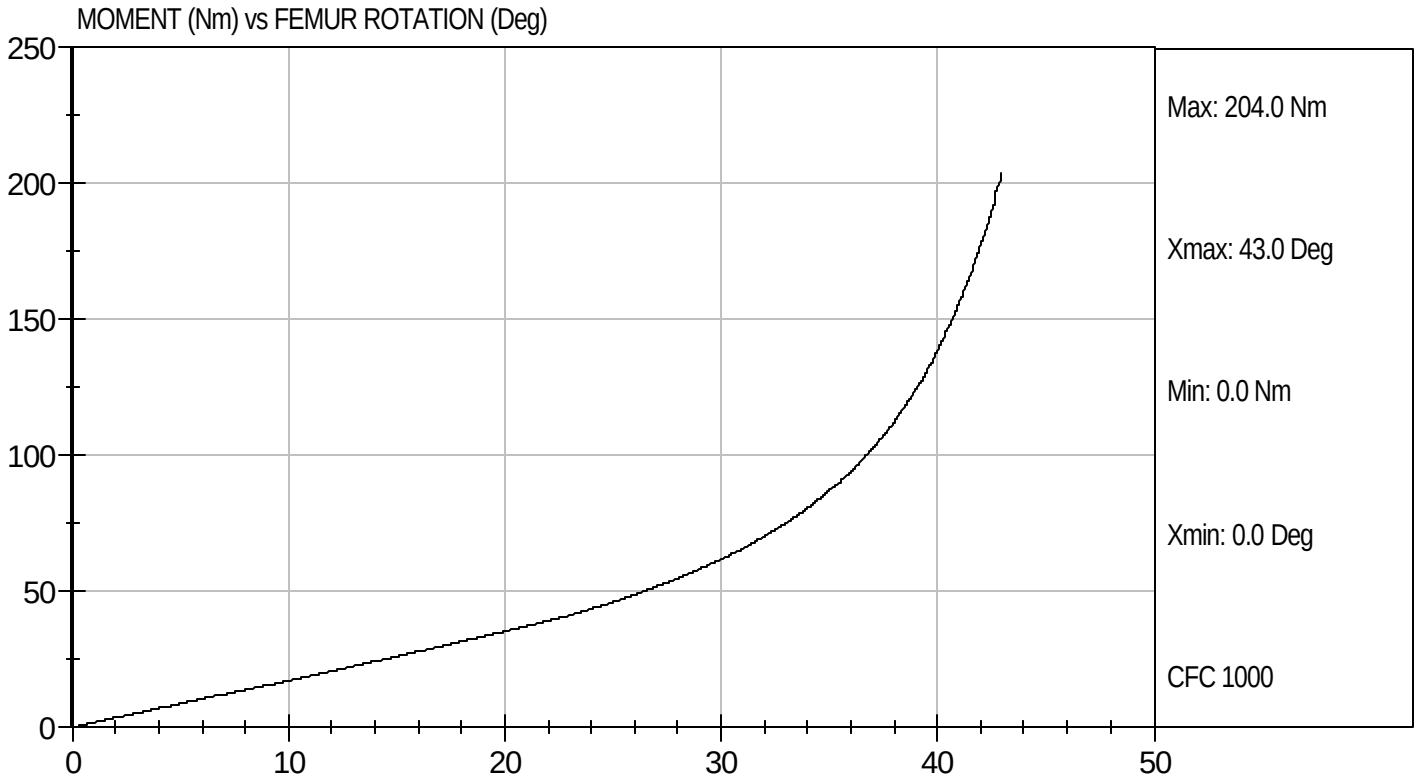
Jessica Gall
Laboratory Technician

12/28/11
Test Date

David Winkelbauer
Approved By

Test Desc: Hip Femur Flexion
Component ID: D114429

Test Date: 12/28/11
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D114420

Test Date: 12/28/11
Velocity: 0 ft/s, 0.00 m/s