

REPORT NUMBER: SPNCAP-MGA-2011-036

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Side Impact Pole Test**

**HONDA OF CANADA MFG.
2011 Acura MDX AWD SUV
NHTSA No.: MB5315**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: October 28, 2010

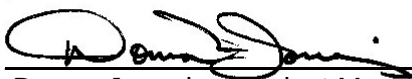
Final Report Date: December 28, 2010

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-09-D-00124.

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Approved by: 
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Approval Date: December 28, 2010

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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		6. Performing Organization Code MGA																					
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SPNCAP-MGA-2011-036																					
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		14. Sponsoring Agency Code NVS-111																					
15. Supplementary Notes																							
16. Abstract A 32.2 km/h (20 mph), 75° oblique impact NCAP Side Pole Test was conducted on the subject 2011 Acura MDX AWD SUV in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on October 28, 2010. The impact velocity was 32.5 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21°C. The test vehicle post-test maximum crush was 476 mm at level 2. The test vehicle's performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>359</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>51</td> </tr> <tr> <td>Combined Acetabular and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>3839</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Driver ATD (SID-IIs)			Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	359	Resultant Lower Spine Acceleration	Gs	82	51	Combined Acetabular and Iliac Pelvic Force	N	5525	3839
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590																					
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SECTION 1
TEST PURPOSE AND PROCEDURE

This side impact test is part of the MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2011 Acura MDX AWD SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated January 2010.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2011 Acura MDX AWD SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.5 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on October 28, 2010. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS NCAP Side Pole Laboratory Test Procedure dated January 2010. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG Triaxial Accelerometers
 Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
 Abdomen Upper and Lower Rib Displacement Potentiometers
 Lower Spine Triaxial Accelerometers
 Iliac Load Cell
 Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

The following table summarizes the results of the test:

DUMMY INJURY VALUES				
Dummy	HIC (36ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)	
SID-IIs 5 th Percentile Female	359	51	Iliac Wing	1269
			Acetabular	2588
			Sum	3839

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

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

GENERAL COMMENTS

There was no valid data collected for:

- Rotation About Z Axis
- Left Floor Sill Y after 5 msec
- Left Lower B-Post Y after 20 msec
- Driver Seat Track Y after 70 msec

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

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
Test Date: 10/28/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB5315	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	Yes
Make	Acura	Power Steering	Yes
Model	MDX	Driver Front Airbag	Yes
Body Style	MPV	Driver Curtain Airbag	Yes
VIN	2HNYD2H20BH503321	Driver Head/Torso Airbag	No
Body Color	Grigio M.	Driver Torso Airbag	No
Delivery Date	10/14/2010	Driver Torso/Pelvis Airbag	Yes
Odometer (mi)	99	Driver Pelvis Airbag	No
Odometer (km)	159	Driver Knee Airbag	No
Dealer	Continental Acura	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	AWD	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.7	Rear Pass. Torso/Pelvis Airbag	No
Engine Placement	Longitudinal	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Rear Pass. Knee Airbag	No
Sunroof/T-Top	Yes	Pretensioners	Yes
Tinted Glass	Yes	Load Limiters	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Bucket Seats	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Power Seats	Yes
Does owner's manual provide instruction to turn off automatic door locks?			Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda of Canada Mfg.	GVWR (kg)	2700
Date of Manufacture	09/'10	GAWR Front (kg)	1310
		GAWR Rear (kg)	1440

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				525	(A)
DSC x 68.04 kg				476	(B)
Cargo Weight (RCLW) (kg)				49	(A-B)

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
Front Seat	X						X
Rear or Second Row			X			w/Lever	
Third Row Seat			X		X		

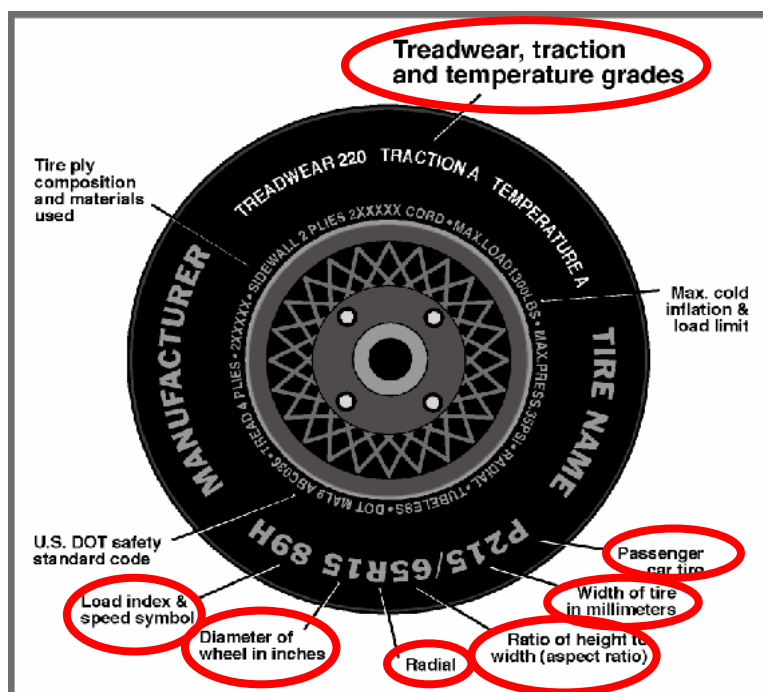
DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P255/55R18	P255/55R18
Tire Size on Vehicle	P255/55R18	P255/55R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/L	Dueler H/L
Treadwear	400	400
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index & Speed Symbol	104T	104T
Tire Material	Rubber	Rubber
DOT Safety Code Right	OB7K 402	OB7K 402
DOT Safety Code Left	OB7K 402	OB7K 402

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	590.1	464.9		609.2	513.0		603.7	499.4	
Right	kg	559.7	462.7		557.9	494.9		574.3	492.2	
Ratio	%	55.3	44.7		53.7	46.3		54.3	45.7	
Totals	kg	1149.8	927.6	2077.4	1167.1	1007.9	2175.0	1178.0	991.6	2169.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2077.4	(A)
Actual Weight of 1 P572V ATD (SID-IIs) ATD Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	49	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	2178.6	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	deg	-0.3	-0.3	-0.2
Front Passenger Sill Angle (front-to-rear)*	deg	-0.4	-0.4	-0.3
Front Bumper Angle (left-to-right)**	deg	0.0	-0.1	-0.1
Rear Bumper Angle (left-to-right)**	deg	-0.4	-0.4	-0.6
Vehicle CG (Aft of Front Axle)	mm	1231	1277	1260
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	13	27	14

*Front up is positive ** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	0.0
Weight of Vehicle Components Removed	kg	47.6

Vehicle components removed to meet target vehicle test weight: Trunk compartment, jack & tools, splash guards, third row seats, radiator plastic cover.

TEST VEHICLE IMPACT POINT DATA

Measurement Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1035
Actual Impact Point (Aft of Front Axle)	mm	1034
Impact Point Difference (- forward / + rearward)	mm	-1

DATA SHEET NO. 2

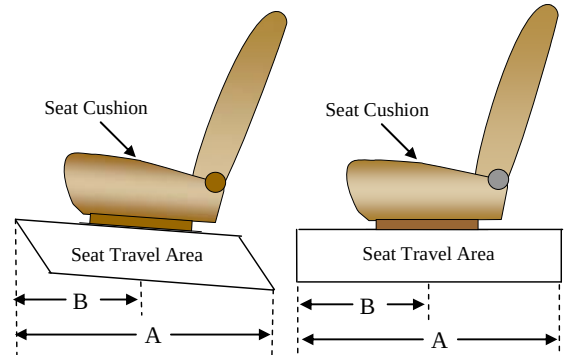
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

SEAT FORE/AFT POSITIONS

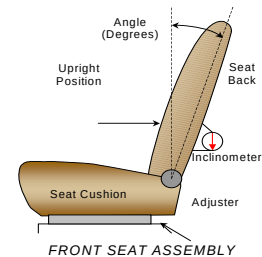
The driver seat was a power fore/aft adjustable seat with a power height/angle adjustment. The seat travel was set as specified in Appendix B of the TP dated January 2010. The right front passenger seat was set to match the driver seat. The rear passenger seats were non-adjustable.



SEAT FORE/AFT POSITIONING	Total Fore/Aft Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat	240 mm	0 mm (full forward)
Front Passenger Seat	240 mm	0 mm (full forward)
Rear Seat – Struck Side	Fixed	
Rear Seat – Non-Struck Side	Fixed	

SEAT BACK ANGLE POSITION

The seat back was set as specified in Appendix B of the TP dated January 2010. The seat back angle measurement was made relative to the rocker sill on the headrest post guide.



SEAT BACK ANGLE	Degrees	Detents
Driver Seat Back Angle with Seated Dummy	0.7	
Front Passenger Seat Back Angle	0.7	
Struck Side Rear Seat Back Angle		0 detent (forward locking position)
Non-Struck Side Rear Passenger Seat Back Angle		0 detent (forward locking position)

SEAT BELT UPPER ANCHORAGE

The driver and passenger seat belt upper anchorages were set at the manufacturer's specified placement in Form 1.

SEAT BELT UPPER ANCHORAGES	Total # of Positions	Placed in Position #
Driver Seat	4 detents	0 (uppermost as 0)
Front Passenger Seat	4 detents	0 (uppermost as 0)

DATA SHEET NO. 2 (CONTINUED)

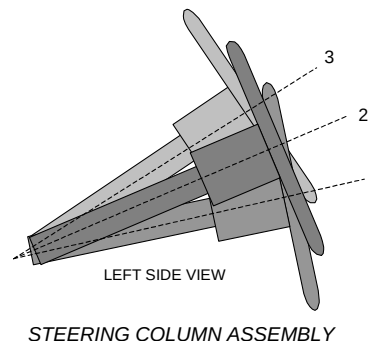
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEM DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

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.

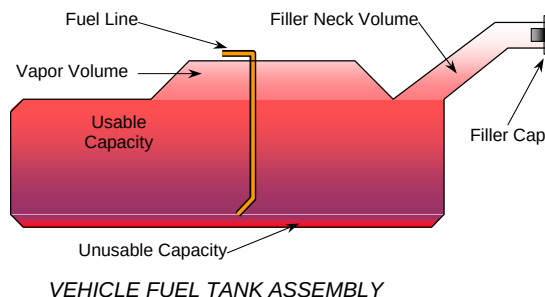


STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	69.9	206
Geometric Center – Position 2	67.5	187
Uppermost – Position 3	65.0	169
Telescoping Steering Wheel Travel		37
Test Position	67.5	187

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. After the ignition key is turned from LOCK (0) to ON (II) position, the pump will be filled up for two seconds, and then the pressure is maintained. The fuel pipe is on the left side.



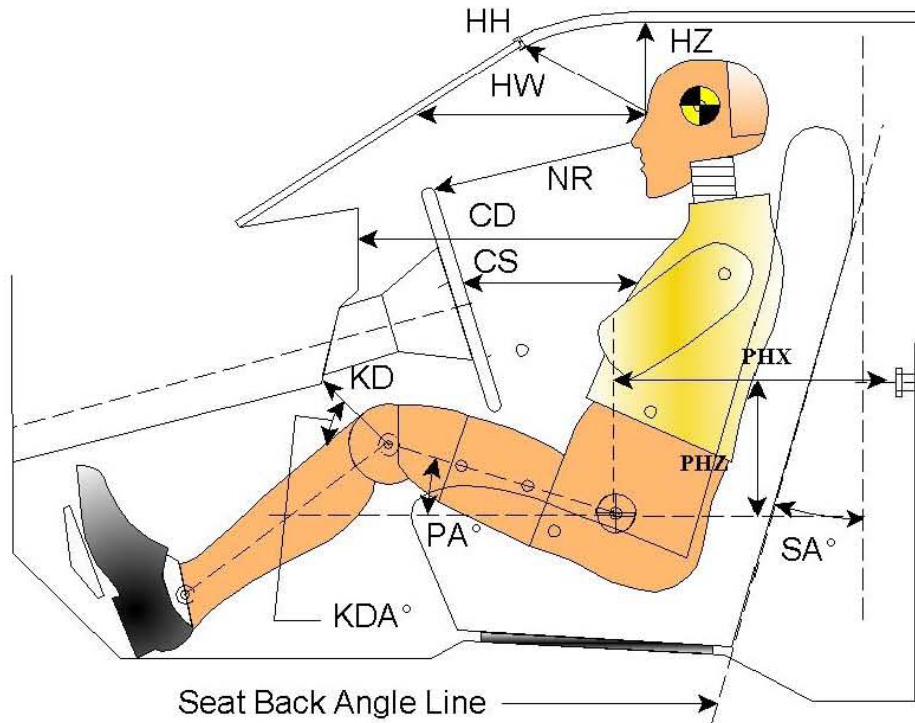
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard" Tank	79.5
Usable Capacity of "Optional" Tank	
Usable Capacity of Standard Tank as Specified in Owner's Manual	79.5
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92-94% of Usable Capacity	73.1 to 74.7
Actual Amount of Solvent Used	73.9
1/3 of Usable Capacity	26.5

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

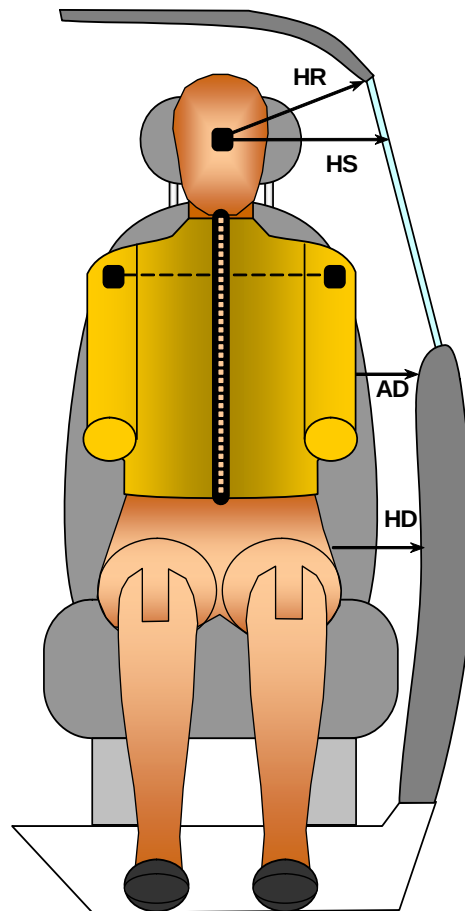


Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	244	
HW	Head to Windshield	532	
HZ	Head to Roof	180	
NR	Nose to Rim	213	
CD	Chest to Dash	412	
CS	Chest to Steering Wheel	174	
KDL/KDAL	Left Knee to Dash	105	32.7
KDR/KDAR	Right Knee to Dash	93	26.9
PA	Pelvic Angle		18.0
PHX	H-Point to Striker (X-Axis)	347	
PHZ	H-Point to Striker (Z-Axis)	108	
SA	Seat Back Angle		0.7

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010



FRONT VIEW OF DUMMY

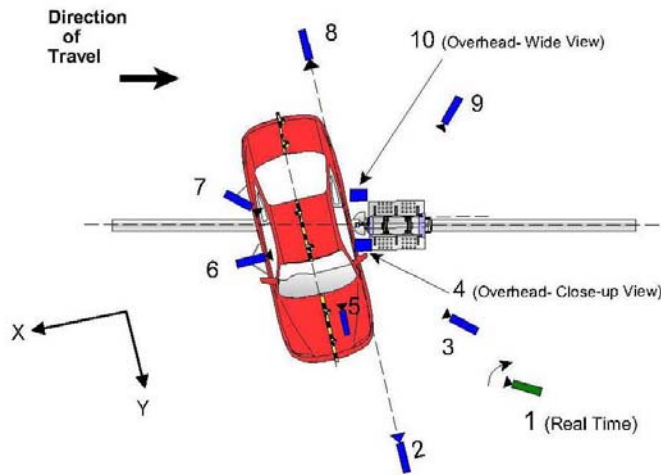
Code	Measurement Description	Driver S/N 296
		Length (mm)
HR	Head to Side Header	245
HS	Head to Side Window	373
AD	Arm to Door	178
HD	H-Point to Door	231

DATA SHEET NO. 5

CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010



Reference: From Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Impact, + Y = Right of Impact, +Z = Down

Camera No.	View	Coordinates (mm)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real-Time Pan View					30
2	Front Ground Level	40	5600	-1560	24	1000
3	Impact Side 45° Forward	-1820	4270	-1710	20	1000
4	Overhead Closeup	40	0	-4520	50	1000
5	Onboard – Driver Front				12.5	1000
6	Onboard – Driver Side				8	1000
7	Onboard – Driver Rear				8	1000
8	Rear Ground Level	0	-6620	-1580	24	1000
9	Impact Side 45° Rearward	-3620	-2890	-1690	20	1000
10	Overhead Wide View	120	0	-4580	14	1000
11	Real-Time Dummy Front View					30

* All measurements accurate to ± 6 mm

Note: Vehicle was at a 15° angle to the rigid pole.

INSTRUMENTATION

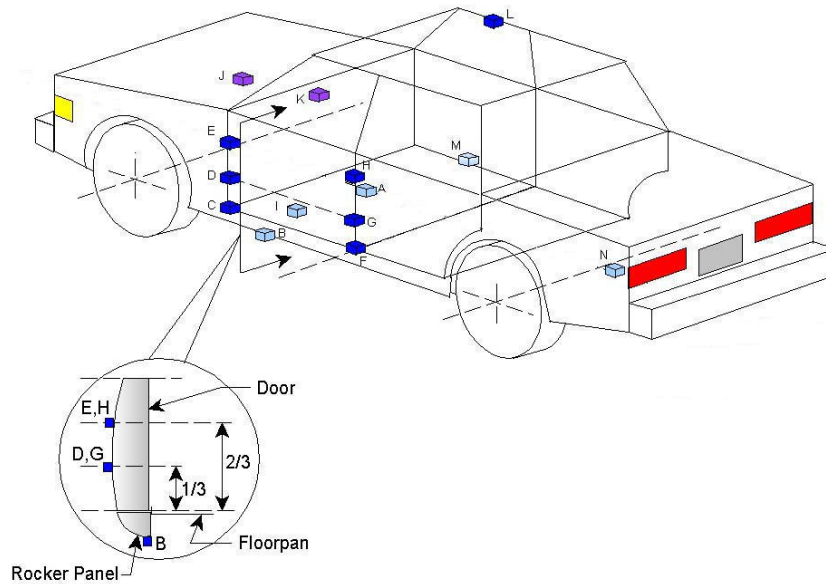
	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells – Not used	8
Contact Switches	3
Airbag Timing	2
Total No. of Data Channels	50

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG	2480	0	-370
	Vehicle CG Sensor	2480	0	-370
B	Left Floor Sill	2294	-787	-350
C	A Pillar Sill	3273	-787	-355
D	A Pillar Low	3277	-788	-705
E	A Pillar Mid	3285	-873	-920
F	B Pillar Sill	2242	-787	-345
G	B Pillar Low	2234	-762	-738
H	B Pillar Mid	2234	-762	-945
I	Driver Seat	2535	-550	-550
L	Engine Top	4070	0	-965
J	Firewall	3898	0	-1082
K	Right Roof	2486	645	-1705
M	Right Floor Sill	2916	787	-360
N	Rear Floorpan	1042	0	-615

Reference: From Point of Impact for X and Y; from Ground for Z):
 +X = Forward of Vehicle, + Y = Right of Vehicle, +Z = Down

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
Test Date: 10/28/2010



254 mm Diameter Rigid Pole

The pole was not instrumented.

Load Cell Locations	
ID	Height From Ground (m)
1	
2	
3	
4	
5	
6	
7	
8	

DATA SHEET NO. 8**POST-TEST OBSERVATIONS**

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver
Dummy Type / Serial No.	SID-IIs / 296
Head Contact	Curtain Airbag, Headrest
Upper Torso Contact	Side Airbag
Lower Torso Contact	Side Airbag
Left Knee Contact	Door Panel
Right Knee Contact	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Doors	Remained closed and jammed shut	Remained closed and jammed shut
Right Side Doors	Remained closed and operational	Remained closed and operational
Hatch and Other Doors	Remained closed and operational	Remained closed and operational
Seat Movement	0	0
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Cracked
Window Damage	Left Front Window Broke
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Rear (Passenger) P4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

VEHICLE SPEED AND IMPACT DATA

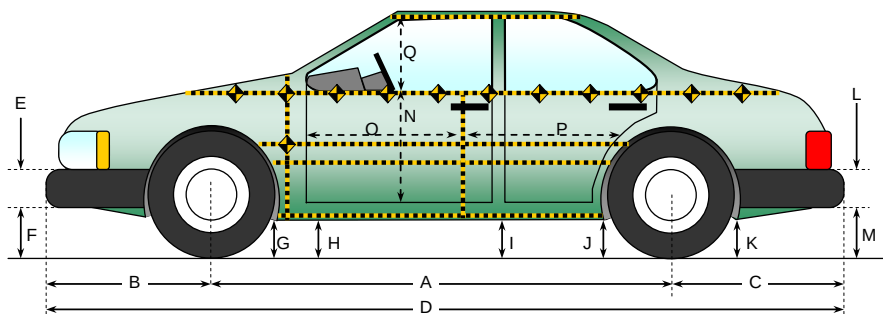
Measured Parameter	Units	Requirement	Value
Horizontal Offset from Vertical Impact Reference Line	mm	+/- 38	1
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.5
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.5

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

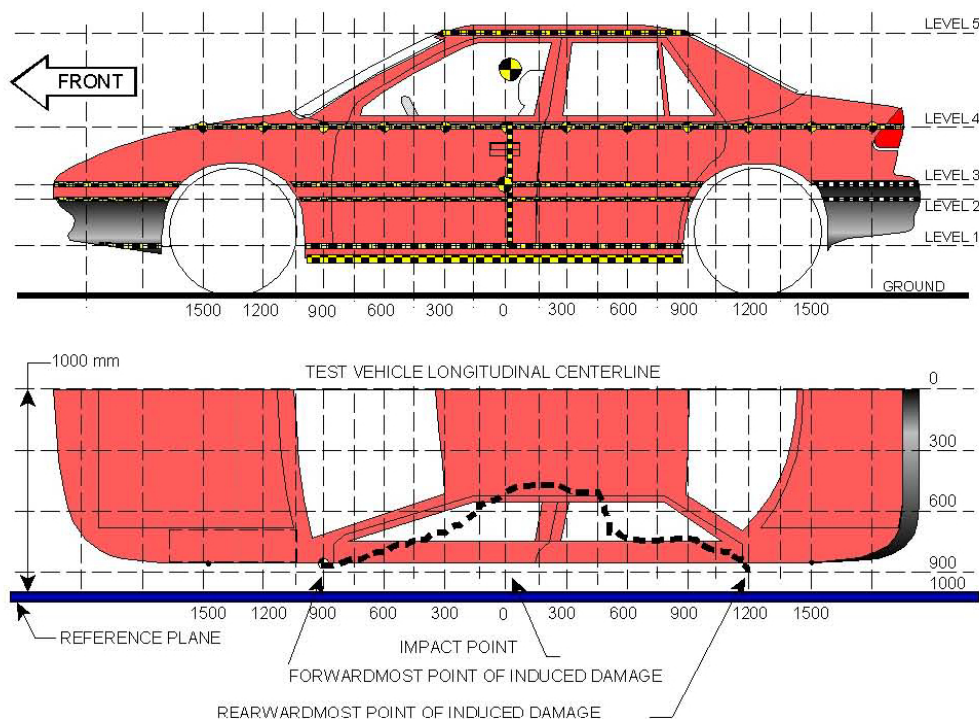
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2756	2670	86
B	Front Axle to FSOV	1016	1012	4
C	Rear Axle to RSOV	1106	1106	0
D1	Total Vehicle Length at Left Side	3685	3563	122
D2	Total Vehicle Length at Centerline	4878	4788	90
D3	Total Vehicle Length at Right Side	3685	3696	-11
E	Front Bumper Thickness	105	105	0
F	Front Bumper Bottom to Ground	312	358	-46
G	Sill Height at Front Wheel Well	306	318	-12
H	Sill Height at Front Door Leading Edge	306	315	-9
I	Sill Height at B Pillar	310	290	20
J1	Sill Height at Rear Wheel Well	325	351	-26
J2	Pinch Weld Height at Rear Wheel Well	323	348	-25
K	Sill Height Aft of Rear Wheel Well	295	308	-13
L	Rear Bumper Thickness	125	125	0
M	Rear Bumper Bottom to Ground	417	402	15
N	Sill Height to Window Bottom Sill	805	830	-25
O	Front Door Leading Edge to Impact CL	567	553	14
P	Rear Door Trailing Edge to Impact CL	1480	1481	-1
Q	Front Window Opening	484	382	102
R	Right Side Length	3685	3696	-11
S	Left Side Length	3685	3563	122
T	Vehicle Width at B Post	1973	1847	126

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010



NOTE: The measurements are taken along the vertical impact reference line.
 Vehicle measurements forward of the vertical impact reference line are negative.

Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	380
2	Occupant H-Point	775
3	Mid-Door	760
4	Window Sill	1100
5	Window Top	1615

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1200				276					274					-2	
-1050				260					266					6	
-900				244					259					15	
-750		107	105	230			152	146	253			45	41	23	
-600	130	120	117	218		172	160	153	251		42	40	36	33	
-525	171	125	125	210		265	195	196	254		94	70	71	44	
-450	178	123	123	208		306	248	250	279		128	125	127	71	
-375	190	120	120	202		342	305	307	326		152	185	187	124	
-300	195	118	118	197		377	363	364	360		182	245	246	163	
-225	194	117	117	194		415	413	414	408		221	296	297	214	
-150	194	115	115	191		479	473	475	486		285	358	360	295	
-75	194	114	114	188		544	532	531	545		350	418	417	357	
0	193	114	114	186	419	577	574	575	578	619	384	460	461	392	200
75	193	114	114	183	418	567	590	589	583	609	374	476	475	400	191
150	193	113	113	182	417	526	558	555	551	591	333	445	442	369	174
225	192	113	113	179	417	466	507	508	500	576	274	394	395	321	159
300	192	113	113	178	417	409	446	445	443	564	217	333	332	265	147
375	192	112	112	177	417	361	380	380	381	548	169	268	268	204	131
450	193	112	112	175	419	327	327	329	347	537	134	215	217	172	118
525	196	114	114	175	420	323	260	261	327	517	127	146	147	152	97
600	196	115	115	174	420	302	246	248	305	497	106	131	133	131	77
750	196	117	117	174	421	270	220	220	280	476	74	103	103	106	55
900	197	119	119	174	423	236	195	195	258	461	39	76	76	84	38
1050	194	122	122	176	426	206	174	175	240	457	12	52	53	64	31
1200	180	123	123	178	432	153	146	144	213	452	-27	23	21	35	20
1350		108	108	182	437		101	99	190	450		-7	-9	8	13
1500		100		185	445		124		169	464		24		-16	19
1650				189	455				202	454				13	-1
1800				196	463				210	469				14	6
1950				206	477				215	480				9	3

NOTE: The measurements are taken along the vertical impact reference line.
 Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
Test Date: 10/28/2010

MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	384	476	475	400	200
Distance From Impact (mm)	0	75	75	75	0

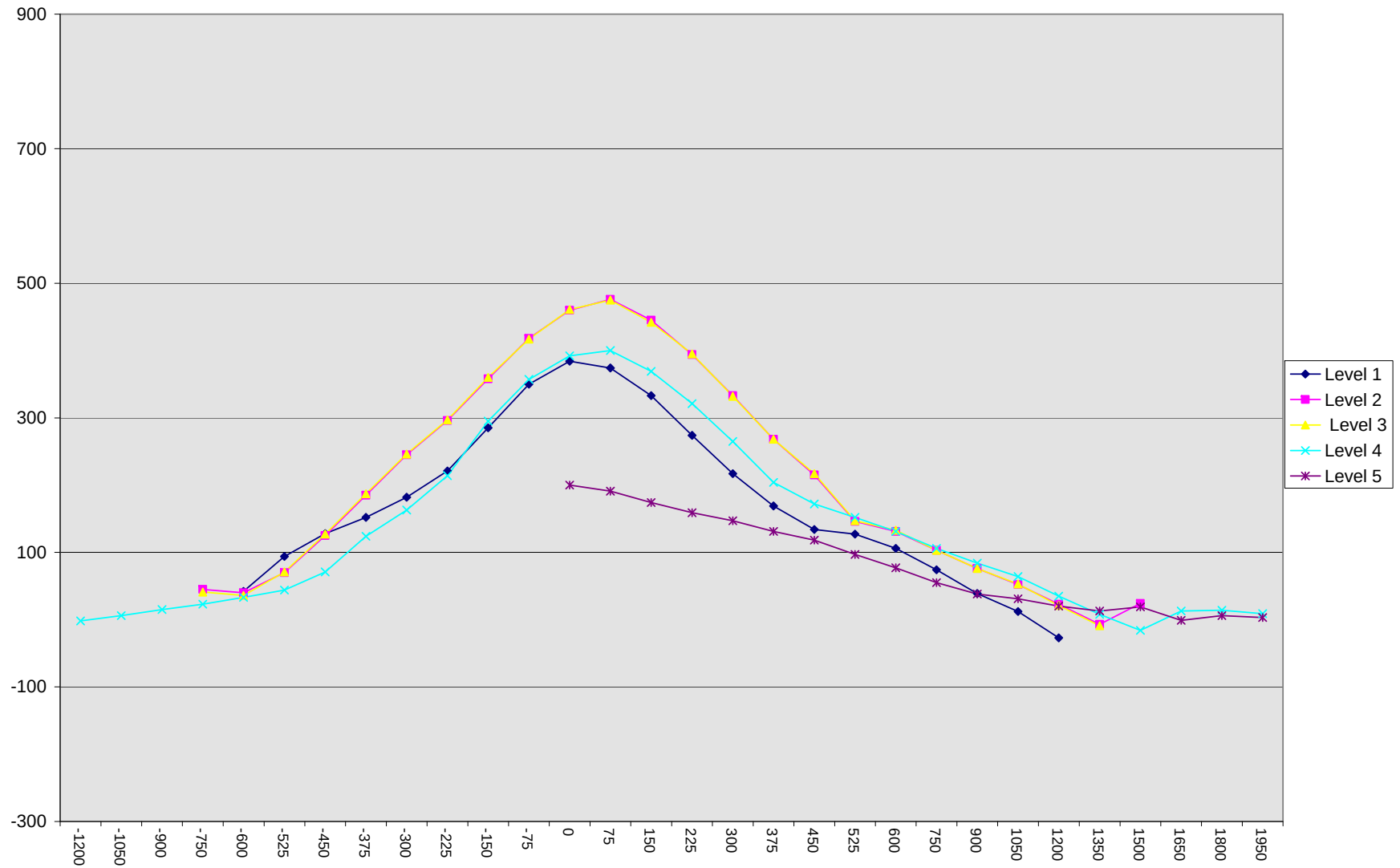
Note: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to test based on an estimated impact point. The final distance to impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy's head.

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
Test Date: 10/28/2010

20



DATA SHEET NO. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

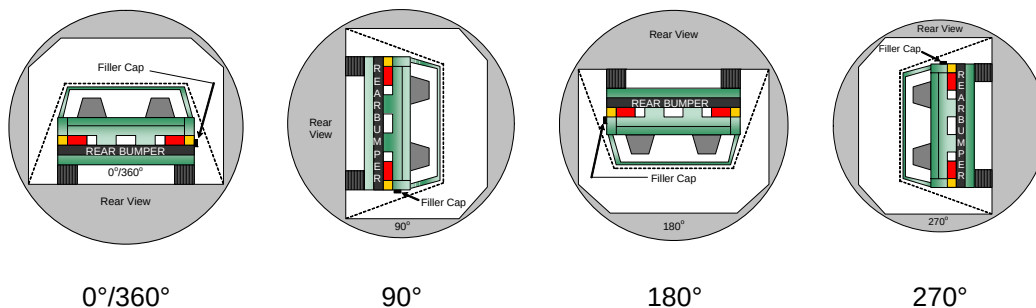
Test Vehicle: 2011 Acura MDX AWD SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
 Test Date: 10/28/2010

Test Time: 11:00 am Temperature: 21° 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

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	118	300	418
90° to 180°	116	300	416
180° to 270°	115	300	415
270° to 360°	115	300	415

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

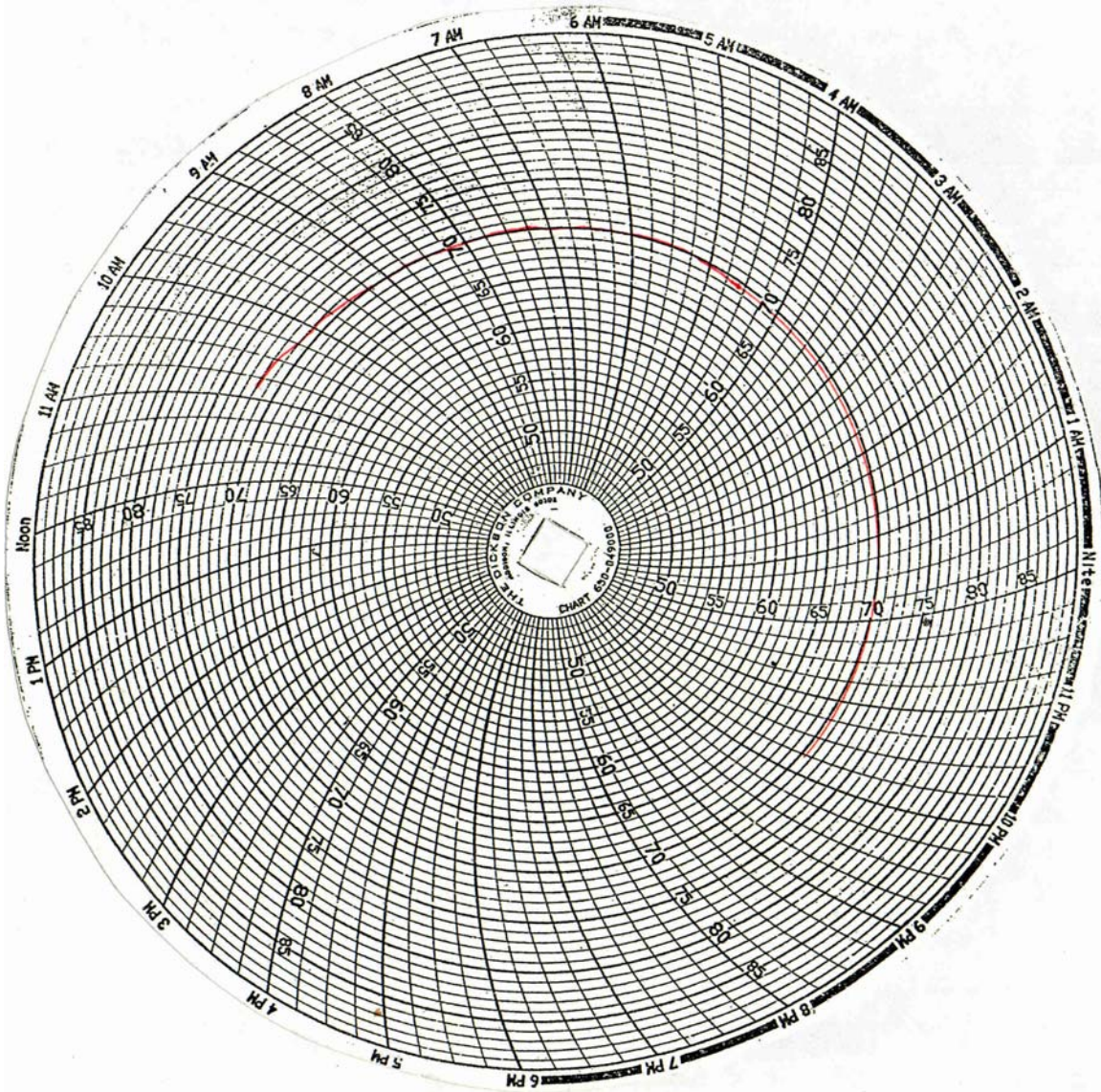
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Acura MDX AWD SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No. MB5315
Test Date: 10/28/2010



APPENDIX A
PHOTOGRAPHS

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As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Pre-Test Rear View of Test Vehicle



Post-Test Rear View of Test Vehicle



Pre-Test Right Side View of Test Vehicle



Post-Test Right Side View of Test Vehicle



Pre-Test Overhead View of Test Vehicle and Pole



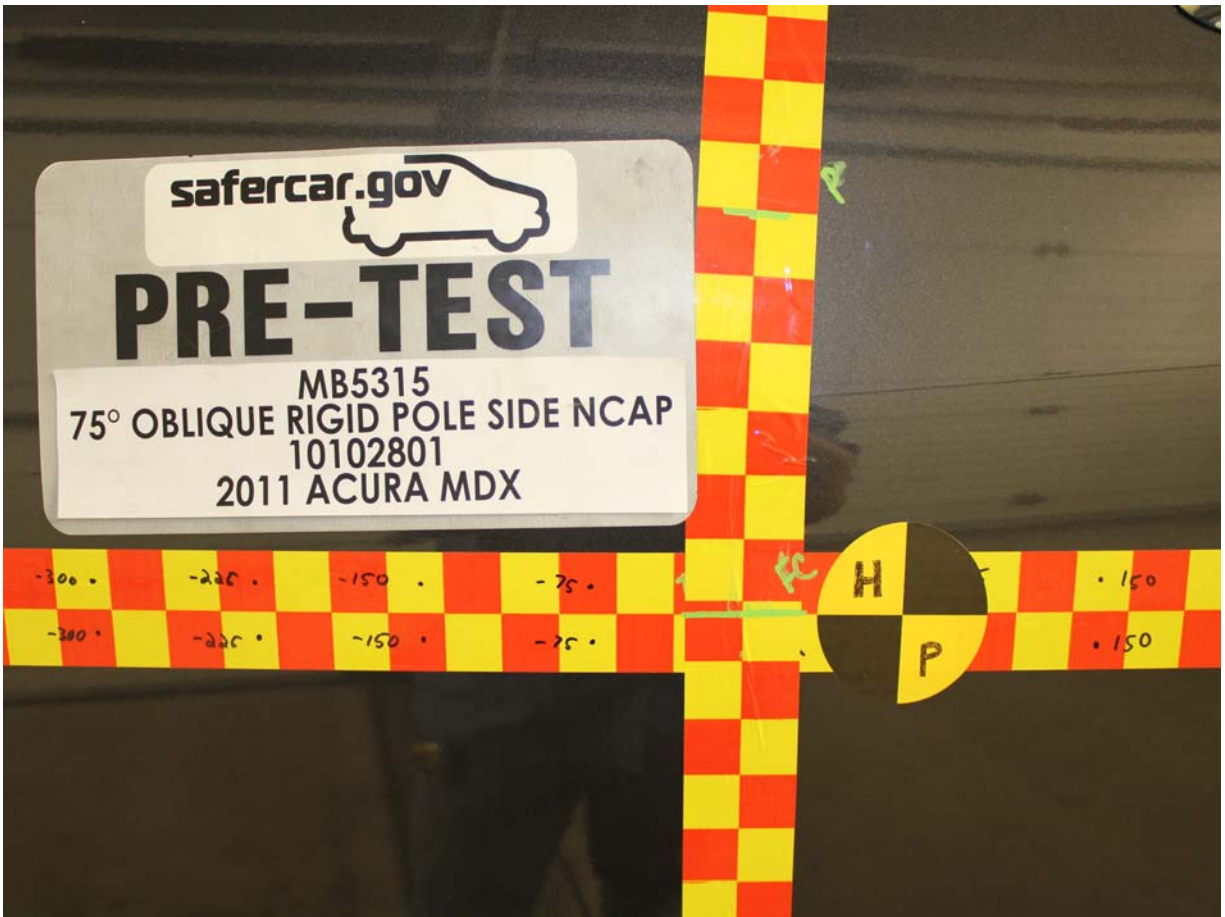
Post-Test Overhead View of Test Vehicle and Pole



Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Pre-Test Close-Up View of Impact Point Target



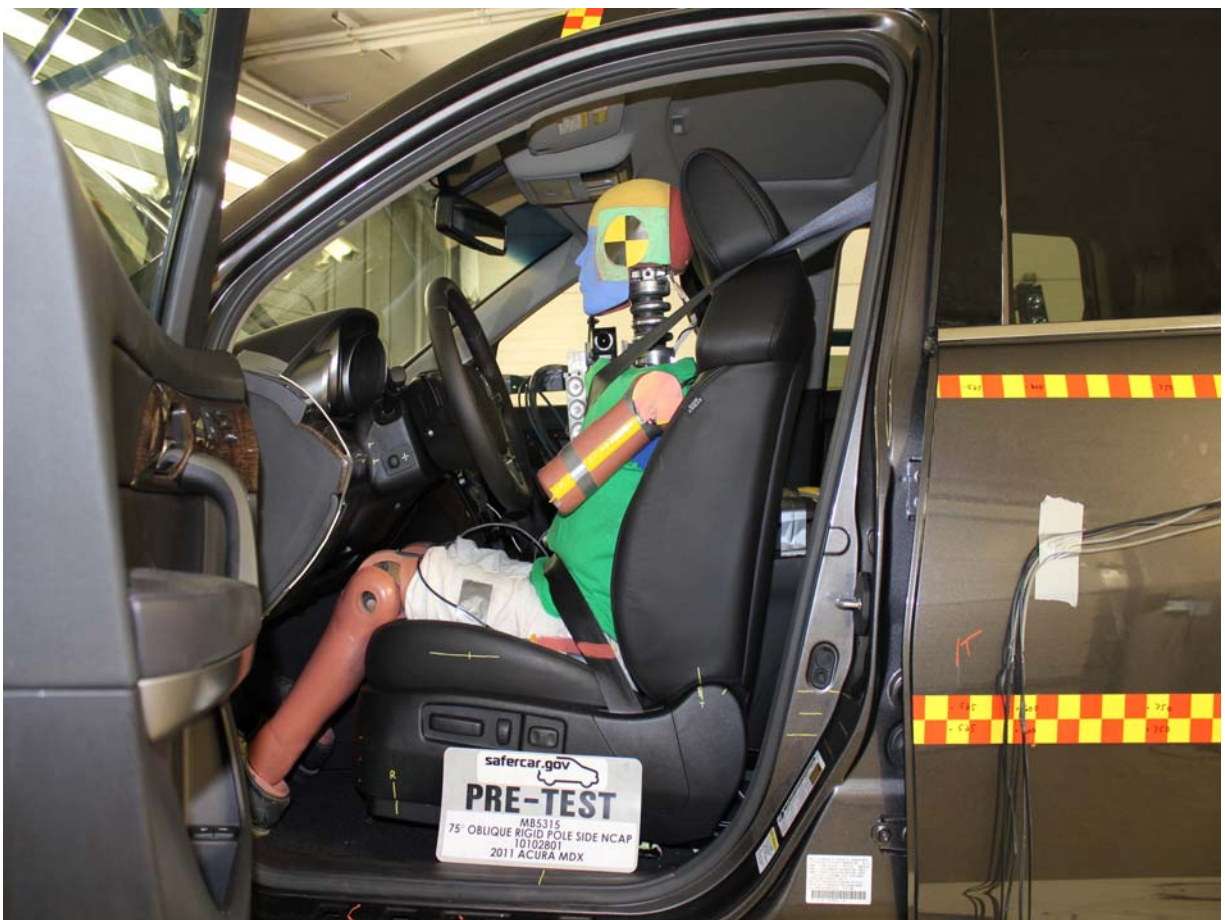
Post-Test Close-Up View of Impact Point Target Showing Impact Location



Pre-Test Front Close-Up View of Dummy (through front window)



Post-Test Front Close-Up View of Dummy (through front window)



Pre-Test Left Side View of Dummy Showing Belts, Chalking, and Contact Switches (Door Open)



Pre-Test Left Side View of Dummy Shoulder and Door Top View



Post-Test Left Side View of Dummy Shoulder and Door Top View



Pre-Test Frontal View of Seat Back Prior to Dummy Positioning



Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint



Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Dummy Thighs on Seat Pan



Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket



Pre-Test View of Dummy's Head Showing Dummy's Head is Level



Pre-Test Placement of Dummy's Feet



Pre-Test View of Belt Anchorage for Dummy to Show Position



Pre-Test Left Side View of Steering Wheel to Show Position



Pre-Test View of Parking Brake



Pre-Test Close-Up Left Side View of Driver Seat Track Showing Test Position



Pre-Test Close-Up Left Side View of Driver Seat Back Showing Test Position



Pre-Test Close-Up View of Driver Seat Back or Head Restraint Showing Seat Back Test Position



Pre-Test Dummy and Door Clearance View



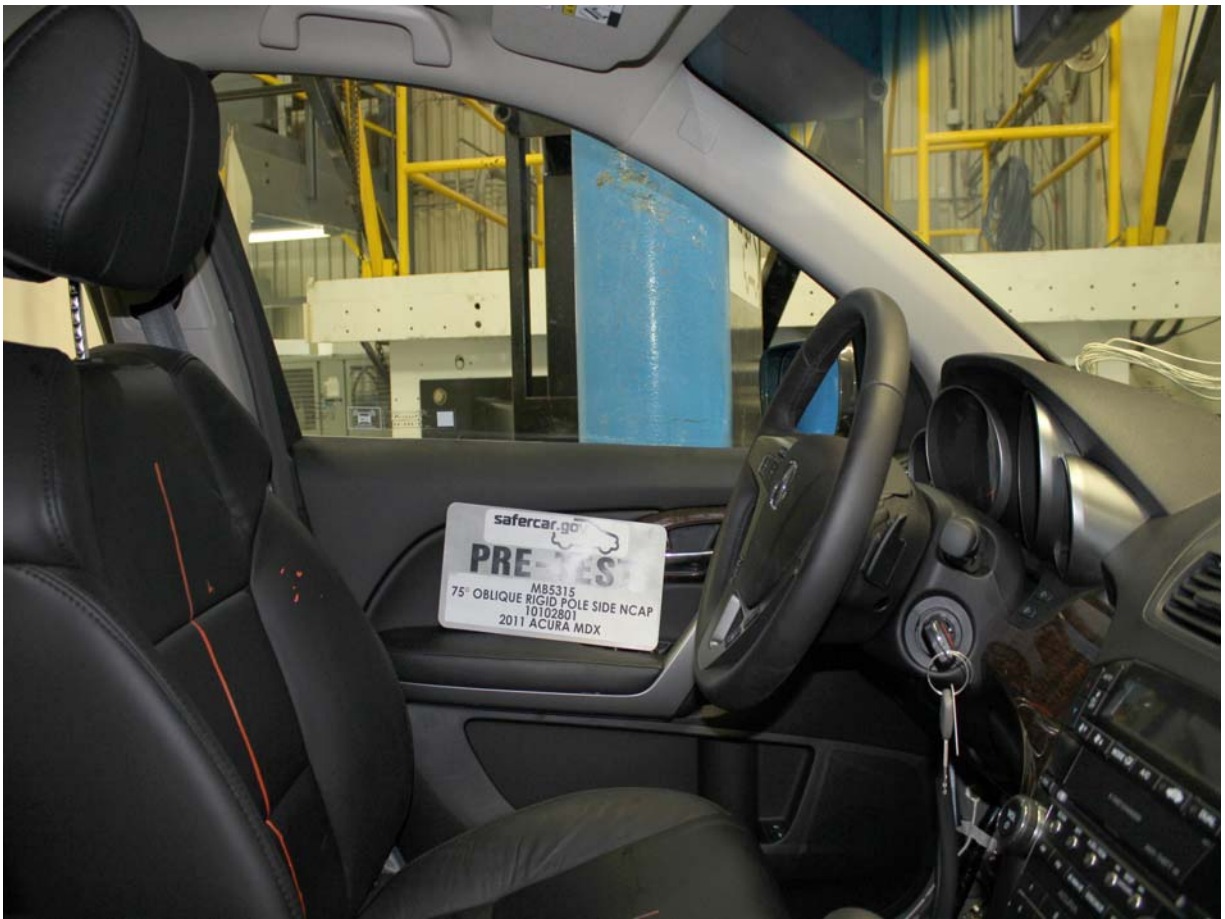
Post-Test Dummy and Door Clearance View



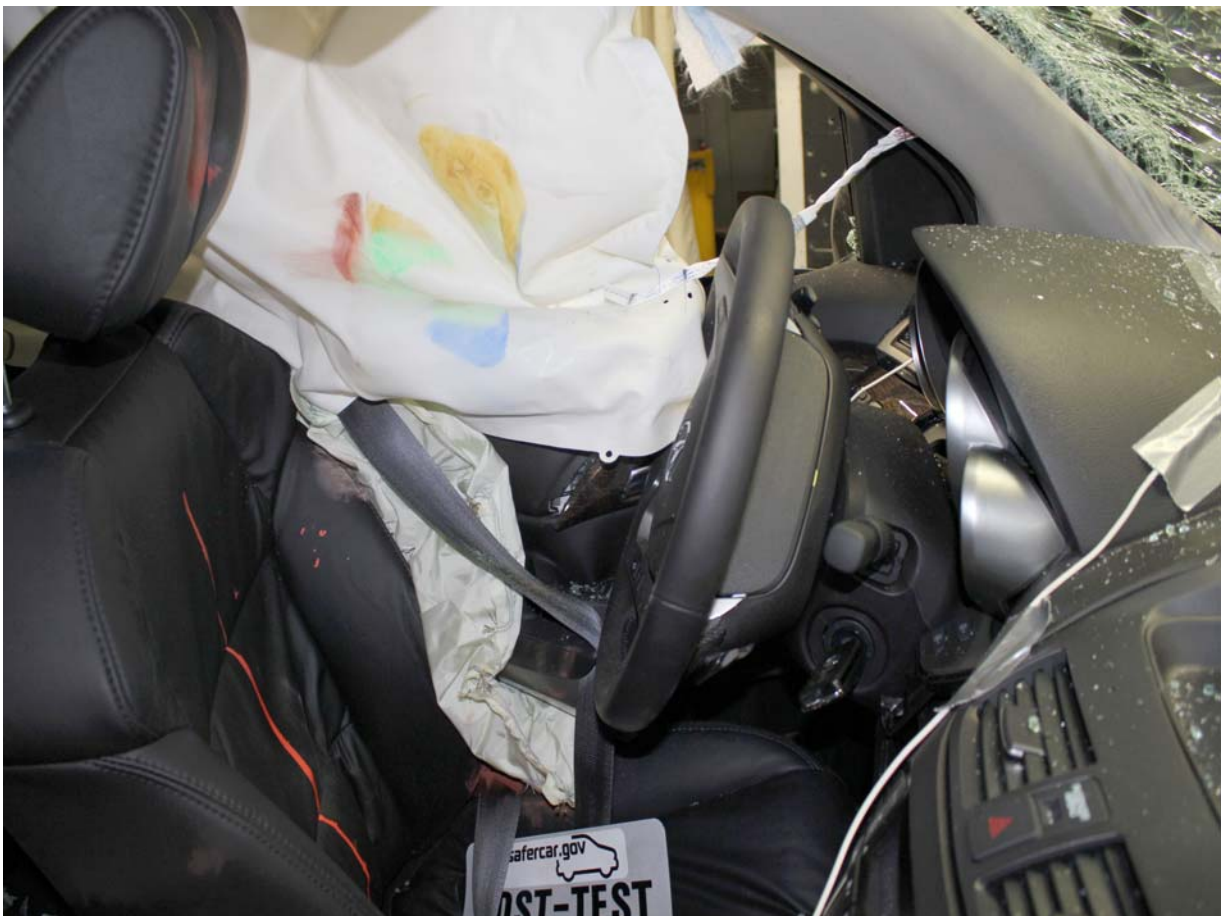
Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment



Post-Test Right Side View of Dummy and Front Seat Occupant Compartment



Pre-Test Inner Driver Door Panel View



Post-Test Inner Driver Door Panel View Showing Dummy Contact Location



Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Post-Test Dummy Close-Up Head Contact with Side Airbag View



Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



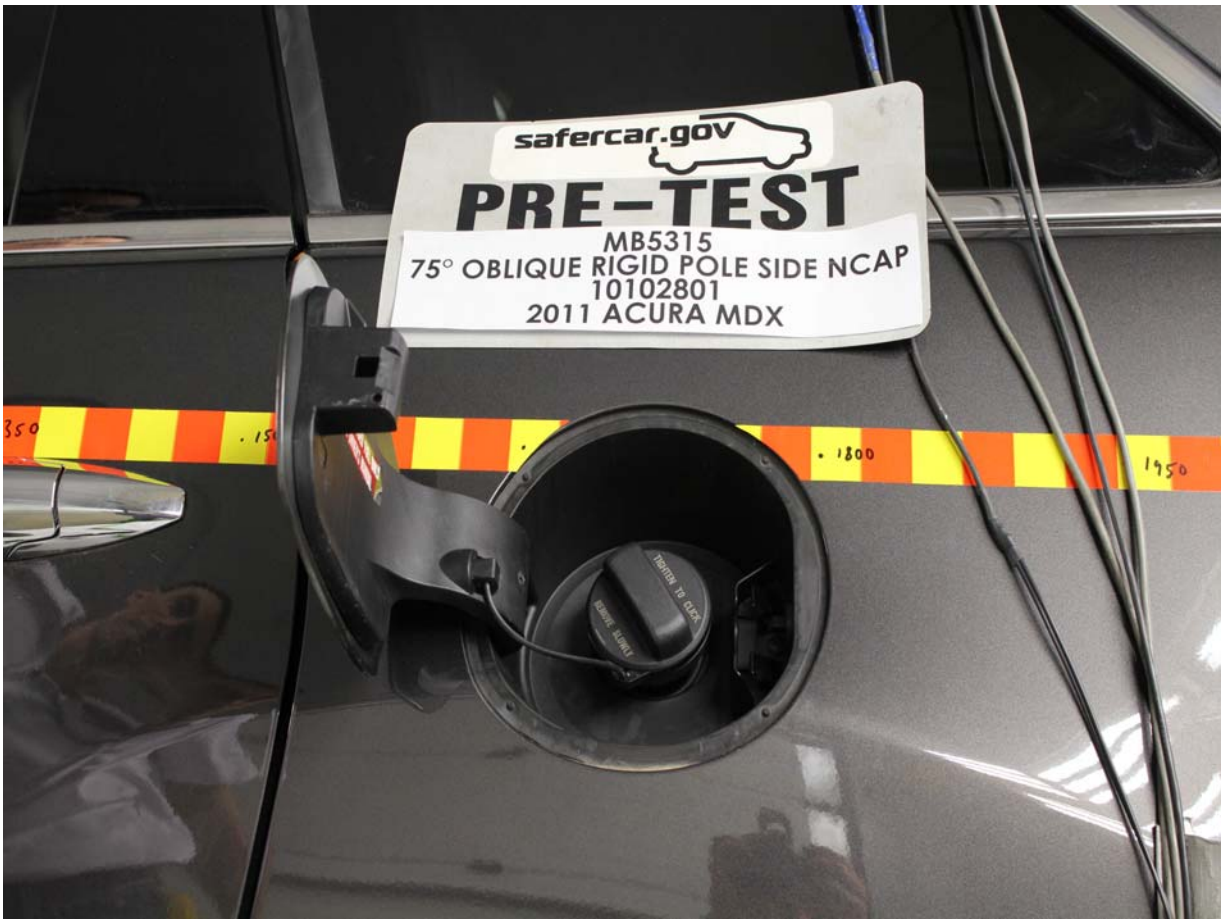
Post-Test Dummy Close-Up Torso Contact with Side Airbag View



Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Close-Up View of Vehicle's Certification Label



Close-Up View of Vehicle's Tire Information Placard or Label



Pre-Test Pole Barrier Front View



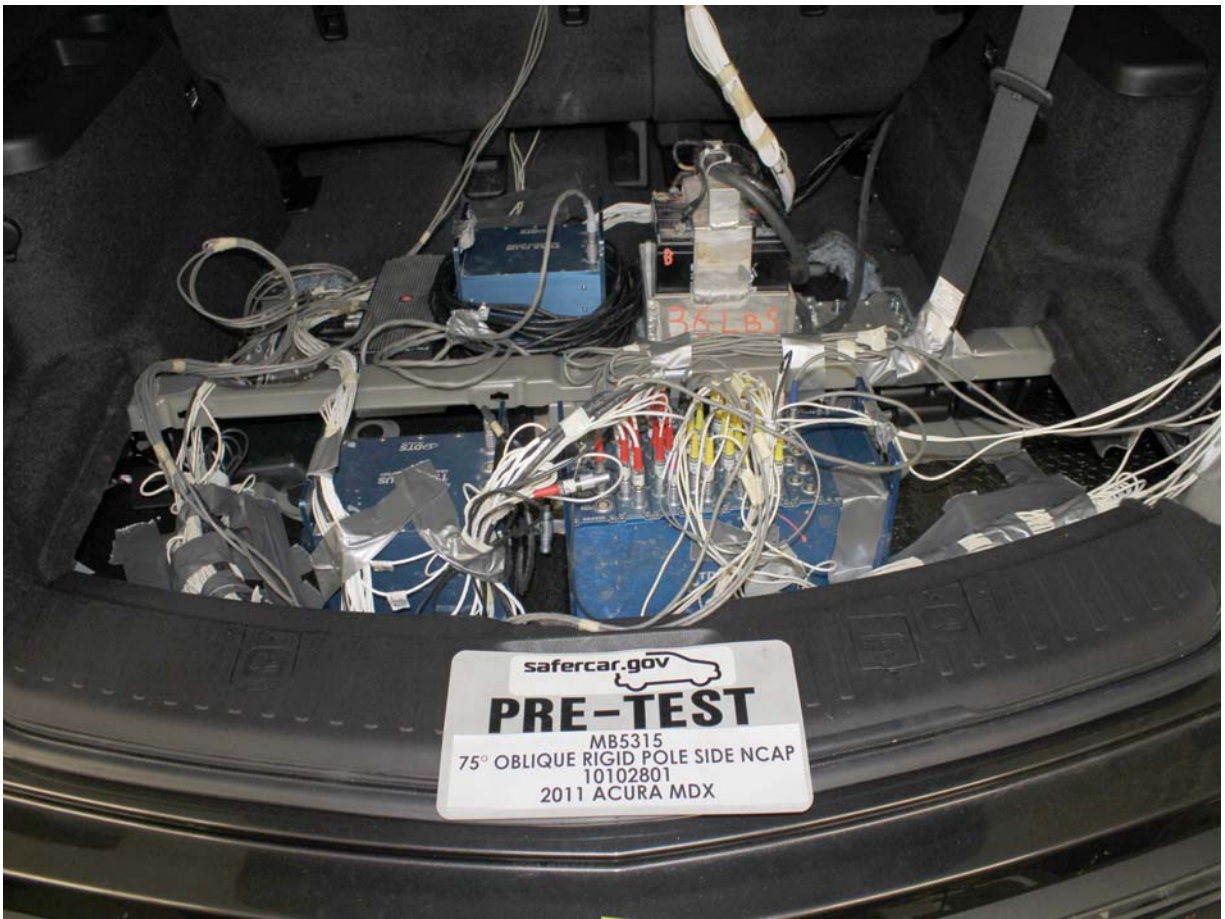
Post-Test Pole Barrier Front View



Pre-Test Pole Barrier Side View



Post-Test Pole Barrier Side View



Pre-Test Ballast View



Post-Test Primary and Redundant Speed Trap Read-Out



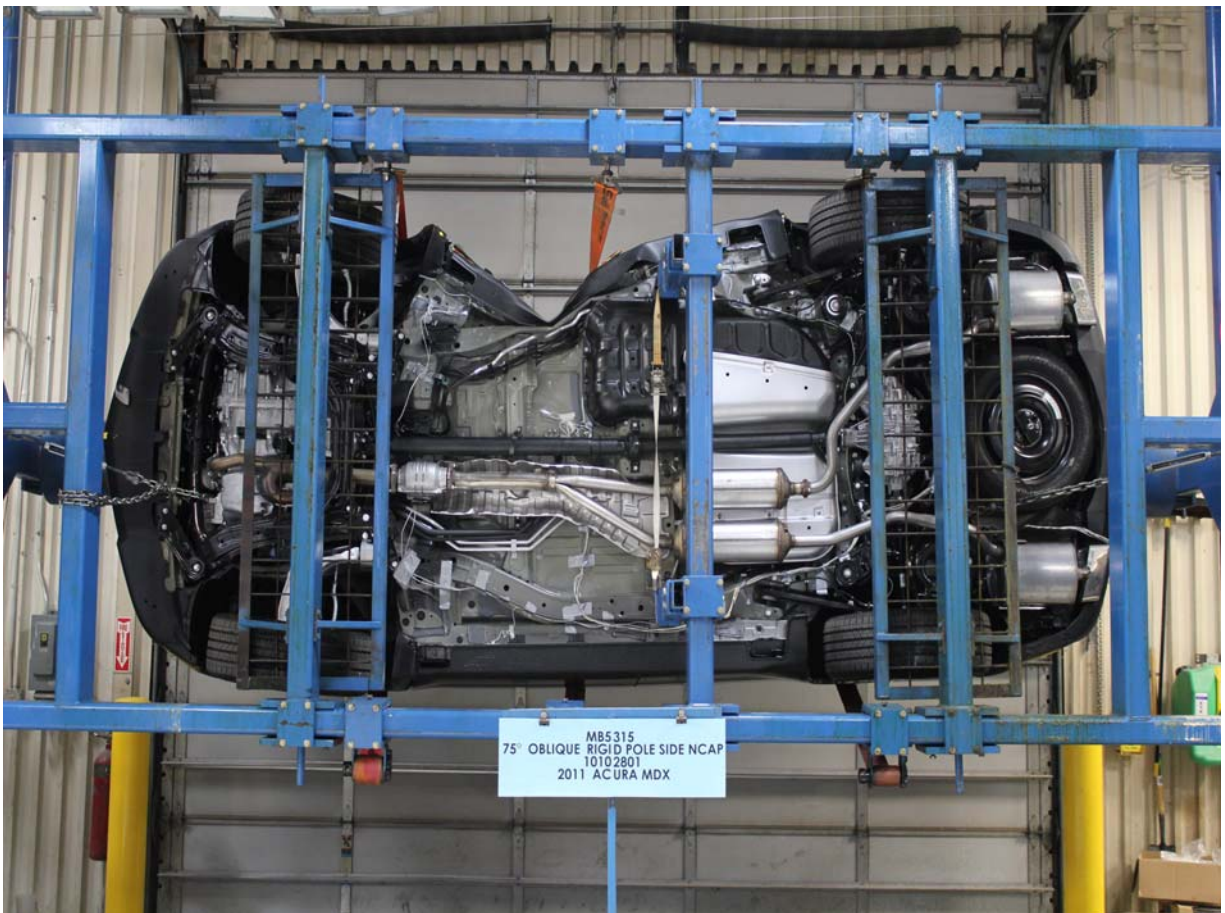
FMVSS No. 301/305 Rollover 0 Degrees



FMVSS No. 301/305 Rollover 90 Degrees



FMVSS No. 301/305 Rollover 180 Degrees



FMVSS No. 301/305 Rollover 270 Degrees



FMVSS No. 301/305 Rollover 360 Degrees



Impact Event



2011 MDX

VEHICLE NUMBER: 2HNYD2H20BH503321
ENGINE NUMBER: 137A1-7004170 EXT: GRIGIO M.
CONTROL NUMBER: 642340 INT: EBONY

STANDARD EQUIPMENT AT NO EXTRA COST

- **TECHNICAL FEATURES ***
 - 300hp 3.7-Liter SOHC 24-Valve VTEC V6 Engine
 - 6-Speed Automatic Transmission with Sequential SportShift
 - Paddle Shifters
 - SH-AWD System
 - MacPherson Strut Front Suspension
 - Rear Multi-Link Suspension
 - Rear Multi-Link Suspension
 - Power Windows
 - Immobilizer Theft-Deterrent System

• SAFETY FEATURES *

- Driver's and Front Passenger's Dual-Stage Airbags (SRS)
- Driver's and Front Passenger's Side Airbags
- Side Curtain Airbags with Rollover Sensor
- Vehicle Stability Assist (VSA)
- Anti-Lock Braking System (ABS)
- Electronic Brake Distribution (EBD)
- Brake Assist
- 3-Point Seat Belts
- Front Seat Belts with Automatic Tensioning System
- Active Front Head Restraints
- Tire Pressure Monitoring System
- ACE Body Structure
- Side-Impact Door Beams
- Day Time Running Lights (DRL)
- LATCH System for Child Seats

• INTERIOR FEATURES *

- Sport Seats with Leather Trim
- Acura Premium Sound System with 8 Speakers
- XM Satellite Radio and AM/FM/6-Disc In-Dash CD
- MP3/Auxiliary Input Jack
- Driver Recognition Memory System
- Driver's 10-Way Power Seat
- Front Passenger's 8-Way Power Seat
- Heated Front Seats
- Hands-Free Bluetooth® Phone
- Bluetooth® HandsFreeLink
- Tri-Zone Auto Climate Control with Air Filtration System
- Acura Personalized Settings
- Auto Dimming Rearview Mirror with Rearview Camera Display

• EXTERIOR FEATURES *

- Power Tailgate
- Power Moonroof with Tilt Feature
- 18" Alloy Wheels
- P255/65 R18 All-Season Tires
- Xenon HID Headlights
- Fog Lights
- Heated Power Door Mirrors
- with Turn Indicators
- Remote Entry with Security System

Manufacturer's
Suggested
Retail Price

\$42,580.00

MSRP Includes:
-8YR/70K Mile Powertrain Warranty
-5YR/50K Mile Ltd Vehicle Warranty
-5YR/50K Mile Powertrain Limited Mileage
-3 Months Free XM Radio Service
-XM Radio is available in the 48 contiguous states

Destination and Handling

860.00

TOTAL VEHICLE PRICE
(Includes Pre-Delivery Service)

\$43,440.00

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

CONTINENTAL ACURA OF NAPE
2275 AURORA AVENUE
NAPERVILLE, IL 60540

PORT OF ENTRY: BUFFALO
DELIVERY POINT: CHICAGO

SHIP#:

ROW/SPACE: 108-005

TRANS.METHOD: N50 ELWOOD

VIN: 2HNYD2H20BH503321

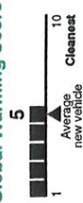
ORIG. DLR: 251144
REF. NO: 40281
HN CODE: AL-4576
EMISSION: 50 STATE
DEALER: 251144



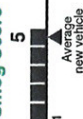
Environmental Performance

Protect the environment, choose vehicles with higher scores:

Global Warming Score



Smog Score



Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle's measured emissions. Please visit: www.DriveClean.ca.gov for more information. AIR RESOURCES BOARD

EPA Fuel Economy Estimates

CITY MPG

16

Expected range for most drivers 13 to 19 MPG

Estimated
Annual Fuel Cost

\$2,669

based on 15,000 miles at \$3.20 per gallon

HIGHWAY MPG

21

Expected range for most drivers 17 to 25 MPG

Combined Fuel Economy

18

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

10 32

All SUVs



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



PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: **65 %**
Major Sources of Foreign Parts Content:
JAPAN 25 %

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

GOVERNMENT SAFETY RATINGS

	Driver	Passenger	Not Rated
Frontal Crash			Not Rated
Side Crash	Front seat	Rear seat	Not Rated
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.

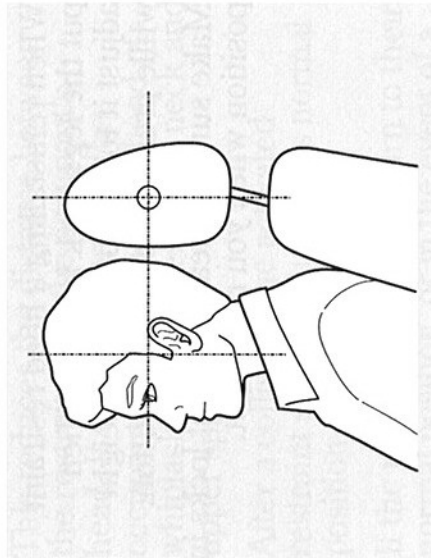
Source: National Highway Traffic Safety Administration (NHTSA).

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

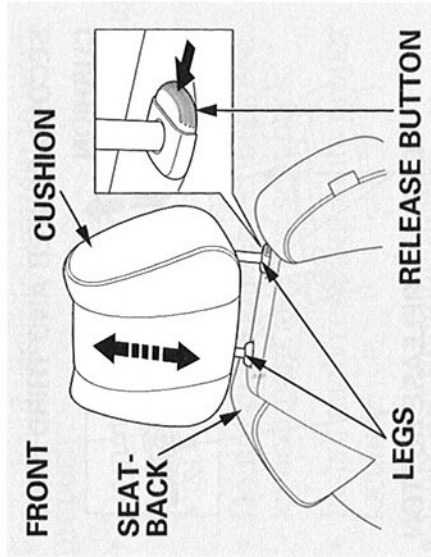
Head Restraints

See page 15 for important safety information and a warning about improperly positioning head restraints.

Your vehicle is equipped with head restraints in all seating positions to help protect you and your passengers from the likelihood of whiplash and other injuries.



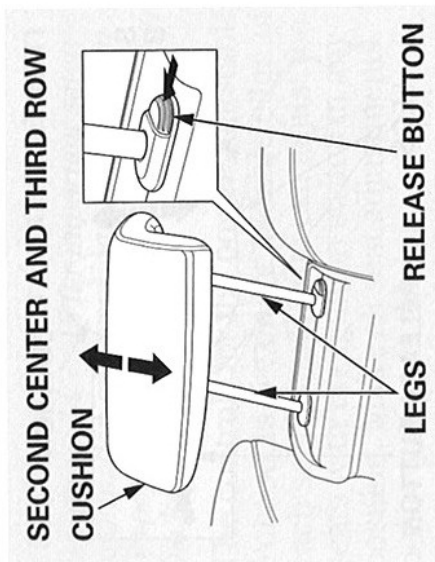
They are most effective when you adjust them so the center of the back of the occupant's head rests against the center of the restraint.



Adjusting the Head Restraint

The head restraints adjust for height. You need both hands to adjust the restraint. Do not attempt to adjust it while driving. To raise it, pull upward. To lower the restraint, push the release button sideways, and push the restraint down.

CONTINUED



Removing the Head Restraint
To remove a head restraint for cleaning or repair, pull it up as far as it will go. Push the release button, then pull the restraint out of the seat-back.

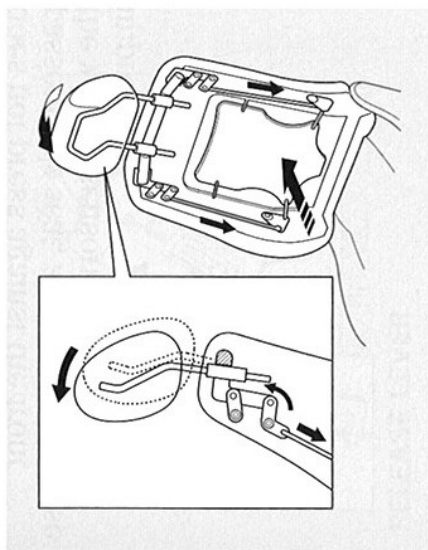
When reinstalling a head restraint, put the legs back in place. Then adjust it to the appropriate height while pressing the release button. Make sure the head restraint locks in position when you reinstall it.

⚠ WARNING

Failure to reinstall the head restraints can result in severe injury during a crash.

Always replace the head restraints before driving.

Active Head Restraints



The driver's and front passenger's seats have active head restraints. If the vehicle is struck severely from the rear, the occupant properly secured with the seat belt will be pushed against the seat-back and the head restraint will automatically move forward.

This reduces the distance between the restraint and the occupant's head. It also helps protect the occupants against the likelihood of whiplash and injuries to the neck and upper spine.

After a collision, the activated restraint should return to its normal position.

If the restraints do not return to their normal position, or in the event of a severe collision, have the vehicle inspected by an Acura dealer.

For a head restraint system to work properly:

- Do not hang any items on the head restraints, or from the restraint legs.
- Do not place any object between an occupant and the seat-back.
- Install each restraint in its proper location.
- Only use genuine Acura replacement head restraints.

CONTINUED

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

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Figure No. 4.	Driver Head Resultant Primary Acceleration vs. Time	B-1
Figure No. 5.	Driver Lower Spine T12 Acceleration (X) vs. Time	B-2
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The following dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

Driver Head Acceleration (X) Redundant

Driver Head Acceleration (Y) Redundant

Driver Head Acceleration (Z) Redundant

Driver Upper Thorax Rib Deflection (Y)

Driver Middle Thorax Rib Deflection (Y)

Driver Lower Thorax Rib Deflection (Y)

Driver Upper Abdomen Rib Deflection (Y)

Driver Lower Abdomen Rib Deflection (Y)

Driver Shoulder Contact Switch

Driver Torso Contact Switch

Driver Pelvis Contact Switch

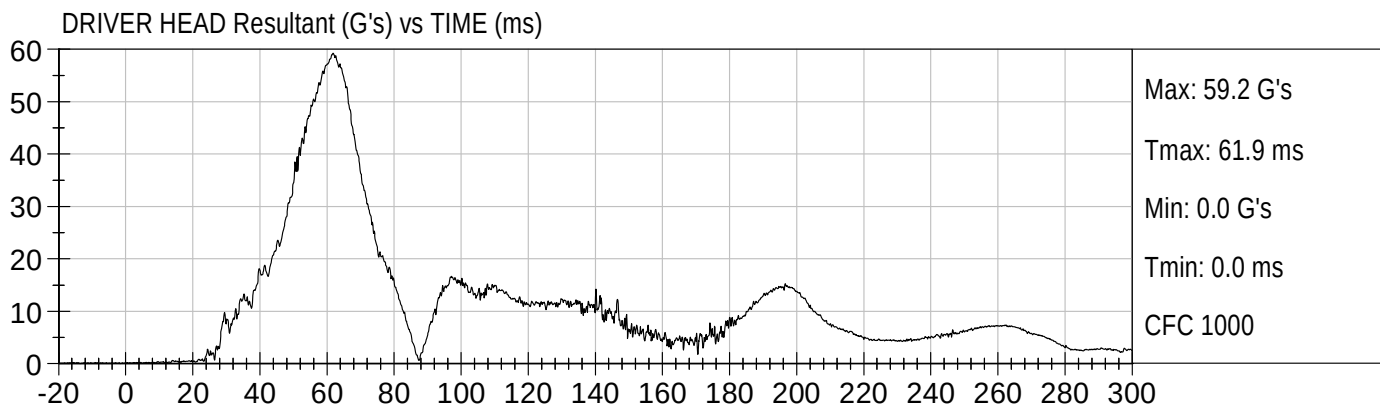
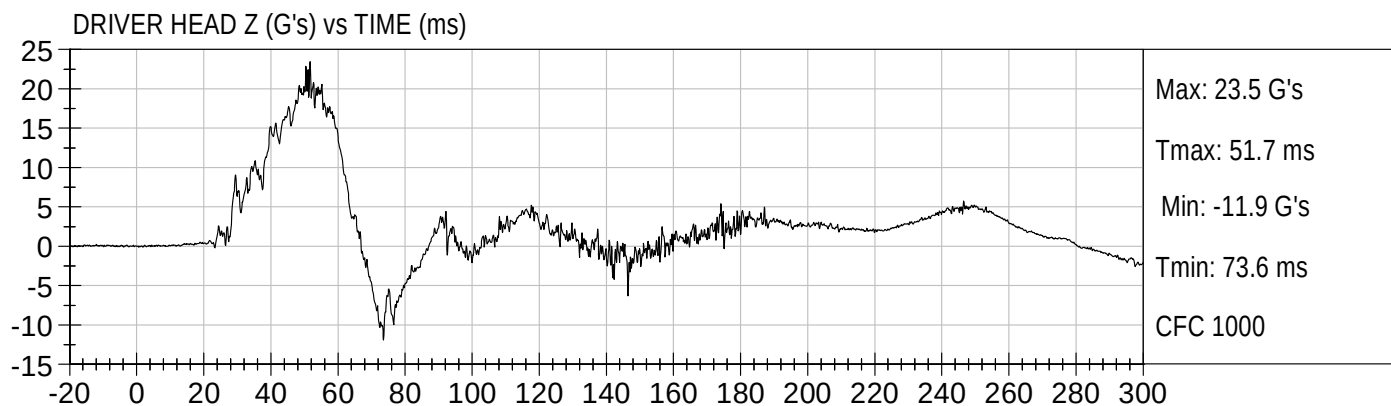
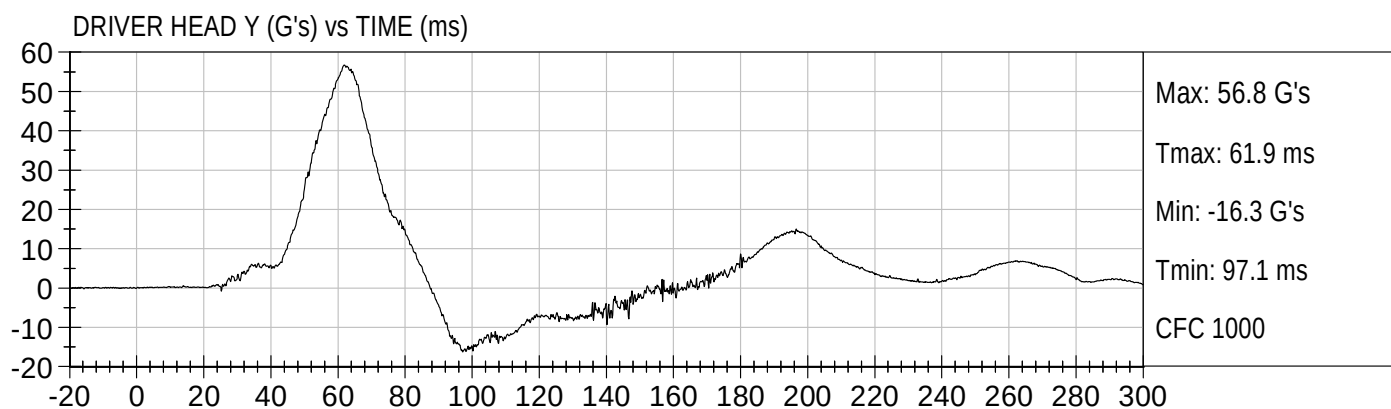
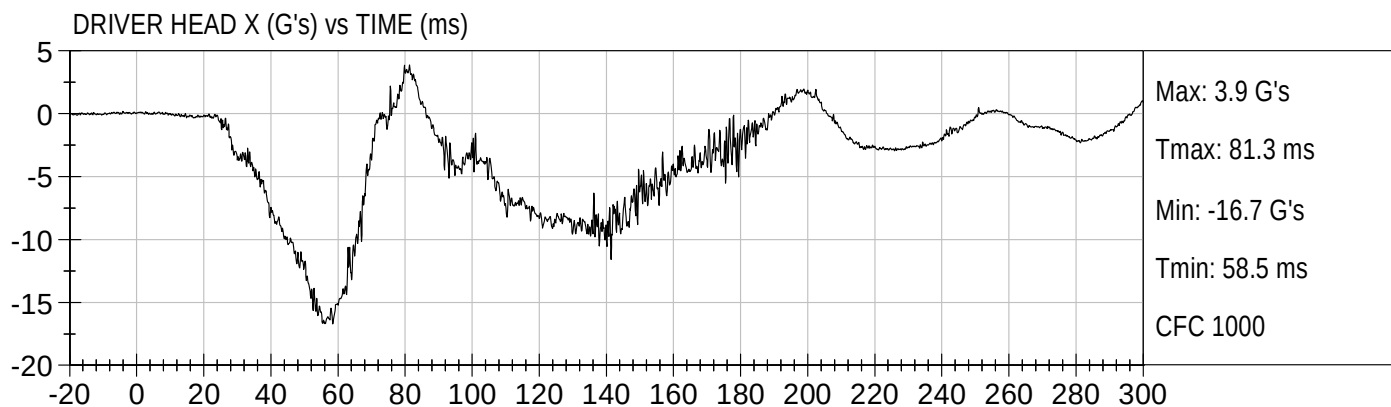
Vehicle CG Acceleration (X)

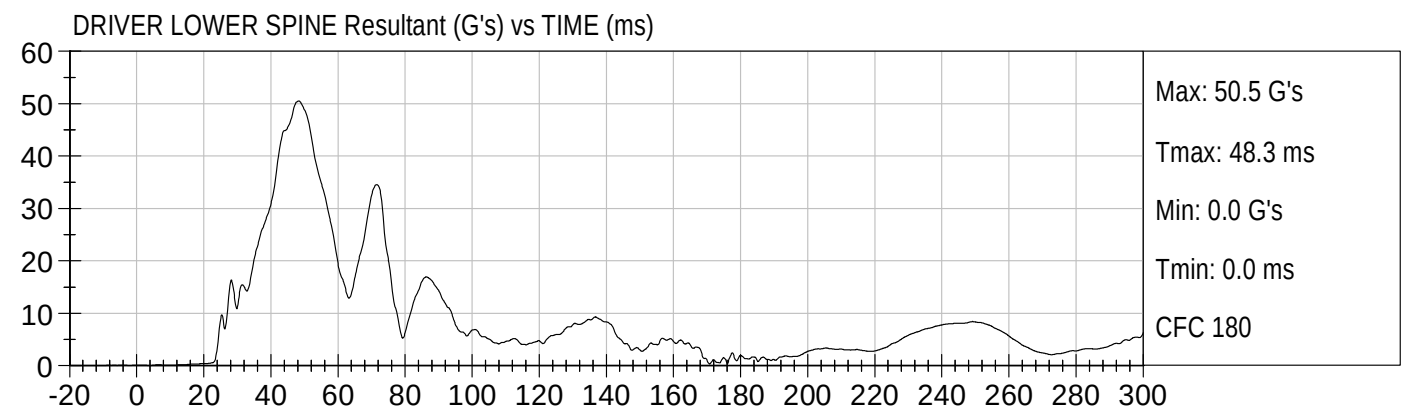
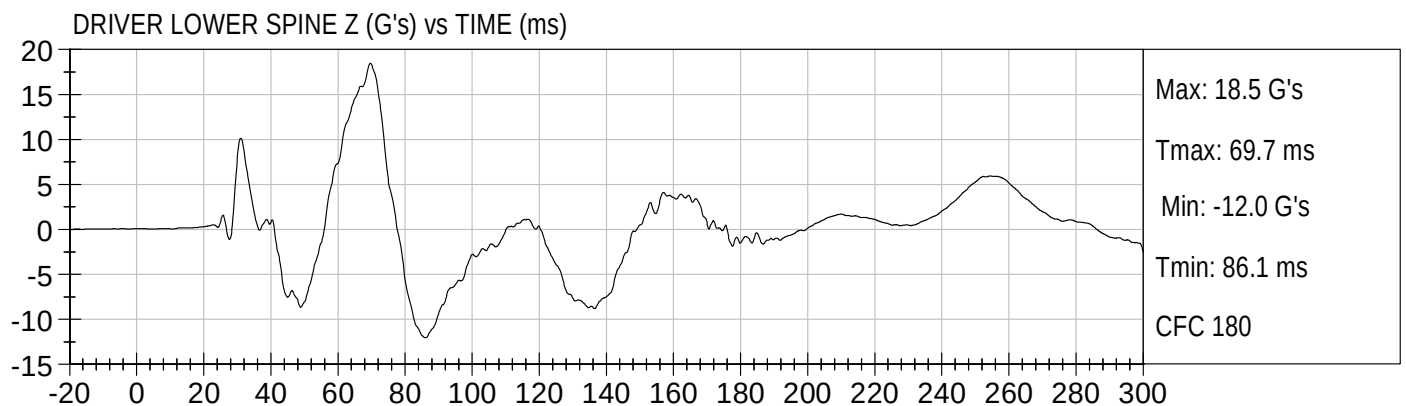
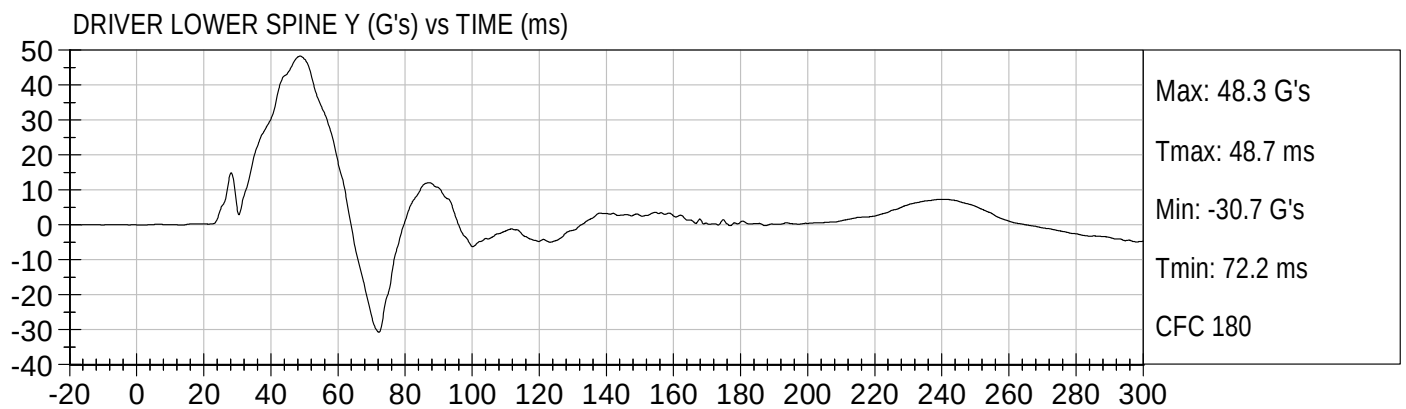
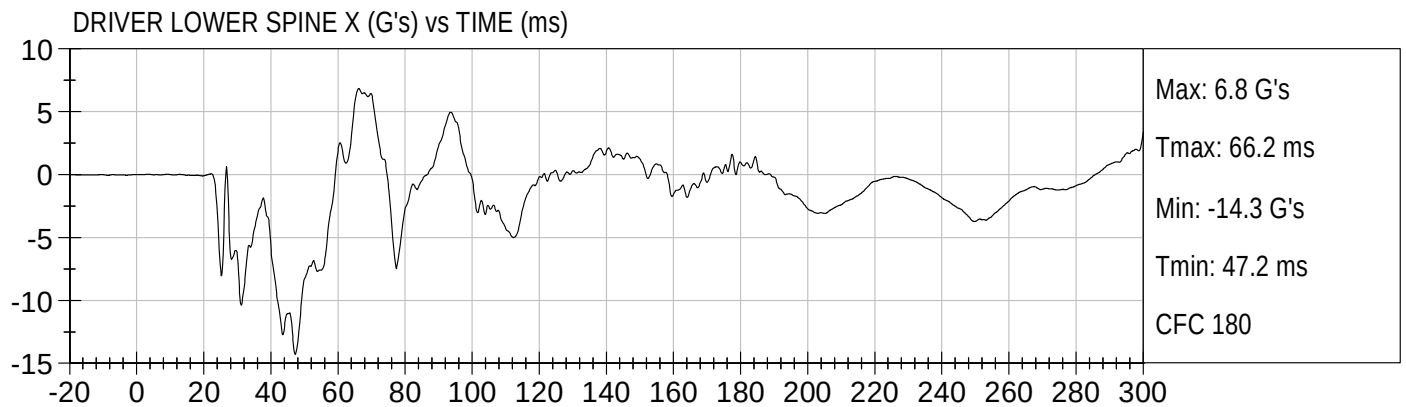
Vehicle CG Acceleration (Y)

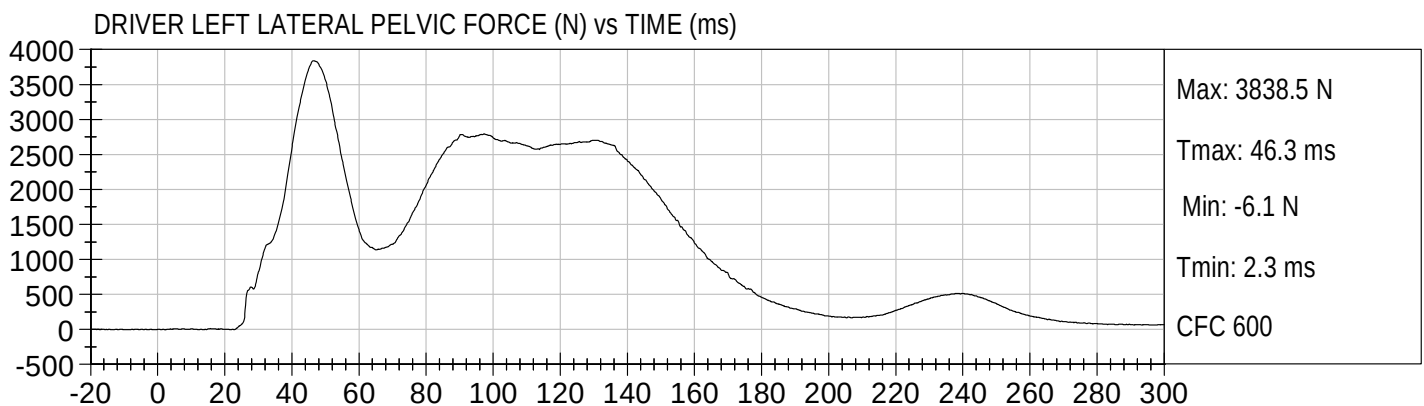
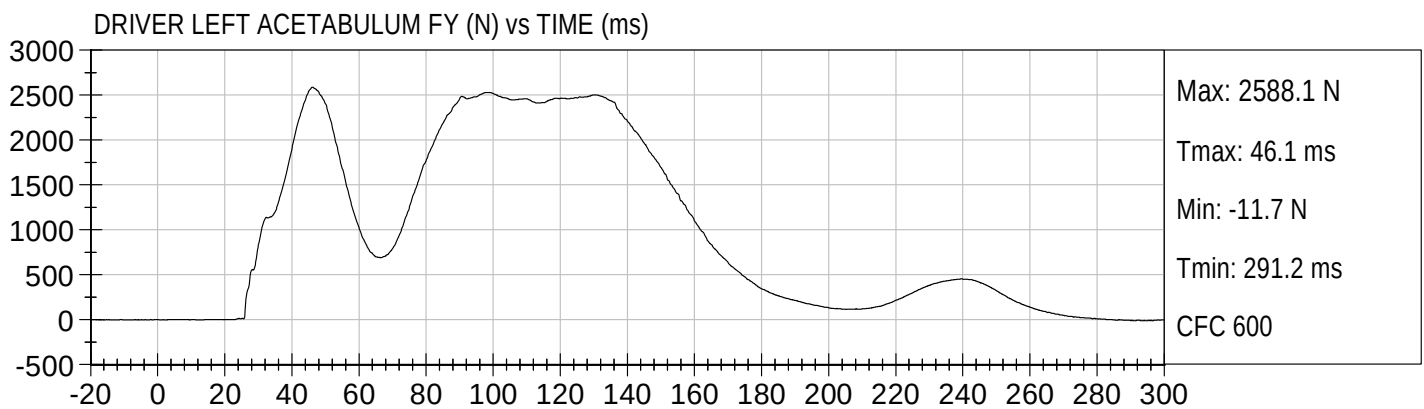
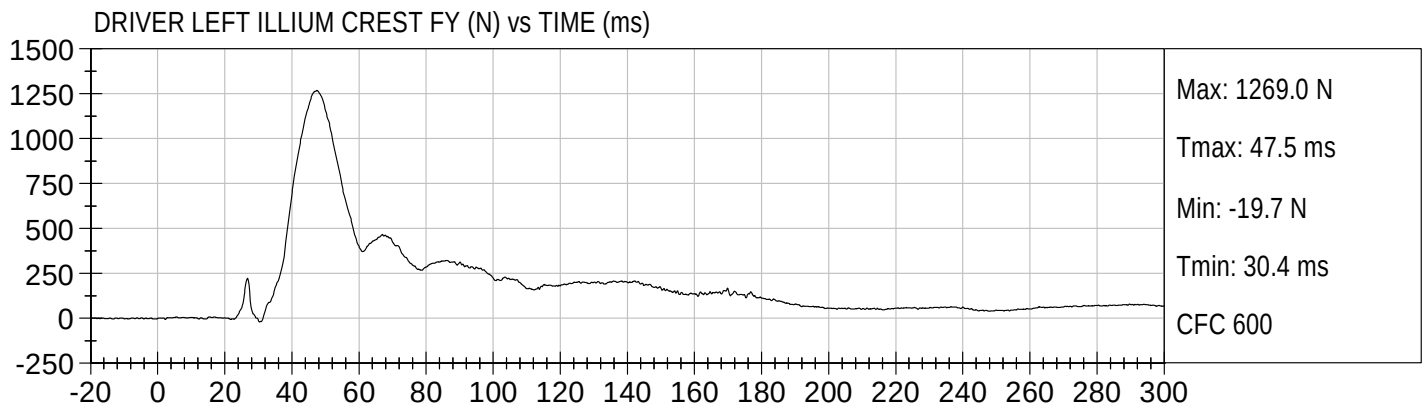
Vehicle CG Acceleration (Z)

Vehicle CG Angular Rate About X (Roll)

Vehicle CG Angular Rate About Y (Pitch)
Vehicle CG Angular Rate About Z (Yaw)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy H-Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)
Driver Side Airbag Timing
Driver Side Curtain Airbag Timing – Not Installed
Load Cell Pole Barrier #1 Force (Y) – Not used
Load Cell Pole Barrier #2 Force (Y) – Not used
Load Cell Pole Barrier #3 Force (Y) – Not used
Load Cell Pole Barrier #4 Force (Y) – Not used
Load Cell Pole Barrier #5 Force (Y) – Not used
Load Cell Pole Barrier #6 Force (Y) – Not used
Load Cell Pole Barrier #7 Force (Y) – Not used
Load Cell Pole Barrier #8 Force (Y) – Not used







APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103561

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Lateral Acceleration	G's	+/- 15	-1.9	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass



Laboratory Technician

10/19/10
Test Date

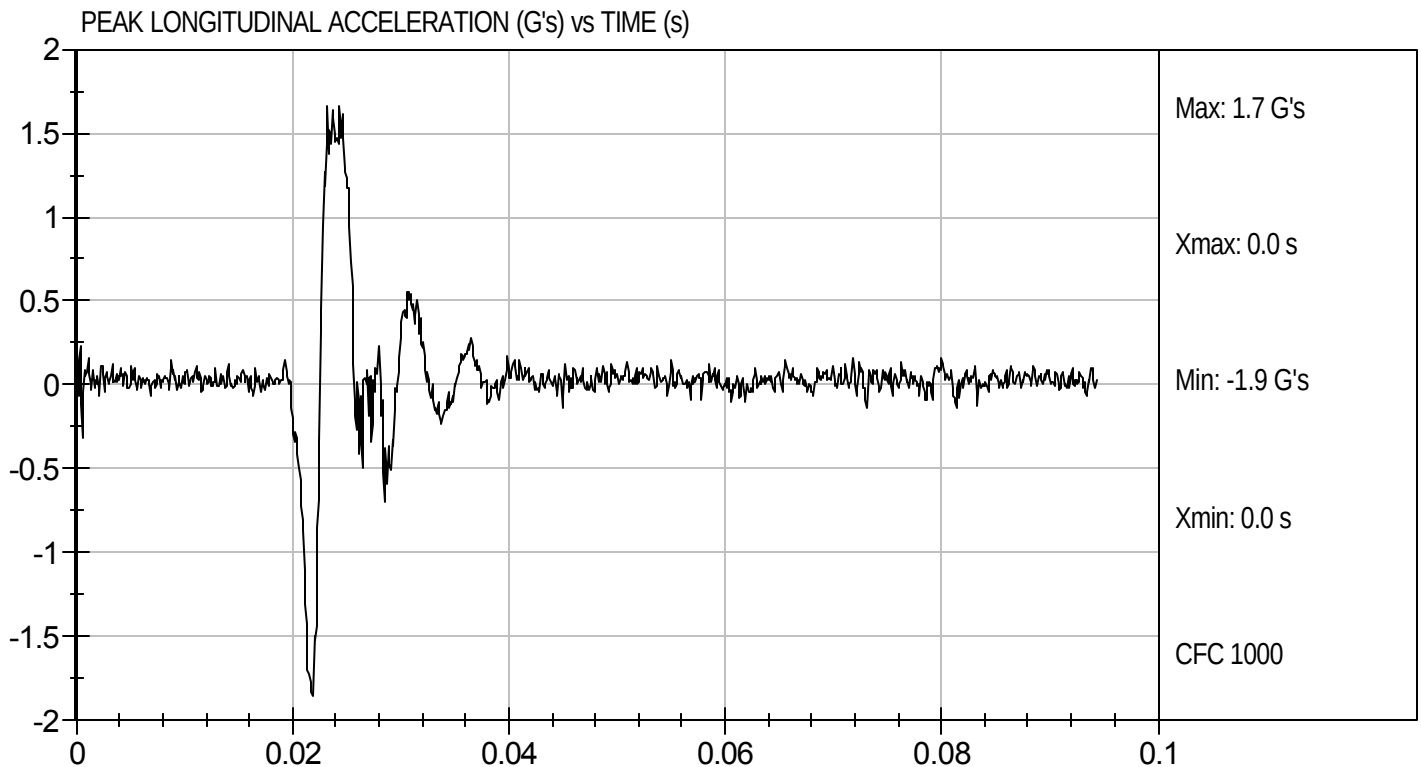
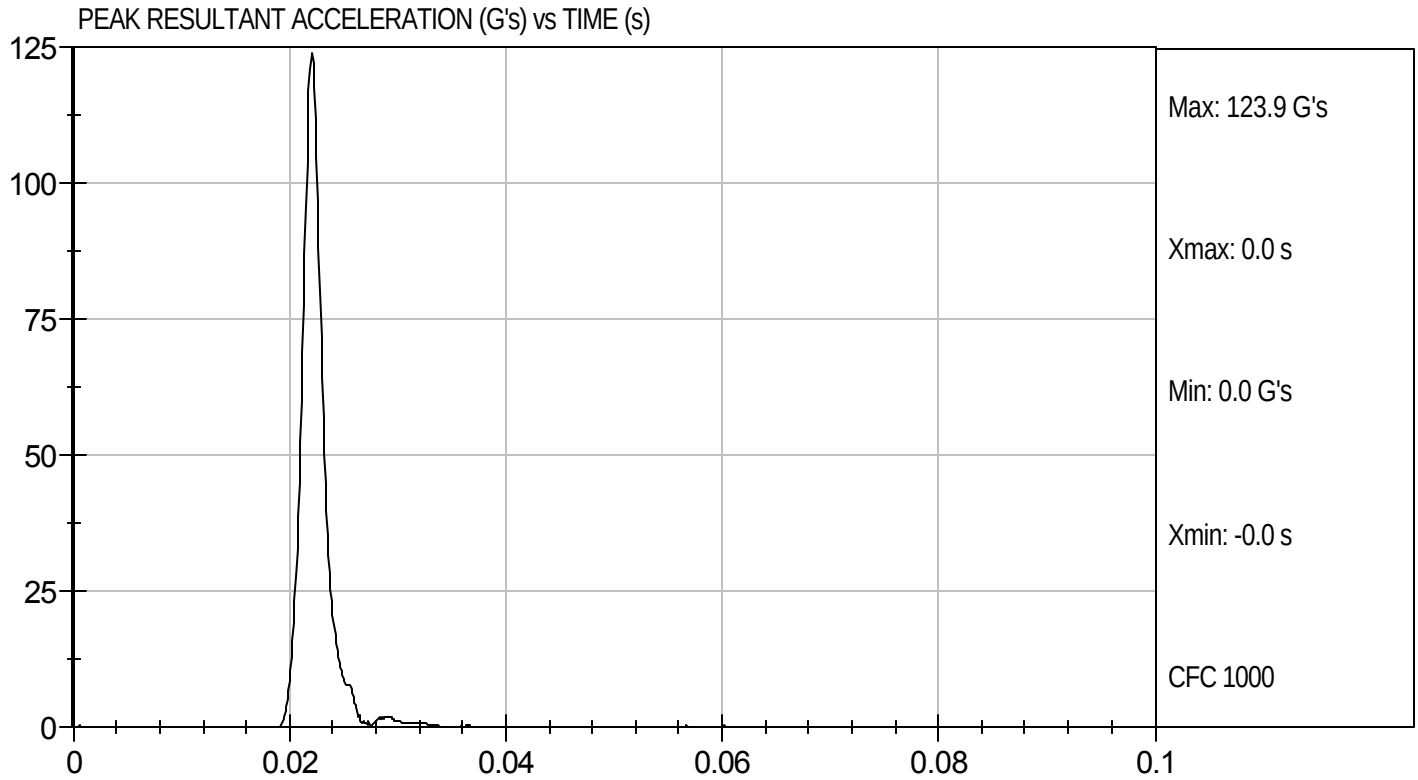


Approved By



Test Desc: Head Drop
Component ID: D103561

Test Date: 10/19/10
Velocity: 0 ft/s, 0 m/s

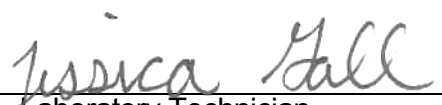


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103562

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.1	Pass
Humidity		%	10 to 70	33	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.50	Pass
	15 ms	m/s	3.30 to 4.10	3.52	Pass
	20 ms	m/s	4.40 to 5.40	4.68	Pass
	25 ms	m/s	5.40 to 6.10	5.51	Pass
	25-100 ms	m/s	5.50 to 6.20	5.54	Pass
Maximum D-Plane Rotation		deg	71 to 81	71	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	59	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-42	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	117	Pass
Overall Test Results				Pass	


 Laboratory Technician

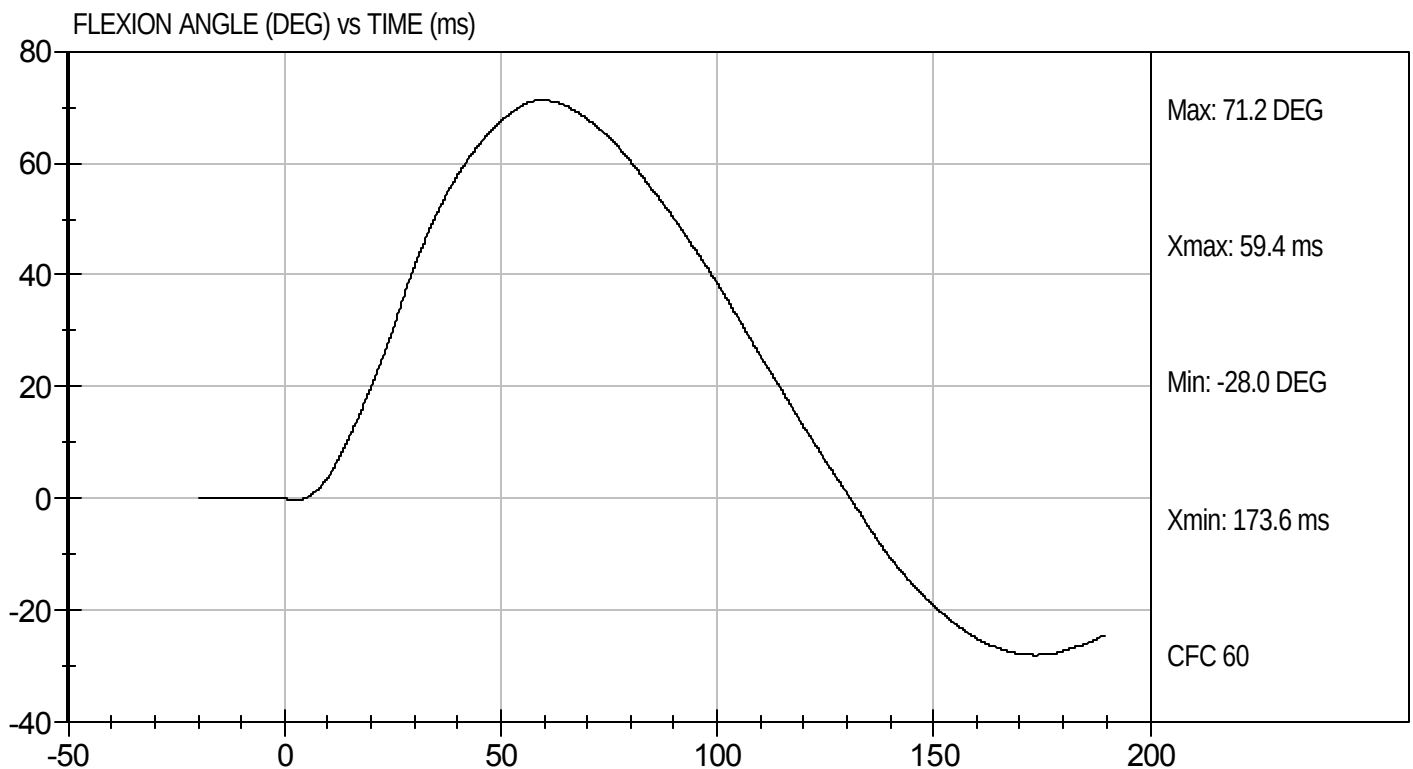
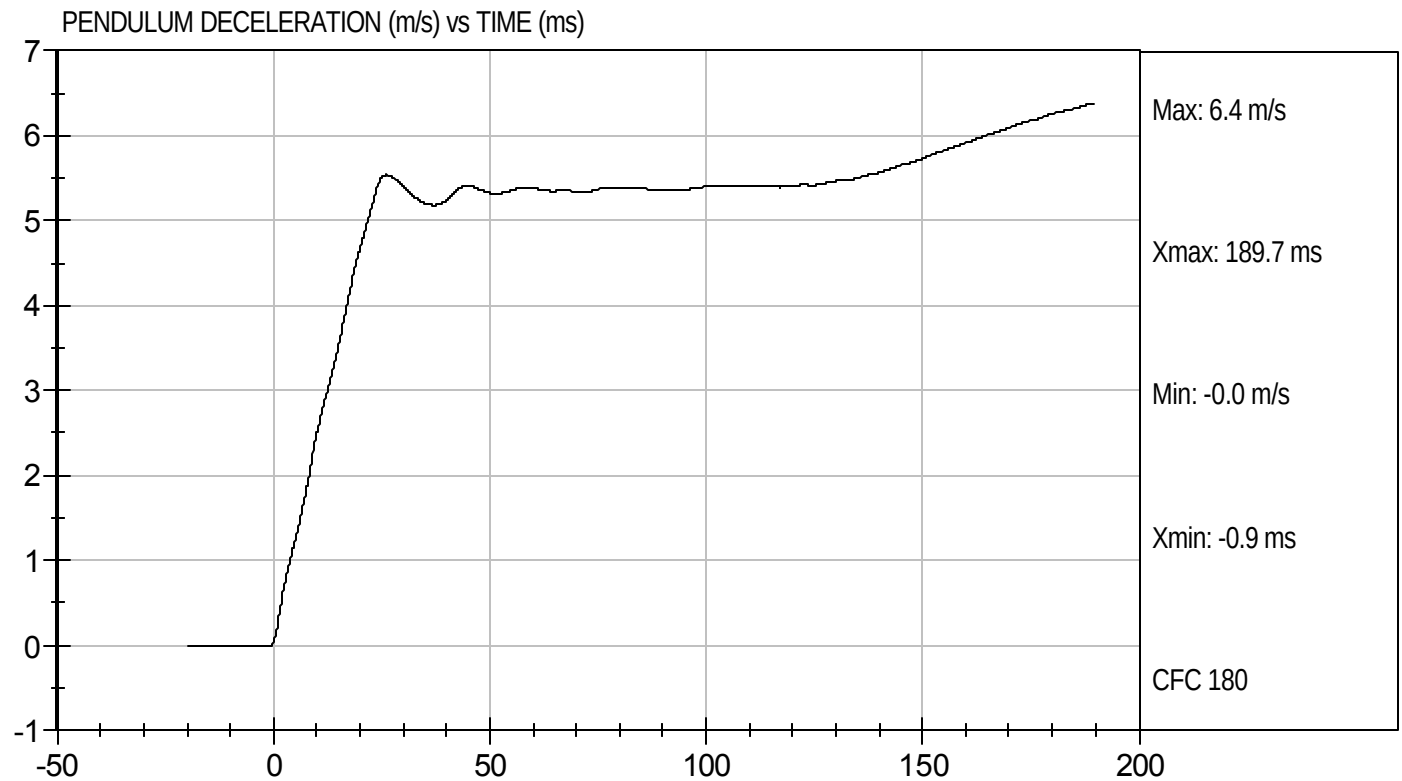
10/19/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D103562

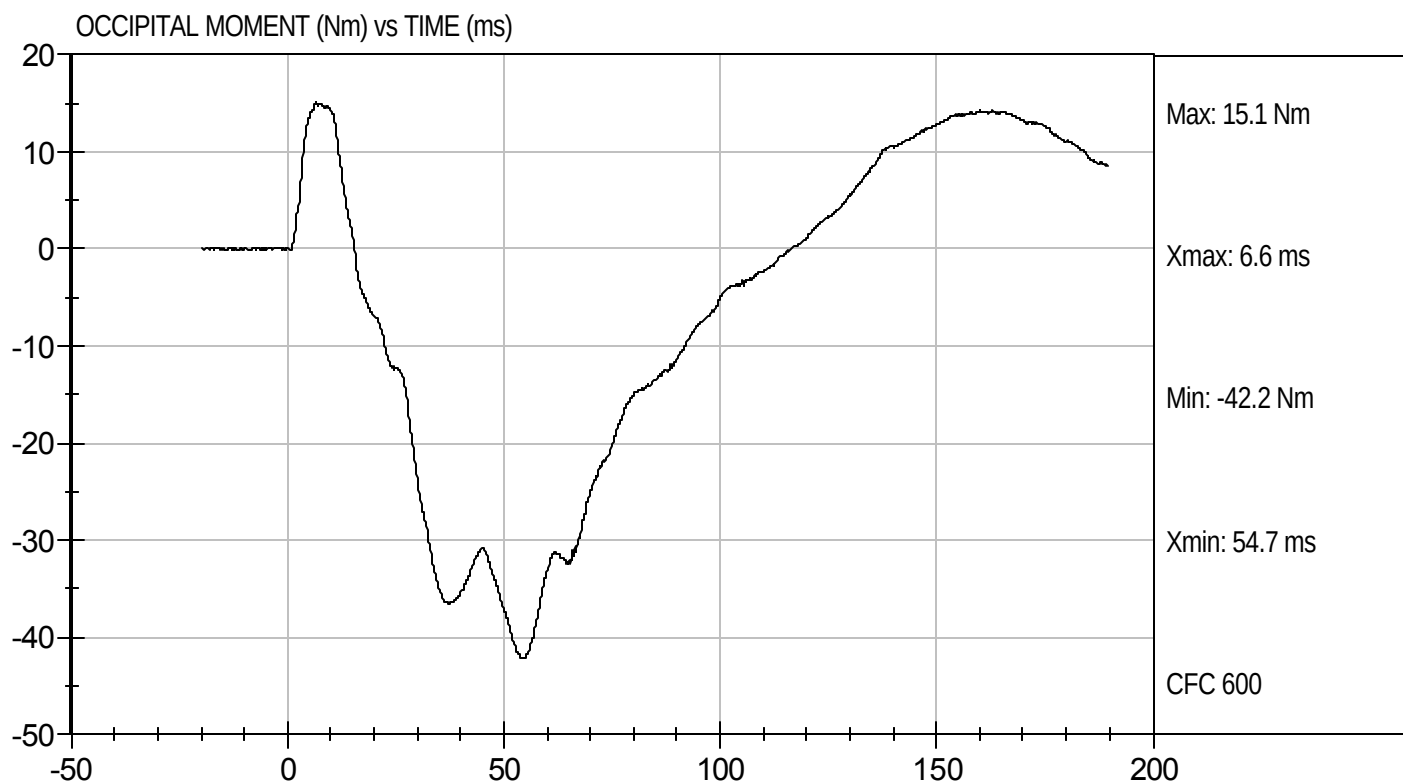
Test Date: 10/19/10
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D103562

Test Date: 10/19/10
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103563

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

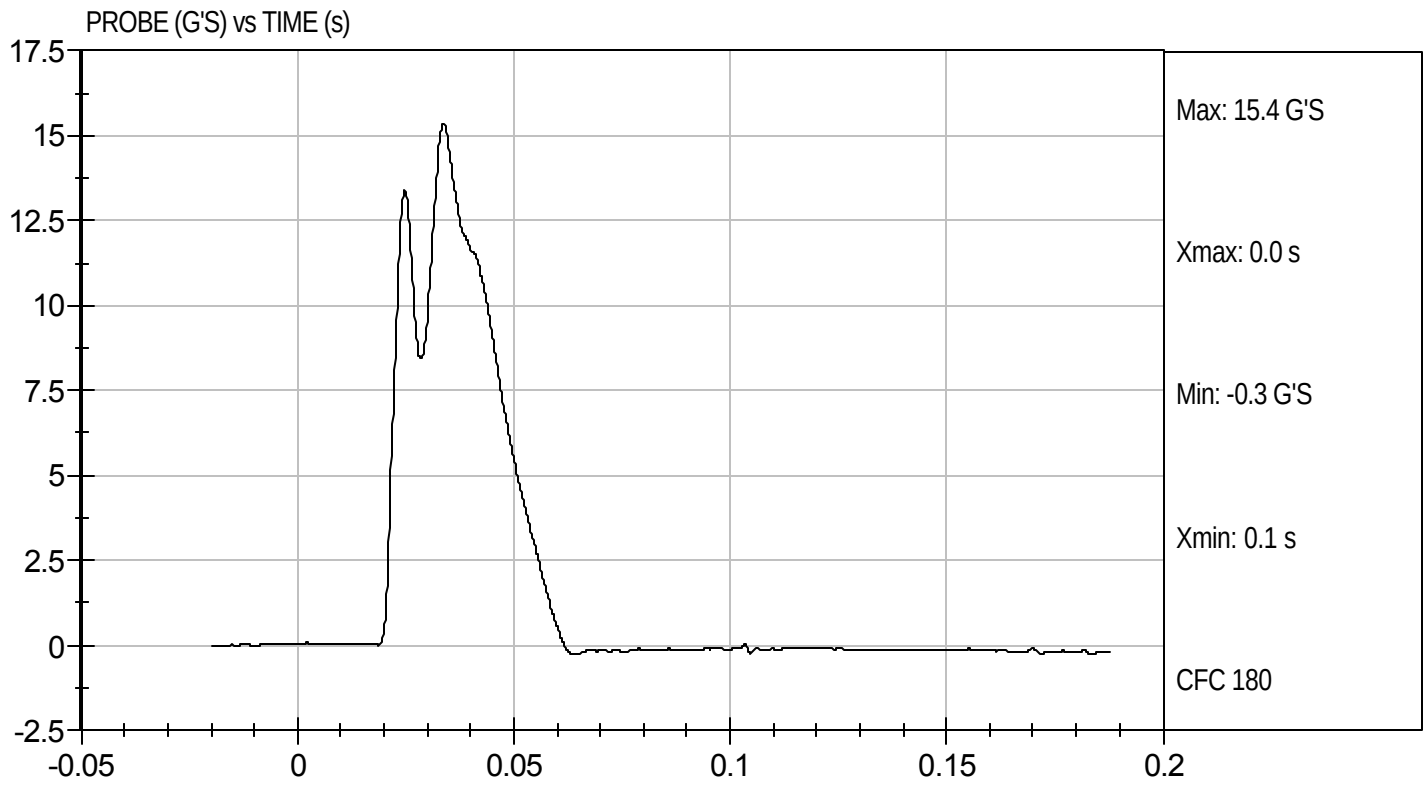
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D103563

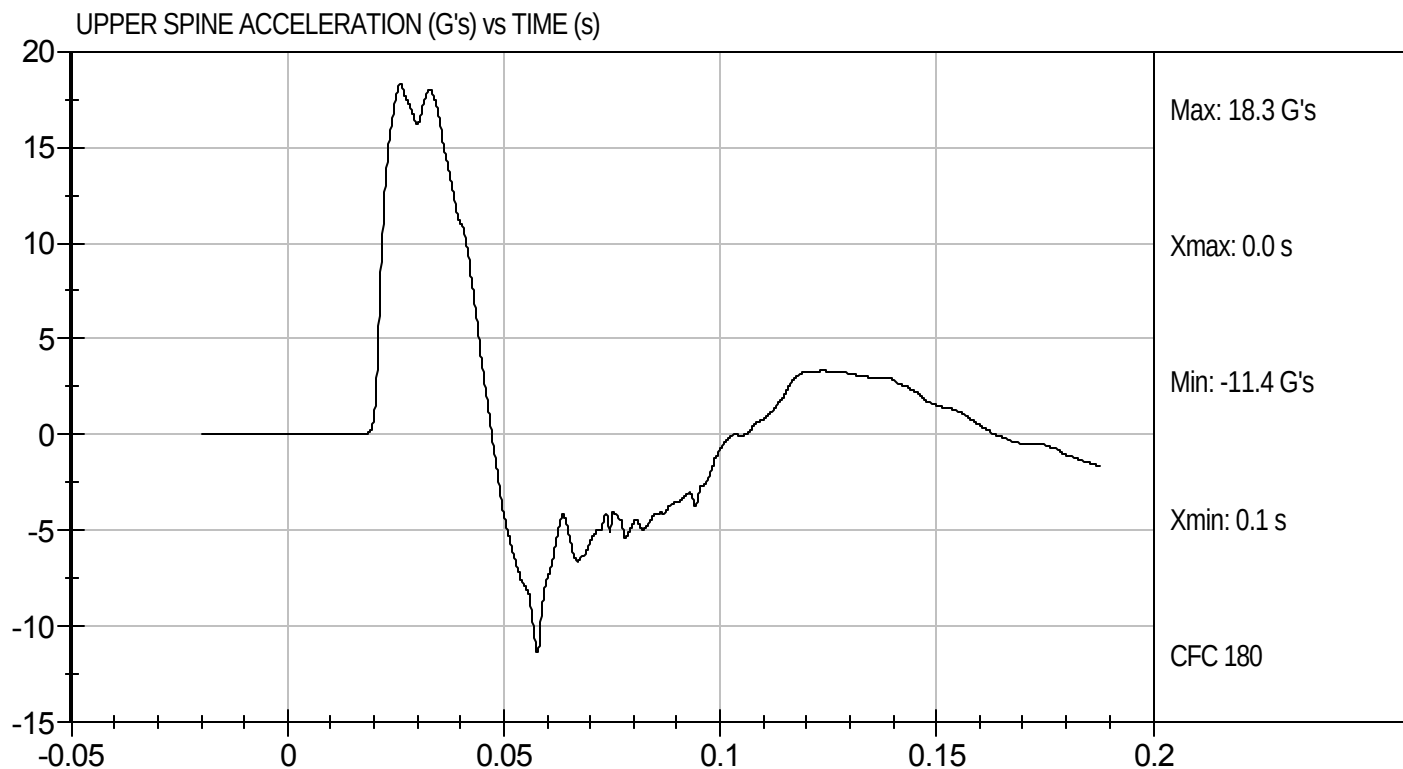
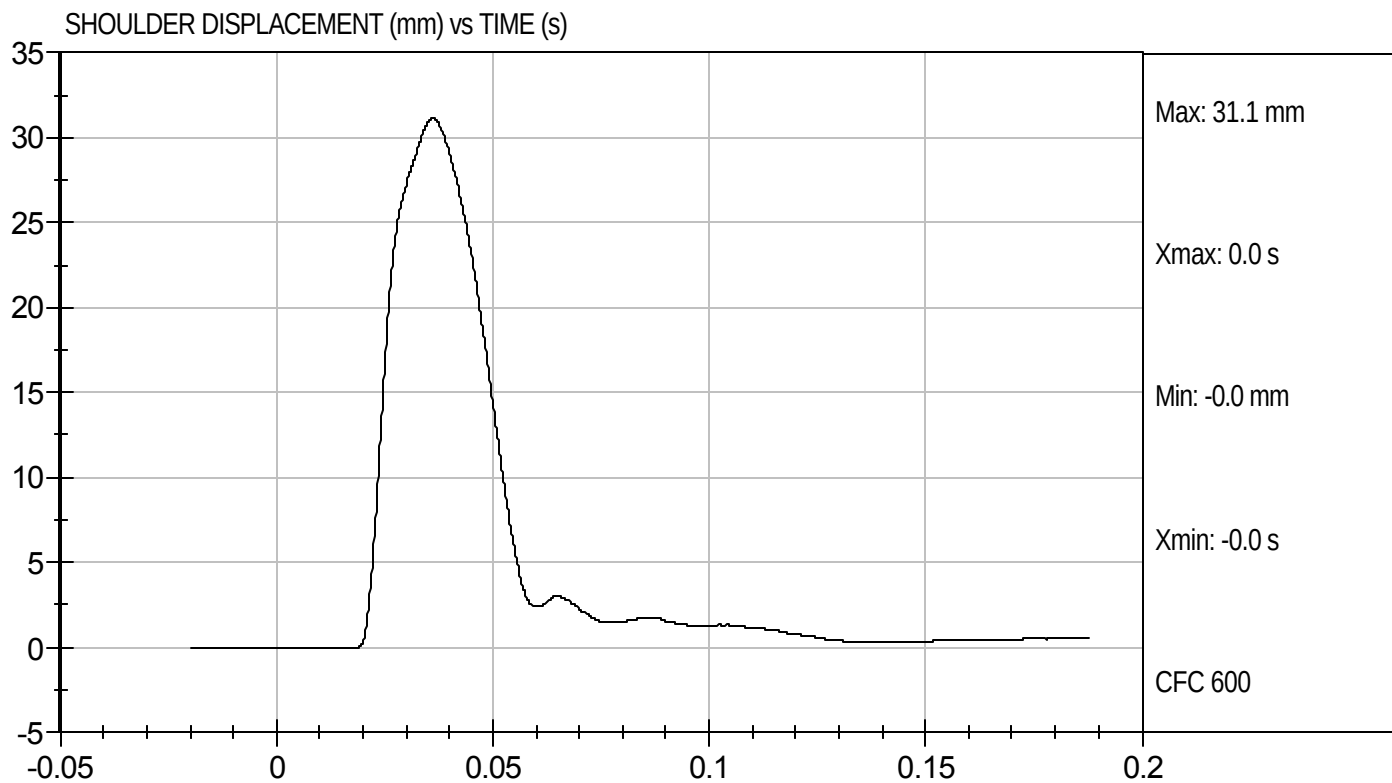
Test Date: 10/19/10
Velocity: 14.01 ft/s, 4.27 m/s





Test Desc: Shoulder Impact
Component ID: D103563

Test Date: 10/19/10
Velocity: 14.01 ft/s, 4.27 m/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103564

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	31	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	36	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	32	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results				Pass


 Laboratory Technician

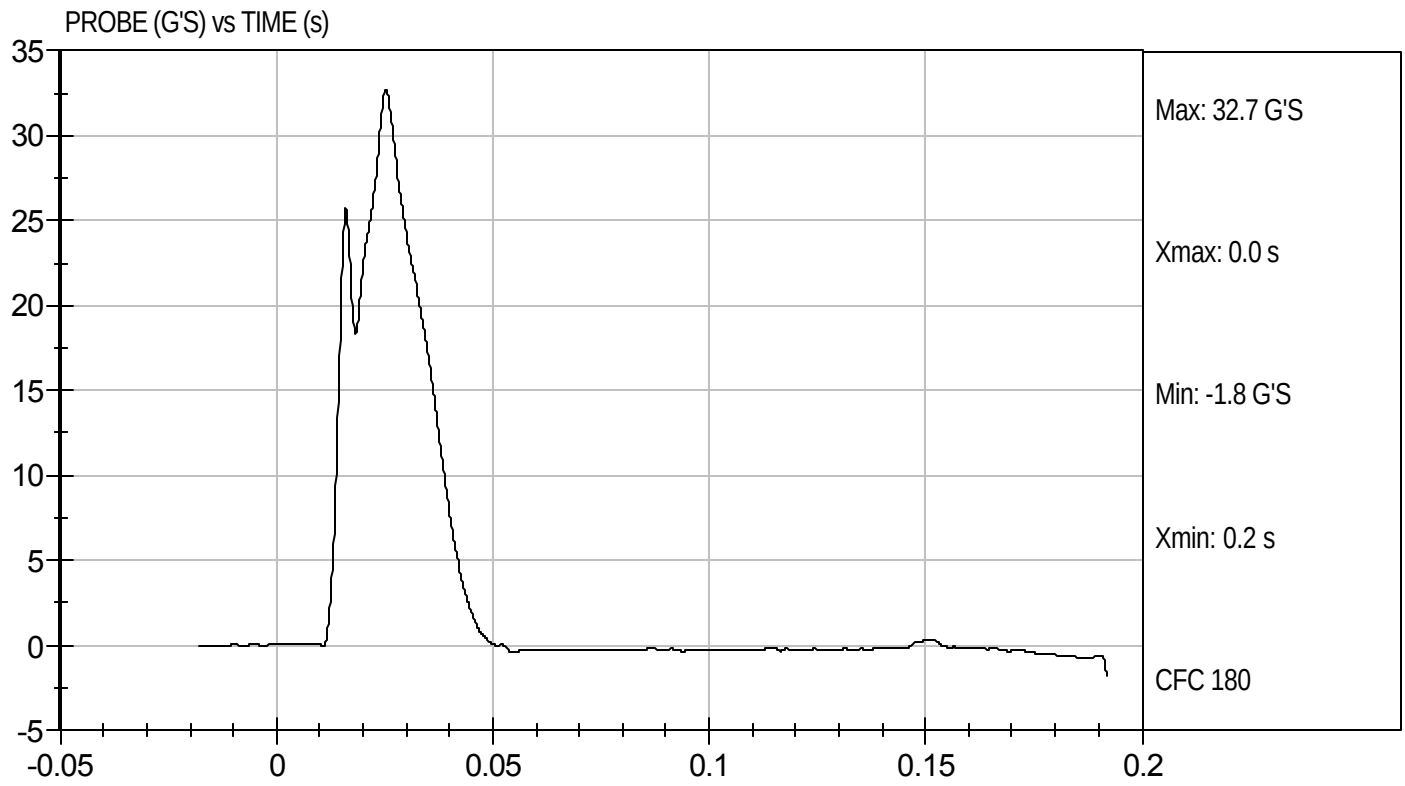
10/19/10
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D103564

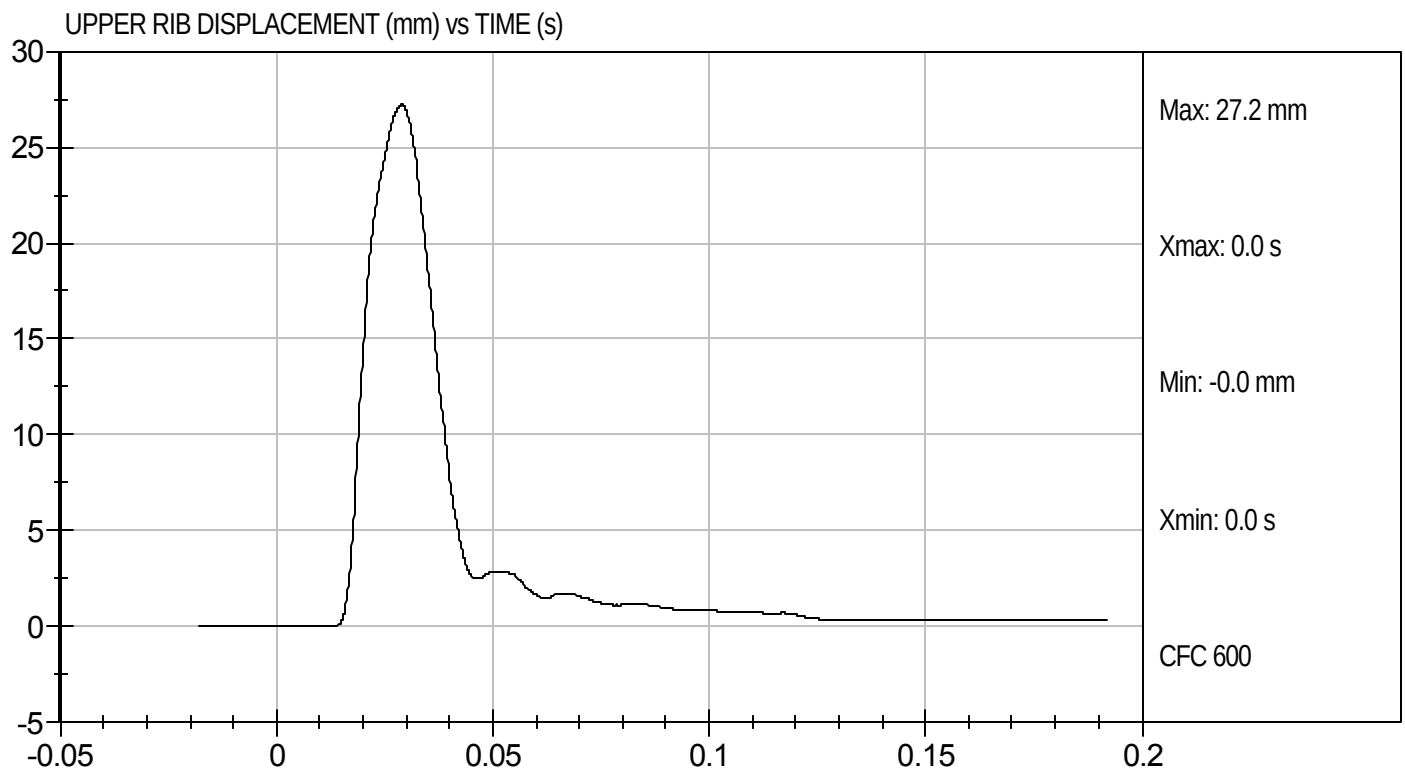
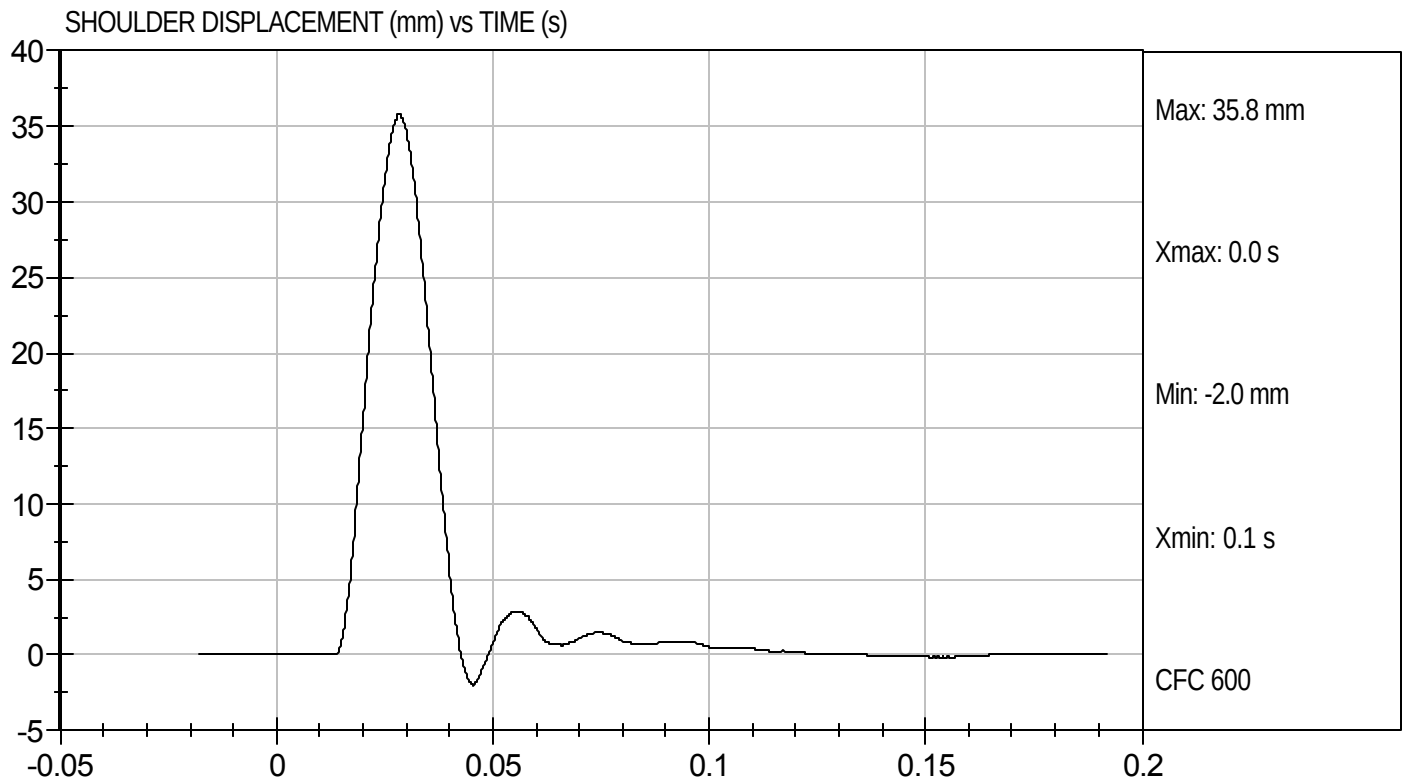
Test Date: 10/19/10
Velocity: 21.93 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103564

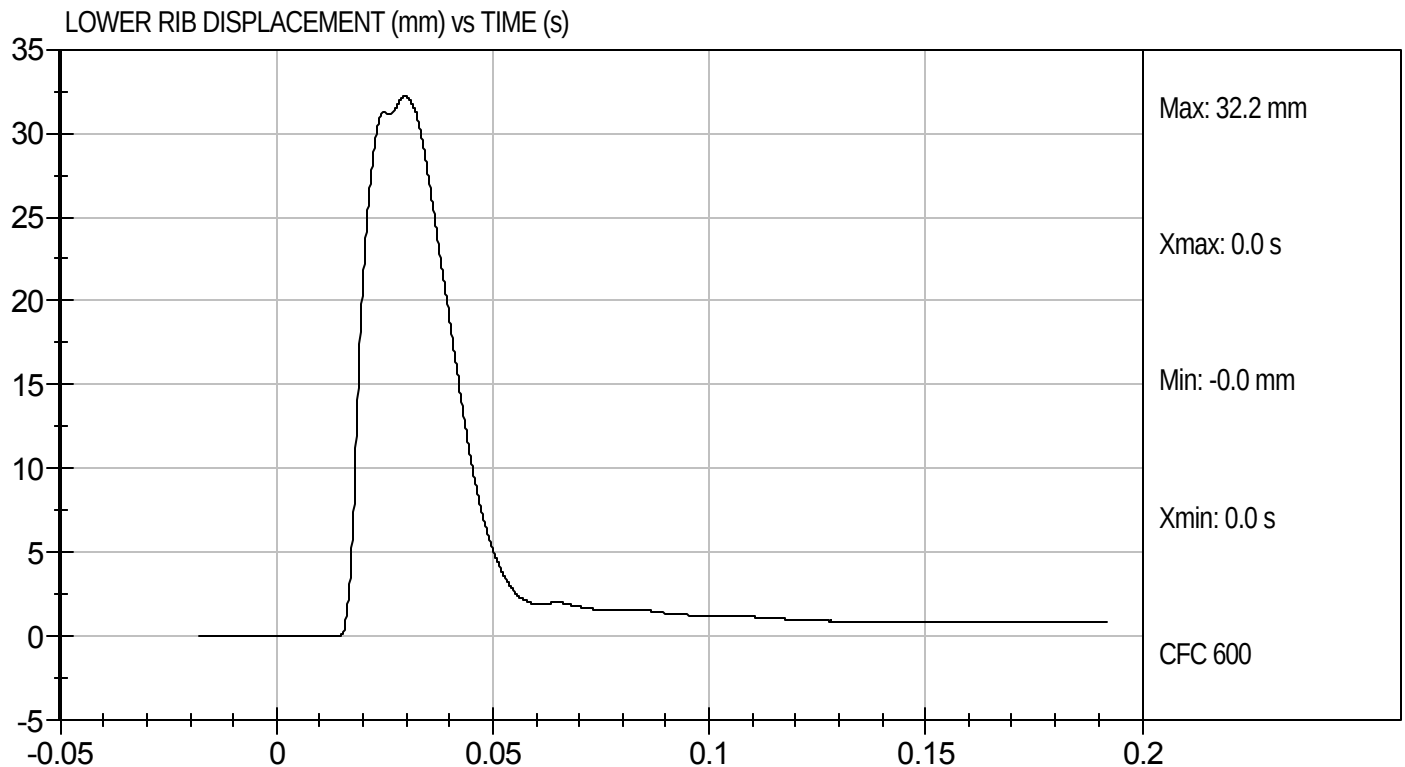
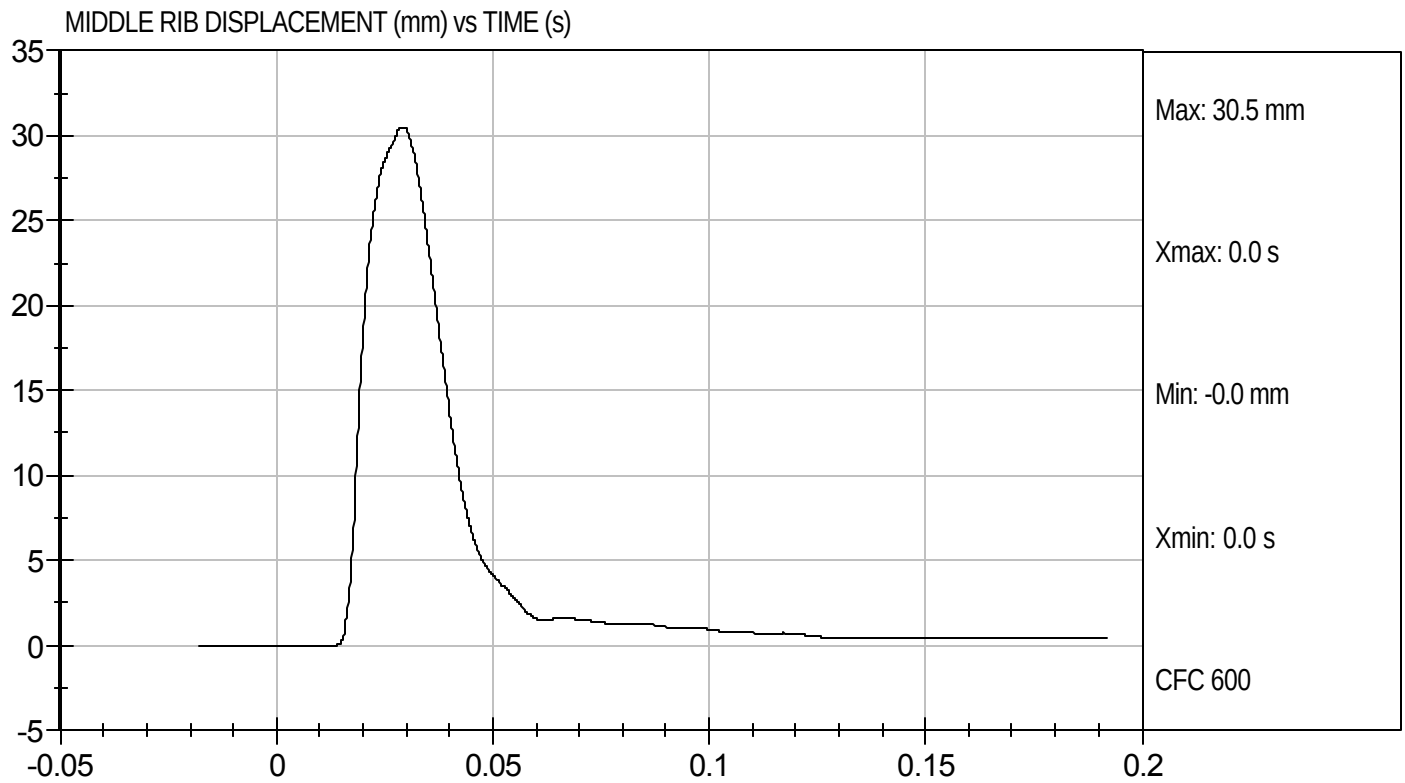
Test Date: 10/19/10
Velocity: 21.93 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103564

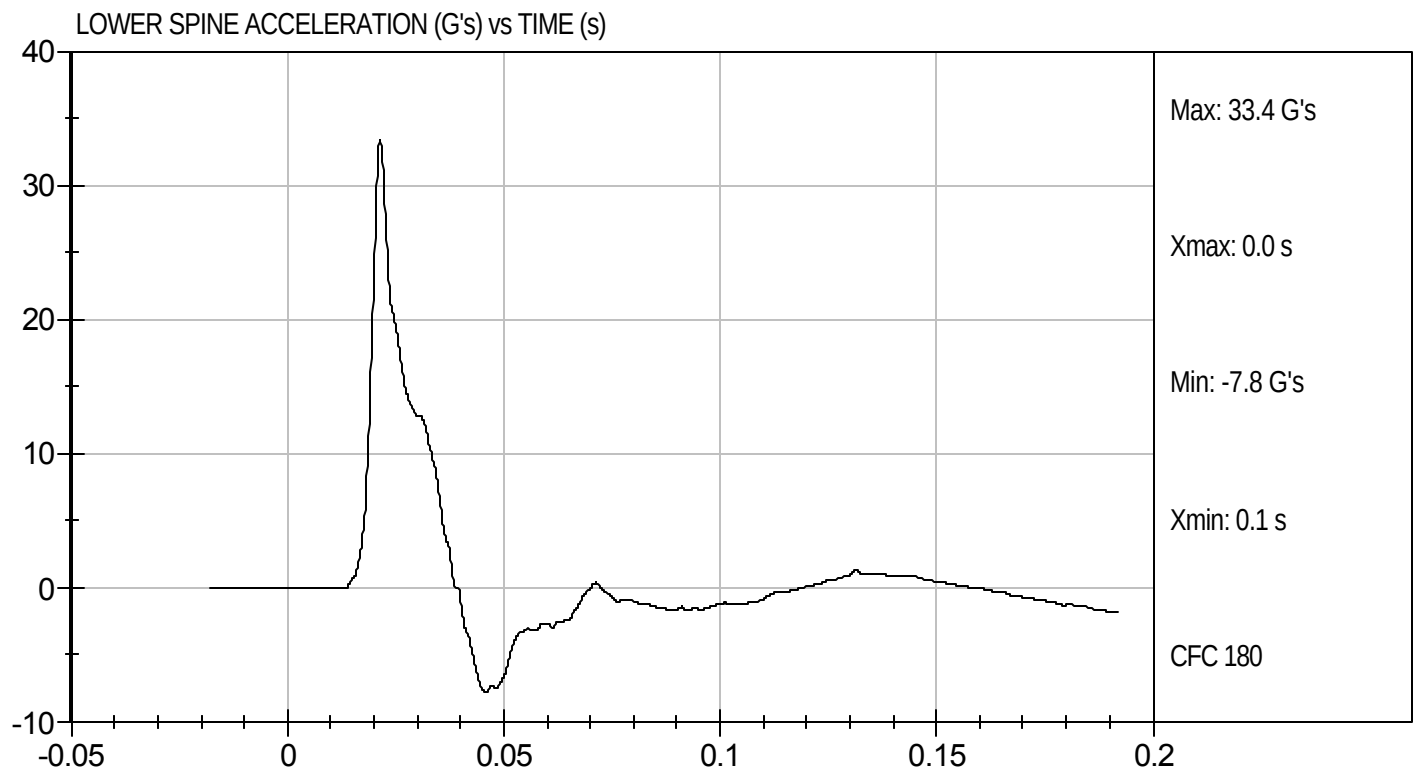
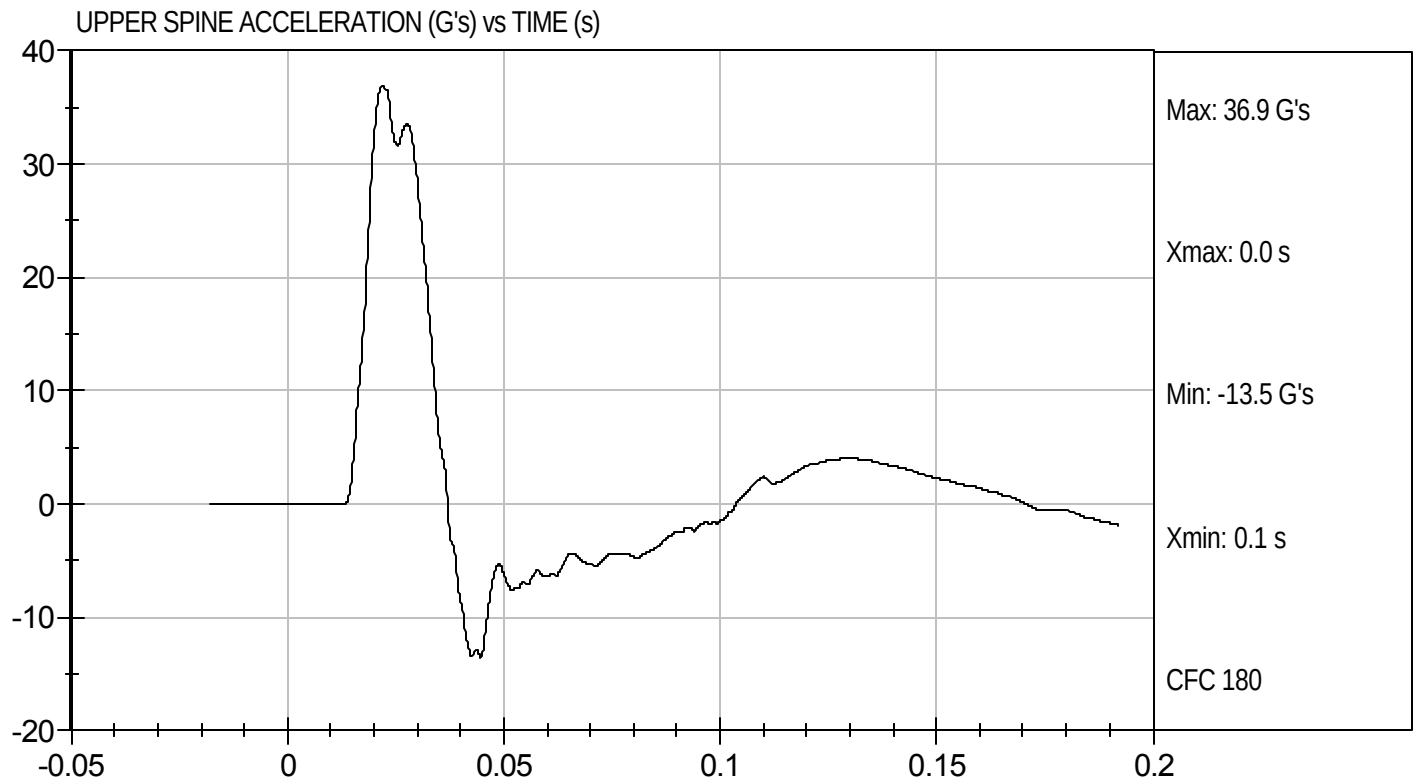
Test Date: 10/19/10
Velocity: 21.93 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103564

Test Date: 10/19/10
Velocity: 21.93 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103565

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	33	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	37	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	38	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results			Pass	


Laboratory Technician

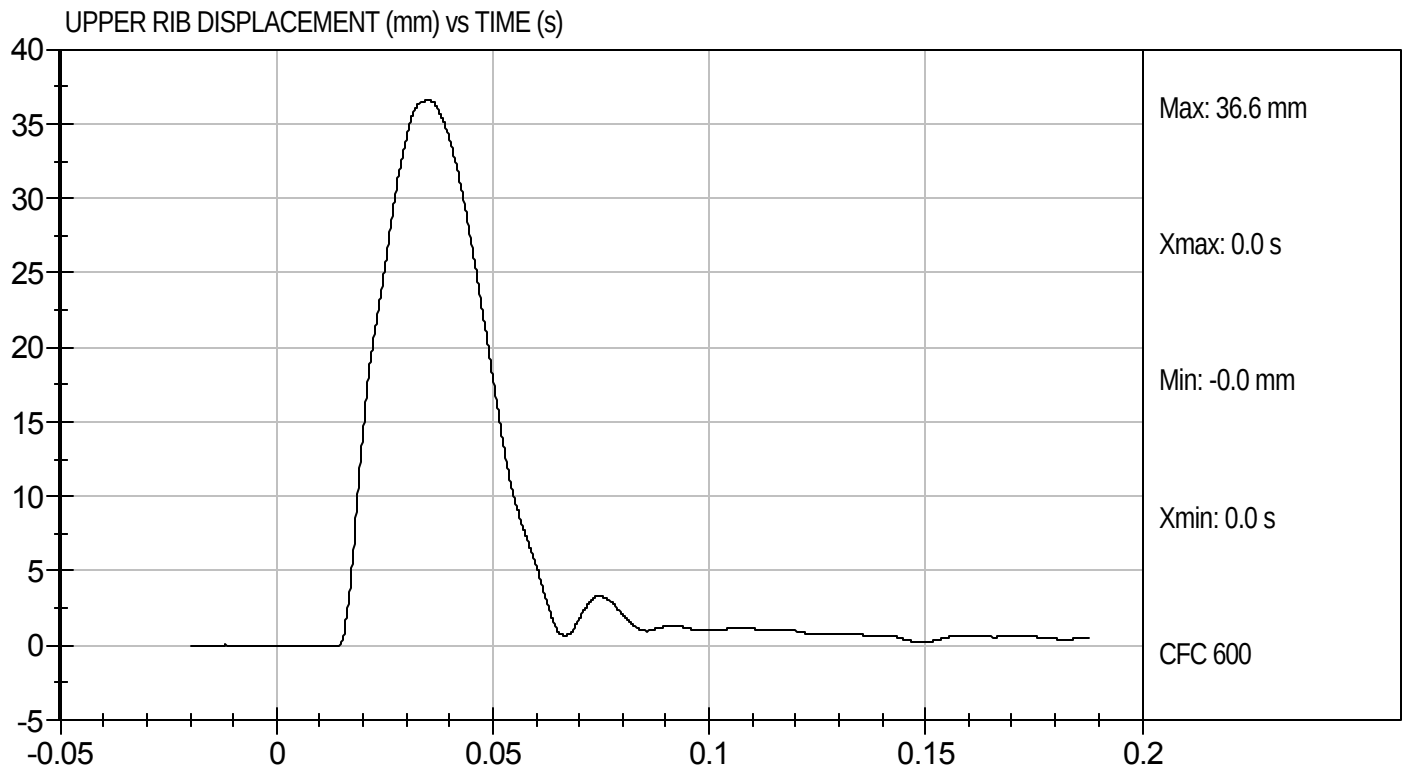
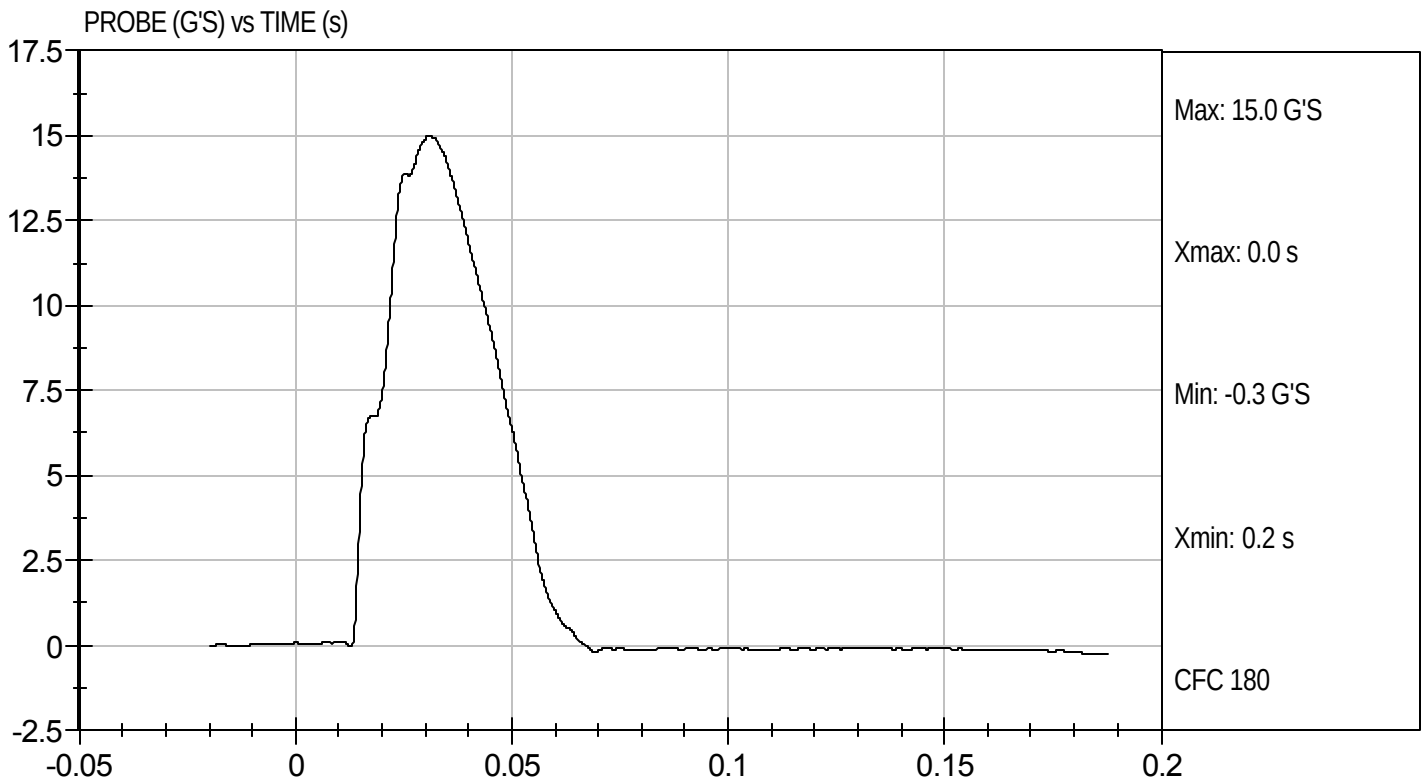
10/19/10
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D103565

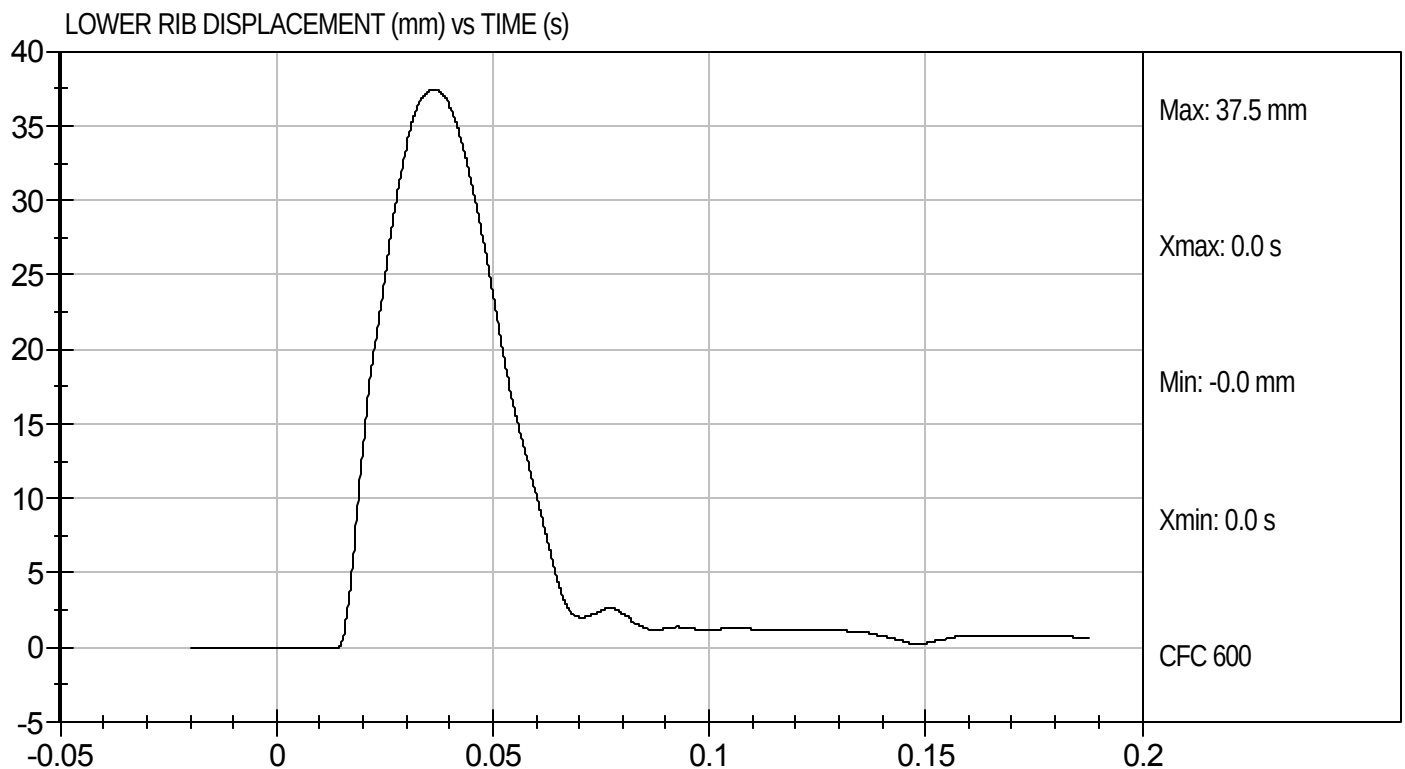
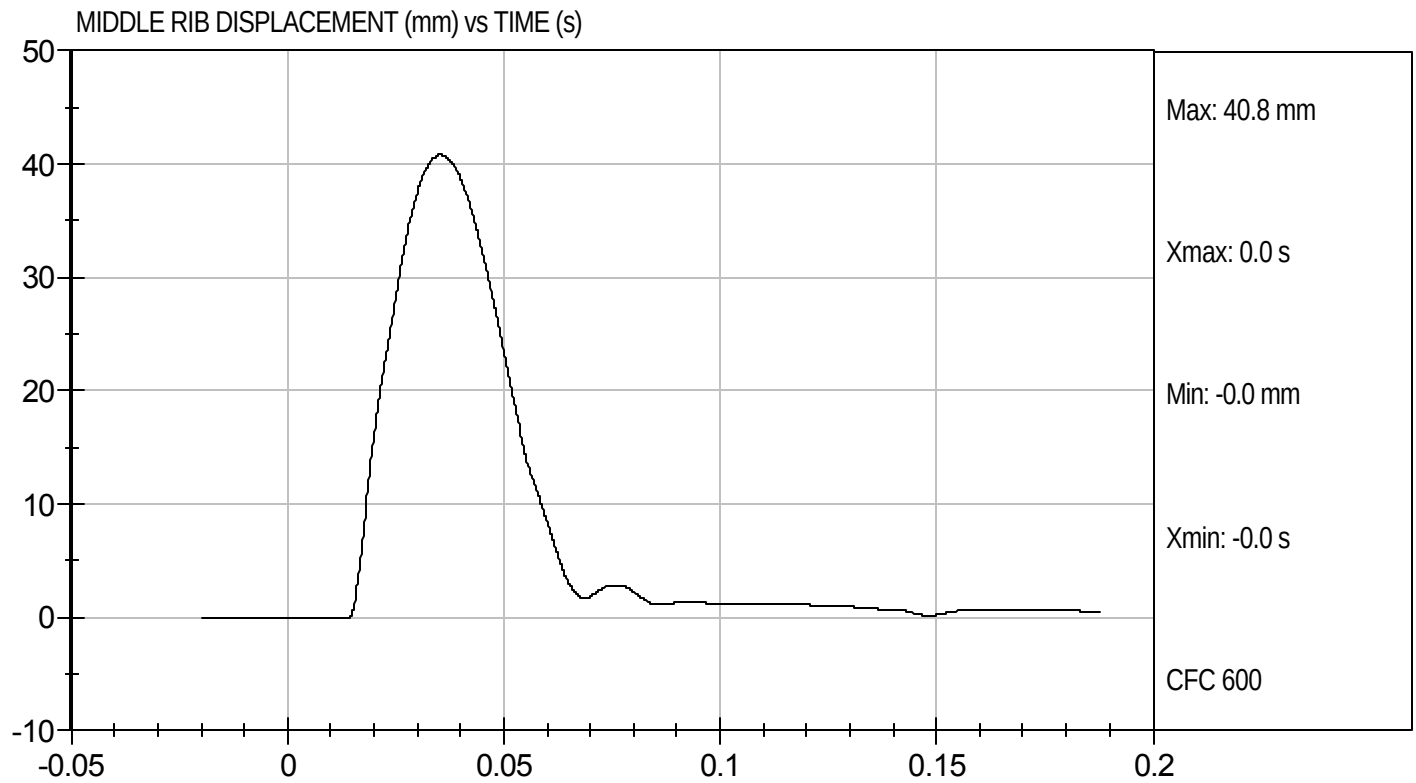
Test Date: 10/19/10
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D103565

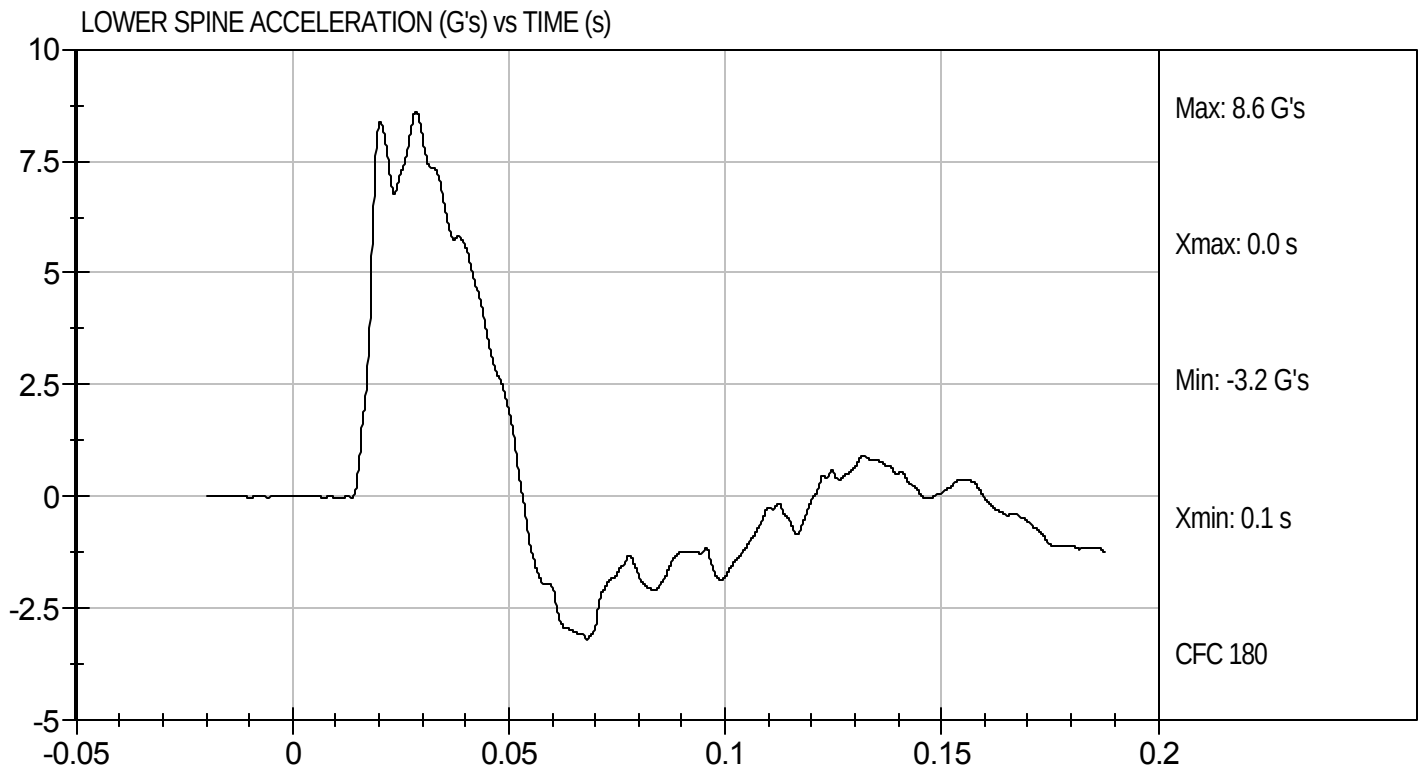
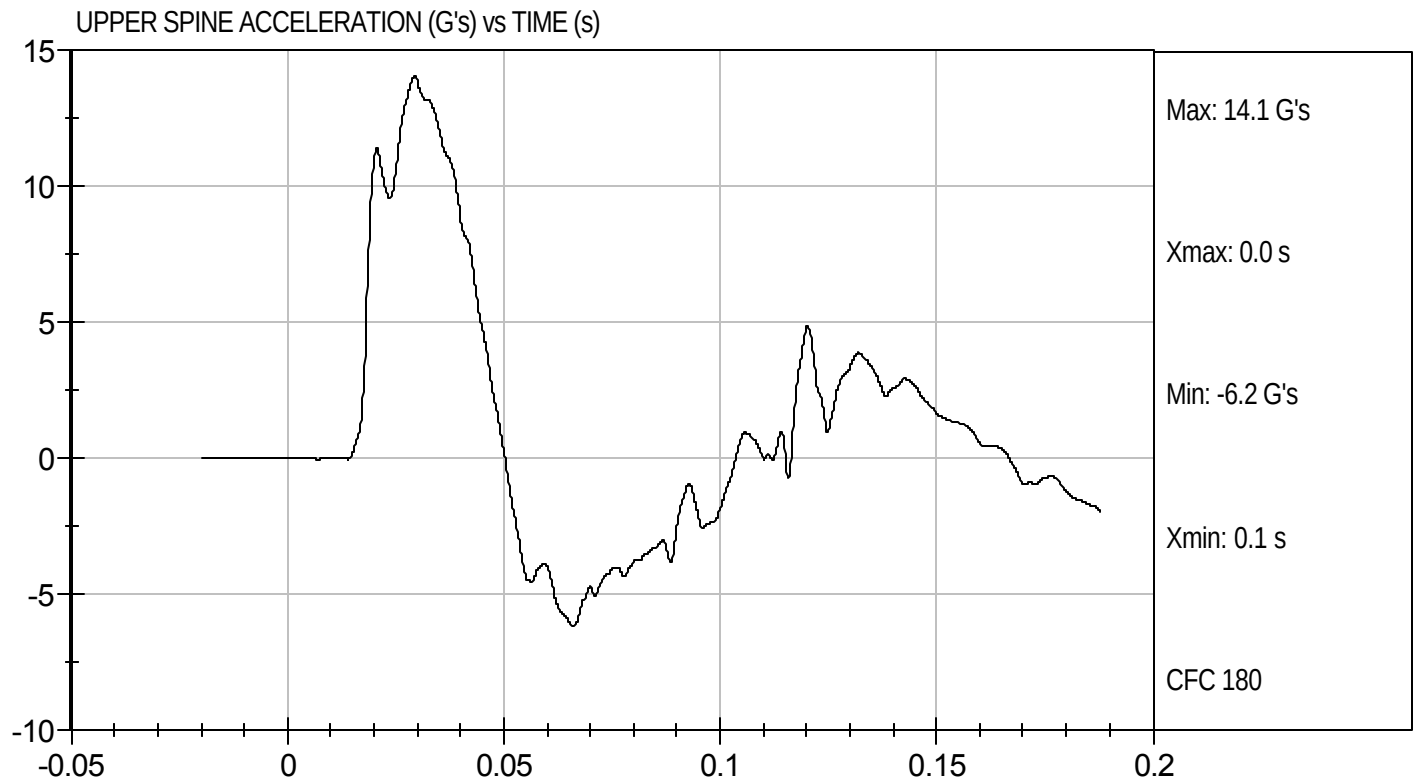
Test Date: 10/19/10
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D103565

Test Date: 10/19/10
Velocity: 14.12 ft/s, 4.30 m/s



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103566

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	33	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	41	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

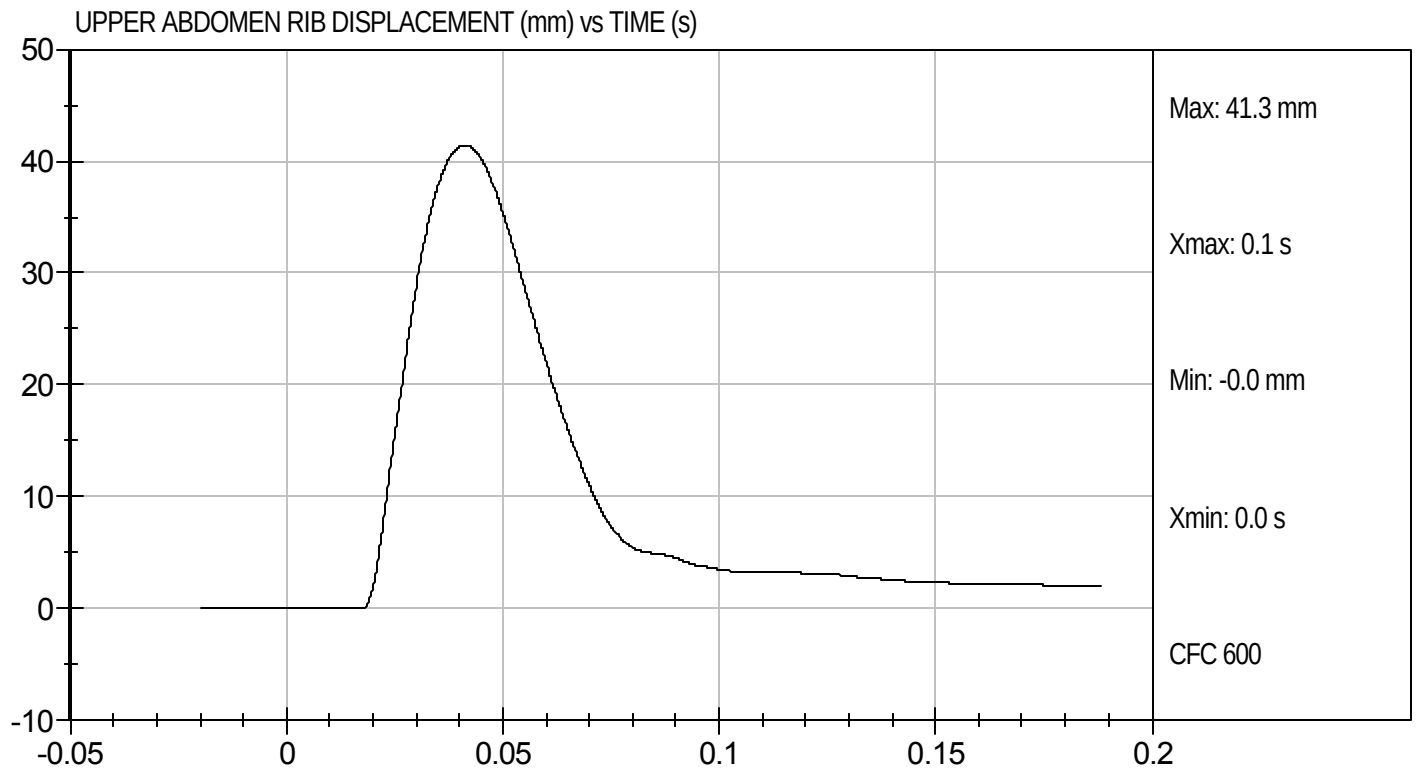
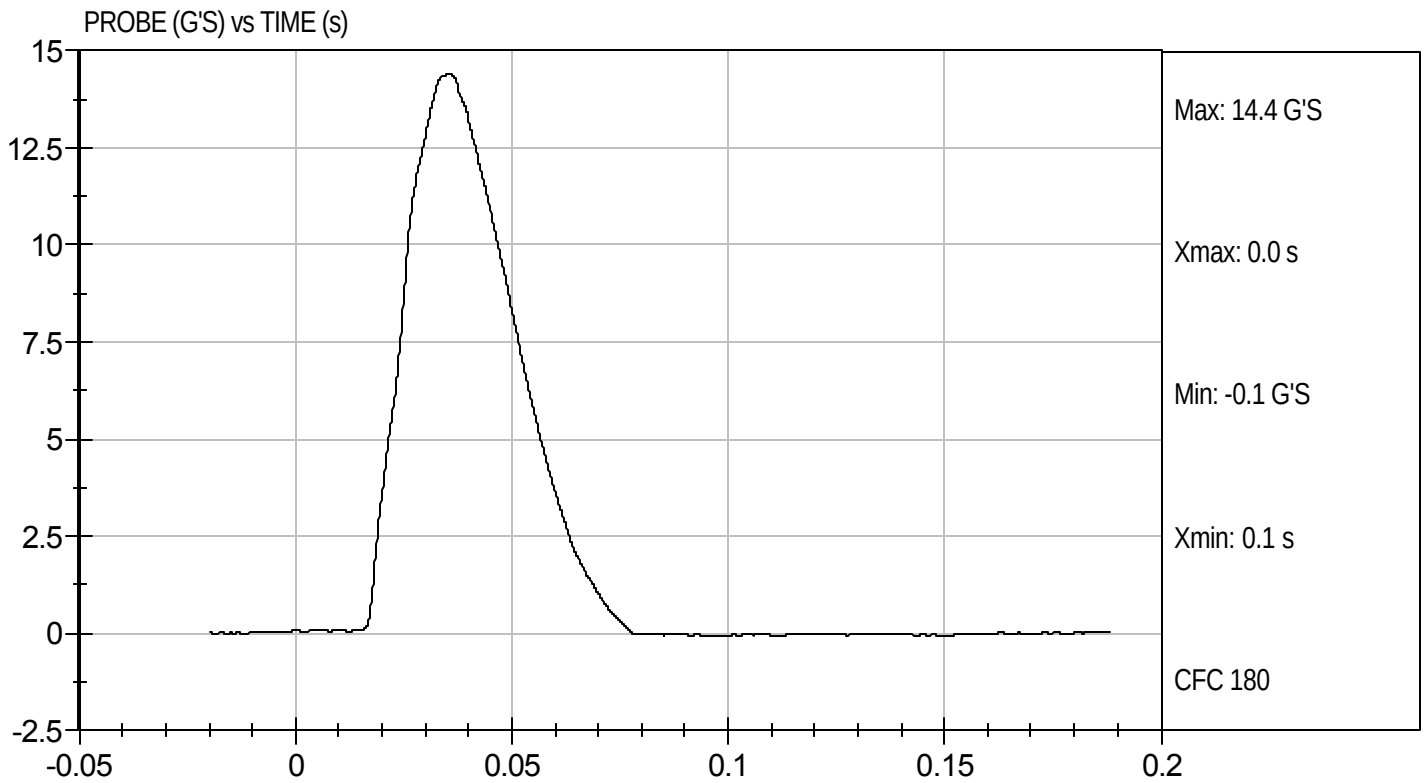
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Abdomen Impact
Component ID: D103566

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s

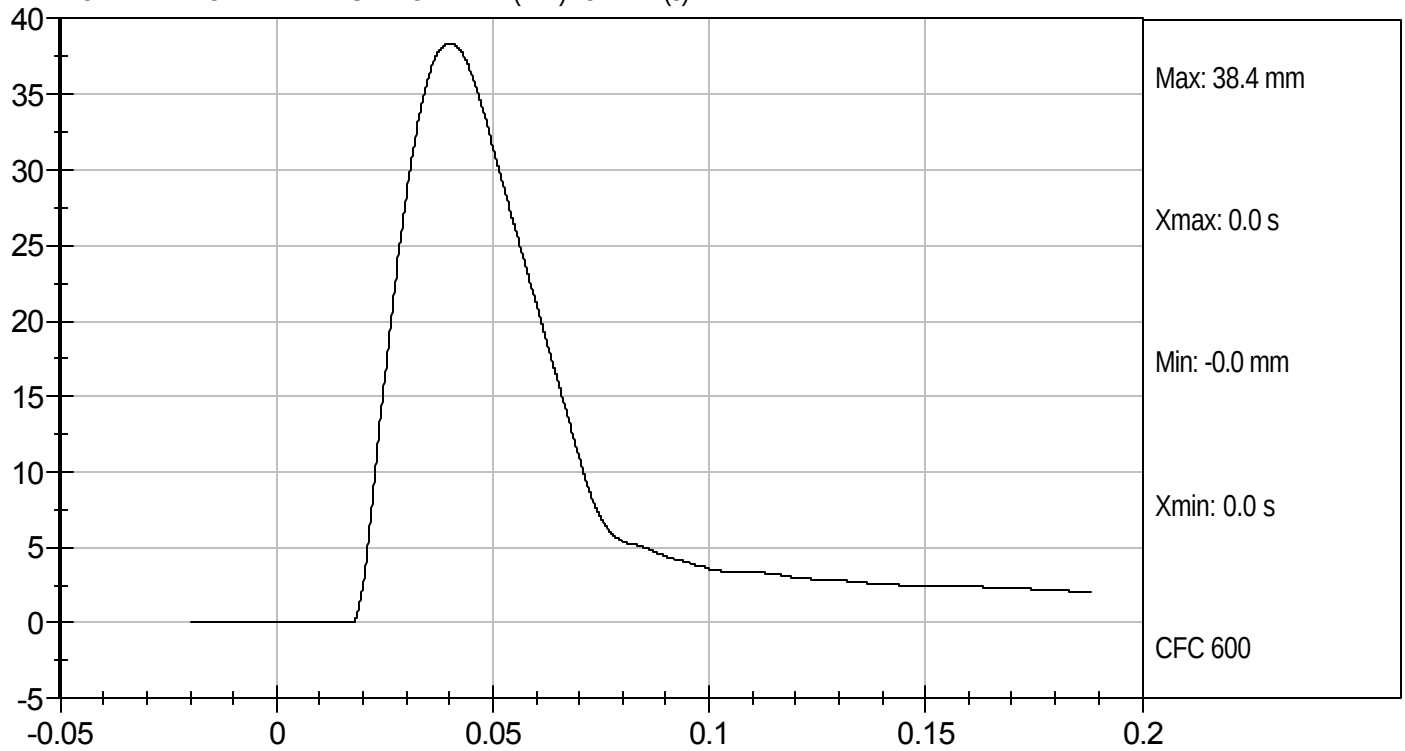




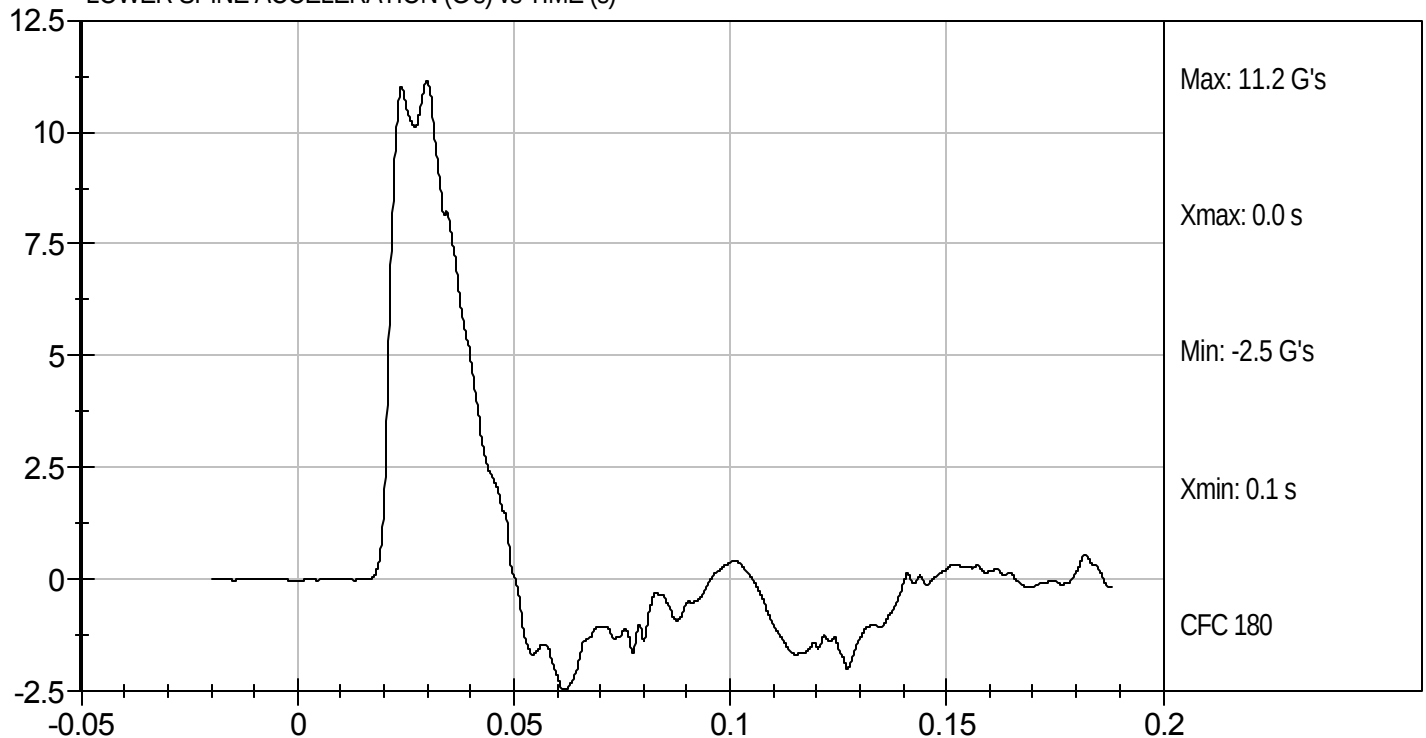
Test Desc: Abdomen Impact
Component ID: D103566

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (s)



LOWER SPINE ACCELERATION (G's) vs TIME (s)



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103567

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	41	Pass
Peak Acetabulum Force	N	3600 to 4300	4047	Pass
Overall Test Results			Pass	


Laboratory Technician

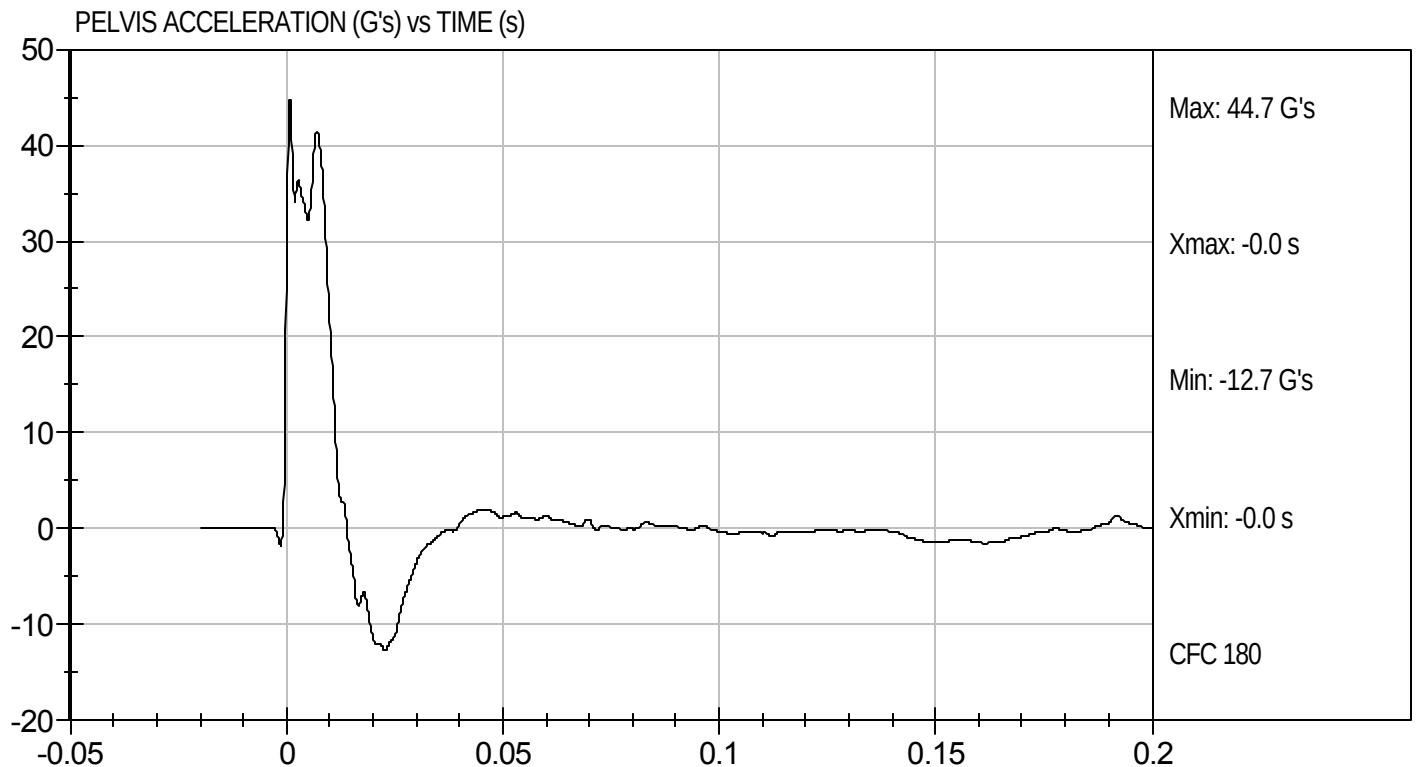
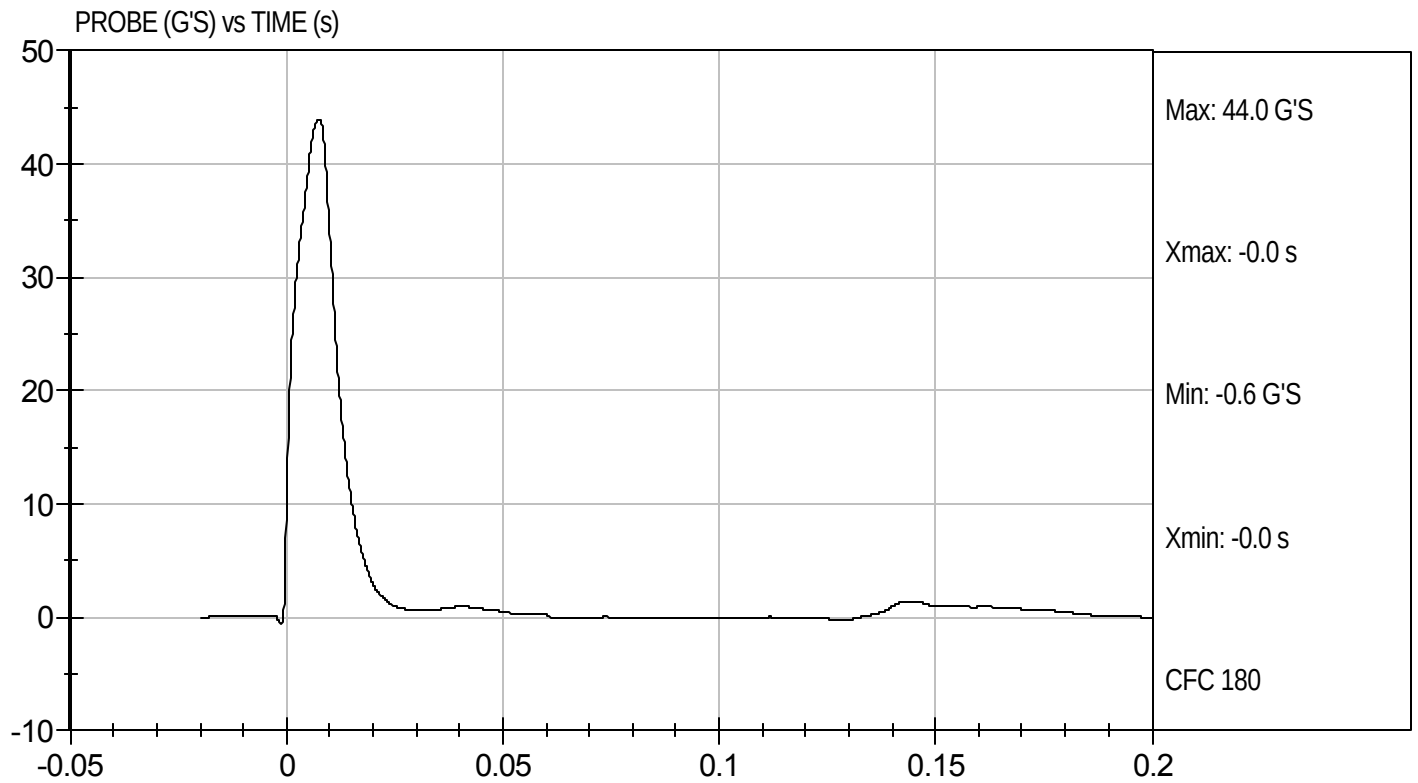
10/19/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D103567

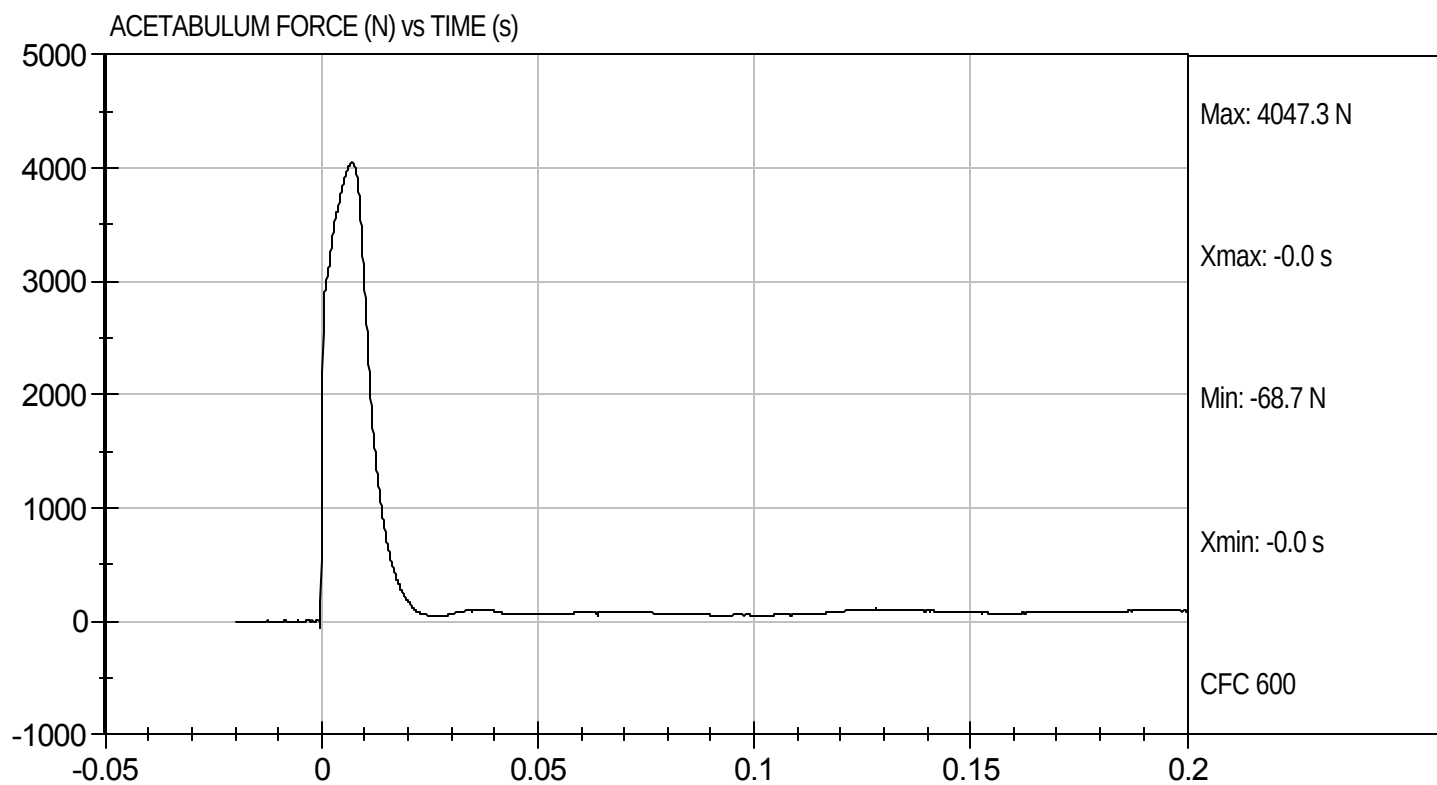
Test Date: 10/19/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D103567

Test Date: 10/19/10
Velocity: 22.22 ft/s, 6.77 m/s



MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103568

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.3	Pass
Humidity	%	10 to 70	34	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	38	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4559	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

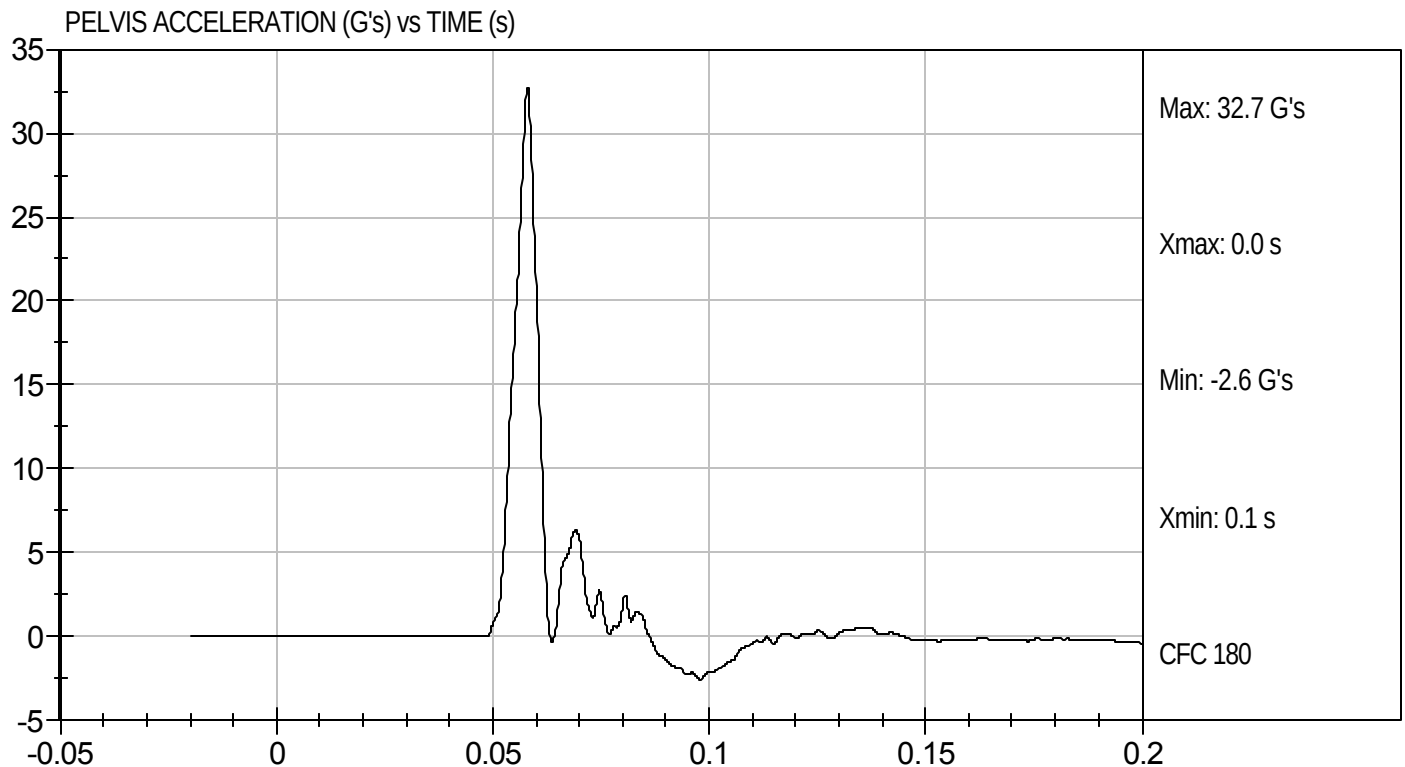
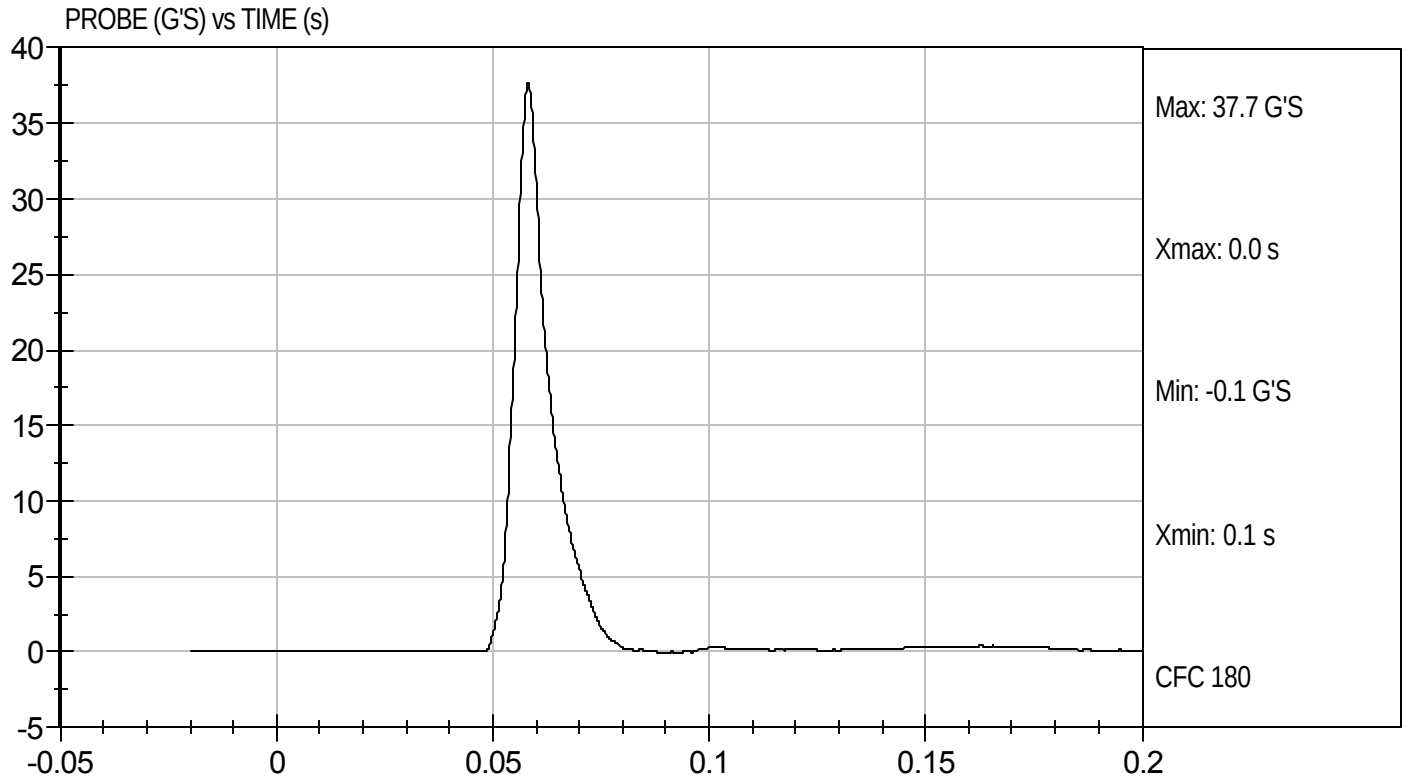
10/19/10
Test Date

David Winkelbauer
Approved By



Test Desc: Iliac Impact
Component ID: D103568

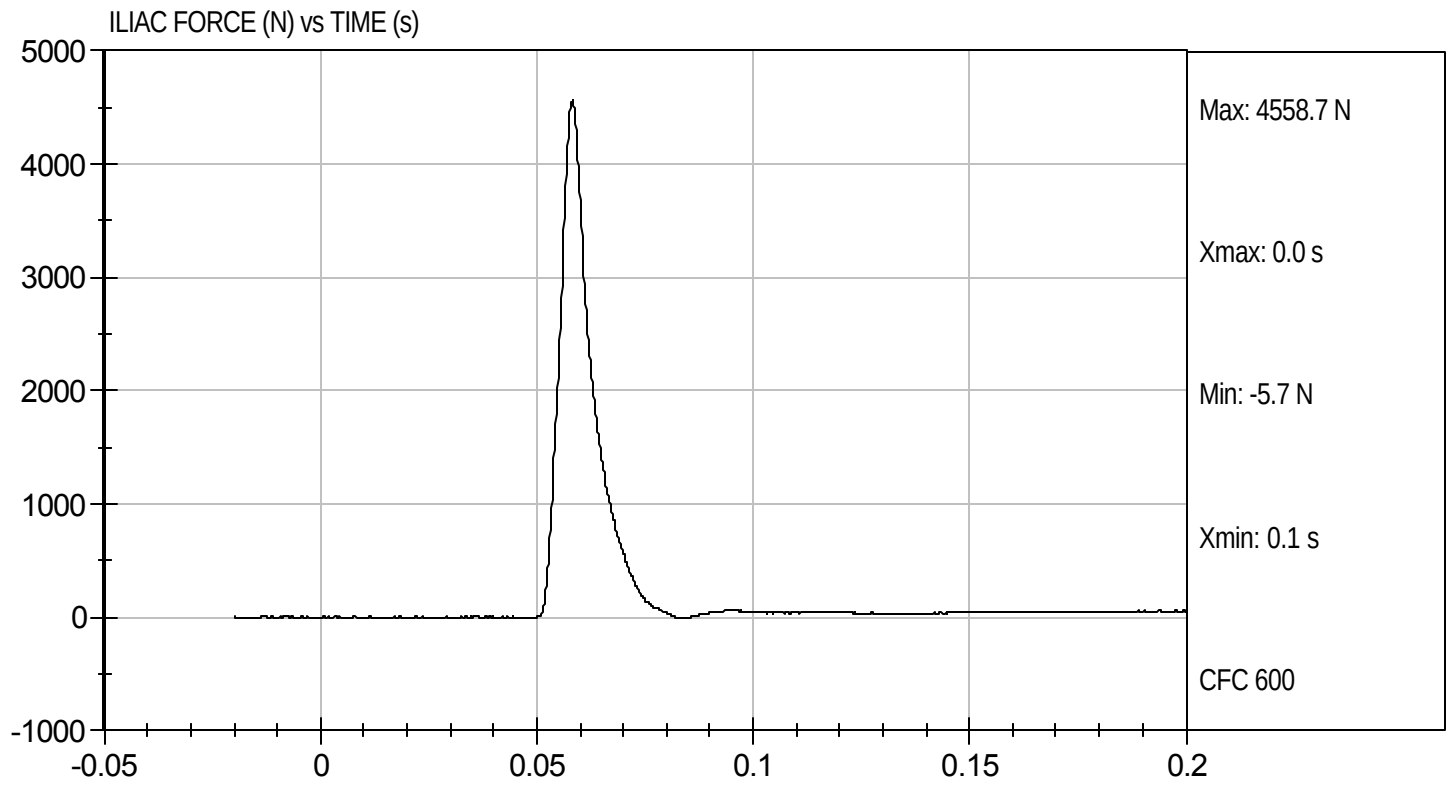
Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103568

Test Date: 10/19/10
Velocity: 14.37 ft/s, 4.38 m/s



MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103721

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.1	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Peak Resultant Acceleration	G's	115 to 137	124	Pass
Peak Lateral Acceleration	G's	+/- 15	2.4	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass



Laboratory Technician

10/29/10
Test Date

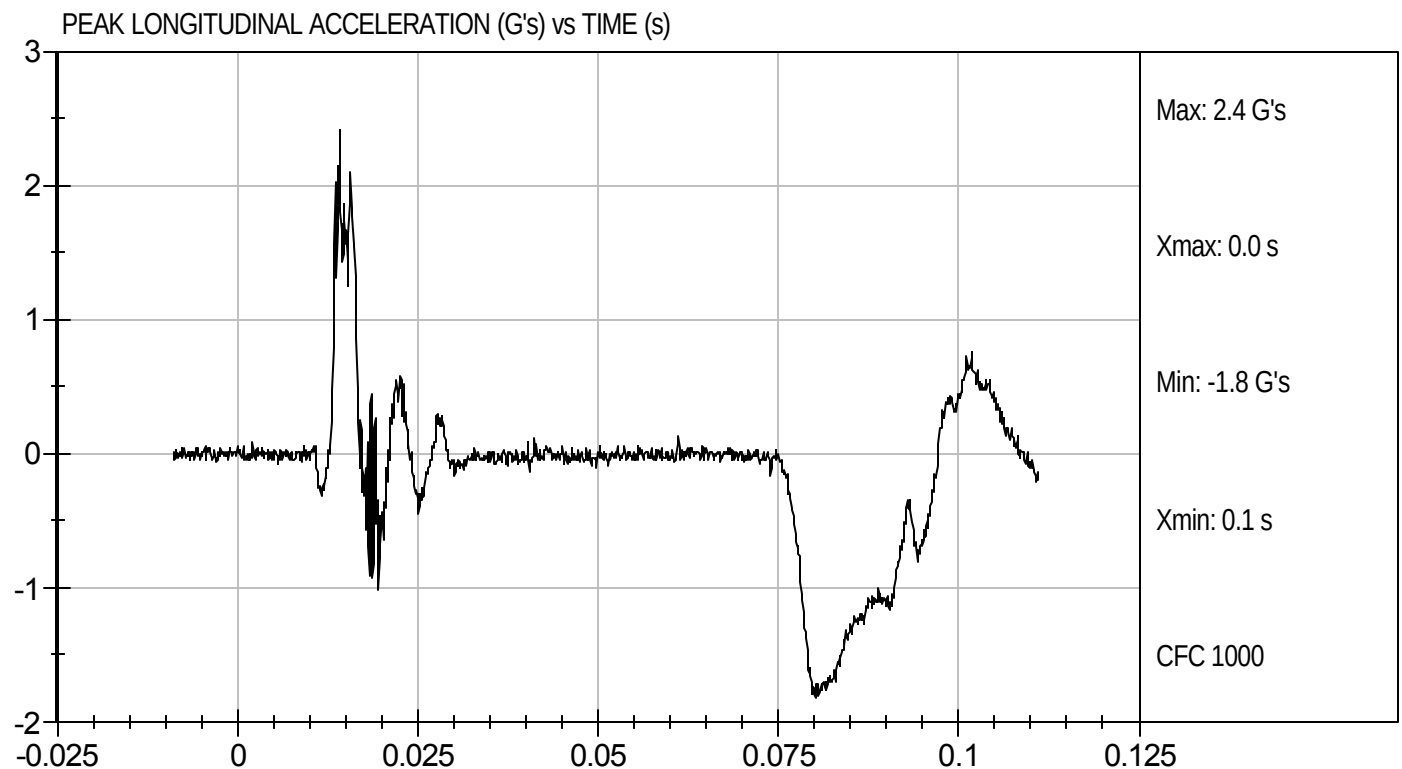
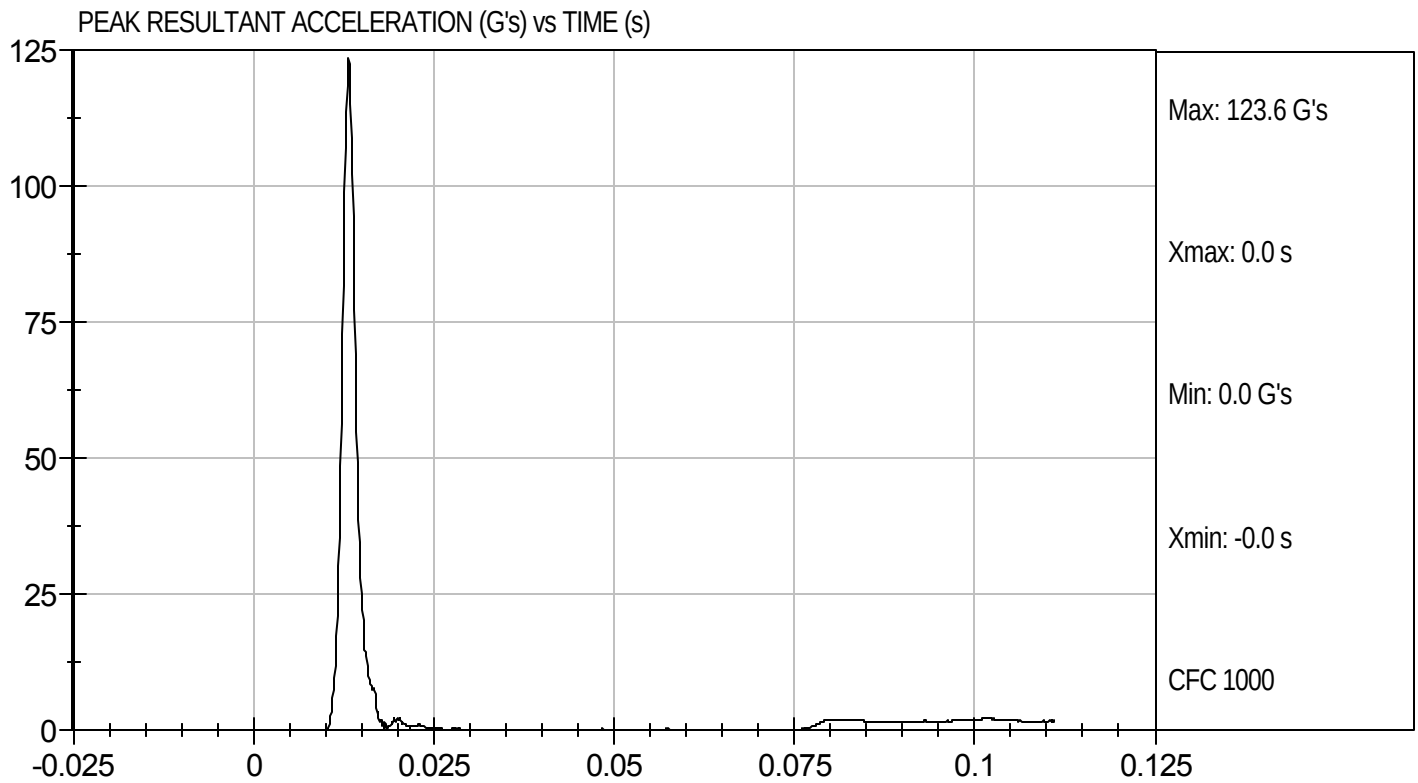


Approved By



Test Desc: Head Drop
Component ID: D103721

Test Date: 10/29/10
Velocity: 0 ft/s, 0 m/s

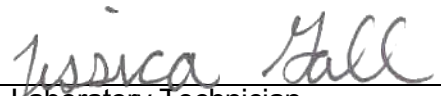


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103722

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	25	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.57	Pass
	15 ms	m/s	3.30 to 4.10	3.60	Pass
	20 ms	m/s	4.40 to 5.40	4.85	Pass
	25 ms	m/s	5.40 to 6.10	5.60	Pass
	25-100 ms	m/s	5.50 to 6.20	5.61	Pass
Maximum D-Plane Rotation		deg	71 to 81	75	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	61	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-44	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	118	Pass
Overall Test Results				Pass	


 Laboratory Technician

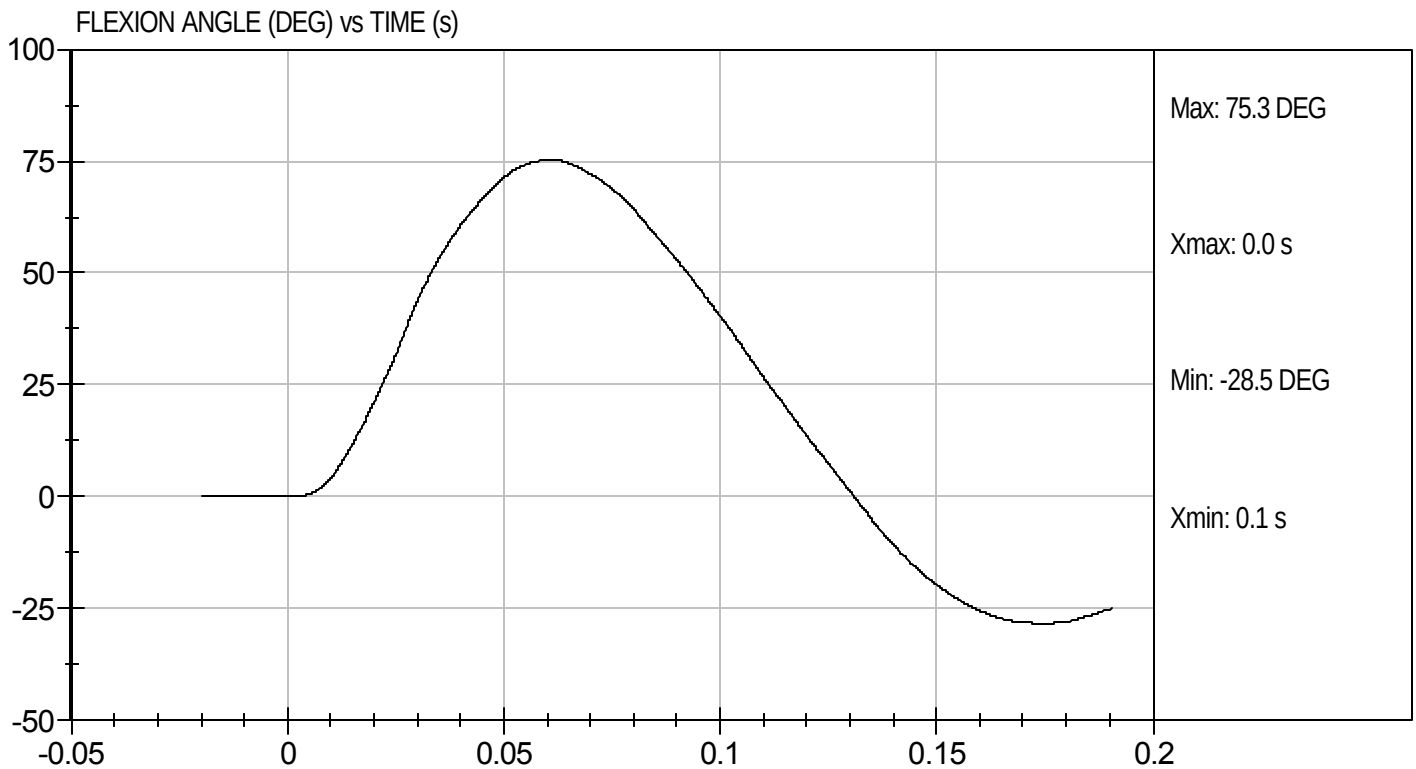
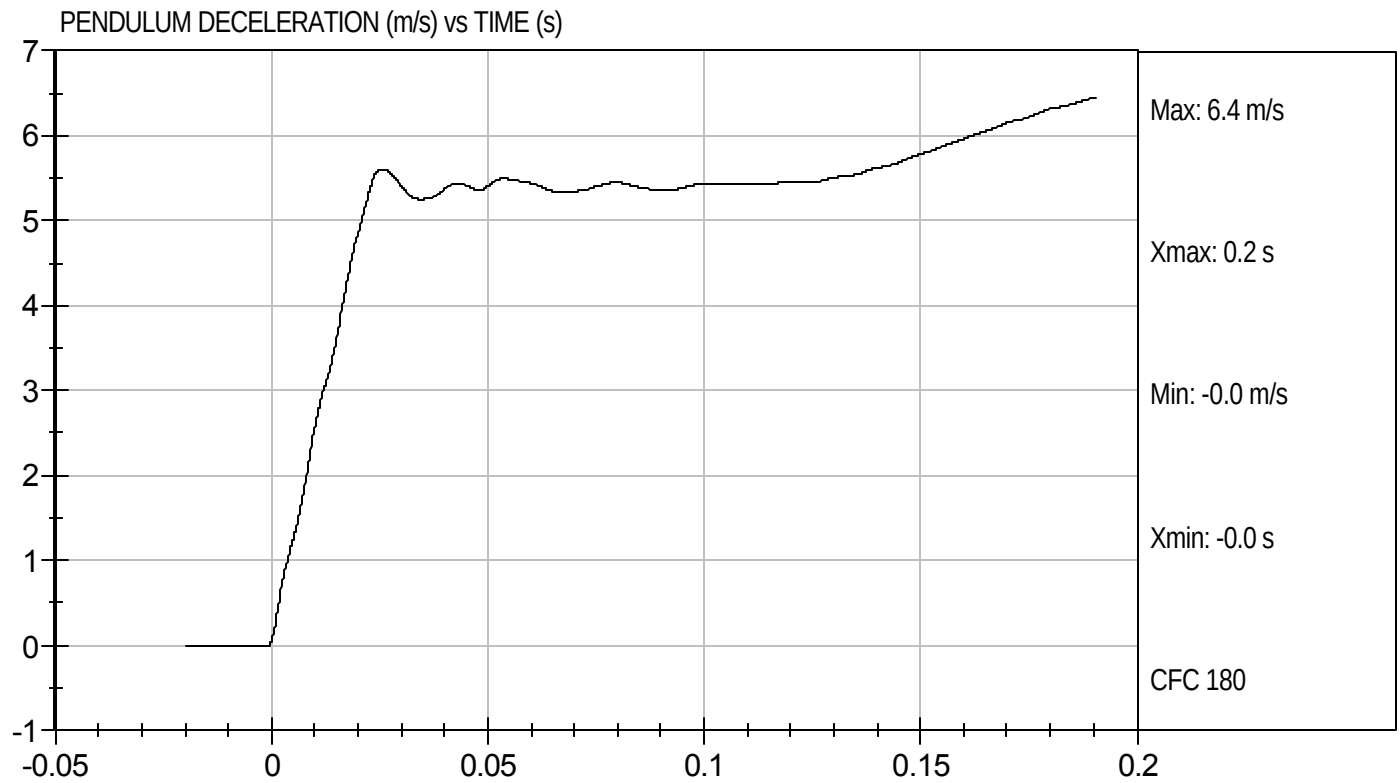
10/29/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D103722

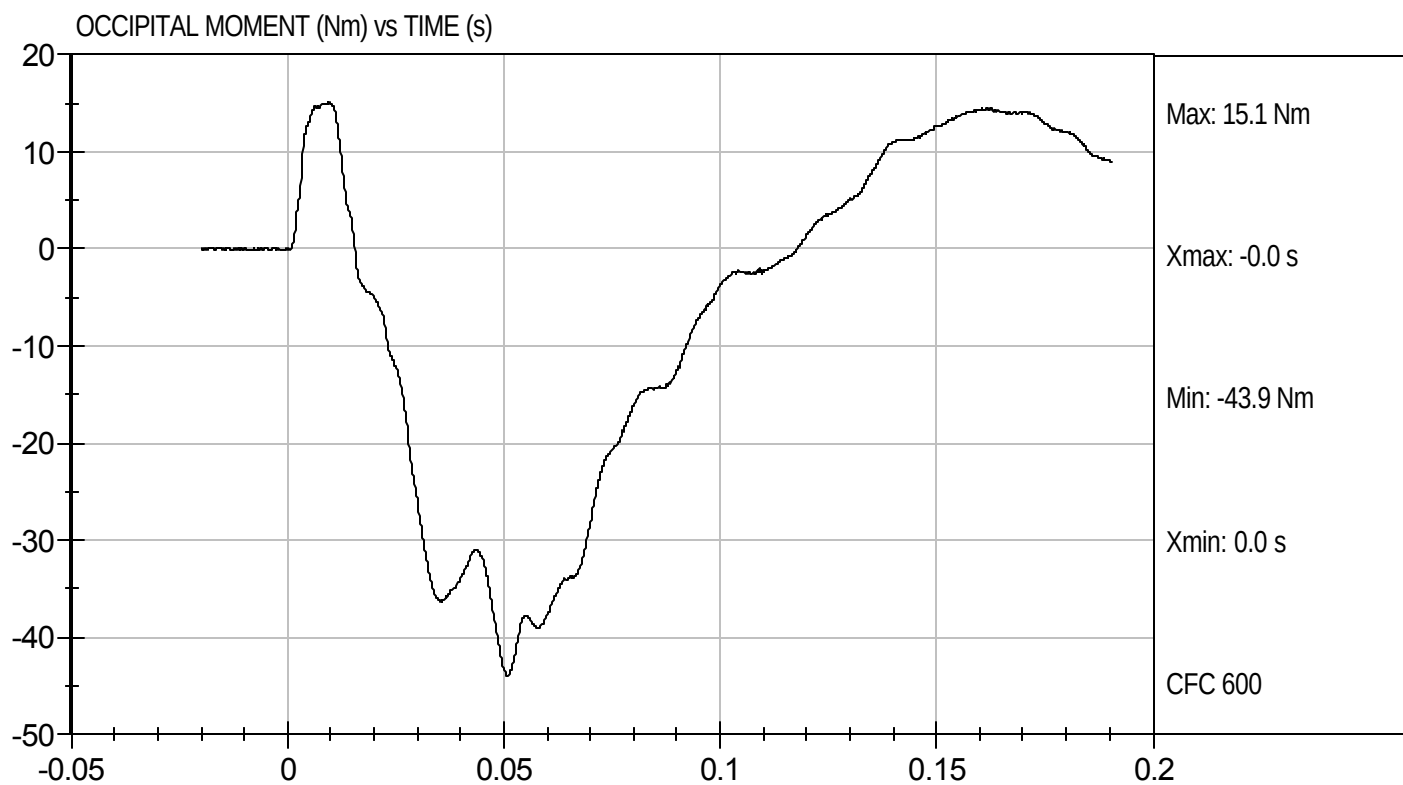
Test Date: 10/29/10
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D103722

Test Date: 10/29/10
Velocity: 18.32 ft/s, 5.58 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-11s BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D103723

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
			Overall Test Results	Pass


Laboratory Technician

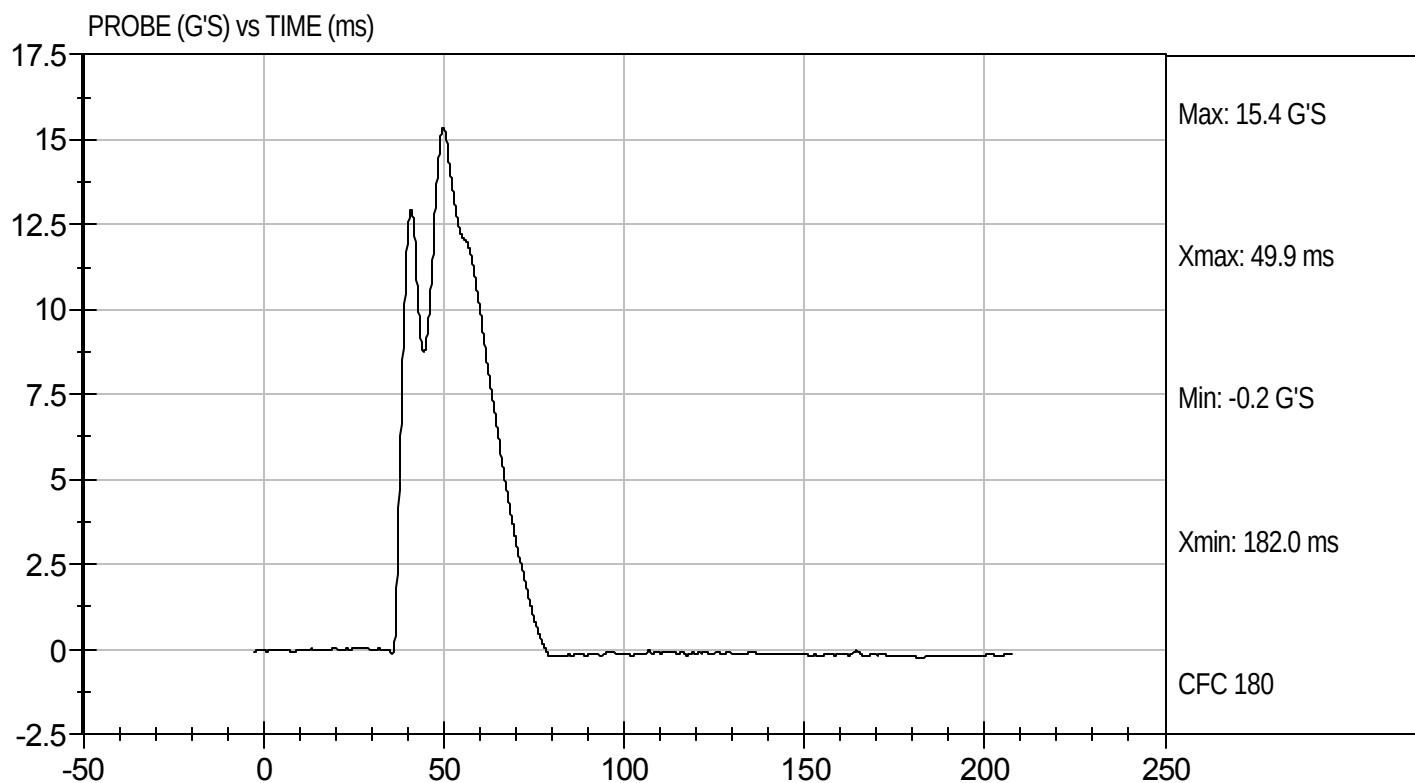
10/29/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D103723

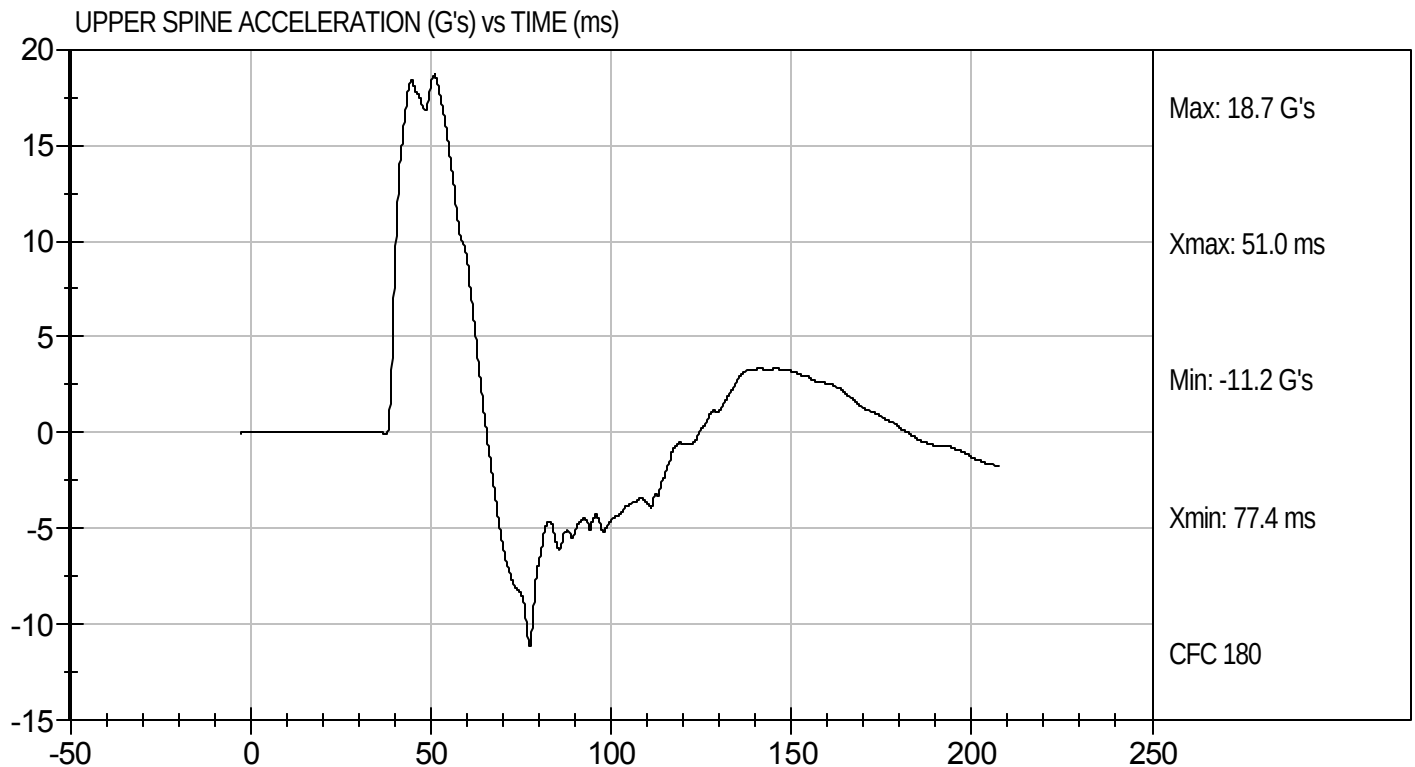
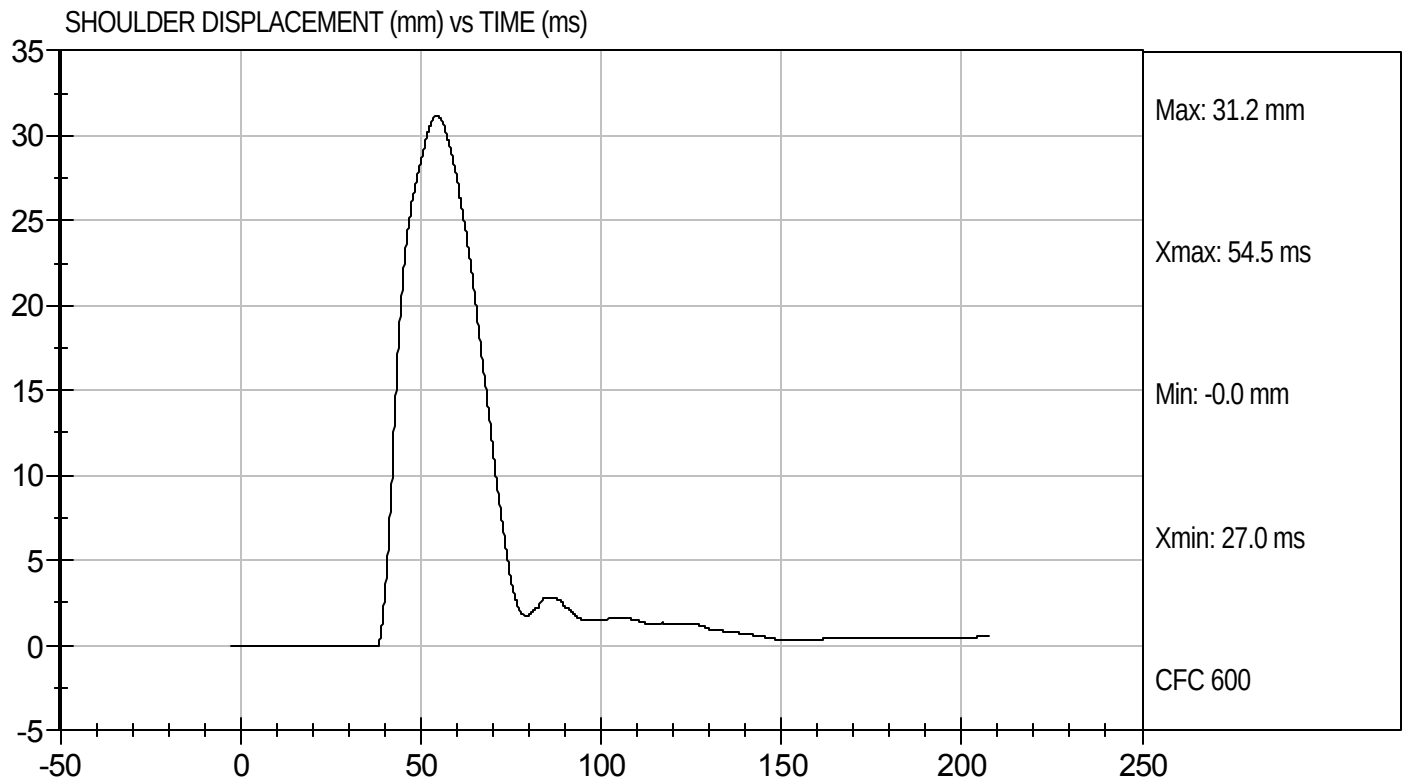
Test Date: 10/29/10
Velocity: 14.00 ft/s, 4.27 m/s





Test Desc: Shoulder Impact
Component ID: D103723

Test Date: 10/29/10
Velocity: 14.00 ft/s, 4.27 m/s



MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103724

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	6.60 to 6.80	6.68	Pass
Peak Impactor Acceleration	G's	30 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	35	Pass
Upper Rib Displacement	mm	25 to 32	27	Pass
Middle Rib Displacement	mm	30 to 36	31	Pass
Lower Rib Displacement	mm	32 to 38	33	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	33	Pass
Overall Test Results				Pass


Laboratory Technician

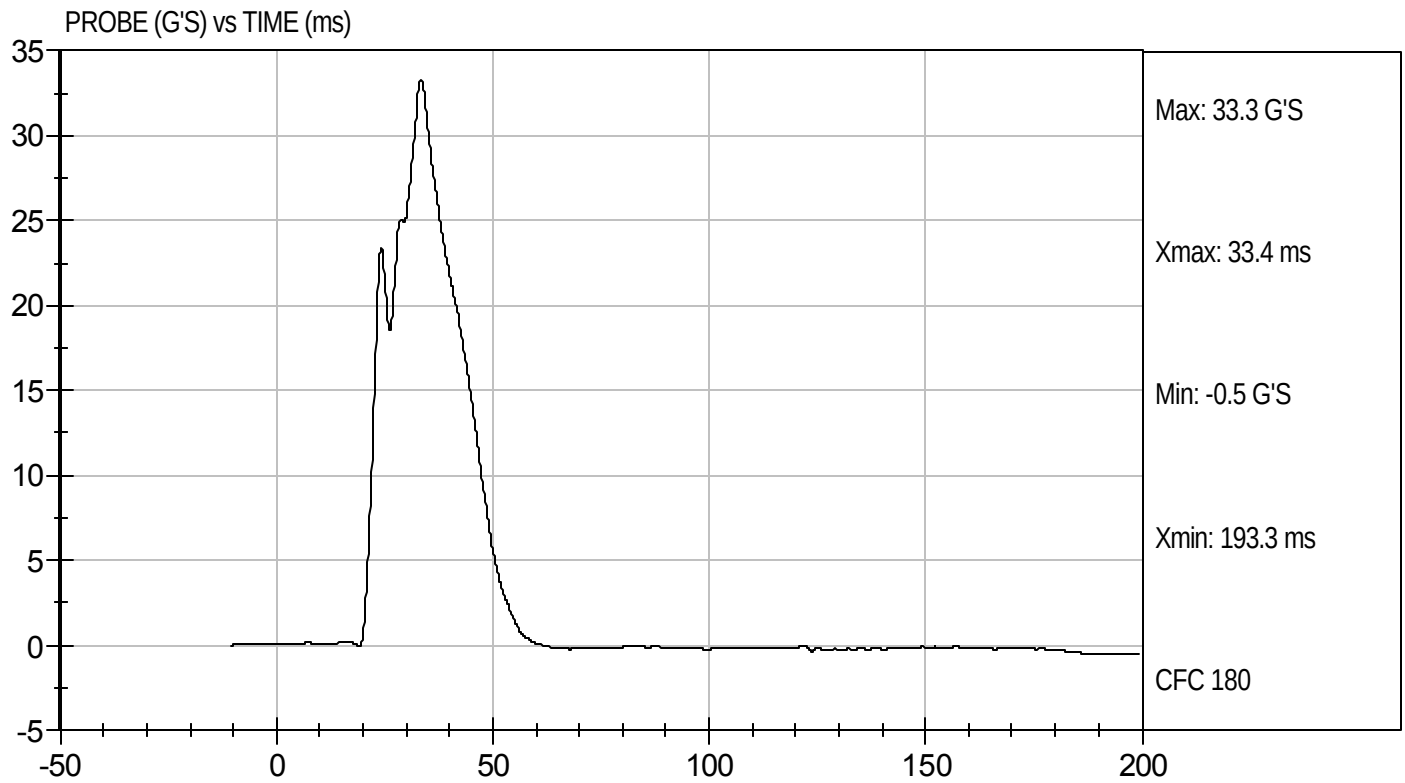
10/29/10
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D103724

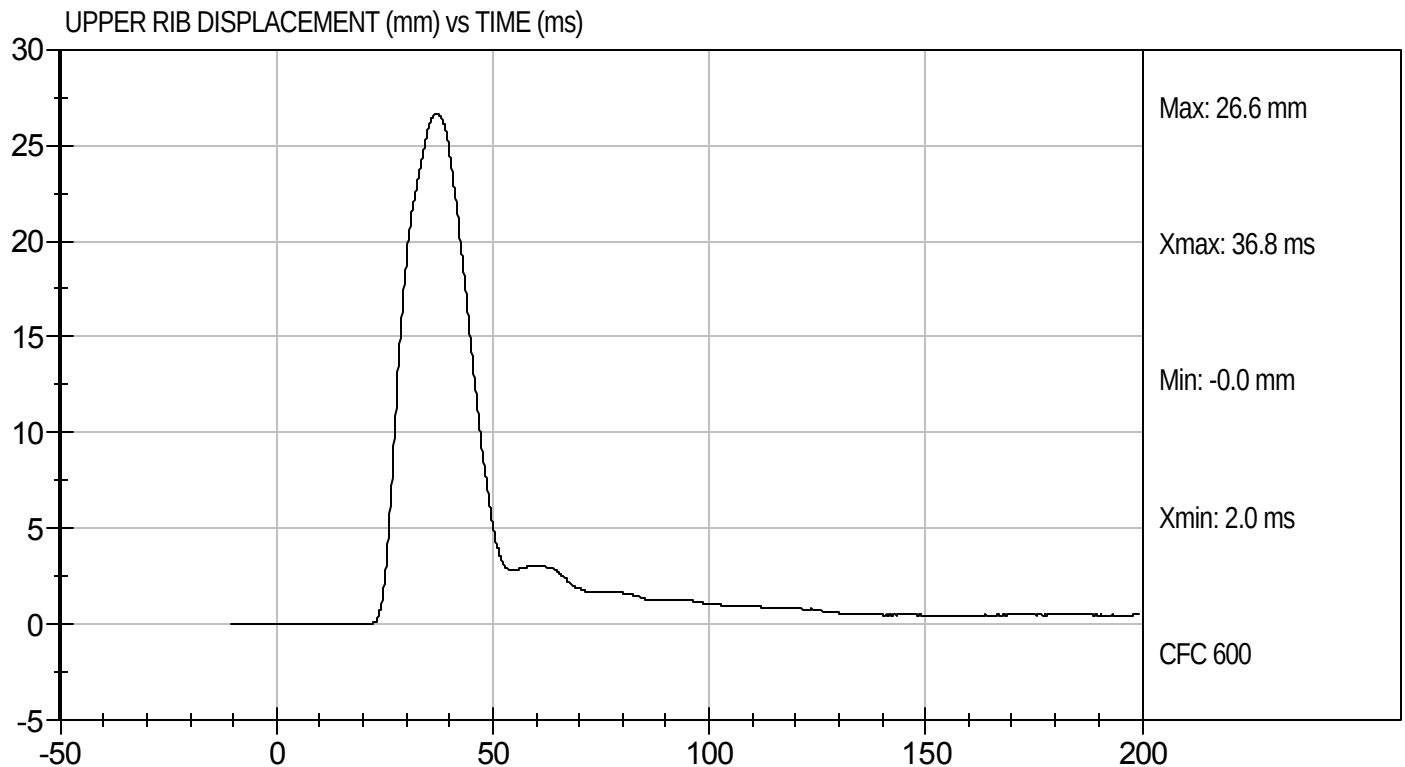
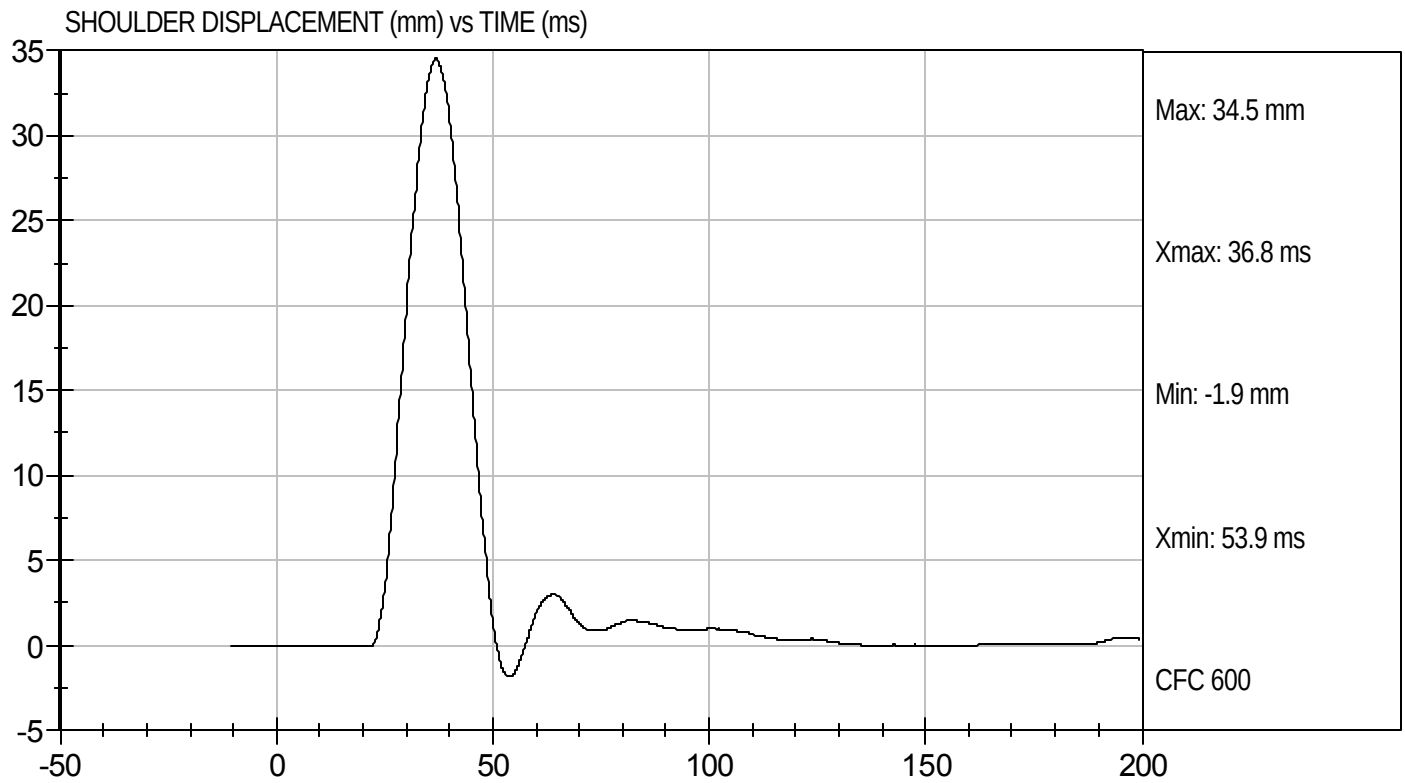
Test Date: 10/29/10
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103724

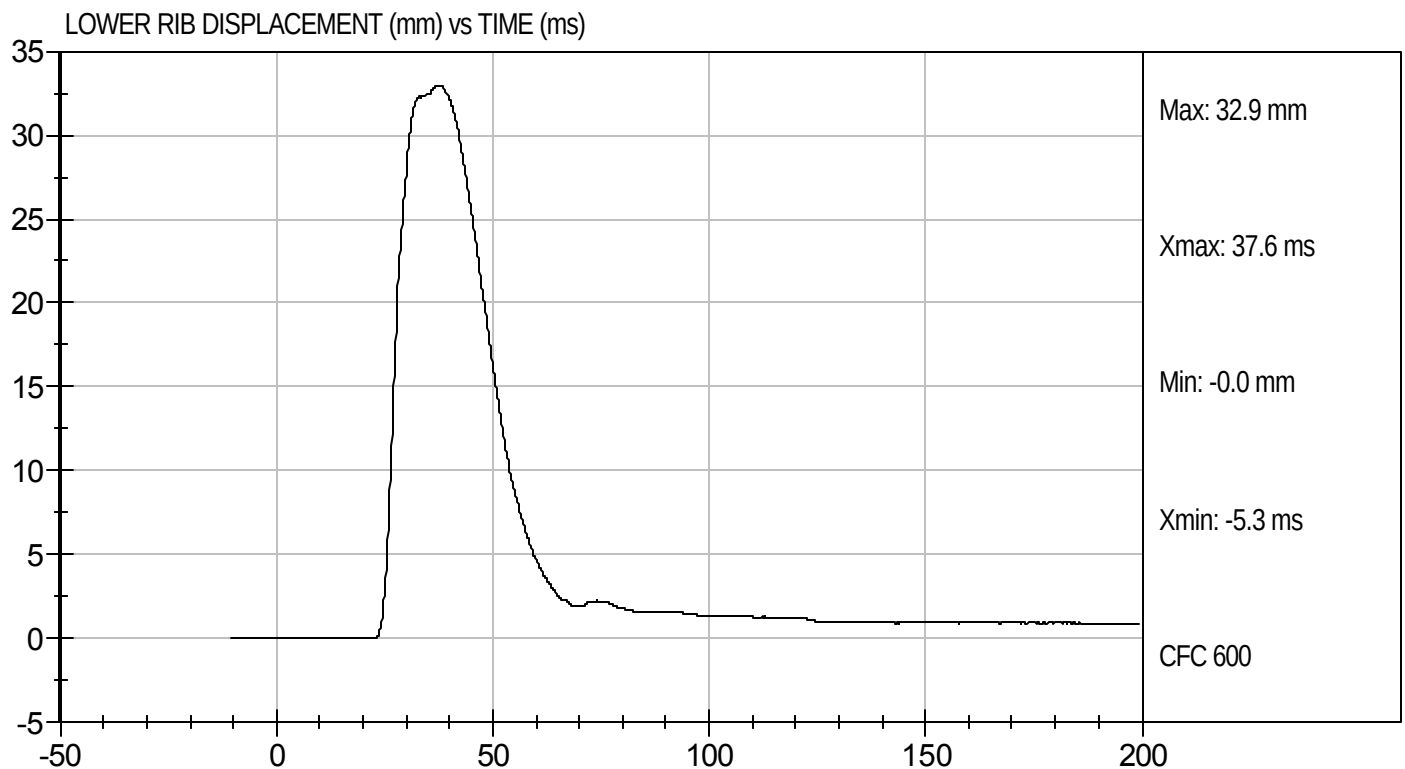
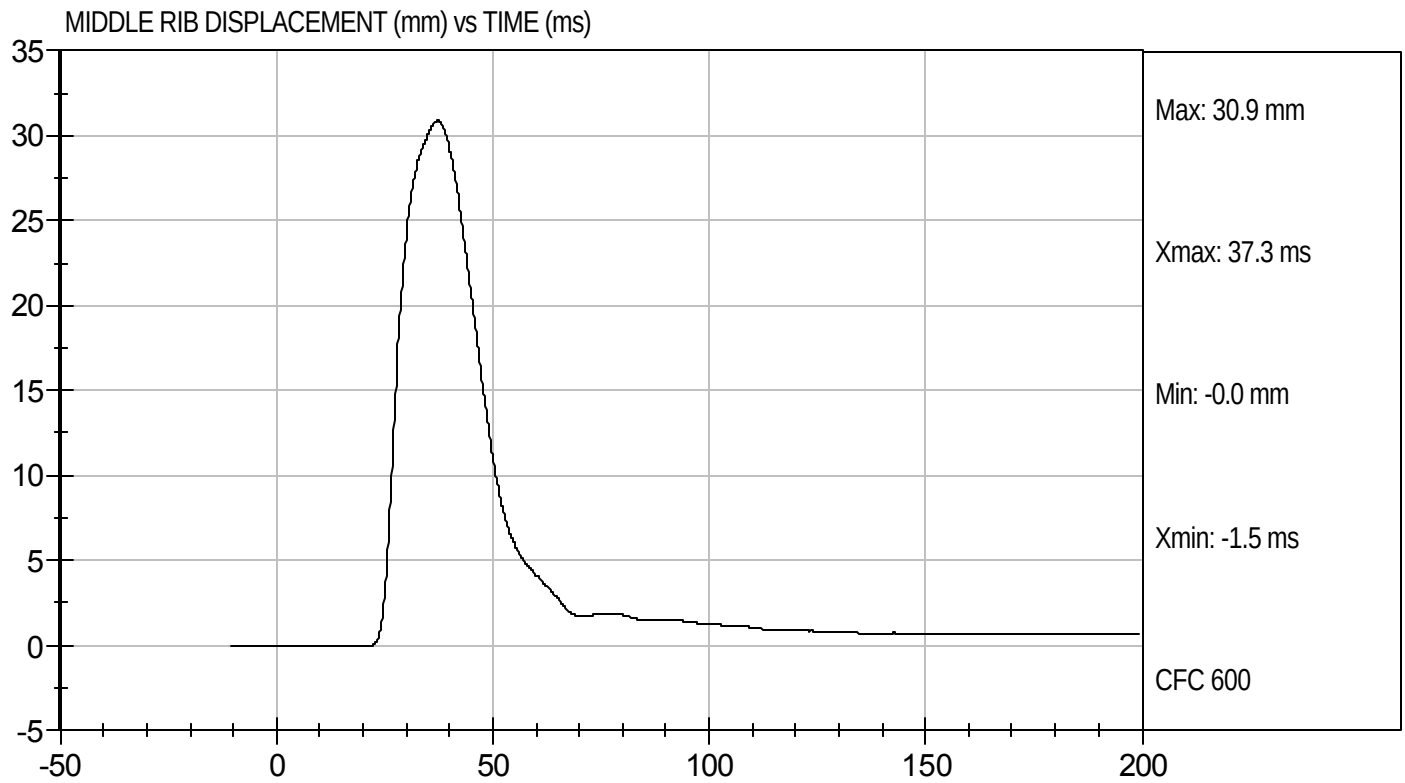
Test Date: 10/29/10
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103724

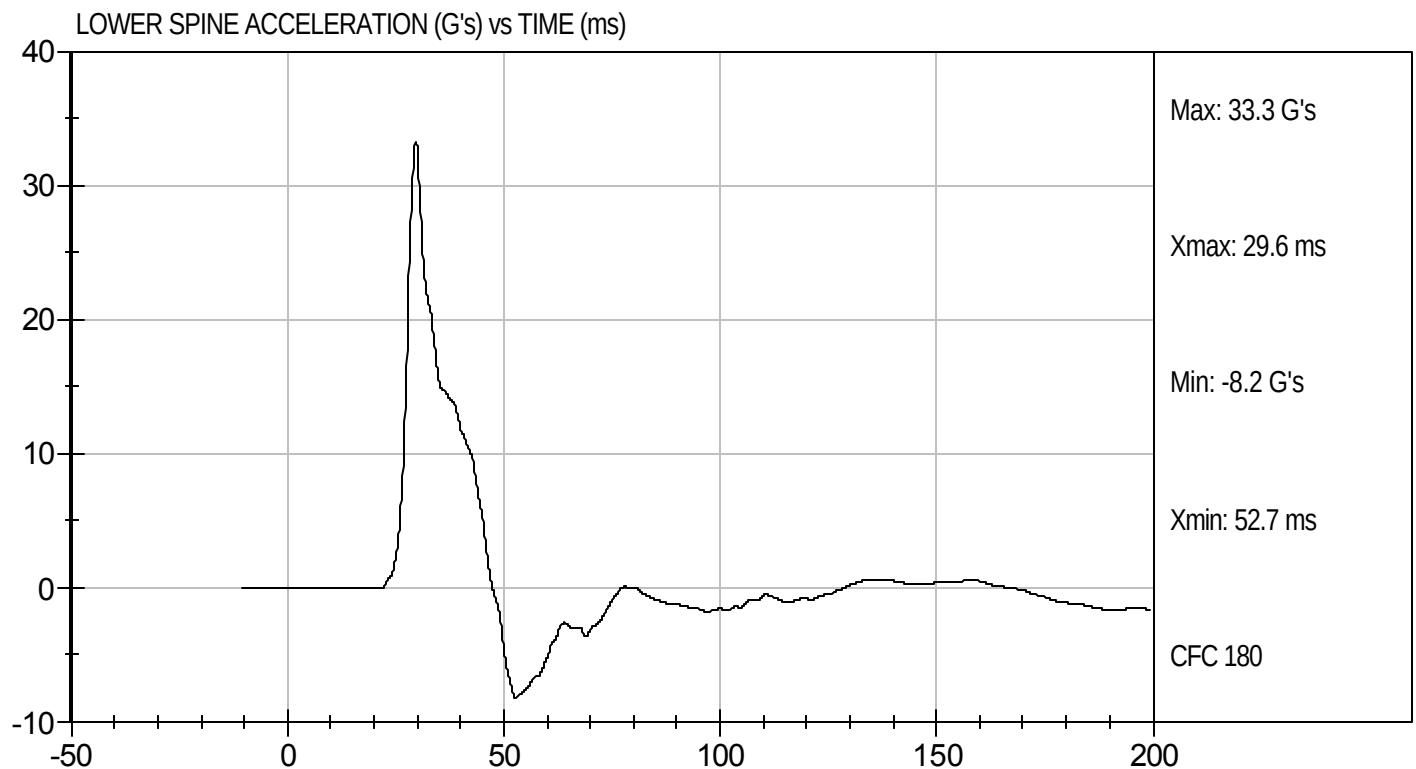
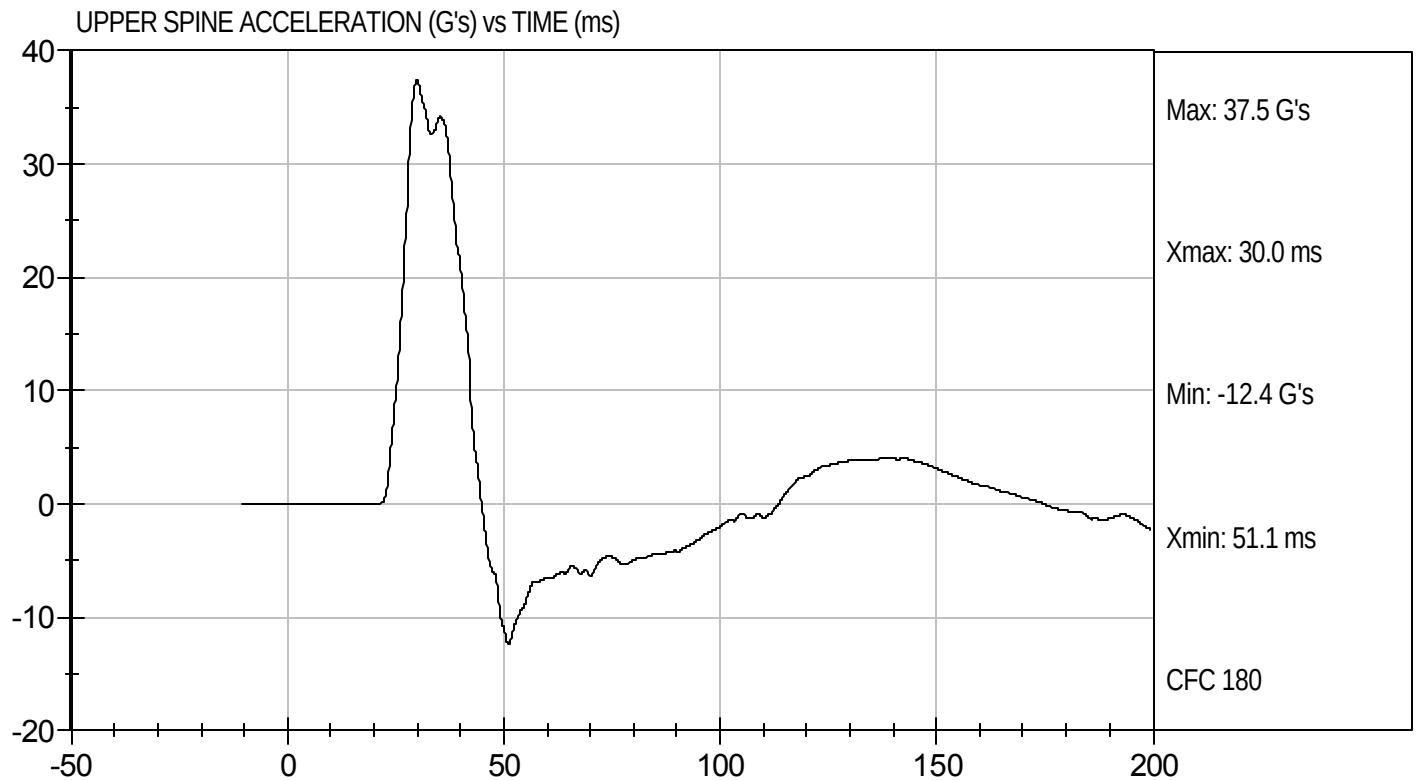
Test Date: 10/29/10
Velocity: 21.9 ft/s, 6.68 m/s





Test Desc: Thorax With Arm
Component ID: D103724

Test Date: 10/29/10
Velocity: 21.9 ft/s, 6.68 m/s

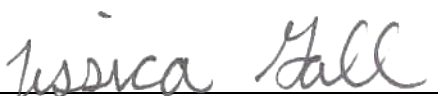


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103725

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	34	Pass
Middle Rib Displacement	mm	39 to 45	40	Pass
Lower Rib Displacement	mm	35 to 43	38	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	14	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
Overall Test Results				Pass


Laboratory Technician

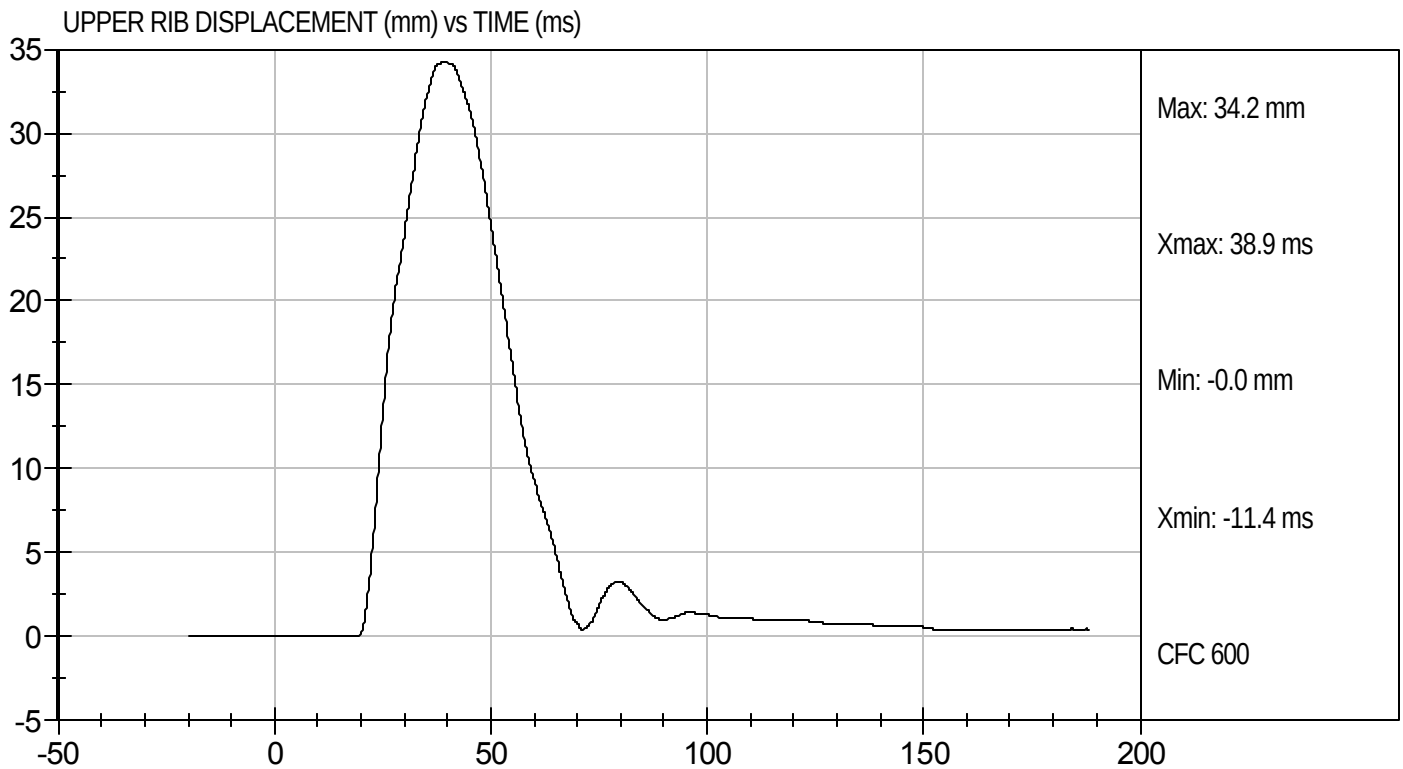
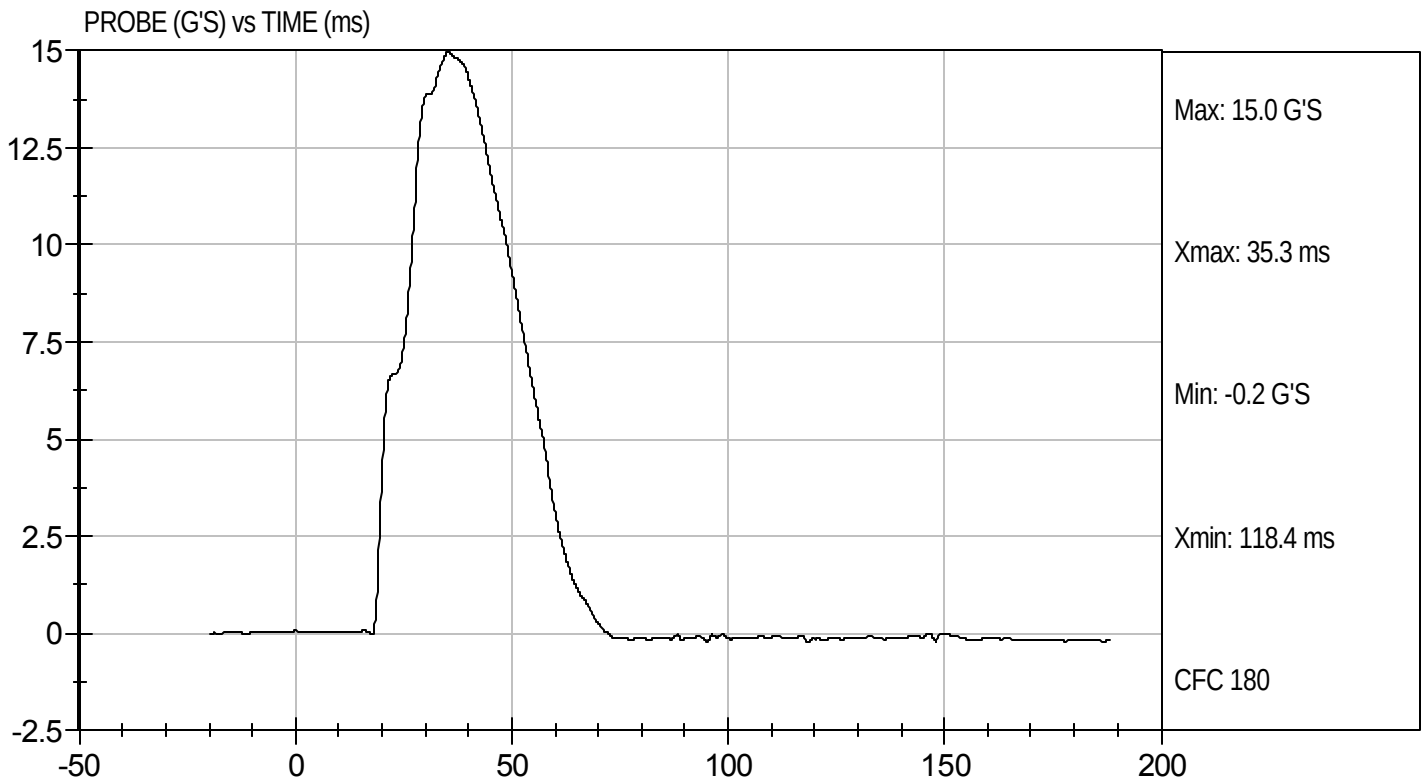
10/29/10
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D103725

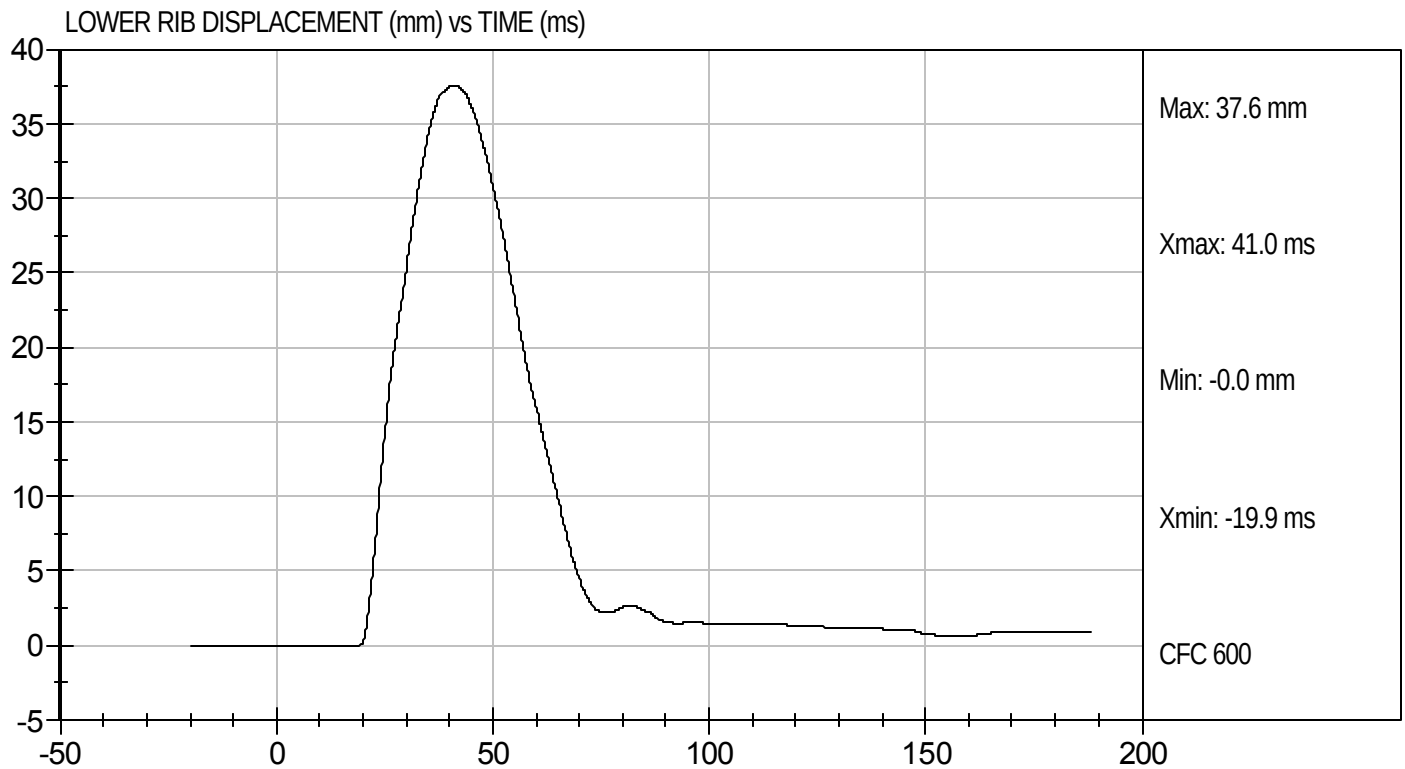
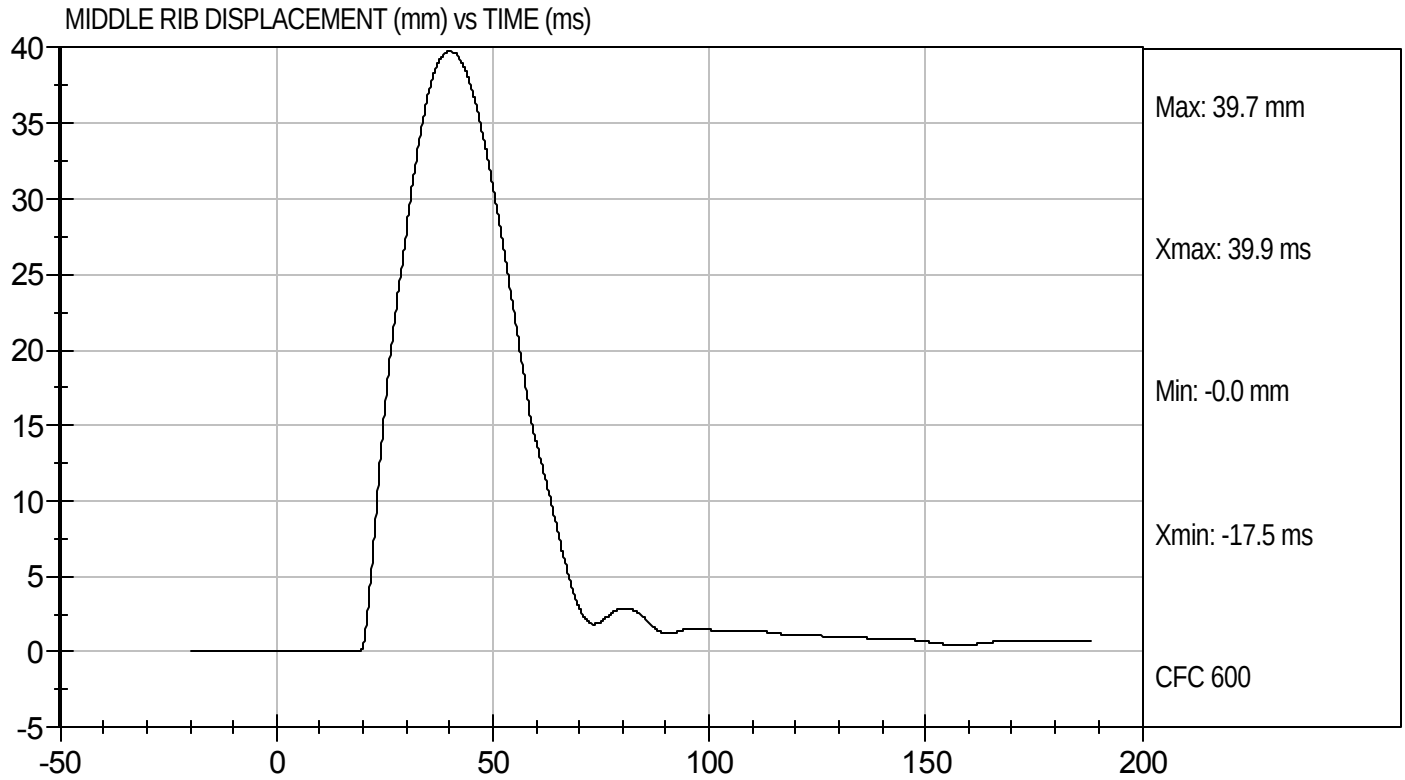
Test Date: 10/29/10
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D103725

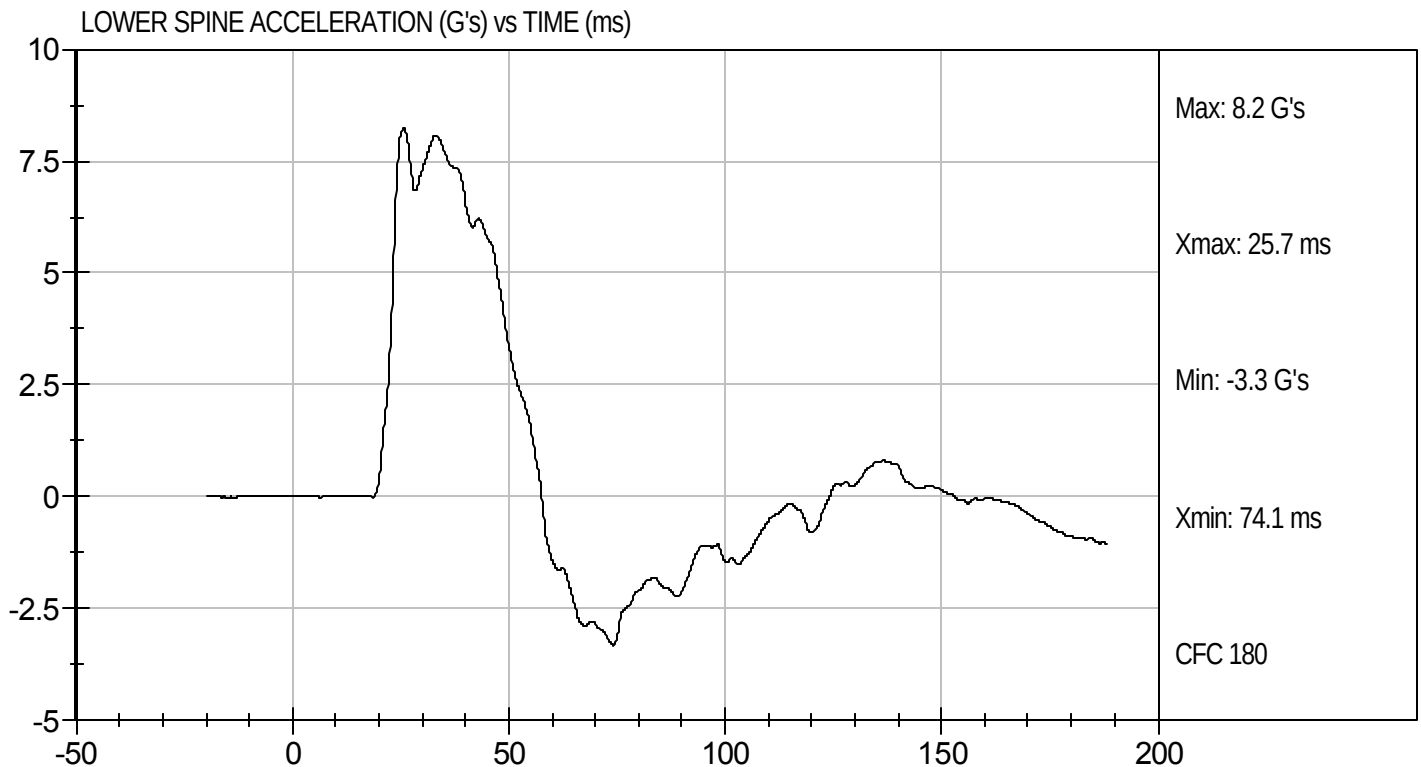
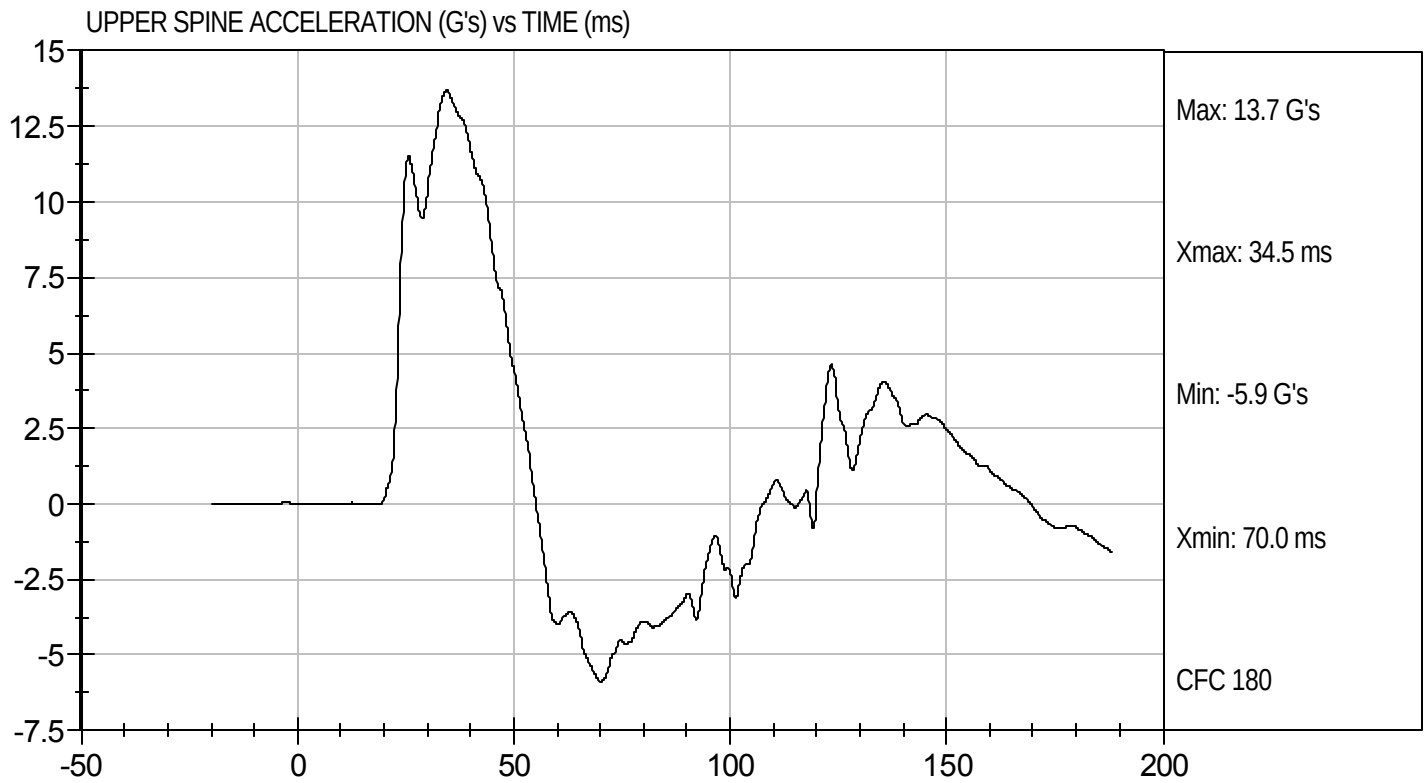
Test Date: 10/29/10
Velocity: 14.24 ft/s, 4.34 m/s





Test Desc: Thorax Without Arm
Component ID: D103725

Test Date: 10/29/10
Velocity: 14.24 ft/s, 4.34 m/s



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103726

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	12 to 16	14	Pass
Upper Rib Displacement	mm	36 to 47	40	Pass
Lower Rib Displacement	mm	33 to 44	38	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
			Overall Test Results	Pass


Laboratory Technician

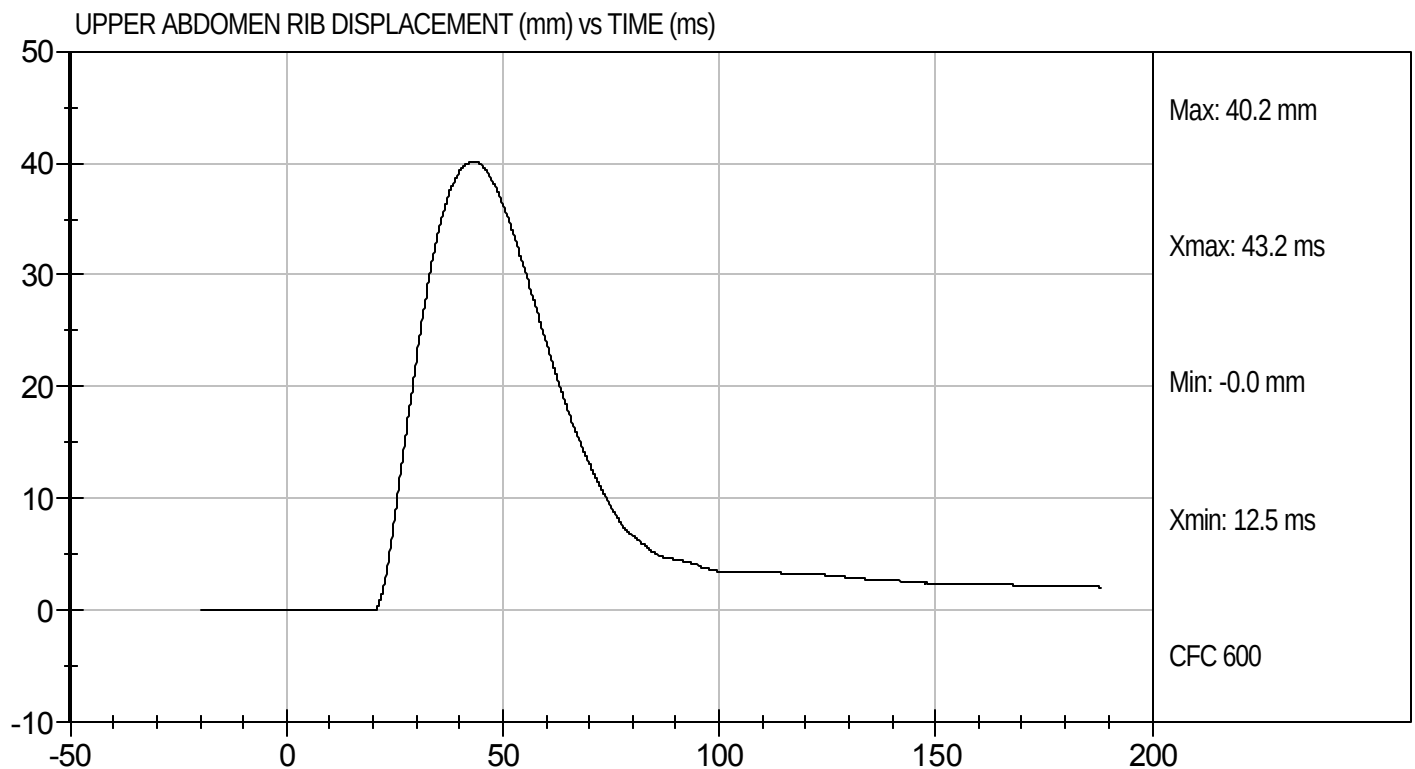
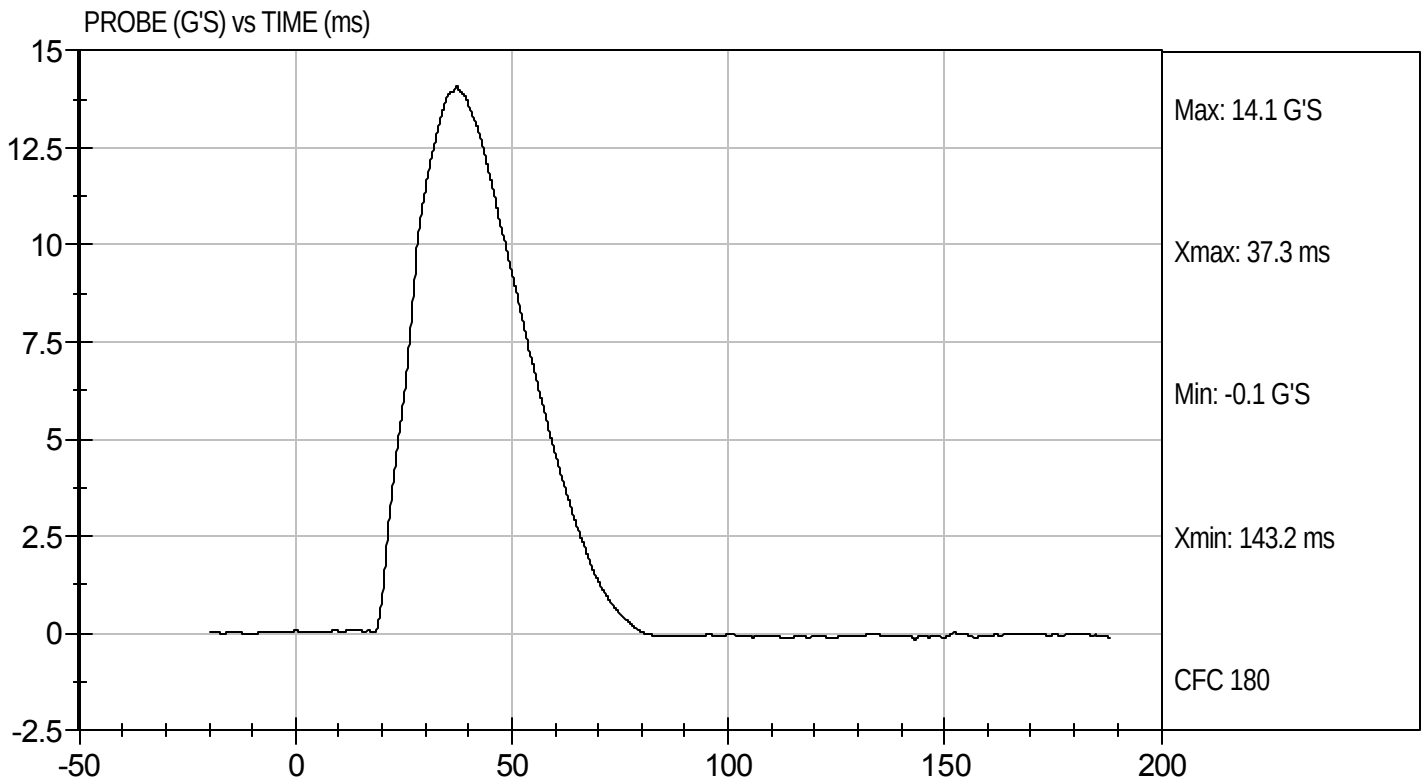
10/29/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D103726

Test Date: 10/29/10
Velocity: 14.24 ft/s, 4.34 m/s

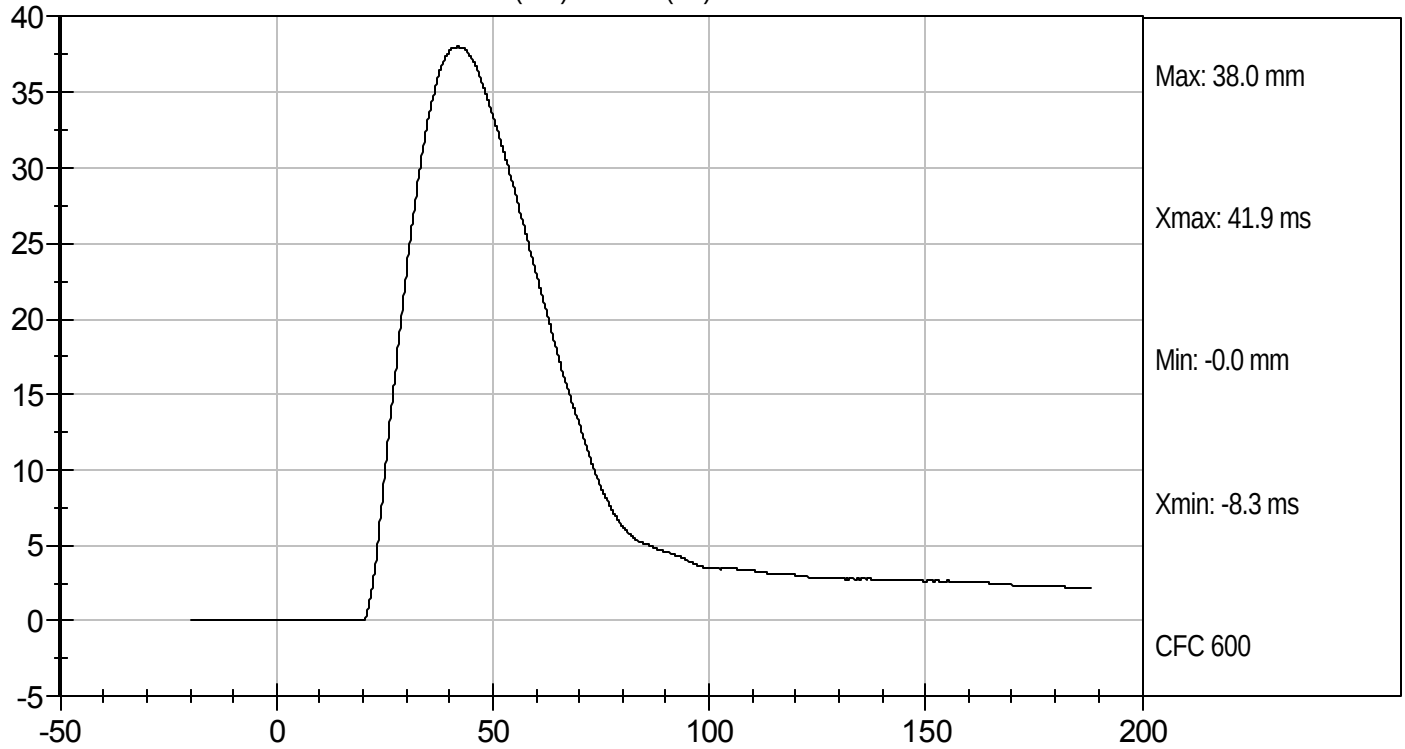




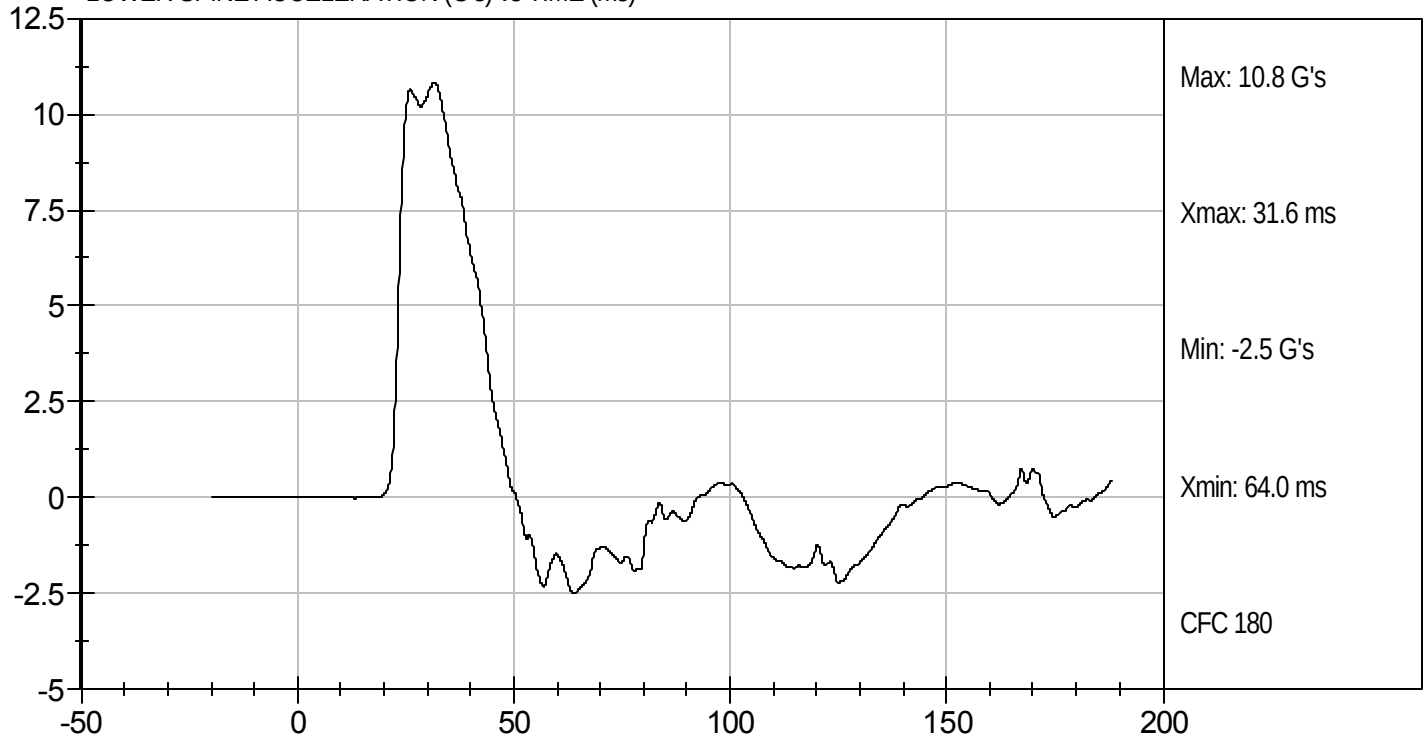
Test Desc: Abdomen Impact
Component ID: D103726

Test Date: 10/29/10
Velocity: 14.24 ft/s, 4.34 m/s

LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)

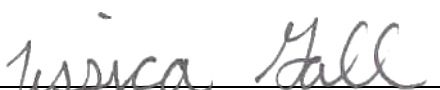


MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103727

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	6.60 to 6.80	6.74	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	42	Pass
Peak Acetabulum Force	N	3600 to 4300	4114	Pass
Overall Test Results			Pass	


Laboratory Technician

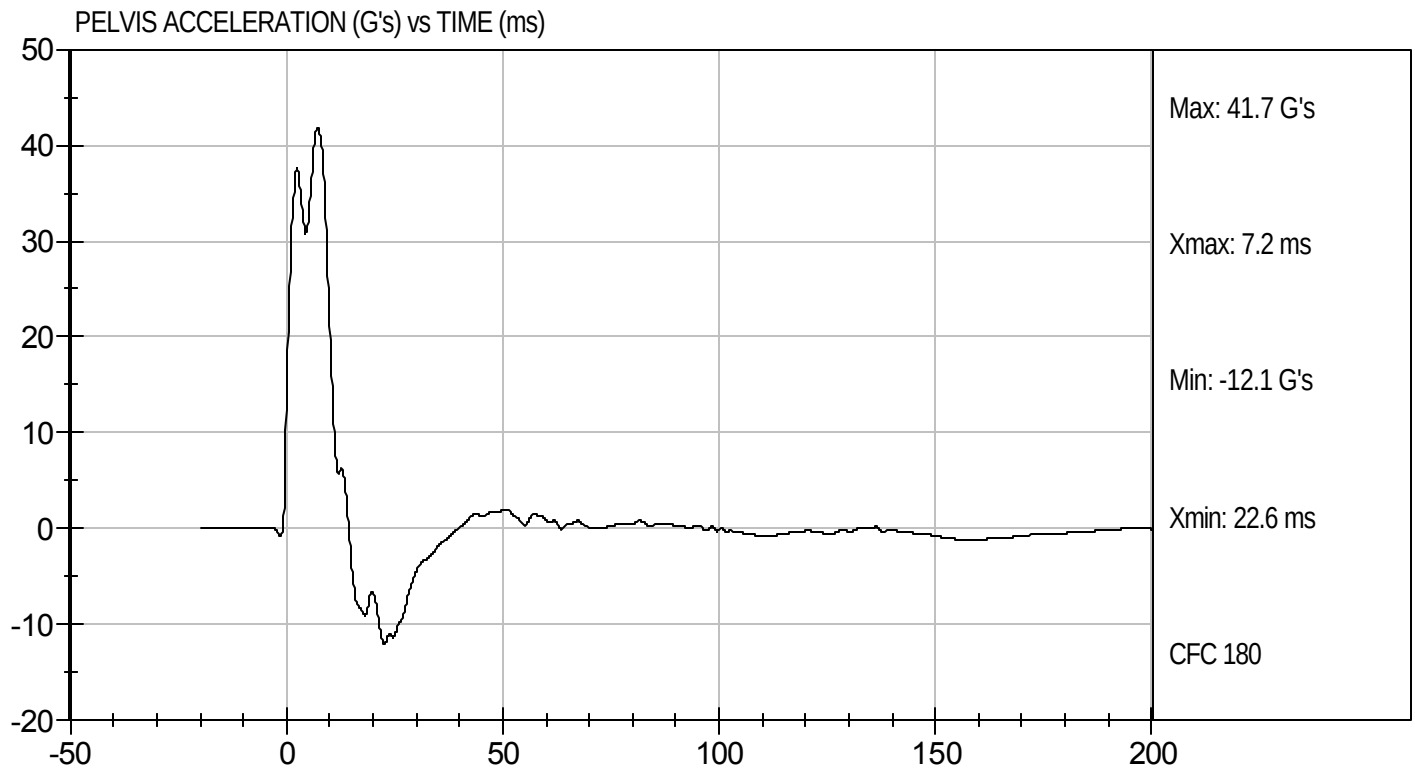
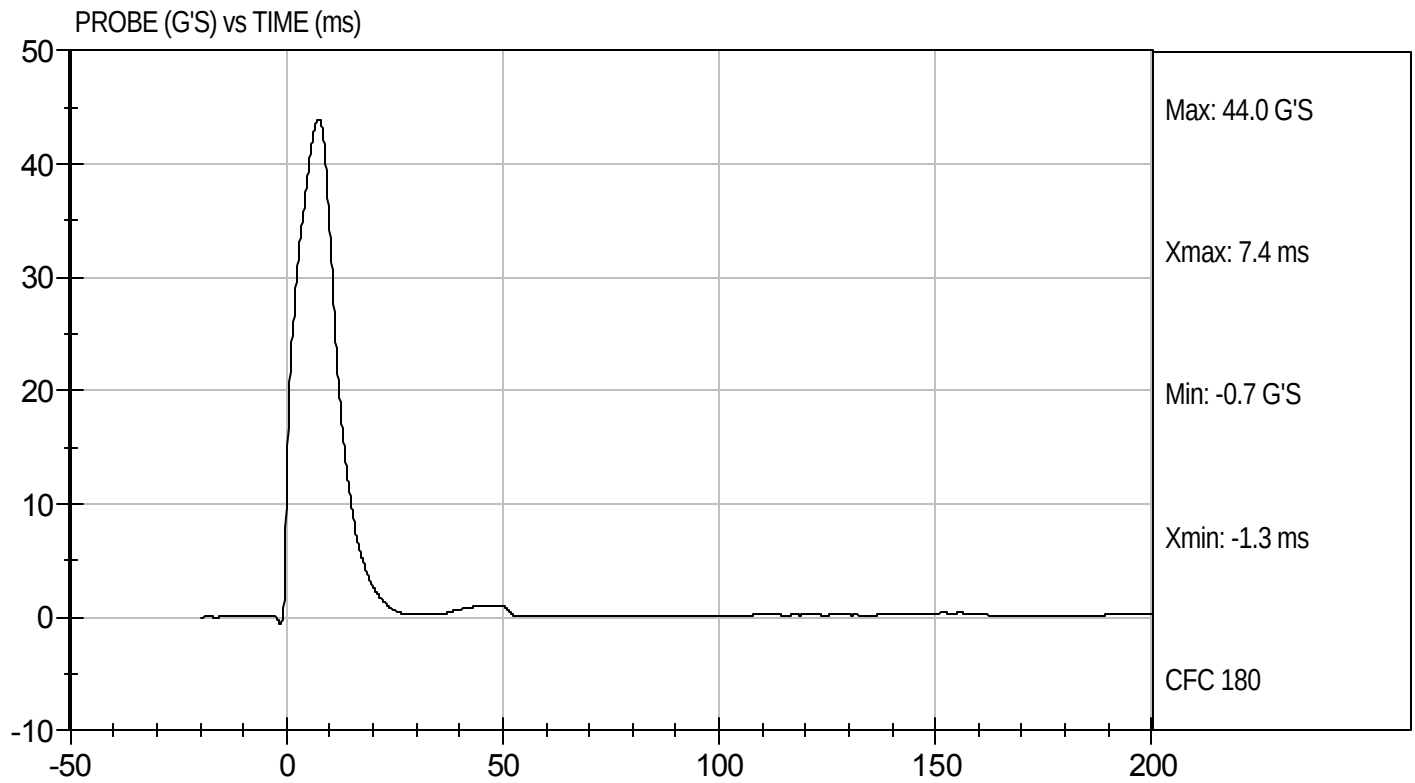
10/29/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D103727

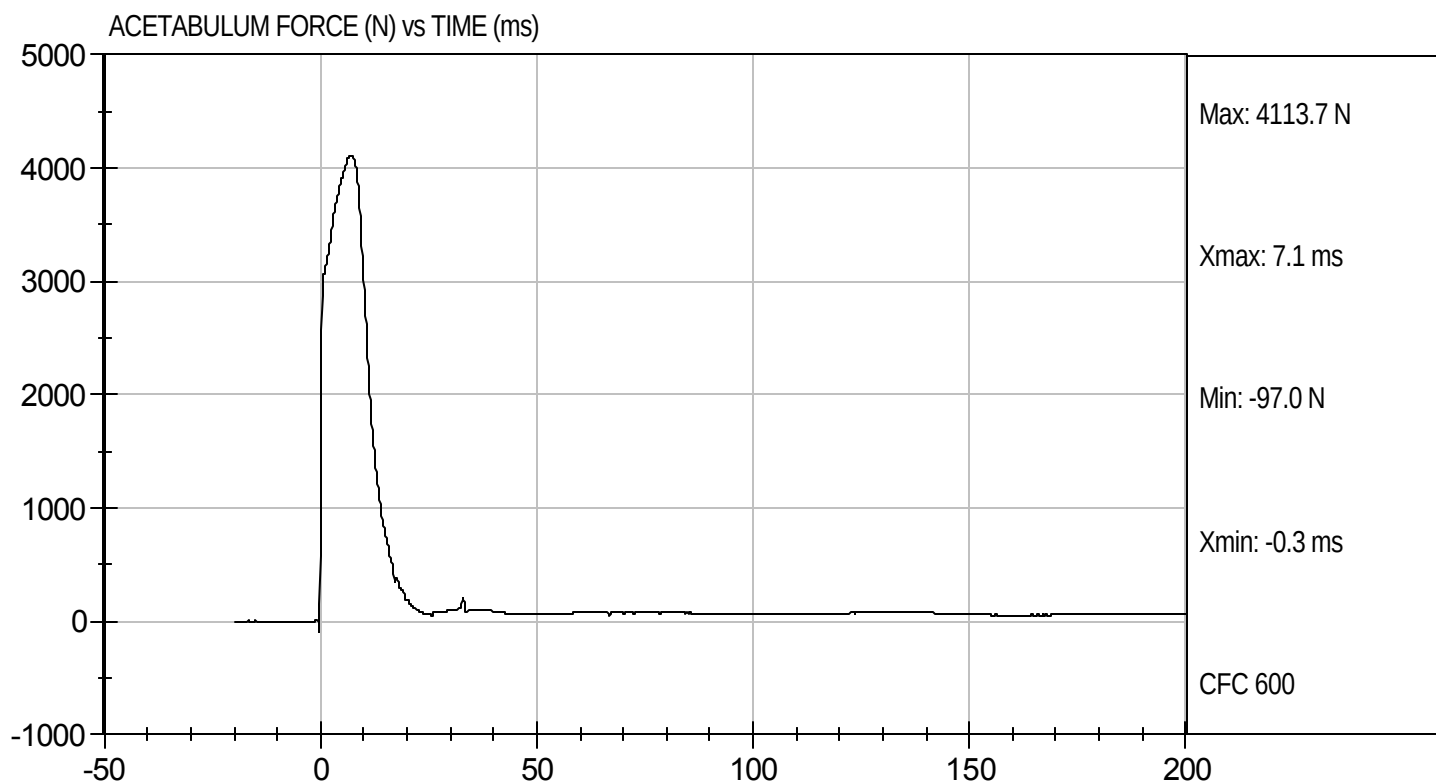
Test Date: 10/29/10
Velocity: 22.1 ft/s, 6.74 m/s





Test Desc: Pelvis Impact
Component ID: D103727

Test Date: 10/29/10
Velocity: 22.1 ft/s, 6.74 m/s

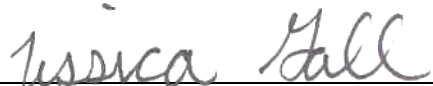


MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D103728

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.5	Pass
Humidity	%	10 to 70	27	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	38	Pass
Pelvis Y Acceleration	G's	28 to 39	32	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4510	Pass
Overall Test Results			Pass	


Laboratory Technician

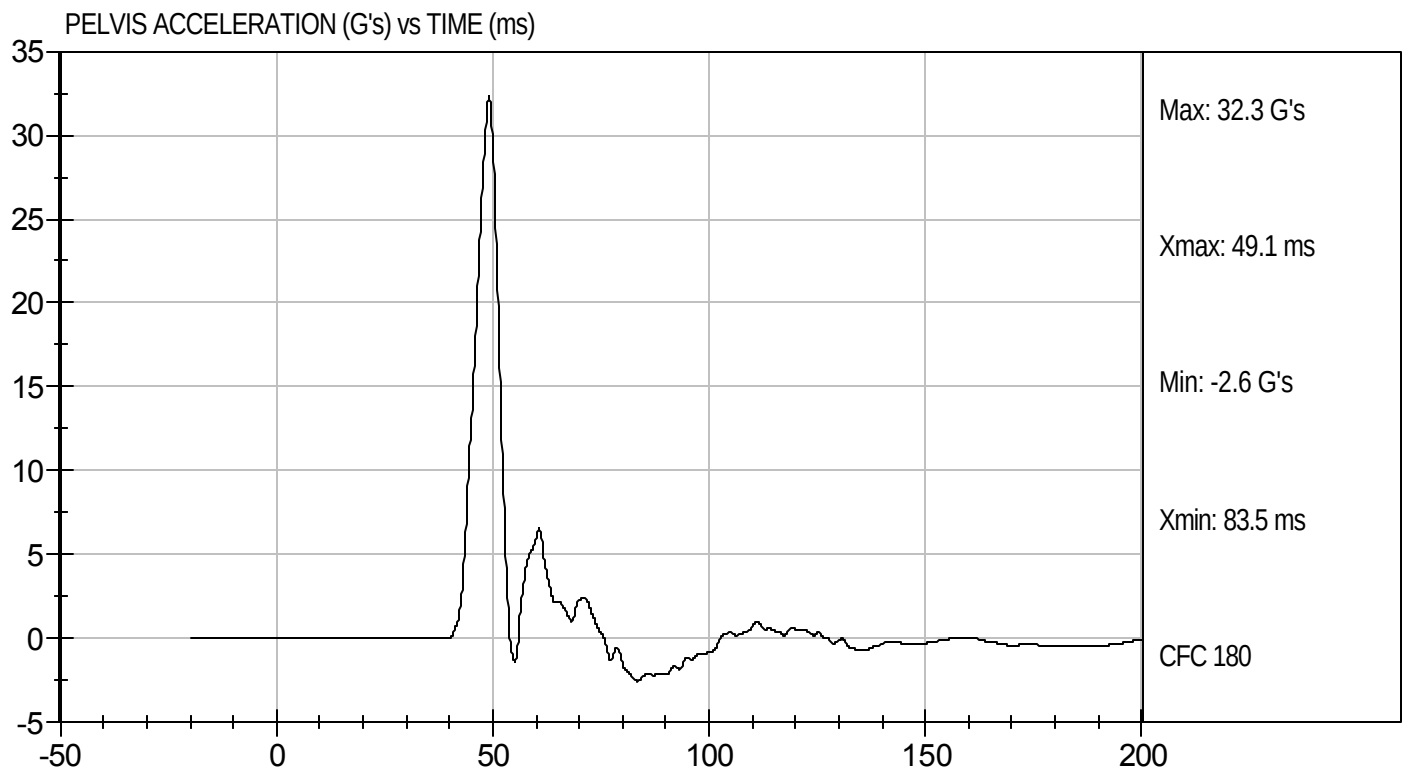
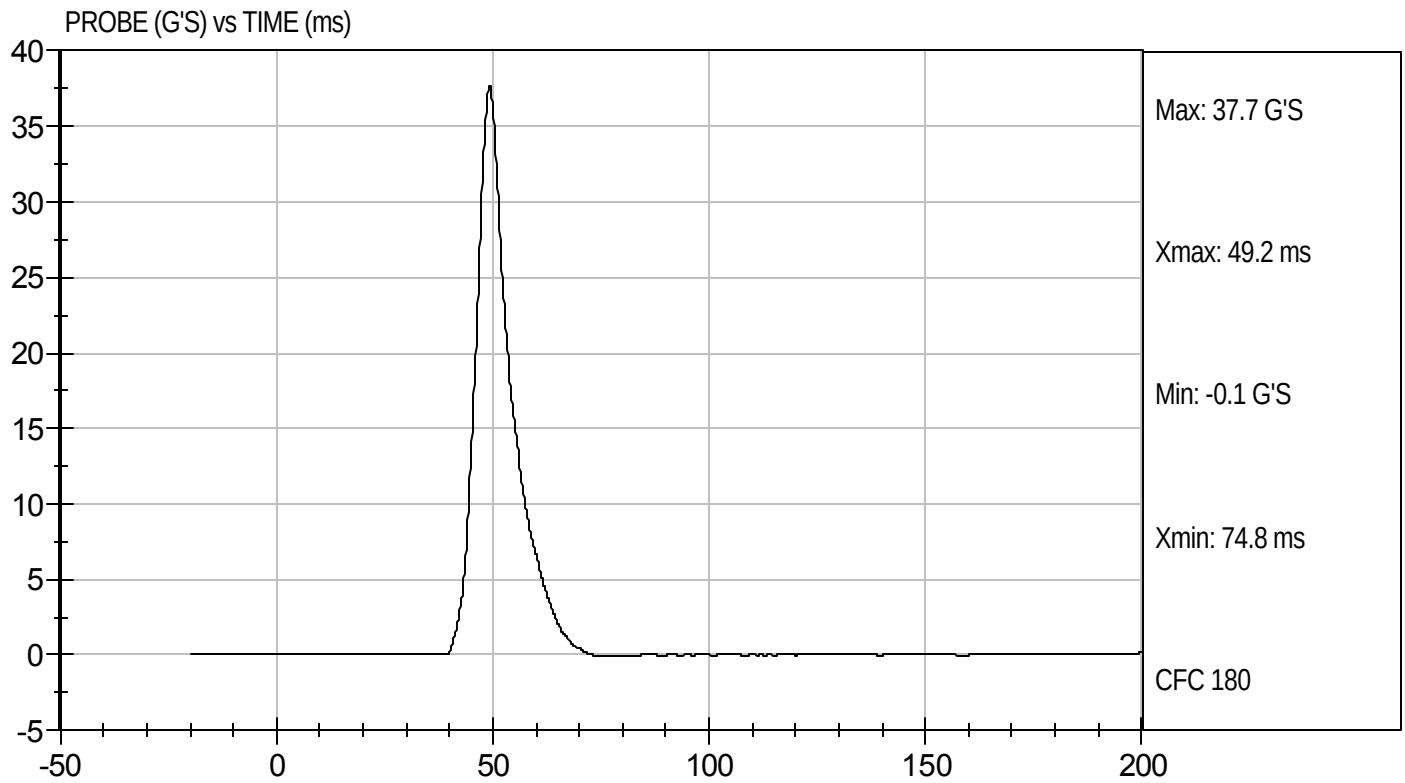
10/29/10
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D103728

Test Date: 10/29/10
Velocity: 14.36 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D103728

Test Date: 10/29/10
Velocity: 14.36 ft/s, 4.38 m/s

