

REPORT NUMBER: SNCAPP-MGA-2009-011

**VALIDATION
SIDE IMPACT POLE TEST**

**FORD MOTOR COMPANY
2010 FORD MUSTANG CONVERTIBLE
NHTSA NUMBER: MA0209**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**



Test Date: May 21, 2009

Report Date: September 18, 2009

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Joe Fleck, Project Engineer

Approval Date: September 18, 2009

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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16. Abstract A 31.2 km/h (19.5 mph), 75° oblique impact Side Validation Test was conducted on the subject 2010 Ford Mustang Convertible in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP 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 May 21, 2009. The impact velocity was 31.1 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 411 mm at level 3. The test vehicle's occupant performance was as follows: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs)</th> </tr> <tr> <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>263</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>50</td> </tr> <tr> <td>Combined Acetabular and Iliac Pelvic Force</td> <td>N</td> <td>5525</td> <td>4680</td> </tr> </tbody> </table> The left door (on the struck side of the vehicle) did not separate from the body at the hinges. The left door became unlatched during the impact. The opposite door did not open during the side impact event.				Measurement Description	Driver ATD (SID-IIs)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	263	Resultant Lower Spine Acceleration	Gs	82	50	Combined Acetabular and Iliac Pelvic Force	N	5525	4680
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17. Key Words Validation Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590																				
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Form DOT F1700.7 (8-72)

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SECTION 1
TEST PURPOSE AND PROCEDURE

This Side Impact Test is part of the FY 2009 Side Impact Validation Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test is to generate comparative side impact performance in a 2010 Ford Mustang Convertible. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Side NCAP Pole Laboratory Test Procedure, dated April 2009.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2010 Ford Mustang Convertible. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.1 km/h. The test was conducted by MGA Research Corporation in Burlington, Wisconsin, on May 21, 2009. 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 Side NCAP Pole Laboratory Test Procedure, dated April, 2009. 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
- Upper Neck Load Cells
- Shoulder Displacement Transducer
- Chest Upper, Middle, and Lower Rib Displacement Transducers
- Abdomen Upper and Lower Rib Displacement Transducers
- Acetabulum Load Cell
- Iliac Load Cell
- Lower Spine Triaxial Accelerometers

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	263	50	Acetabular	3169
			Iliac Wing	1547
			Sum	4680

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front Driver (P1)		Left Rear Passenger (P4)	
	Installed	Operated	Installed	Operated
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Torso Airbag	No		No	
Combination Head/Torso Side Airbag	Yes	Yes	No	
Curtain/Tube Side Airbag	No		No	
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes	No	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:

Right Roof at Impact Line Y

Right Sill at Impact Line Y after 25 msec.

The left door became unlatched during the impact. See photo on page A-25.

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: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MA0209	Anti-Lock Brakes	Yes
Model Year	2010	All Wheel Drive	No
Make	Ford	Power Steering	Yes
Model	Mustang	Driver Front Airbag	Yes
Body Style	Convertible	Driver Side Airbag	No
VIN	1ZVBP8EN9A5112160	Driver Head/Torso Airbag	Yes
Body Color	Red Candy Metallic	Driver Curtain Airbag	No
Delivery Date	5/08/2009	Driver Knee Bag	No
Odometer (km/mi)	235 / 146	LR Pass. Front Airbag	No
Dealer	Boucher Fleet Group	LR Pass. Side Airbag	No
Transmission	Automatic	LR Pass. Head Airbag	No
Final Drive	Rear	LR Pass. Curtain Airbag	No
Type/No. Cylinders	V6	LR Pass. Knee Bag	No
Engine Displacement (L)	4.0	Pretensioners	Yes
Engine Placement	Longitudinal	Load Limiters	Yes
Roof Rack	No	Air Conditioning	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	No	Tilt Wheel	Yes
Traction Control	Advancetrac w/ ESC	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other: ADLs	Yes
Does owner's manual provide instructions to turn off automatic door locks?	Yes	Other:	

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company	GVWR (kg)	2091
Date of Manufacture	04/09	GAWR Front (kg)	1007
		GAWR Rear (kg)	1089

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	2		4	(A)
Vehicle Capacity Weight (VCW) (kg)				301	(B)
DSC x 68.04 kg				272	(A-B)
Rated Cargo and Luggage Weight (RCLW) (kg)				29	

VEHICLE SEAT TYPE

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

GENERAL TEST AND VEHICLE PARAMETER DATA

NHTSA No. MA0209
Test Date: 5/21/2009

The diagram shows a cross-section of a tire mounted on a wheel. The following labels point to specific markings on the tire sidewall:

- Treadwear, traction and temperature grades:** Points to the top of the sidewall where 'TREADWEAR 220', 'TRACTION A', and 'TEMPERATURE A' are printed.
- Tire ply composition and materials used:** Points to the text 'SIDEWALL 2 PLYS 2XXXXX CORD • MAX LOAD 1300 LB • MAX PRESS 35 PSI • RADIAL • TUBELESS • DOT M49 ASBC66 • FREQ 4 PLYS • 2XXXXX •'.
- Max. cold inflation & load limit:** Points to the text 'MAX. COLD INFLATION & LOAD LIMIT'.
- U.S. DOT safety standard code:** Points to the text 'DOT M49 ASBC66'.
- Load index & speed symbol:** Points to the code '89H'.
- Diameter of wheel in inches:** Points to the code '15' in 'P215/65R15 89H'.
- Radial:** Points to the 'R' in 'P215/65R15 89H'.
- Ratio of height to width (aspect ratio):** Points to the code '65' in 'P215/65R15 89H'.
- Width of tire in millimeters:** Points to the code '215' in 'P215/65R15 89H'.
- Passenger car tire:** Points to the 'P' in 'P215/65R15 89H'.

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	P235/50R18	P235/50R18
Tire Size on Vehicle	P235/50R18	P235/50R18
Tire Model	Pirelli	Pirelli
Tire Manufacturer	P Zero Nero	P Zero Nero
Treadwear	400	400
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index & Speed Symbol	97W	97W
Tire Material	Rubber	Rubber
DOT Safety Code Right	N9 4W H367 4508	N9 4W H367 4508
DOT Safety Code Left	N9 4W H367 4508	N9 4W H367 4508

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	435.5	396.4		448.6	414.6		458.6	425.5	
Right	kg	438.6	396.9		459.5	421.4		442.2	419.6	
Ratio	%	52.4	47.6		52.1	47.9		51.6	48.4	
Totals	kg	874.1	793.3	1667.4	908.1	836.0	1744.1	900.8	845.1	1745.9

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1667.4	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	52.2	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	29	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1748.6	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)*	deg	-1.4	-2.0	-1.3
Front Passenger Sill Angle (front-to-rear)*	deg	-1.4	-1.8	-1.2
Front Bumper Angle (left-to-right)**	deg	-0.4	-0.4	-0.3
Rear Bumper Angle (left-to-right)**	deg	-0.1	-0.1	-0.2
Vehicle CG (Aft of Front Axle)	mm	1294	1304	1316
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	24	-8	10

*Front up is positive ** Left up is positive

GENERAL VEHICLE TEST DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	31.3

Vehicle components removed to make target vehicle test weight: Tail lights, spare tire and jack, trunk interior, right front door panel and speakers, right rear window, right front floor mat.

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Parameter	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1336
Actual Impact Point (Aft of Front Axle)	mm	1342
Impact Point Difference	mm	6

DATA SHEET NO. 2

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

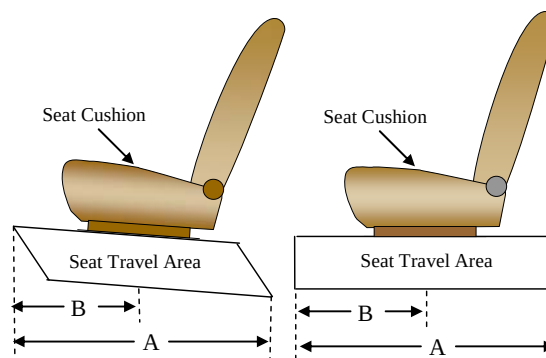
Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009

SEAT FORE/AFT POSITIONS

The driver seat was a power fore/aft adjustment with a power angle and height adjustable seat. The seat travel was set as specified in Appendix B of the TP dated April 2009. The right front passenger seat was set to match the driver seat.

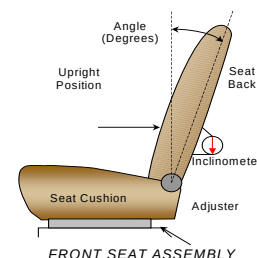
The rear passenger seat's fore/aft and vertical operation was fixed and non-adjustable.



SEAT FORE/AFT POSITIONING	Total Fore/Aft Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat	240 mm	24 mm rear of full forward
Front Passenger Seat	240 mm	24 mm rear of full forward
Rear Seat – Struck Side	Fixed	Fixed
Rear Seat – Non-Struck Side	Fixed	Fixed

SEAT BACK ANGLE POSITION

The seat back was set as specified in Appendix B of the TP dated April 2009. The seat back angle measurement was made relative to the rocker sill at the headrest post.



SEAT BACK ANGLE	Degrees	Detents
Driver Seat Back Angle with Seated Dummy	5.3	
Front Passenger Seat Back Angle	5.3	
Struck Side Rear Seat Back Angle	Fixed	
Non-Struck Side Rear Passenger Seat Back Angle	Fixed	

SEAT BELT UPPER ANCHORAGE

The driver and passenger seat belt upper anchorages were non-adjustable.

SEAT BELT UPPER ANCHORAGE POSITIONING	Total # of Positions	Placed in Position #
Driver Seat	Fixed	
Front Passenger Seat	Fixed	

DATA SHEET NO. 2 (CONTINUED)

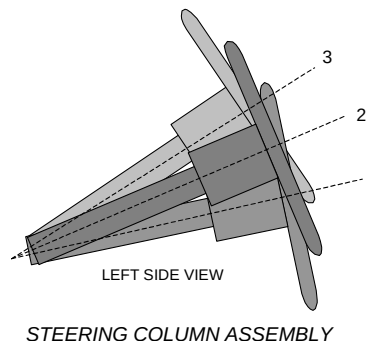
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT, AND FUEL SYSTEMS DATA

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009

STEERING COLUMN ADJUSTMENT

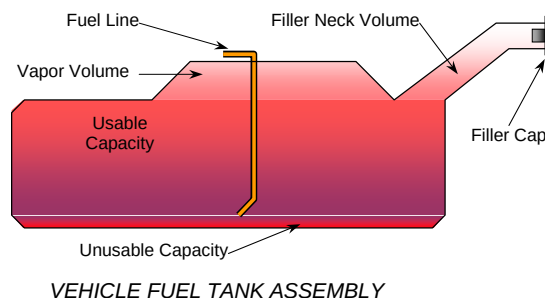
Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN POSITIONING

	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	65.3	
Geometric Center – Position 2	67.5	
Uppermost – Position 3	69.7	
Telescoping Steering Wheel Travel		
Test Position	67.5	

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe. The test vehicle is equipped with an electric fuel pump. The electric fuel pump operates for 2 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following ignition



actuation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is deactivated. Also, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude. The fuel pipe is on the left side.

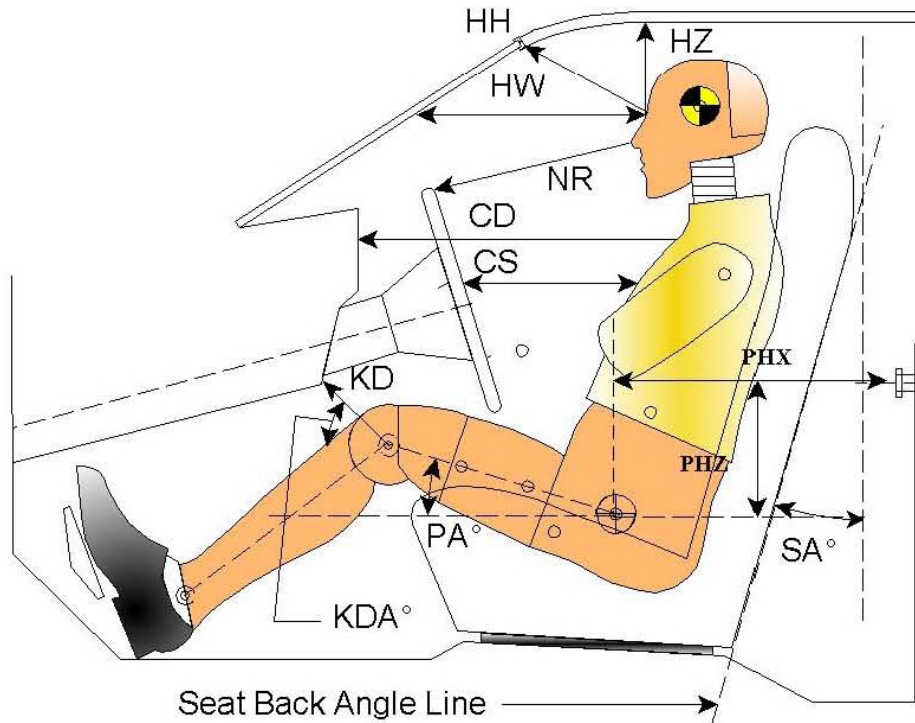
FUEL CAPACITY DATA

	Liters
Usable Capacity of "Standard" Tank	60.6
Usable Capacity of "Optional" Tank	
Usable Capacity of Standard Tank as Specified in Owner's Manual	60.6
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92-94% of Usable Capacity	55.7 to 56.9
Actual Amount of Solvent Used	56.0
1/3 of Usable Capacity	20.2

.DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009

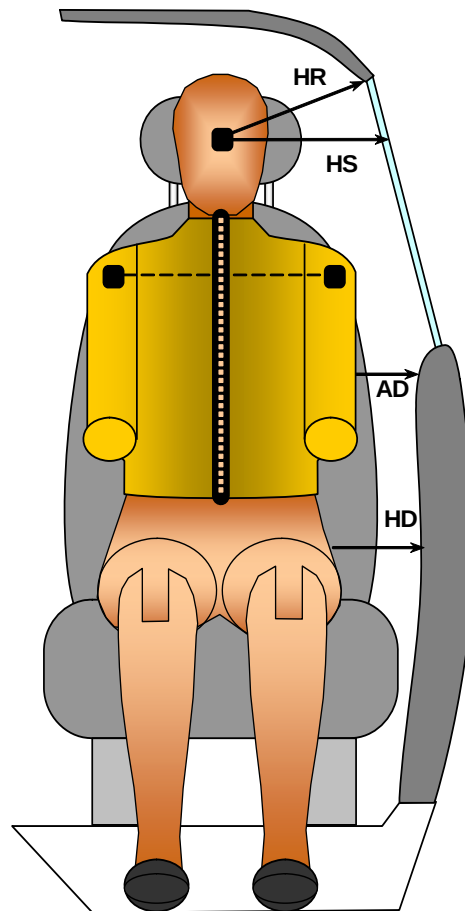


Code	Measurement Description	Driver S/N 296	
		Length (mm)	Angle (°)
HH	Head to Header	221	
HW	Head to Windshield	454	
HZ	Head to Roof	137	
NR	Nose to Rim	228	
CD	Chest to Dash	397	
CS	Chest to Steering Wheel	163	
KDL/KDAL°	Left Knee to Dash	76	42.9
KDR/KDAR°	Right Knee to Dash	63	39.7
PA°	Pelvic Angle		19.5
PHX	H-Point to Striker (X-Axis)	590	
PHZ	H-Point to Striker (Z-Axis)	185	
SA°	Seat Back Angle		5.3

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009



FRONT VIEW OF DUMMY

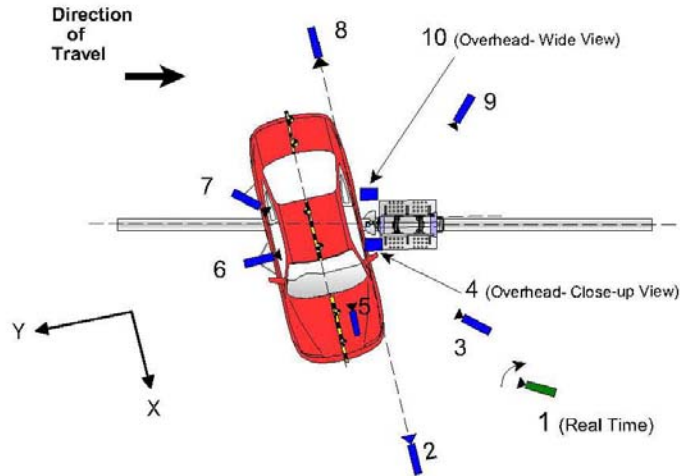
Code	Measurement Description	Length (mm)
HR	Head to Side Header	230
HS	Head to Side Window	352
AD	Arm to Door	152
HD	H-Point to Door	150

DATA SHEET NO. 5

CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009



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				13	24
2	Front Ground Level	5500	-1570	-1700	24	1000
3	Impact Side 45° Forward	3210	-2540	-1700	20	1000
4	Overhead Closeup	0	-70	-4470	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	-5940	1480	-1840	24	1000
9	Impact Side 45° Rearward	-3580	-2750	-1770	20	1000
10	Overhead Side	0	-580	-4850	14	1000

* All measurements accurate to ± 6 mm

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

INSTRUMENTATION

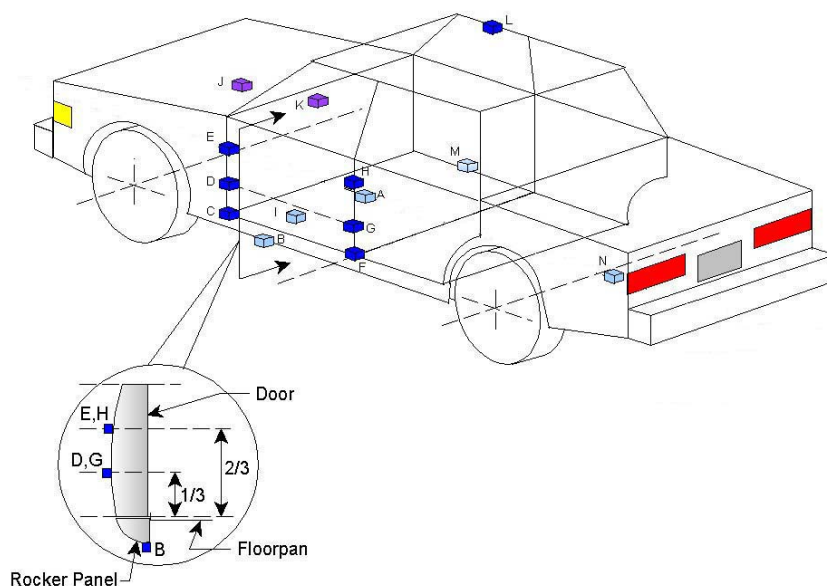
	Number of Channels
Driver Dummy	23
Vehicle Structure	21
Pole Load Cells	0
Contact Switches	3
Airbag Timing	1
Manufacturer's Additional Vehicle Channels	5
Total No. of Data Channels	53

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009



	Accelerometer Location			
	ID	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG	1888	-18	-459
	Vehicle CG Sensor	1888	20	-459
B	Left Floor Sill	2867	-733	-174
C	A Pillar Sill	3358	-730	-166
D	A Pillar Low	3004	-703	-473
E	A Pillar Mid	3014	-787	-761
F	B Pillar Sill	1784	-724	-192
G	B Pillar Low	1871	-728	-527
H	B Pillar Mid	1798	-729	-748
I	Driver Seat	2194	-546	-305
L	Engine Top	3785	0	-947
J	Firewall	3452	0	-926
K	Right Roof			
M	Right Floor Sill	2377	733	-182
N	Rear Floorpan	966	0	-598
	ACU	2158	0	-461
	Right SIS	2264	687	-259
	Left SIS	2267	-644	-310

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: 2010 Ford Mustang Convertible
Test Program: Validation Side Impact Pole

NHTSA No. MA0209
Test Date: 5/21/2009



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: 2010 Ford Mustang ConvertibleNHTSA No. MA0209Test Program: Validation Side Impact PoleTest Date: 5/21/2009**TEST DUMMY INFORMATION AND CONTACT**

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

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door	Opened/unlatched during the crash	
Right Side Door	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)	
	Installed	Operated	Installed	Operated
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Torso Airbag	No		No	
Combination Head/Torso Side Airbag	Yes	Yes	No	
Curtain/Tube Side Airbag	No		No	
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes	No	No	

VEHICLE SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset from Vertical Impact Reference Line	mm	+/- 38	6
Trap No. 1 Velocity (Primary)	km/h	30.4 to 32.0	31.1
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 32.0	31.1

DATA SHEET NO. 9

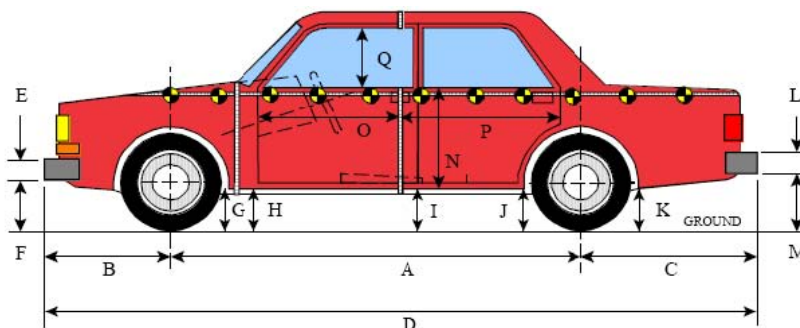
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Ford Mustang Convertible

NHTSA No. MA0209

Test Program: Validation Side Impact Pole

Test Date: 5/21/2009



LEFT SIDE VIEW

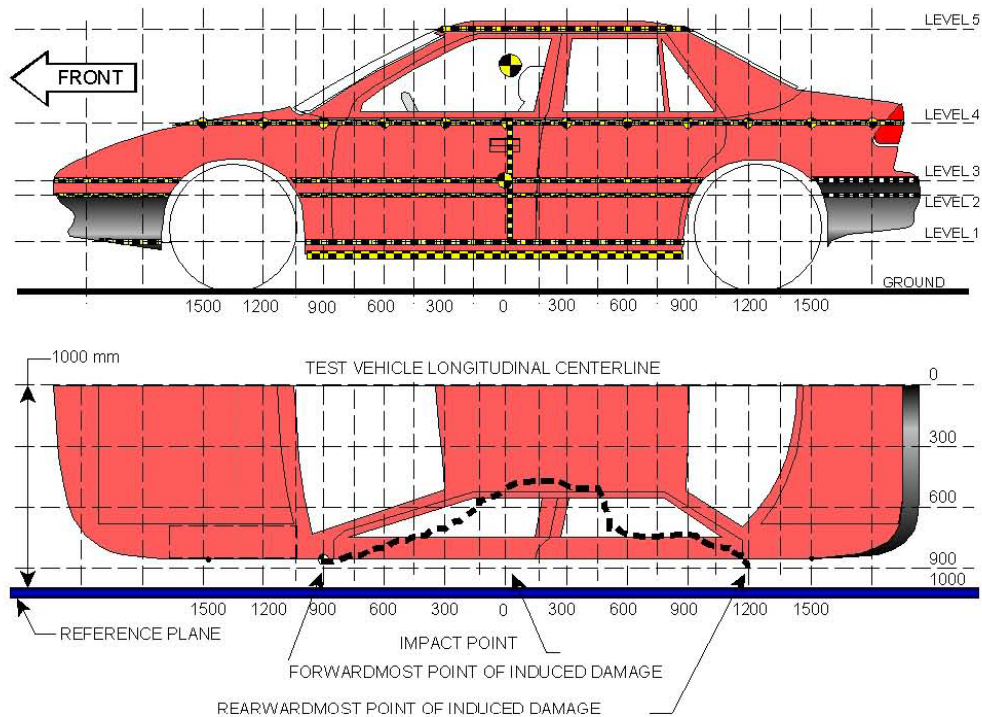
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

Code	Measurement Description	Pre-Test (mm)	Post-Test (mm)	Difference (mm)
A	Wheelbase	2720	2612	108
B	Front Axle to FSOV	929	915	14
C	Rear Axle to RSOV	1119	1222	-103
D1	Total Vehicle Length at Left Side	4115	3950	165
D2	Total Vehicle Length at Centerline	4768	4749	19
D3	Total Vehicle Length at Right Side	4115	4119	-4
E	Front Bumper Thickness	129	129	0
F	Front Bumper Bottom to Ground	202	300	-98
G	Sill Height at Front Wheel Well	136	181	-45
H	Sill Height at Front Door Leading Edge	151	184	-33
I	Sill Height at B Pillar	163	157	6
J1	Sill Height at Rear Wheel Well	175	187	-12
J2	Pinch Weld Height at Rear Wheel Well	176	186	-10
K	Sill Height Aft of Rear Wheel Well	251	256	-5
L	Rear Bumper Thickness	195	195	0
M	Rear Bumper Bottom to Ground	305	357	-52
N	Sill Height to Window Bottom Sill	732	726	6
O	Front Door Leading Edge to Impact CL	603	600	3
P	Rear Door Trailing Edge to Impact CL	696	663	33
Q	Front Window Opening	342	333	9
R	Right Side Length	4115	4119	-4
S	Left Side Length	4115	3950	165
T	Vehicle Width at B Post	1849	1833	16

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Ford Mustang Convertible
 Test Program: Validation Side Impact Pole

NHTSA No. MA0209
 Test Date: 5/21/2009



Level	Measurement Description	Height Above Ground (mm)
1	Sill Top	275
2	Occupant H-Point	542
3	Mid-Door	620
4	Window Sill	954
5	Window Top	1324

NOTE: The above 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: 2010 Ford Mustang Convertible
Test Program: Validation Side Impact Pole

NHTSA No. MA0209
Test Date: 5/21/2009

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950				361					338					-23	
-1800				338					316					-22	
-1650				322					299					-23	
-1500				308					291					-17	
-1350				297					280					-17	
-1200				292					278					-14	
-1050			172	289				200	275				28	-14	
-900	236	181	183	286		243	219	220	275		7	38	37	-11	
-825	235	185	185	283		260	230	220	271		25	45	35	-12	
-750	236	187	181	280		279	237	215	269		43	50	34	-11	
-675	235	187	182	278		298	240	217	267		63	53	35	-11	
-600	235	187	183	274		322	233	224	264		87	46	41	-10	
-525	233	187	182	273		340	268	264	300		107	81	82	27	
-450	232	186	181	273		377	308	301	321		145	122	120	48	
-375	230	185	180	273		400	345	340	340		170	160	160	67	
-300	230	184	180	272		432	388	380	377		202	204	200	105	
-225	229	184	180	271		488	457	449	442		259	273	269	171	
-150	228	183	179	271		529	507	502	492		301	324	323	221	
-75	227	182	179	272		573	552	548	535		346	370	369	263	
0	226	182	179	271	474	606	592	590	575	508	380	410	411	304	34
75	228	182	179	271	468	599	593	589	571	482	371	411	410	300	14
150	229	181	178	271	463	564	561	561	538	470	335	380	383	267	7
225	228	181	178	270	466	505	510	510	492	481	277	329	332	222	15
300	227	182	178	271	455	461	455	459	458	488	234	273	281	187	33
375	231	182	178	271	457	416	402	405	420	482	185	220	227	149	25
450	230	182	179	271	459	379	354	352	379	478	149	172	173	108	19
525	232	183	179	270	452	339	305	305	334	465	107	122	125	64	13
600	235	184	179	270	461	352	268	266	295	475	117	84	87	25	14
675	236	184	180	268	470	324	225	219	252	484	88	41	39	-16	14
750	240	178	180	265	478	291	293	302	261	497	51	115	122	-4	19
825	240	171	171	262	477	257	263	295	259	495	17	92	124	-3	18
900	241	171	171	258	478	227	245	272	261	488	-14	74	101	3	10
1050			160	253	505			224	262	521			64	9	16
1200				257	512				269	518				12	6
1350				263					279					16	
1500				268					292					24	
1650				278					308					30	
1800				292					307					15	
1950				306					319					13	
2100				321					336					15	

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Ford Mustang Convertible
Test Program: Validation Side Impact Pole

NHTSA No. MA0209
Test Date: 5/21/2009

MAXIMUM CRUSH DATA

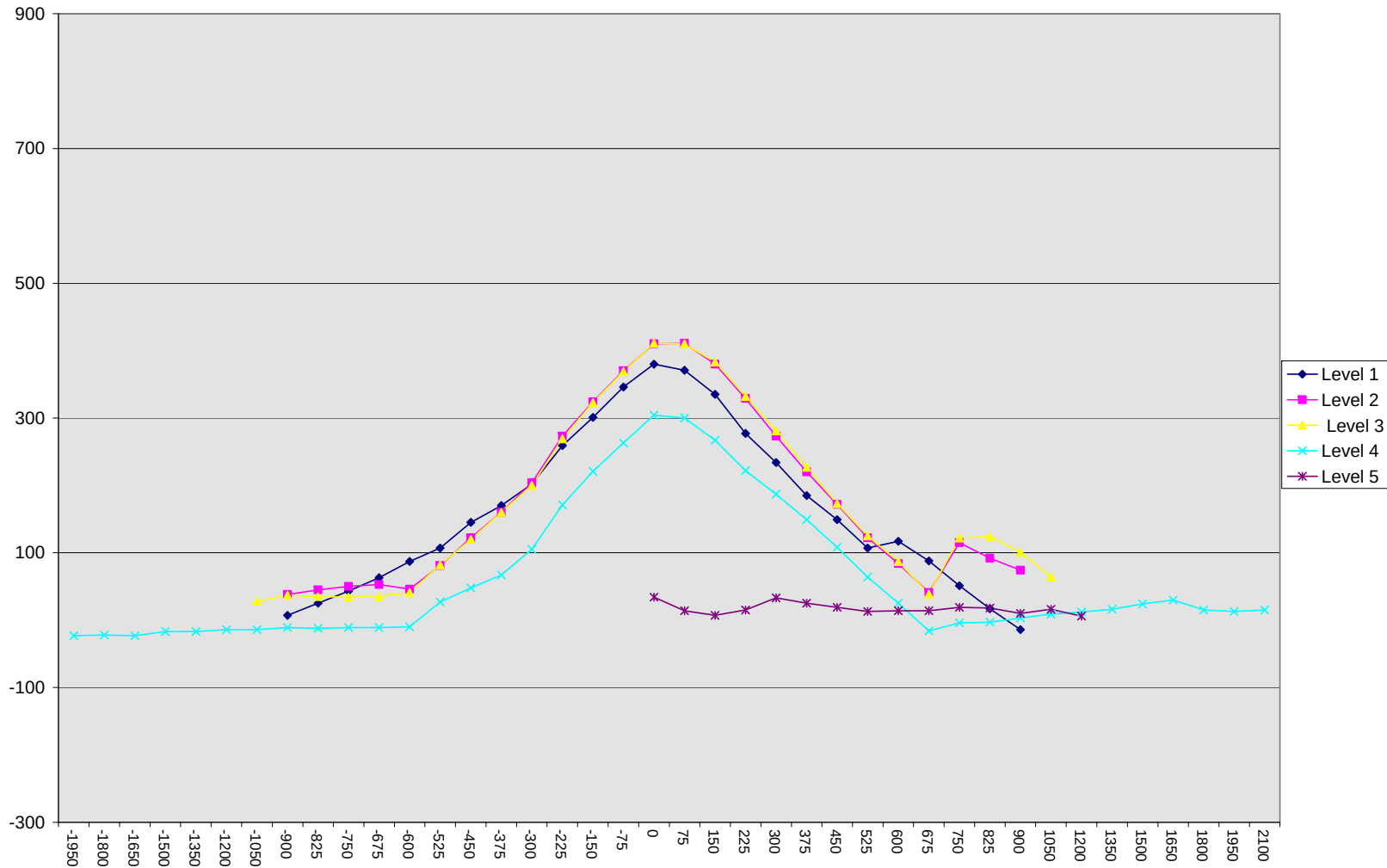
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	380	411	411	304	34
Distance From Impact (mm)	0	75	0	0	0

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: 2010 Ford Mustang Convertible
Test Program: Validation Side Impact Pole

NHTSA No. MA0209
Test Date: 5/21/2009

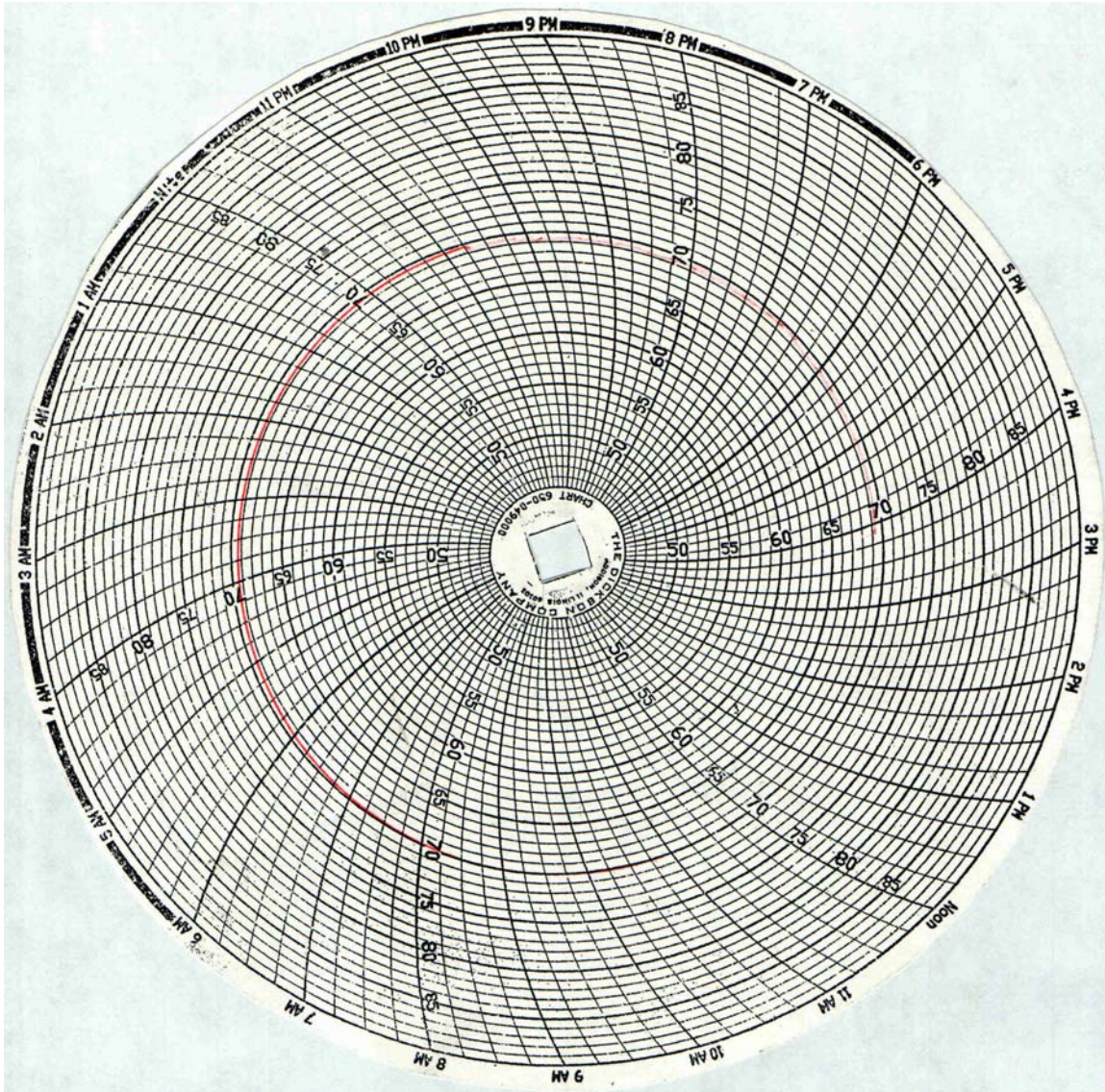


DATA SHEET NO. 11

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2010 Ford Mustang Convertible
Test Program: Validation Side Impact Pole

NHTSA No. MA0209
Test Date: 5/21/2009



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



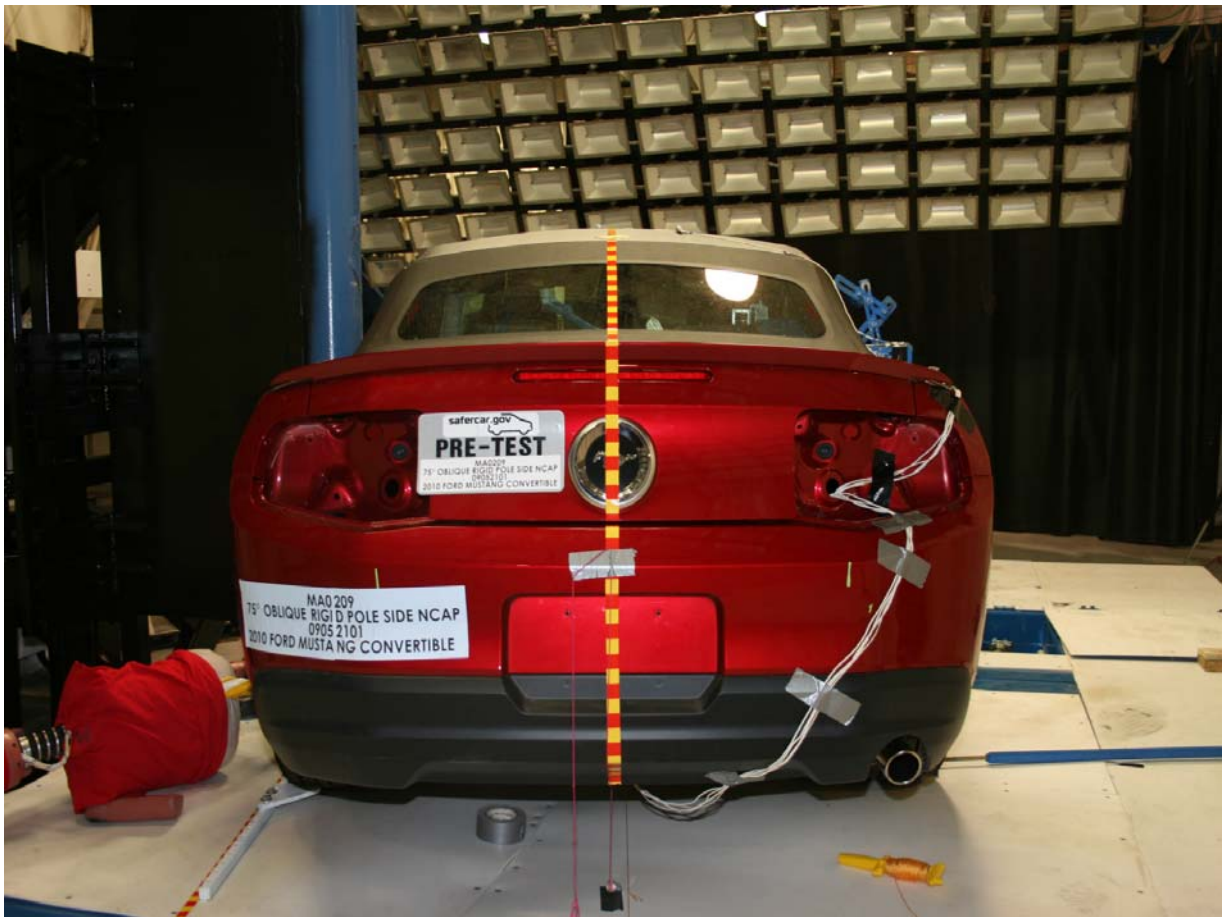
Post-Test Left Side View of Test Vehicle



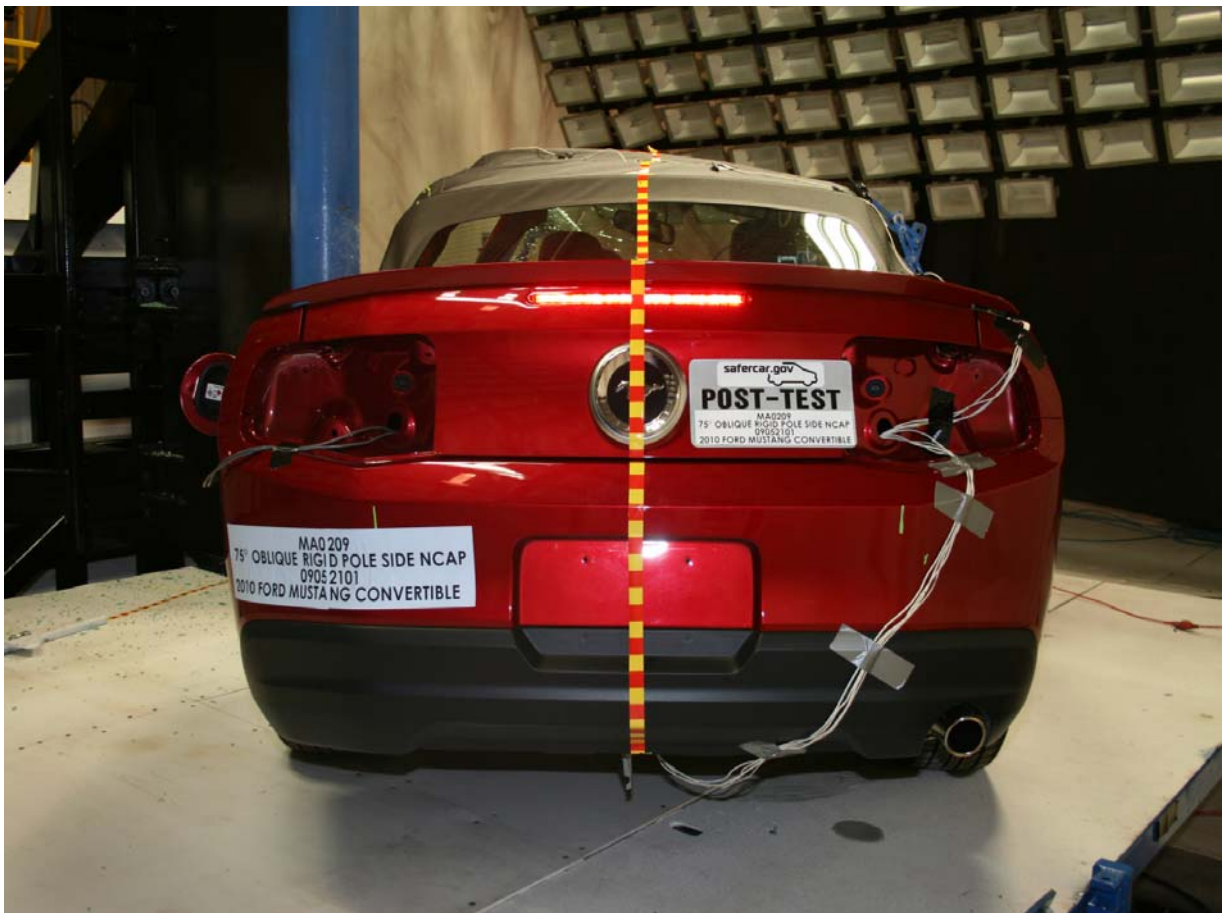
Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



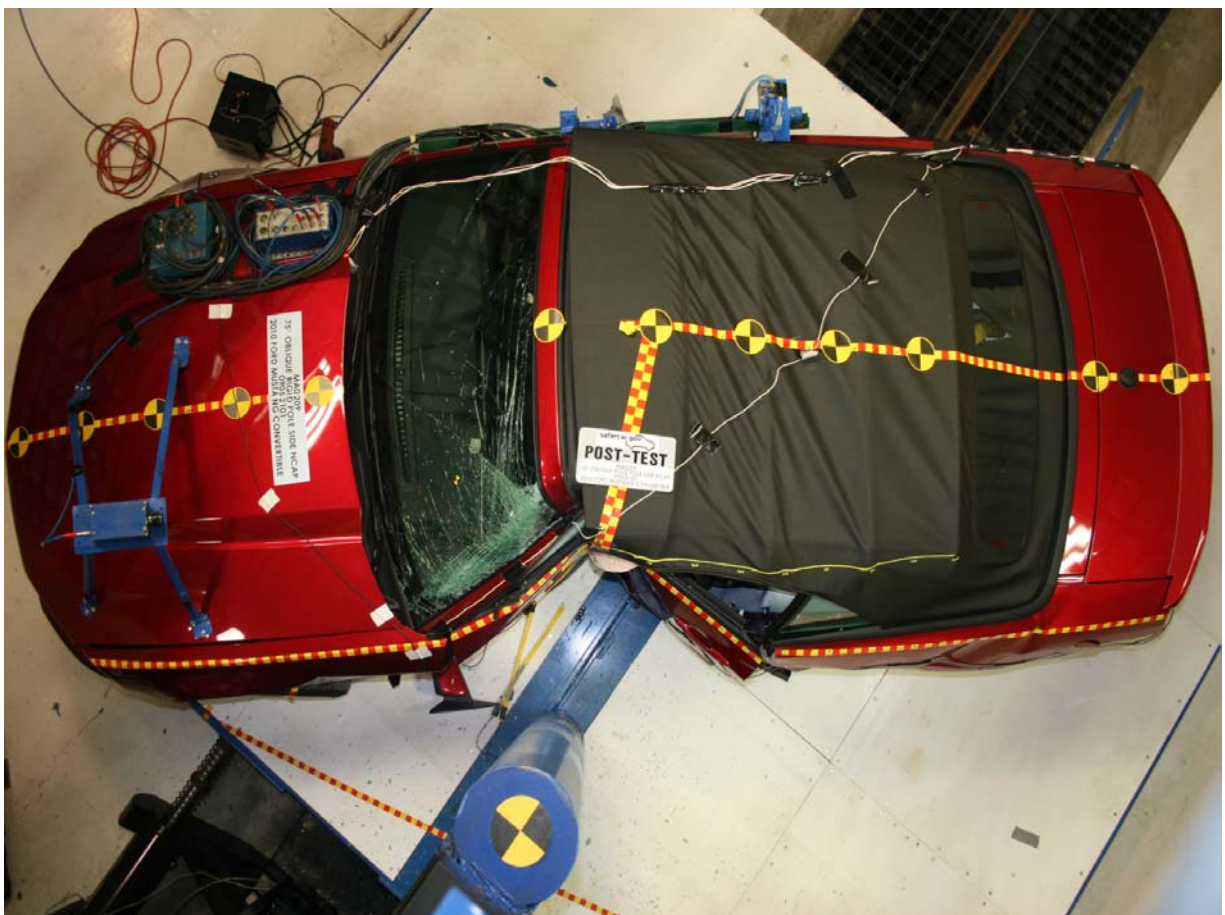
Pre-Test Right Side View of Test Vehicle



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 at Ideal Impact Point



Pre-Test Right Side View of Pole Positioned Against Side of Vehicle at Ideal Impact Point



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

NO PHOTOGRAPH AVAILABLE

Pre-Test Frontal View of Seat Back (including head restraint) Prior to Dummy Positioning (showing centerline)



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

NO PHOTOGRAPH AVAILABLE

Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning (showing centerline)

NO PHOTOGRAPH AVAILABLE

Pre-Test Overhead View of Dummy Thighs on Seat Pan

NO PHOTOGRAPH AVAILABLE

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

NO PHOTOGRAPH AVAILABLE

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



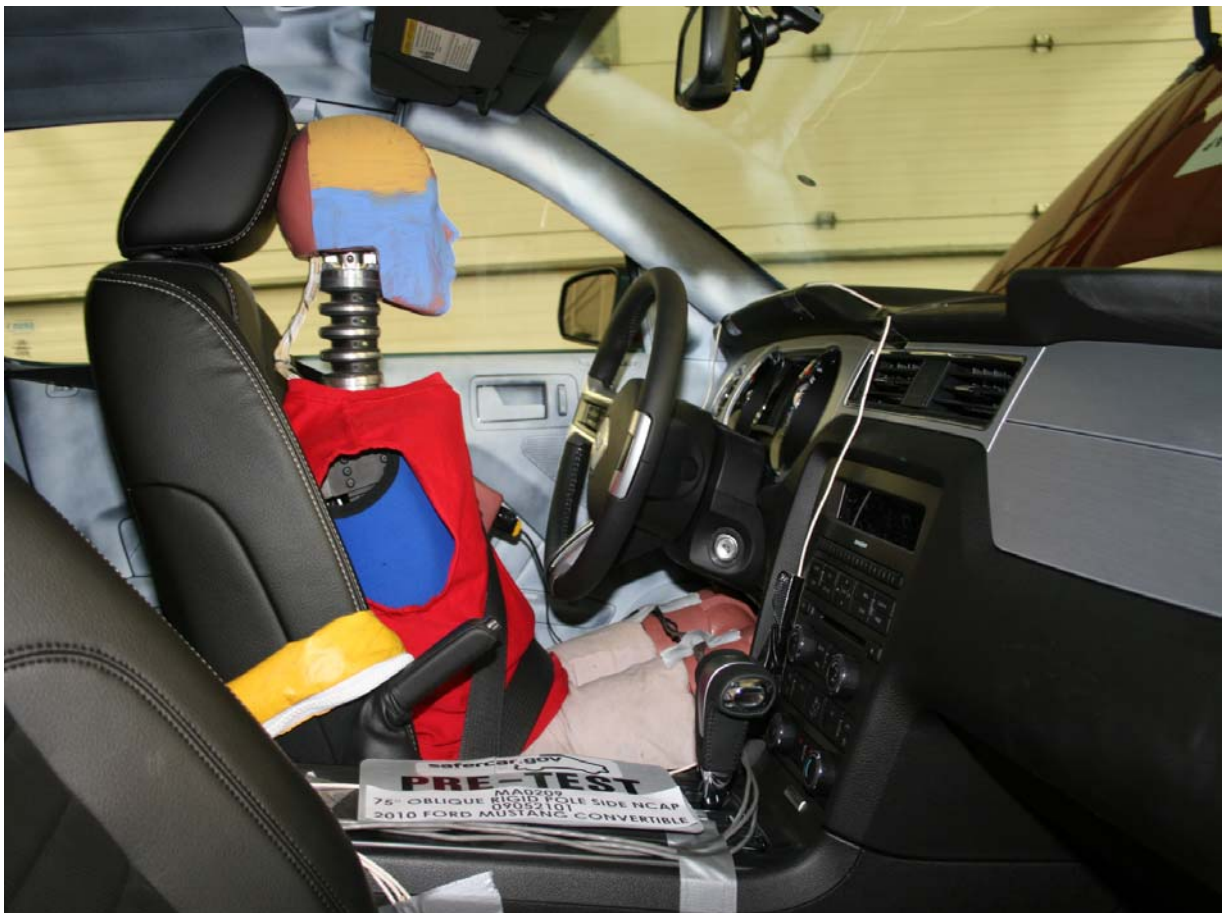
Pre-Test Placement of Dummy's Feet

NO PHOTOGRAPH AVAILABLE

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

NO PHOTOGRAPH AVAILABLE

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



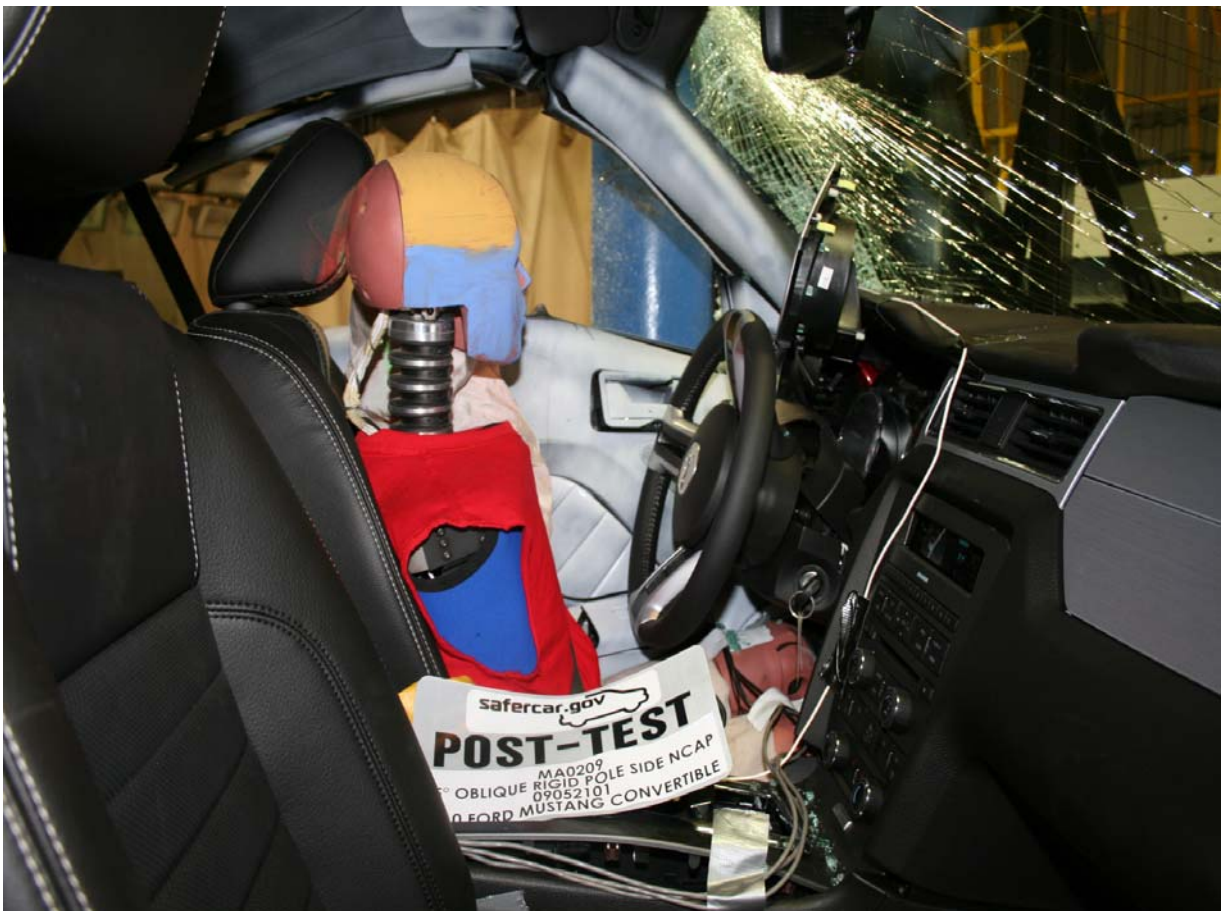
Pre-Test Dummy and Door Clearance View



Post-Test Dummy and Door Clearance View



Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment (through vehicle with door open)



Post-Test Right Side View of Dummy and Front Seat Occupant Compartment (through vehicle with door open)



Pre-Test Inner Door Panel View



Post-Test Inner Door Panel View Showing Dummy Contact Location



Post-Test Dummy Close-Up Head Contact with Vehicle View, if applicable



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



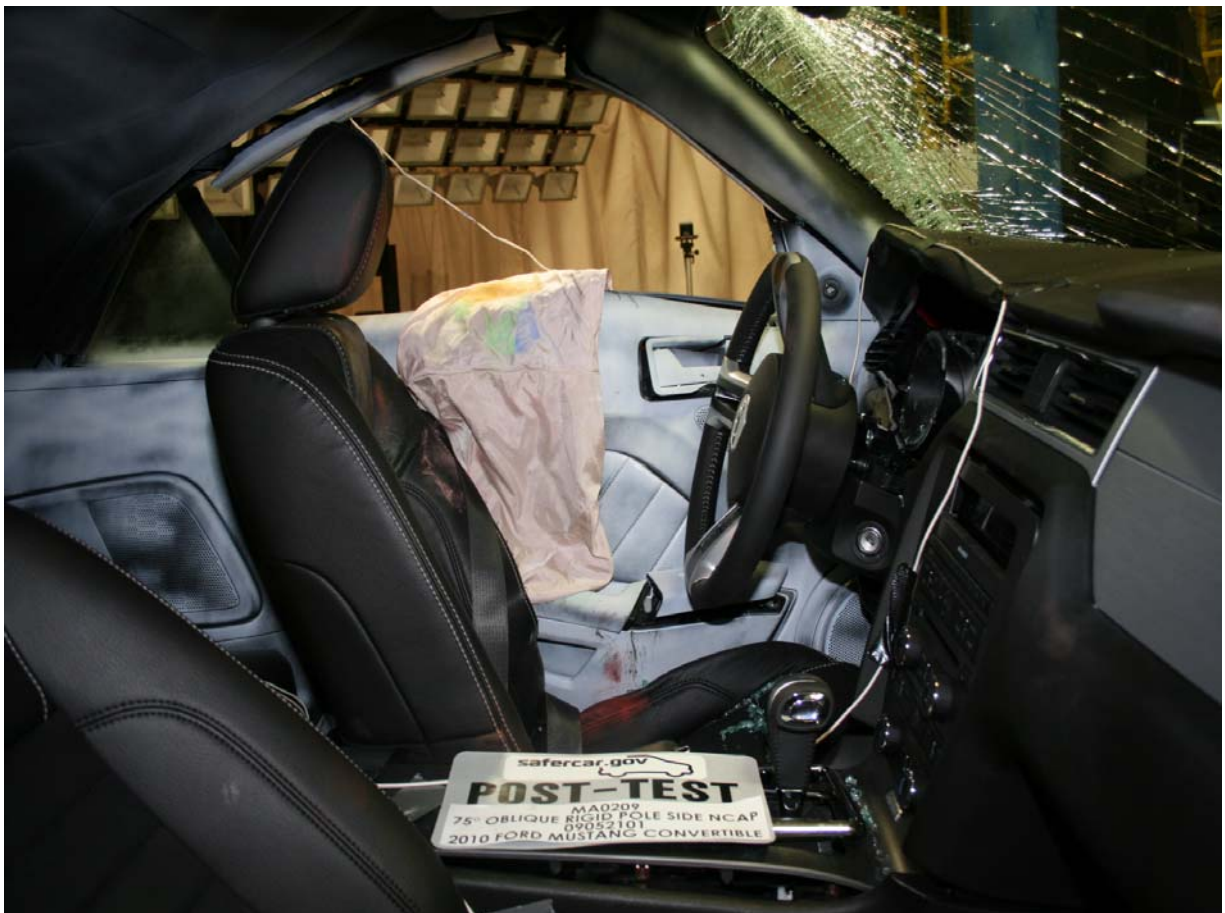
Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View, if applicable



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



Post-Test Dummy Close-Up Pelvis Contact View, if applicable



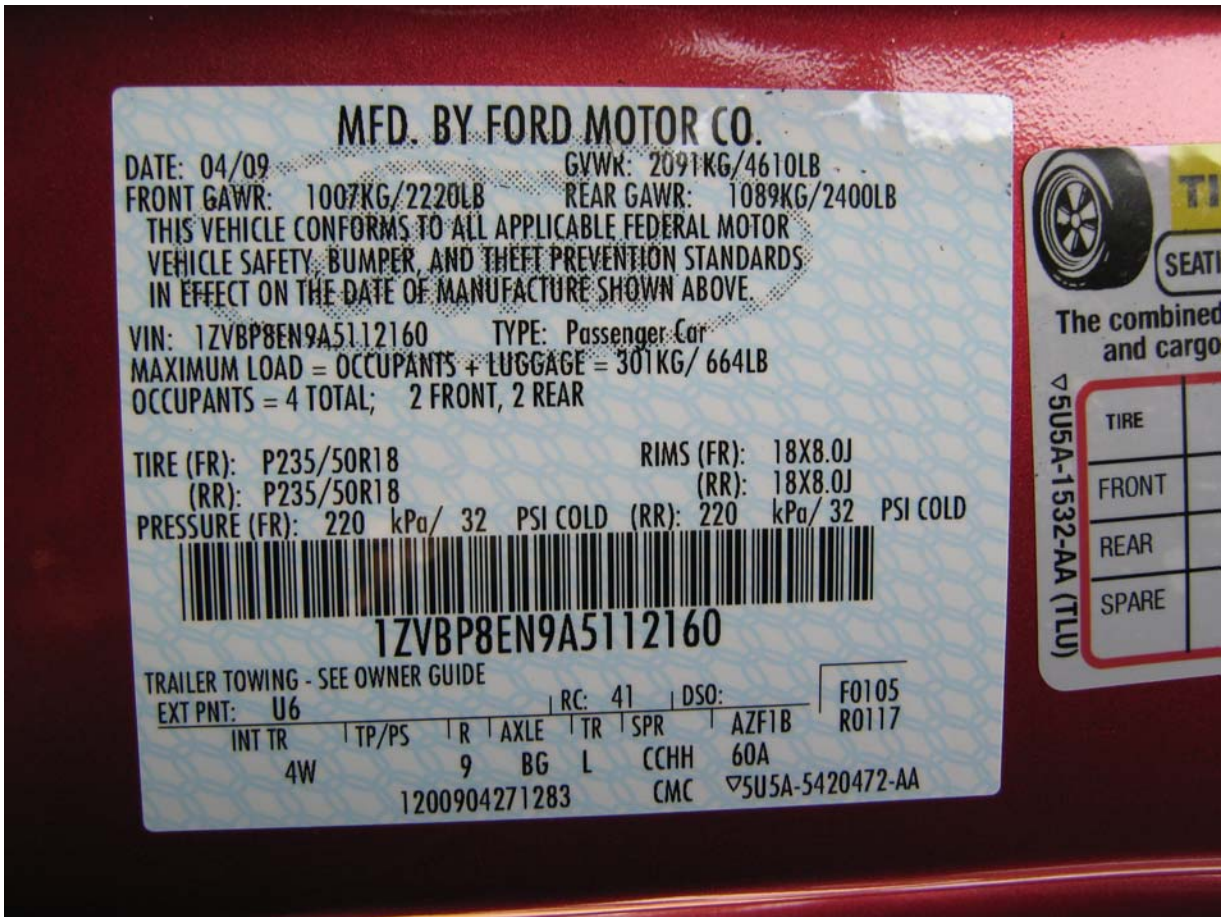
Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View, if applicable



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



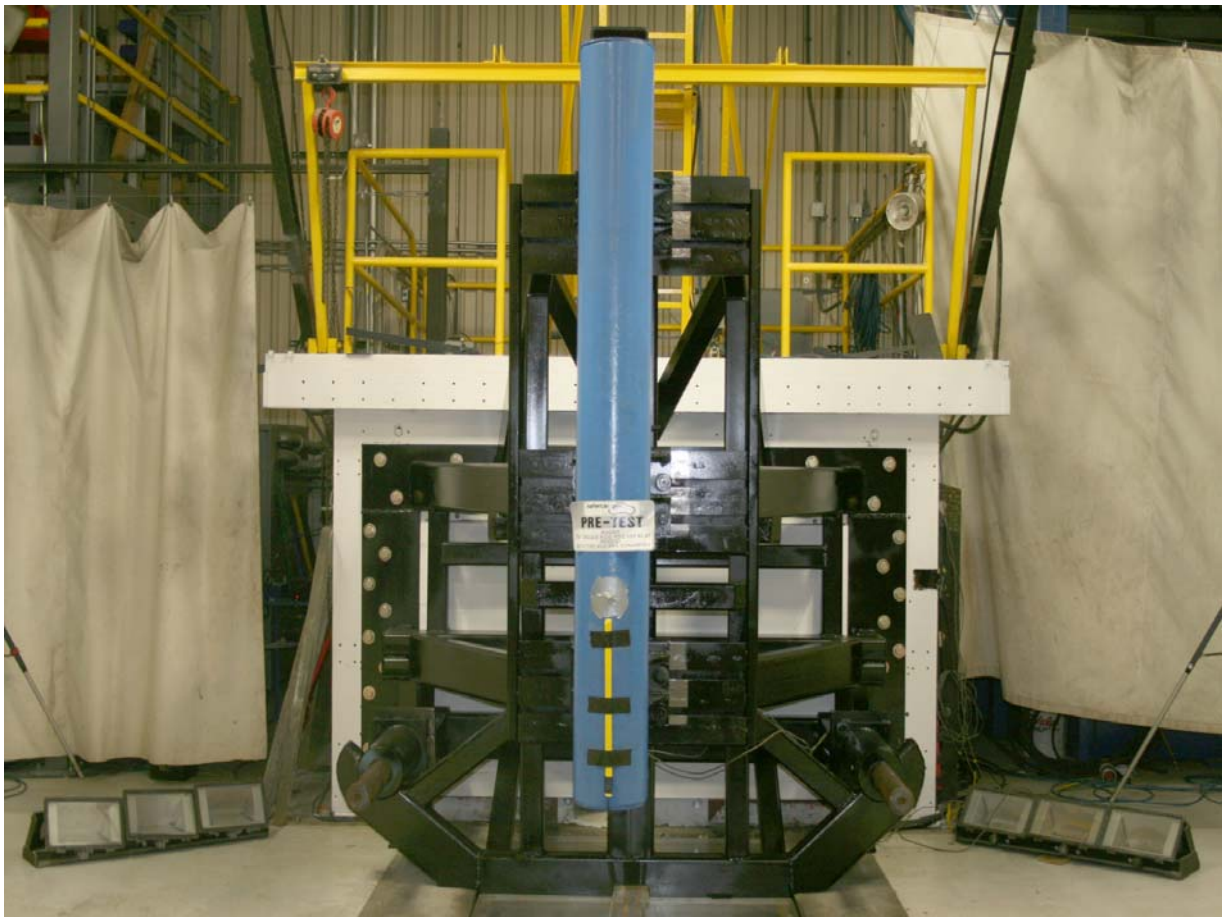
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



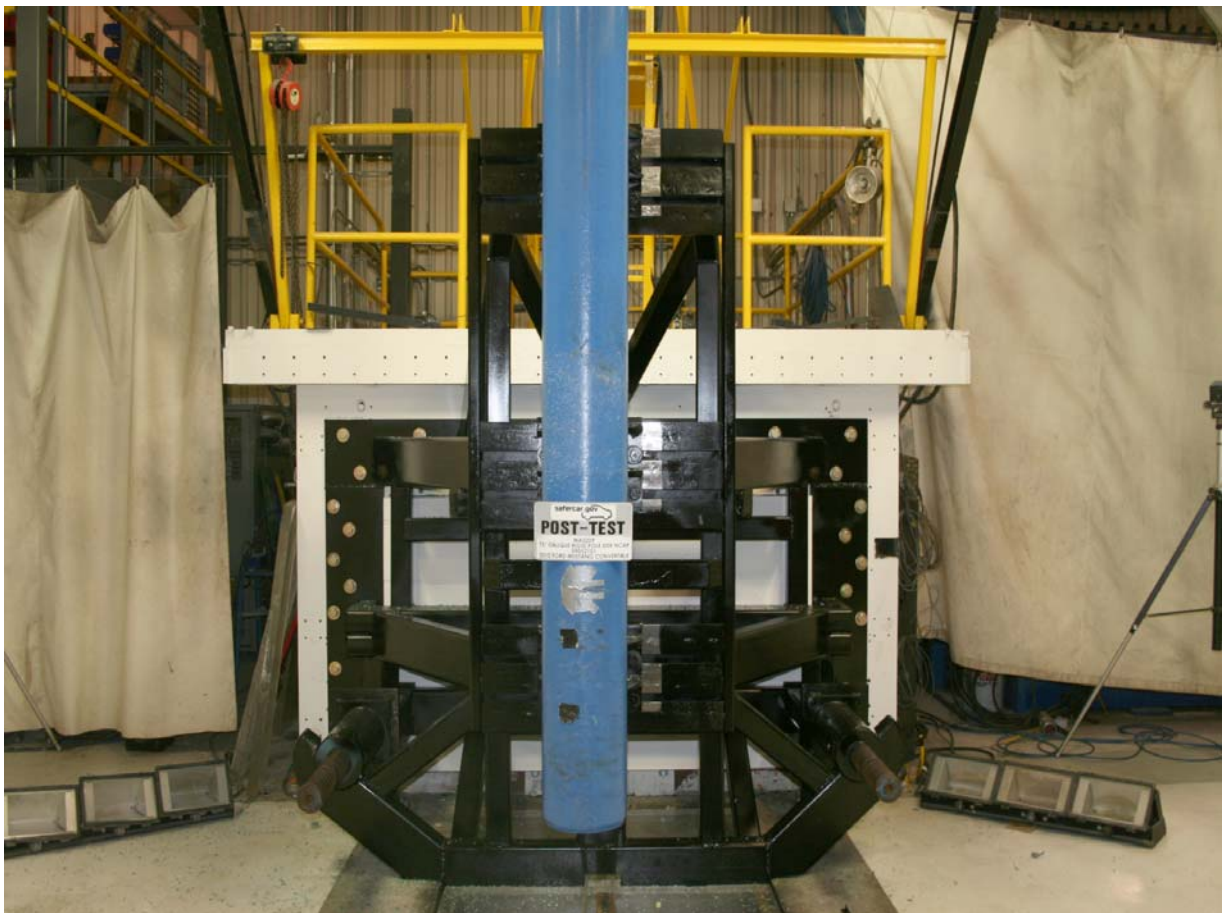
Close-Up View of Vehicle's Certification Label



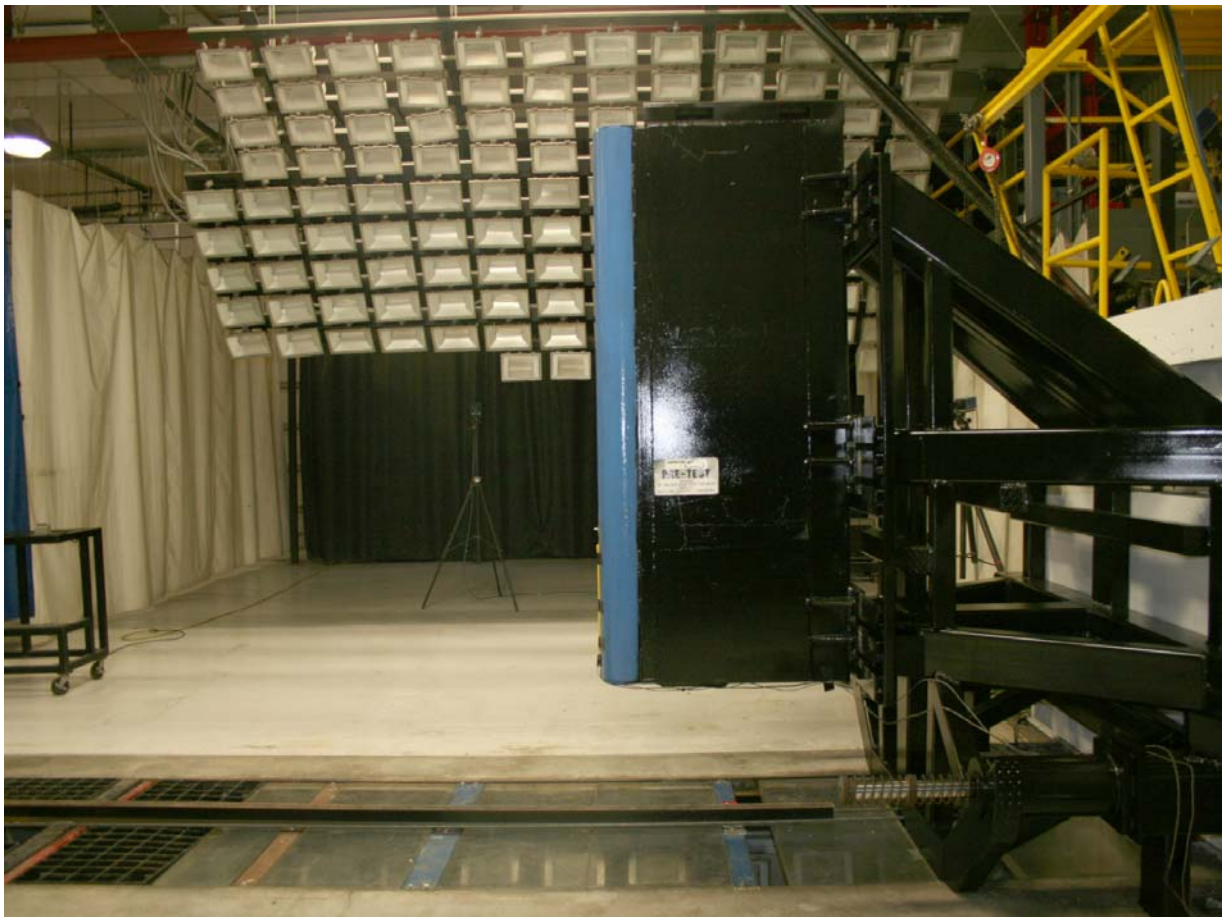
Close-Up View of Vehicle's Tire Information Placard of Label



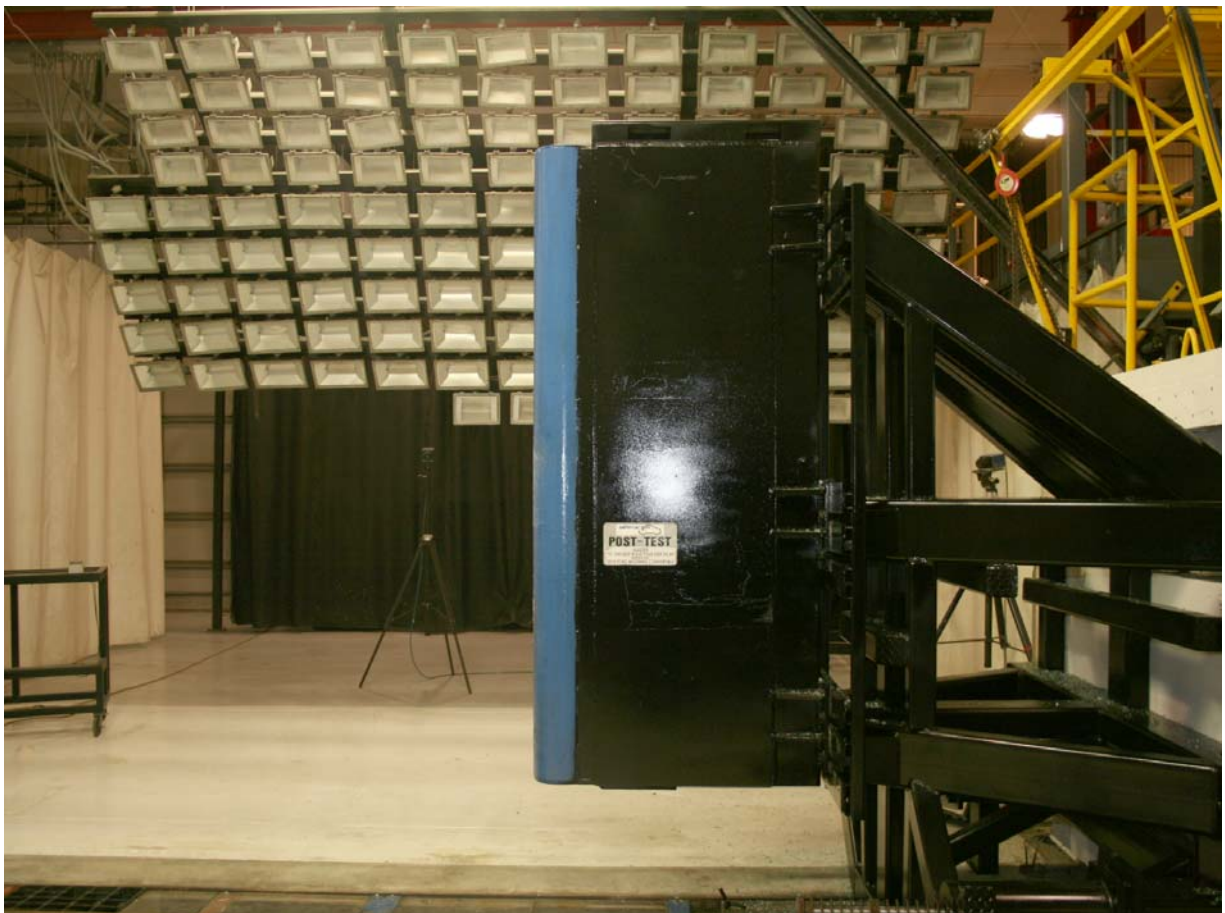
Pre-Test Pole Barrier Front View



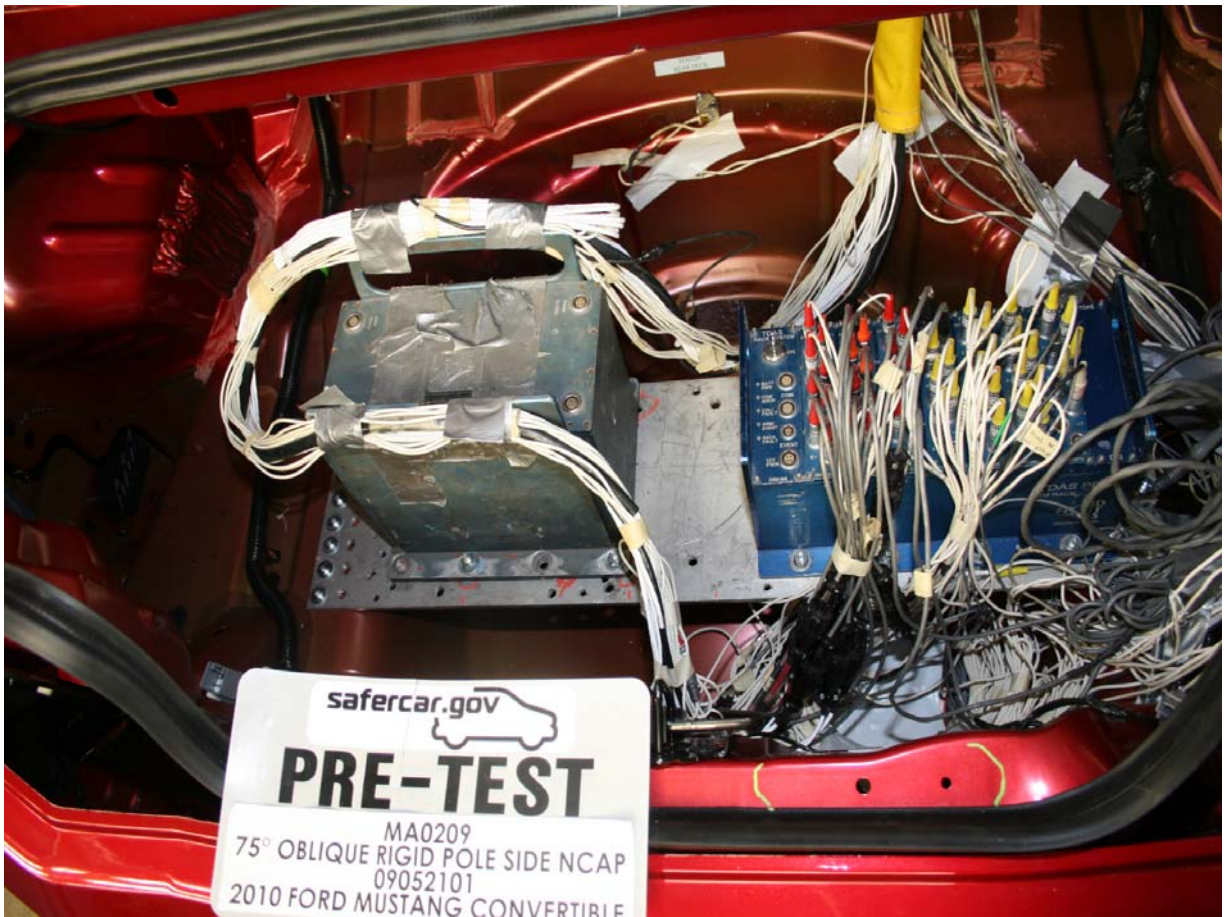
Post-Test Pole Barrier Front View



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

NO STATIC ROLLOVER PERFORMED

FMVSS No. 301/305 Rollover 0 Degrees

NO STATIC ROLLOVER PERFORMED

FMVSS No. 301/305 Rollover 90 Degrees

NO STATIC ROLLOVER PERFORMED

FMVSS No. 301/305 Rollover 180 Degrees

NO STATIC ROLLOVER PERFORMED

FMVSS No. 301/305 Rollover 270 Degrees

NO STATIC ROLLOVER PERFORMED

FMVSS No. 301/305 Rollover 360 Degrees



Impact Event (Impact Side)



www.fordvehicles.com

VEHICLE DESCRIPTION

MUSTANG

2010 V6 CONVERTIBLE PREMIUM

4.0L SOHC V6 ENGINE
5-SPEED AUTO TRANSMISSION

EXTERIOR
RED CANDY METALLIC W/TINTED
INTERIOR
CHAR BLACK TURNED MINI LEAT

A5 112160

PRICE INFORMATION

Manufacturer's
Suggested Retail Price

STANDARD VEHICLE PRICE \$28,995.00

INCLUDED ON THIS VEHICLE
• RAPID SPEC 202A 995.00
• AUTOMATIC HEADLAMP CONTROL
• V6 PONY PACKAGE
• GT REAR DECKLID SPOILER
• PONY TAPE STRIPE
• 18" POLISHED ALUM WHEEL
• FRT FLOOR MATS MUSTANG LOGO

OPTIONAL EQUIPMENT
2010 MODEL YEAR
RED CANDY METALLIC W/TINTED CC 300.00
• PREMIUM INTERIOR PACKAGE
5-SPEED AUTO TRANSMISSION 995.00
BRIGHT ROLLED EXHAUST TIPS NO CHARGE
FRONT LICENSE PLATE BRACKET NO CHARGE
SECURITY PACKAGE 395.00
• ACTIVE ANTI-THEFT SYSTEM
• WHEEL LOCKING KIT
COMFORT PACKAGE 595.00
• HEATED SEATS
SATIN BLACK TAPE STRIPE
VINYL CONVERTIBLE ROOF NO CHARGE
• BLACK
TOTAL OPTIONS 3,280.00

TOTAL VEHICLE & OPTIONS 32,275.00
DESTINATION & DELIVERY 850.00

This vehicle qualifies for auto insurance discounts, call
1-866-367-3131 or visit www.fordautoinsurance.com for
availability in your state.

TOTAL MSRP \$33,125.00

GOVERNMENT SAFETY RATINGS

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

Star ratings based on the risk of injury in a side impact.

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 call 1-888-327-4236

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- LED SEQUENTIAL TAILLAMPS
- VARIABLE INTERVAL WIPERS
- REAR WINDOW DEFROSTER
- POWER CONVERTIBLE TOP

INTERIOR

- LEATHER TRIM SPORT SEATS
- POWER 6-WAY DRIVERS SEAT
- MANUAL 2-WAY FRT PASS SEAT
- CENTER CONSOLE W/ARMREST
- AIR CONDITIONING
- AMBIENT LIGHTING
- SHAKER 500 AUDIO SYSTEM
- AM/FM IN-DASH 6CD/MP3
- CAPABL W/AUX JACK
- SYNC VOICE ACTIVATED SYS
- LTHR WRAPPED STEERING WHL
- CRUISE CONTROL & TILT
- MESSAGE CENTER
- FRONT FLOOR MATS - BLACK

FUNCTIONAL

- ADVANCETRAC W/ESC
- EASY FUEL CAPLESS FILLER
- BRAKES, POWER 4-WHEEL DISC
- POWER POINTS (2)
- PWR WIN, LOCKS, MIRRORS,
- REMOTE KEYLESS ENTRY

SAFETY/SECURITY

- ILLUMINATED ENTRY
- DRIVER/PASSENGER AIR BAGS
- SIDE AIRBAGS
- PERSONAL SAFETY SYSTEM
- LATCH CHILD SAFETY SYSTEM
- SECURILOCK PASS ANTI THEFT
- TIRE PRESSURE MONITOR SYS
- SOS POST CRASH ALERT SYS

WARRANTY

- 3YR/36,000 BUMPER TO BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST

EPA Fuel Economy Estimates

CITY MPG

16

Expected range
for most drivers
14 to 18 MPG

HIGHWAY MPG

24

Expected range
for most drivers
20 to 28 MPG

Estimated
Annual Fuel Cost

\$1,500

based on 15,000 miles
at \$1.90 per gallon

Combined Fuel Economy

This Vehicle

19

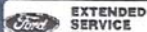
12 32

All Subcompacts

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

SOLD TO 41B 077 Bredemann Ford In Glenview Glenview IL 60025	ONE CL5P	DEALER NO. 41B 077	METHOD OF TRANSP. CONVOY ITEM # 41-A000 O/T 2
SHIP TO (if other than SOLD TO)	TWO	12VBP8EN9A5112160 	
SHIP THROUGH	FINAL ASSEMBLY POINT FLAT ROCK	The label is affixed pursuant to the Federal Automobile Information Disclosure Act, Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above. 9D091 N RA 2X 025 001773 04 09 09	



EXTENDED
SERVICE

Ford Extended Service Plan is the only service contract backed by Ford and honored at all Ford and Lincoln Mercury Dealers. Ask your dealer for prices and additional details or see our website at www.ford-esp.com

Monroney Label

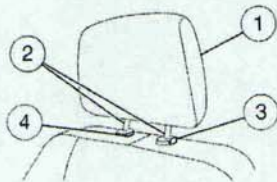
Adjustable head restraints

Your vehicle is equipped with front row outboard head restraints that are vertically adjustable.

WARNING: To minimize the risk of neck injury in the event of a crash, the driver and passenger occupants should not sit in and/or operate the vehicle until the head restraint is placed in its proper position. The driver should never adjust the head restraint while the vehicle is in motion.

The adjustable head restraints consist of :

- a trimmed energy absorbing foam and structure (1),
- two steel stems (2),
- a guide sleeve adjust/release button (3),
- and a guide sleeve unlock/remove button (4).

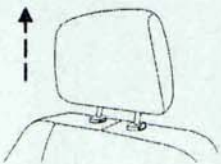


109

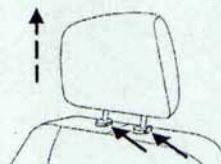
Seating and Safety Restraints

To remove the adjustable head restraint, do the following:

1. Pull up the head restraint until it reaches the highest adjustment position.

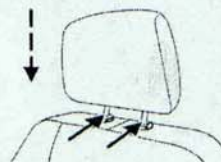


2. Simultaneously press and hold both the adjust/release button and the unlock/remove button, then pull up on the head restraint.



To reinstall the adjustable head restraint, do the following:

1. Insert the two stems into the guide sleeve collars.
2. Push the head restraint down until it locks.



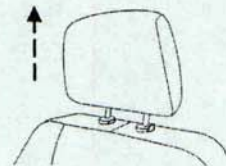
Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

111

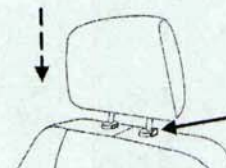
Seating and Safety Restraints

To adjust the head restraint, do the following:

1. Adjust the seatback to an upright driving/riding position.
2. Raise the head restraint by pulling up on the head restraint.



3. Lower the head restraint by pressing and holding the guide sleeve adjust/release button and pushing down on the head restraint.



Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

WARNING: The adjustable head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

110

Seating and Safety Restraints

WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

Adjusting the front manual seat (if equipped)

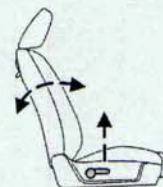
WARNING: Never adjust the driver's seat or seatback when the vehicle is moving.

WARNING: Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

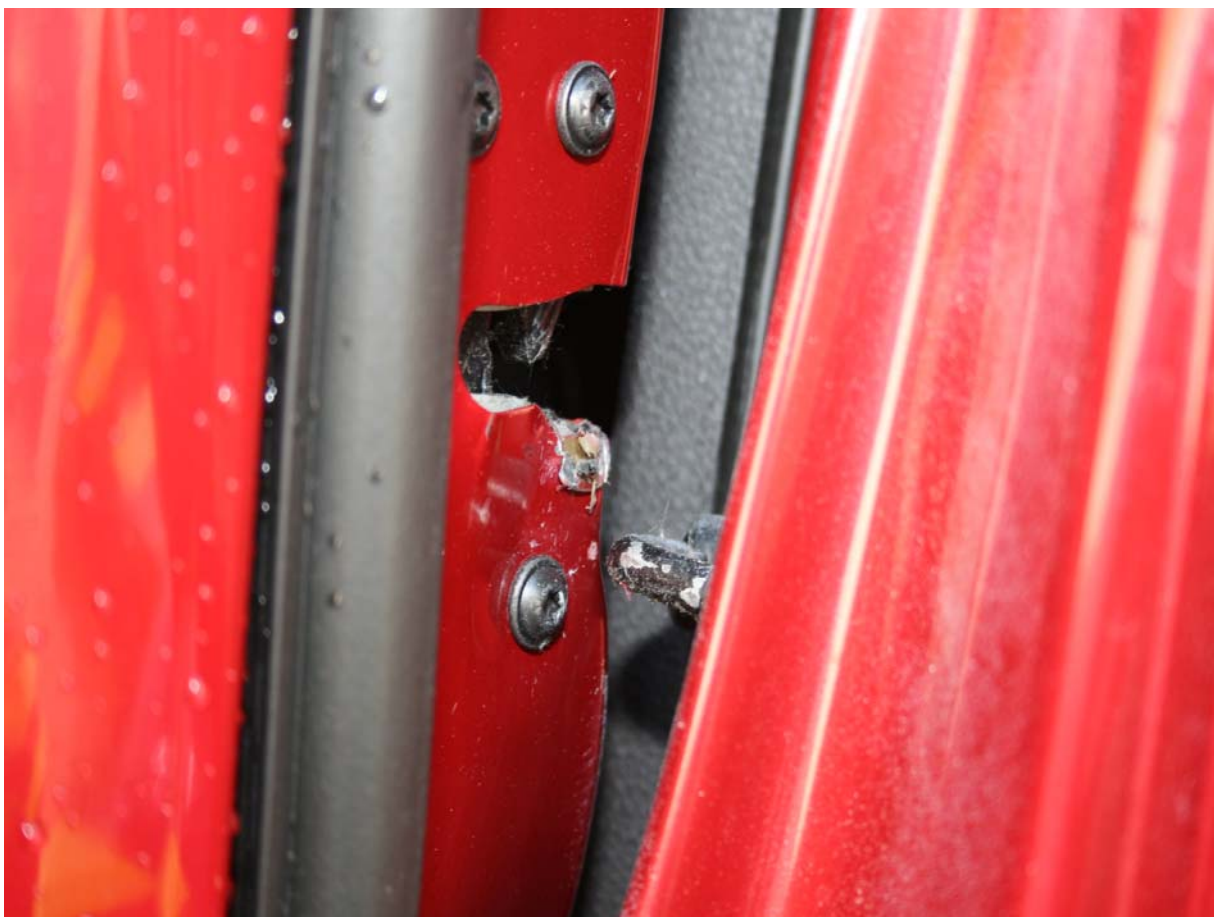
Lift handle to move seat forward or backward.



Pull lever up to adjust the angle of the seatback.



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Left Door Latch Post-Test

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

		<u>Page No.</u>
	List of Data Plots Provided in the Test Report	
Figure No. 1.	Driver Head Acceleration (X) Primary vs. Time	B-1
Figure No. 2.	Driver Head Acceleration (Y) Primary vs. Time	B-1
Figure No. 3.	Driver Head Acceleration (Z) Primary vs. Time	B-1
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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Figure No. 9.	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-3
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Figure No. 11.	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-3

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 Neck Force (X)

Driver Upper Neck Force (Y)

Driver Upper Neck Force (Z)

Driver Upper Neck Moment About X

Driver Upper Neck Moment About Y

Driver Upper Neck Moment About Z

Driver Shoulder Deflection (Y)

Driver Upper Thorax Rib Deflection (Y)

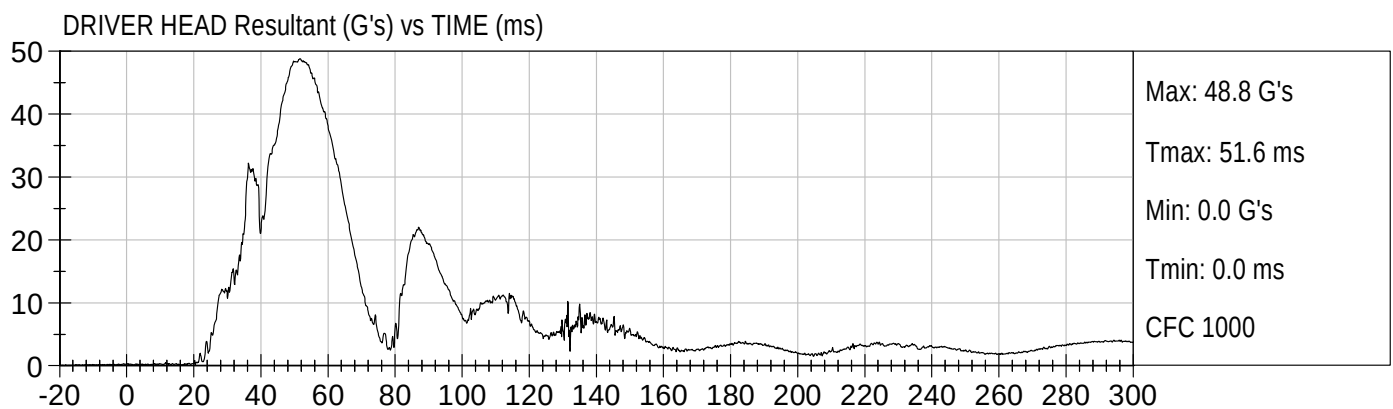
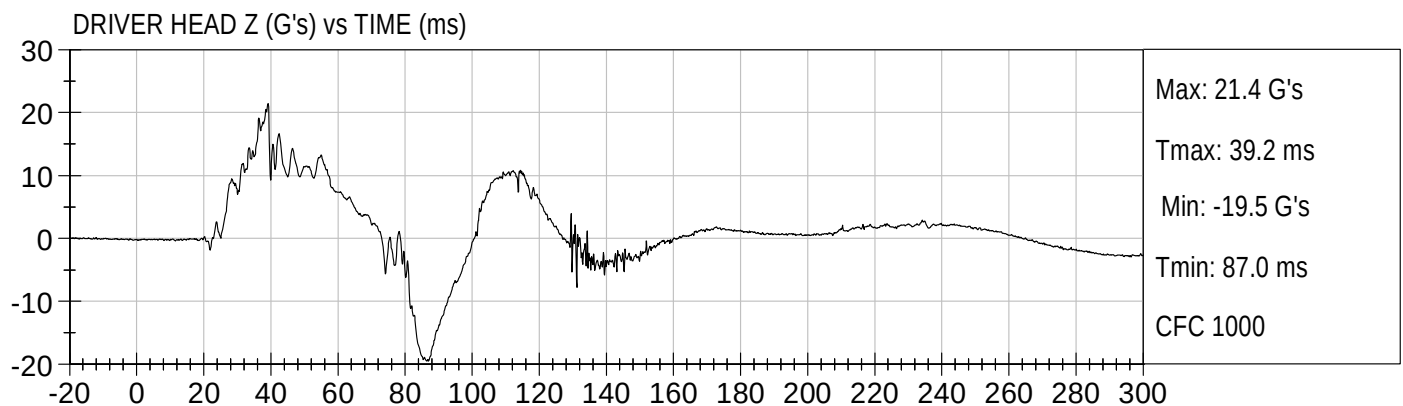
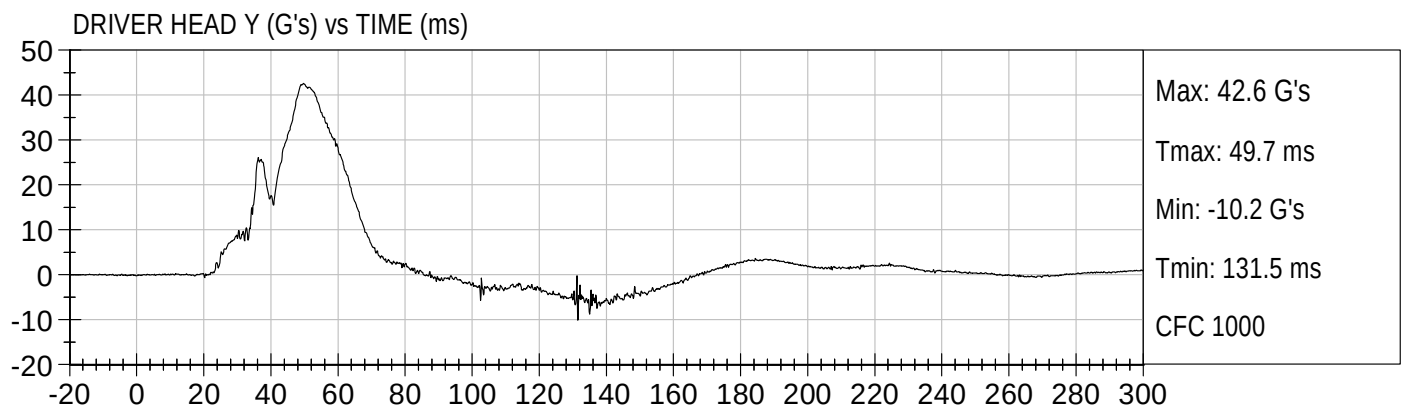
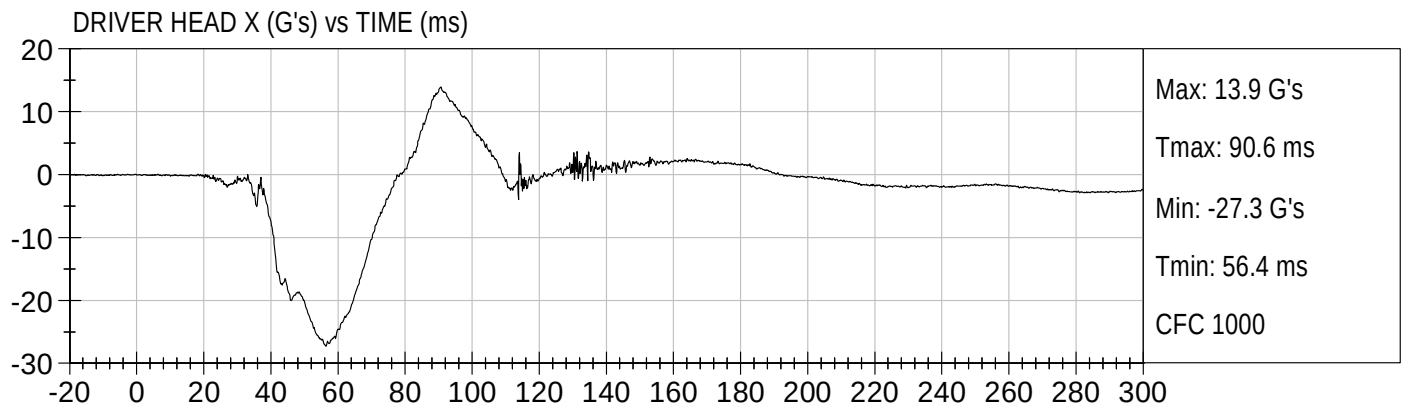
Driver Middle Thorax Rib Deflection (Y)

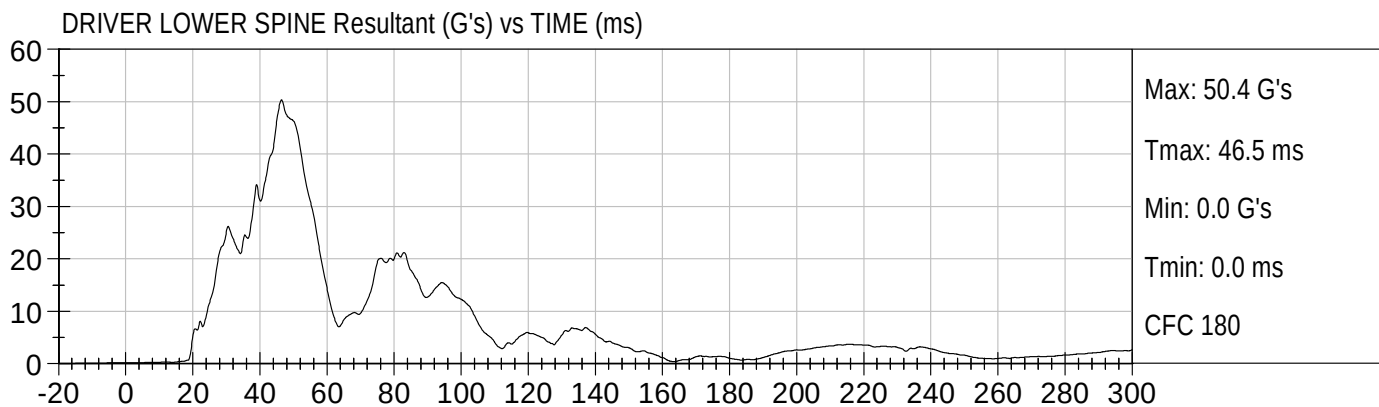
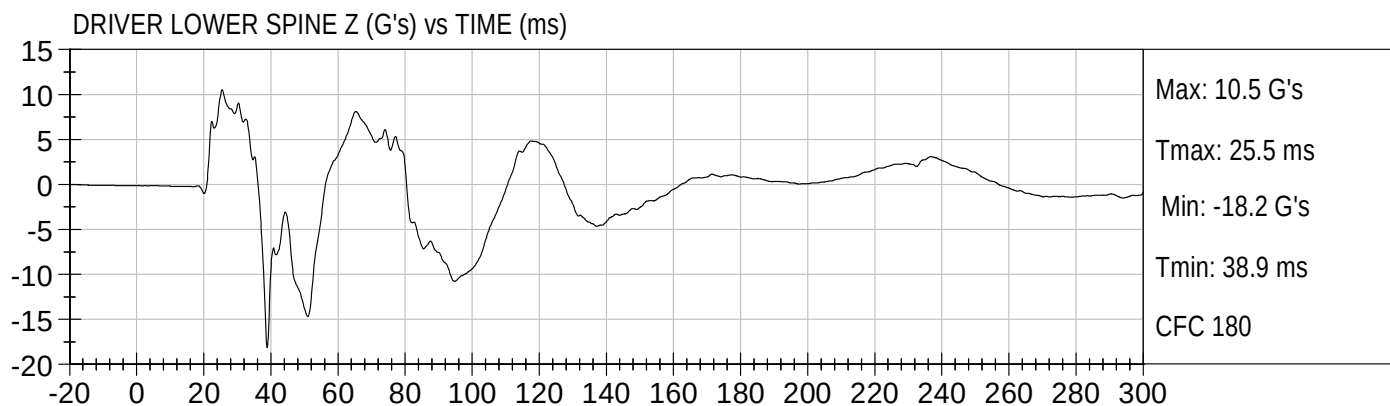
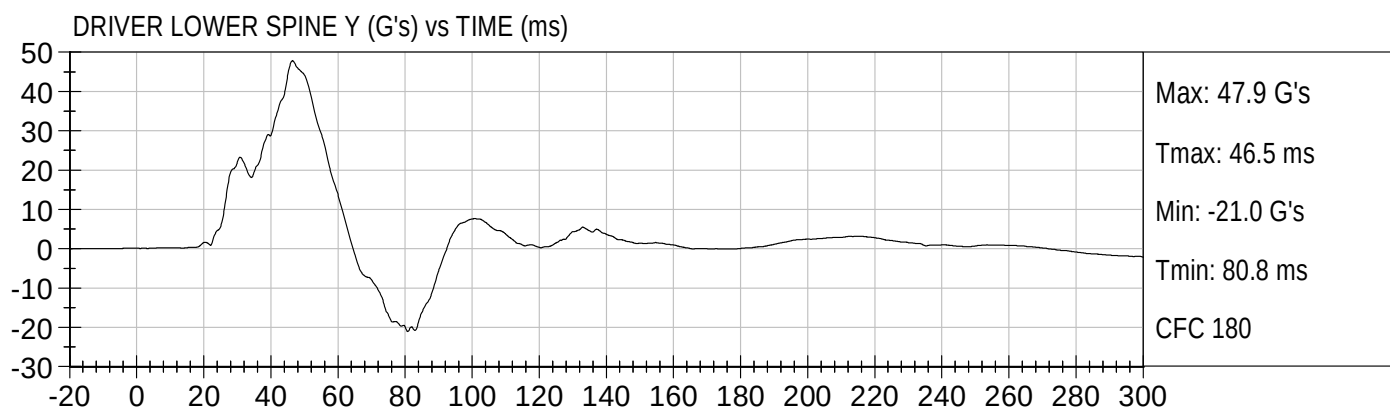
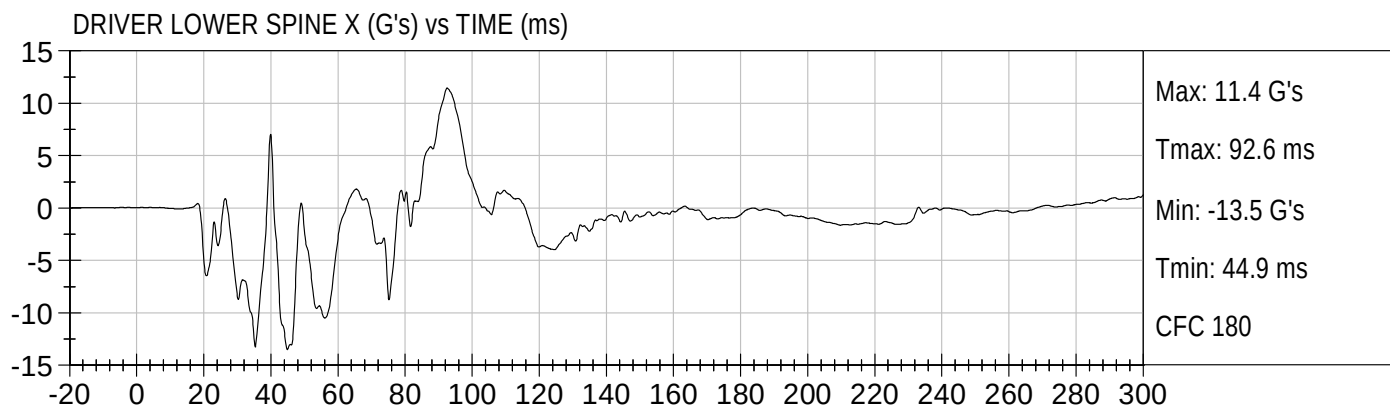
Driver Lower Thorax Rib Deflection (Y)

Driver Upper Abdomen Rib Deflection (Y)

Driver Lower Abdomen Rib Deflection (Y)

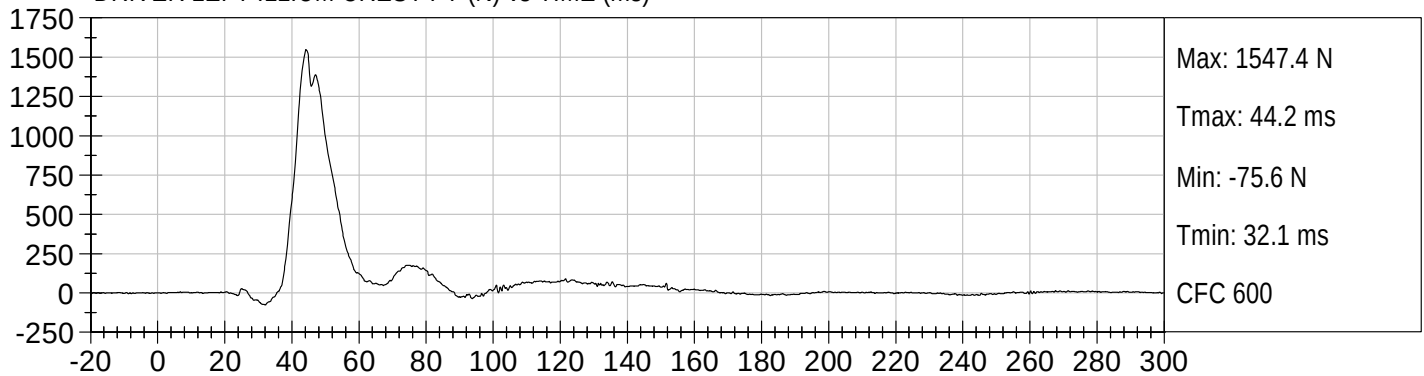
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Vehicle CG Acceleration (X)
Vehicle CG Acceleration (Y)
Vehicle CG Acceleration (Z)
Vehicle CG Angular Rate About X (Roll)
Vehicle CG Angular Rate About Y (Pitch)
Vehicle CG Angular Rate About Z (Yaw)
Left Floor Sill 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
ACU (X)
ACU (Y)
ACU (Z)
SIS LH (Y)
SIS RH (Y)



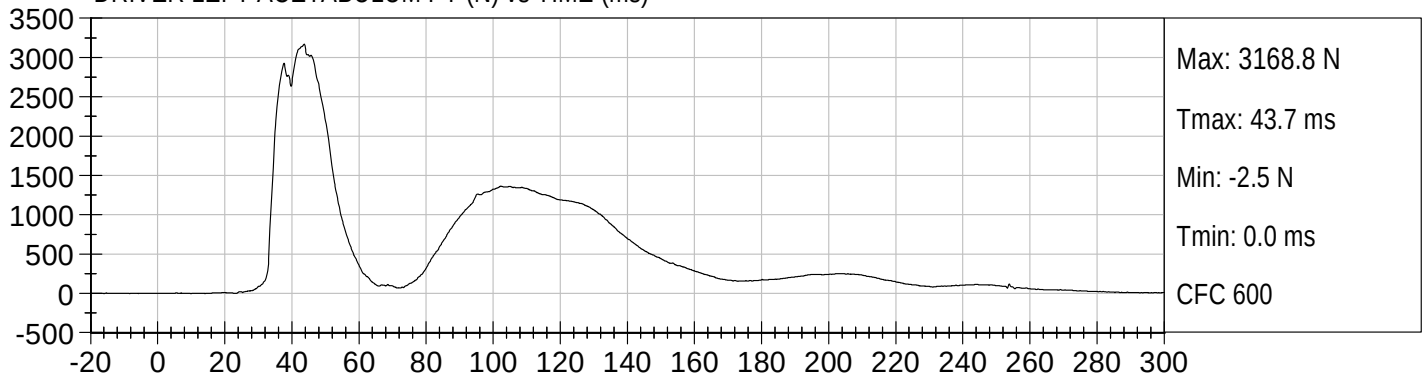




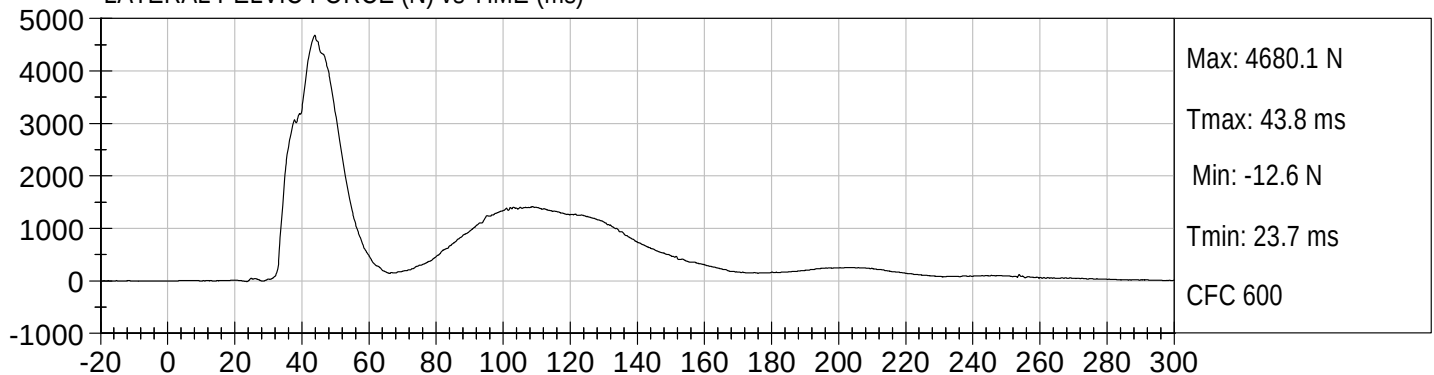
DRIVER LEFT ILLIUM CREST FY (N) vs TIME (ms)



DRIVER LEFT ACETABULUM FY (N) vs TIME (ms)



LATERAL PELVIC FORCE (N) vs TIME (ms)



APPENDIX C

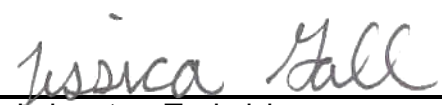
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

ATD Serial No: 296

Test ID: D091191

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	46	Pass
Peak Resultant Acceleration	G's	115 to 137	118	Pass
Peak Lateral Acceleration	G's	+/- 15	-4.1	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

5/15/09
Test Date

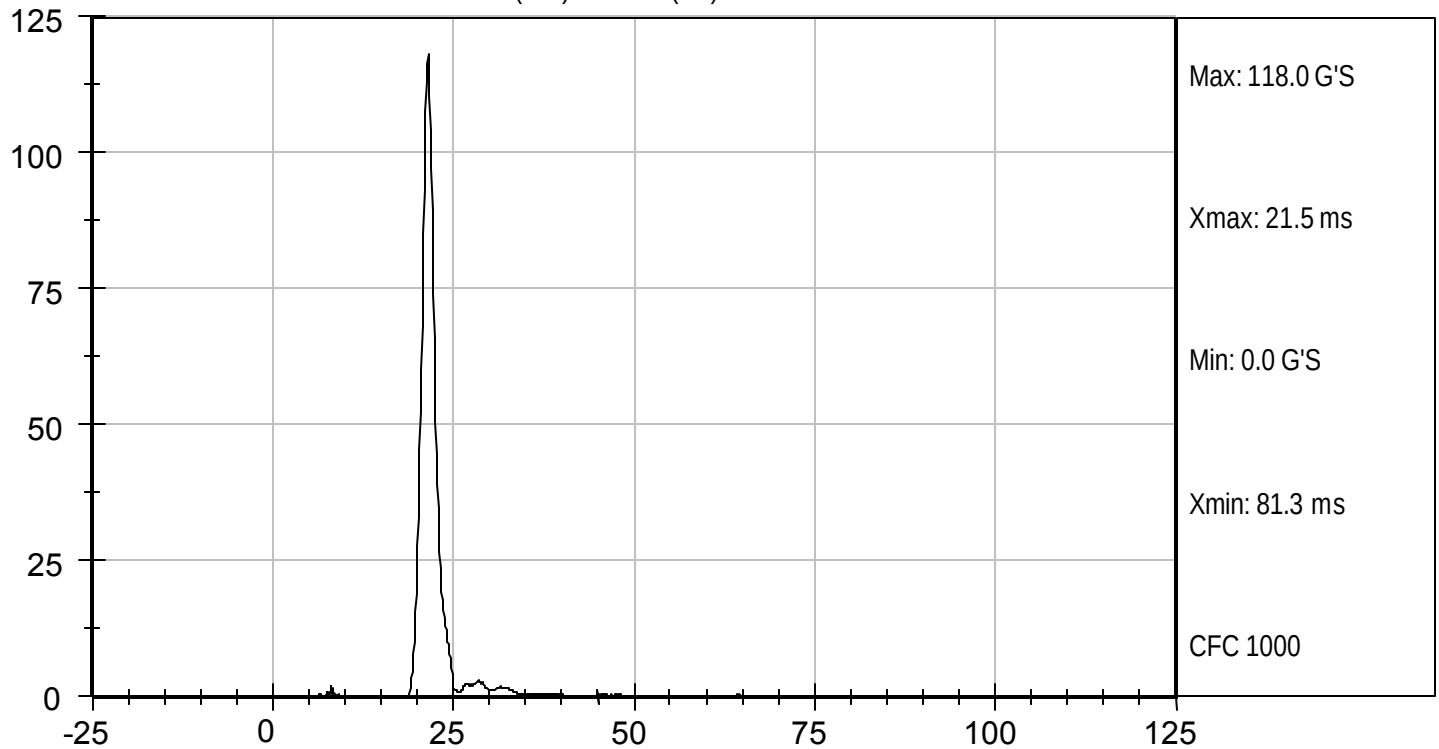

Approved By



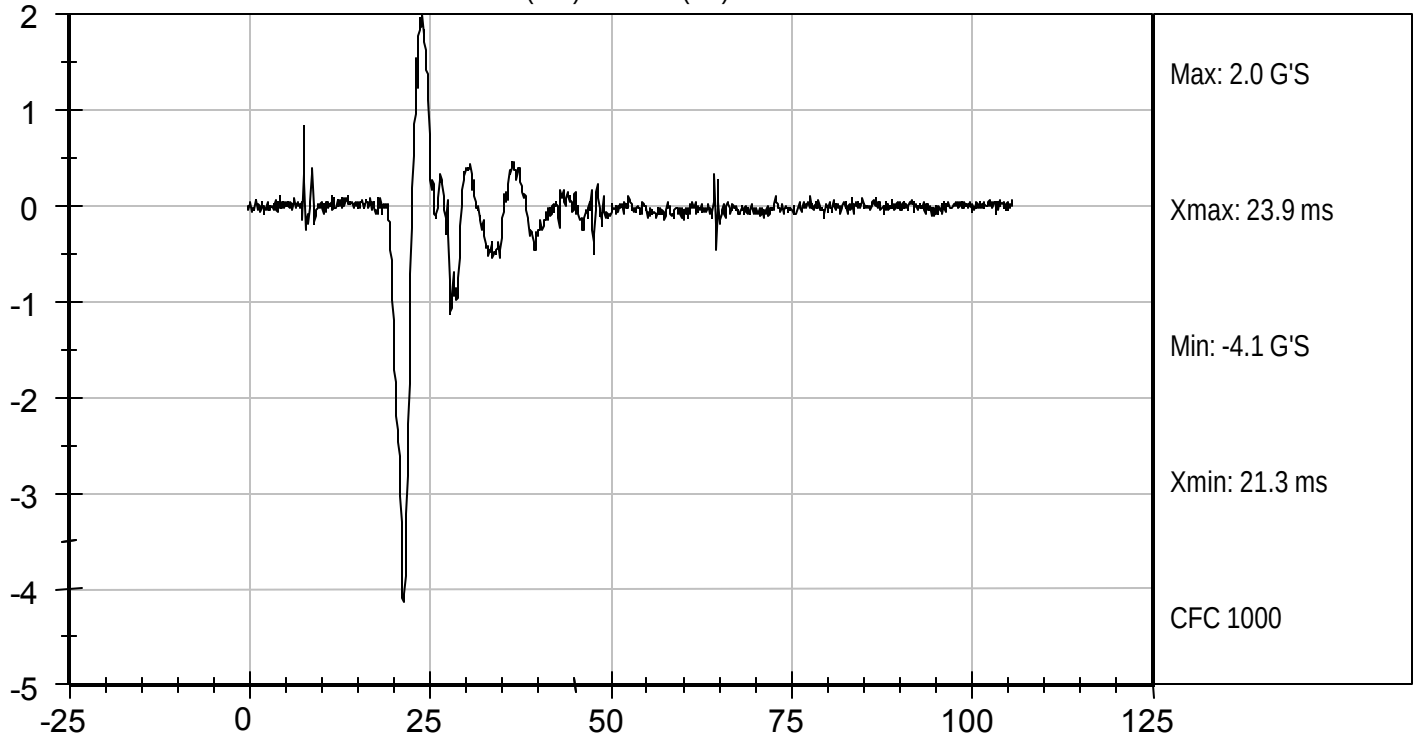
Test Desc: Head Drop
Component ID: D091191

Test Date: 5/15/09
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G'S) vs TIME (ms)



PEAK LONGITUDINAL ACCELERATION (G'S) vs TIME (ms)

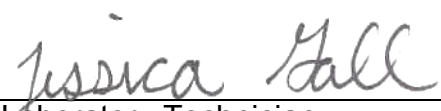


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091192

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.6	Pass
Humidity		%	10 to 70	46	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 msec	m/s	2.20 to 2.80	2.6	Pass
	15 msec	m/s	3.30 to 4.10	3.7	Pass
	20 msec	m/s	4.40 to 5.40	4.9	Pass
	25 msec	m/s	5.40 to 6.10	5.6	Pass
	25-100 msec	m/s	5.50 to 6.20	5.7	Pass
Maximum D-Plane Rotation		deg	71 to 81	71	Pass
Time of Maximum D-Plane Rotation		msec	50 to 70	62	Pass
Maximum Occipital Condyle Moment during Rotation Interval		Nm	-44 to -36	-41	Pass
Time of Moment Decay to 0 Nm		msec	102 to 126	116	Pass
Overall Test Results					Pass


 Laboratory Technician

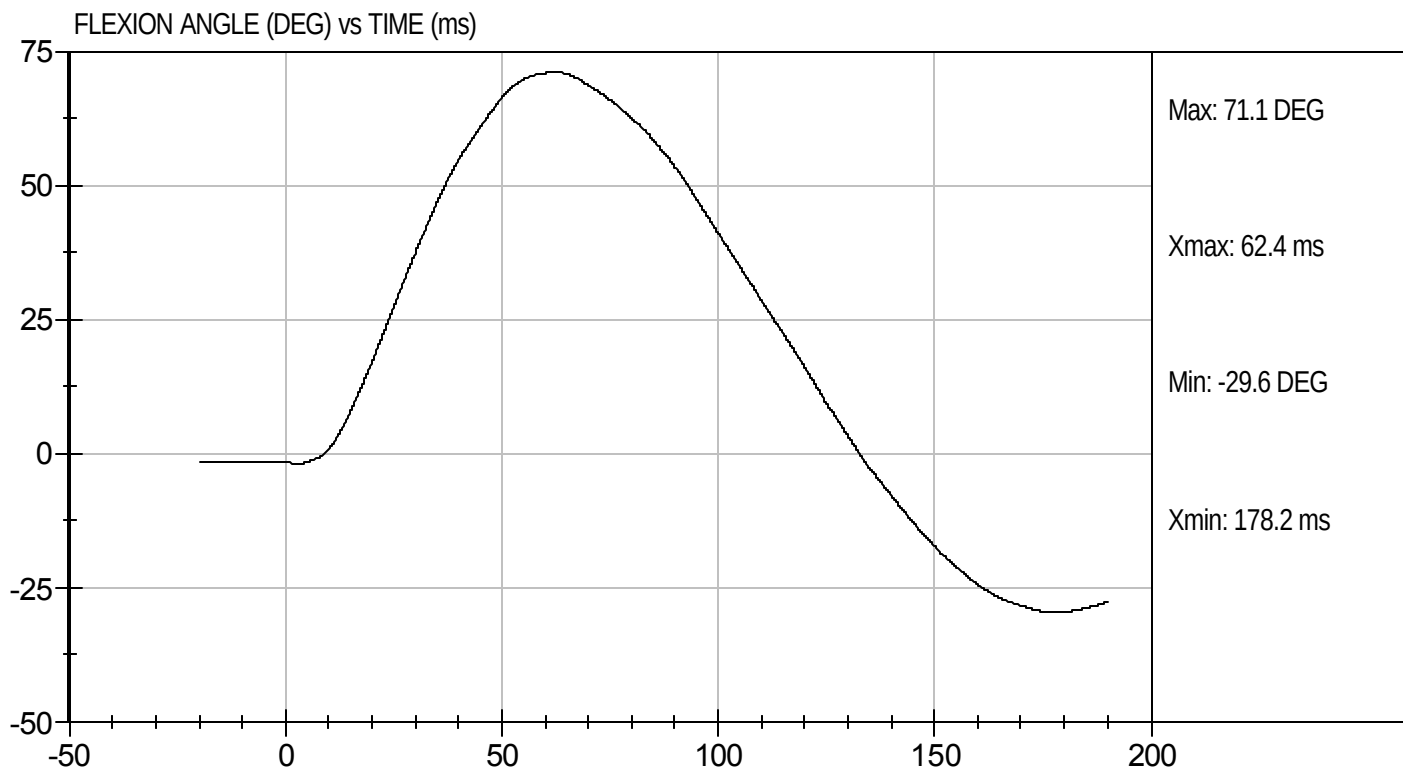
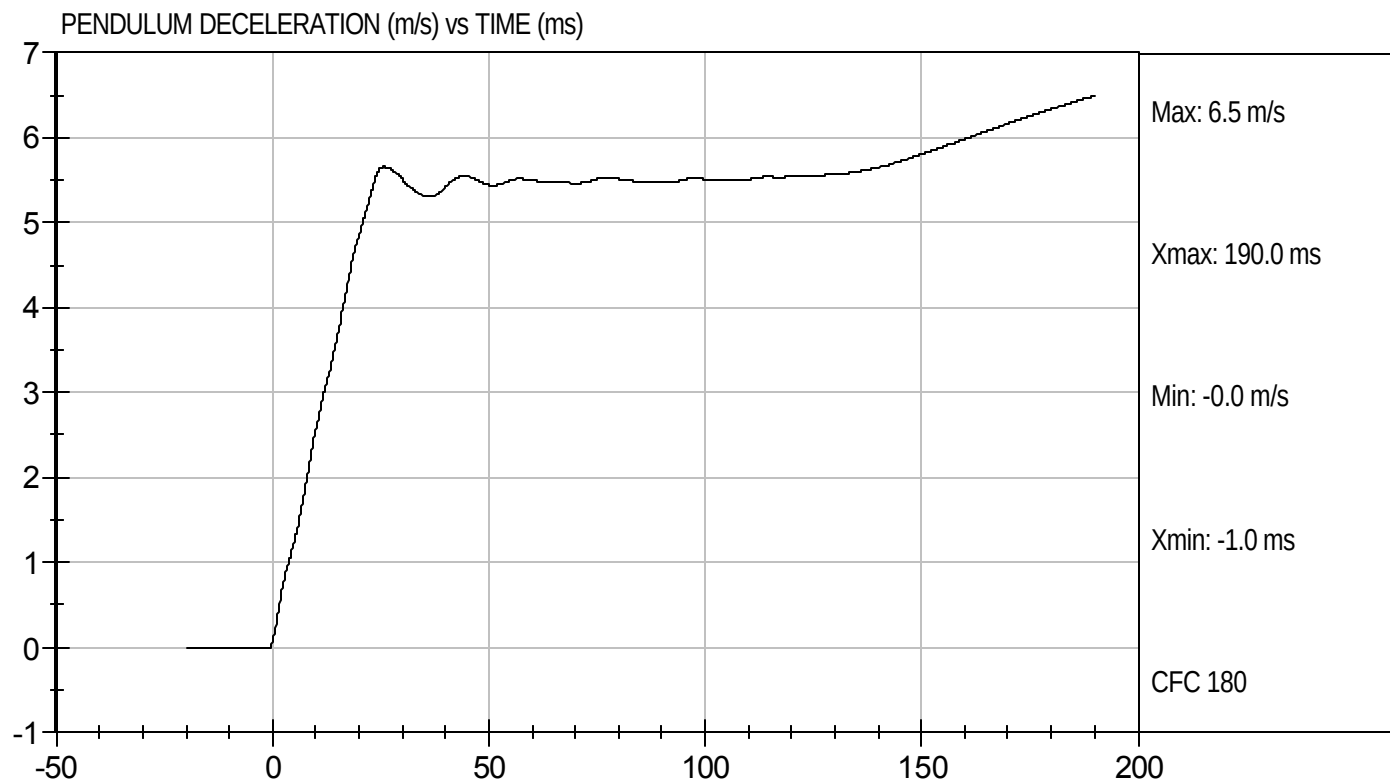
5/15/09
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D091192

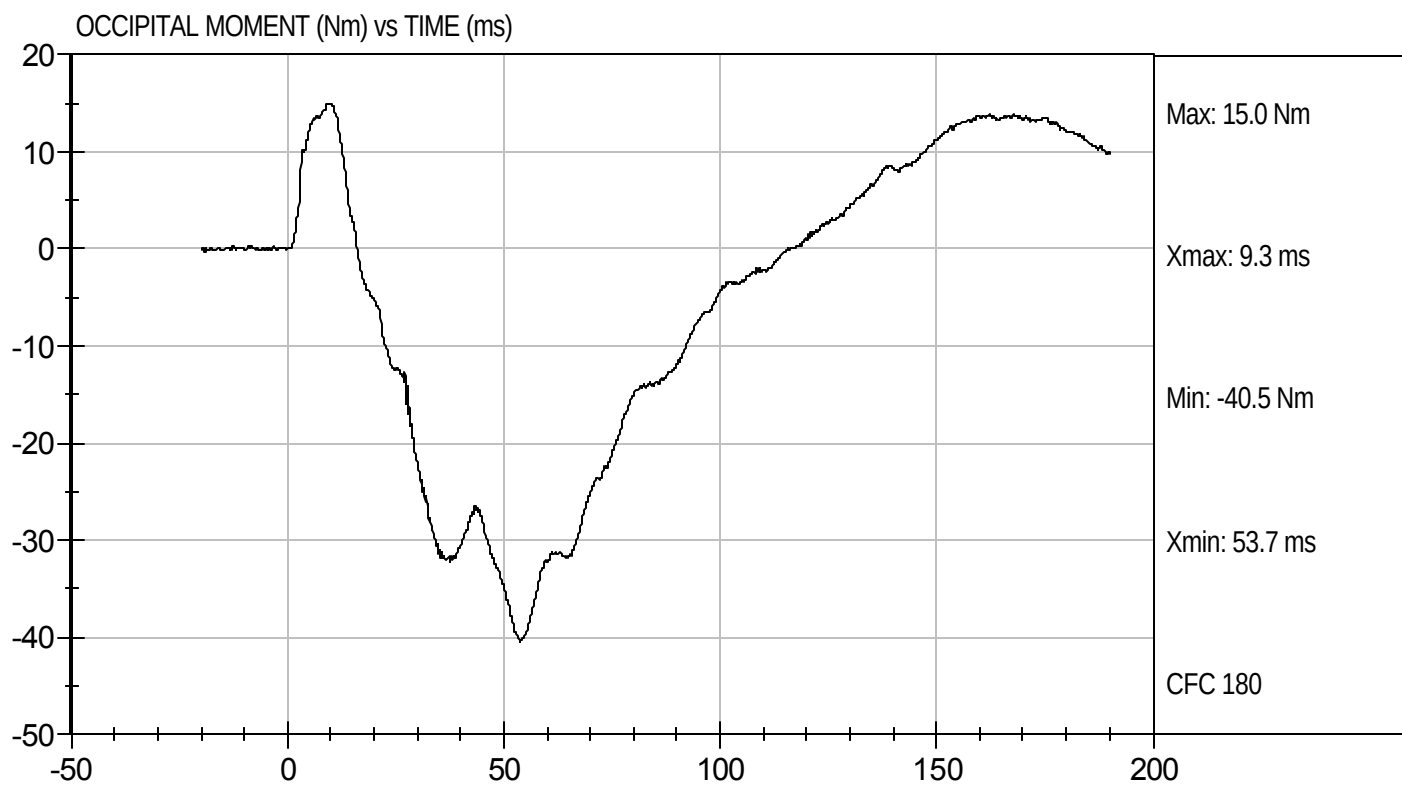
Test Date: 5/15/09
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D091192

Test Date: 5/15/09
Velocity: 18.32 ft/s, 5.58 m/s



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

ATD Serial No: 296

Test ID: D091193

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	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.39	Pass
Maximum Probe Acceleration	G's	13 to 18	16	Pass
Shoulder Displacement	mm	28 to 37	33	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

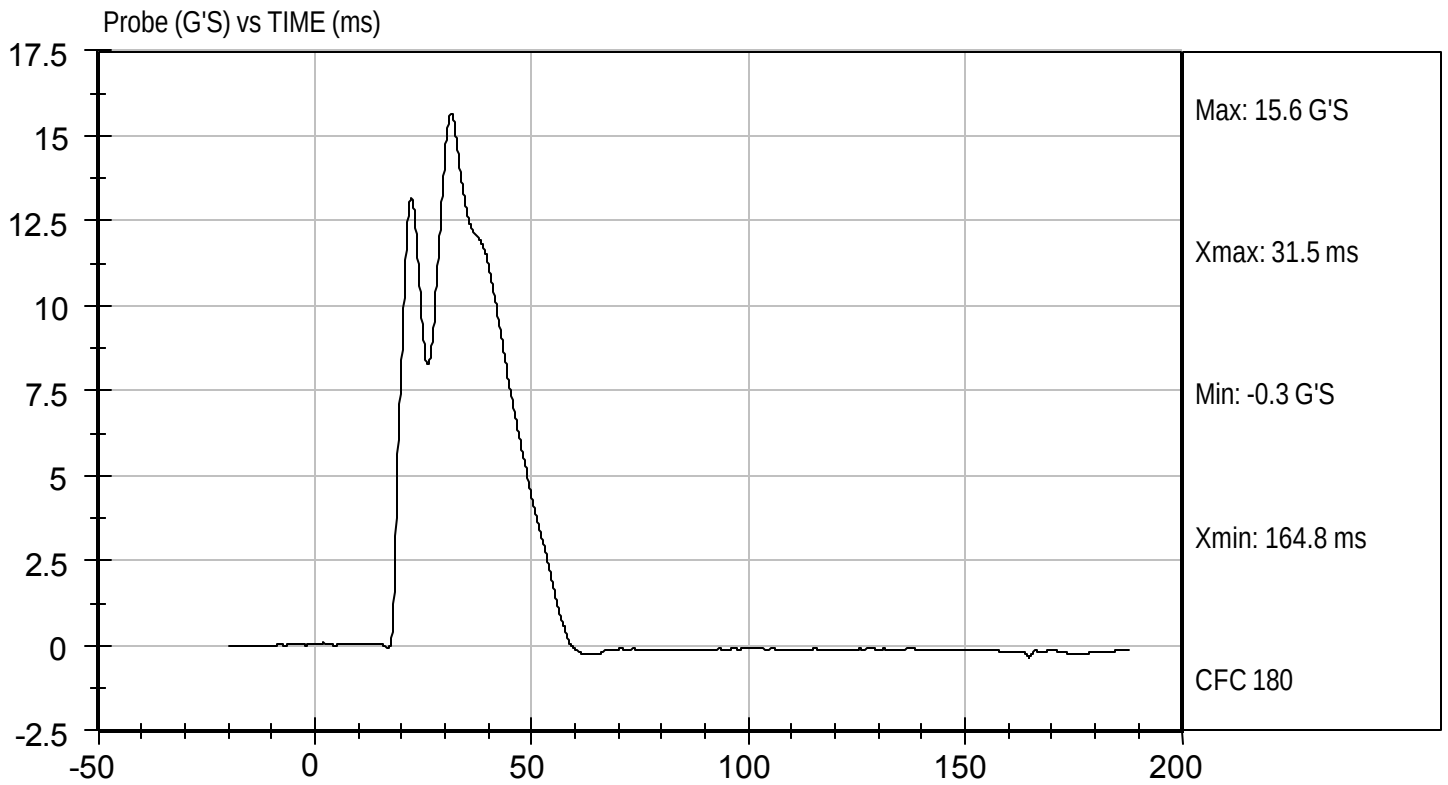
5/15/09
Test Date

David Winkelbauer
Approved By



Test Desc: Shoulder Impact
Component ID: D091193

Test Date: 5/15/09
Velocity: 14.4 ft/s, 4.39 m/s

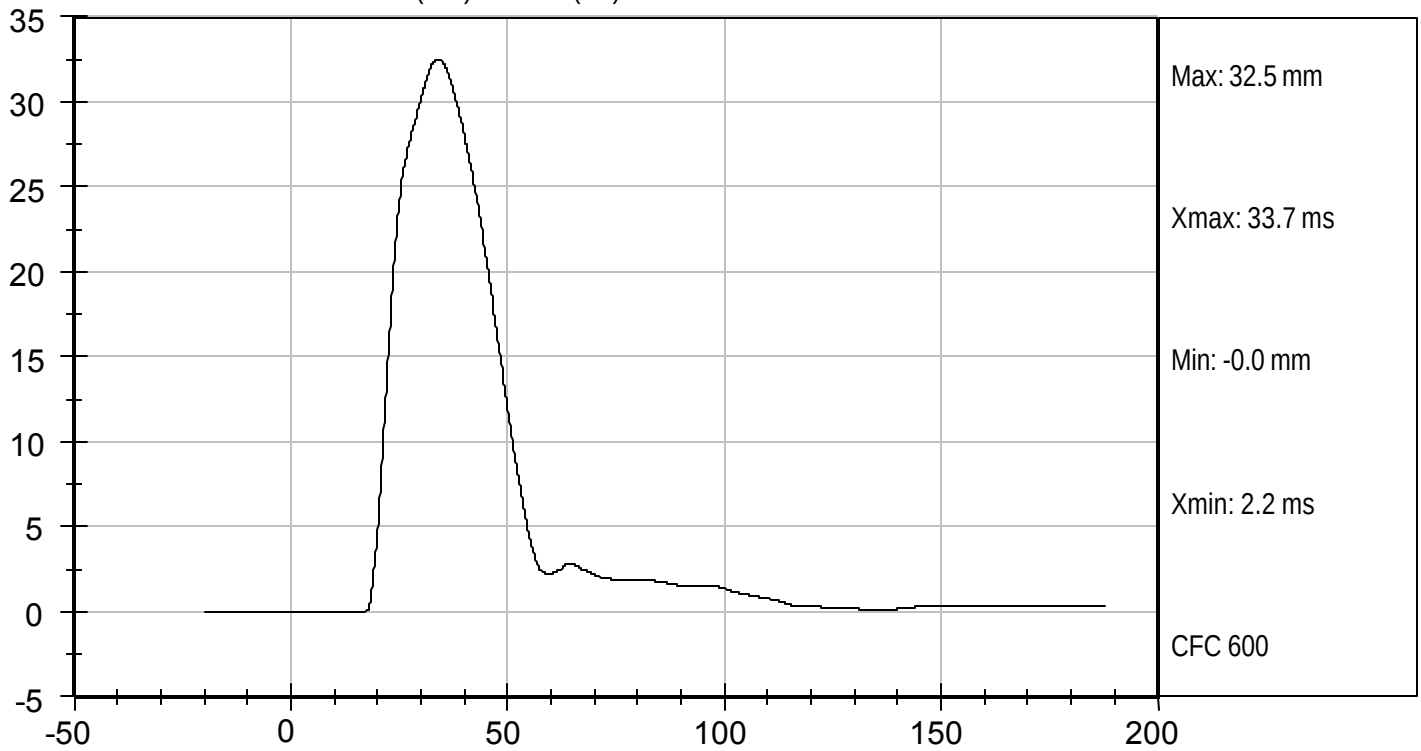




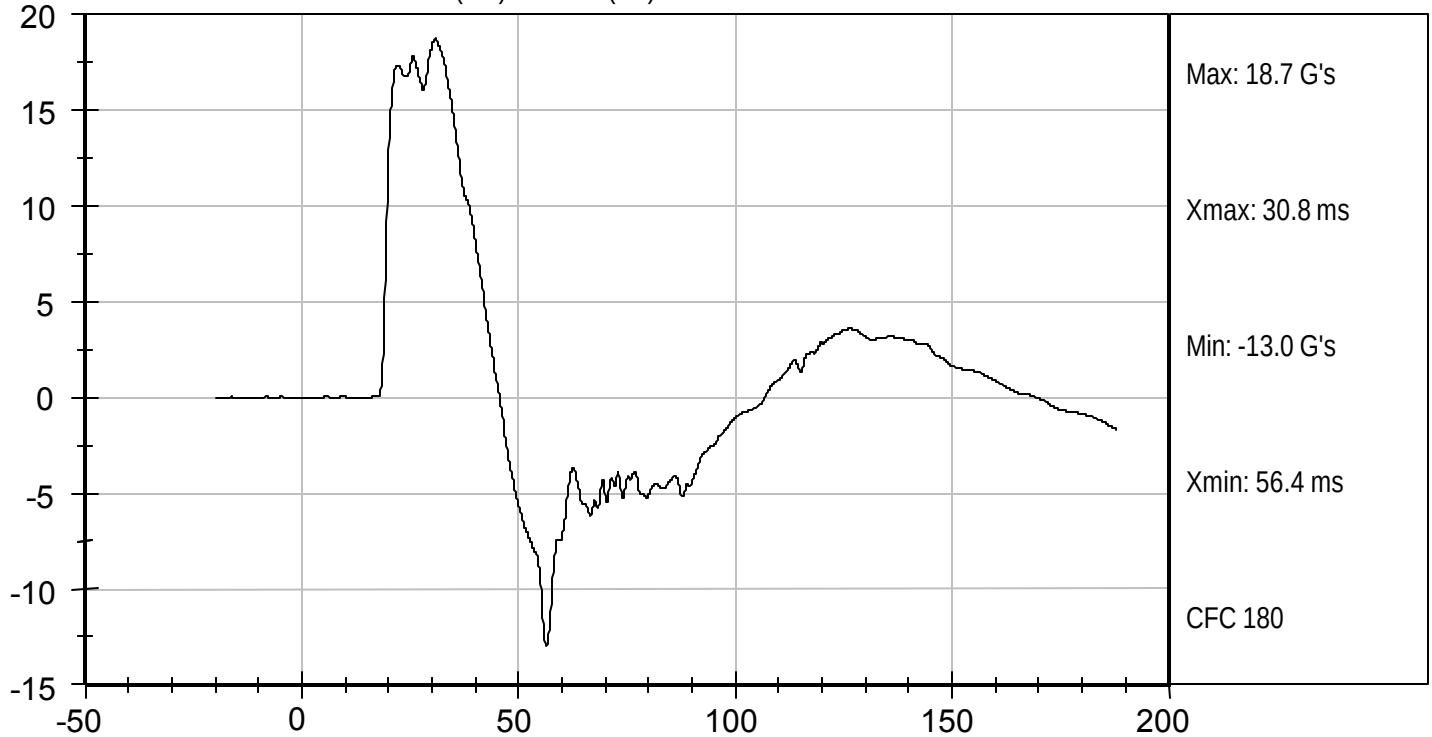
Test Desc: Shoulder Impact
Component ID: D091193

Test Date: 5/15/09
Velocity: 14.4 ft/s, 4.39 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

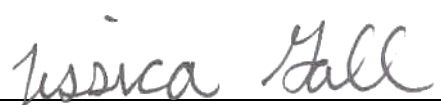


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091194

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	31 to 36	33	Pass
Shoulder Displacement	mm	31 to 40	37	Pass
Upper Rib Displacement	mm	25 to 32	28	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	35	Pass
Overall Test Results			Pass	


Laboratory Technician

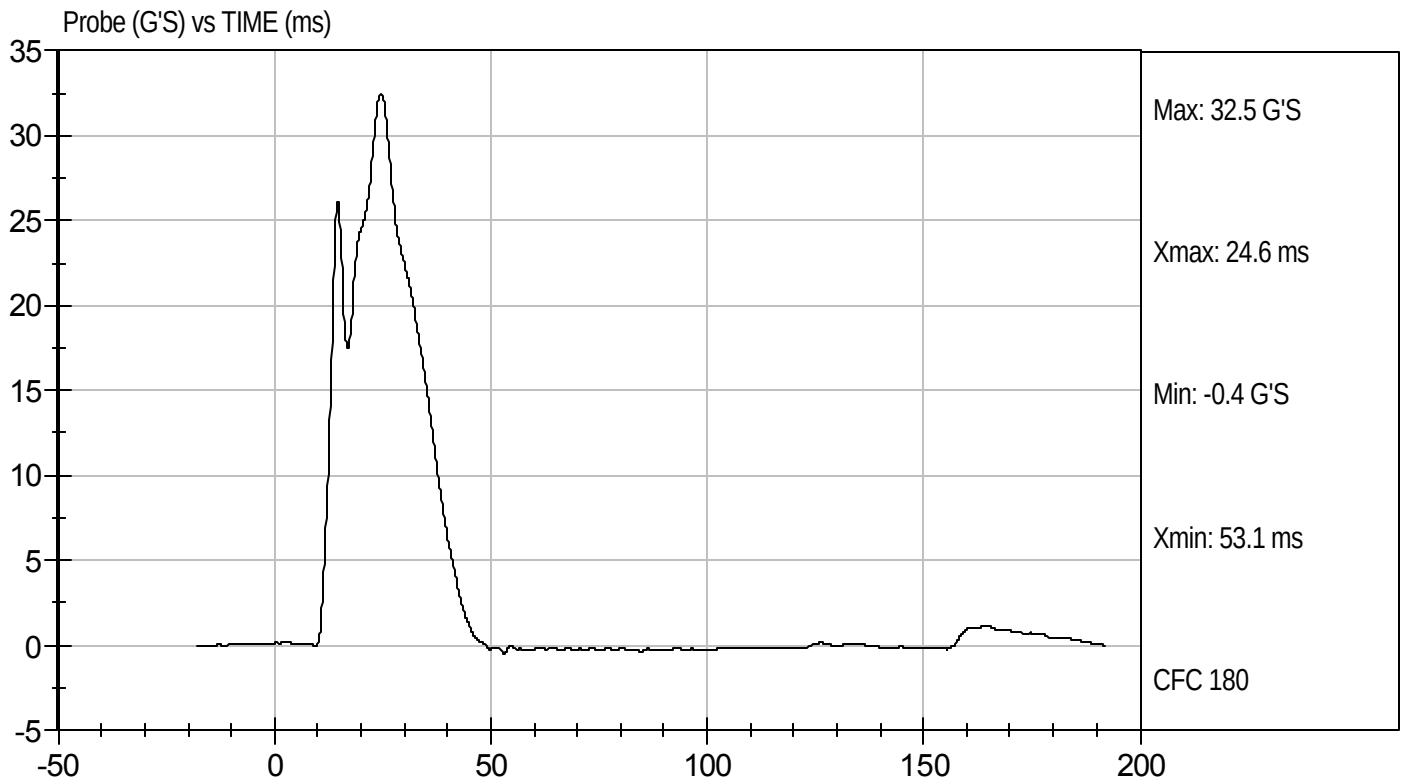
5/15/09
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D091194

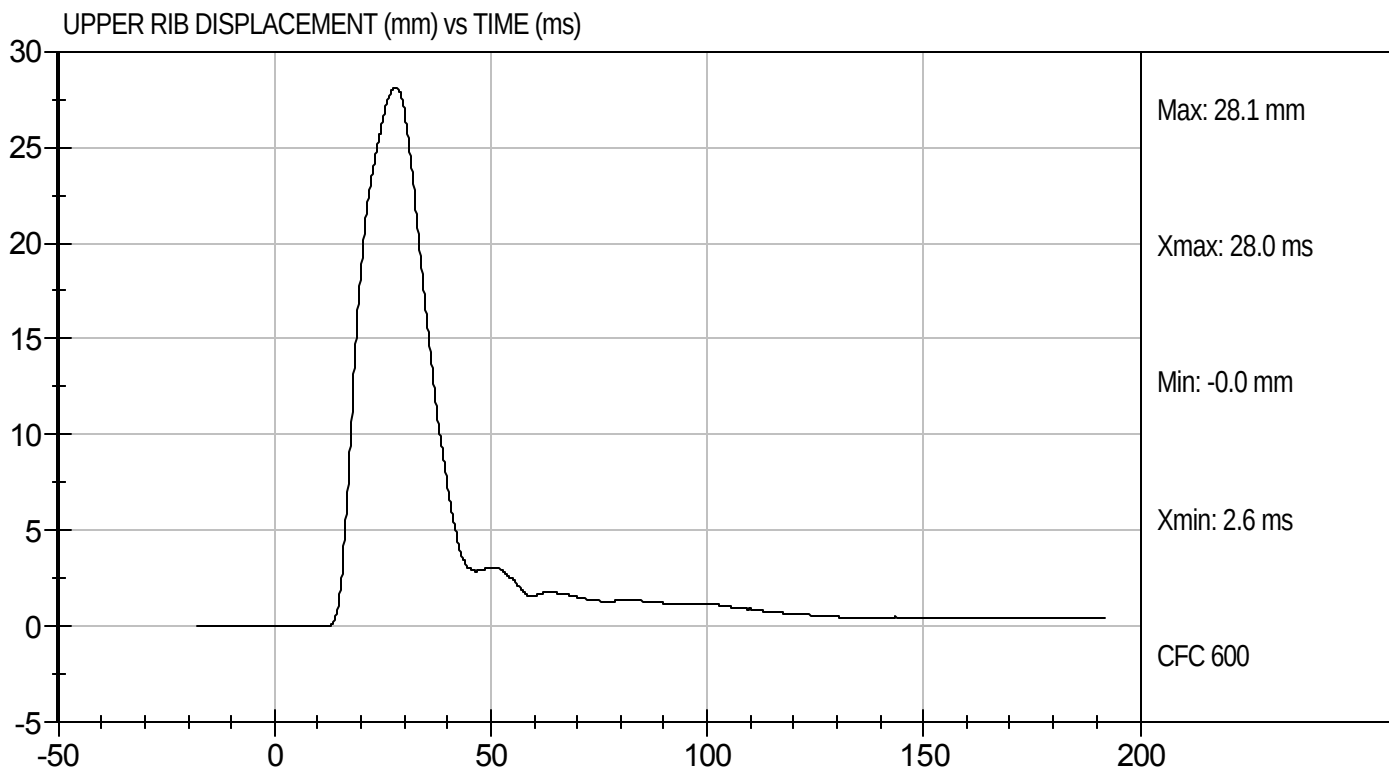
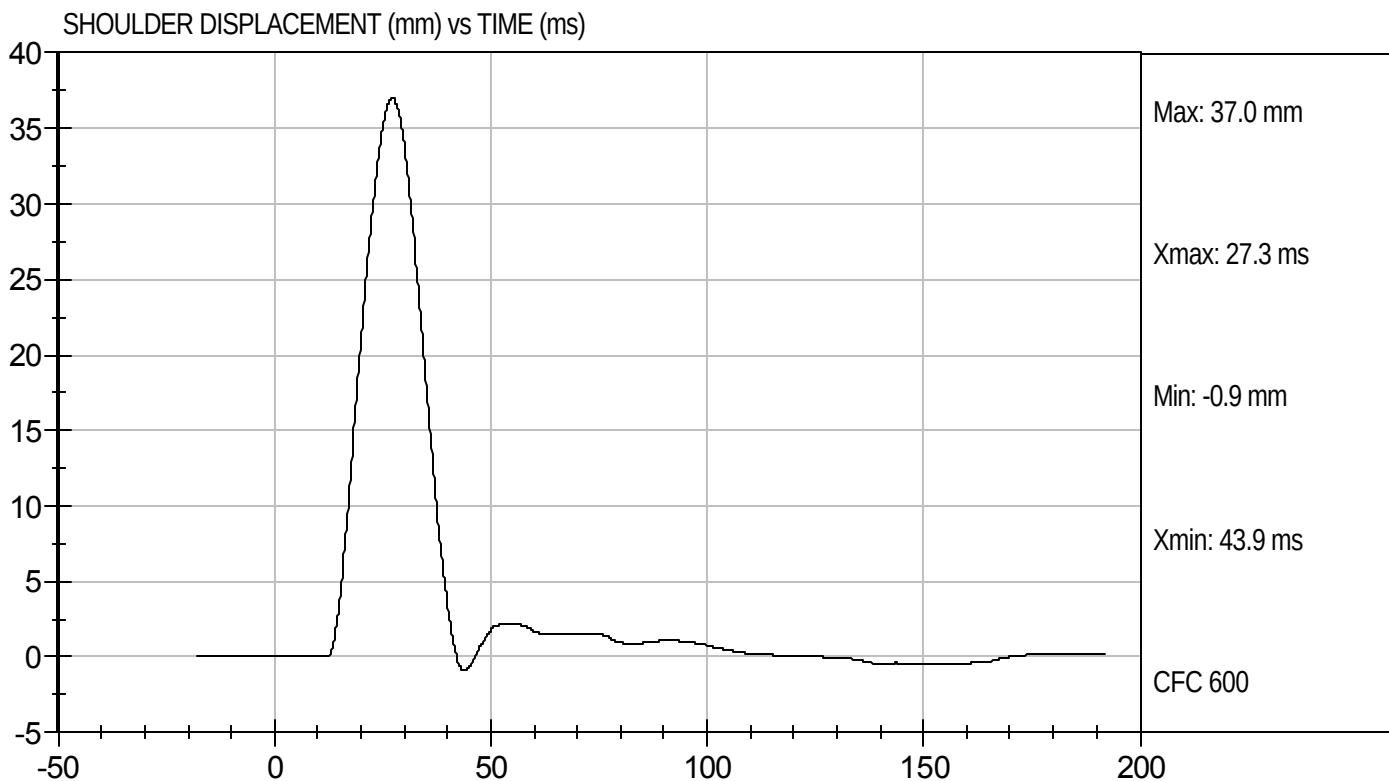
Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D091194

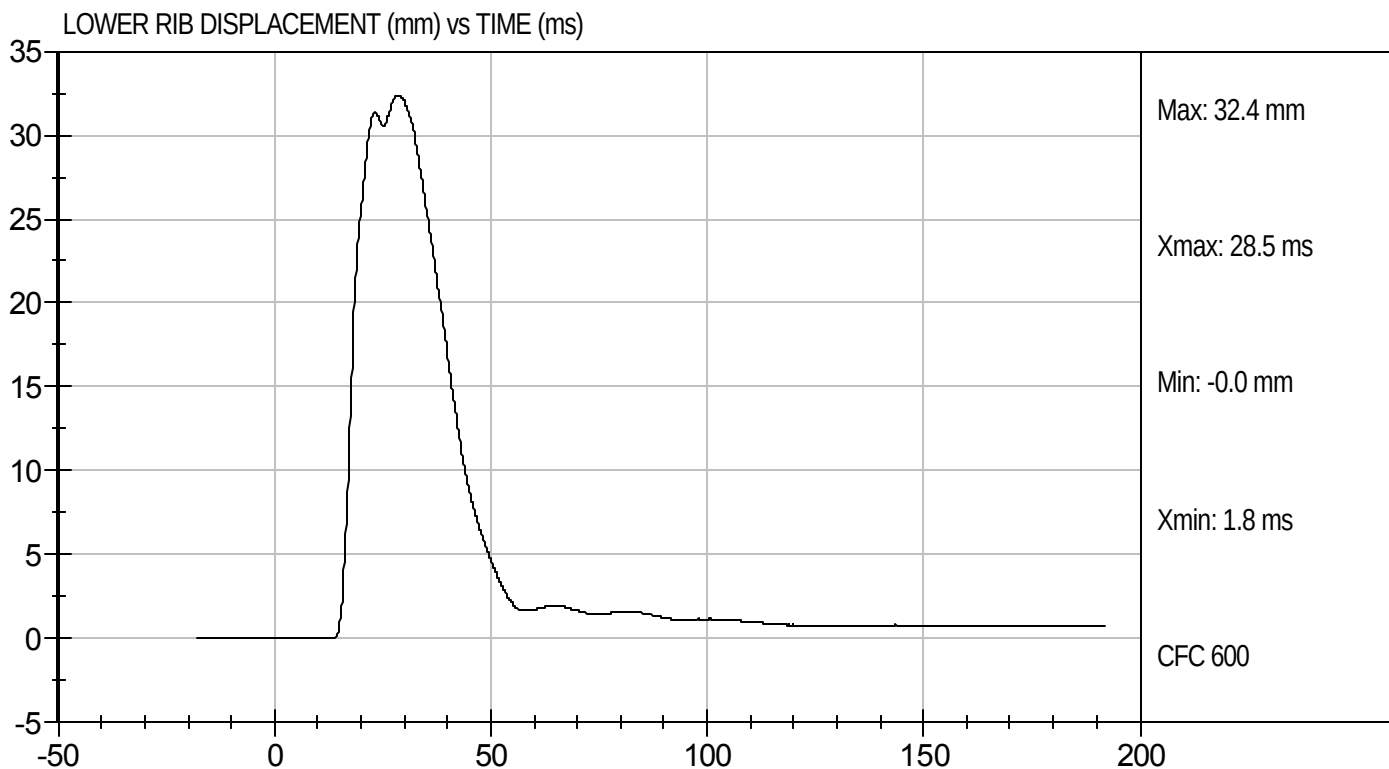
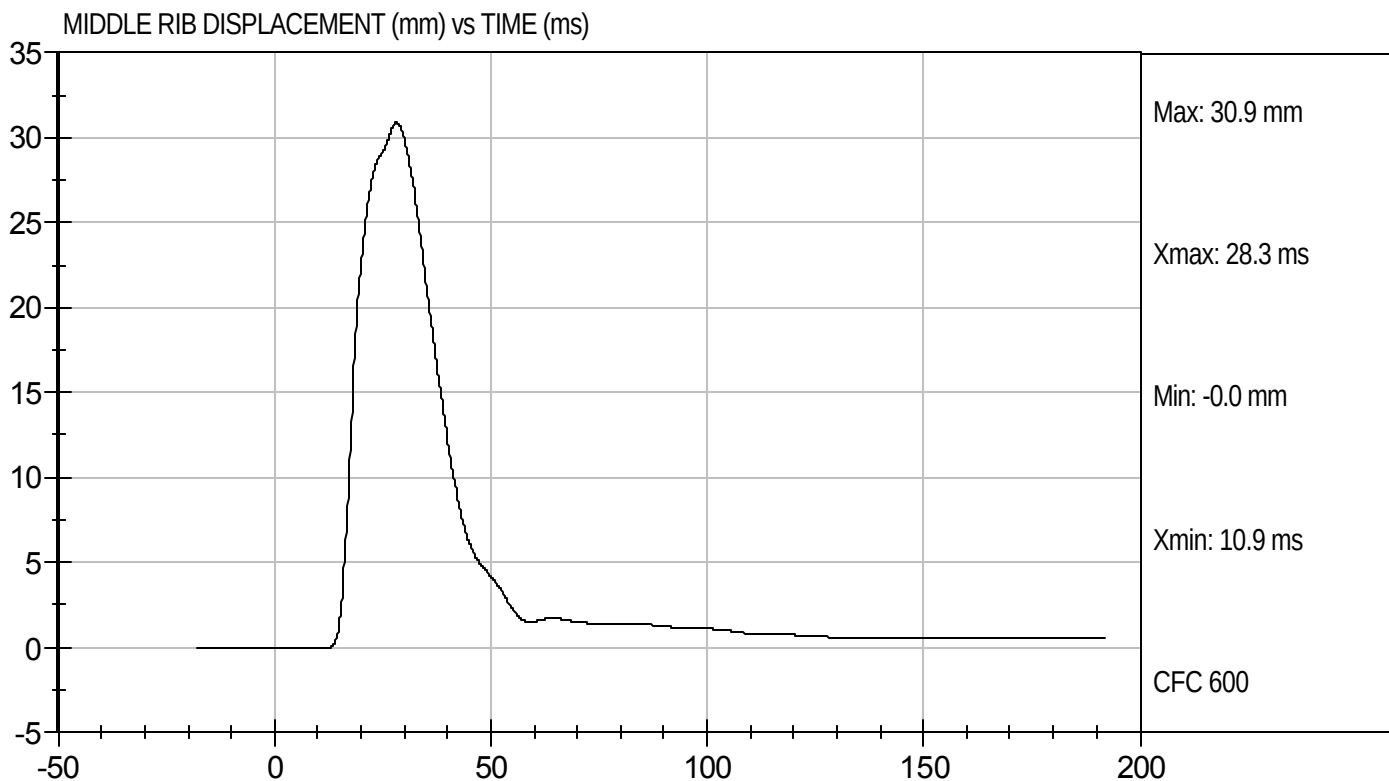
Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D091194

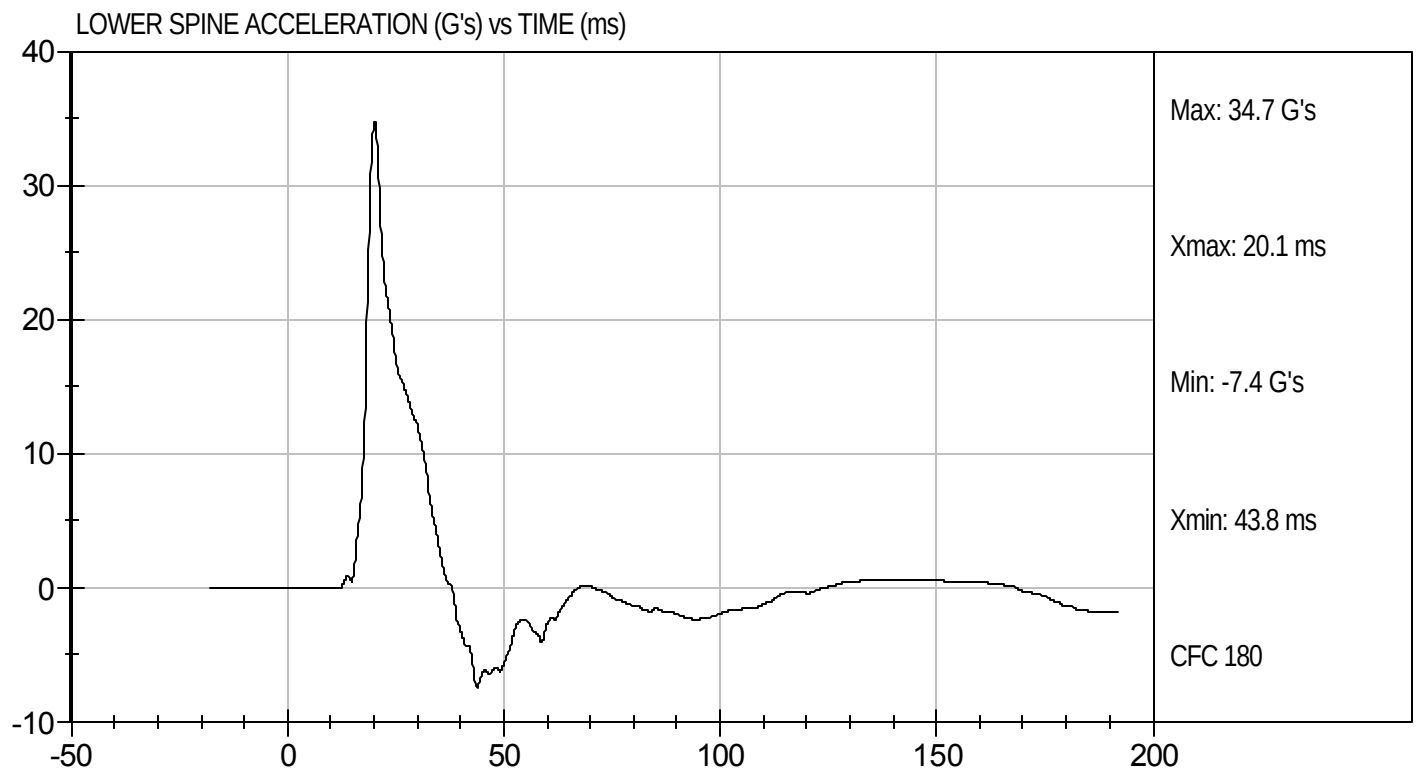
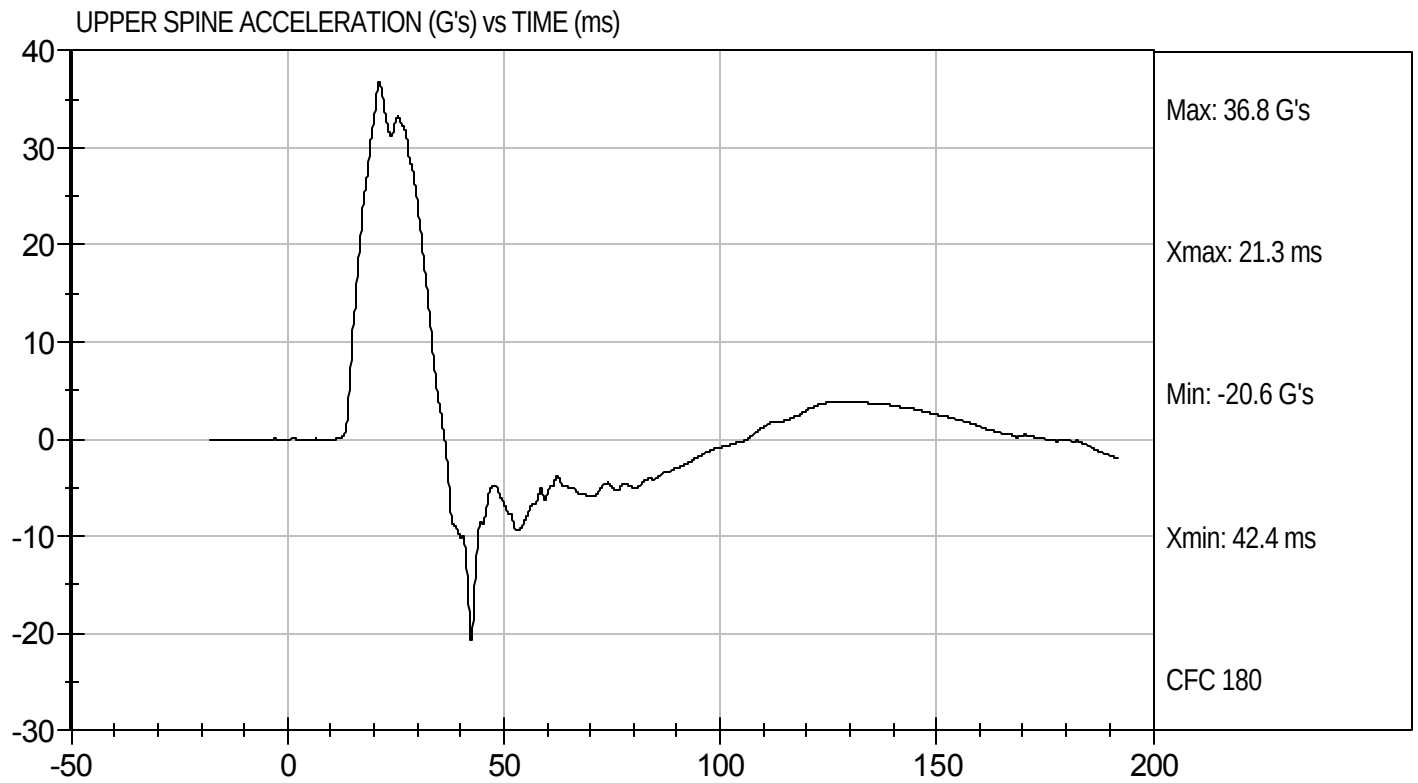
Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D091194

Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s



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

ATD Serial No: 296

Test I.D: D091195

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Force	G's	14 to 18	15	Pass
Upper Rib Displacement	mm	32 to 40	40	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	35	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	8	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

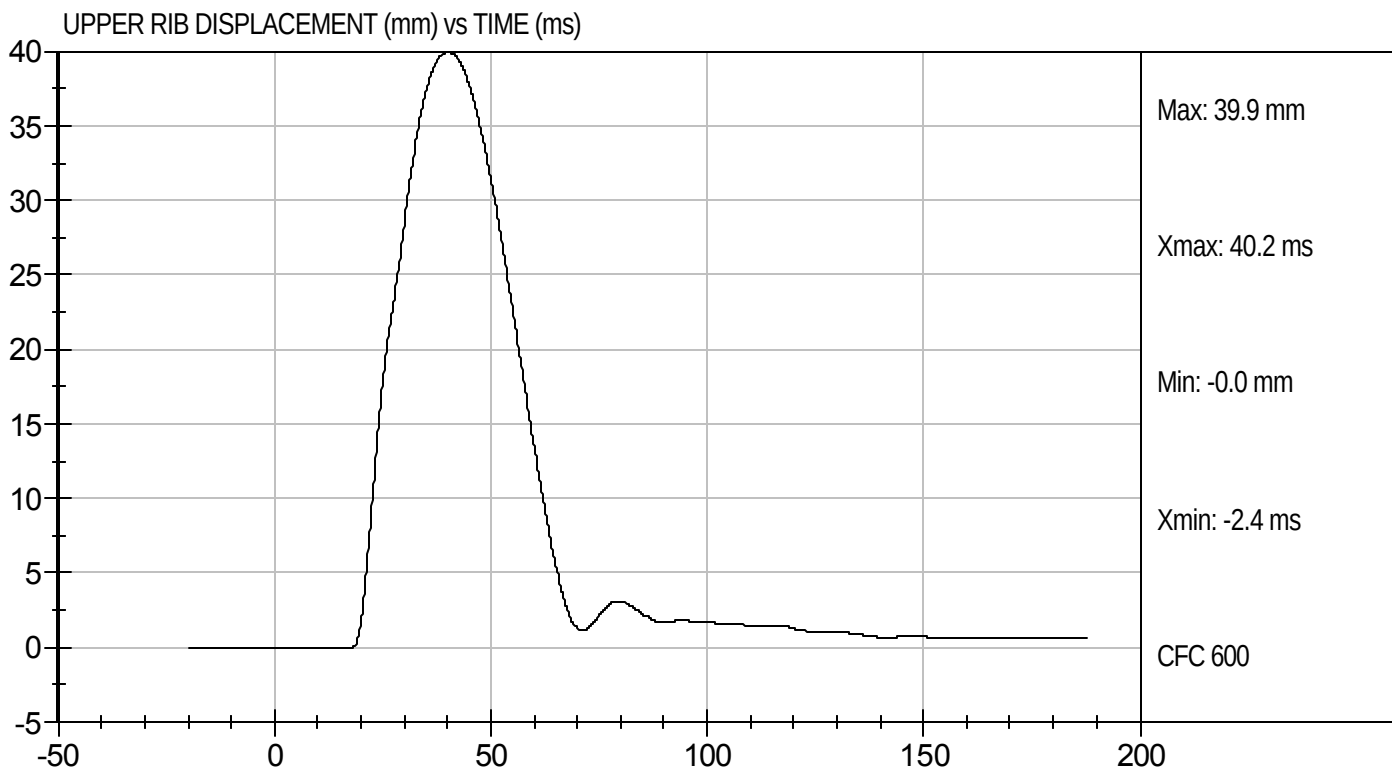
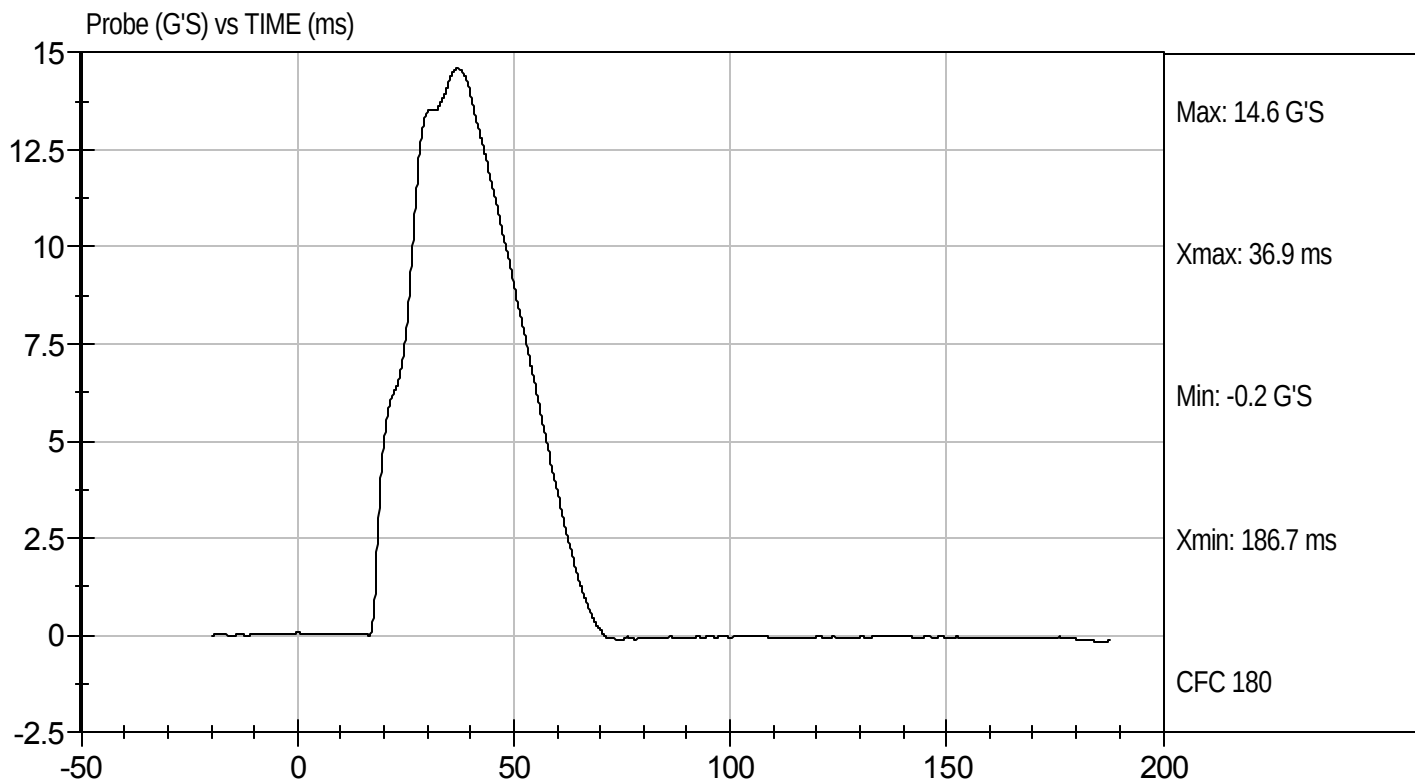
5/15/09
Test Date

David Winkelbauer
Approved By



Test Desc: Thorax Without Arm
Component ID: D091195

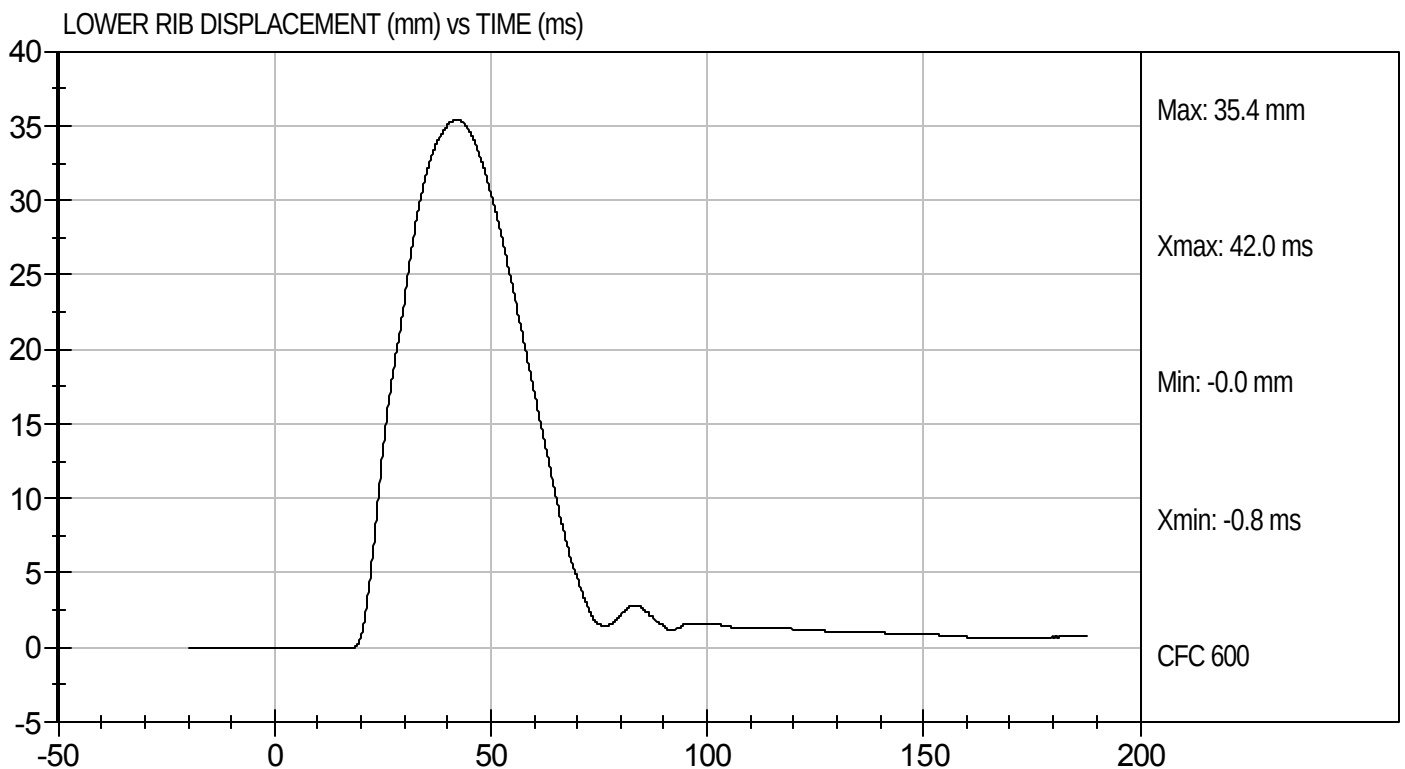
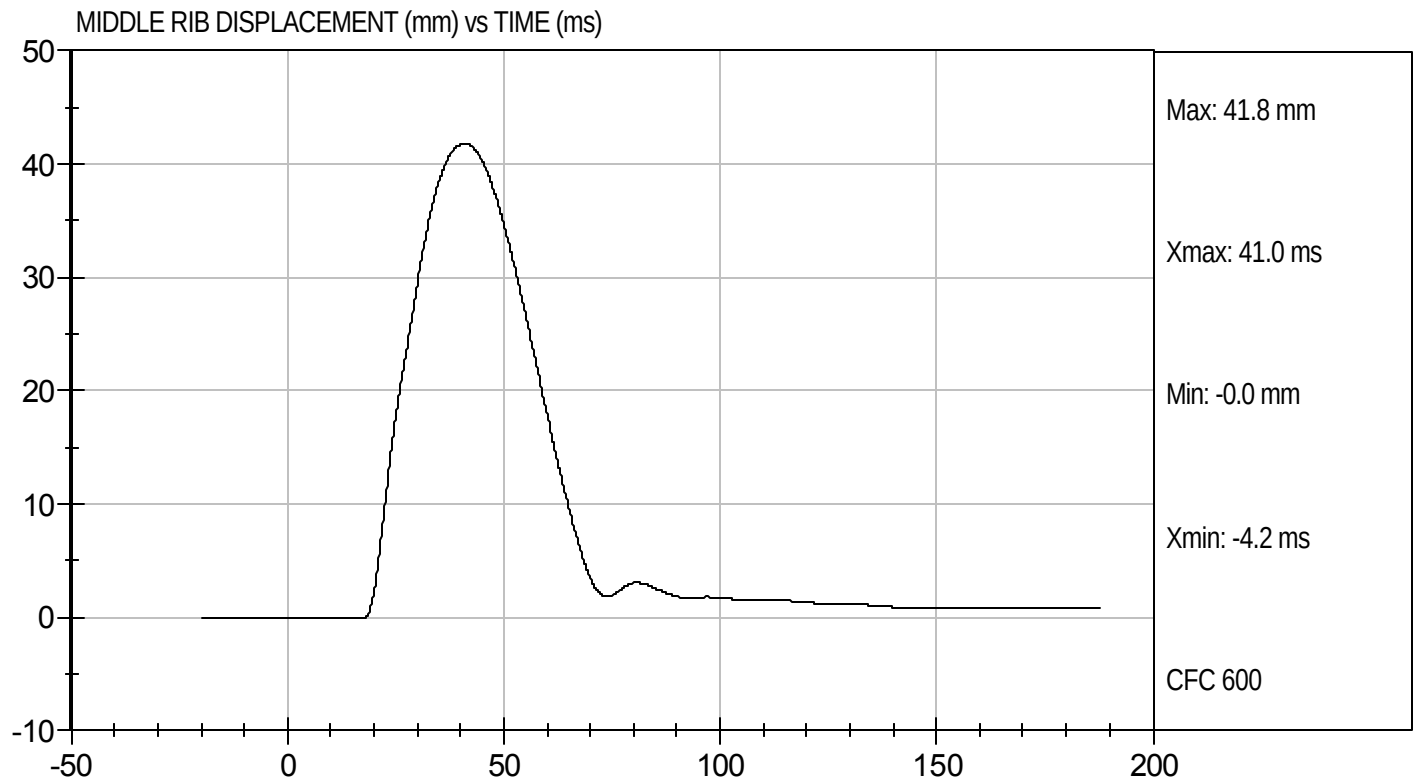
Test Date: 5/15/09
Velocity: 14.0 ft/s, 4.27 m/s





Test Desc: Thorax Without Arm
Component ID: D091195

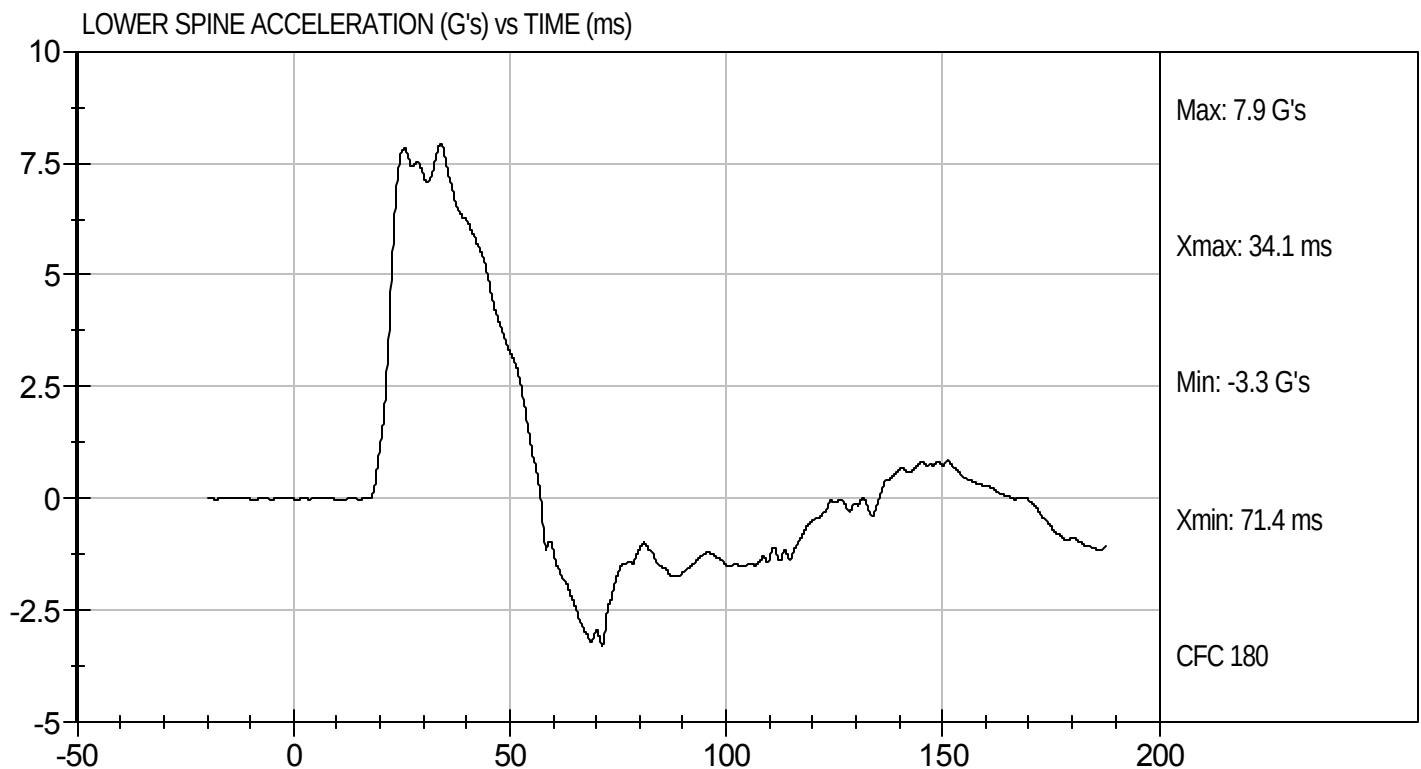
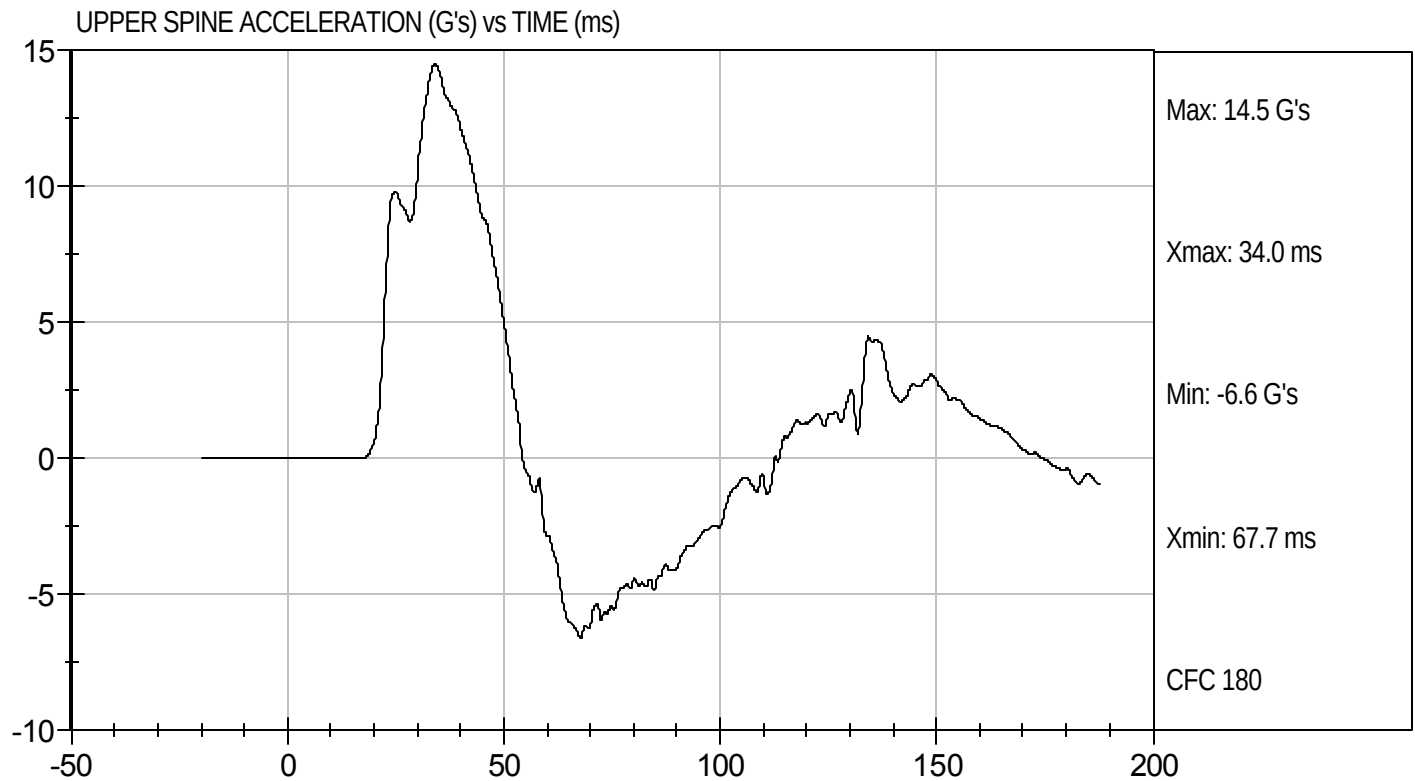
Test Date: 5/15/09
Velocity: 14.0 ft/s, 4.27 m/s





Test Desc: Thorax Without Arm
Component ID: D091195

Test Date: 5/15/09
Velocity: 14.0 ft/s, 4.27 m/s



MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-II's BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091196

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.27	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	40	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results				Pass


Laboratory Technician

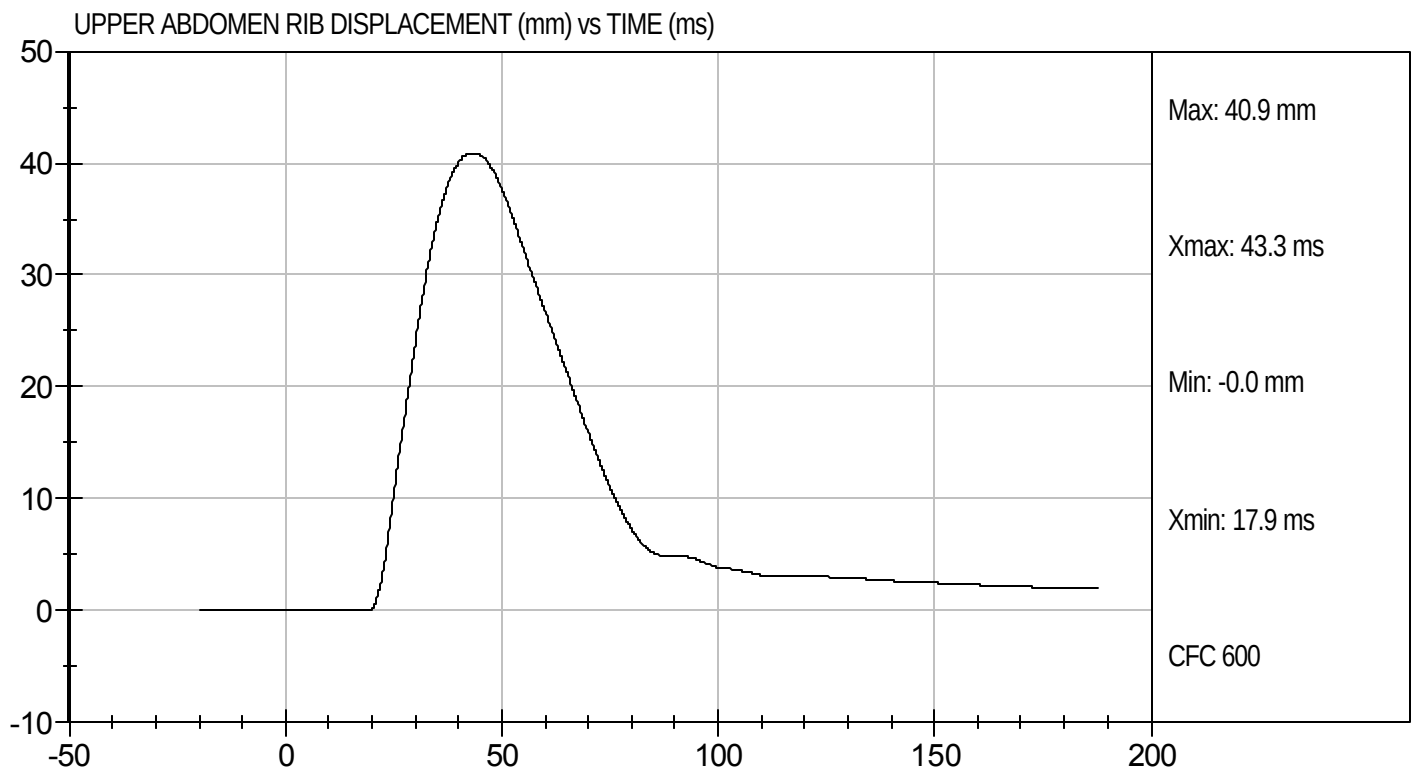
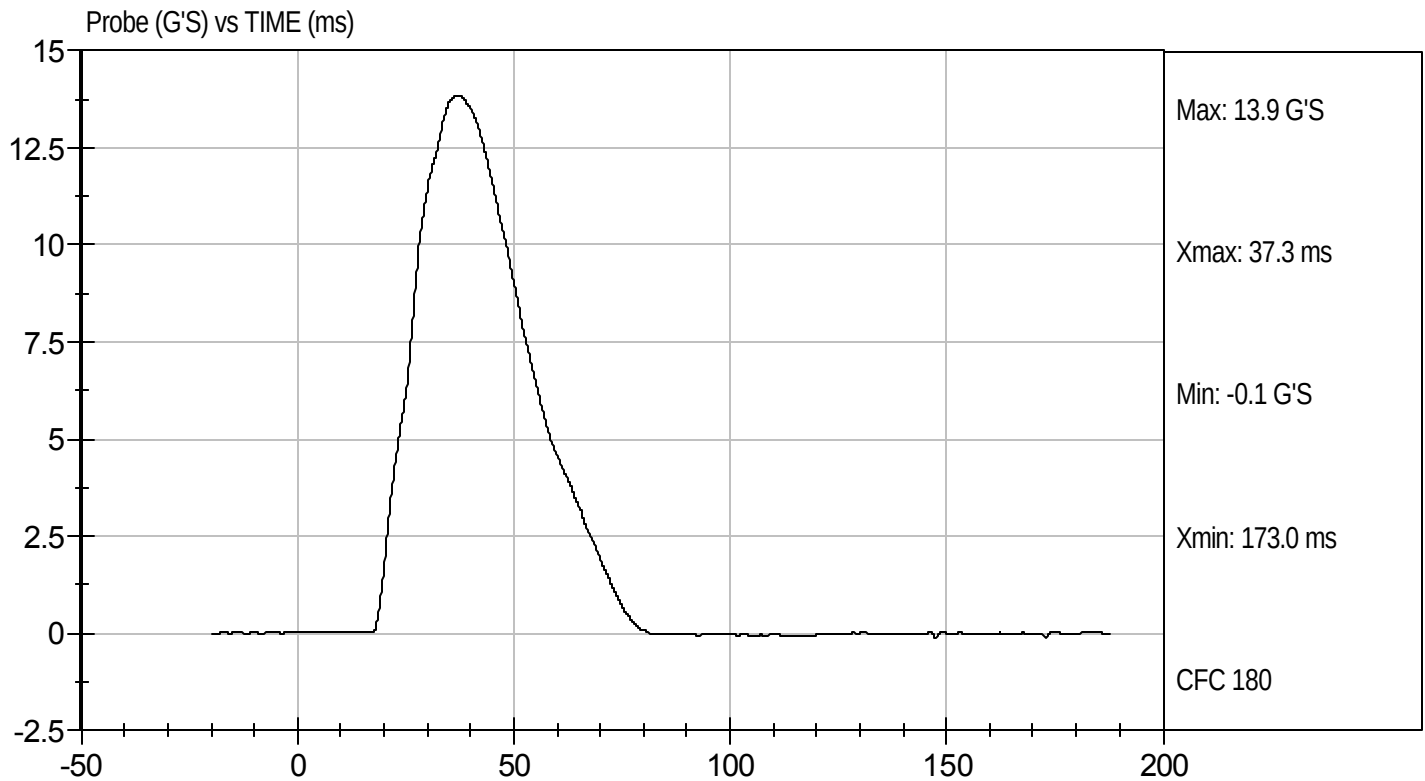
5/15/09
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D091196

Test Date: 5/15/09
Velocity: 14.0 ft/s, 4.27 m/s

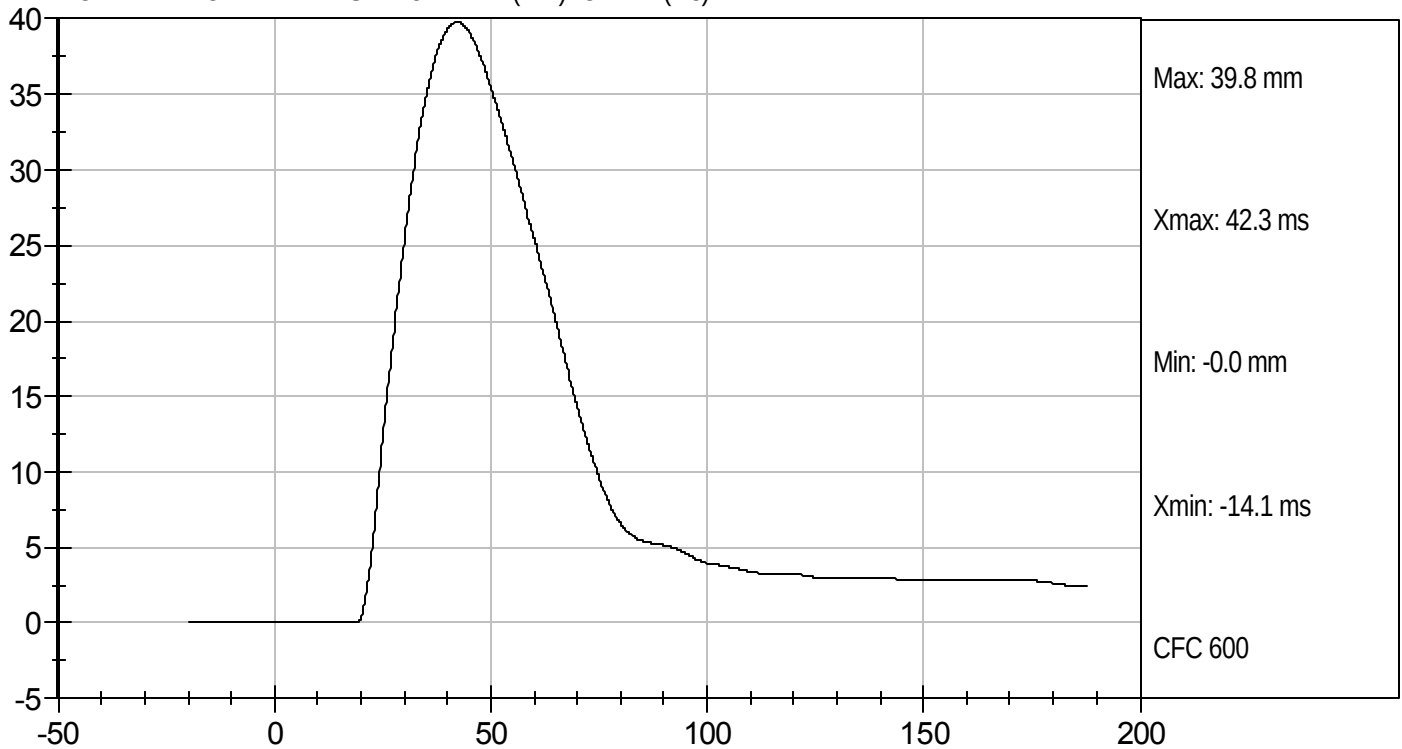




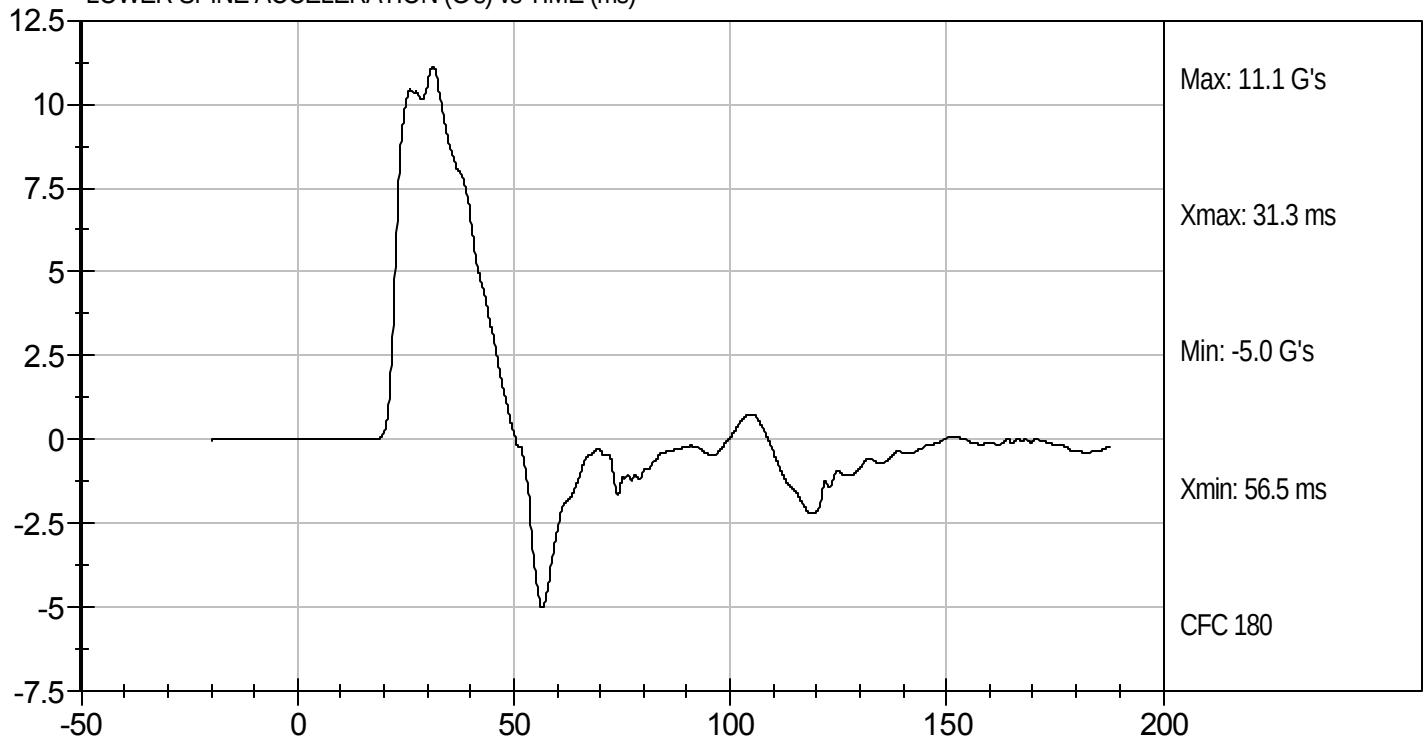
Test Desc: Abdomen Impact
Component ID: D091196

Test Date: 5/15/09
Velocity: 14.0 ft/s, 4.27 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: D091197

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Humidity	%	10 to 70	47	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	39	Pass
Peak Acetabulum Force	N	3600 to 4300	4216	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

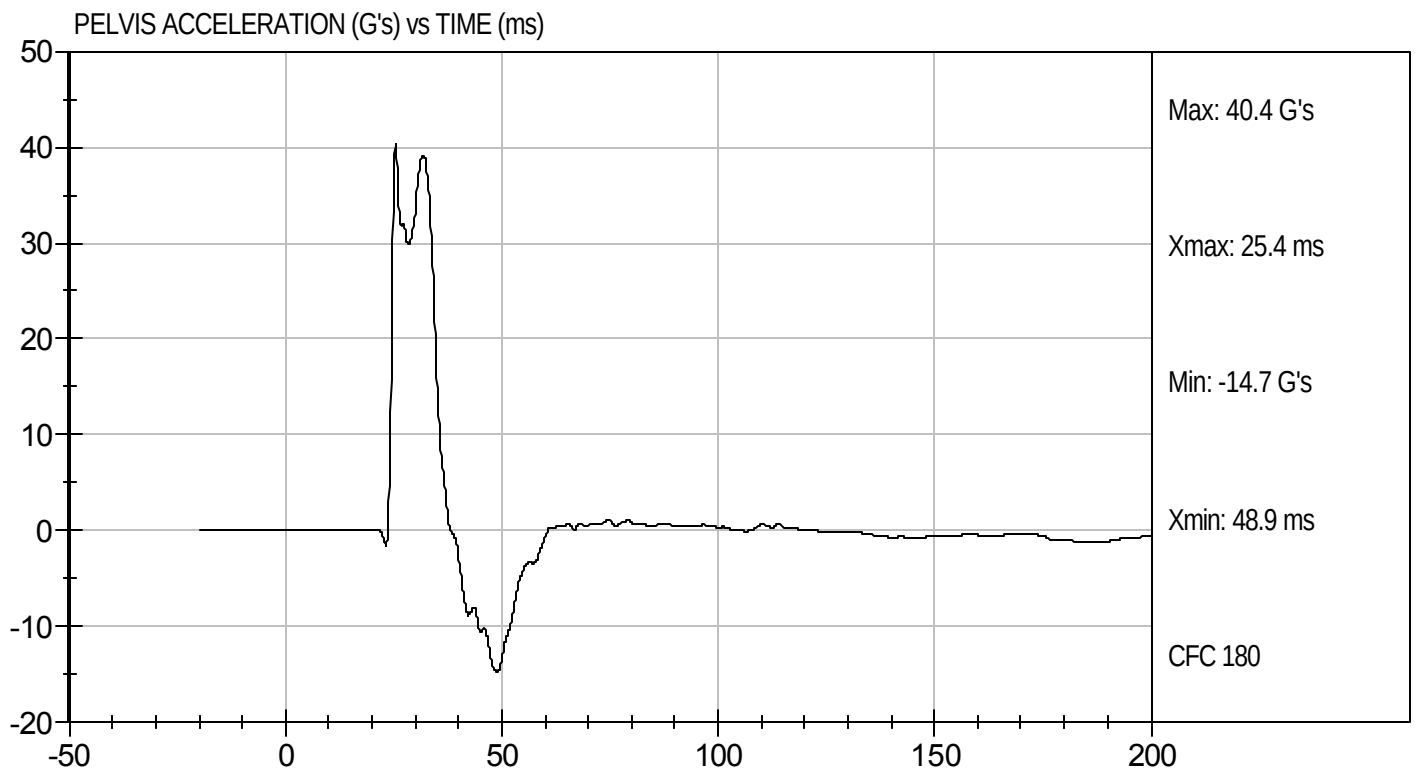
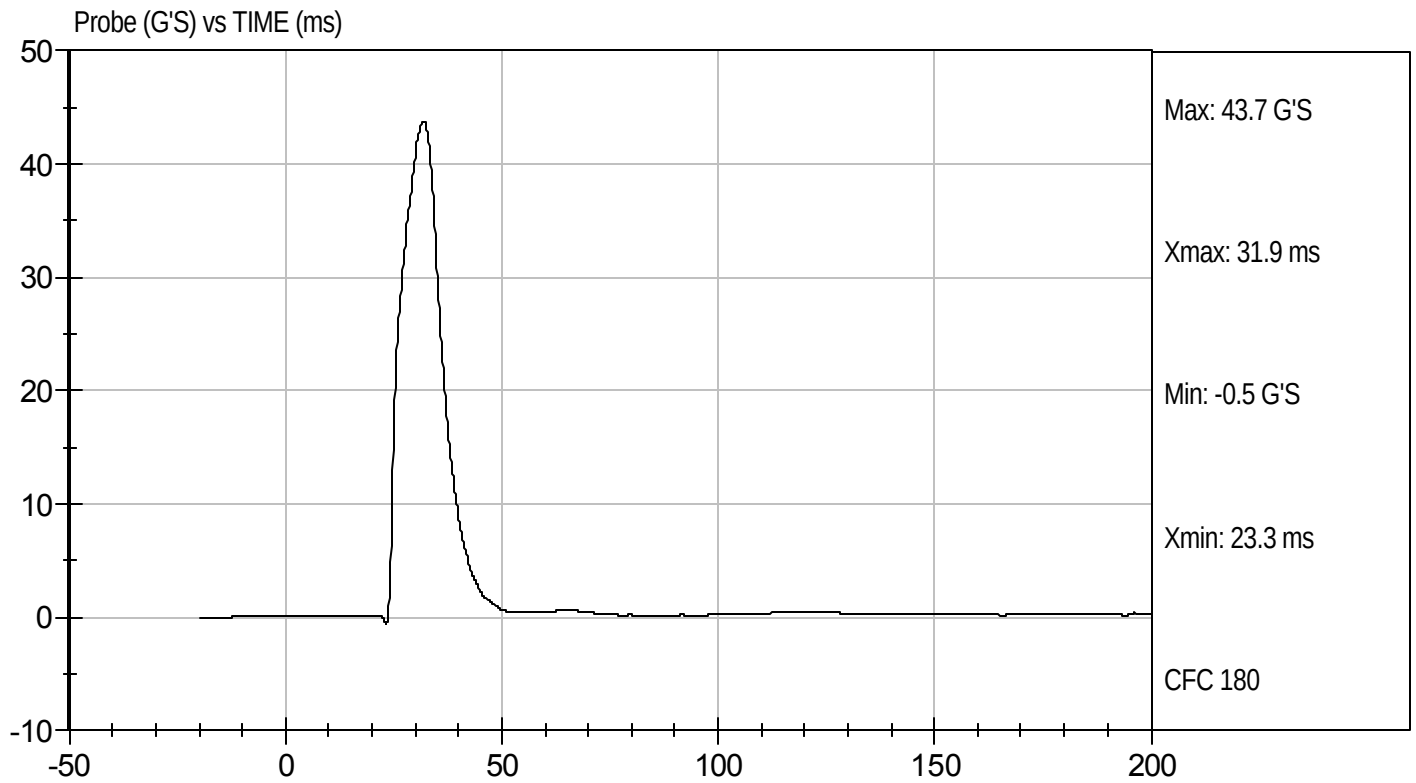
5/15/09
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D091197

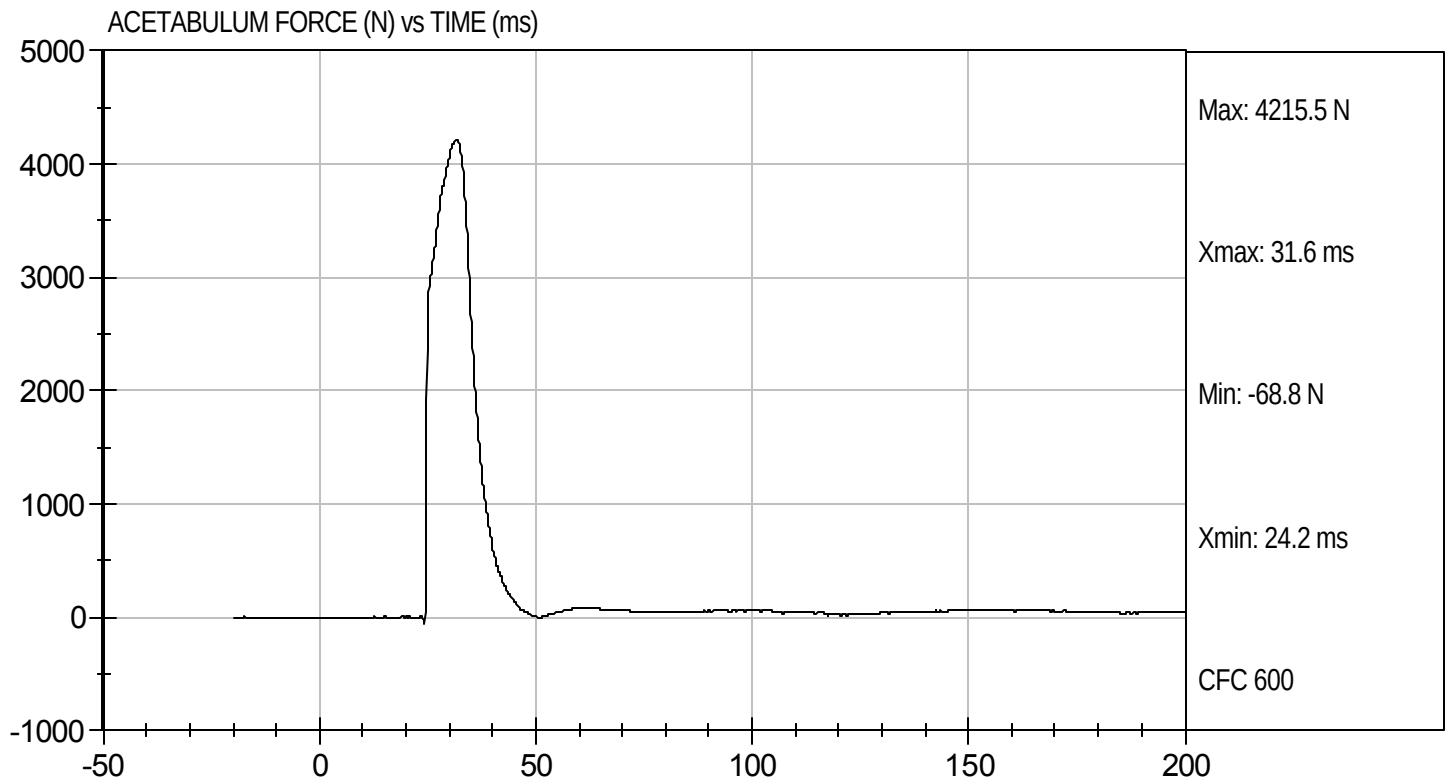
Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D091197

Test Date: 5/15/09
Velocity: 22.2 ft/s, 6.77 m/s

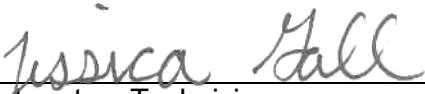


MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-II's BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091198

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	46	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Peak Impactor Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	37	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4784	Pass
Overall Test Results				Pass


Laboratory Technician

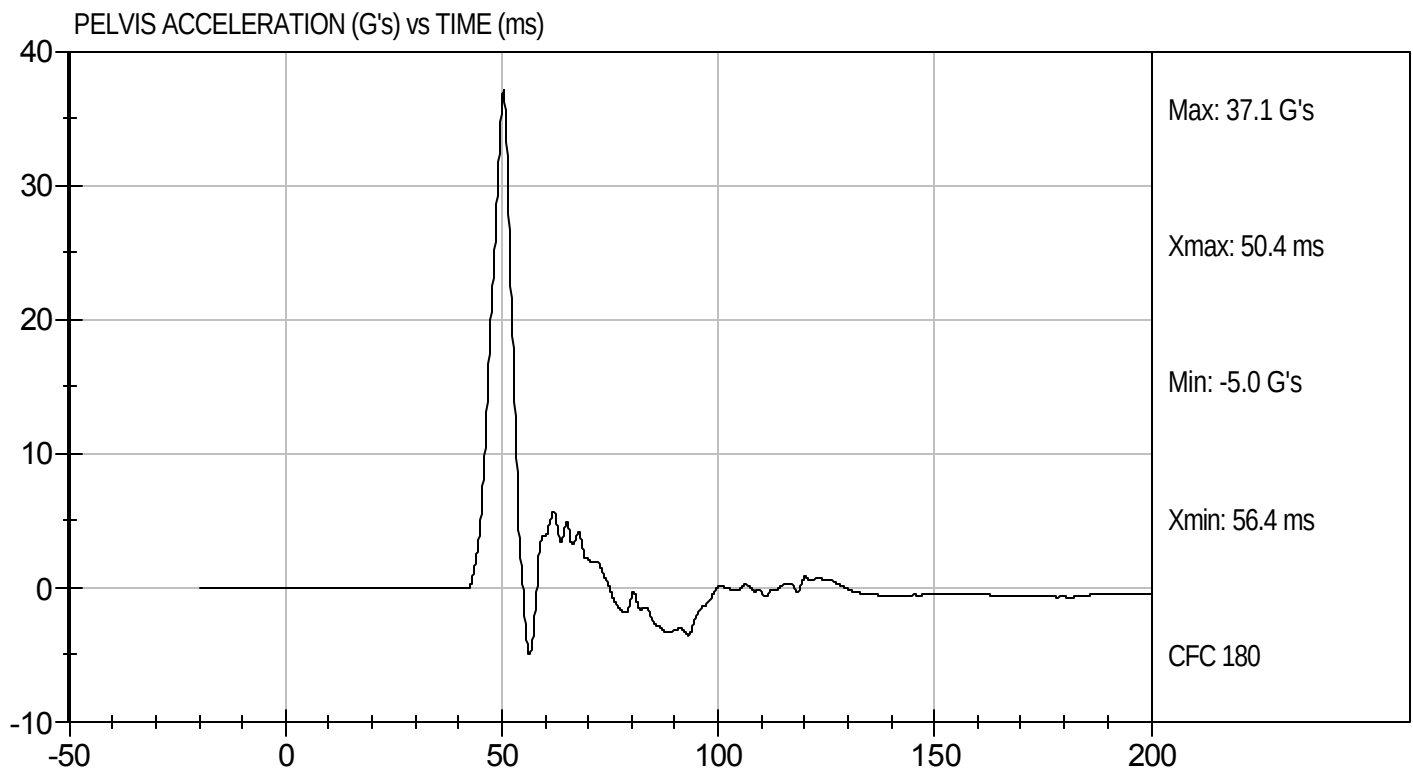
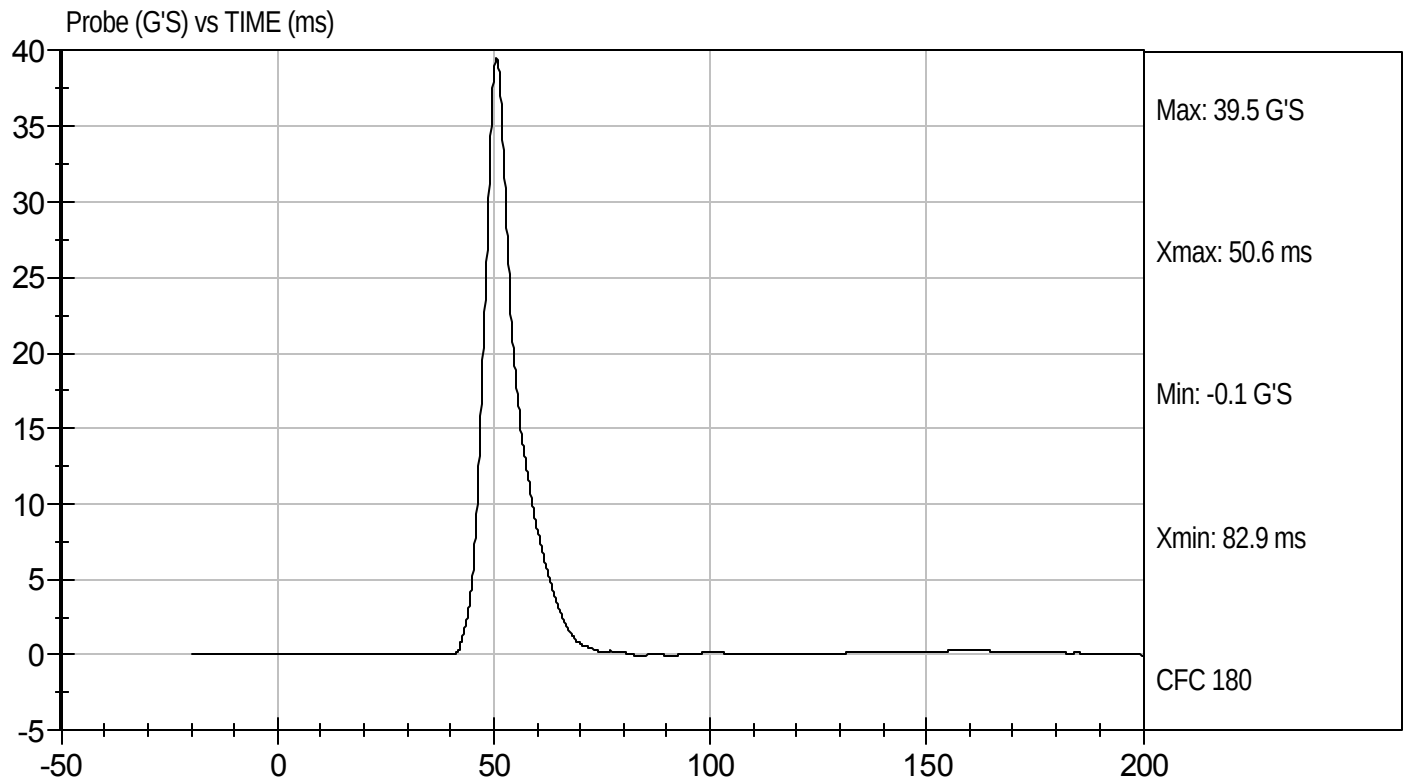
5/15/09
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D091198

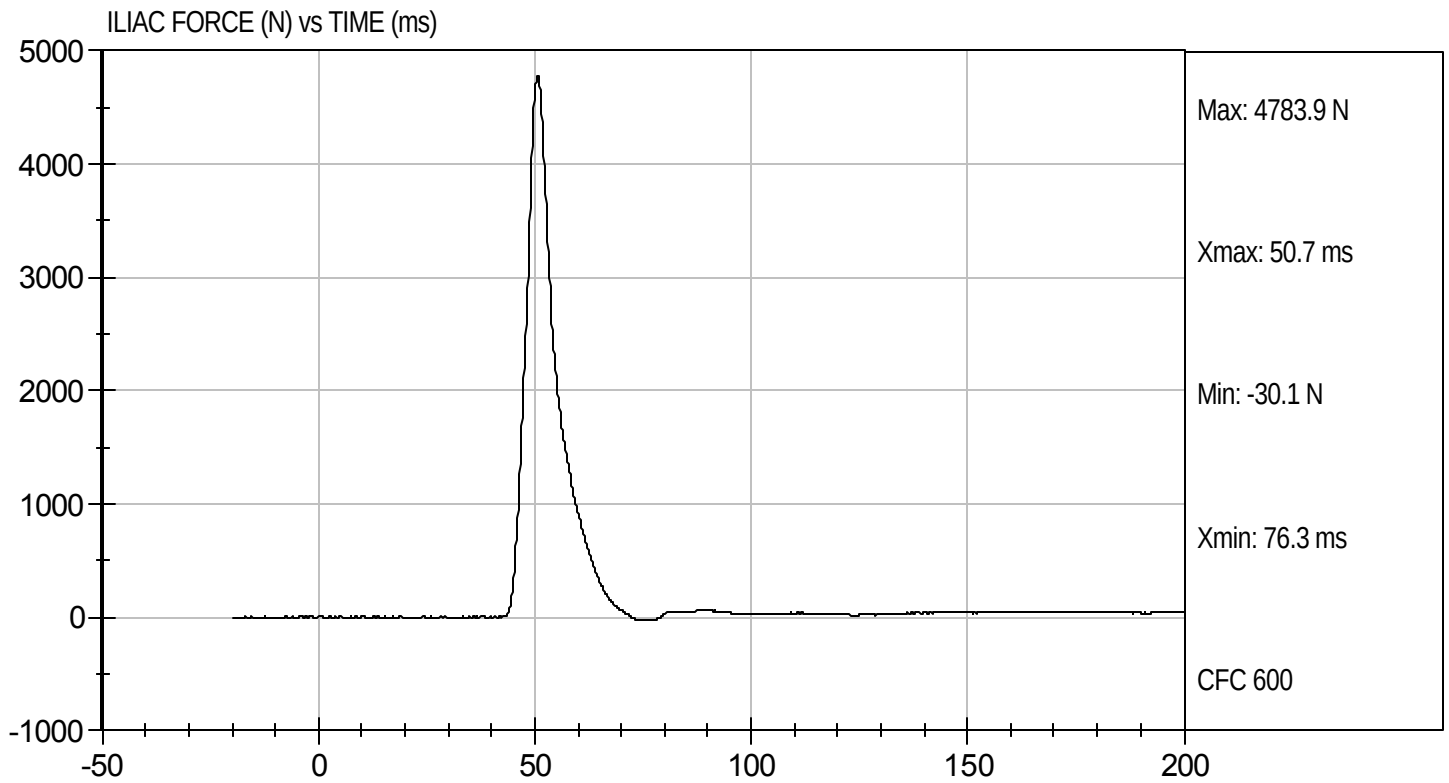
Test Date: 5/15/09
Velocity: 14.1 ft/s, 4.30 m/s





Test Desc: Iliac Impact
Component ID: D091198

Test Date: 5/15/09
Velocity: 14.1 ft/s, 4.30 m/s



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

ATD Serial No: 296

Test ID: D091251

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	39	Pass
Peak Resultant Acceleration	G's	115 to 137	121	Pass
Peak Lateral Acceleration	G's	+/- 15	-4.6	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results			Pass	


Laboratory Technician

5/22/09
Test Date

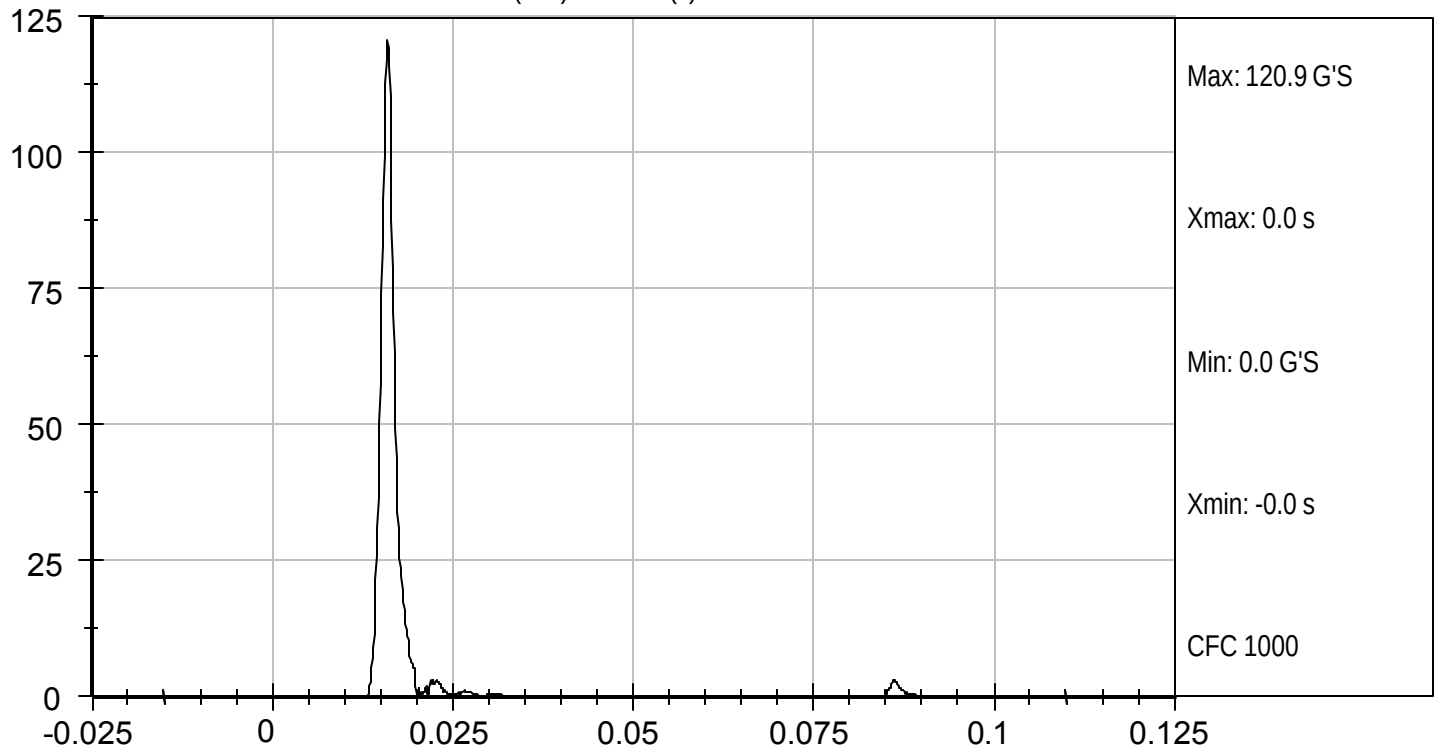

Approved By



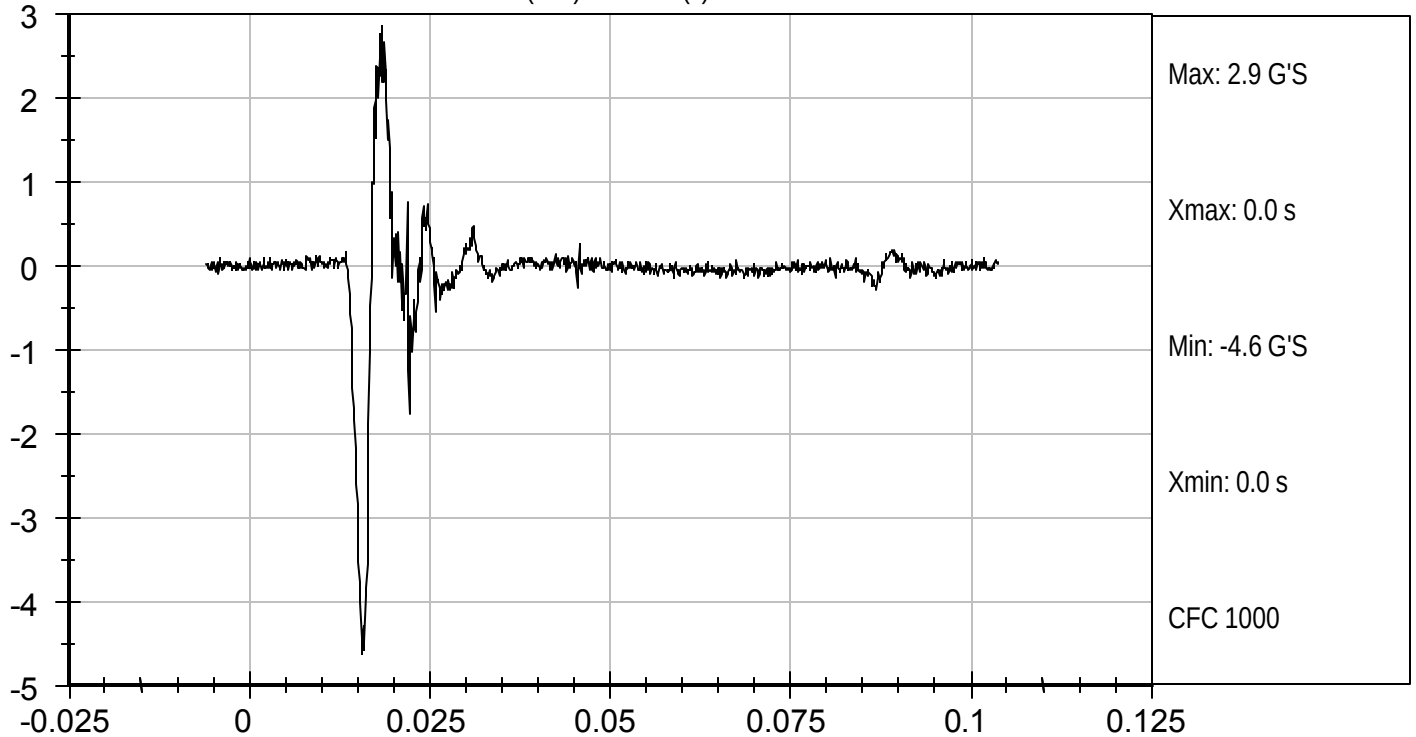
Test Desc: Head Drop
Component ID: D091251

Test Date: 5/22/09
Velocity: 0 ft/s, 0 m/s

PEAK RESULTANT ACCELERATION (G'S) vs TIME (s)



PEAK LONGITUDINAL ACCELERATION (G'S) vs TIME (s)

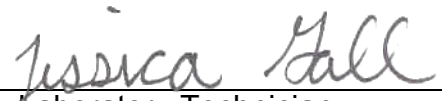


MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091252

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.2	Pass
Humidity		%	10 to 70	39	Pass
Impact Velocity		m/s	5.51 to 5.63	5.60	Pass
Delta Velocity	10 msec	m/s	2.20 to 2.80	2.56	Pass
	15 msec	m/s	3.30 to 4.10	3.66	Pass
	20 msec	m/s	4.40 to 5.40	4.82	Pass
	25 msec	m/s	5.40 to 6.10	5.66	Pass
	25-100 msec	m/s	5.50 to 6.20	5.68	Pass
Maximum D-Plane Rotation		deg	71 to 81	71	Pass
Time of Maximum D-Plane Rotation		msec	50 to 70	60	Pass
Maximum Occipital Condyle Moment during Rotation Interval		Nm	-44 to -36	-39	Pass
Time of Moment Decay to 0 Nm		msec	102 to 126	114	Pass
Overall Test Results					Pass


 Laboratory Technician

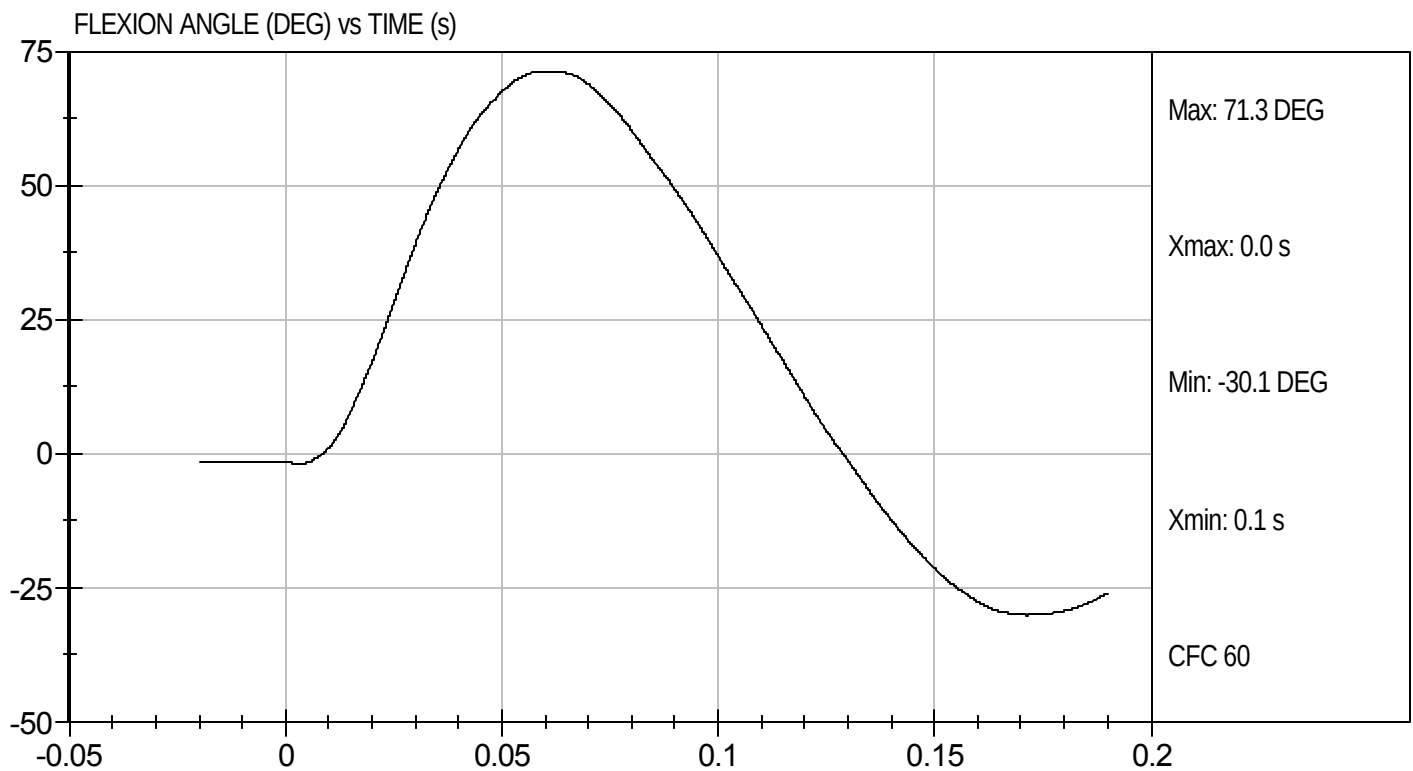
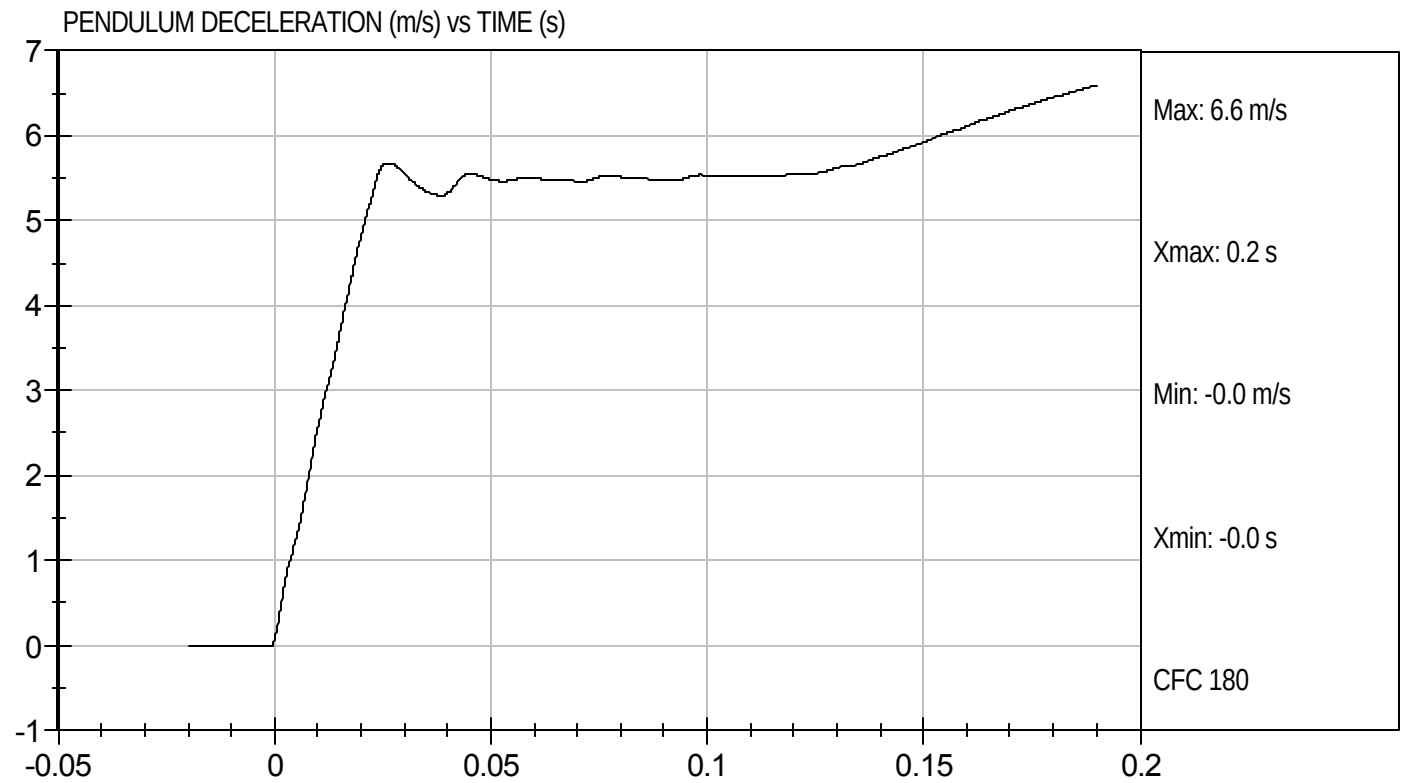
5/22/09
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D091252

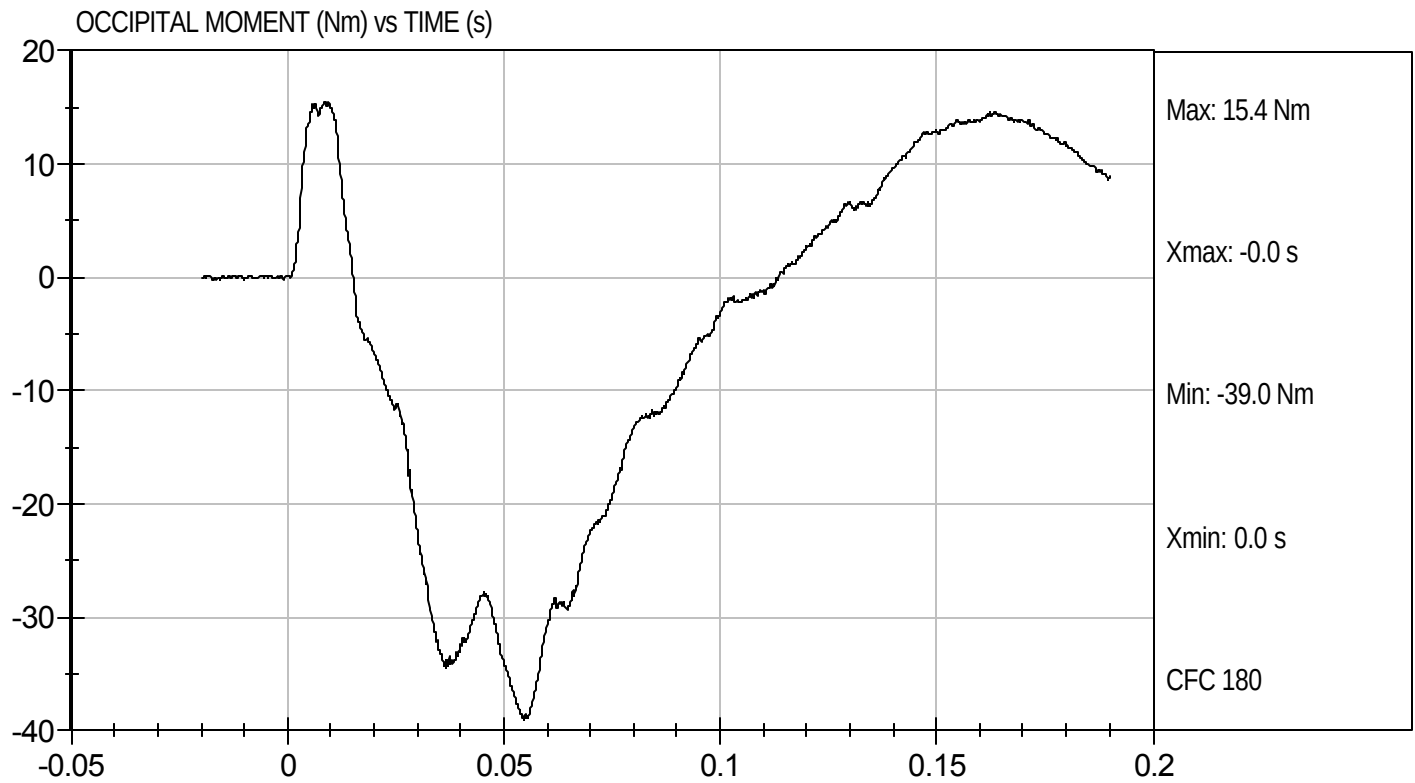
Test Date: 5/22/09
Velocity: 18.37 ft/s, 5.60 m/s





Test Desc: Neck Bending
Component ID: D091252

Test Date: 5/22/09
Velocity: 18.37 ft/s, 5.60 m/s



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

ATD Serial No: 296

Test ID: D091253

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	41	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	Pass
Maximum Probe Acceleration	G's	13 to 18	15	Pass
Shoulder Displacement	mm	28 to 37	30	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass


Laboratory Technician

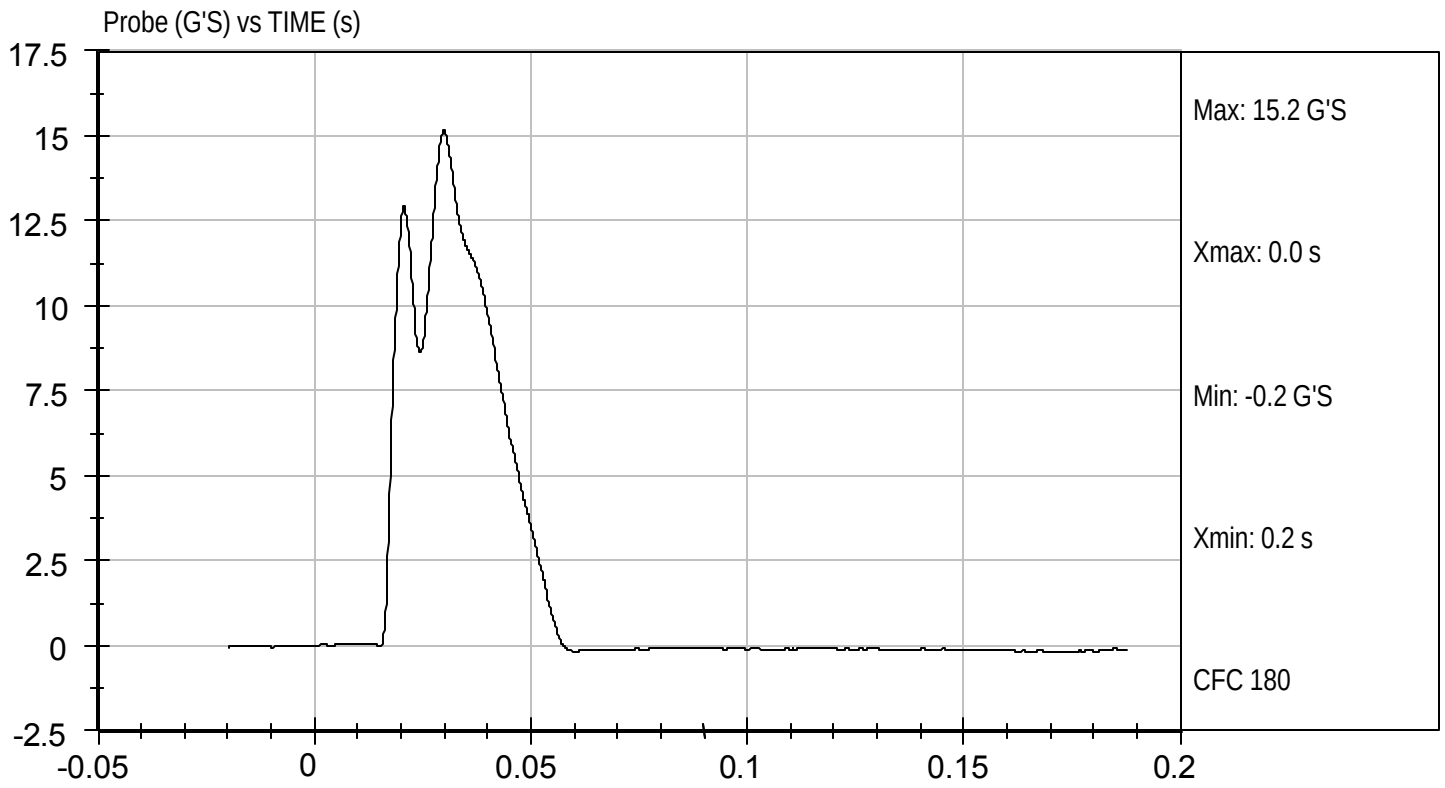
5/22/09
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D091253

Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 m/s

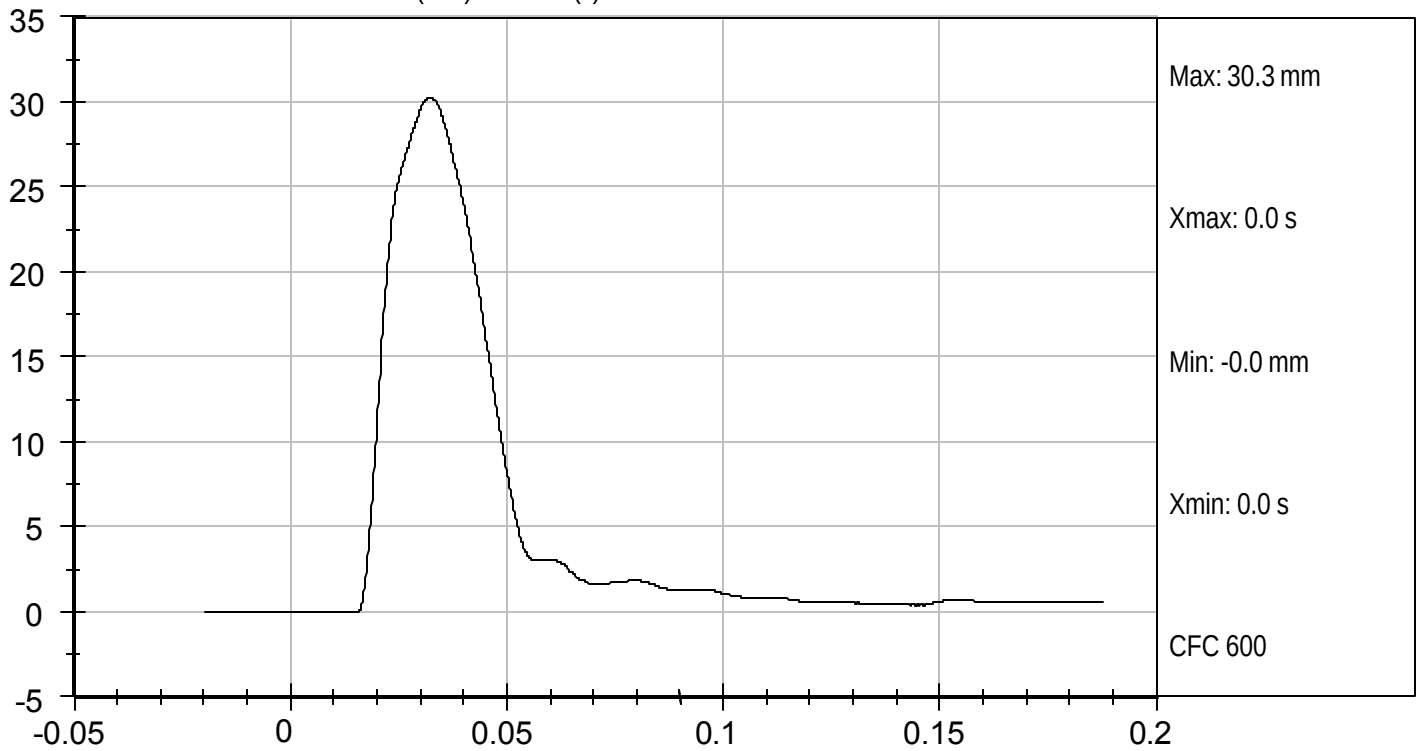




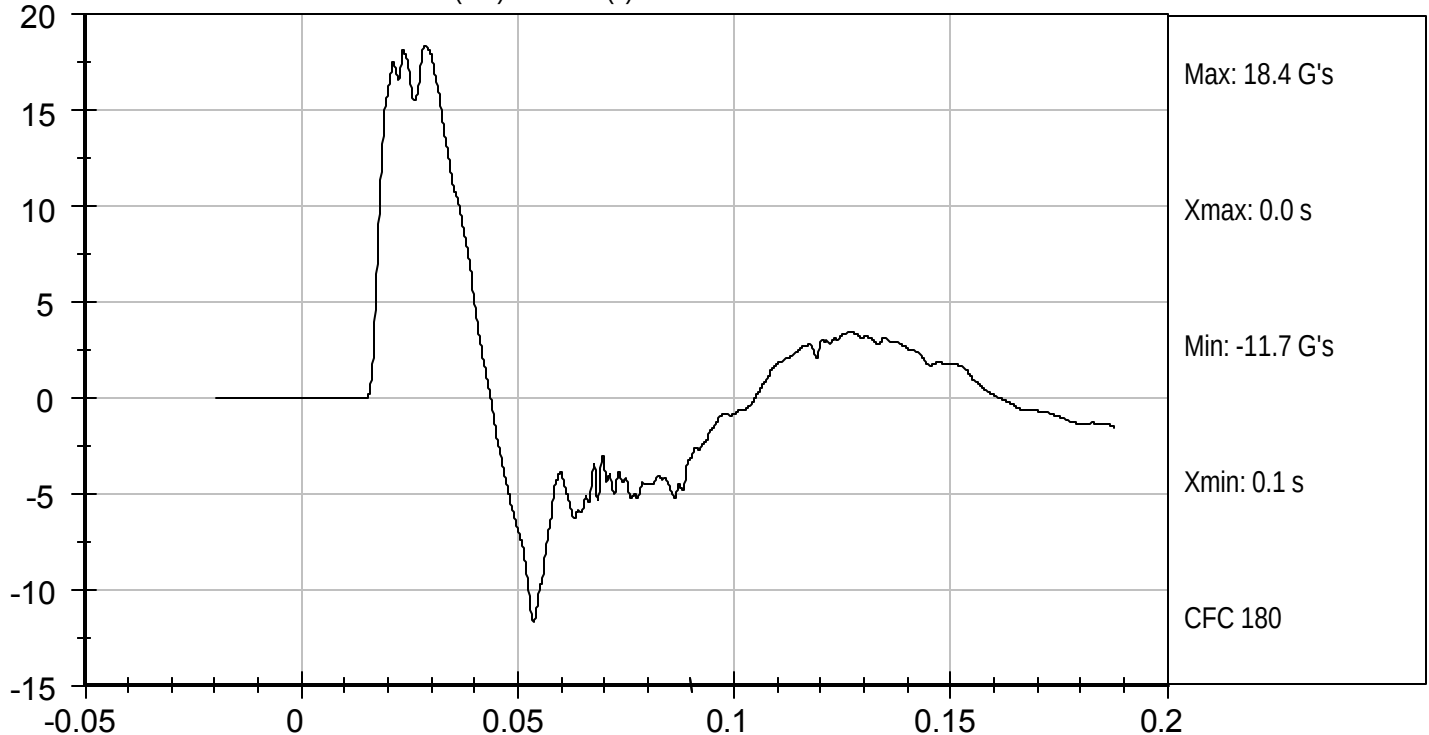
Test Desc: Shoulder Impact
Component ID: D091253

Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (s)



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

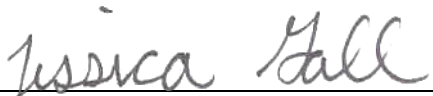


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D091254

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	41	Pass
Impact Velocity	m/s	6.60 to 6.80	6.69	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	38	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	35	Pass
Overall Test Results			Pass	


 Laboratory Technician

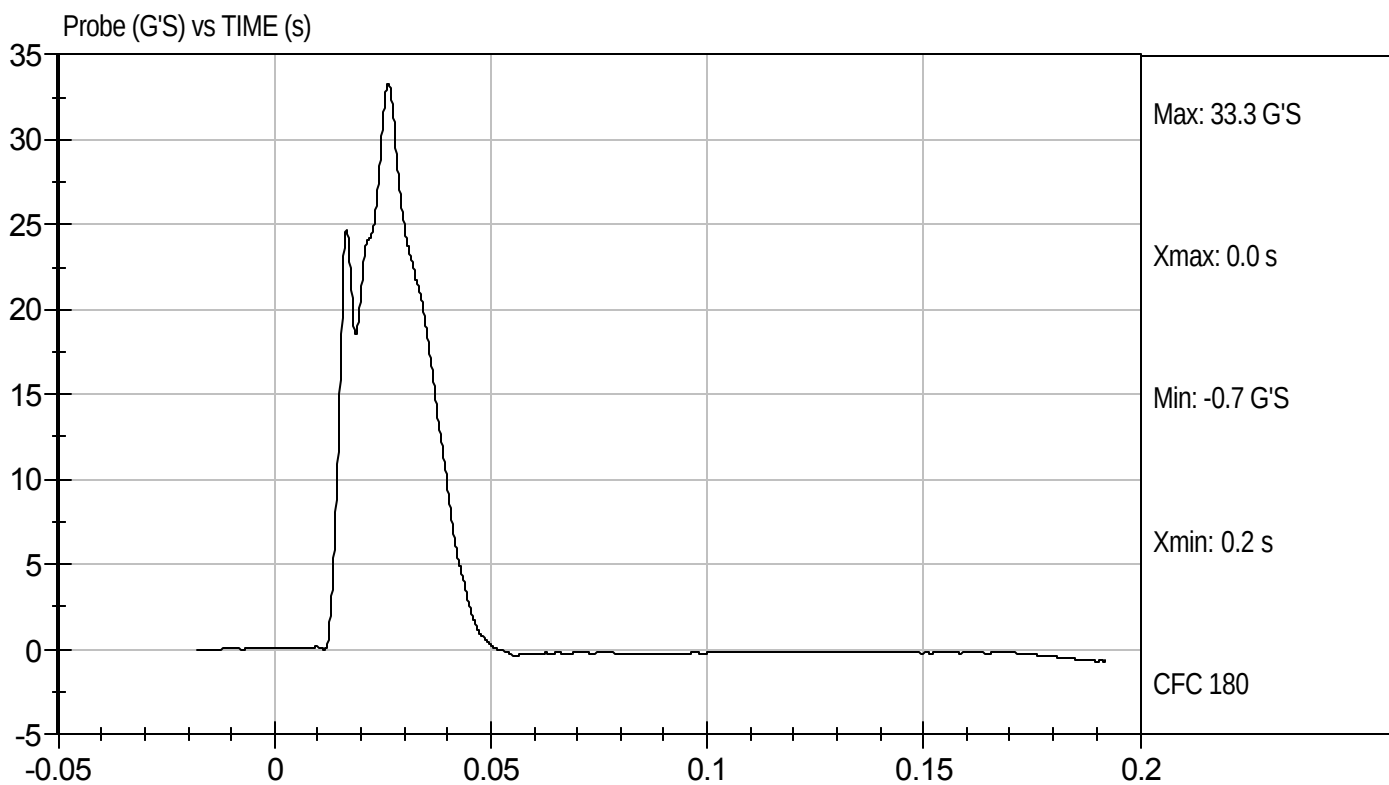
5/22/09
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D091254

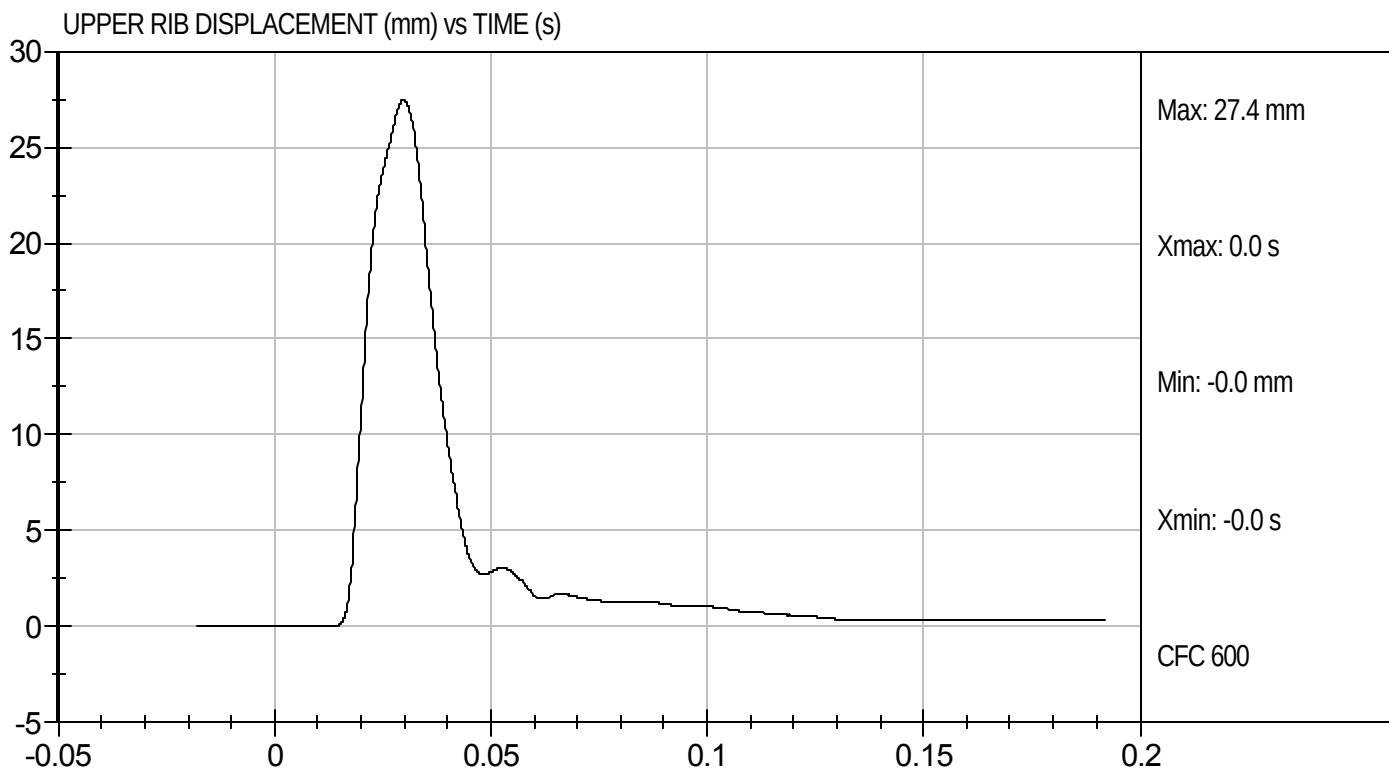
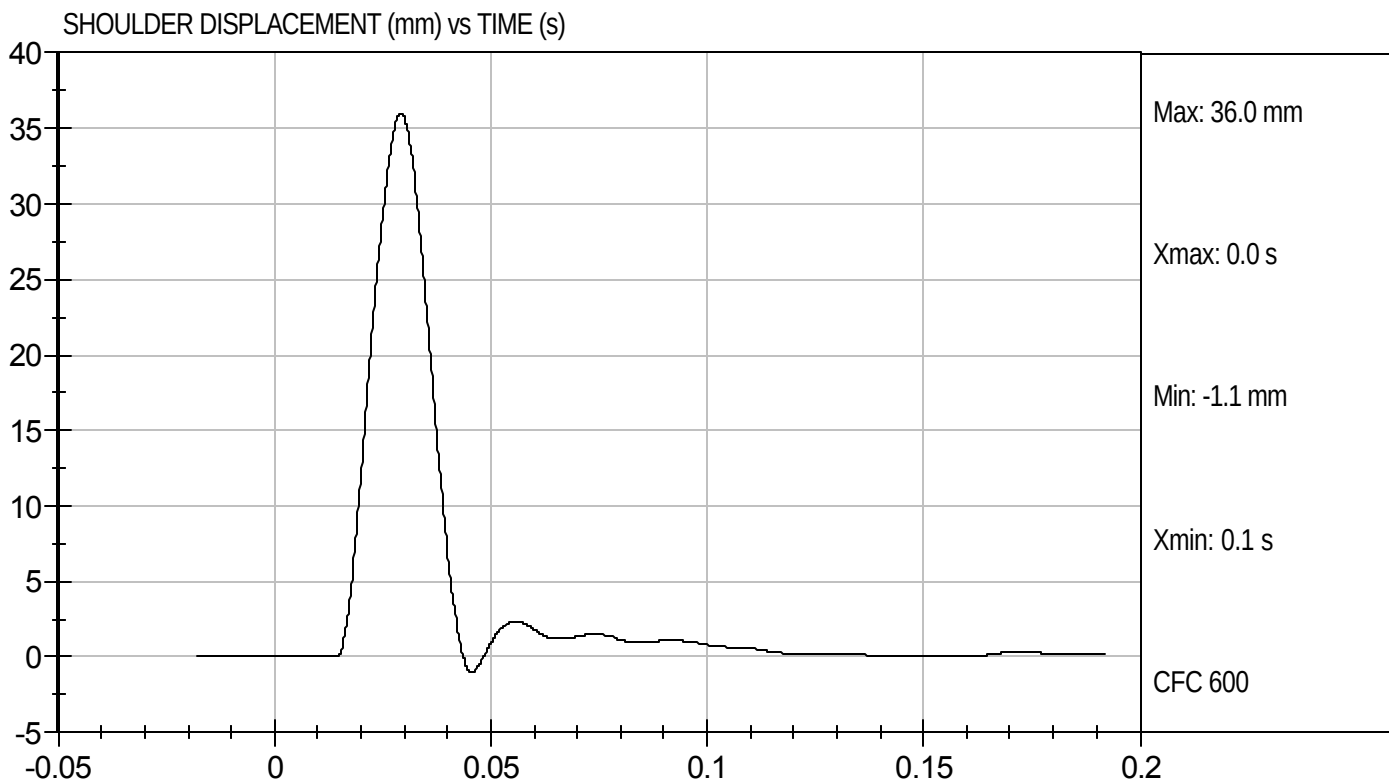
Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s





Test Desc: Thorax With Arm
Component ID: D091254

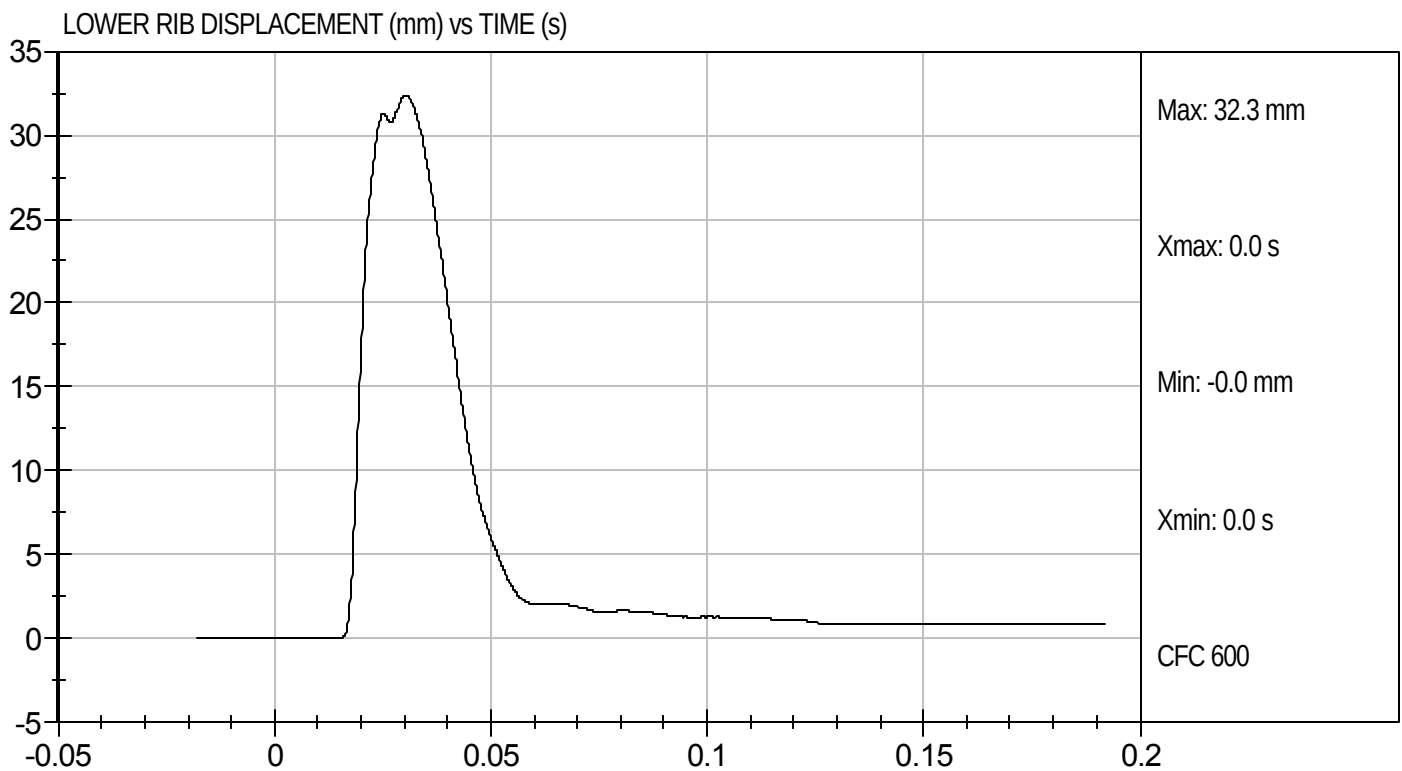
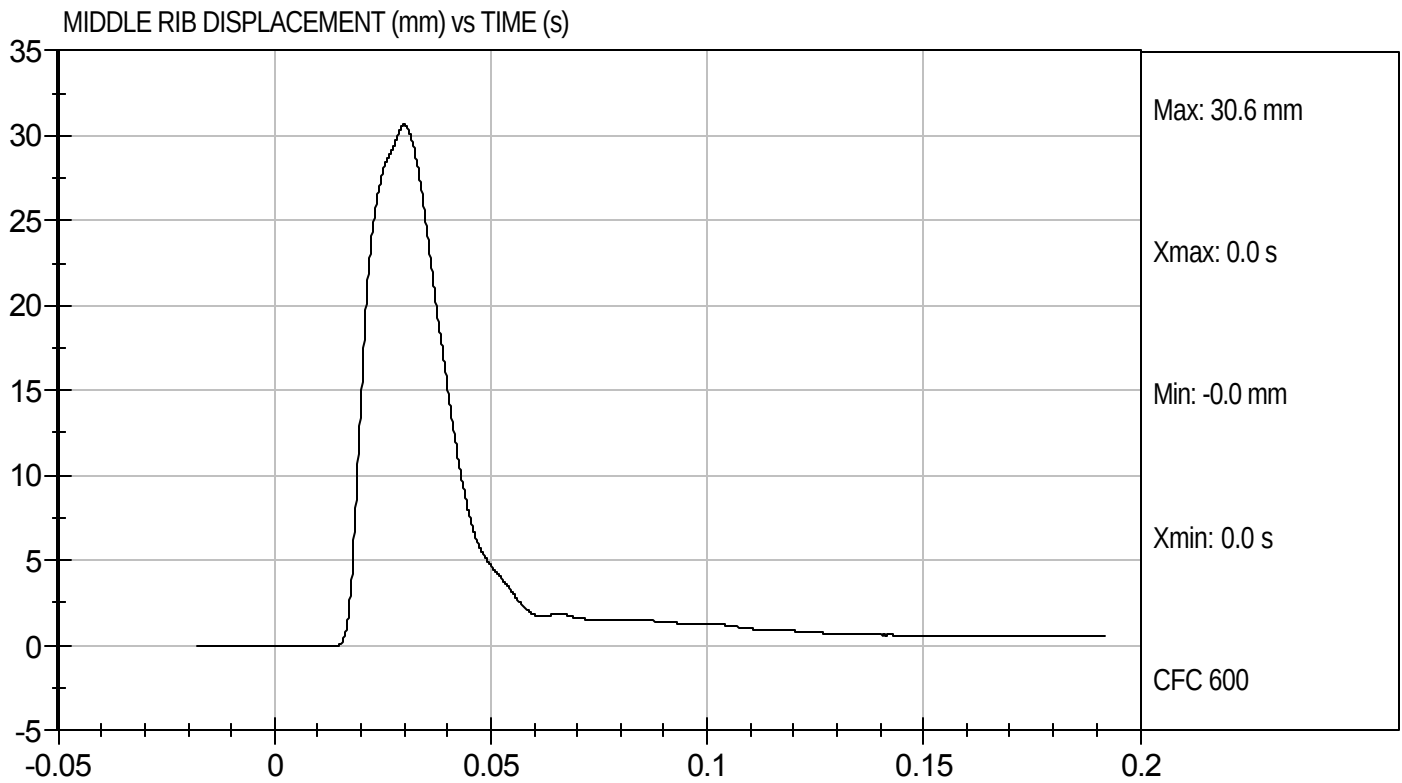
Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s





Test Desc: Thorax With Arm
Component ID: D091254

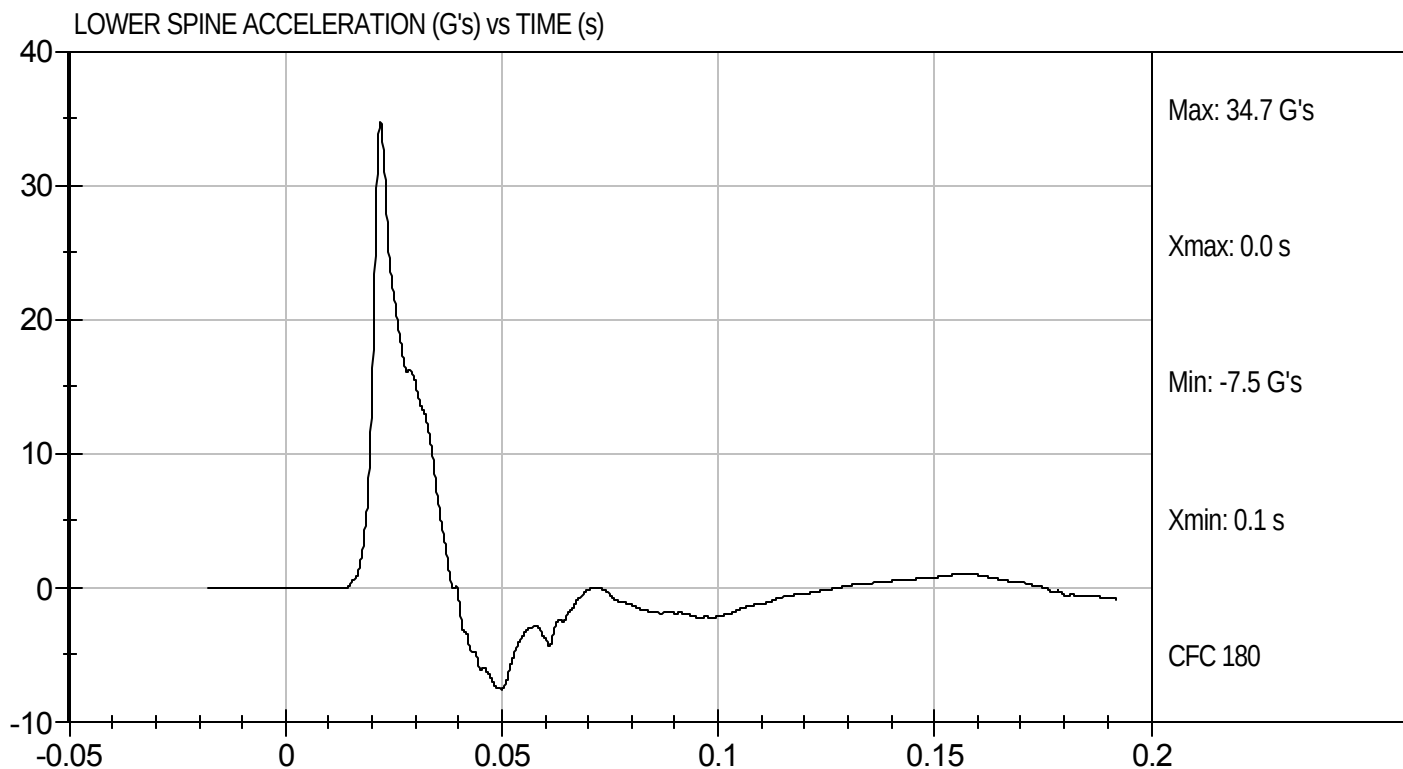
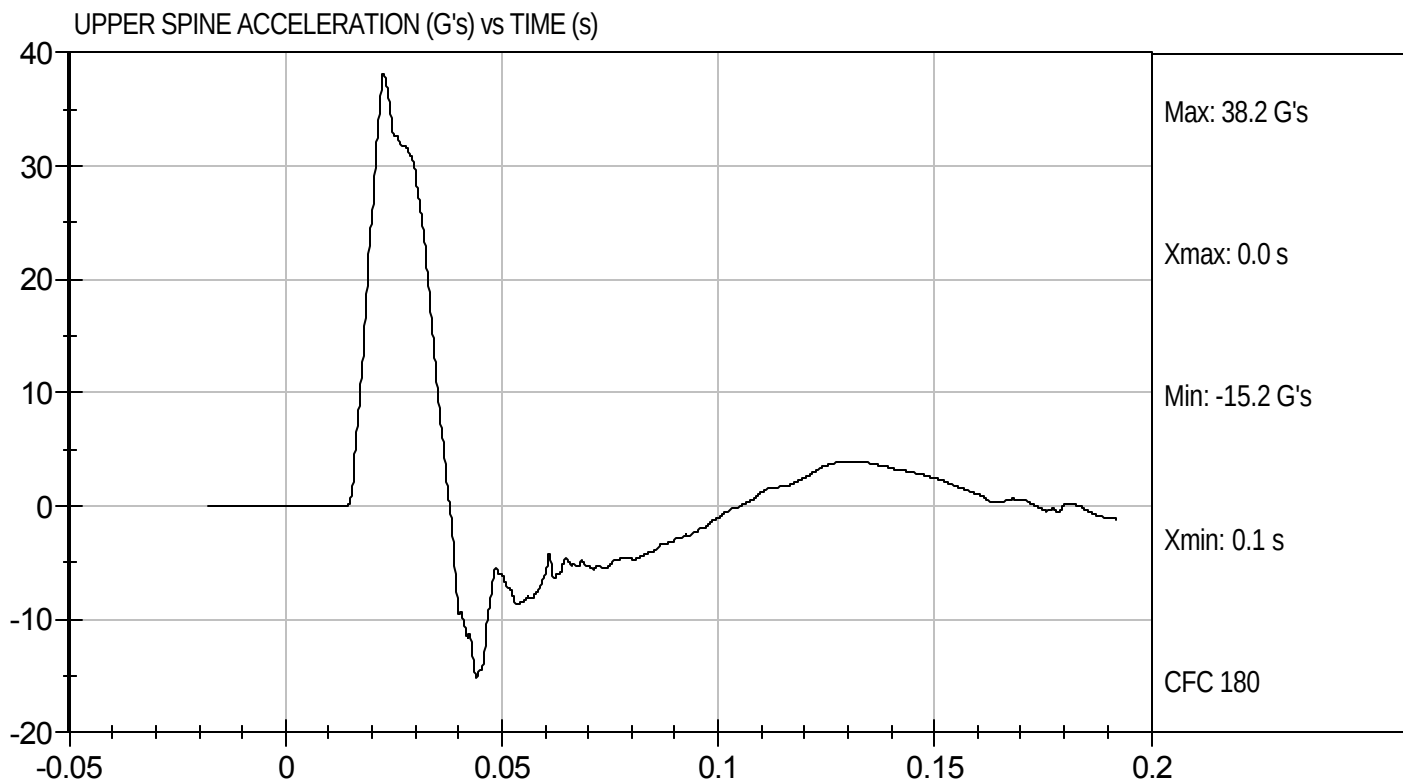
Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s





Test Desc: Thorax With Arm
Component ID: D091254

Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s



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

ATD Serial No: 296

Test I.D: D091255

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	41	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	39	Pass
Middle Rib Displacement	mm	39 to 45	42	Pass
Lower Rib Displacement	mm	35 to 43	39	Pass
Upper Spine (T1) Y Acceleration	G's	13 to 17	15	Pass
Lower Spine (T12) Y Acceleration	G's	7 to 11	9	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

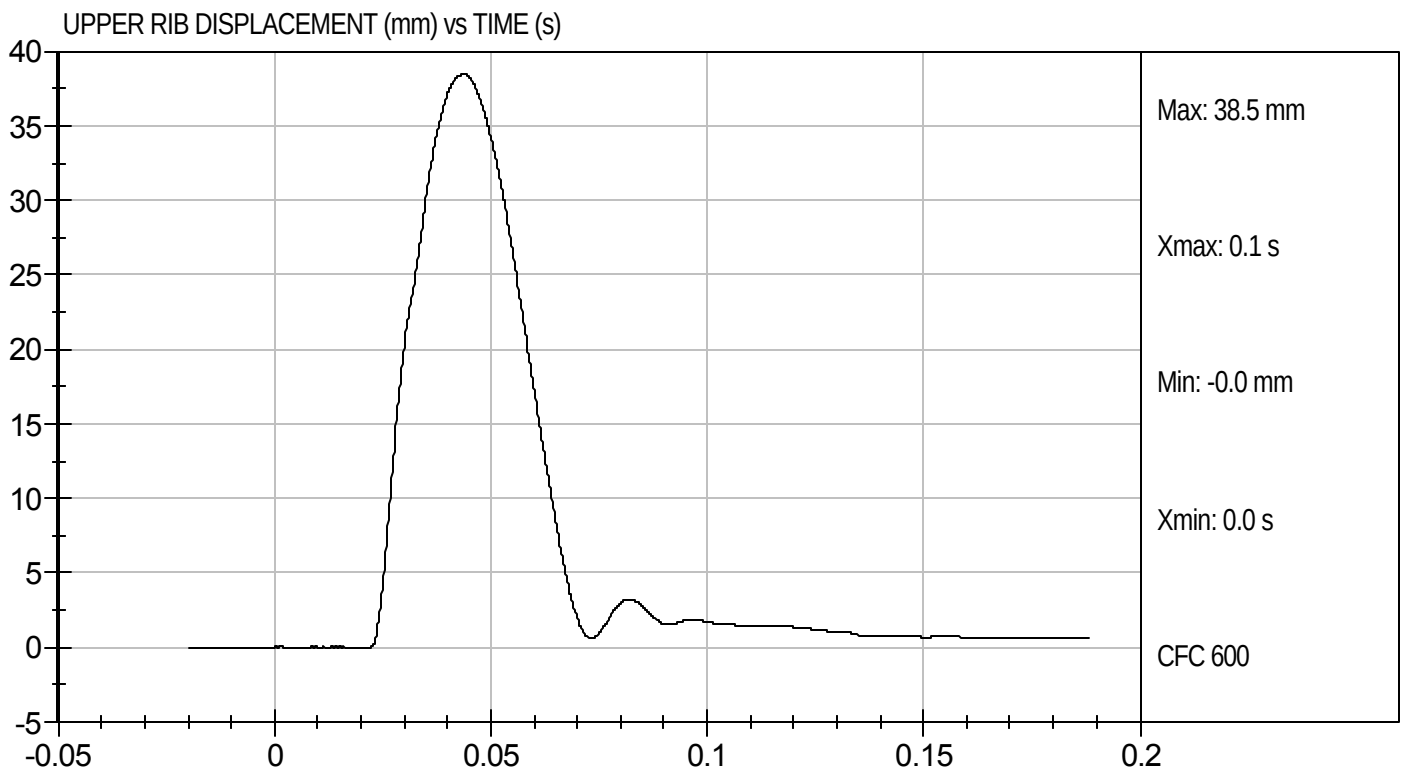
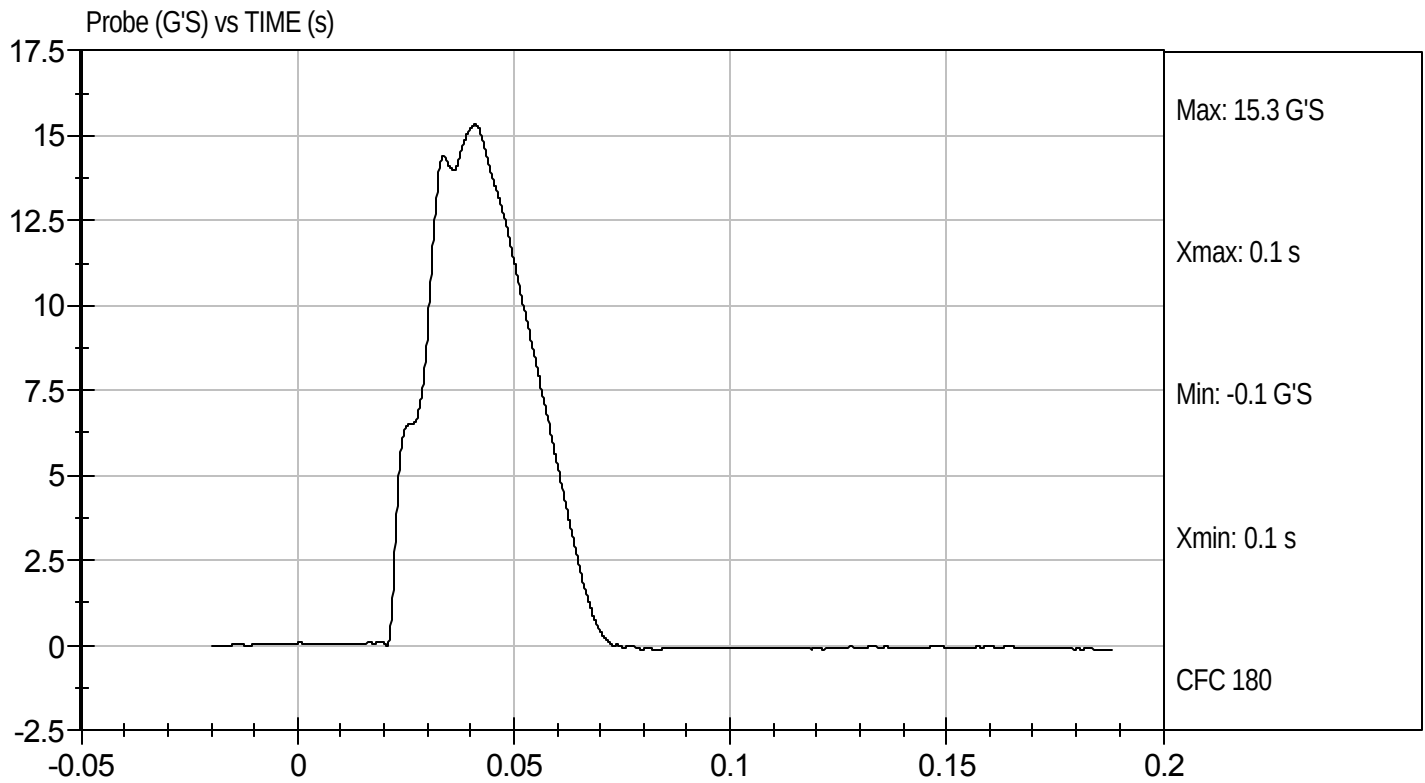
5/22/09
Test Date

David Winkelbauer
Approved By



Test Desc: Thorax Without Arm
Component ID: D091255

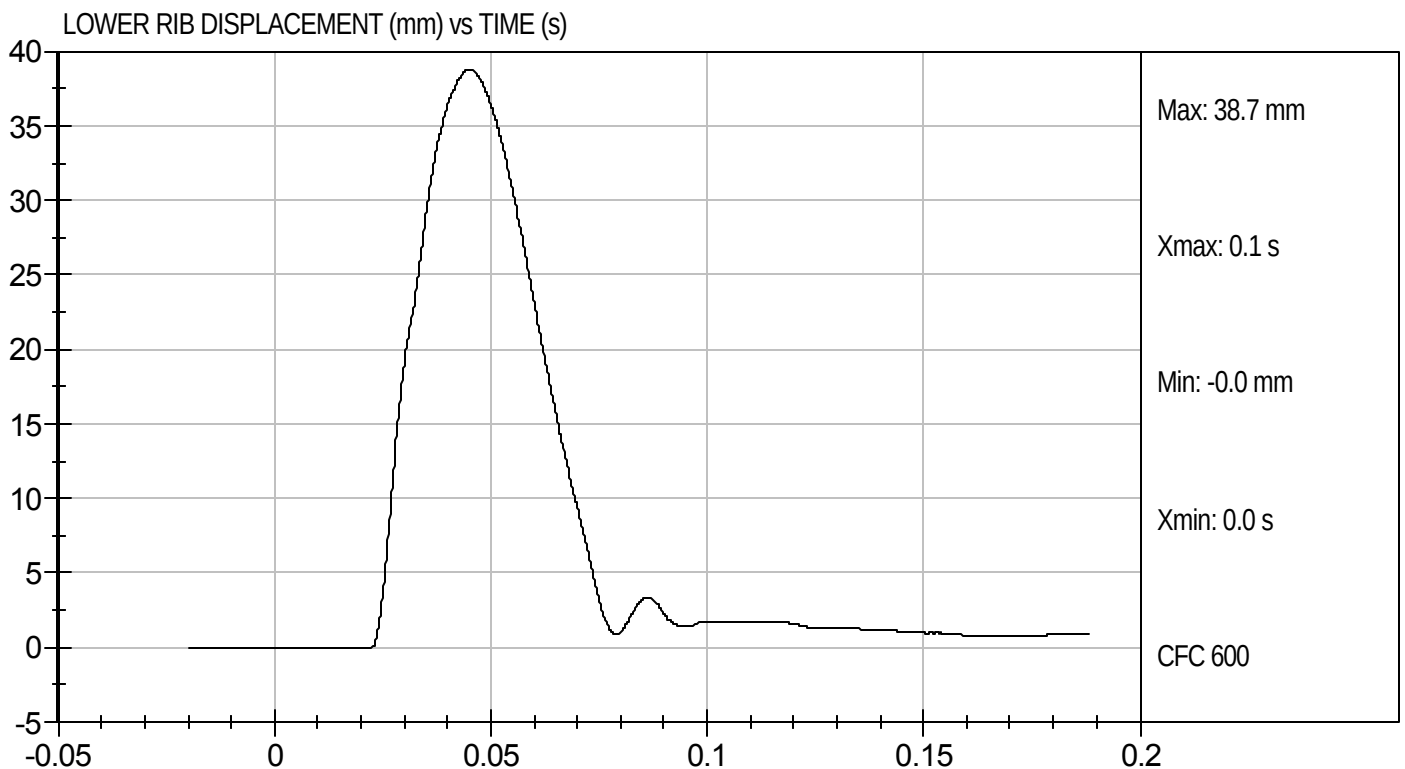
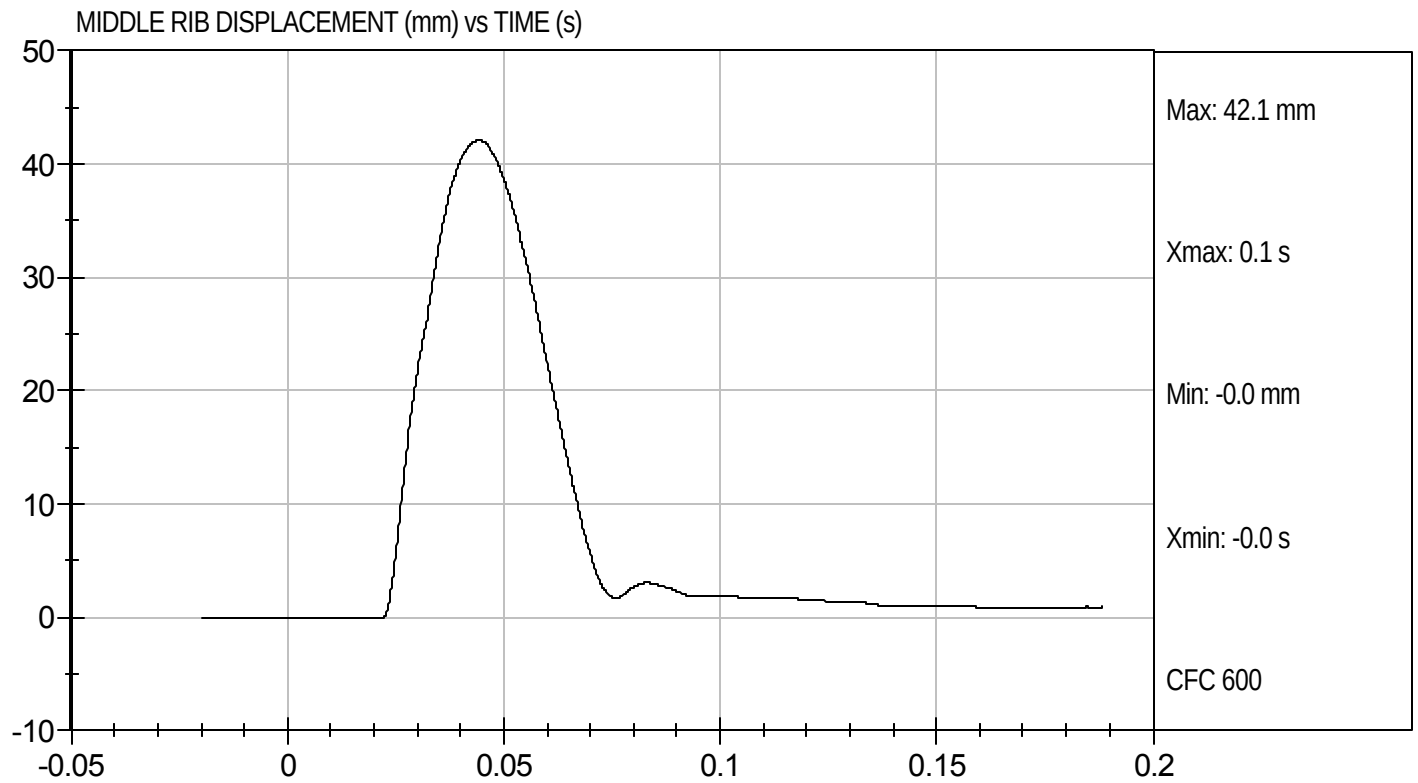
Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D091255

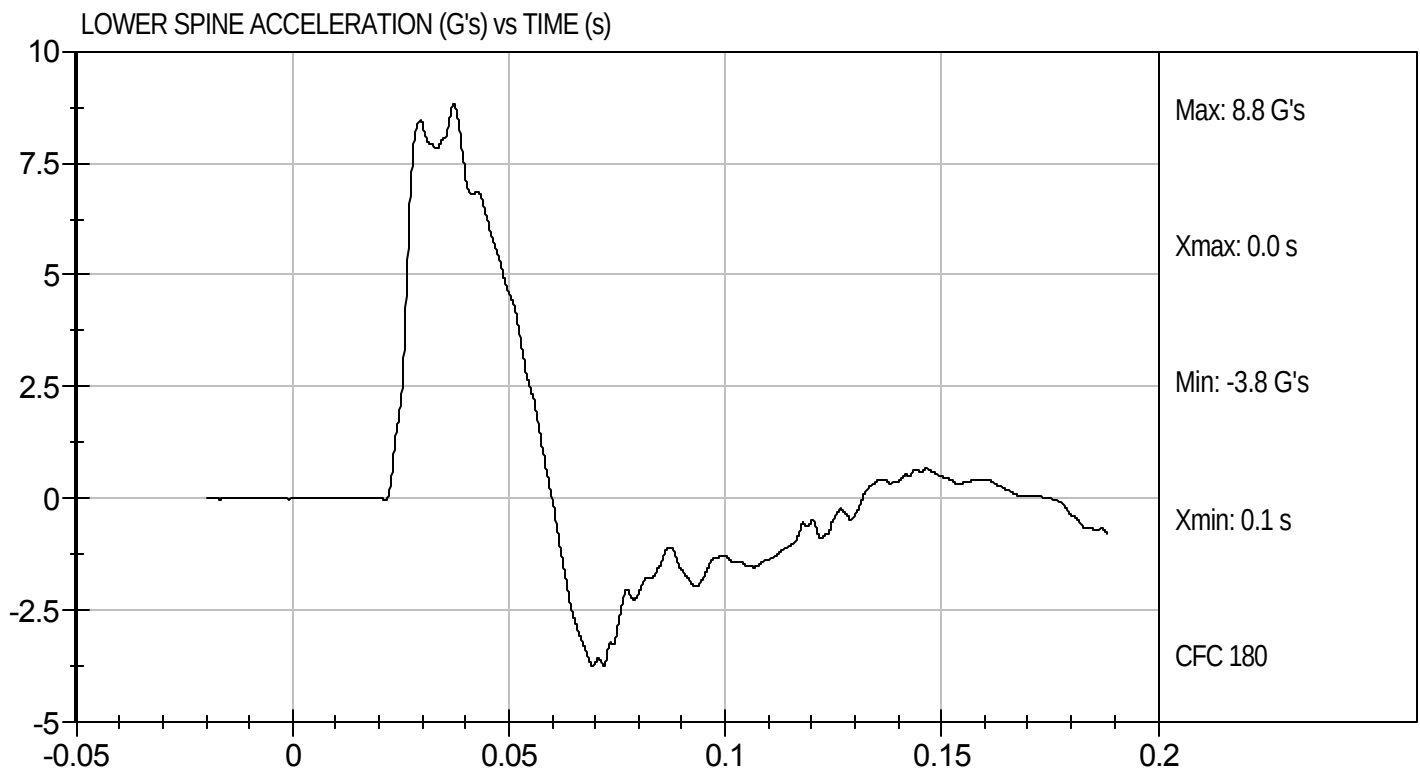
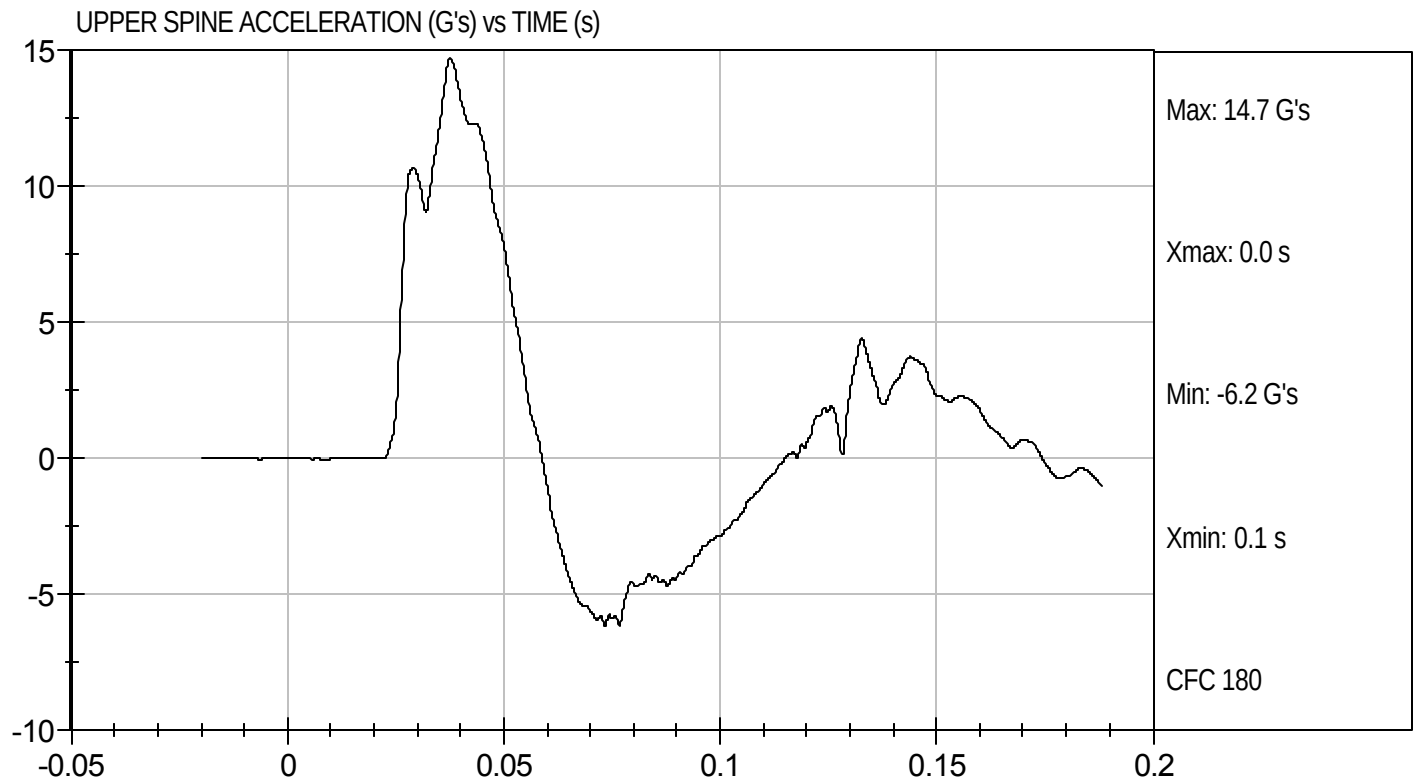
Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D091255

Test Date: 5/22/09
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: D091256

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	40	Pass
Impact Velocity	m/s	4.20 to 4.40	4.30	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	37	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
			Overall Test Results	Pass


Laboratory Technician

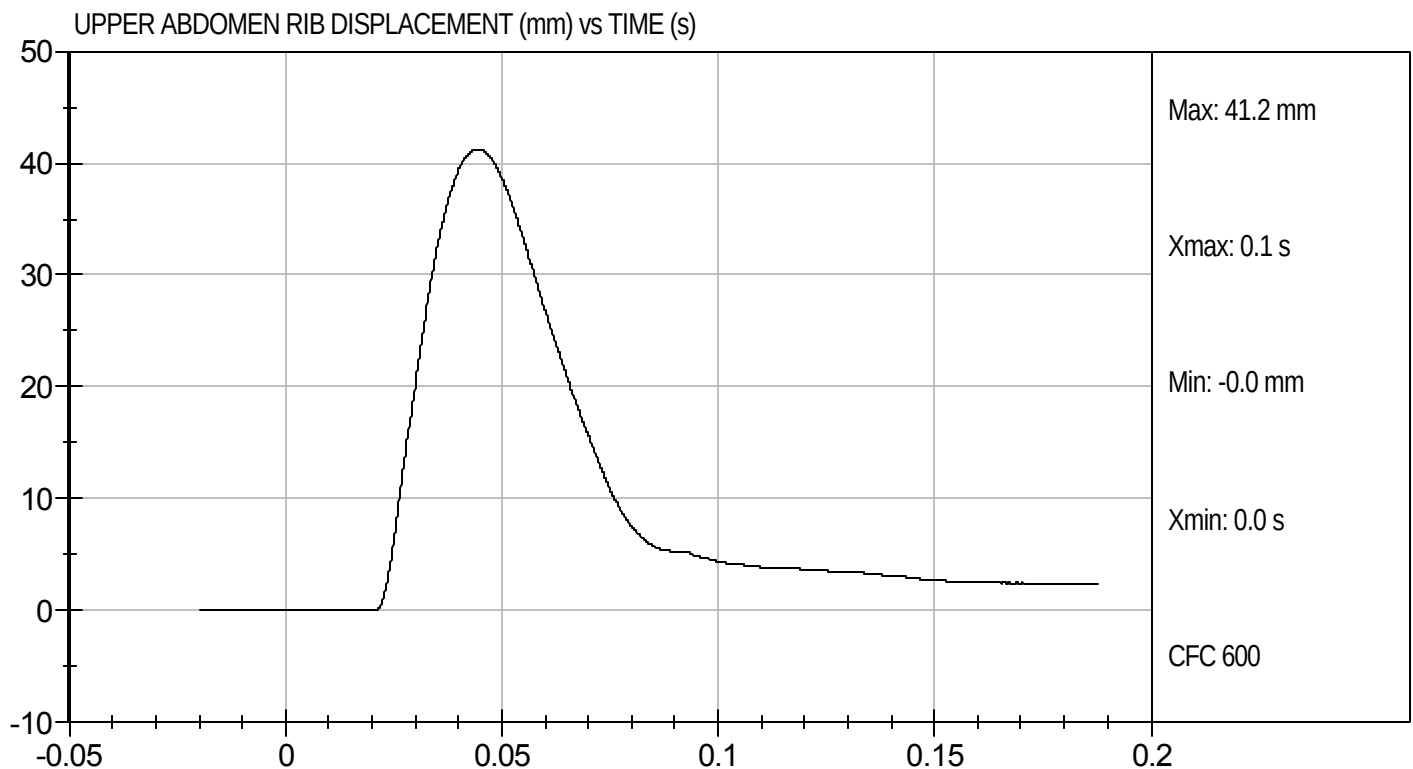
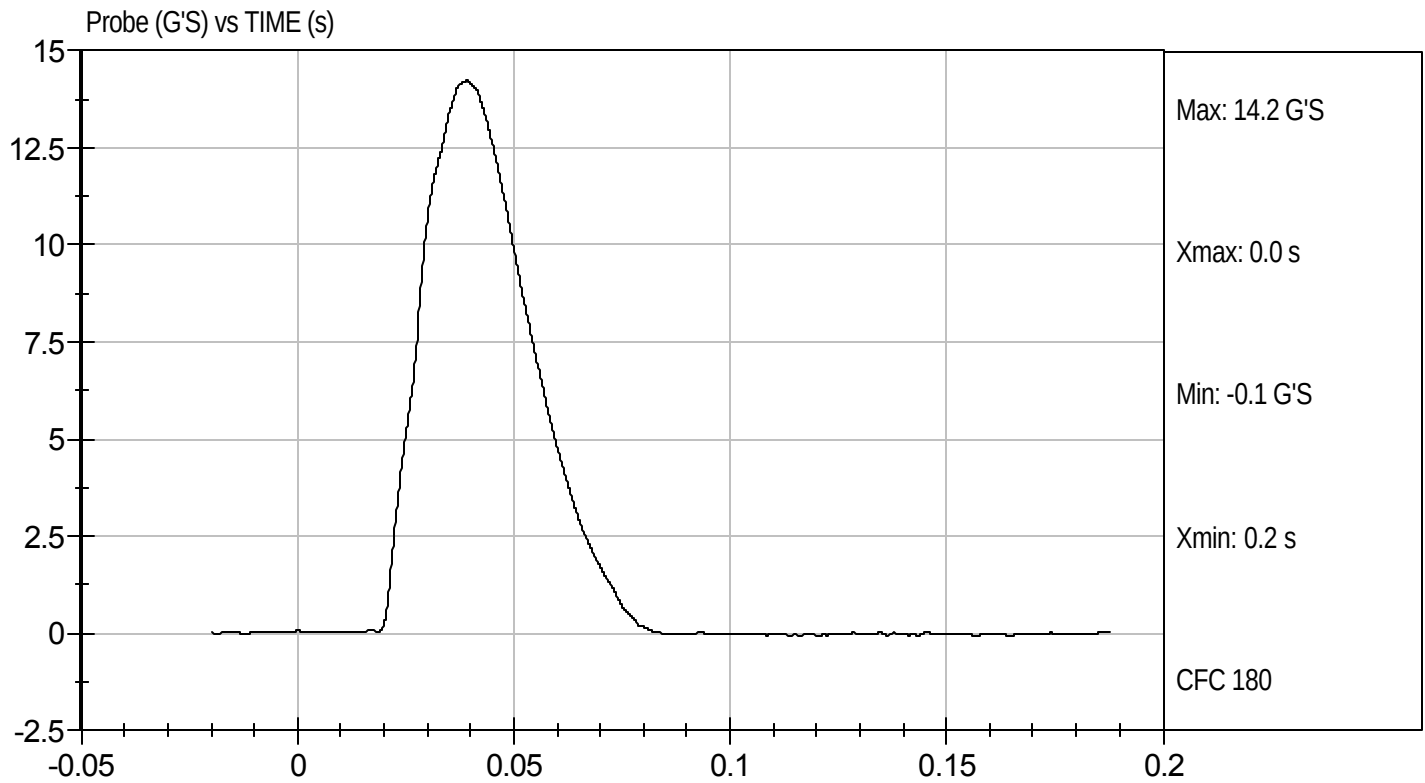
5/22/09
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D091256

Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 m/s

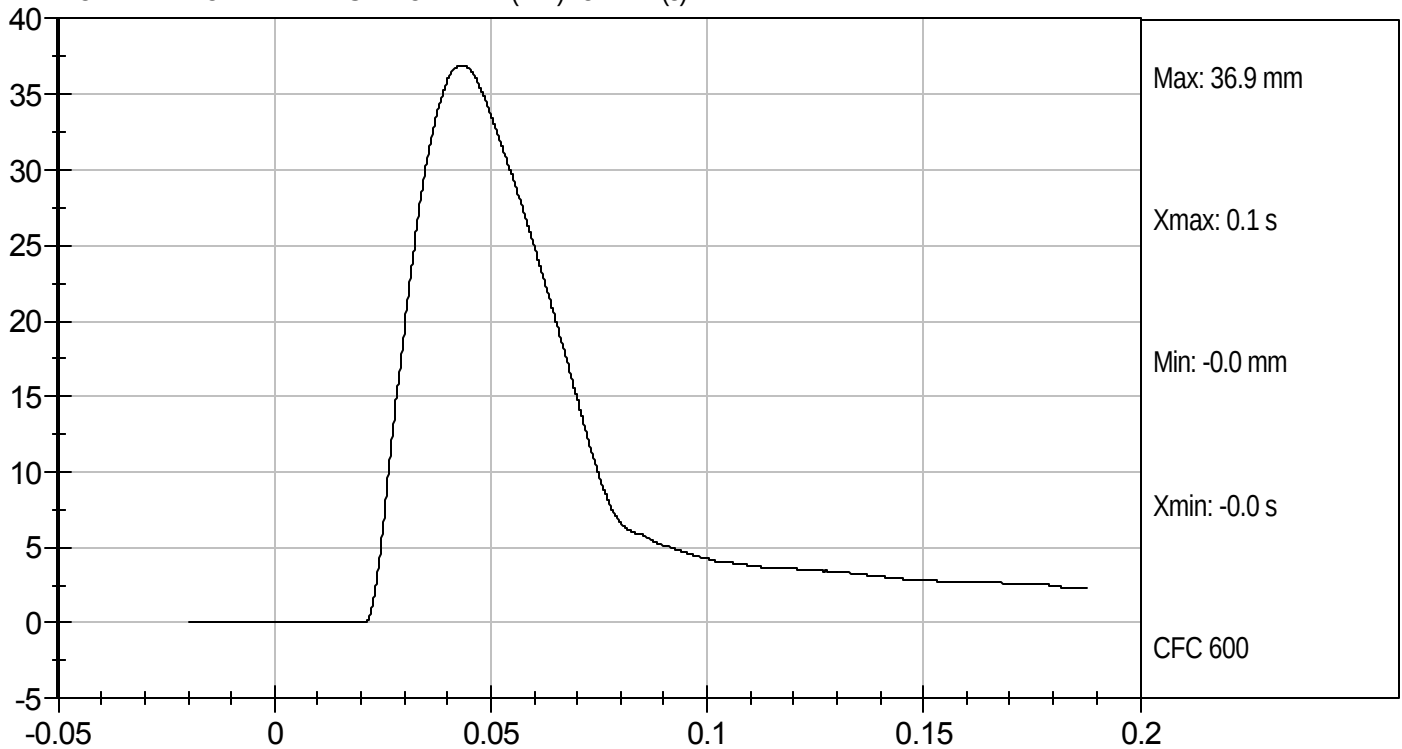




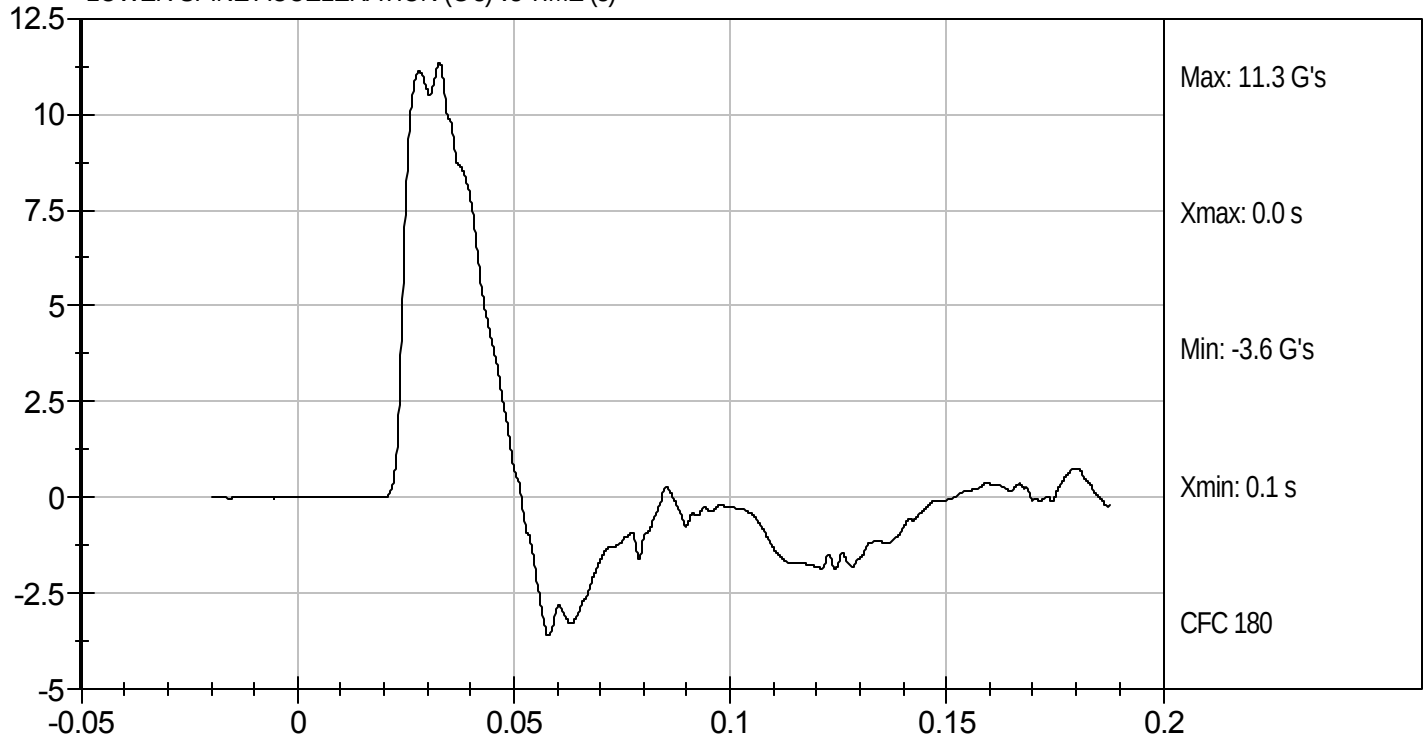
Test Desc: Abdomen Impact
Component ID: D091256

Test Date: 5/22/09
Velocity: 14.12 ft/s, 4.30 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: D091257

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	40	Pass
Impact Velocity	m/s	6.60 to 6.80	6.69	Pass
Peak Impactor Acceleration	G's	38 to 47	44	Pass
Pelvis Y Acceleration after 6 ms	G's	34 to 42	37	Pass
Peak Acetabulum Force	N	3600 to 4300	4135	Pass
Overall Test Results				Pass


Laboratory Technician

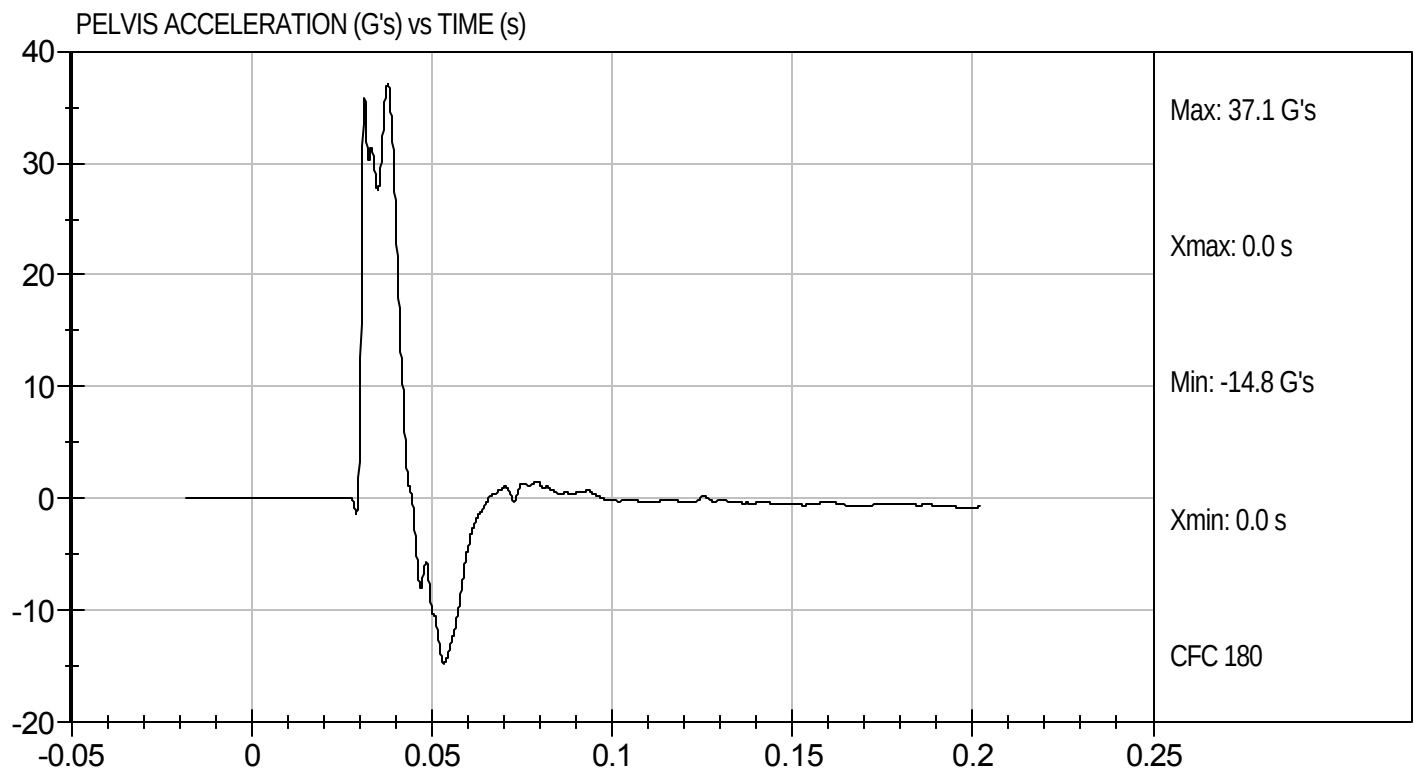
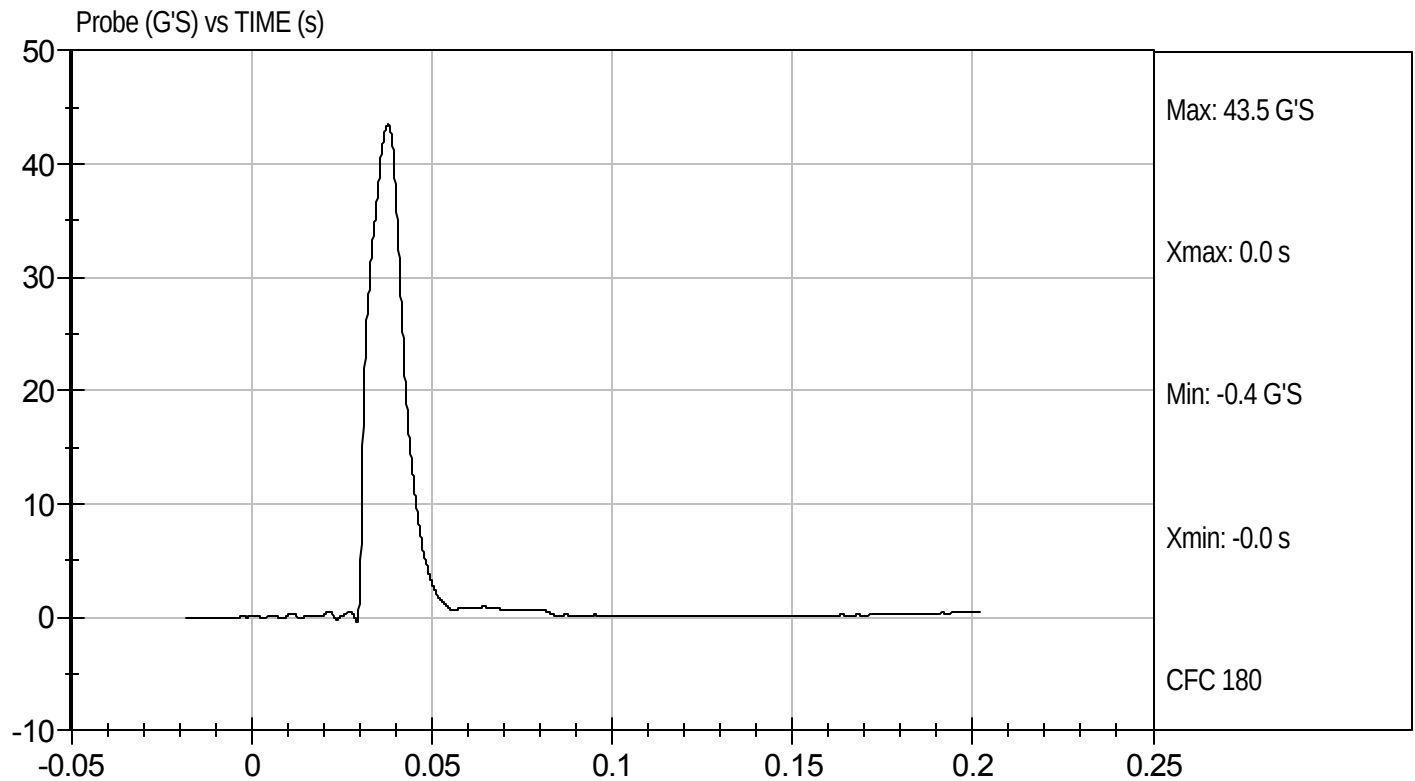
5/22/09
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D091257

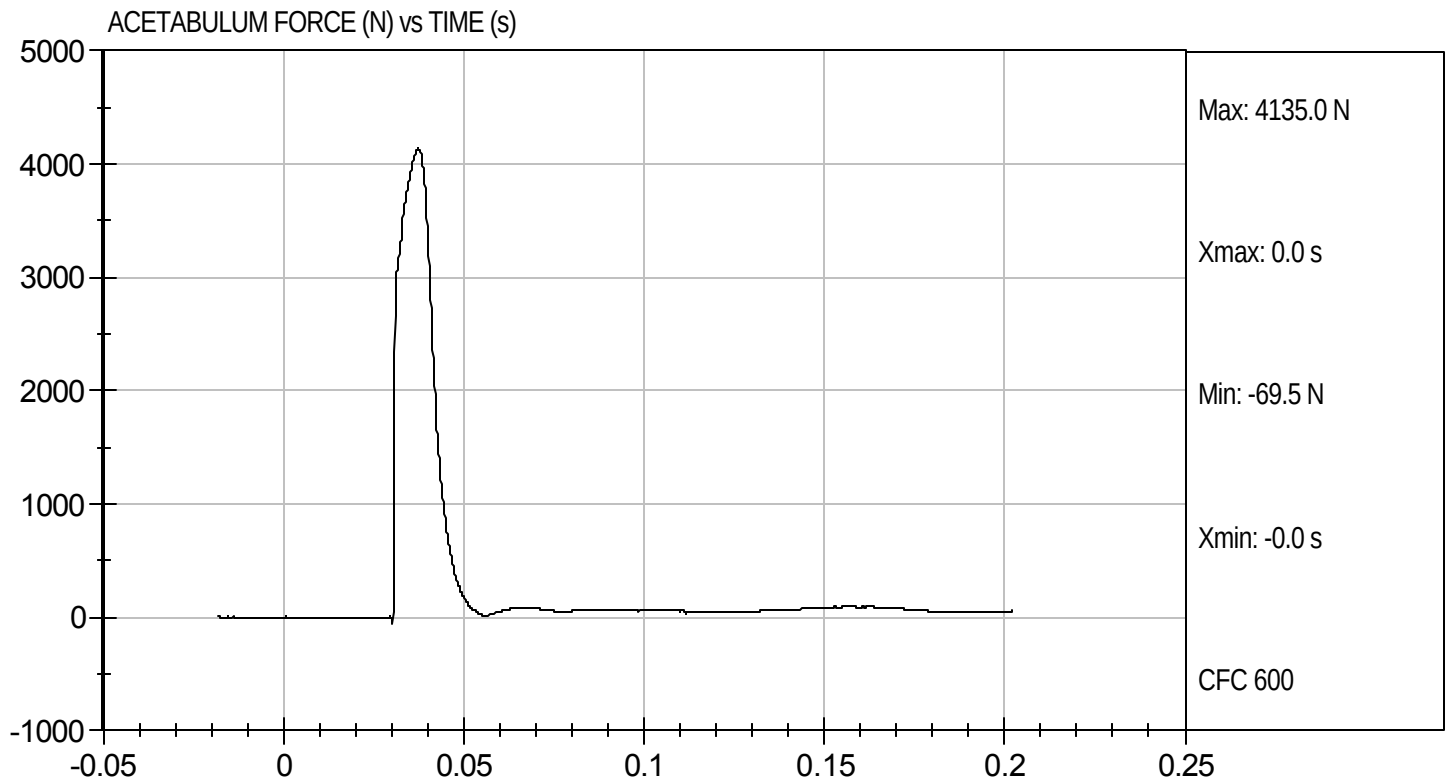
Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s





Test Desc: Pelvis Impact
Component ID: D091257

Test Date: 5/22/09
Velocity: 21.96 ft/s, 6.69 m/s



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

ATD Serial No: 296

Test I.D: D091258

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.4	Pass
Humidity	%	10 to 70	40	Pass
Impact Velocity	m/s	4.20 to 4.40	4.34	Pass
Peak Impactor Acceleration	G's	36 to 45	40	Pass
Pelvis Y Acceleration	G's	28 to 39	37	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4844	Pass
Overall Test Results			Pass	


Laboratory Technician

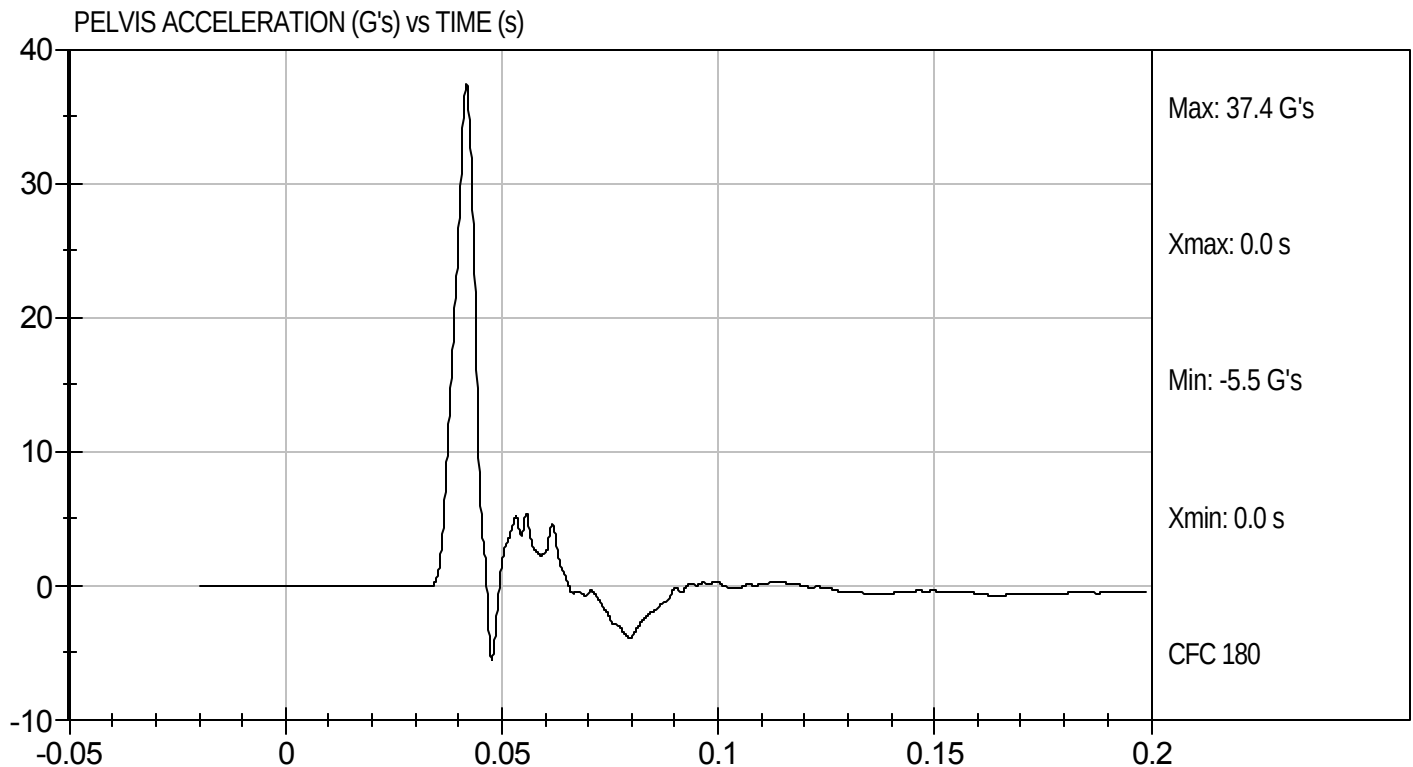
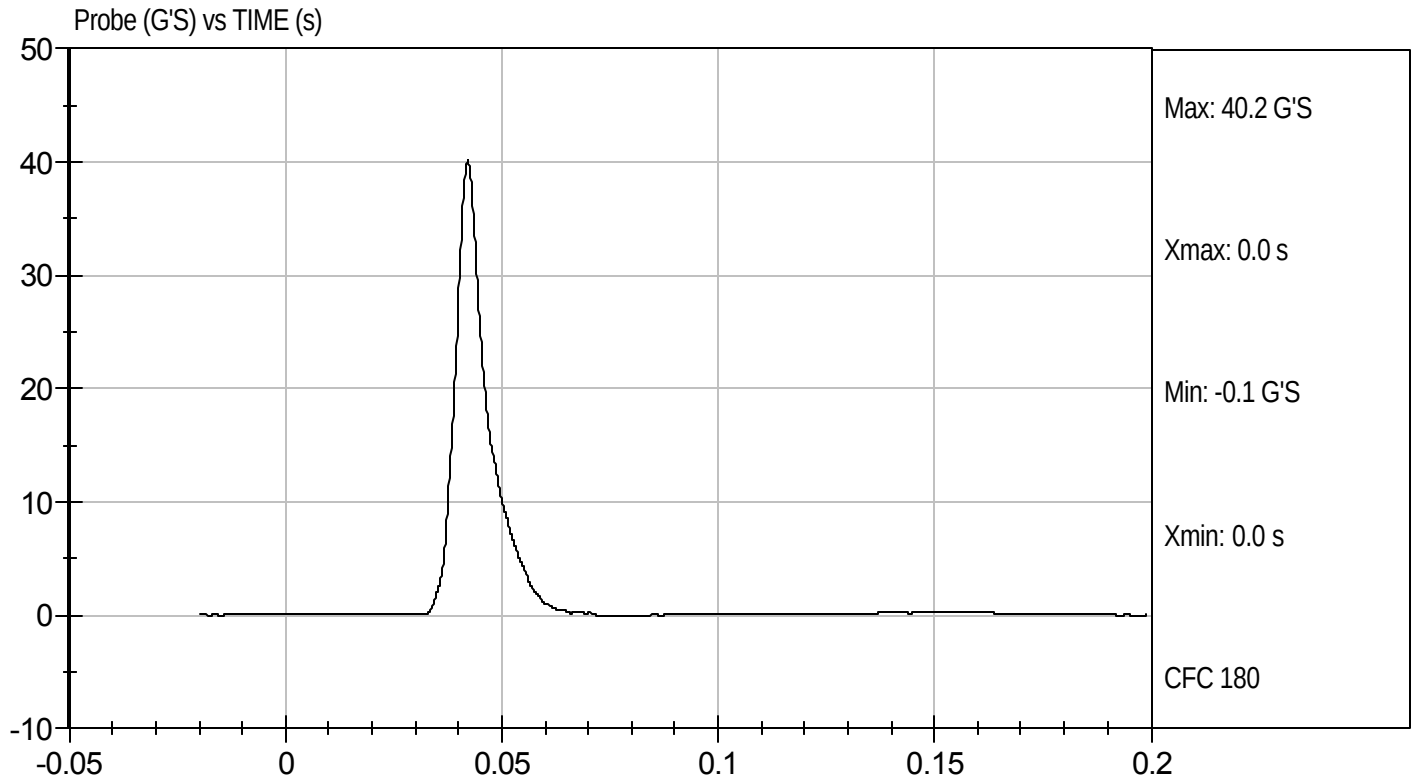
5/22/09
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D091258

Test Date: 5/22/09
Velocity: 14.25 ft/s, 4.34 m/s





Test Desc: Iliac Impact
Component ID: D091258

Test Date: 5/22/09
Velocity: 14.25 ft/s, 4.34 m/s

