

REPORT NUMBER: SINCAP-MGA-2011-018

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Moving Deformable Barrier Side Impact Test**

**DAIMLER AG STUTTGART
2011 Mercedes-Benz C300 4-Dr Sedan
NHTSA No.: MB0501**

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



Test Date: September 8, 2010

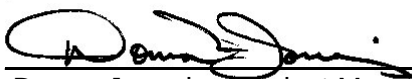
Final Report Date: December 30, 2010

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.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: December 30, 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

1. Report No. SINCAP-MGA-2011-018	2. Government Accession No.	3. Recipient's Catalog No.																																													
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of a 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No.: MB0501		5. Report Date December 30, 2010																																													
		6. Performing Organization Code MGA																																													
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SINCAP-MGA-2011-018																																													
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																																													
		11. Contract or Grant No. DTNH22-09-D-00124																																													
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered: Final Test Report September 8, 2010 to December 30, 2010																																													
		14. Sponsoring Agency Code NVS-111																																													
15. Supplementary Notes																																															
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Mercedes-Benz C300 4-Dr Sedan in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on September 8, 2010. The impact velocity of the Moving Deformable Barrier (MDB) was 61.6 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 target vehicle post-test maximum crush was 164 mm at level 3. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th colspan="3">Driver ATD (ES-2re)</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>186</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>14</td> </tr> <tr> <td>Combined Abdominal Force</td> <td>N</td> <td>2500</td> <td>706</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>1551</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th colspan="3">Passenger 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>322</td> </tr> <tr> <td>Lower Spine (T12) Resultant Acceleration</td> <td>G</td> <td>82</td> <td>56</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>4502</td> </tr> </tbody> </table>					Driver ATD (ES-2re)			Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	186	Maximum Thorax Rib Deflection	mm	44	14	Combined Abdominal Force	N	2500	706	Pubic Symphysis Force	N	6000	1551		Passenger ATD (SID-IIs)			Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	322	Lower Spine (T12) Resultant Acceleration	G	82	56	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4502
	Driver ATD (ES-2re)																																														
Measurement Description	Units	Threshold	Result																																												
Head Injury Criteria (HIC ₃₆)	N/A	1000	186																																												
Maximum Thorax Rib Deflection	mm	44	14																																												
Combined Abdominal Force	N	2500	706																																												
Pubic Symphysis Force	N	6000	1551																																												
	Passenger ATD (SID-IIs)																																														
Measurement Description	Units	Threshold	Result																																												
Head Injury Criteria (HIC ₃₆)	N/A	1000	322																																												
Lower Spine (T12) Resultant Acceleration	G	82	56																																												
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4502																																												

TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Summary of Test	1
2	Occupant and Vehicle Information / Data Sheets	3
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	4
2	Seat Adjustment, Fuel System, and Steering Wheel Data	7
3	Dummy Longitudinal Clearance Dimensions	9
4	Dummy Lateral Clearance Dimensions	10
5	Camera Locations and Data	11
6	Vehicle Accelerometer Locations	12
7	Moving Deformable Barrier Accelerometer Locations	13
8	Test Vehicle Summary of Results	14
9	Moving Deformable Barrier Summary of Results	15
10	Post-Test Observations	16
11	Vehicle Profile Measurements	17
12	Vehicle Exterior Crush Measurements	18
13	Vehicle Damage Profile Distances	21
14	Exterior Static Crush for Impactor Face	22
15	FMVSS 301 Fuel System Integrity Post-Impact Data	23
16	Dummy/Vehicle Temperature Stabilization Data	24
<u>Appendix</u>		
A	Photographs	A
B	Dummy Response Data	B
C	Dummy Calibration and Performance Verification Data	C

SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier 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 Mercedes-Benz C300 4-Dr Sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Mercedes-Benz C300 4-Dr Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.6 km/h (38.3 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin, on September 8, 2010. Pretest and post test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated January 2010. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

- Head CG Triaxial Accelerometers
- Thorax Rib 1 to Rib 3 Displacement Potentiometers
- Abdomen Forward, Middle, and Rear Load Cells
- Lower Spine Triaxial Accelerometers
- Pubic Load Cell

PASSENGER ATD (SID-IIs)

- 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

DUMMY INJURY VALUES

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	186
Maximum Thorax Rib Deflection	mm	44	14
Combined Abdominal Force	N	2500	706
Pubic Symphysis Force	N	6000	1551

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	322
Lower Spine (T12) Resultant Acceleration	G	82	56
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4502

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	Yes	No	No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Side 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:

Right Rear Sill Z
Left Front Sill Y
Left Mid B-Post Y

Camera No. 10 – Real-Time Rear View of Impact did not run.

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
 Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB0501	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Mercedes-Benz	Power Steering	Yes
Model	C300	Driver Front Airbag	Yes
Body Style	Sedan	Driver Curtain Airbag	Yes
VIN	WDDGF5EB1BA416677	Driver Head/Torso Airbag	No
Body Color	Steel Grey	Driver Torso Airbag	Yes
Delivery Date	9/02/2010	Driver Torso/Pelvis Airbag	No
Odometer (mi)	83	Driver Pelvis Airbag	Yes
Odometer (km)	134	Driver Knee Airbag	Yes
Dealer	Concours Motors	Rear Pass. Front Airbag	No
Transmission	Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Rear	Rear Pass. Head/Torso Airbag	No
Type/No. Cylinders	6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.0	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	No	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	Daimler AG Stuttgart	GVWR (kg)	2060
Date of Manufacture	06/10	GAWR Front (kg)	1010
		GAWR Rear (kg)	1090

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3		5	
Capacity Weight (VCW) (kg)				380	(A)
DSC x 68.04 (kg)				340	(B)
Cargo Weight (RCLW) (kg)				40	(A-B)

VEHICLE SEAT TYPE

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

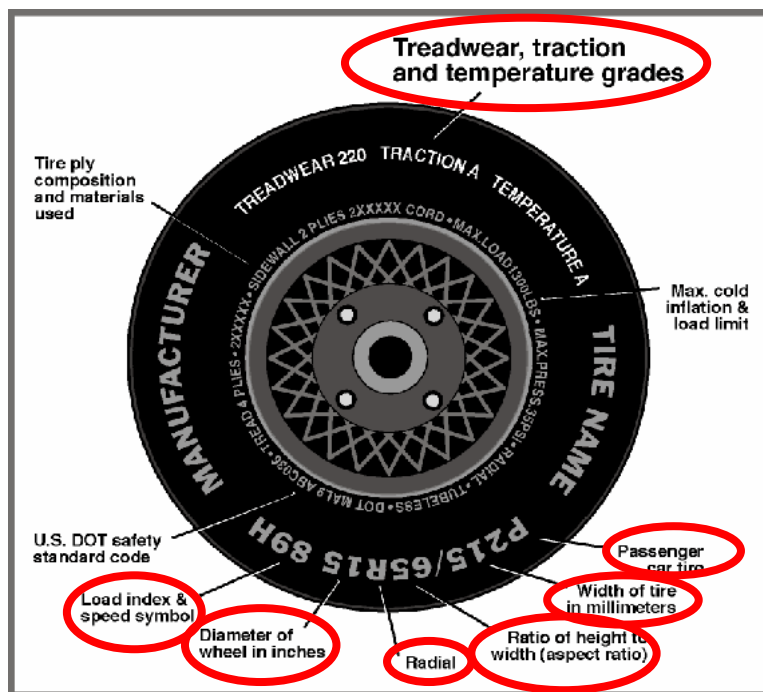
DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010

VEHICLE TIRE INFORMATION



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	190	230
Recommended Tire Size	P225/45R17	P245/40R17
Tire Size on Vehicle	P225/45R17	P245/40R17
Tire Manufacturer	Continental	Continental
Tire Model	ContiPro Contact	ContiPro Contact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1 rayon	1 rayon
Tire Plies Body	1 rayon, 2 steel, 1 nylon	1 rayon, 2 steel, 1 polymide
Load Index & Speed Symbol	91H	91H
Tire Material	Rubber	Rubber
DOT Safety Code Right	LM7R PXH6 2110	LM8NPXH60910
DOT Safety Code Left	LM7R PXH6 2110	LM8NPXH60910

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	422.3	376.5		460.0	440.0		469.0	458.1	
Right	kg	426.4	373.7		437.7	422.3		420.9	419.6	
Ratio	%	53.1	46.9		51.0	49.0		50.3	49.7	
Totals	kg	848.7	750.2	1598.9	897.7	862.3	1760.0	889.9	877.7	1767.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1598.9	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	40	(C)
Calculated Target Vehicle Test Weight (TVTW)	kg	1768.2	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
Fully Loaded	mm	641	654	631	642	
As Tested (Fully Loaded $\pm$ 10mm at each wheel well)	mm	645	650	639	644	1353

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2762
Total Vehicle Length at Left Side	mm	3639
Total Vehicle Length at Centerline	mm	4634
Total Vehicle Length at Right Side	mm	3639
Weight of Ballast in Cargo Area	kg	6.8
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	61.6

Vehicle components removed to meet target vehicle test weight: Right front mirror, spare tire and tools, right taillight, trunk trim

TEST VEHICLE VERTICAL IMPACT POINT DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	441
Actual Impact Point Aft of Front Axle	mm	446

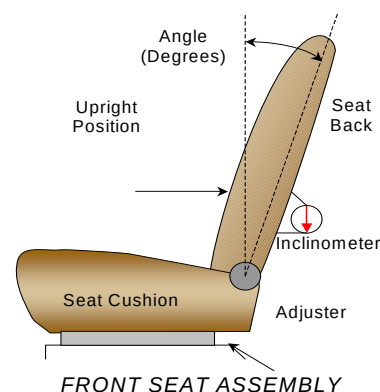
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows:
 For the driver, set seat back at 21.0° referenced to the sill and measured at the outboard headrest post. The left rear passenger seat back was fixed.



SEAT BACK ANGLES

	Degrees
Driver with Seated Dummy	21.0° at headrest post
Passenger with Seated Dummy	Full forward position

SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	200 mm	100 mm (forwardmost as 0)
Rear Seat	Fixed	Fixed

Describe method: For the driver seat track, using only the controls that primarily move the seat in the fore-aft direction, the seat was moved to the full rear position and marked. The seat was then moved to the foremost position and marked. The seat was then placed in the mid point of travel and marked. The left rear passenger seat track was fixed.

SEAT BELT UPPER ANCHORAGES

	Total # of Positions	Placed in Position #
Driver Seat	4 detents	0 (uppermost as 0)
Rear Seat	4 detents	0 (uppermost as 0)

Describe method: The driver and left rear passenger seat anchorages were set in the uppermost position.

DATA SHEET NO. 2 (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

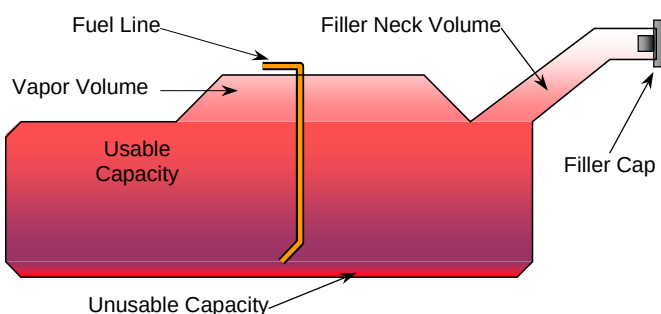
NHTSA No. MB0501
 Test Date: 9/8/2010

FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	66.2
Usable Capacity of "Optional" Tank	
Usable Capacity Used for FMVSS 301	60.9 to 62.2
Actual Amount of Solvent used	61.6

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

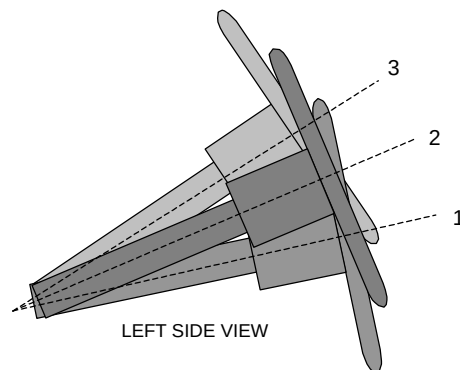
The test vehicle is equipped with an electric fuel pump. The fuel pump is in operation if the ignition is switched to the "ON" position. After about 15 seconds, the pump switches back to standby mode, if the engine is not started. The fuel pipe is on the right side.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITION

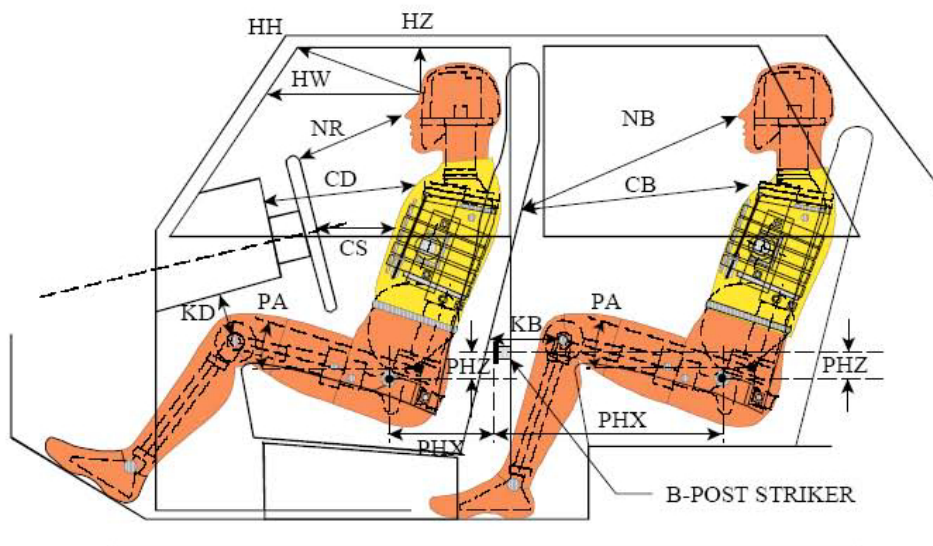
	Degrees	Fore/Aft Position (mm)
Lowermost - Position 1	70.0	250
Geometric Center – Position 2	67.5	220
Uppermost – Position 3	65.0	190
Telescoping Steering Wheel Travel		60
Test Position	67.5	220

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

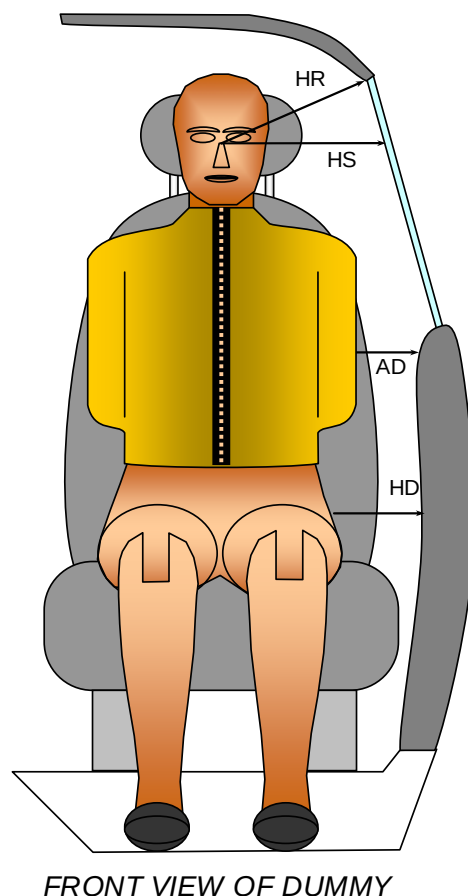
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver S/N 032		Passenger S/N 296	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	363	15.2		
HW		Head to Windshield	562	0		
HZ	HZ	Head to Roof	143	90	217	90
NR	NB	Nose to Rim/Seat Back	455	12.3	454	21.7
CD	CB	Chest to Dash/Seat Back	552	10.5	448	13.2
CS		Chest to Steering Wheel	354	6.3		
KDL	KBL	Left Knee to Dash/Seat Back	196	41.8	206	31.4
KDR	KBR	Right Knee to Dash/Seat Back	191	37.4	219	17.5
PA	PA	Pelvic Angle		25.4		21.0
PHX	PHX	H-Point to Striker (X-Axis)	139	0	202	0
PHZ	PHZ	H-Point to Striker (Z-Axis)	228	90	281	90
SA	SA	Seat Back Angle		21.0		

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



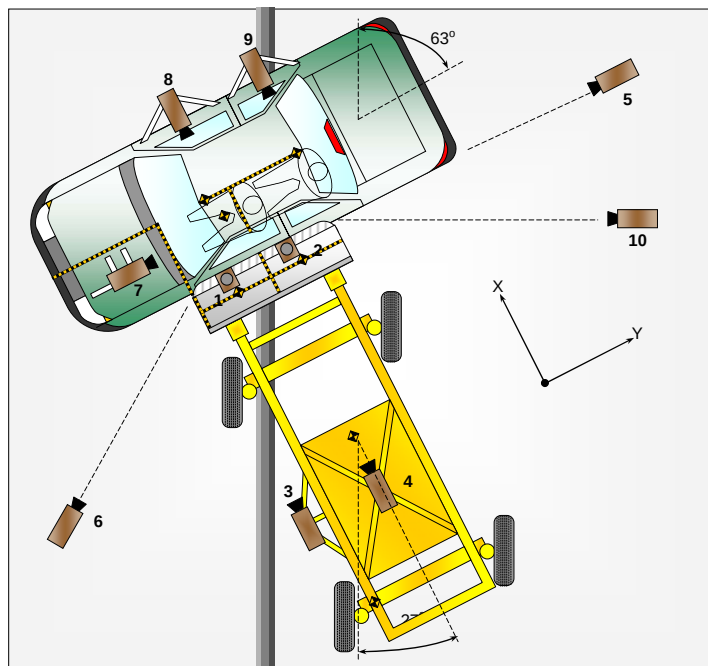
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver S/N 032	Passenger S/N 296
HR	Head to Side Header	mm	157	231
HS	Head to Side Window	mm	173	363
AD	Arm to Door	mm	56	172
HD	H-Point to Door	mm	125	199

DATA SHEET NO. 5 **CAMERA LOCATIONS AND DATA**

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



CAMERA LOCATIONS AND DATA

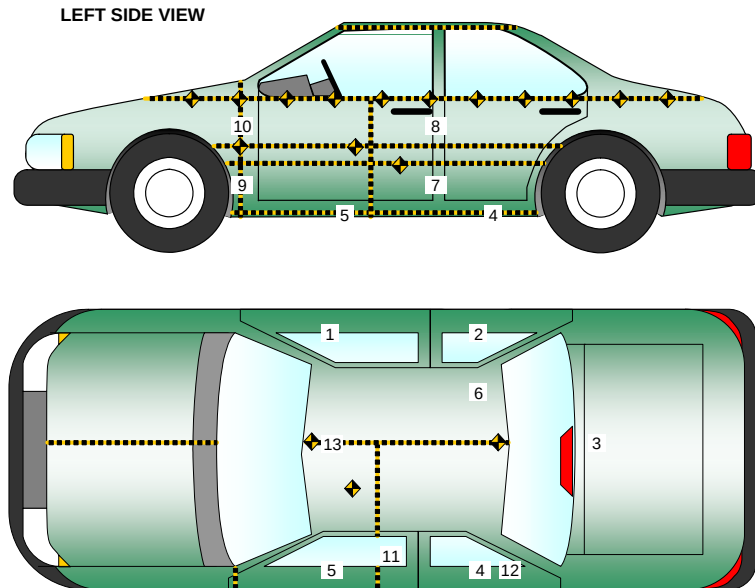
No.	Camera View	Coordinates (mm)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead Overall	-870	0	-5050	87.4	14	1000
2	Overhead Close-up	620	1160	-5050	78.3	50	1000
3	Left Impact Point (MDB)					50	1000
4	Side Overall (MDB)					16	1000
5	Rear	-3420	5280	-1230	4.2	24	1000
6	Left Front	3380	-4170	-1250	5.6	24	1000
7	Driver Front (OB)					12.5	1000
8	Driver Side (OB)					8	1000
9	Passenger Side (OB)					8	1000
10	Real Time Left Rear						30
11	Real Time Inrun						30

Reference: Impact Point projected to Ground
 +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

* All measurements accurate to ± 6 mm

**DATA SHEET NO. 6
VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2560	682	-170
2	Right Sill at Rear Seat	1495	682	-175
3	Rear Floorpan Above Axle	912	0	-515
4	Left Sill at Rear Door	1500	-682	-175
5	Left Sill at Front Door	2605	-682	-170
6	Rt. Rear Occ. Compartment	1860	376	-210
7	Left Lower B-Post	2108	-750	-427
8	Left Middle B-Post	2082	-710	-640
9	Left Lower A-Post	3105	-708	-455
10	Left Middle A-Post	3205	-771	-684
11	Front Seat Track	2270	-531	-315
12	Rear Seat Track or Structure			
13	Vehicle CG	2445	-269	-174

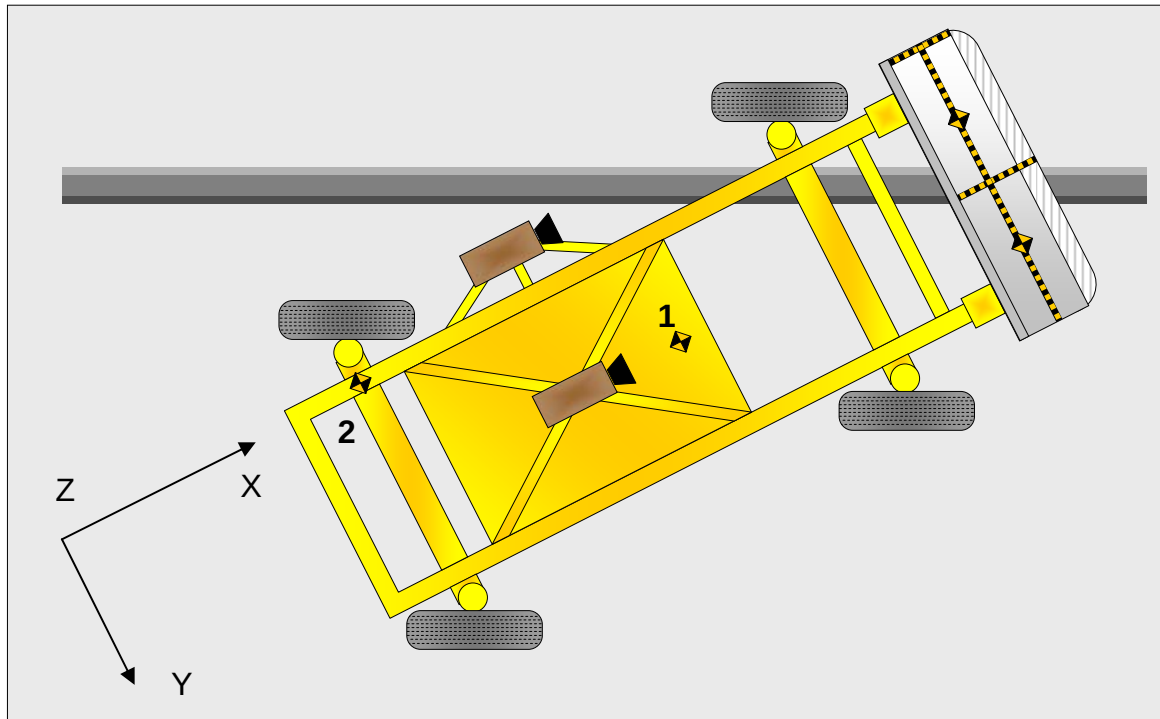
Reference: X – Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1105	0	-330
2	MDB Rear	-2580	-650	-625

Reference: X - MDB Face (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 8
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measurement Description	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	78	290
2	Occupant H-Point	mm	135	470
3	Mid Door	mm	164	595
4	Window Sill	mm	134	850
5	Window Top	mm	14	1350
	Maximum Penetration	mm	164	

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	8
Monitoring Channels	4
Total	70

CAMERA COVERAGE

High-Speed Vehicle Onboard	3
High-Speed Offboard	4
High-Speed MDB Onboard	2
Real-Time Stationary	1
Real-Time Panning	1
Total	11

DATA SHEET NO. 9**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
 Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2592
CG Location aft of Front Axle	1129

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	411.8	281.6	
Right	kg	356.8	311.3	
Ratio	%	56.5	43.5	
Totals	kg	768.6	592.9	1361.5

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.6
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.8
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	400	Right	239
B	Top of Bumper	533	500	Right	188
C	Mid-Level	686	800	Left	208
D	Top of Stack	813	800	Left	205

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High-Speed Cameras	2

DATA SHEET NO. 10

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
 Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver (ES-2re)	Passenger (SID-IIs)
Dummy Type / Serial No.	ES-2re / 032	SID-IIs / 296
Head Contact	Curtain Airbag, Headrest	Curtain Airbag, Seatback
Upper Torso Contact	Torso Airbag	Door Panel
Lower Torso Contact	Pelvis Airbag	Seat
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	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	None
Window Damage	Left Front and Left Rear Windows 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	Yes	No	No	
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Side Pelvis Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	

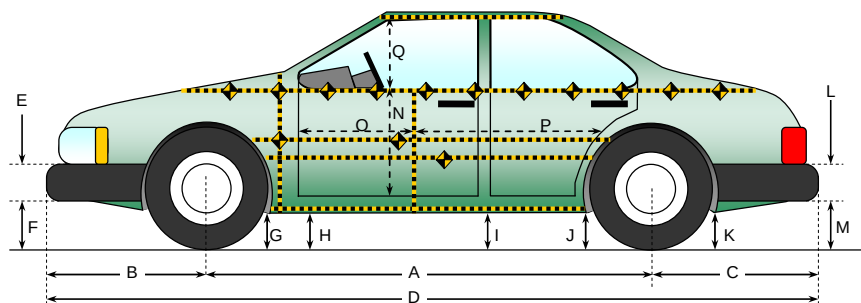
MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	5 rear
Vertical Offset	mm	+/-20	15 down

DATA SHEET NO. 11

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
 Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010



LEFT SIDE VIEW

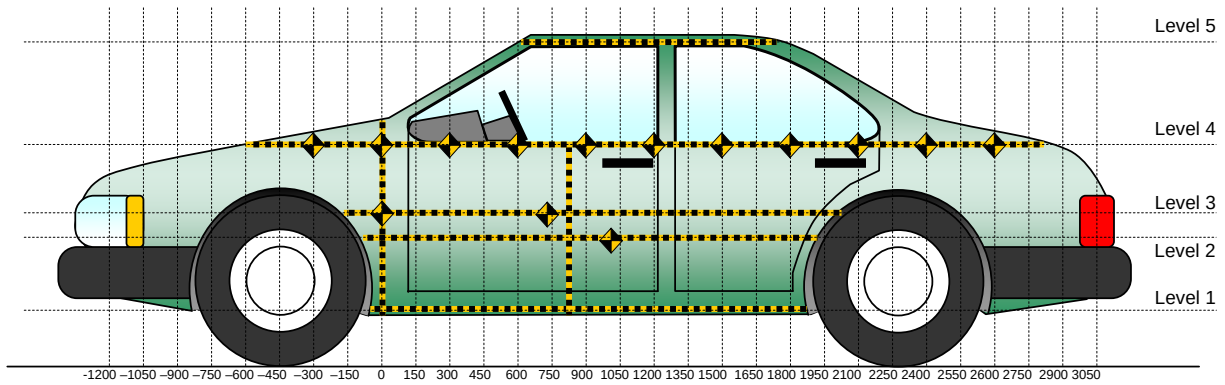
All measurements in (mm) with tolerance of ± 3 mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2762	2755	7
B	Front Axle to FSOV	750	773	-23
C	Rear Axle to RSOV	1122	1110	12
D	Total Length at Centerline	4634	4638	-4
E	Front Bumper Thickness	160	160	0
F	Front Bumper Bottom to Ground	215	155	60
G	Sill Height at Front Wheel Well	145	152	-7
H	Sill Height at Front Door Leading Edge	150	143	7
I	Sill Height at B Pillar	161	142	19
J1	Sill Height at Rear Wheel Well	147	140	7
J2	Pinch Weld Height at Rear Wheel Well	140	141	-1
K	Sill Height Aft of Rear Wheel Well	177	170	7
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	289	279	10
N	Sill Height to Window Bottom Sill	650	589	61
O	Front Door Leading Edge to Impact CL	677	667	10
P	Rear Door Trailing Edge to Impact CL	1249	1208	41
Q	Front Window Opening	410	408	2
R	Right Side Length	3639	3639	0
S	Left Side Length	3639	3629	10
T	Vehicle Width at B Post	1773	1683	90

DATA SHEET NO. 12 **VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010



All Measurements Shown in mm

LEFT SIDE VIEW

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	290
2	Occupant H-Point	470
3	Mid-Door	595
4	Window Sill	850
5	Window Top	1350

DATA SHEET NO. 12 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750				379					381					2	
-600				354					359					5	
-450				330					336					6	
-300				318					322					4	
-150			220	305				220	312				0	7	
0	258	239	231	300		269	278	251	305		11	39	20	5	
150	256	240	228	288		287	335	294	297		31	95	66	9	
300	254	239	226	284		291	345	329	310		37	106	103	26	
450	252	238	224	275		300	370	355	320		48	132	131	45	
600	250	237	222	269		307	368	354	320		57	131	132	51	
750	248	237	221	263		312	360	365	334		64	123	144	71	
900	248	237	218	259	517	316	365	382	342	520	68	128	164	83	3
1050	247	236	218	256	520	319	371	373	326	532	72	135	155	70	12
1200	247	236	216	253	524	325	359	337	314	538	78	123	121	61	14
1350	247	237	218	252	530	306	335	312	328	543	59	98	94	76	13
1500	247	238	219	253	535	291	355	347	355	546	44	117	128	102	11
1650	246	241	220	251	538	280	361	372	385	549	34	120	152	134	11
1800	246	242	223	254	544	251	321	361	370	550	5	79	138	116	6
1950		227	225	242	556		236	292	309	562		9	67	67	6
2100			219	257				230	287				11	30	
2250			216	266				227	257				11	-9	
2400				276					284					8	
2550				286					290					4	
2700				297					299					2	

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

MAXIMUM CRUSH DATA

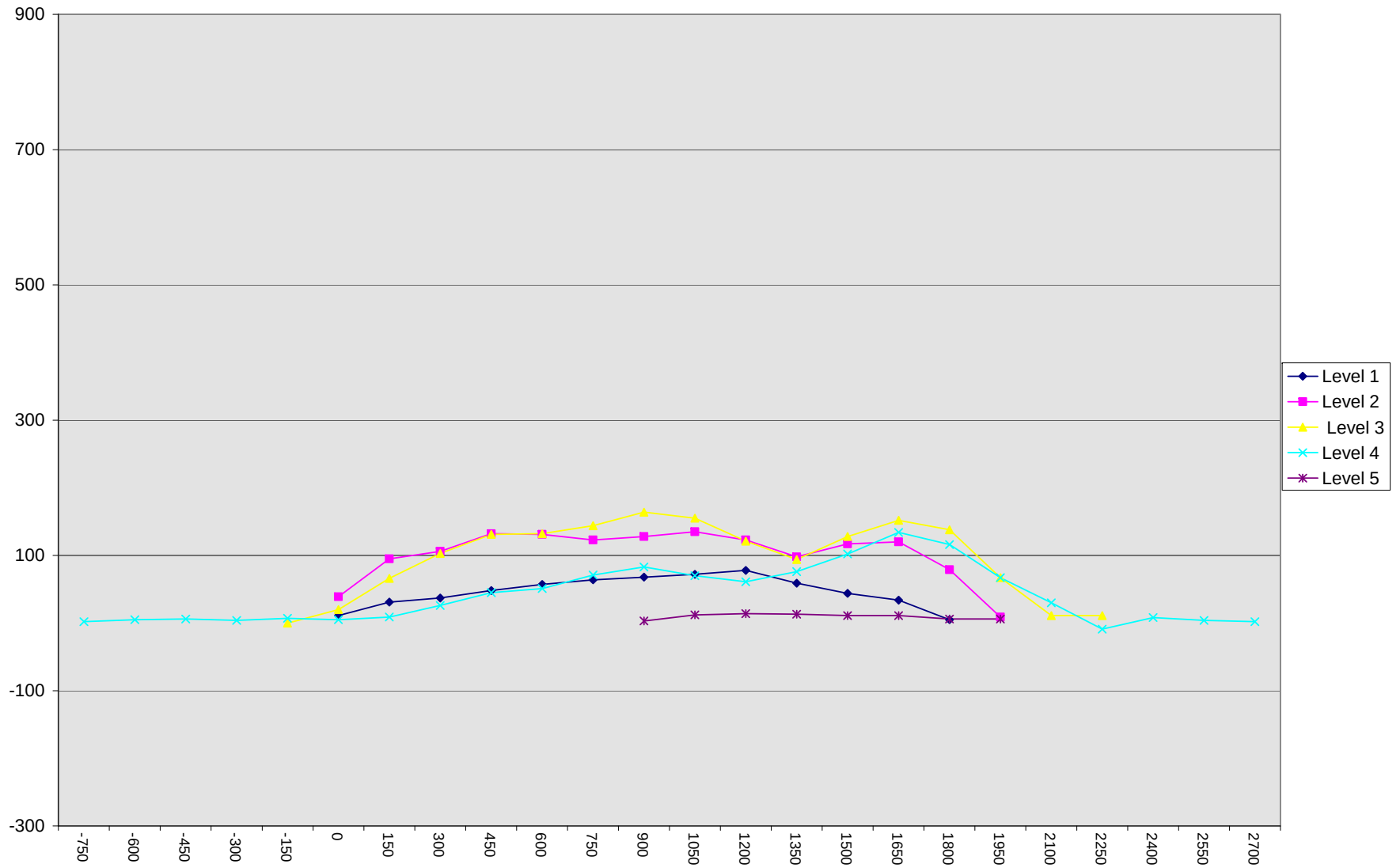
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	78	135	164	134	14
Distance From Impact (mm)	1200	1050	900	1650	1200

DATA SHEET NO. 12 (continued)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
Test Date: 9/8/2010

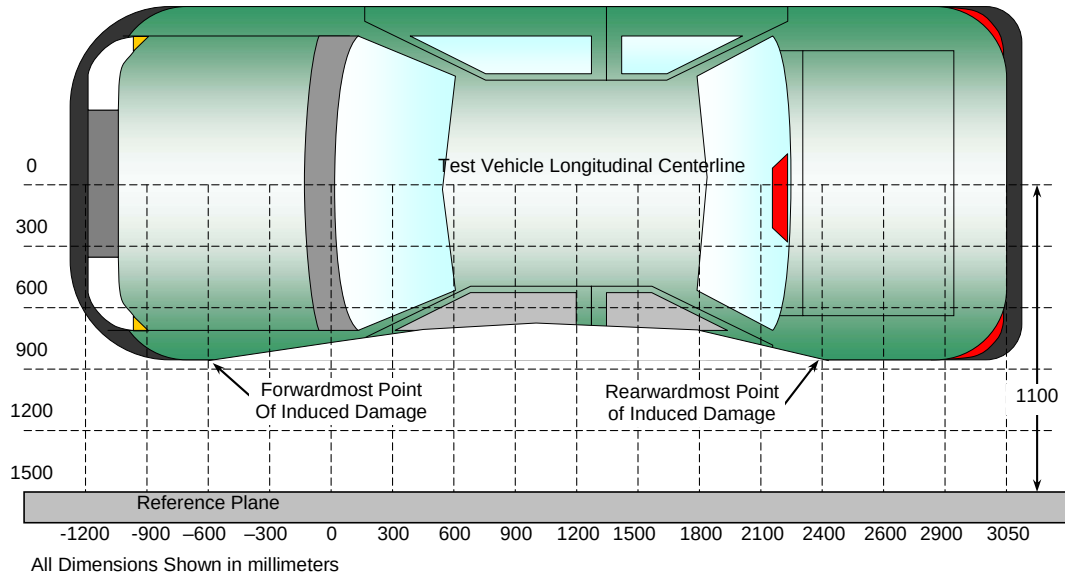
20



DATA SHEET NO. 13
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



TOP VIEW

DAMAGE PROFILE DISTANCES

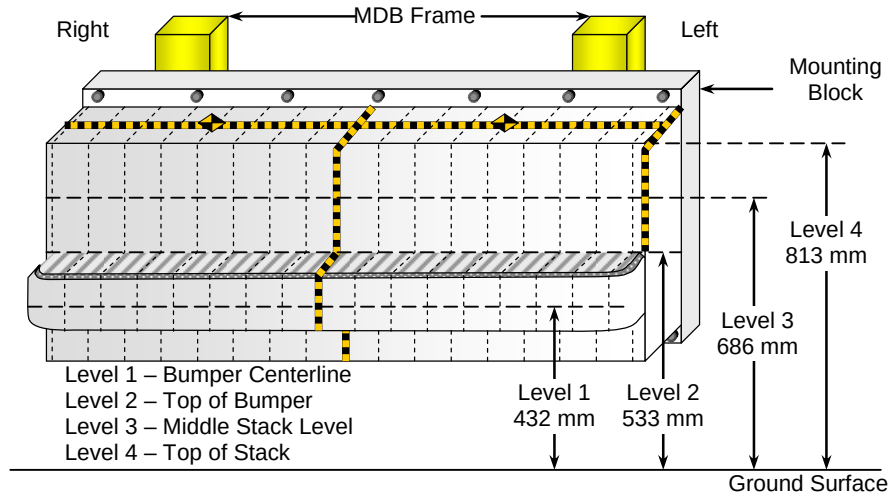
DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2700	4	297	299	2
2	2020	4	250	322	72
3	1310	2	237	342	105
4	620	2	237	376	139
5	-60	1	258	270	12
6	-750	4	379	381	2

DATA SHEET NO. 14

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
 Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
 Test Date: 9/8/2010



FRONT VIEW

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C _L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
4	95	76	82	108	153	133	115	108	89	95	97	103	110	125	145	179	205
3	92	82	96	112	151	137	104	77	68	65	65	68	77	94	129	177	208
2	166	173	180	188	183	168	153	144	139	142	144	147	153	157	165	174	183
1	214	211	216	225	239	224	215	201	188	183	187	190	197	203	216	234	212

DATA SHEET NO. 15

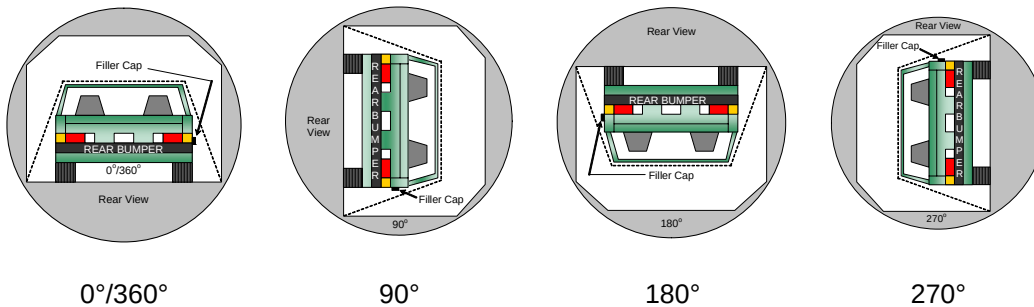
FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan NHTSA No. MB0501
 Test Program: NCAP Side MDB Impact Test Test Date: 9/8/2010

Test Time: 11:22 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°	111	300	411
90° to 180°	109	300	409
180° to 270°	105	300	405
270° to 360°	113	300	413

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

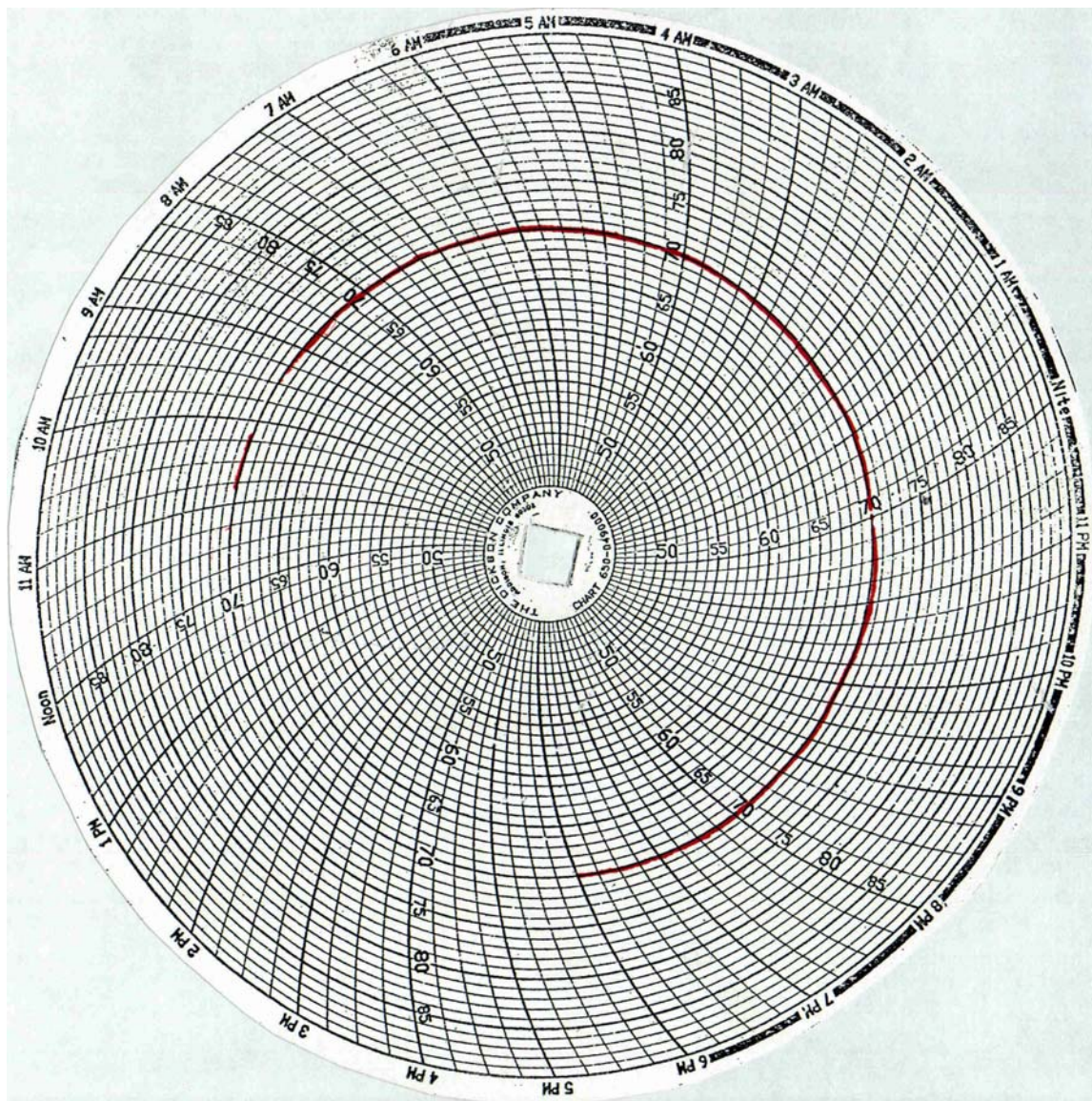
Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 16

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2011 Mercedes-Benz C300 4-Dr Sedan
Test Program: NCAP Side MDB Impact Test

NHTSA No. MB0501
Test Date: 9/8/2010



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

		<u>Page No.</u>
Photo No. 1.	As Delivered Right Front Three-Quarter View of Test Vehicle	A-1
Photo No. 2.	As Delivered Left Rear Three-Quarter View of Test Vehicle	A-1
Photo No. 3.	Pre-Test Frontal View of Test Vehicle	A-2
Photo No. 4.	Post-Test Frontal View of Test Vehicle	A-2
Photo No. 5.	Pre-Test Left Three-Quarter Front View of Test Vehicle	A-3
Photo No. 6.	Post-Test Left Three-Quarter Front View of Test Vehicle	A-3
Photo No. 7.	Pre-Test Left Side View of Test Vehicle	A-4
Photo No. 8.	Post-Test Left Side View of Test Vehicle	A-4
Photo No. 9.	Pre-Test Left Three-Quarter Rear View of Test Vehicle	A-5
Photo No. 10.	Post-Test Left Three-Quarter Rear View of Test Vehicle	A-5
Photo No. 11.	Pre-Test Rear View of Test Vehicle	A-6
Photo No. 12.	Post-Test Rear View of Test Vehicle	A-6
Photo No. 13.	Pre-Test Right Side View of Test Vehicle	A-7
Photo No. 14.	Post-Test Right Side View of Test Vehicle	A-7
Photo No. 15.	Pre-Test Overhead View of Test Vehicle with MDB Positioned Against Side of Target Vehicle	A-8
Photo No. 16.	Post-Test Overhead View of Test Vehicle and MDB	A-8
Photo No. 17.	Pre-Test Left Side View of MDB Positioned Against Side of Target Vehicle	A-9
Photo No. 18.	Pre-Test Right Side View of MDB Positioned Against Side of Target Vehicle	A-9
Photo No. 19.	Pre-Test Close-Up View of Impact Point Target	A-10
Photo No. 20.	Post-Test Close-Up View of Impact Point Target	A-10
Photo No. 21.	Pre-Test Left Front Door Latch Close-Up	A-11
Photo No. 22.	Post-Test Left Front Door Latch Close-Up	A-11
Photo No. 23.	Pre-Test Left Rear Door Latch Close-Up	A-12

		<u>Page No.</u>
Photo No. 24.	Post-Test Left Rear Door Latch Close-Up	A-12
Photo No. 25.	Pre-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 26.	Post-Test Front Close-Up View of Driver Dummy	A-13
Photo No. 27.	Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches	A-14
Photo No. 28.	Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
Photo No. 29.	Post-Test Left Side View of Driver Dummy Shoulder and Door Top View	A-15
Photo No. 30.	Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning	A-16
Photo No. 31.	Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint	A-16
Photo No. 32.	Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning	A-17
Photo No. 33.	Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan	A-17
Photo No. 34.	Pre-Test Placement of Driver Dummy's Feet	A-18
Photo No. 35.	Pre-Test View of Belt Anchorage for Driver Dummy	A-18
Photo No. 36.	Pre-Test Left Side View of Steering Wheel	A-19
Photo No. 37.	Pre-Test View of Parking Brake	A-19
Photo No. 38.	Pre-Test Close-Up Left Side View of Driver Seat Track	A-20
Photo No. 39.	Pre-Test Close-Up Left Side View of Driver Seat Back	A-20
Photo No. 40.	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-21
Photo No. 41.	Pre-Test Driver Dummy and Door Clearance View	A-22
Photo No. 42.	Post-Test Driver Dummy and Door Clearance View	A-22
Photo No. 43.	Pre-Test Right Side View of Front Seat of Occupant Compartment	A-23
Photo No. 44.	Post-Test Right Side View of Front Seat of Occupant Compartment	A-23
Photo No. 45.	Pre-Test Driver Inner Door Panel View	A-24
Photo No. 46.	Post-Test Driver Inner Door Panel View Showing Driver Dummy Contact Locations	A-24
Photo No. 47.	Post-Test Driver Dummy Close-up Head Contact with Vehicle View	A-25

		<u>Page No.</u>
Photo No. 48.	Post-Test Driver Dummy Close-up Head Contact with Side Airbag View	A-25
Photo No. 49.	Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View	A-26
Photo No. 50.	Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View	A-26
Photo No. 51.	Post-Test Driver Dummy Close-up Pelvis Contact View	A-27
Photo No. 52.	Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View	A-27
Photo No. 53.	Pre-Test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches	A-28
Photo No. 54.	Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 55.	Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View	A-29
Photo No. 56.	Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning	A-30
Photo No. 57.	Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint (Photo Not Available)	A-30
Photo No. 58.	Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning	A-31
Photo No. 59.	Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan	A-31
Photo No. 60.	Pre-Test View of Rear Passenger Dummy's Neck Showing Position of Adjustable Neck Bracket	A-32
Photo No. 61.	Pre-Test View of Rear Passenger Dummy's Head Showing Dummy's Head is Level	A-32
Photo No. 62.	Pre-Test Placement of Rear Passenger Dummy's Feet	A-33
Photo No. 63.	Pre-Test View of Belt Anchorage for Rear Passenger Dummy	A-33
Photo No. 64.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Track	A-34
Photo No. 65.	Pre-Test Close-Up Left Side View of Rear Passenger Seat Back	A-34
Photo No. 66.	Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint	A-35
Photo No. 67.	Pre-Test Rear Passenger Dummy and Door Clearance View	A-36
Photo No. 68.	Post-Test Rear Passenger Dummy and Door Clearance View	A-36
Photo No. 69.	Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment	A-37
Photo No. 70.	Post-Test Right Side View of Rear Passenger Dummy Seat and Rear Seat Occupant Compartment	A-37
Photo No. 71.	Pre-Test Passenger Inner Door Panel View	A-38

		<u>Page No.</u>
Photo No. 72.	Post-Test Rear Passenger Inner Door Panel View Showing Dummy Contact Locations	A-38
Photo No. 73.	Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View	A-39
Photo No. 74.	Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View	A-39
Photo No. 75.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View	A-40
Photo No. 76.	Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View (Photo Not Applicable)	A-40
Photo No. 77.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact View	A-41
Photo No. 78.	Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View (Photo Not Applicable)	A-41
Photo No. 79.	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 80.	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-42
Photo No. 81.	Pre-Test Front View of MDB Impactor Face	A-43
Photo No. 82.	Post-Test Front View of MDB Impactor Face	A-43
Photo No. 83.	Pre-Test Top View of MDB Impactor Face	A-44
Photo No. 84.	Post-Test Top View of MDB Impactor Face	A-44
Photo No. 85.	Pre-Test Left Side View of MDB Impactor Face	A-45
Photo No. 86.	Post-Test Left Side View of MDB Impactor Face	A-45
Photo No. 87.	Pre-Test Right Side View of MDB Impactor Face	A-46
Photo No. 88.	Post-Test Right Side View of MDB Impactor Face	A-46
Photo No. 89.	Close-Up View of Vehicle's Certification Label	A-47
Photo No. 90.	Close-Up View of Vehicle's Tire Information Placard or Label	A-47
Photo No. 91.	Pre-Test Ballast View	A-48
Photo No. 92.	Post-Test Primary and Redundant Speed Trap Read-Out	A-48
Photo No. 93.	FMVSS No. 301/305 Rollover 0 Degrees	A-49
Photo No. 94.	FMVSS No. 301/305 Rollover 90 Degrees	A-49
Photo No. 95.	FMVSS No. 301/305 Rollover 180 Degrees	A-50

		<u>Page No.</u>
Photo No. 96.	FMVSS No. 301/305 Rollover 270 Degrees	A-50
Photo No. 97.	FMVSS No. 301/305 Rollover 360 Degrees	A-51
Photo No. 98.	Impact Event	A-51
Photo No. 99.	Monroney Label	A-52
Photo No. 100.	Driver Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-53
Photo No. 101.	Left Rear Passenger Head Restraint Use and Adjustment Information from Vehicle Manual	A-54



As Delivered Right Front Three-Quarter View of Test Vehicle



As Delivered Left Rear Three-Quarter View of Test Vehicle



Pre-Test Frontal View of Test Vehicle



Post-Test Frontal View of Test Vehicle



Pre-Test Left Three-Quarter Front View of Test Vehicle



Post-Test Left Three-Quarter Front View of Test Vehicle



Pre-Test Left Side View of Test Vehicle



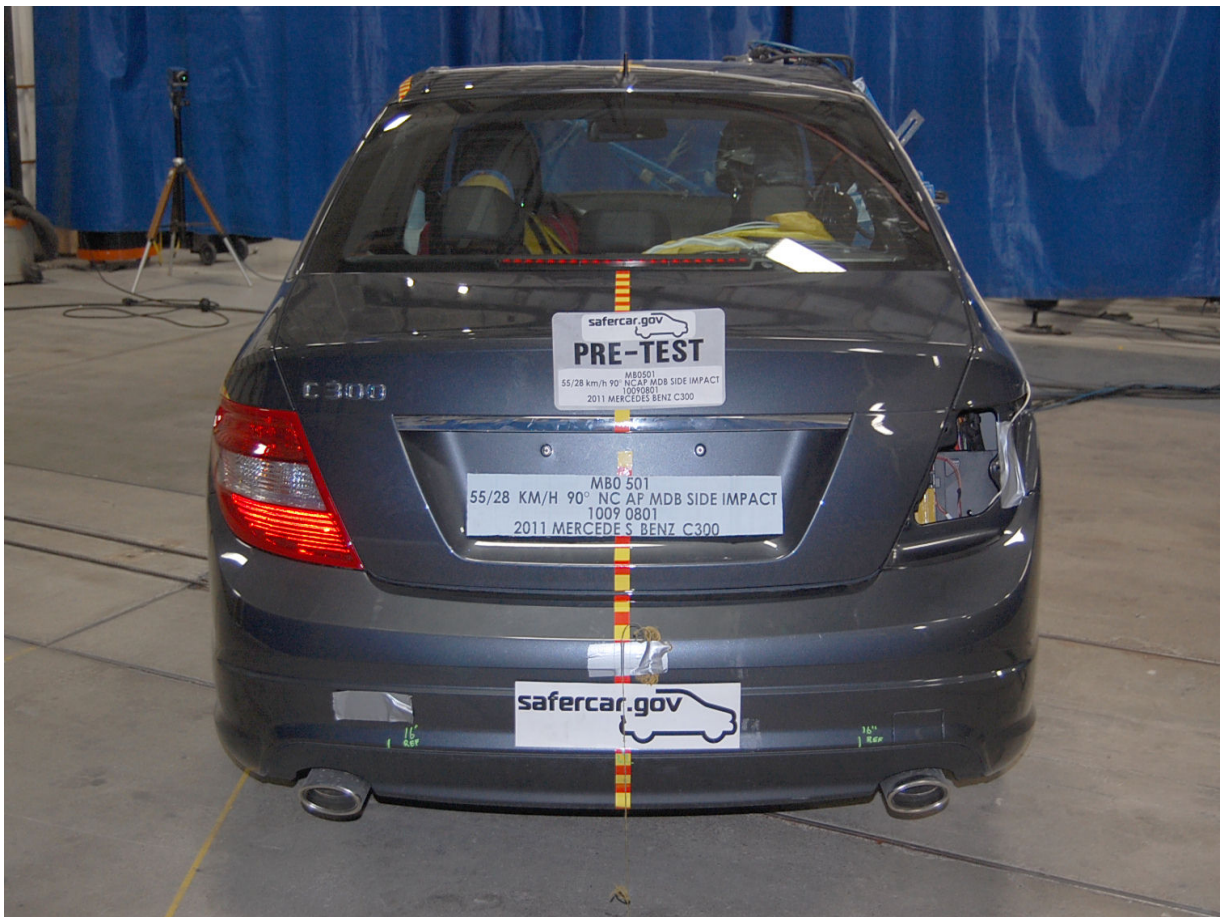
Post-Test Left Side View of Test Vehicle



Pre-Test Left Three-Quarter Rear View of Test Vehicle



Post-Test Left Three-Quarter Rear 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 with MDB Positioned Against Side of Target Vehicle



Post-Test Overhead View of Test Vehicle and MDB



Pre-Test Left Side View of MDB Positioned Against Side of Target Vehicle



Pre-Test Right Side View of MDB Positioned Against Side of Target Vehicle



Pre-Test Close-Up View of Impact Point Target



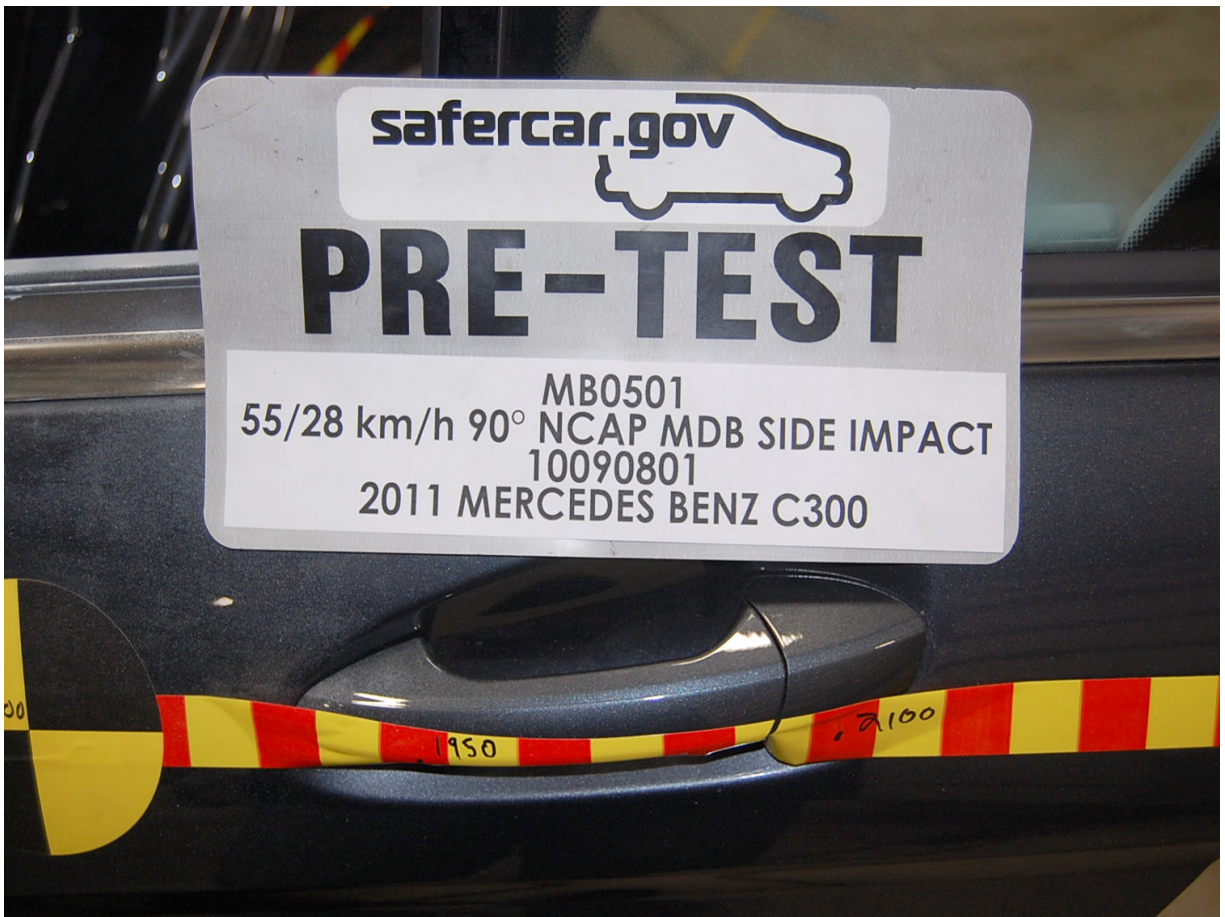
Post-Test Close-Up View of Impact Point Target



Pre-Test Left Front Door Latch Close-Up



Post-Test Left Front Door Latch Close-Up



Pre-Test Left Rear Door Latch Close-Up



Post-Test Left Rear Door Latch Close-Up



Pre-Test Front Close-Up View of Driver Dummy



Post-Test Front Close-Up View of Driver Dummy



Pre-Test Left Side View of Driver Dummy Showing Belt, Chalking, and Contact Switches



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



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



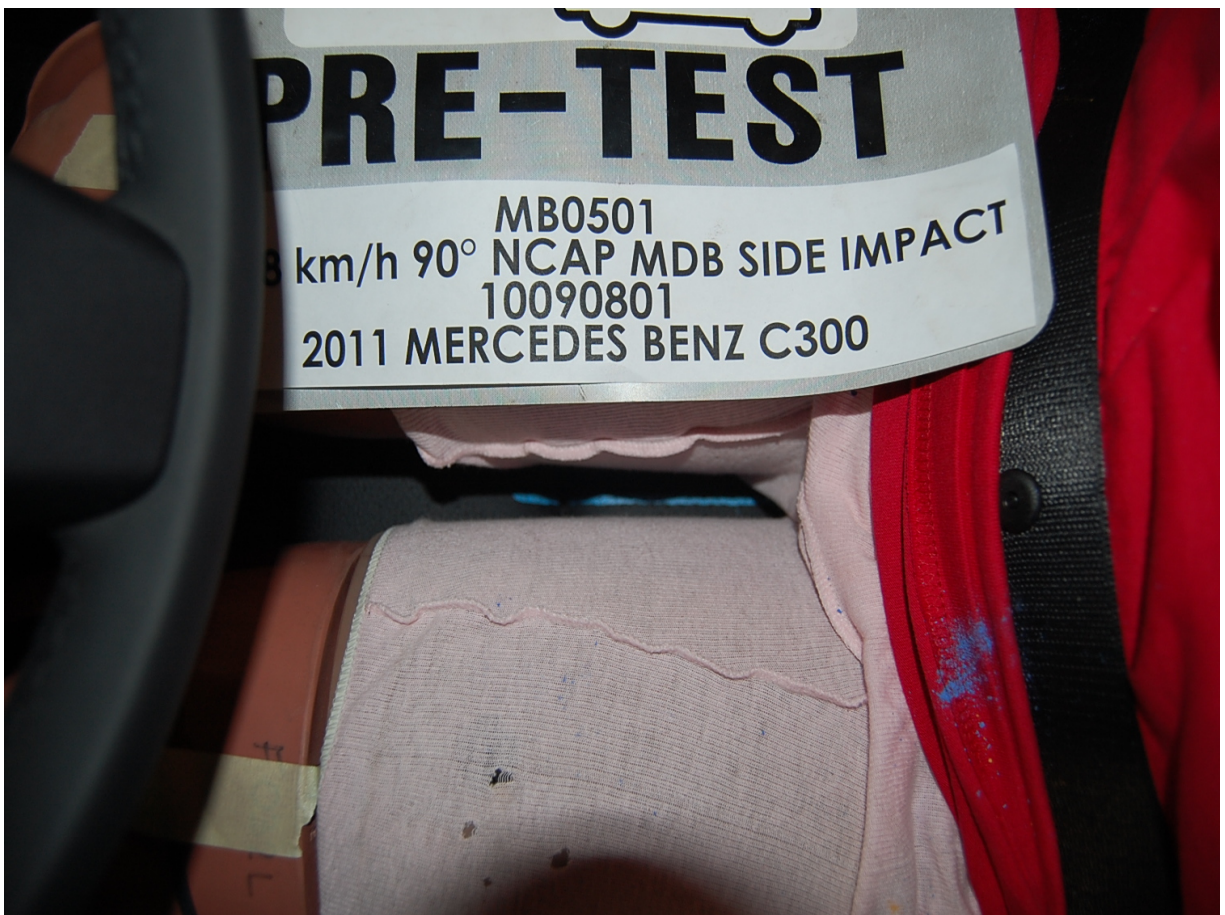
Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



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



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



Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Pre-Test Placement of Driver Dummy's Feet



Pre-Test View of Belt Anchorage for Driver Dummy



Pre-Test Left Side View of Steering Wheel



Pre-Test View of Parking Brake



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



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



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



Pre-Test Driver Dummy and Door Clearance View



Post-Test Driver Dummy and Door Clearance View



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



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



Pre-Test Driver Inner Door Panel View



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



Post-Test Driver Dummy Close-up Head Contact with Vehicle View



Post-Test Driver Dummy Close-up Head Contact with Side Airbag View



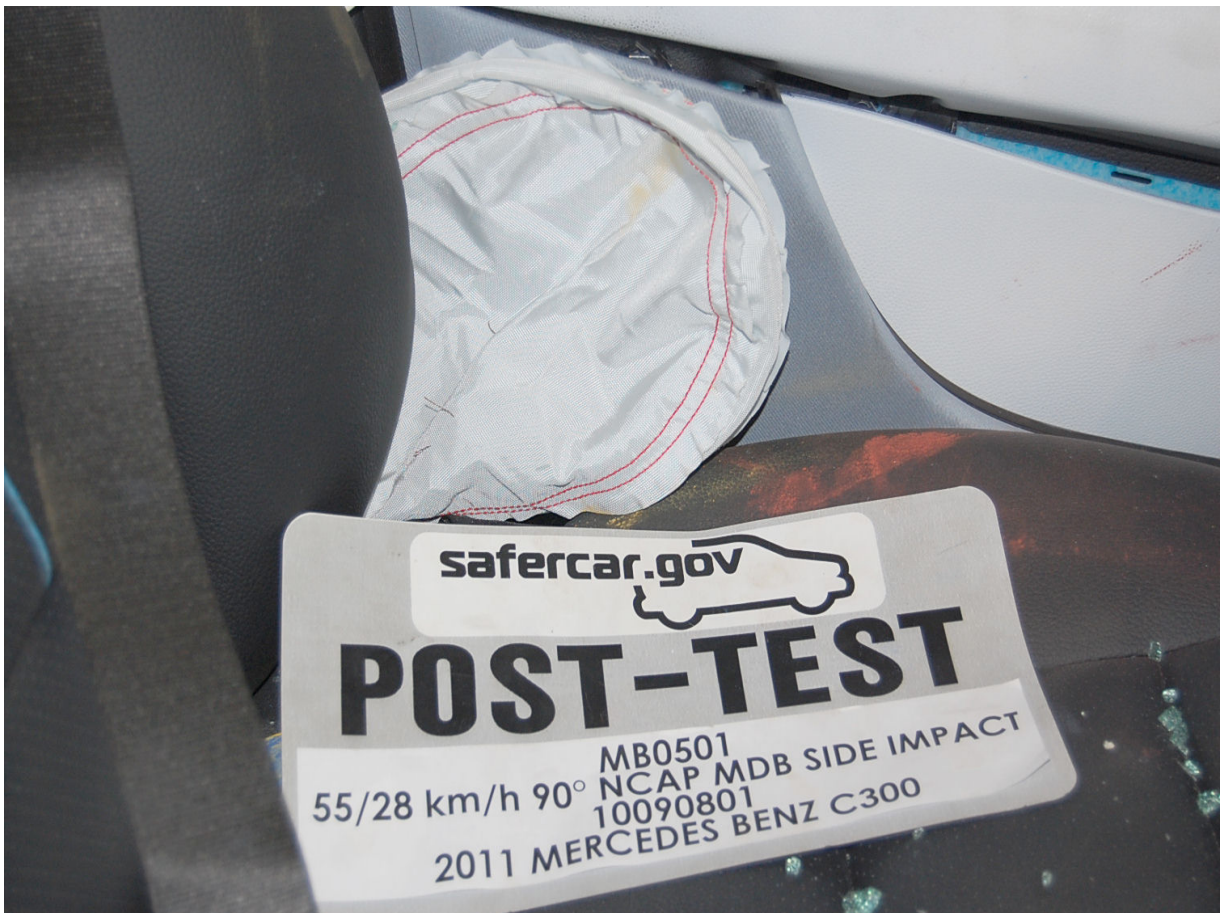
Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View



Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View



Post-Test Driver Dummy Close-up Pelvis Contact View



Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Pre-Test Left Side View of Passenger Dummy Showing Belt, Chalking, and Contact Switches



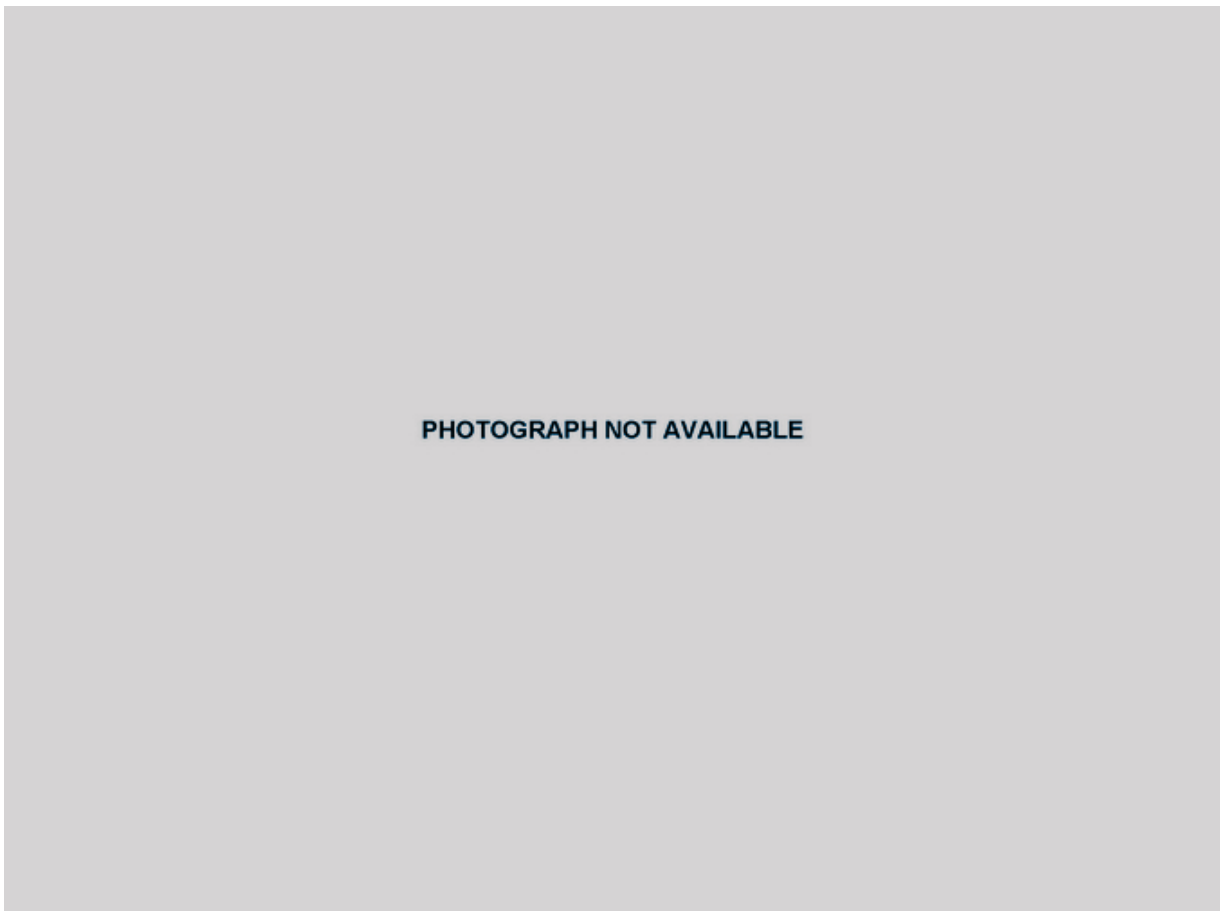
Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



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



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



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



Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



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



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



Pre-Test Placement of Rear Passenger Dummy's Feet



Pre-Test View of Belt Anchorage for Rear Passenger Dummy



Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint



Pre-Test Rear Passenger Dummy and Door Clearance View



Post-Test Rear Passenger Dummy and Door Clearance View



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



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



Pre-Test Passenger Inner Door Panel View



Post-Test Rear Passenger Inner Door Panel View Showing Dummy Contact Locations



Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle View



Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View

PHOTOGRAPH NOT APPLICABLE

Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View



Post-Test Rear Passenger Dummy Close-up Pelvis Contact View

PHOTOGRAPH NOT APPLICABLE

Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View



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



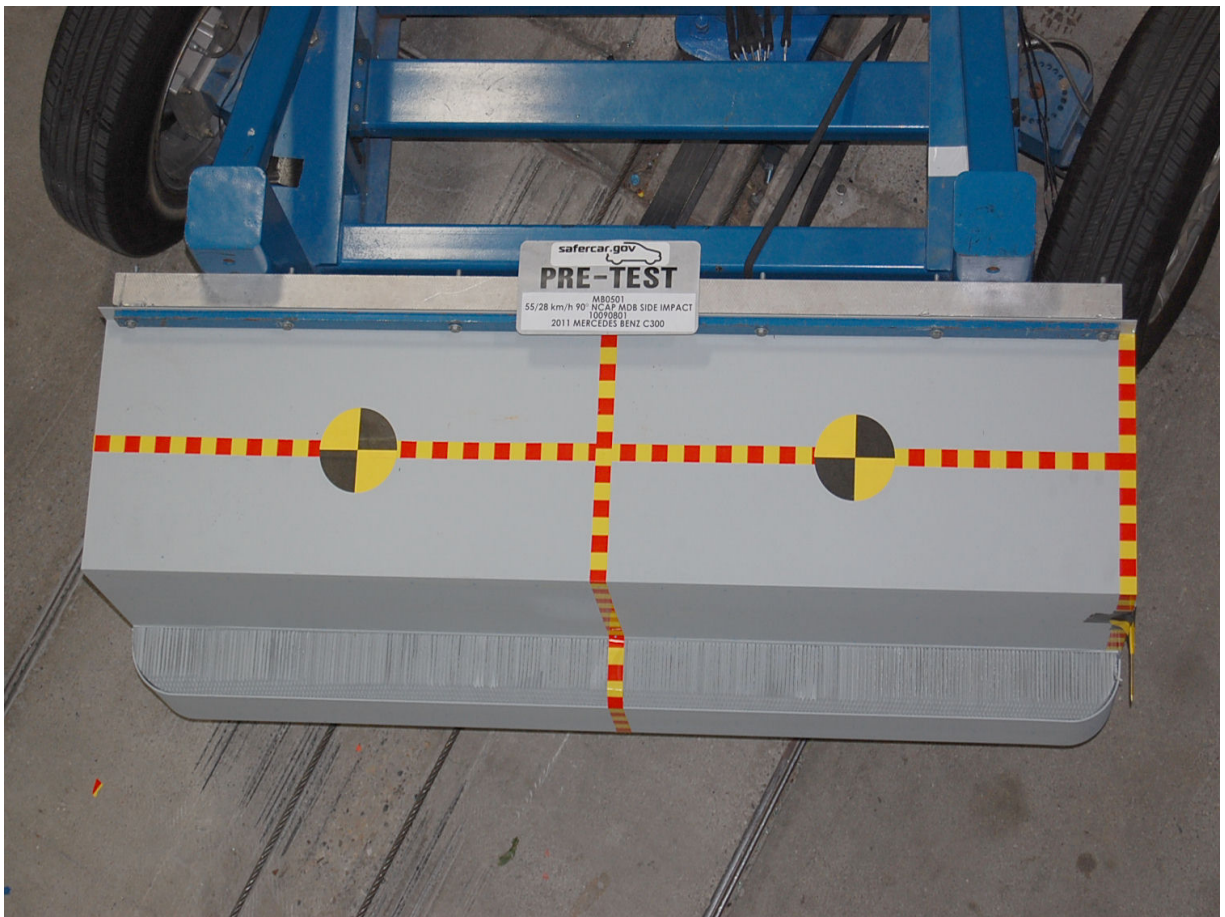
Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Pre-Test Front View of MDB Impactor Face



Post-Test Front View of MDB Impactor Face



Pre-Test Top View of MDB Impactor Face



Post-Test Top View of MDB Impactor Face



Pre-Test Left Side View of MDB Impactor Face



Post-Test Left Side View of MDB Impactor Face



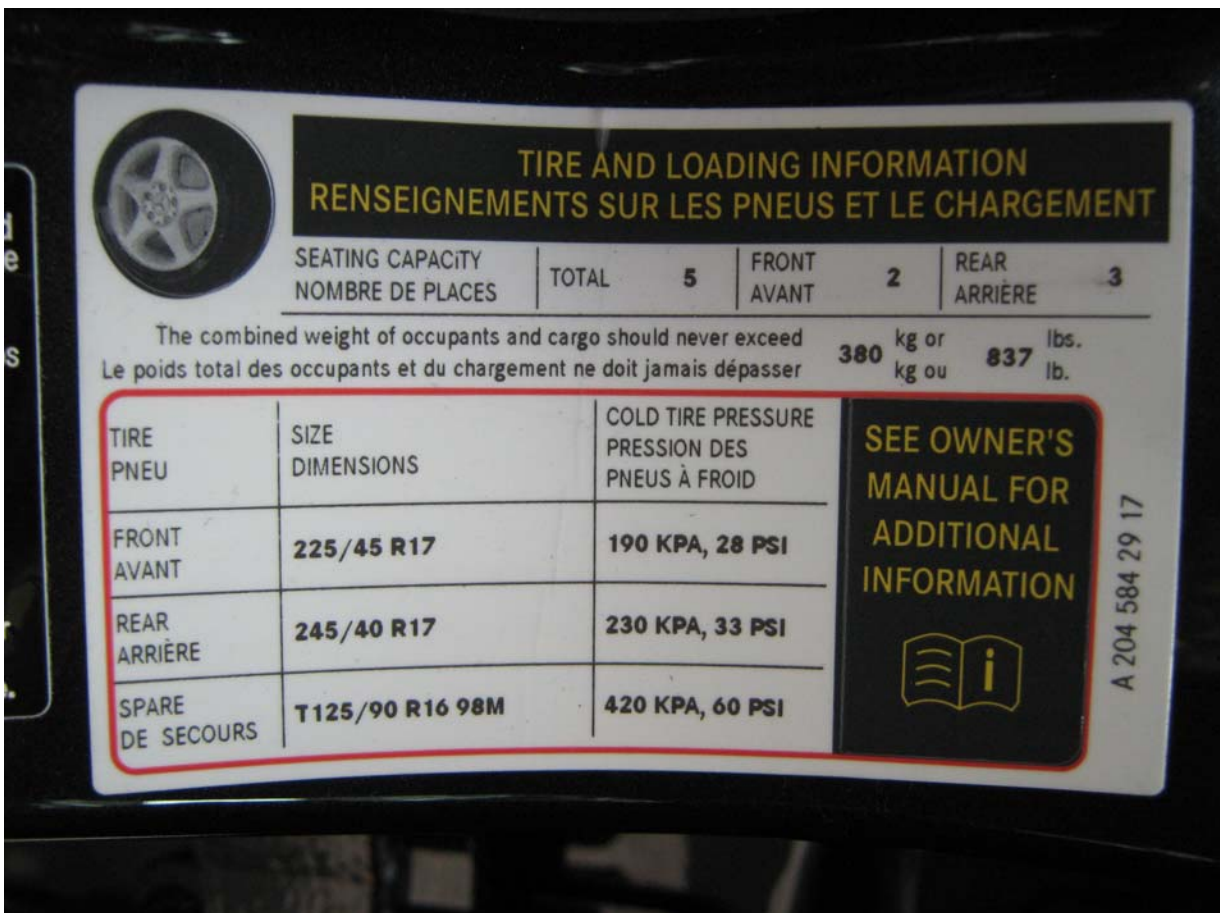
Pre-Test Right Side View of MDB Impactor Face



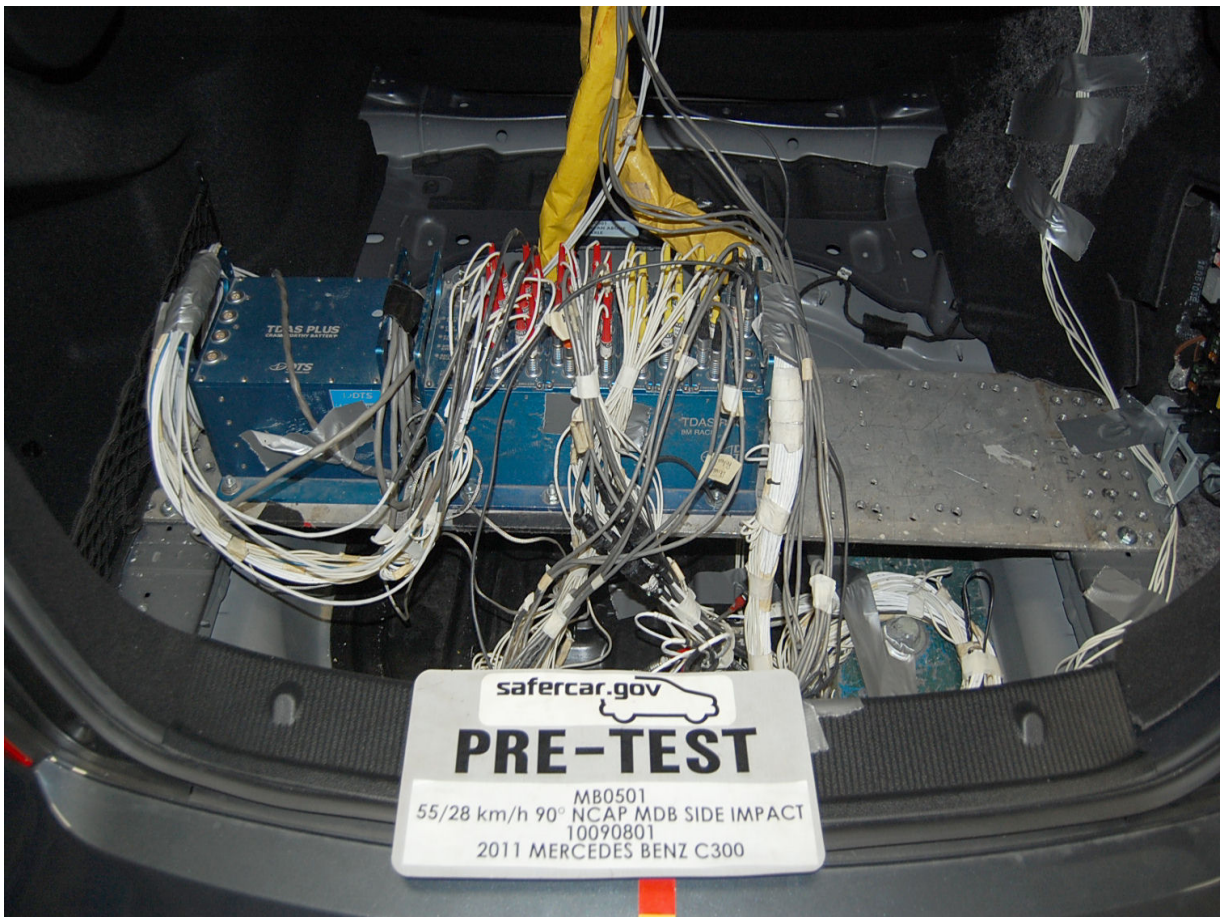
Post-Test Right Side View of MDB Impactor Face



Close-Up View of Vehicle's Certification Label



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



Pre-Test Ballast View



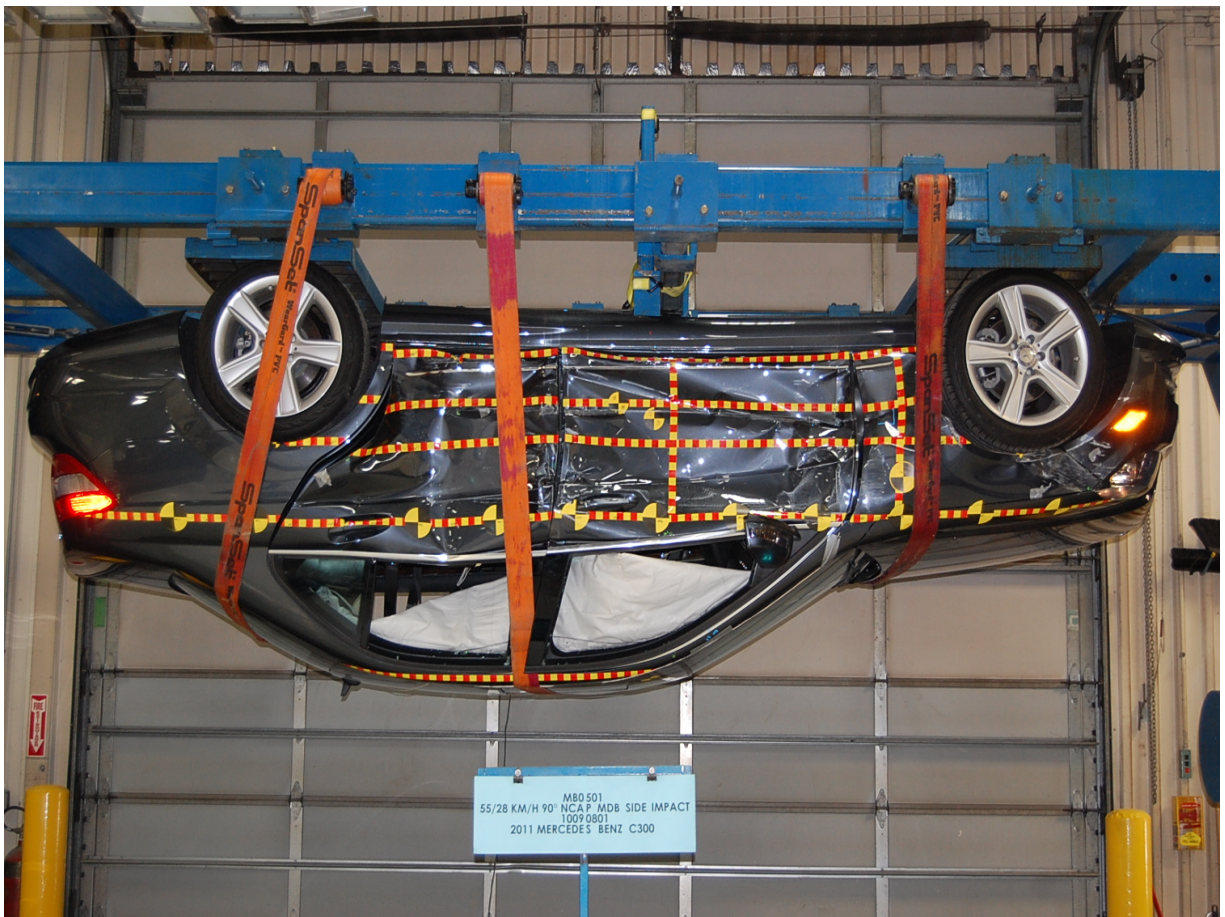
Post-Test Primary and Redundant Speed Trap Read-Out



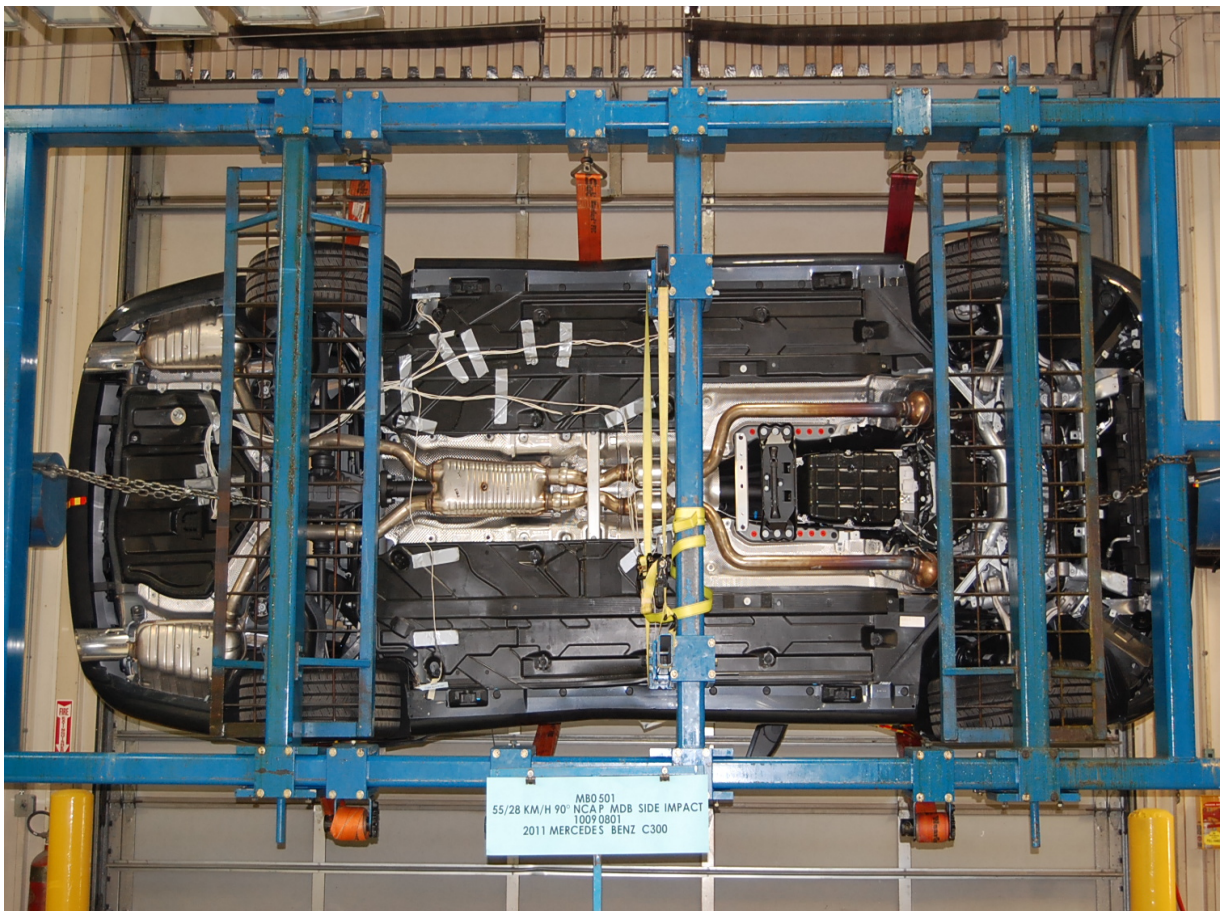
FMVSS No. 301/305 Rollover 0 Degrees



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



Mercedes-Benz

2011 C300

3.0 Liter Dual Overhead Cam 24V V6

PO#: 0170425643

VIN: WDDGF5E1BA416677

MB 11-138
Burlington

SOLD TO:
CONCORD MOTORS, INC.
140 WEST VALLEY SPRING DRIVE
VALLEY SPRING, AR
72758
Make: Buick

SHEID:
CONCORD MOTORS, INC.
140 WEST VALLEY SPRING DRIVE
VALLEY SPRING, AR
72758

PERFORMANCE/HANDLING

- 228 Horsepower @ 6,000 RPM
- 221 lb-ft of Torque @ 2,700-5,000 RPM
- Front Suspension: 3-link Independent
- Strut-type with Stabilizer Bar
- Rear Suspension: Multi-link Independent
- with Stabilizer Bar
- Dual Exhaust with Two Chrome Outlets

COMFORT/CONVENIENCE

- Power Sunroof with Express Open and Close
- Dual-Zone Automatic Climate Control with Dust Filter
- 8-Way Power Front Seats with Lumbar Support
- Single Disc CD/MP3/AM/FM/Weatherband Radio
- 8-Speaker Sound System with Auxiliary Input
- Bluetooth Connectivity for Hands-free Phone Use
- Cruise Control with Steering Wheel
- 4.5" Instrument Cluster Display
- Multi-Function Steering Wheel
- Front and Rear Cupholders
- Tilt & Telescoping Steering Column
- Cruise Control
- Intermittent Wipers
- Power Windows with Express Up and Down
- Automatic Headlamps with Twilight Sensor & Locator Lighting
- Trip Computer

SAFETY/SECURITY

- New Vehicle 4 Year/50,000 Mile Warranty
- 24 hr. Roadside Assistance Program
- Owner Information Kit
- Mercedes-Benz Maintenance System
- Steel Reinforced Cabin w/ Front & Rear Crumple Zones
- Ion & Rear Outboard Seatbelts with Pretensioners & Force Limiters
- Dual Two Stage Front Airbags
- Side Airbags Mounted in Front Seat Backrests
- Head Protection Curtains
- Dual Front Pelvic Airbags
- Driver's Side Knee Airbag
- Active Front Head Restraints
- 4-Wheel ABS Disc Brakes with Brake Assist System
- Electronic Stability Program (ESP)
- Anti-Lock Braking System (ABS)
- LATCH-Lower Anchors and Tethers for Children
- Anti-theft Alarm with Engine Immobilizer
- SmartKey with Panic Button
- Tire Pressure Monitoring System

** Prepaid Maintenance Plan available for this vehicle, see dealer for details. **

SUGGESTED RETAIL PRICE

PAINT/UPHOLSTERY & TRIM
755 Steel Grey
101 Black MB-Tex
731 Burr Walnut Wood Trim

\$33,990

720.00
N/C
325.00

OPTIONAL EQUIPMENT AND VALUE ADDED PACKAGES

323 Sport Package: Sport Body Styling, Mercedes-Benz Star in Grille, 17" Staggered-width Alloy Wheels with All-Season Tires, LED Daytime Running Lamps, Sport Suspension and Braking System, Sport Interior, Aluminum Trim
427 7-Speed Automatic Transmission (Required with 16T Luxury Sedan)
Destination and Delivery
Total Retail Price

1,490.00
875.00
\$37,400.00

EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

GASOLINE
CITY MPG

18

Expected range
for most drivers
14 to 22 MPG

Dual Fuel Vehicle*
Gasoline-Ethanol(E85)

Estimated
Annual Fuel Cost
\$1,999

based on 15,000 miles
at \$2.80 per gallon

GASOLINE
HIGHWAY MPG

26

Expected range
for most drivers
21 to 31 MPG

Combined Gasoline
Fuel Economy
This Vehicle

21

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

11 42

All Compacts



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

www.MBUSA.com

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
Crash
Front seat
Rear seat
Not Rated
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.
★★★★

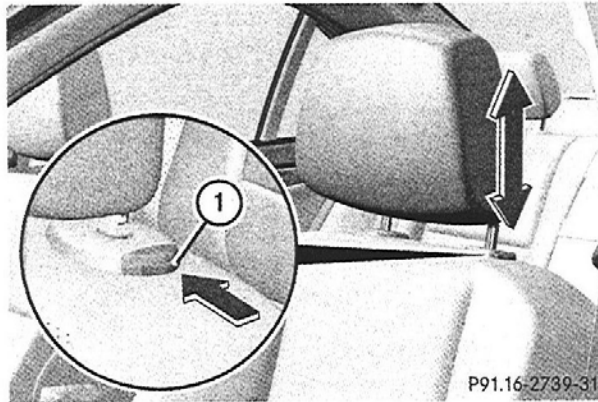
Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).

VISIT www.safercar.gov

Adjusting the head restraints

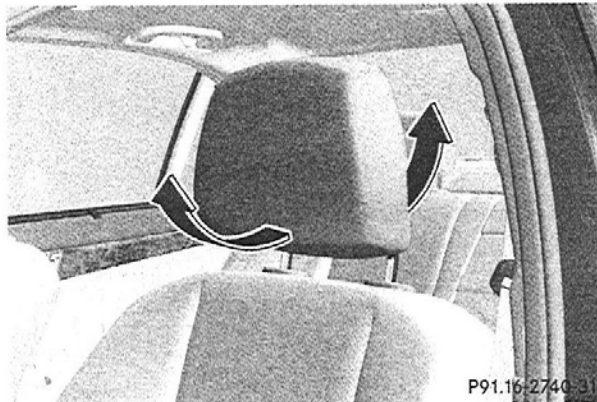
Adjusting the head restraints manually

Adjusting the head restraint height⁶



- **To raise:** pull the head restraint up to the desired position.
- **To lower:** press release catch ① in the direction of the arrow and push the head restraint down to the desired position.

Adjusting the angle of the head restraints



- Push or pull the lower edge of the head restraint in the direction of the arrow.

Adjusting the head restraints electrically⁷

- **To adjust the head restraint height:** slide the switch for head restraint adjustment (▷ page 94) up or down in the direction of the arrow.

Rear seat head restraints

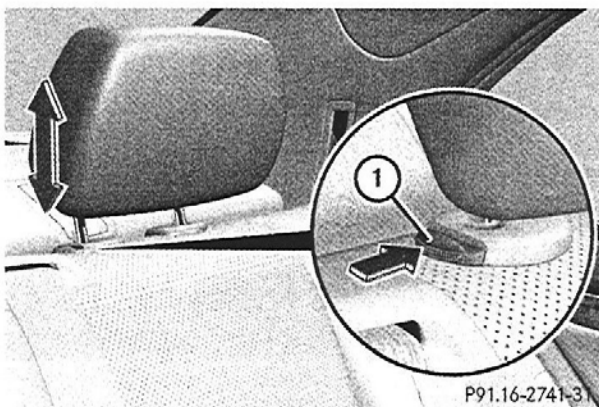
⚠ Warning!

For your protection, drive only with properly positioned head restraints.

Adjust the head restraint in such a way that it is as close to the head as possible and the center of the head restraint supports the back of the head at eye level. This will reduce the potential for injury to the head and neck in the event of an accident or similar situation.

With a rear seat occupied, make sure to move the respective head restraint up from the lowest non-use position and have the occupant adjust the head restraint properly. Do not drive the vehicle without the seat head restraints installed when the rear seats are occupied. Head restraints are intended to help reduce injuries during an accident.

Adjusting the rear seat head restraint height



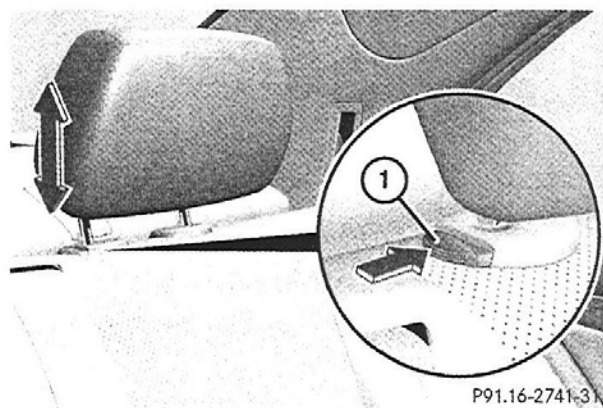
If the head restraint is fully lowered, it is necessary to press release catch ①.

- ▶ **To raise:** pull the head restraint up to the desired position.
- ▶ **To lower:** press release catch ① and push the head restraint down until it is in the desired position.

Removing and installing the rear head restraints⁸

⚠ Warning!

Occupants should only travel sitting on seats which have the head restraints installed. In the event of an accident, this reduces the risk of injury for passengers seated in the rear compartment.



- ▶ Release the rear seat backrest and fold it slightly forwards (▷ page 218).
- ▶ **To remove:** pull the head restraint up to the stop.
- ▶ Press release catch ① and pull the head restraint out of the guides.
- ▶ **To re-install:** insert the head restraint so that the notches on the bar are on the left when viewed in the direction of travel.
- ▶ Push the head restraint down until you hear it engage in position.
- ▶ Fold back the rear seat backrest until it engages.

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS
Driver & Passenger Dummy Instrumentation Plots
FILTERED DATA

<u>No.</u>	<u>Description</u>	<u>Page No.</u>
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 Acceleration Primary vs. Time	B-1
Figure No. 5.	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 6.	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 7.	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-2
Figure No. 8.	Driver Thorax Rib Deflection Maximum vs. Time	B-2
Figure No. 9.	Driver Anterior Abdomen Force (Y) vs. Time	B-3
Figure No. 10.	Driver Middle Abdomen Force (Y) vs. Time	B-3
Figure No. 11.	Driver Posterior Abdomen Force (Y) vs. Time	B-3
Figure No. 12.	Driver Total Abdominal Force (Y) vs. Time	B-3
Figure No. 13.	Driver Pubic Symphysis Force (Y) vs. Time	B-4
Figure No. 14.	Passenger Head Acceleration (X) Primary vs. Time	B-5
Figure No. 15.	Passenger Head Acceleration (Y) Primary vs. Time	B-5
Figure No. 16.	Passenger Head Acceleration (Z) Primary vs. Time	B-5
Figure No. 17.	Passenger Head Resultant Acceleration Primary vs. Time	B-5
Figure No. 18.	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-6
Figure No. 19.	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-6
Figure No. 20.	Passenger Lower Spine T12 Acceleration (Z) vs. Time	B-6
Figure No. 21.	Passenger Lower Spine T12 Resultant Acceleration vs. Time	B-6
Figure No. 22.	Passenger Iliac Force on Impact Side (Y) vs. Time	B-7
Figure No. 23.	Passenger Acetabulum Force on Impact Side (Y) vs. Time	B-7
Figure No. 24.	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.nhtsa.dot.gov

Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)
Passenger Shoulder Contact Switch
Passenger Torso Contact Switch
Passenger Pelvis Contact Switch

Vehicle Instrumentation Data

Driver Side Airbag Timing
Driver Side Curtain Airbag Timing (not installed)
Passenger Side Airbag Timing (not installed)
Passenger Side Curtain Airbag Timing (not installed)
Right Side Sill at Front Seat Acceleration (X)

Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)

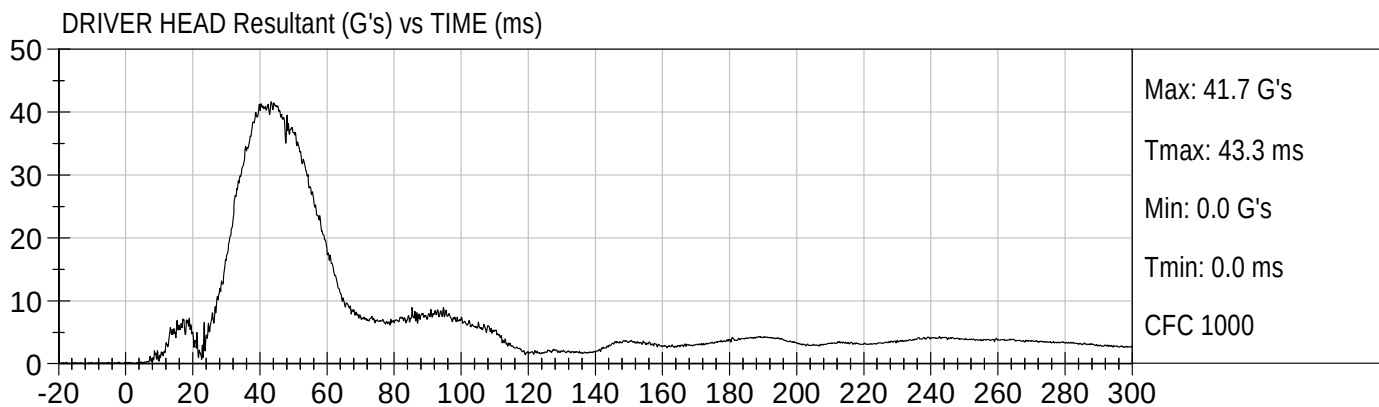
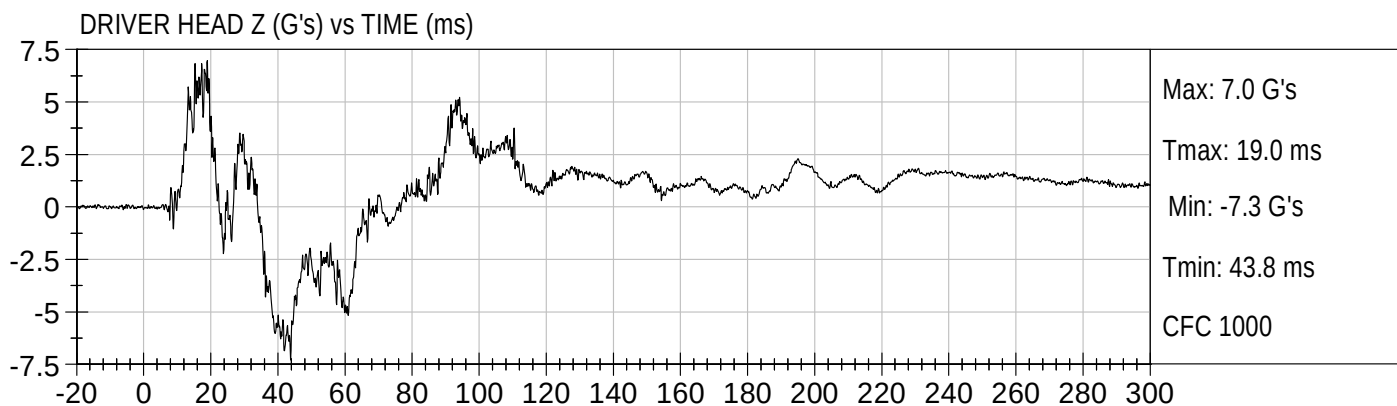
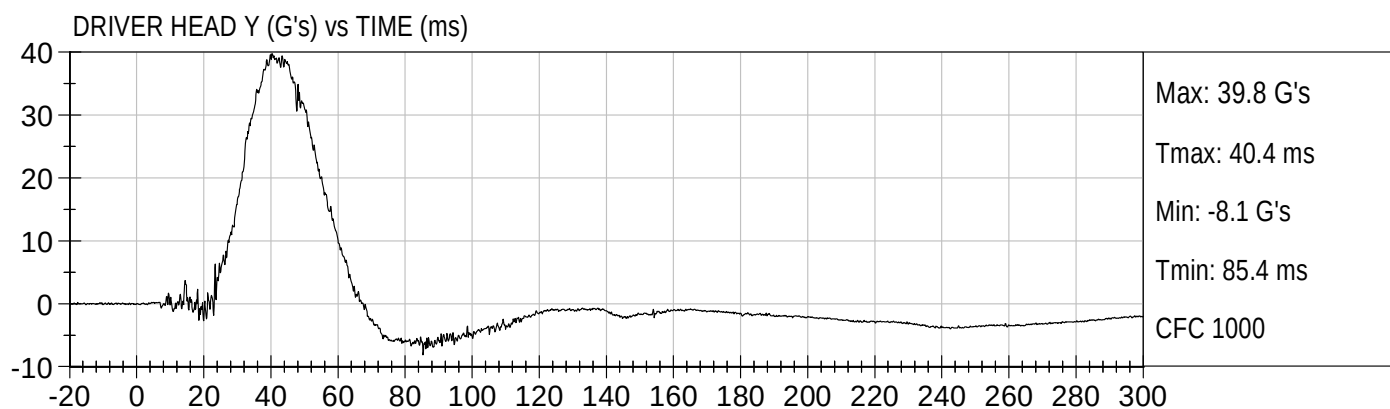
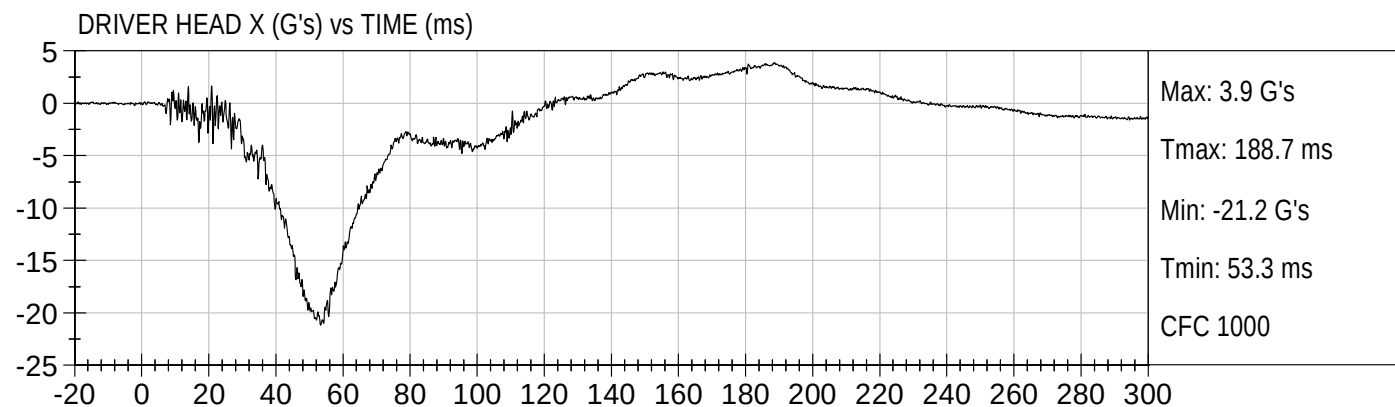
MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch



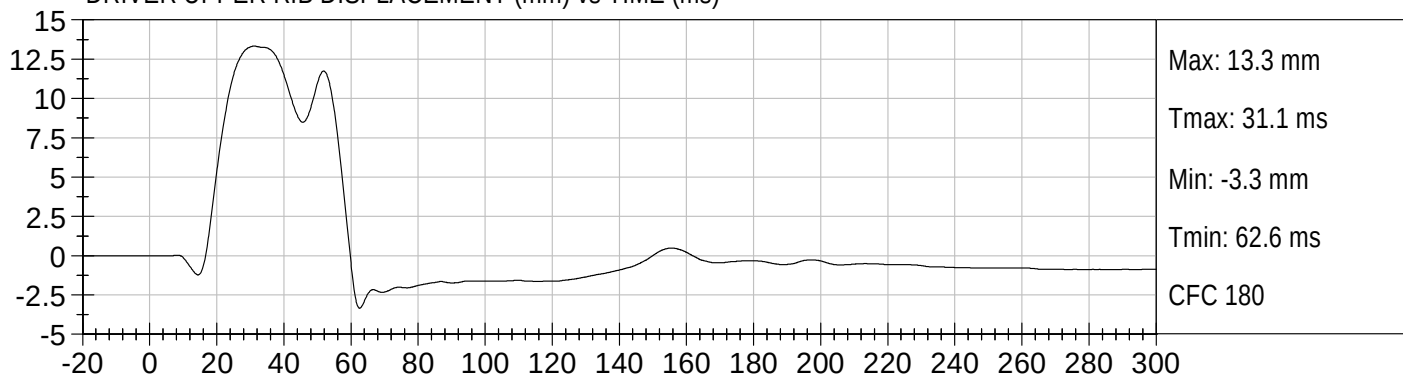
55/28 km/h 90° NCAP MDB Side Impact
2011 Mercedes-Benz C300 - MB0501

Test Date: 09/08/2010
Speed: 38.3 mph (61.6 km/h)

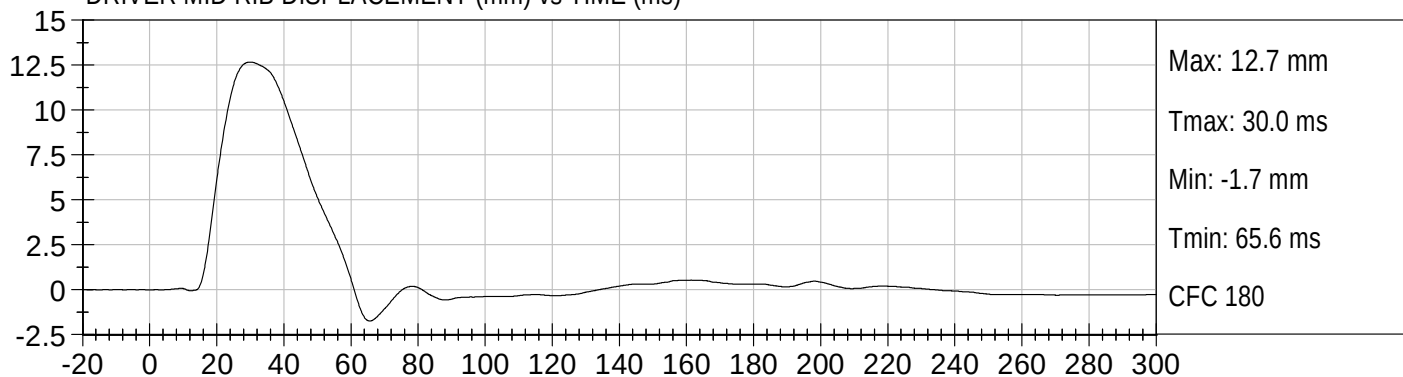




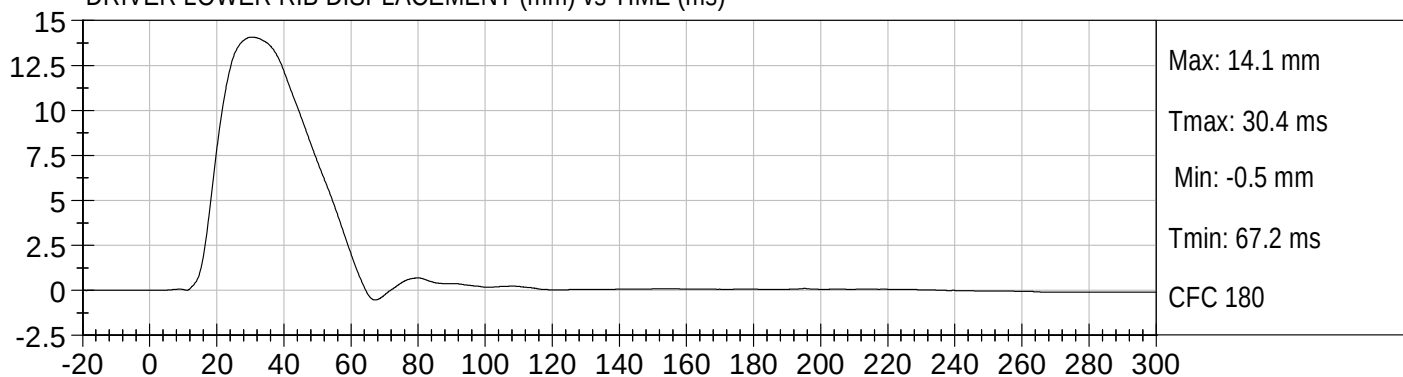
DRIVER UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



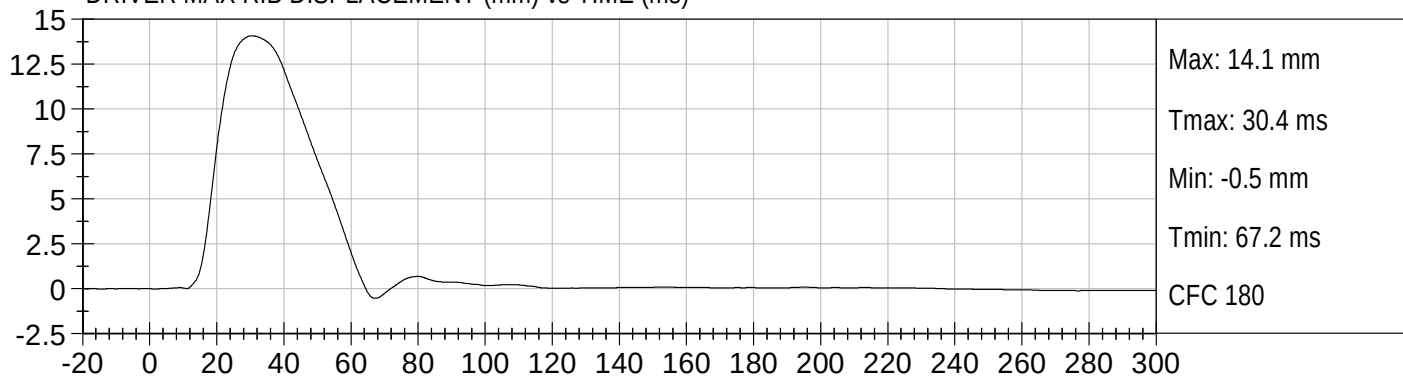
DRIVER MID RIB DISPLACEMENT (mm) vs TIME (ms)



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



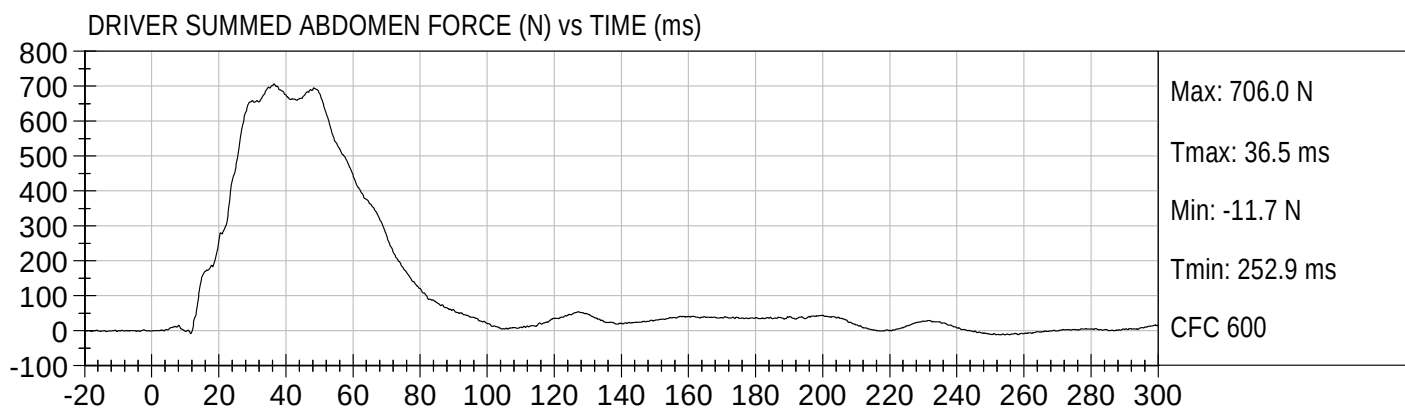
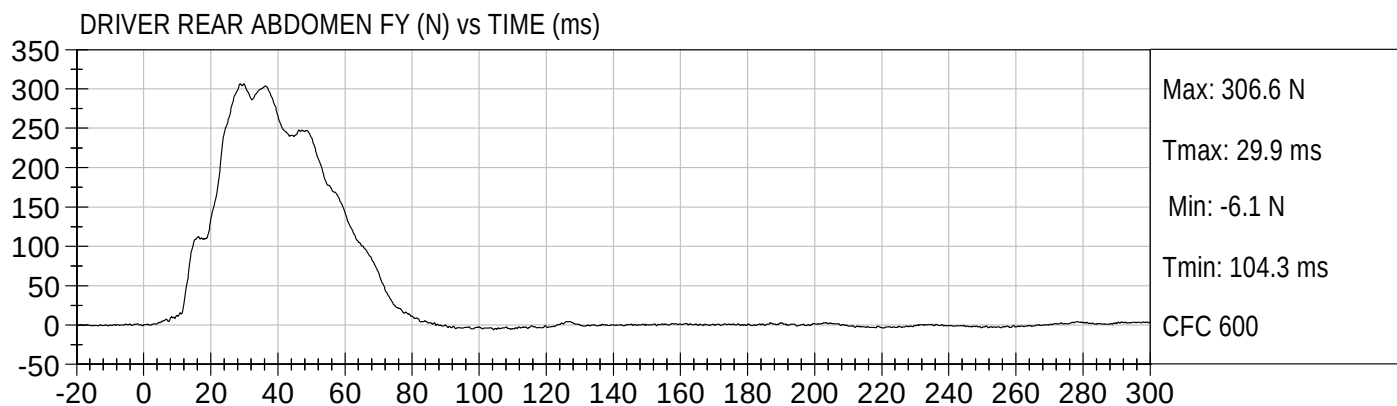
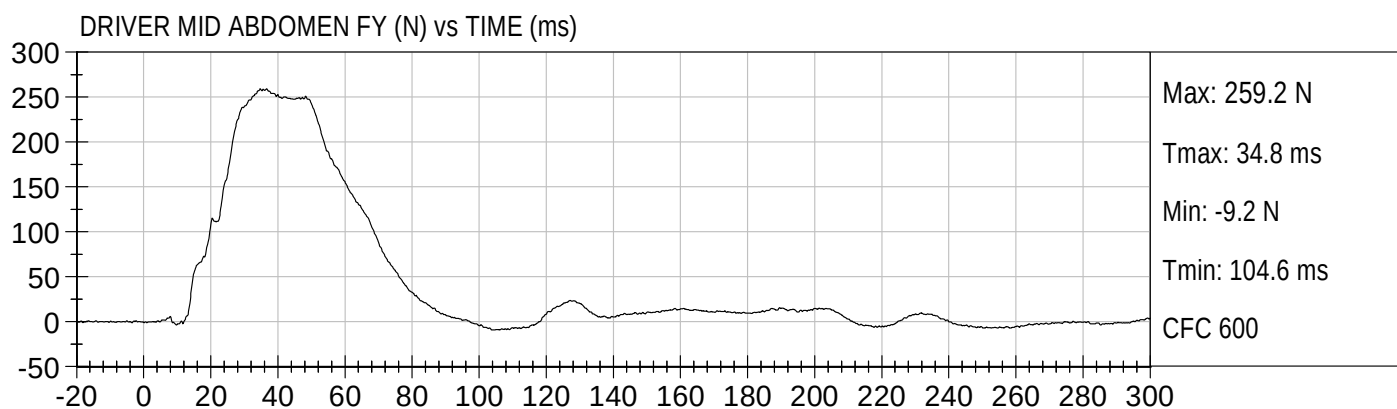
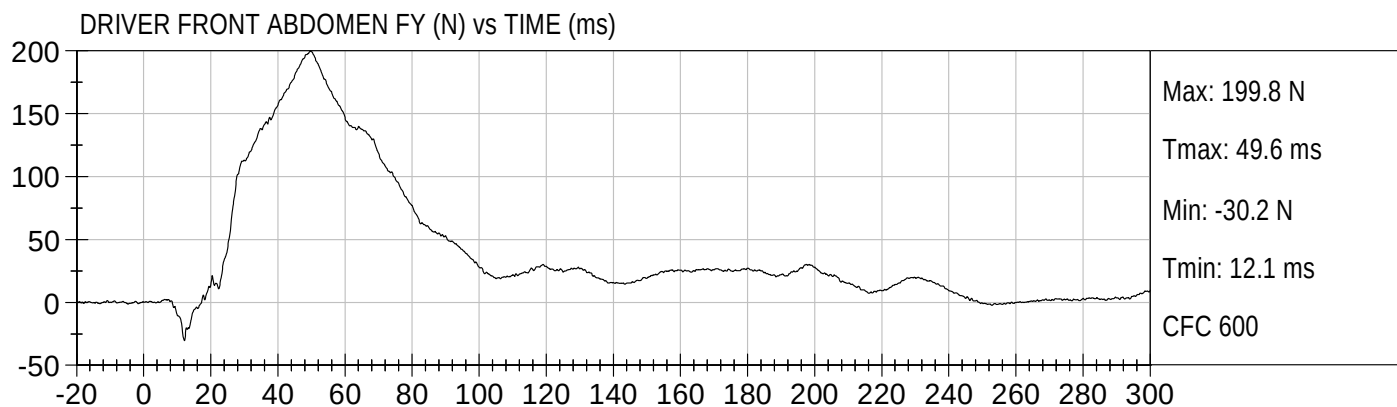
DRIVER MAX RIB DISPLACEMENT (mm) vs TIME (ms)





55/28 km/h 90° NCAP MDB Side Impact
2011 Mercedes-Benz C300 - MB0501

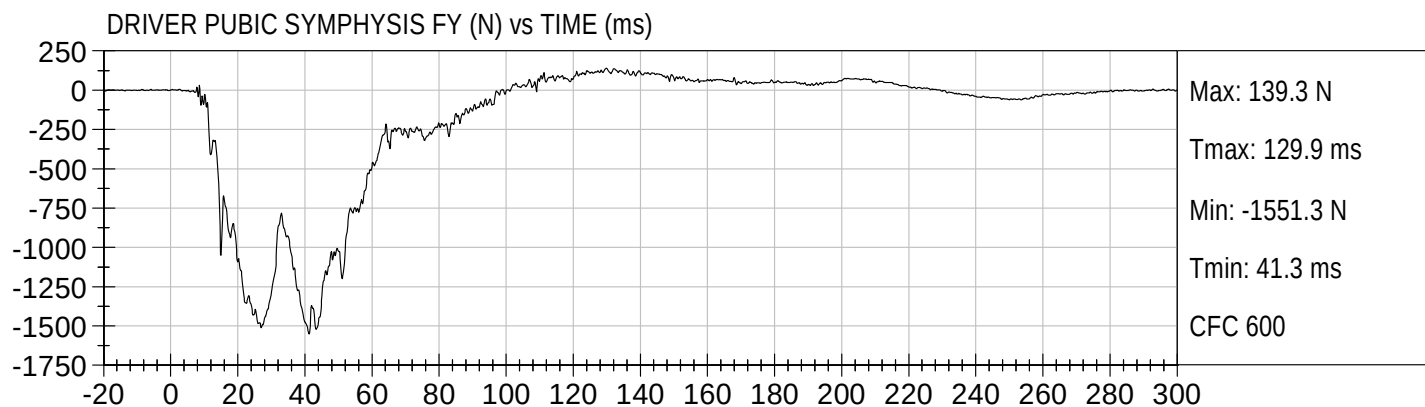
Test Date: 09/08/2010
Speed: 38.3 mph (61.6 km/h)





55/28 km/h 90° NCAP MDB Side Impact
2011 Mercedes-Benz C300 - MB0501

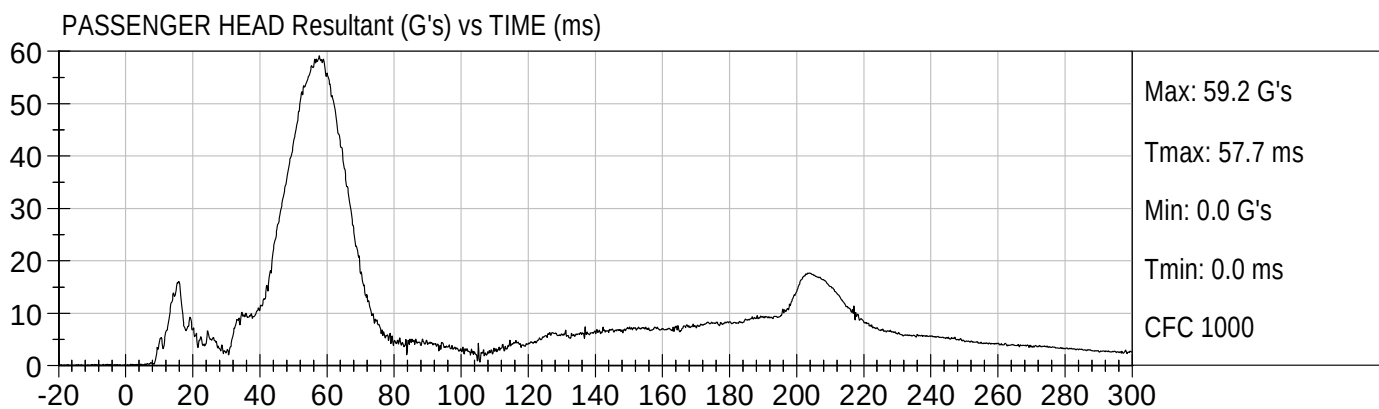
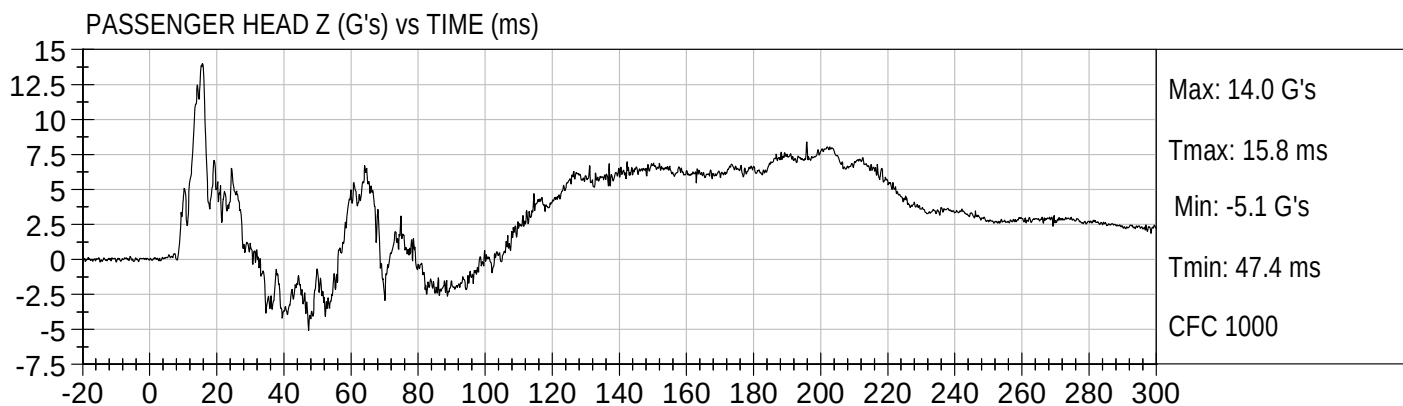
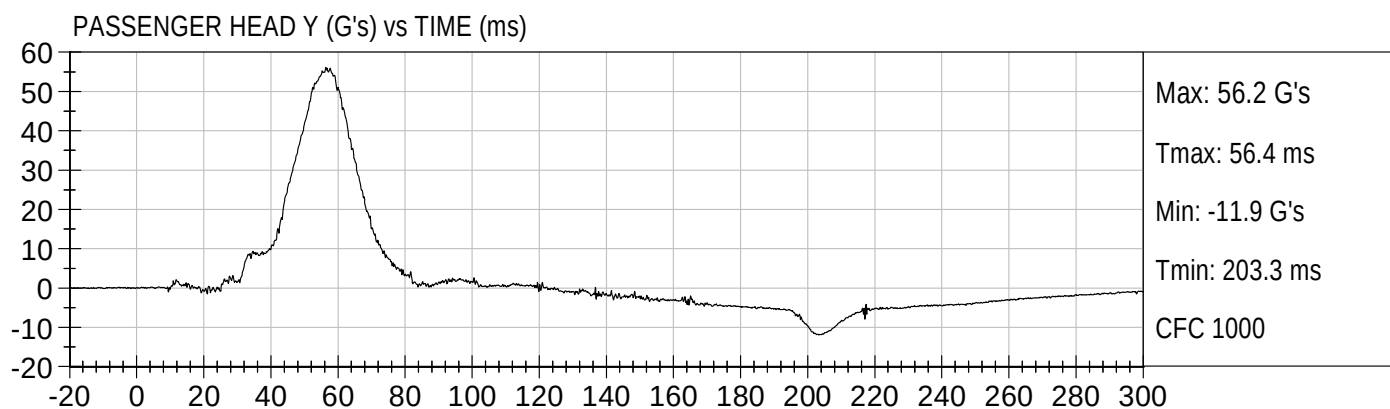
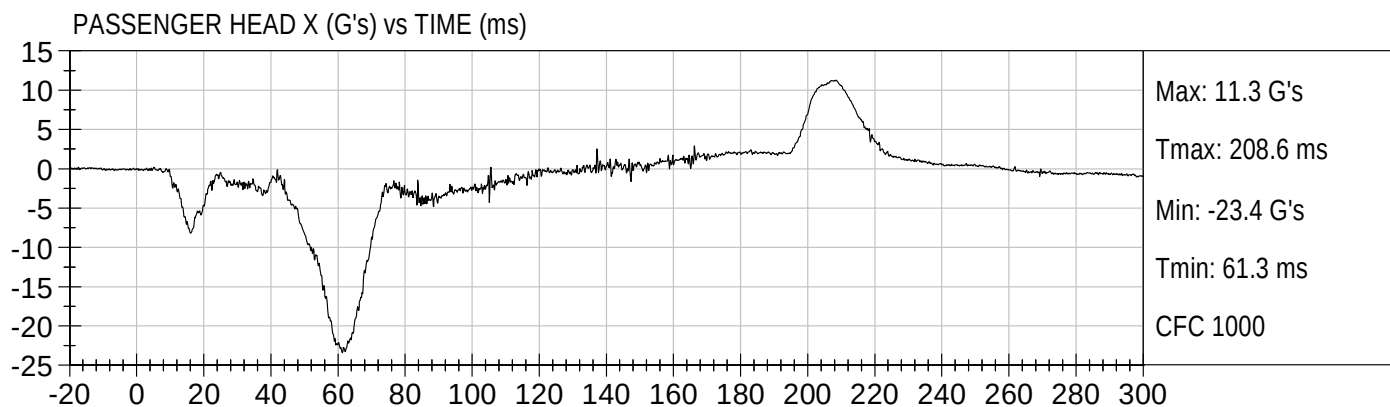
Test Date: 09/08/2010
Speed: 38.3 mph (61.6 km/h)

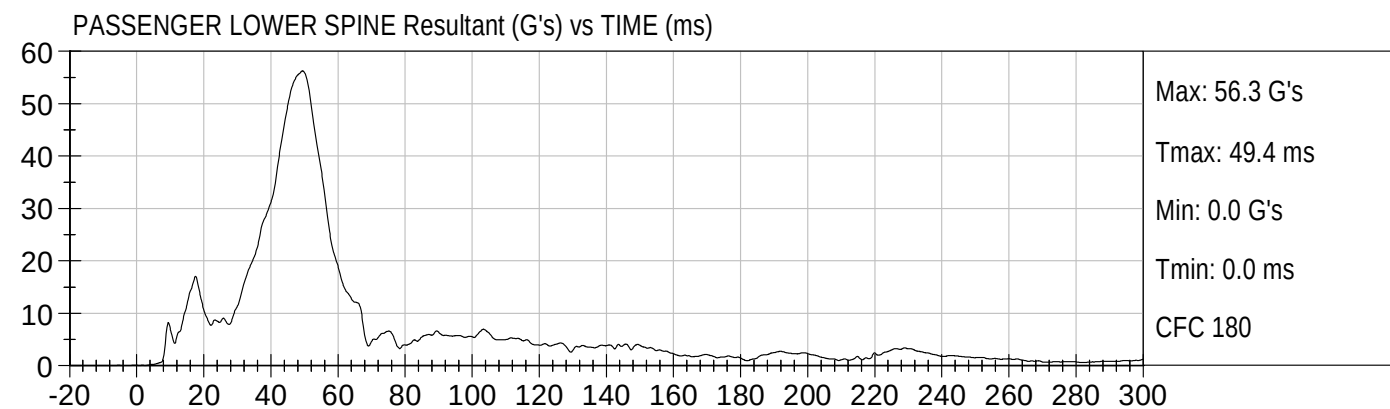
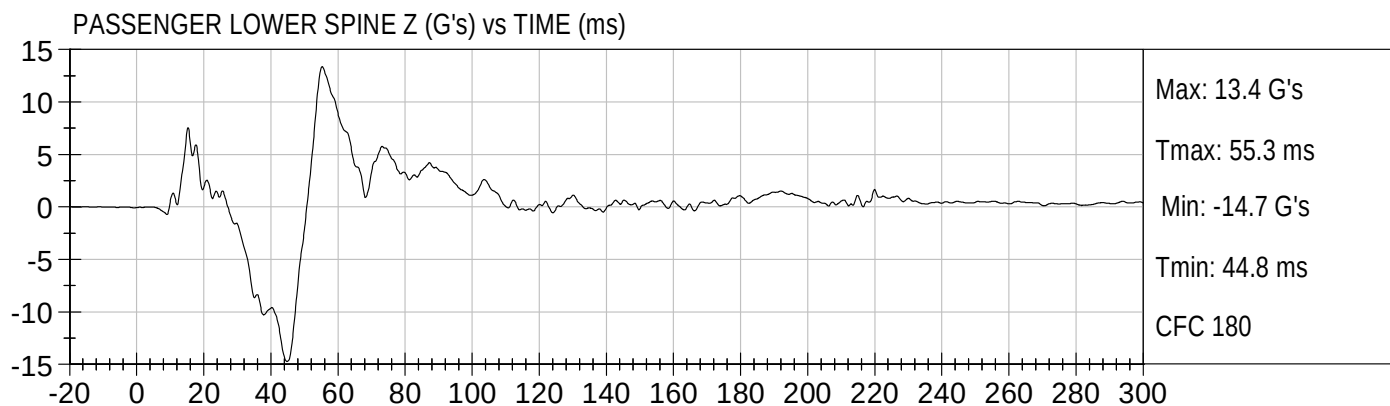
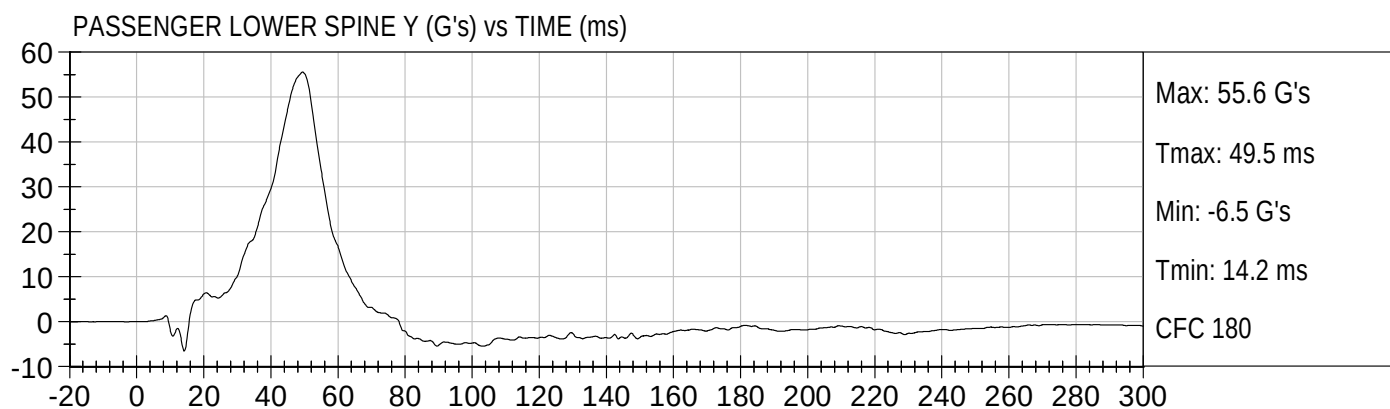
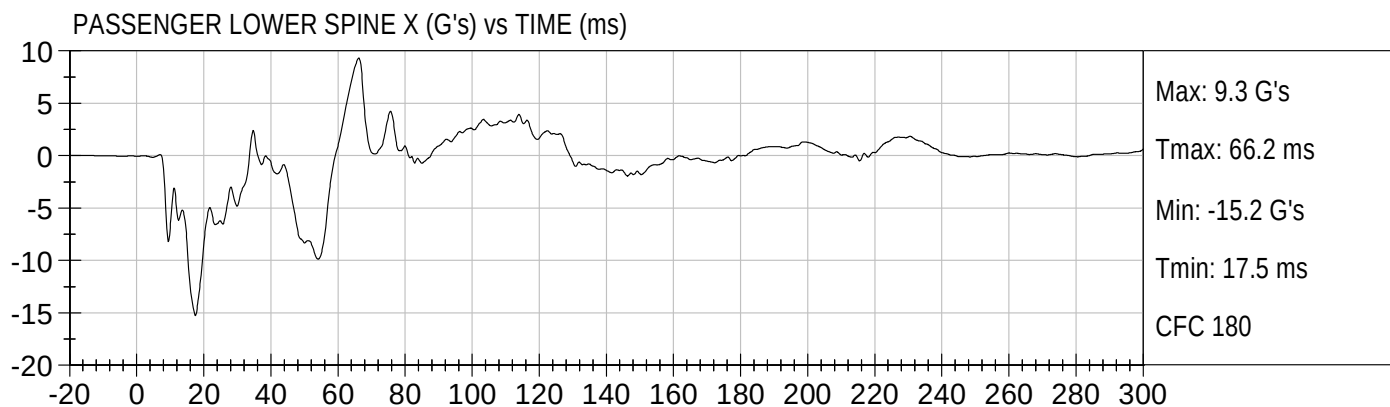




55/28 km/h 90° NCAP MDB Side Impact
2011 Mercedes-Benz C300 - MB0501

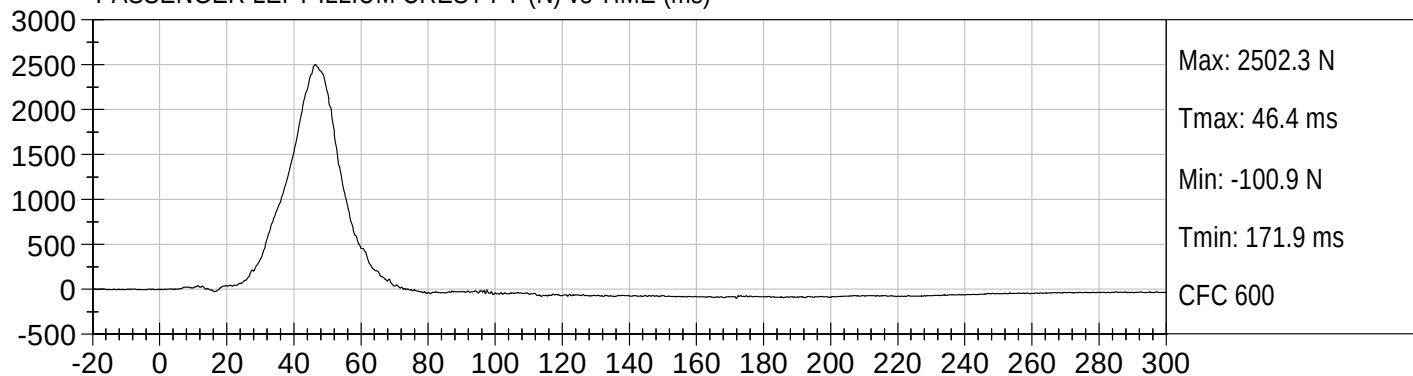
Test Date: 09/08/2010
Speed: 38.3 mph (61.6 km/h)



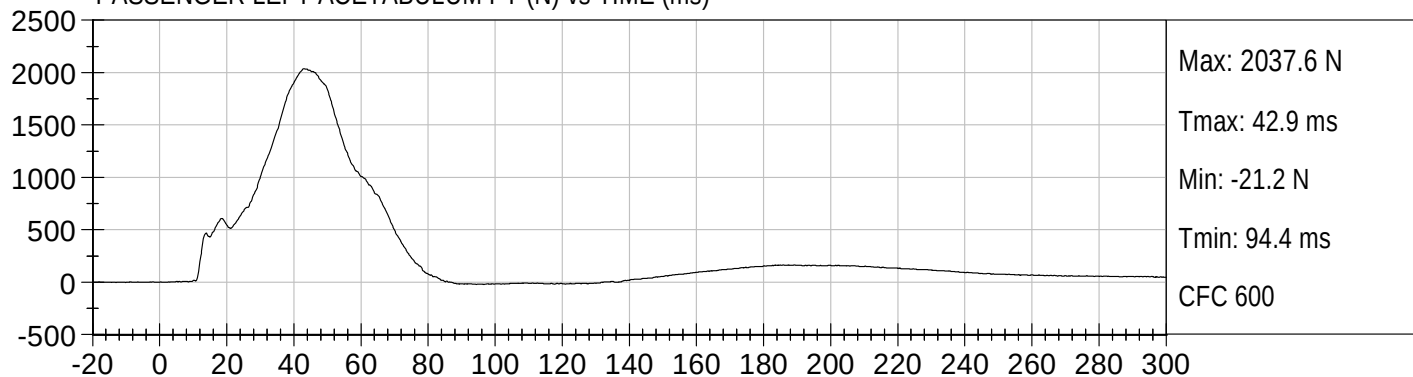




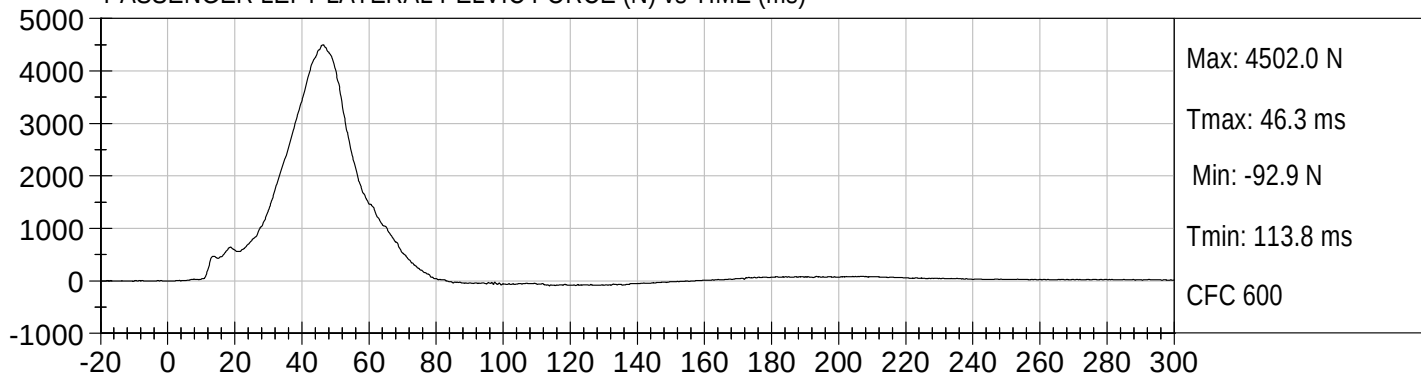
PASSENGER LEFT ILLIUM CREST FY (N) vs TIME (ms)



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



PASSENGER LEFT LATERAL PELVIC FORCE (N) vs TIME (ms)



APPENDIX C

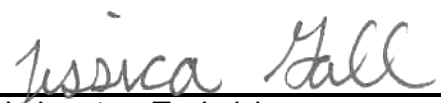
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

Test ID: D102451

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	48	Pass
Peak Resultant Acceleration	G's	125 to 155	150	Pass
Peak Lateral Acceleration	G's	+/- 15	-6.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

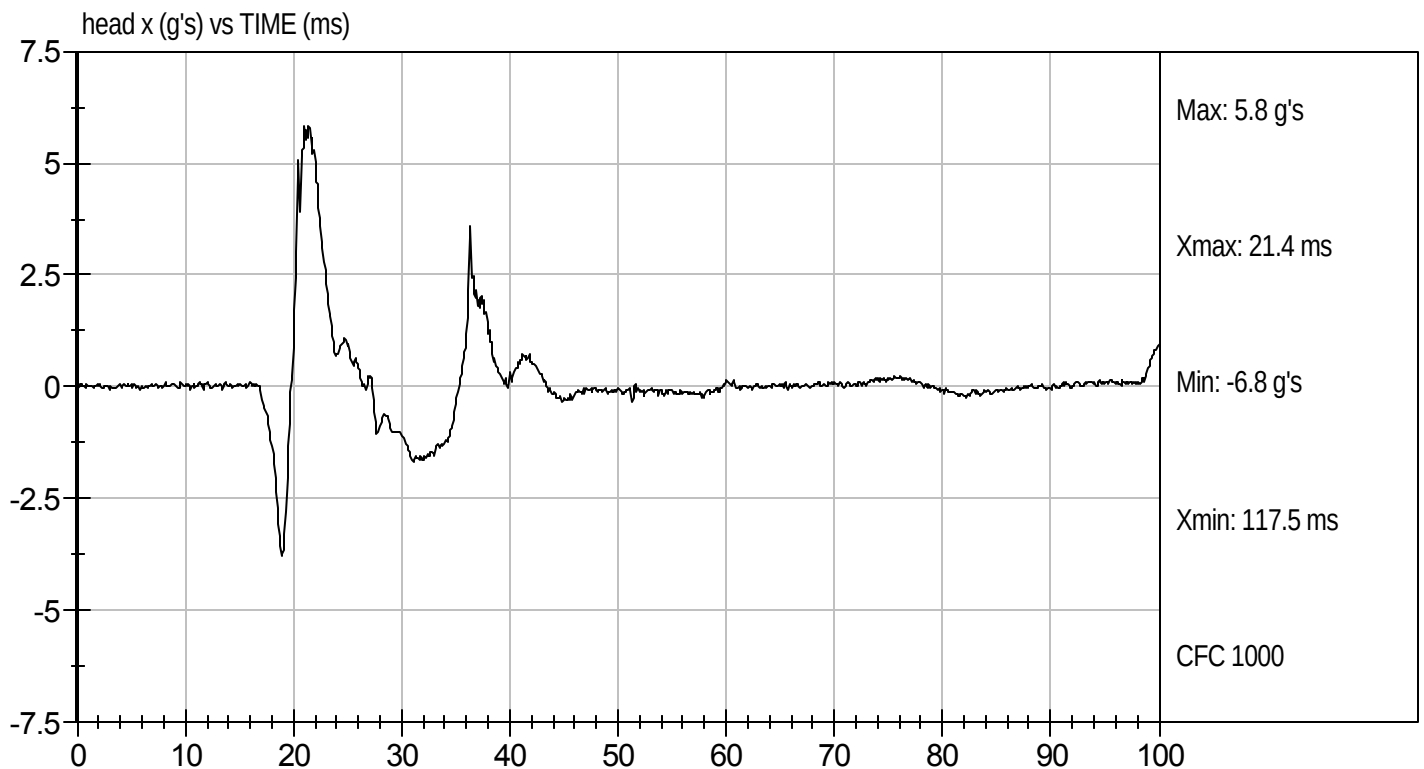
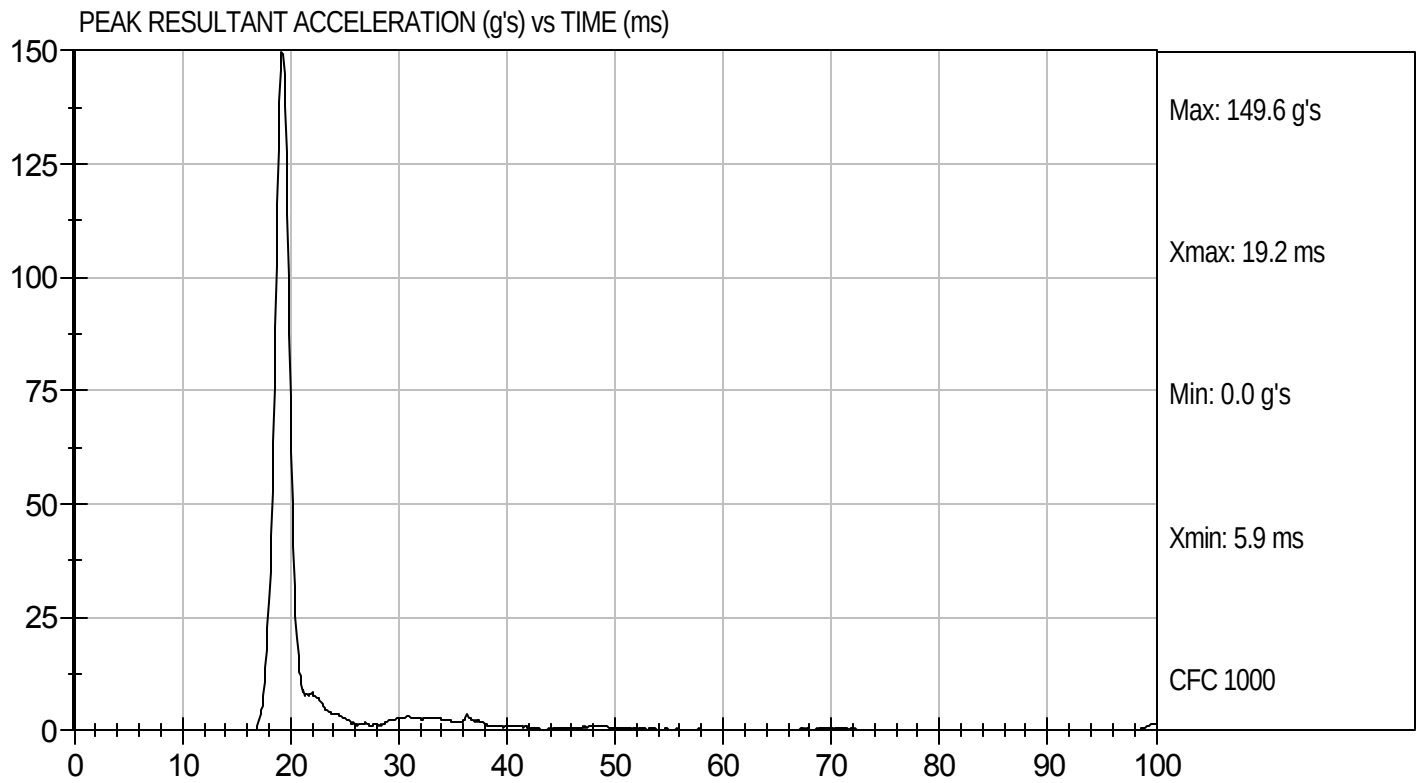
7/29/10
Test Date


Approved By



Test Desc: Head Drop
Component ID: D102451

Test Date: 7/29/10
Velocity: 0 ft/s, 0 m/s



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102452

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	48	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.4	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.03	Pass
	3 ms	m/s	-0.25 to -0.375	-0.33	Pass
	14 ms	m/s	-3.20 to -3.70	-3.22	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	53.0	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	61.2	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	59.9	Pass
Overall Test Results					Pass


 Laboratory Technician

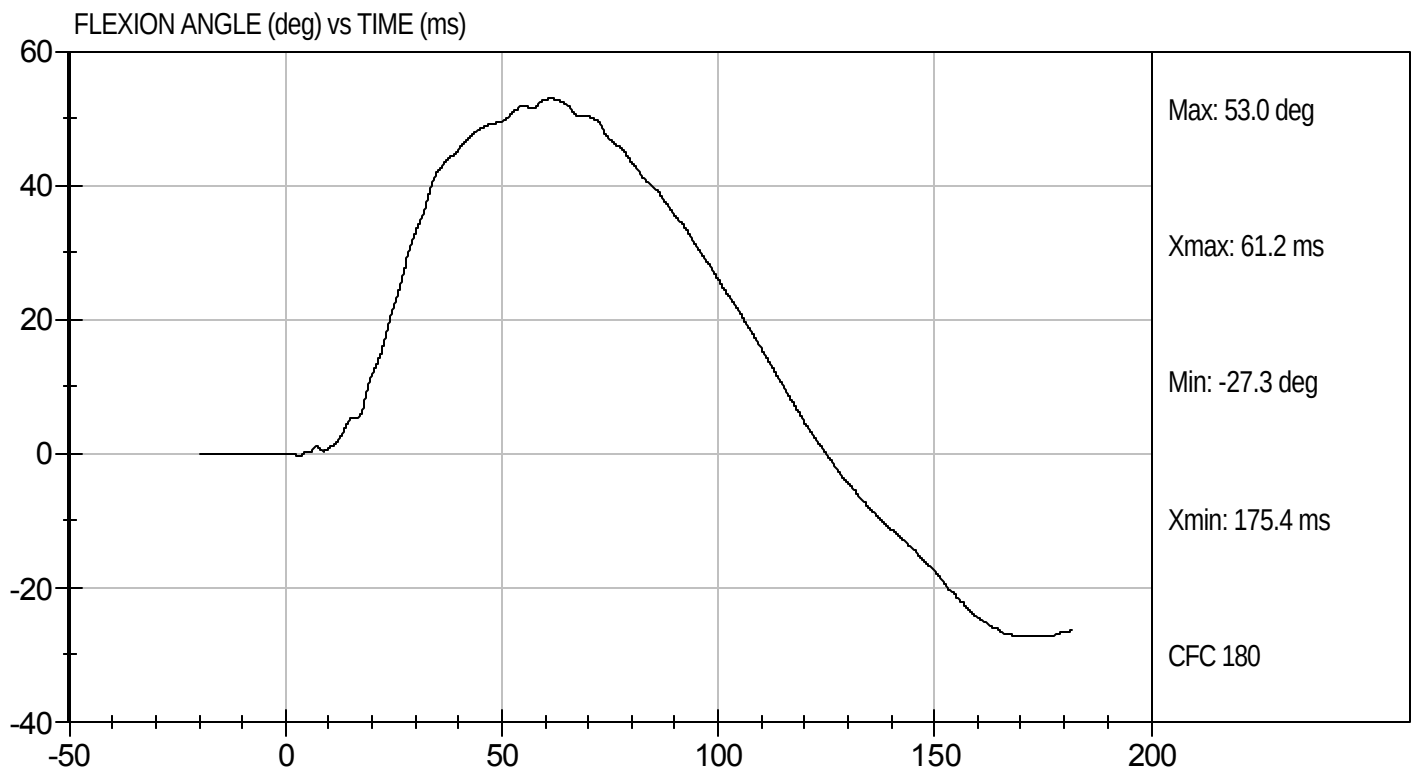
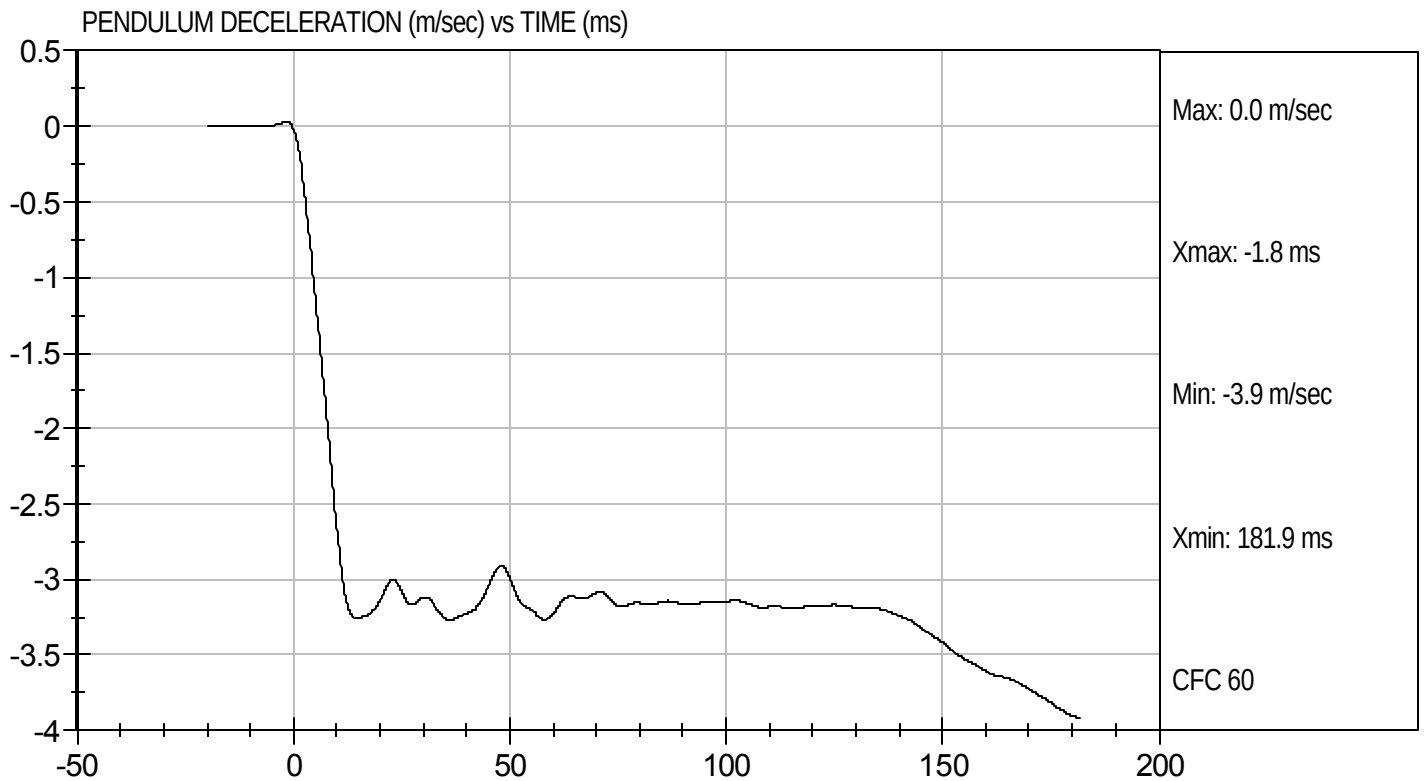
7/29/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D102452

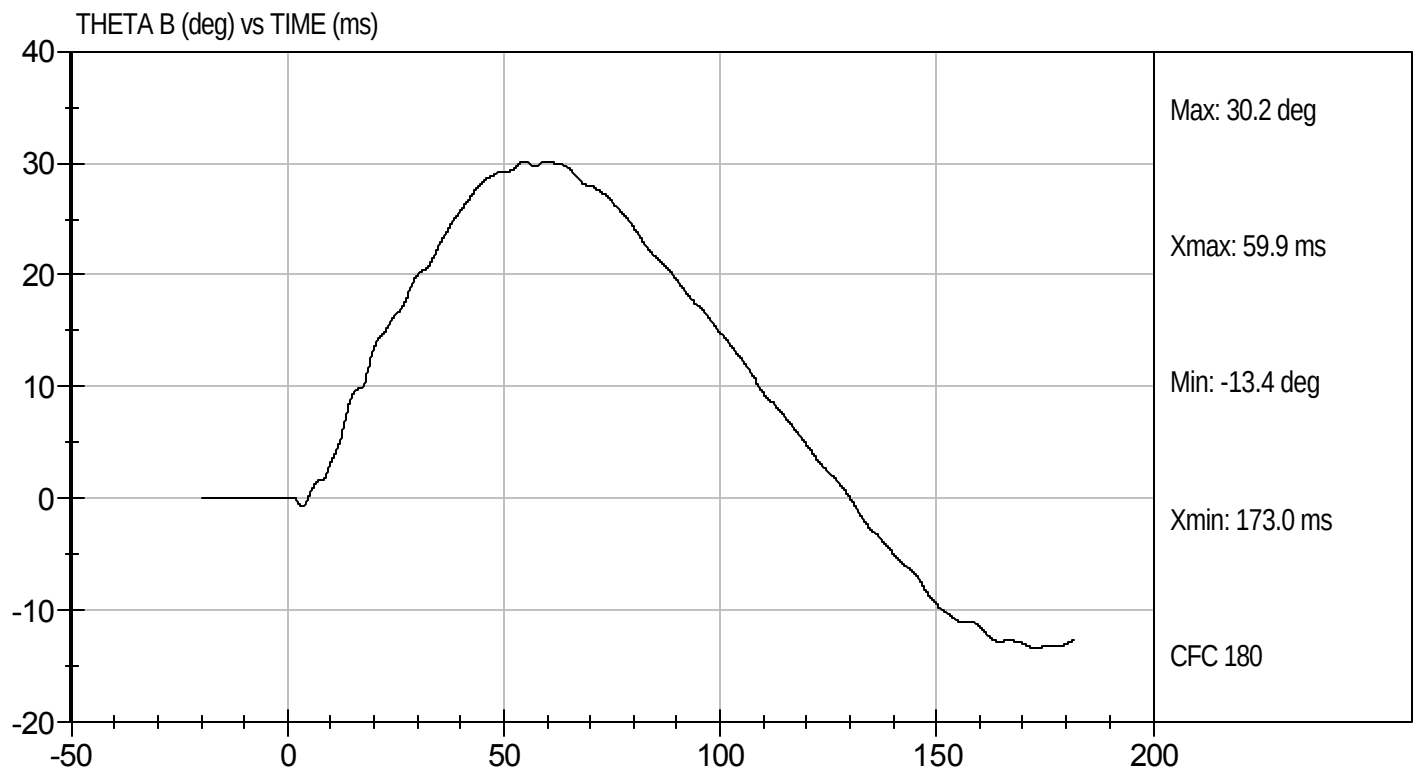
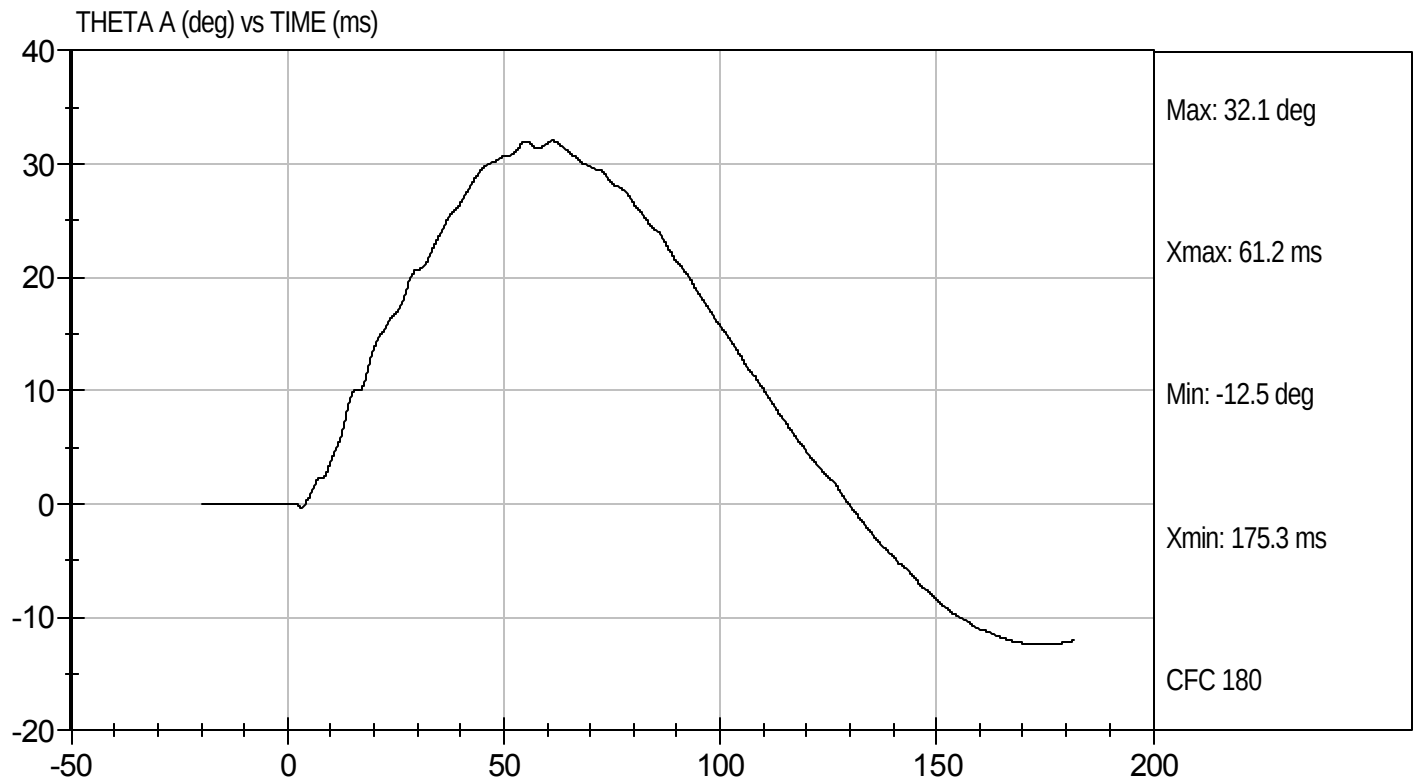
Test Date: 7/29/10
Velocity: 11.19 ft/s, 3.4 m/s





Test Desc: Neck Bending
Component ID: D102452

Test Date: 7/29/10
Velocity: 11.19 ft/s, 3.4 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102453

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	47	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.7	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.7	Pass
Overall Test Results			Pass	


Laboratory Technician

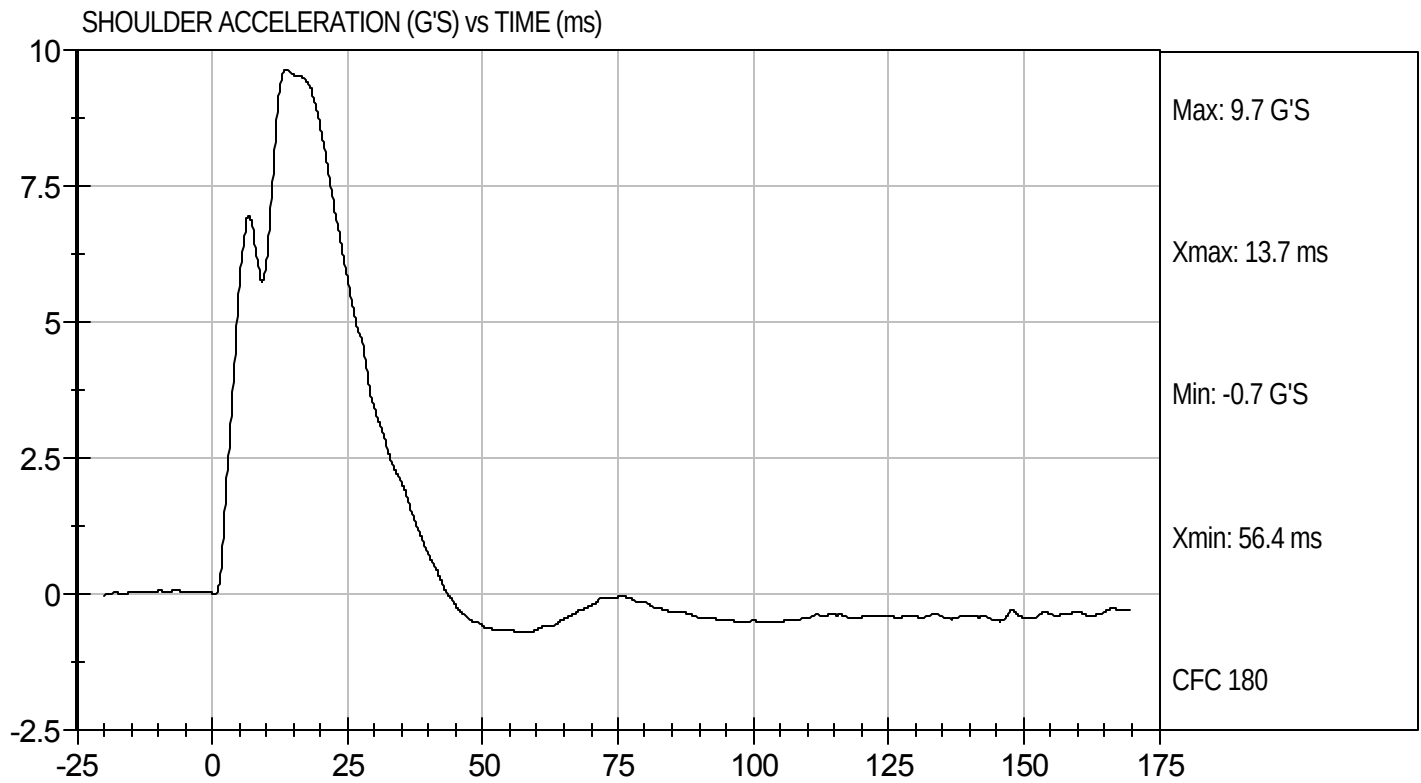
7/30/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D102453

Test Date: 7/30/10
Velocity: 14.0 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102454

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	36.2	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.4	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

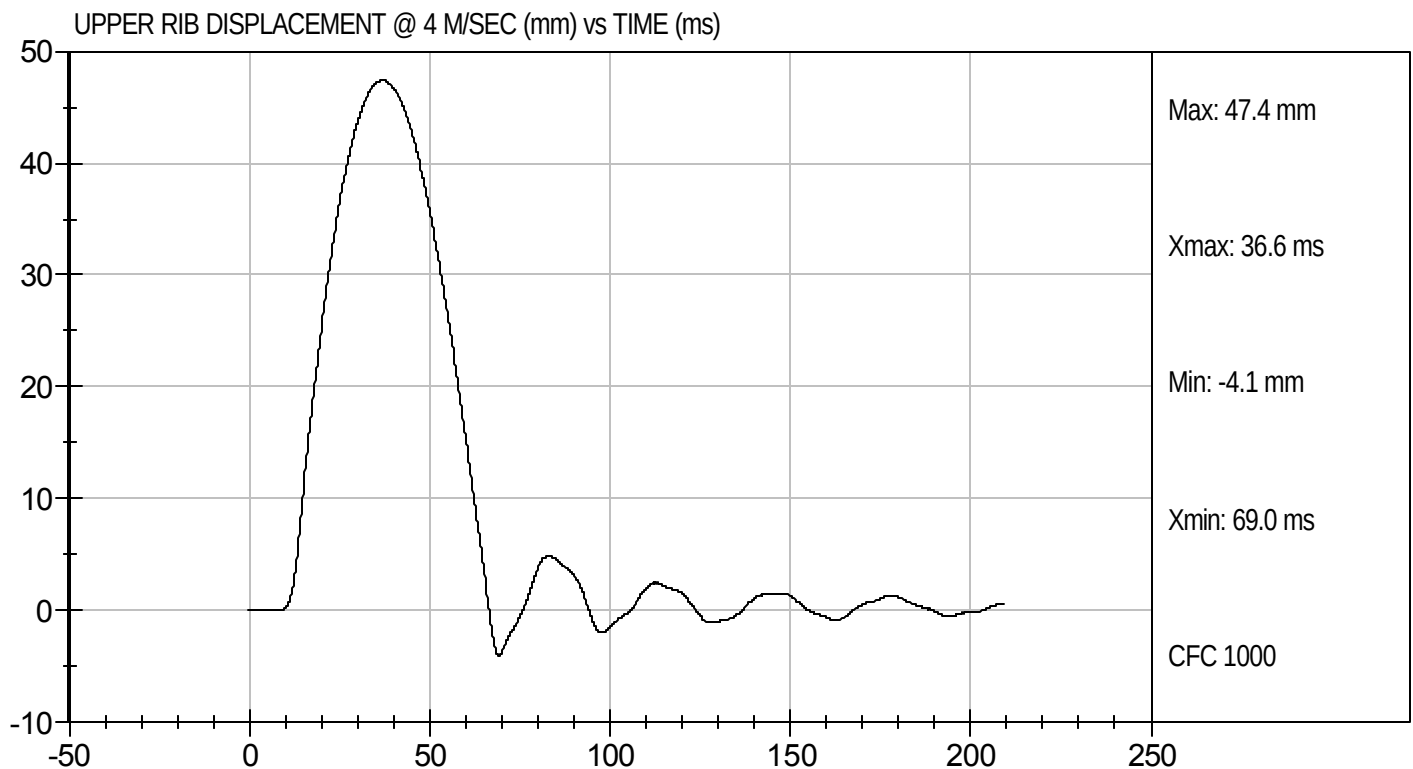
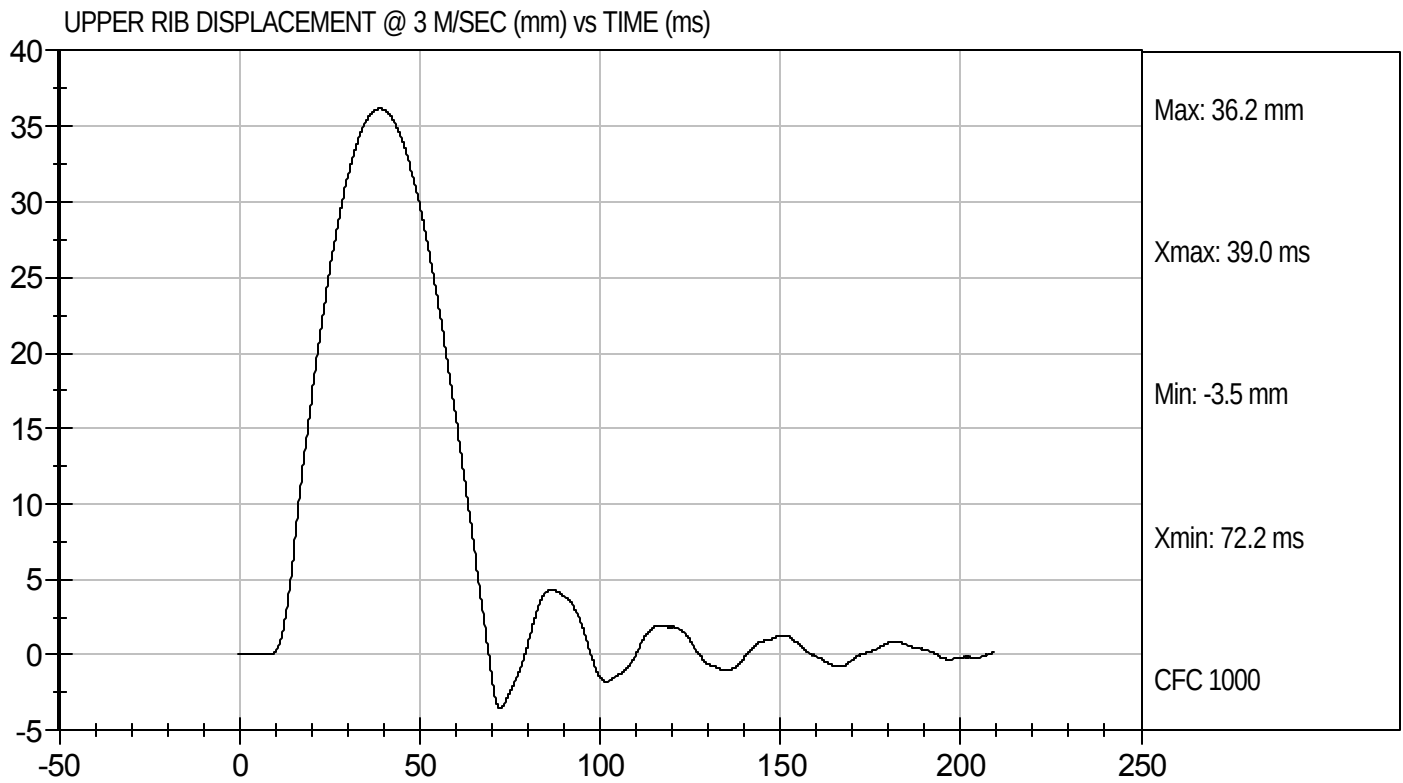
7/30/10
Test Date

David Winkelbauer
Approved By



Test Desc: Rib Impact - Upper
Component ID: D102454

Test Date: 7/30/10



MGA RESEARCH CORPORATION

**MID RIB TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102455

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.1	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.1	Pass
Overall Test Results				Pass


Laboratory Technician

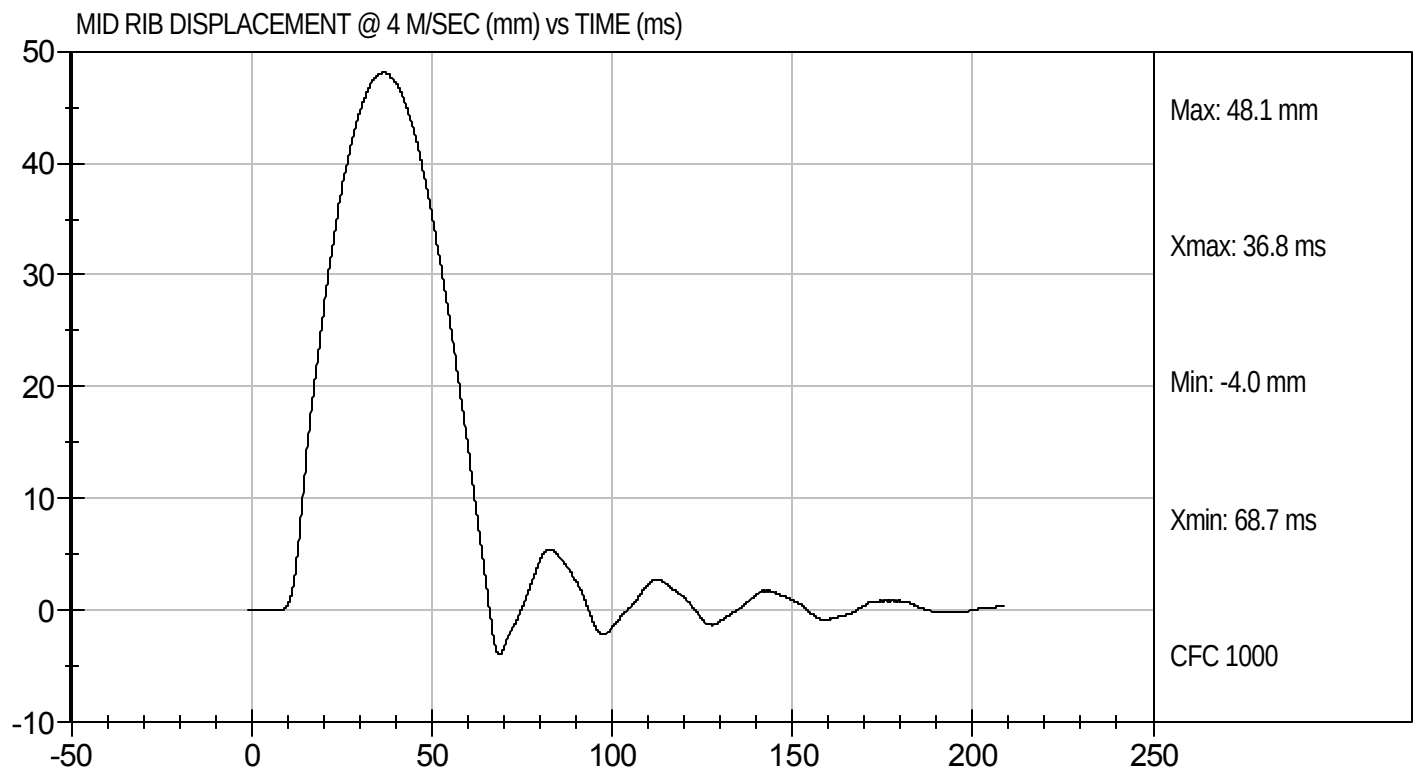
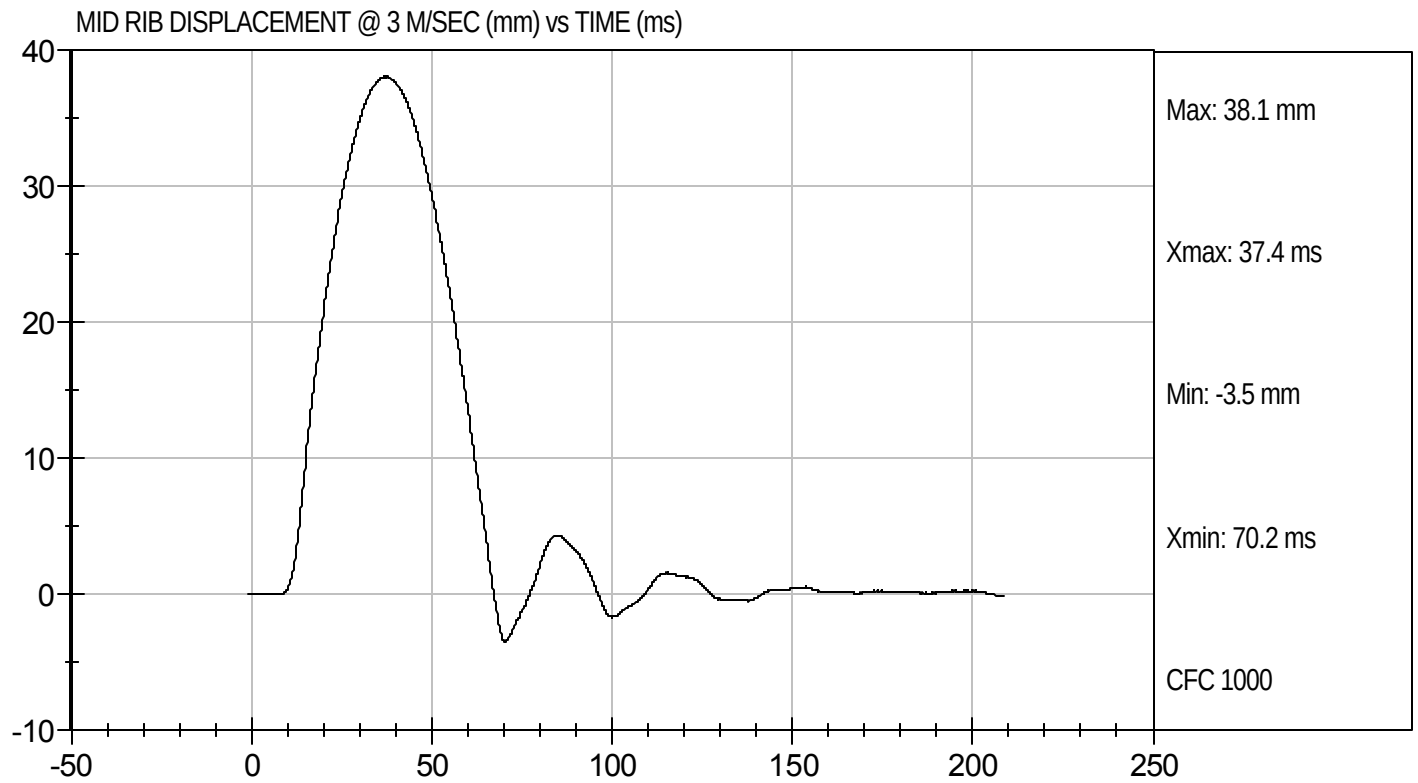
7/30/10
Test Date


Approved By



Test Desc: Rib Impact - Mid
Component ID: D102455

Test Date: 7/30/10



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102456

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.6	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.1	Pass
Overall Test Results				Pass


Laboratory Technician

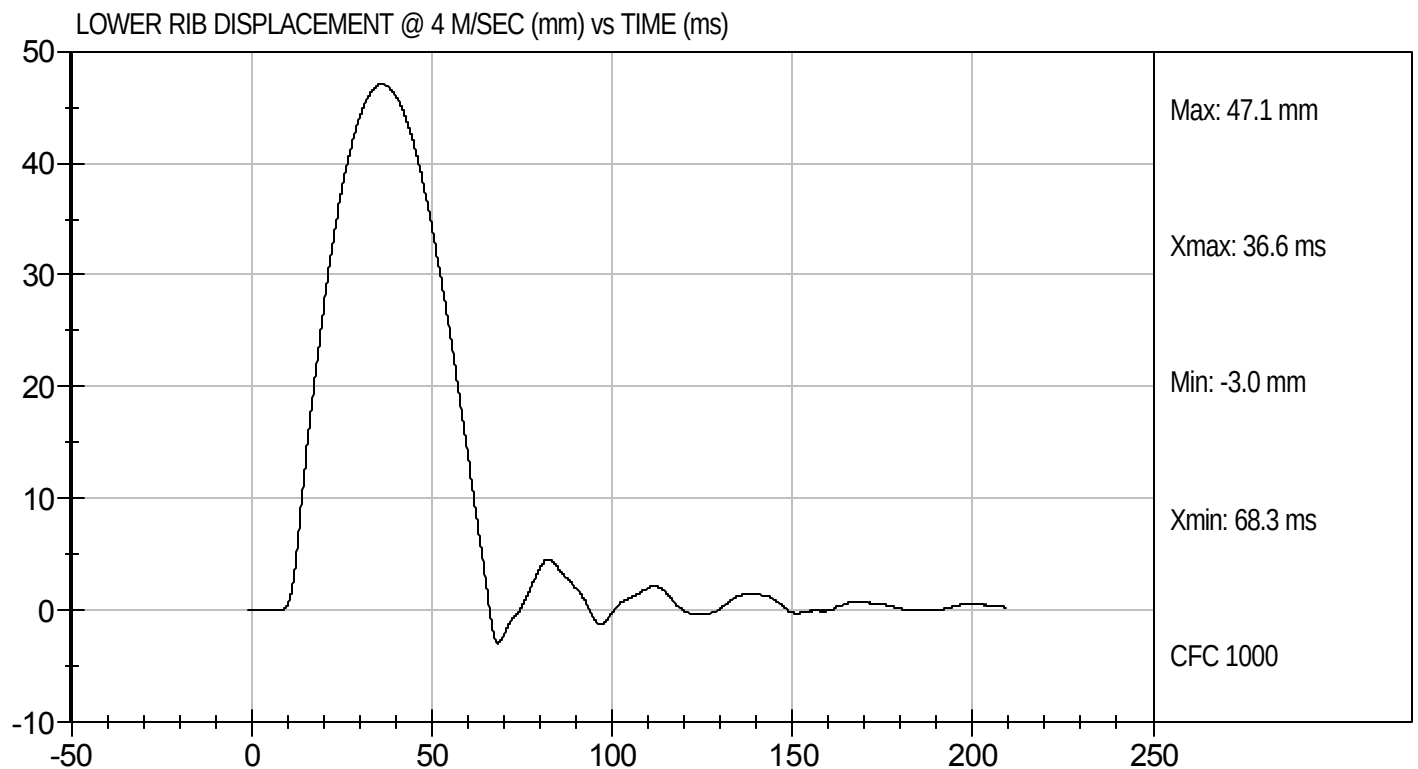
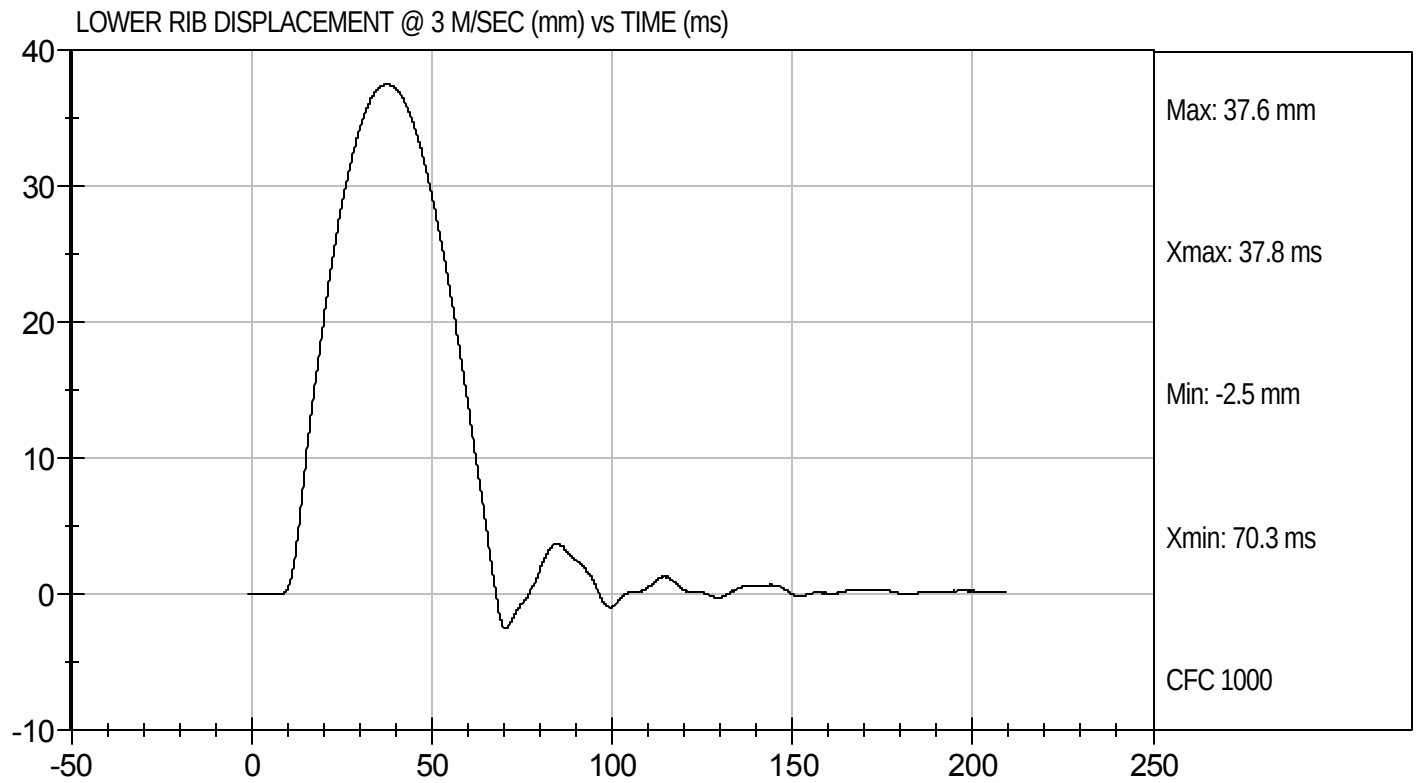
7/30/10
Test Date


Approved By



Test Desc: Rib Impact - Lower
Component ID: D102456

Test Date: 7/30/10



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102457

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Speed	m/s	3.90 to 4.10	4.08	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.11	Pass
Time of Maximum Impactor Force	ms	10.60 to 13.00	12.00	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.46	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.30	Pass
Overall Test Results			Pass	


Laboratory Technician

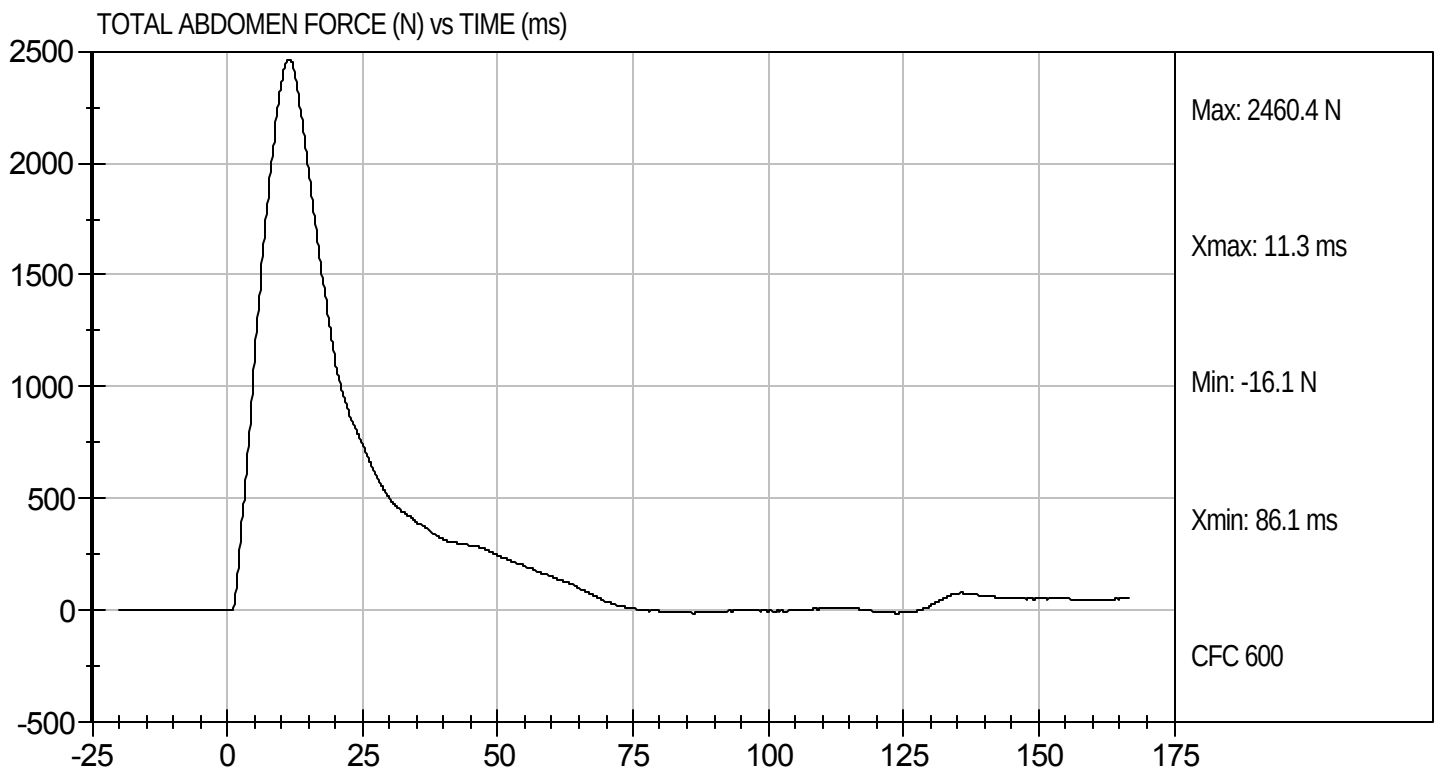
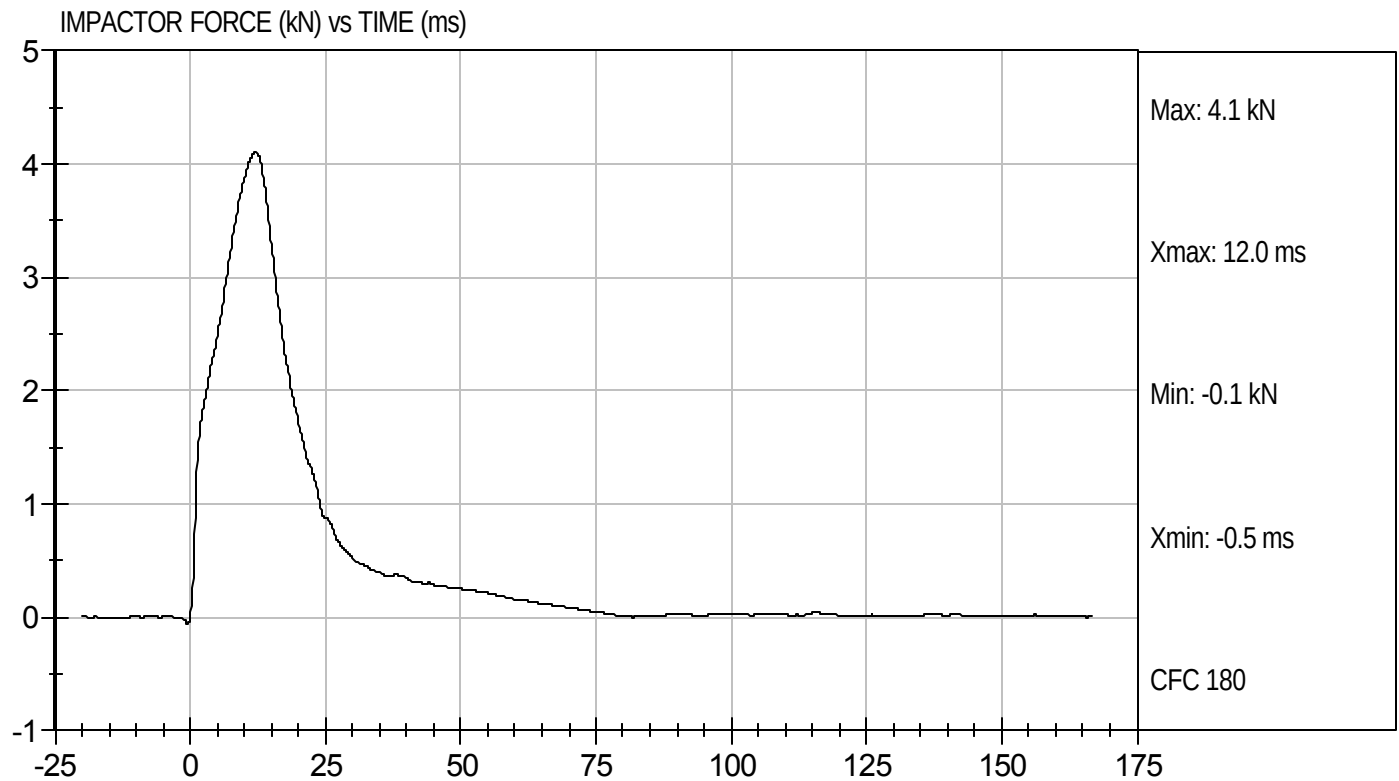
7/30/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D102457

Test Date: 7/30/10
Velocity: 13.4 ft/s, 4.08 m/s



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102458

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity		%	10 to 70	48	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.12	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.42	Pass
	27 ms	m/s	-6.50 to -5.80	-5.84	Pass
	30 ms	m/s	>= -6.5	-6.02	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	45.5	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	42.9	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	42	Pass
Overall Results					Pass


 Laboratory Technician

7/29/10
 Test Date

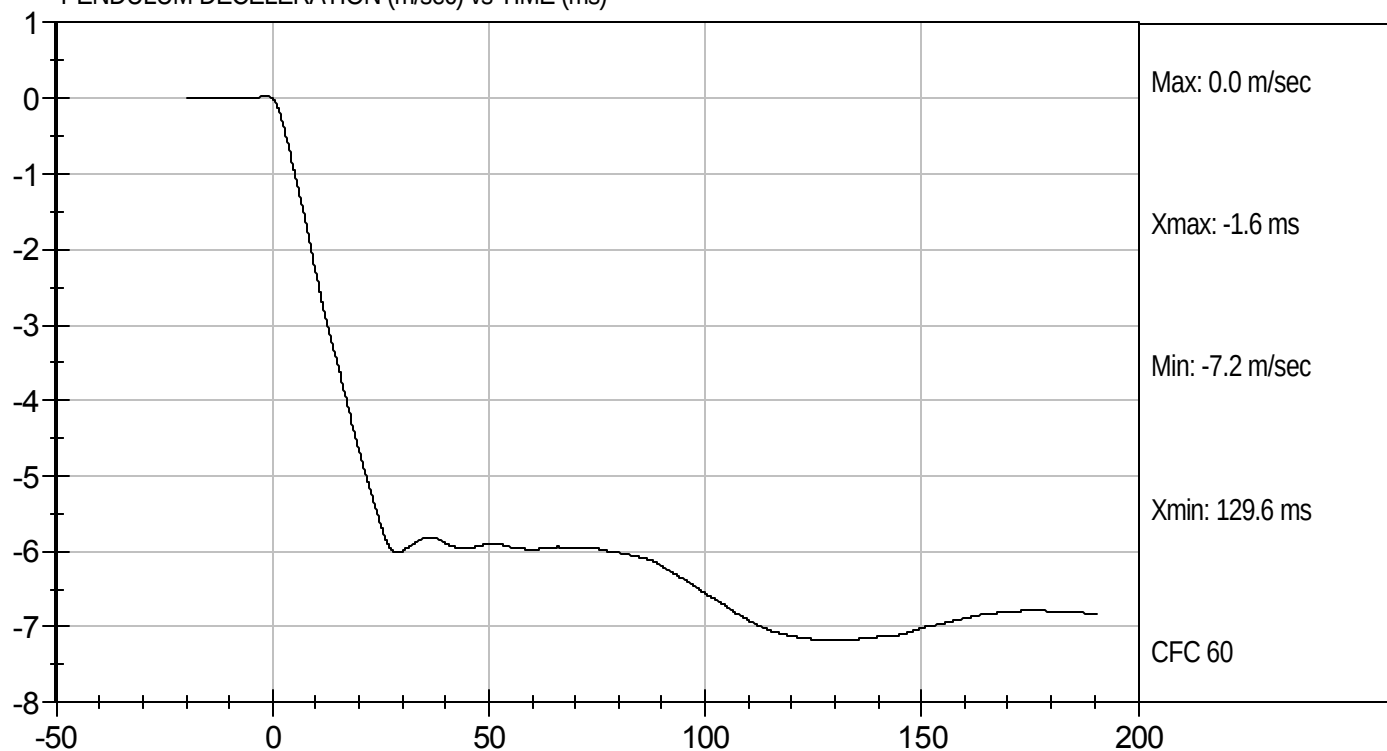

 Approved By



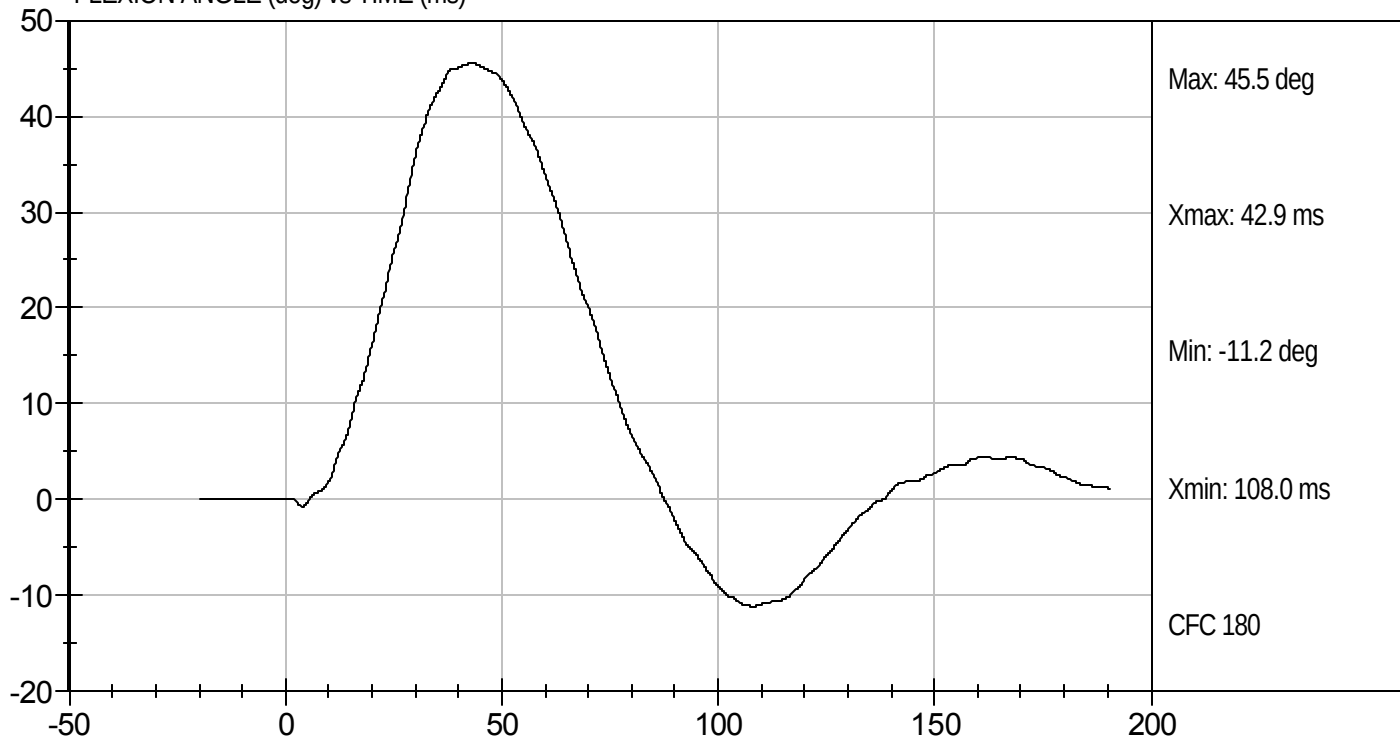
Test Desc: Lumbar Bending
Component ID: D102458

Test Date: 7/29/10
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (m/sec) vs TIME (ms)



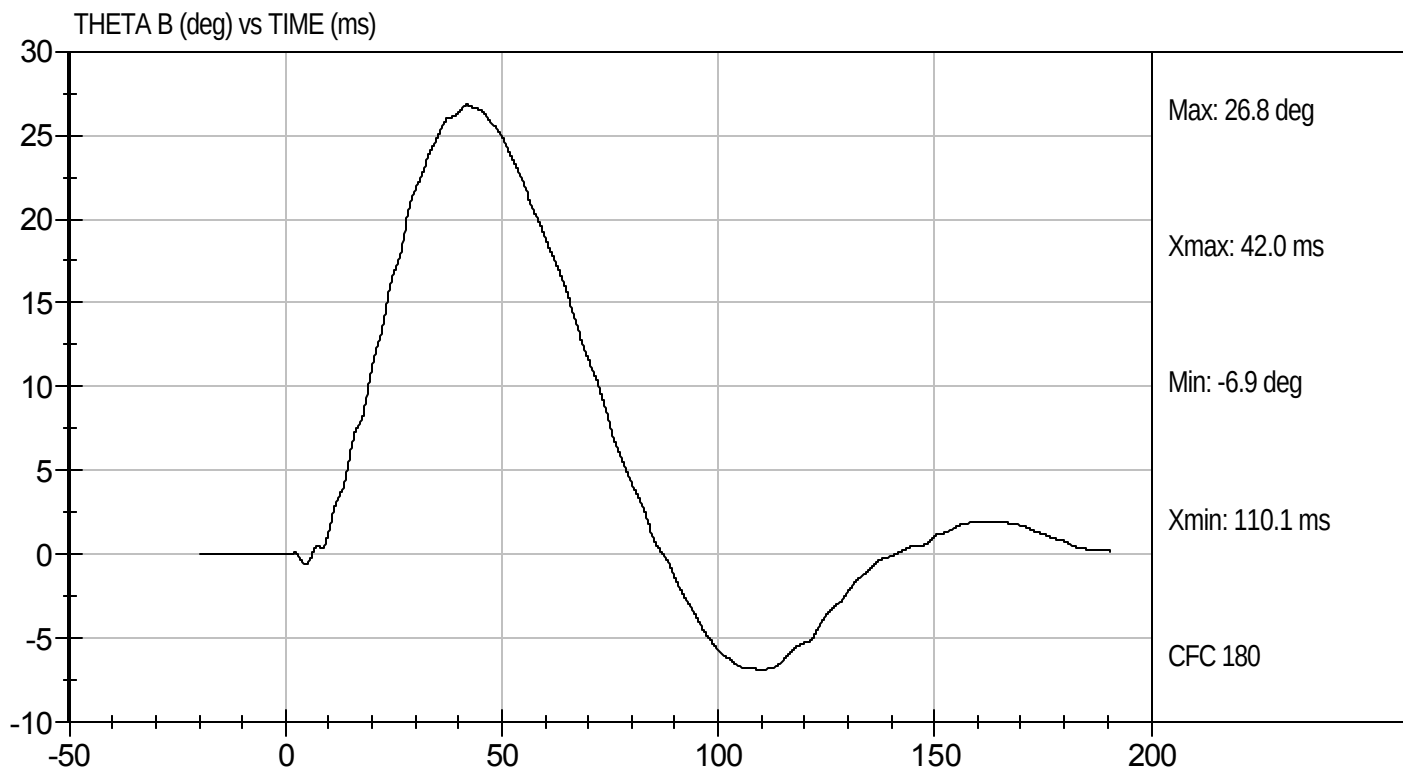
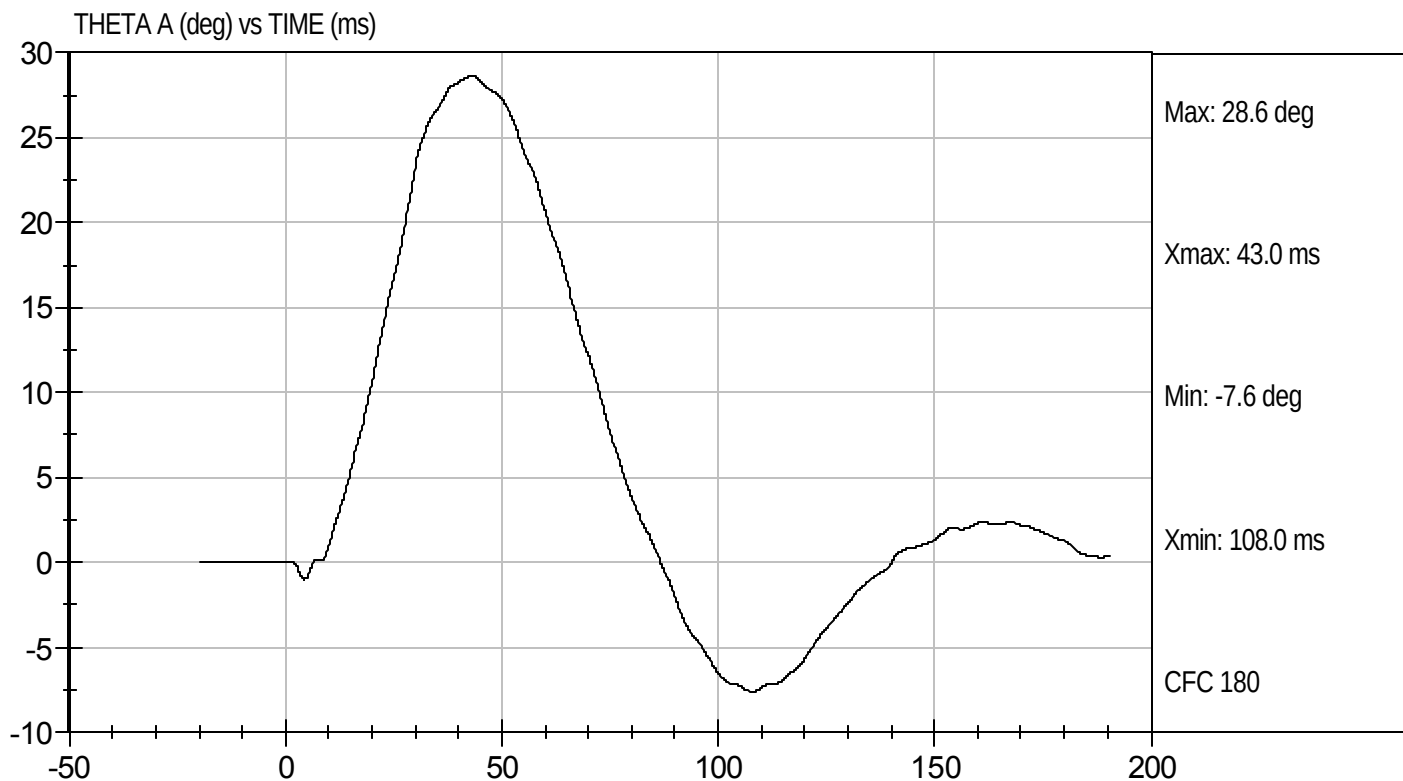
FLEXION ANGLE (deg) vs TIME (ms)





Test Desc: Lumbar Bending
Component ID: D102458

Test Date: 7/29/10
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

PELVIS TEST
ES-2re DUMMYATD Serial No: 032Test I.D: D102459

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	49	Pass
Probe Speed	m/s	4.20 to 4.40	4.33	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.73	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	14.10	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.55	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	16.00	Pass
Overall Test Results				Pass


Laboratory Technician

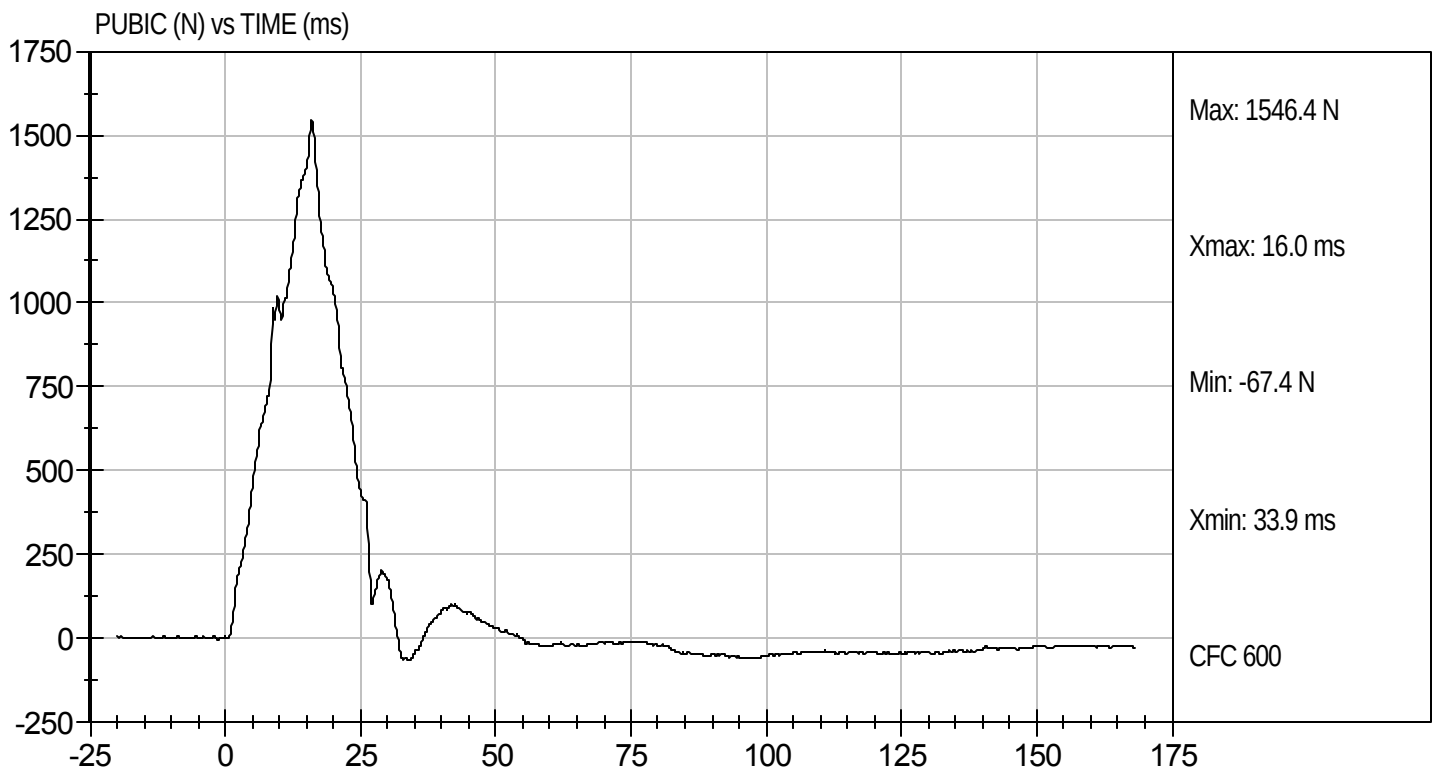
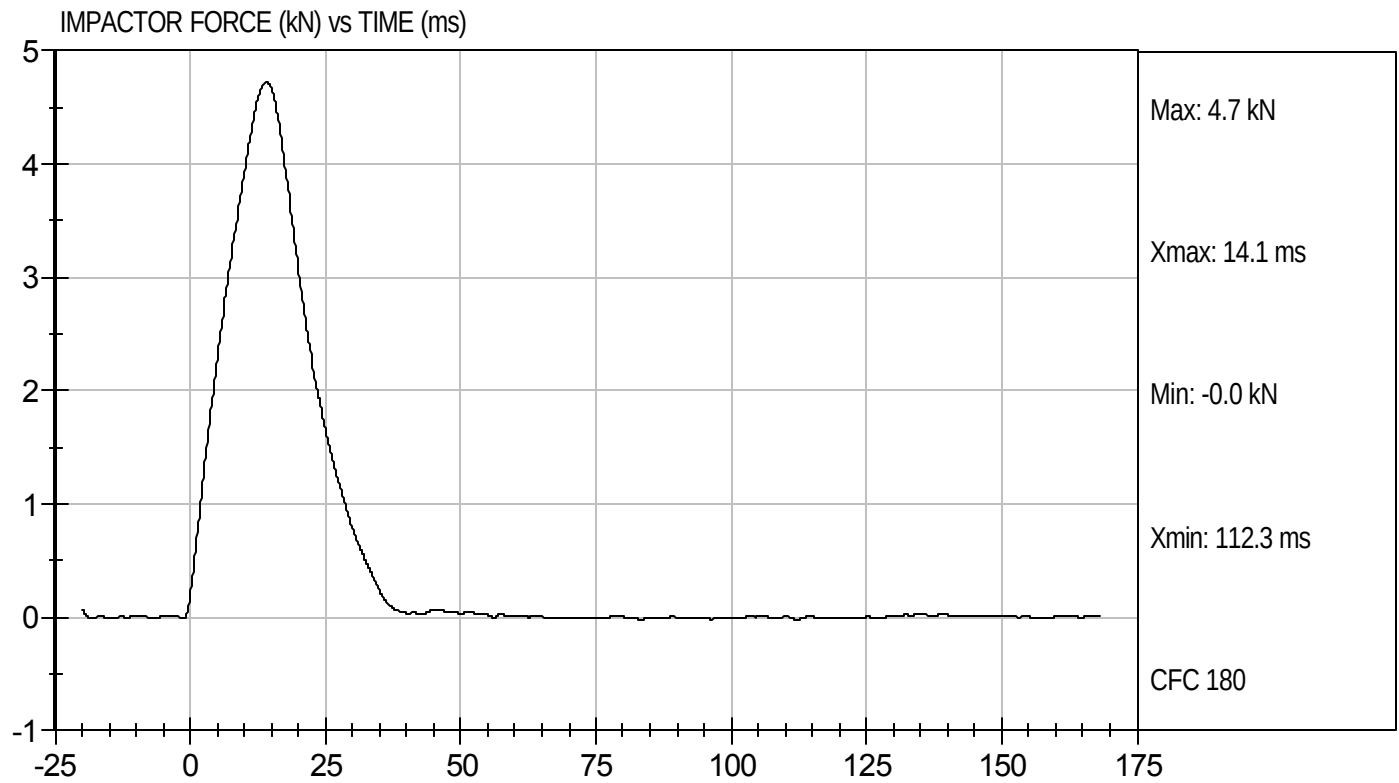
7/30/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D102459

Test Date: 7/30/10
Velocity: 14.2 ft/s, 4.33 m/s

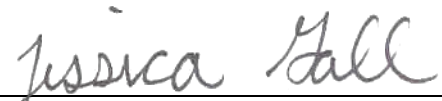


MGA RESEARCH CORPORATION
FULL BODY THORAX IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102450

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.7	Pass
Humidity	%	10 to 70	47	Pass
Probe Speed	m/s	5.40 to 5.60	5.46	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.14	Pass
Upper Rib Displacement	mm	34.0 to 41.0	38.6	Pass
Middle Rib Displacement	mm	37.0 to 45.0	41.2	Pass
Lower Rib Displacement	mm	37.0 to 44.0	40.8	Pass
			Overall Test Results	Pass


Laboratory Technician

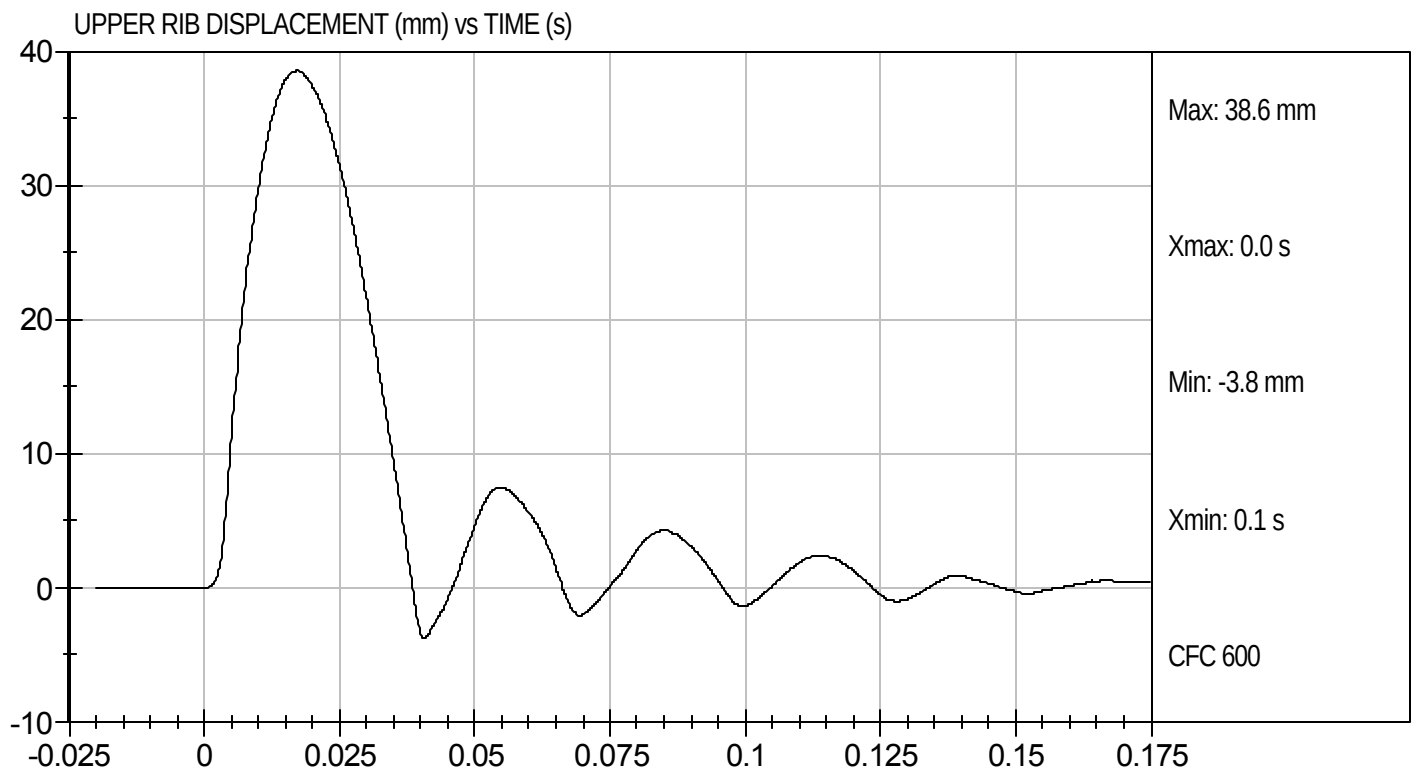
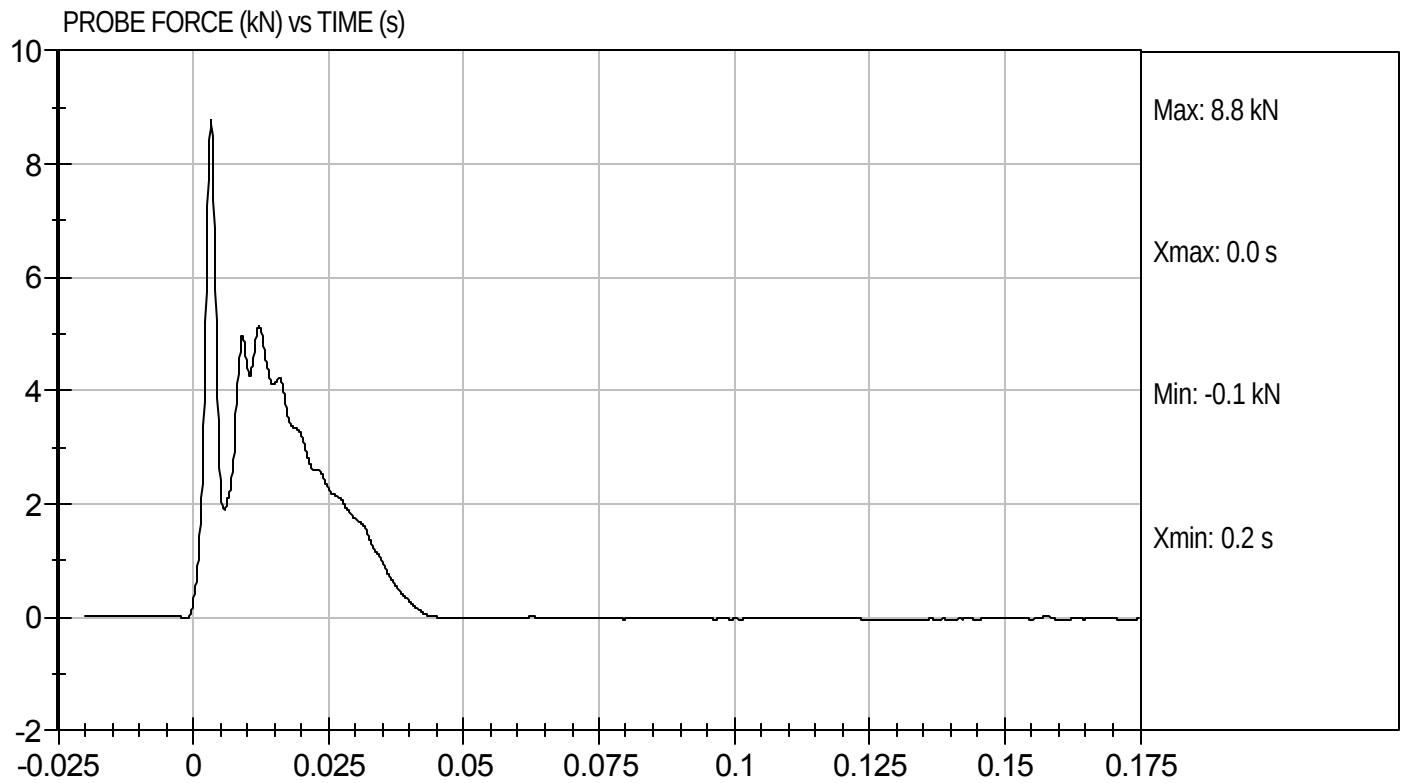
7/30/10
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D102450

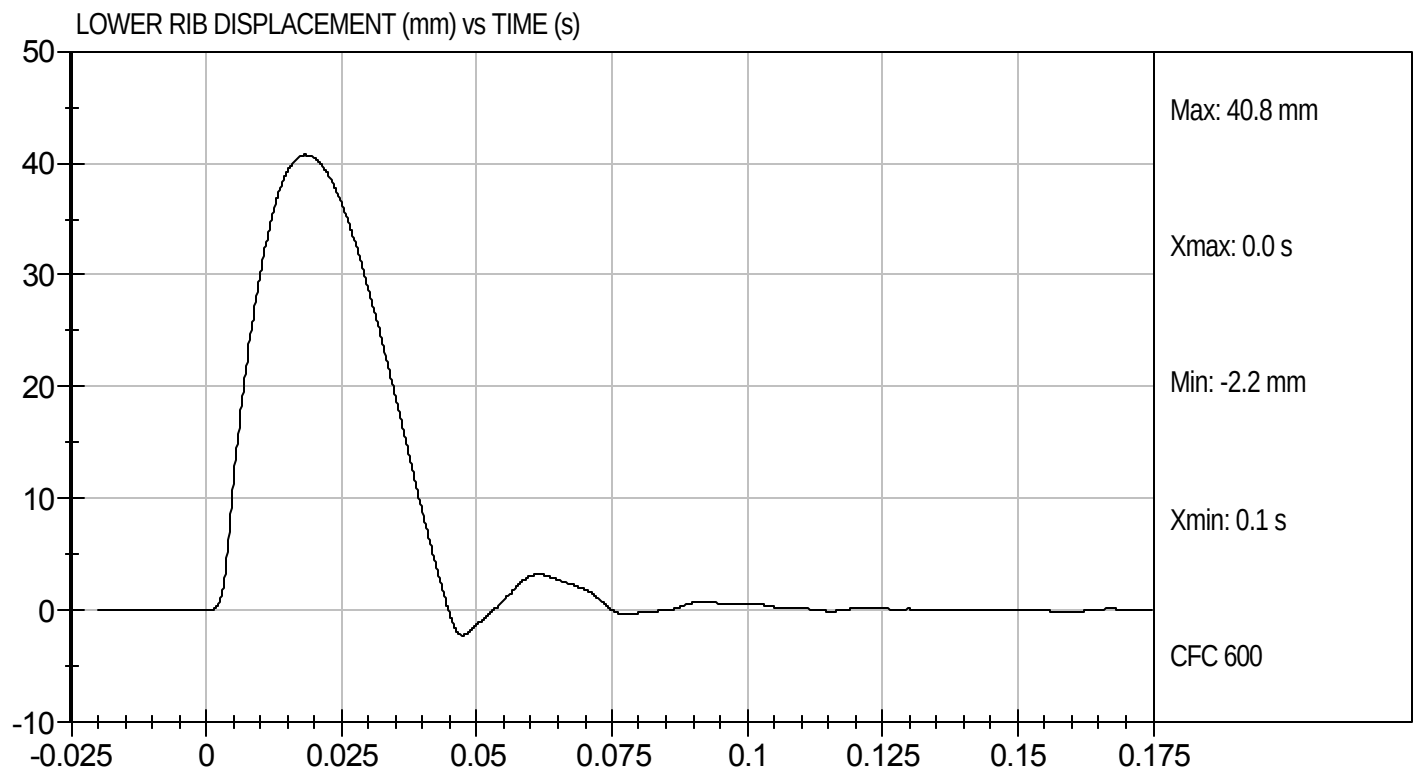
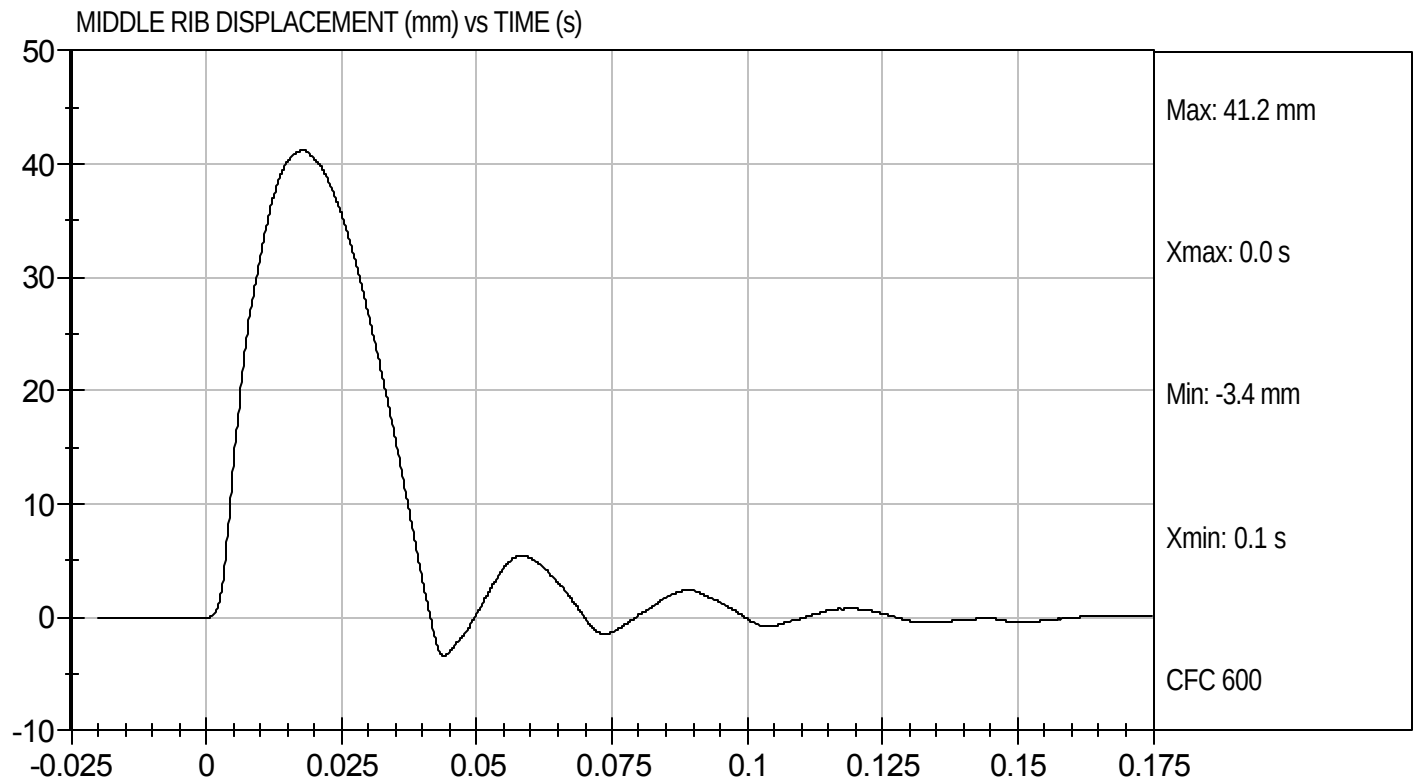
Test Date: 7/30/10
Velocity: 17.9 ft/s, 5.46 m/s





Test Desc: Thorax Impact
Component ID: D102450

Test Date: 7/30/10
Velocity: 17.9 ft/s, 5.46 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

ES-2re DUMMY

ATD Serial No: 032

Test ID: D102931

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	125 to 155	153	Pass
Peak Lateral Acceleration	G's	+/- 15	5.8	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 15% of peak	Yes	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

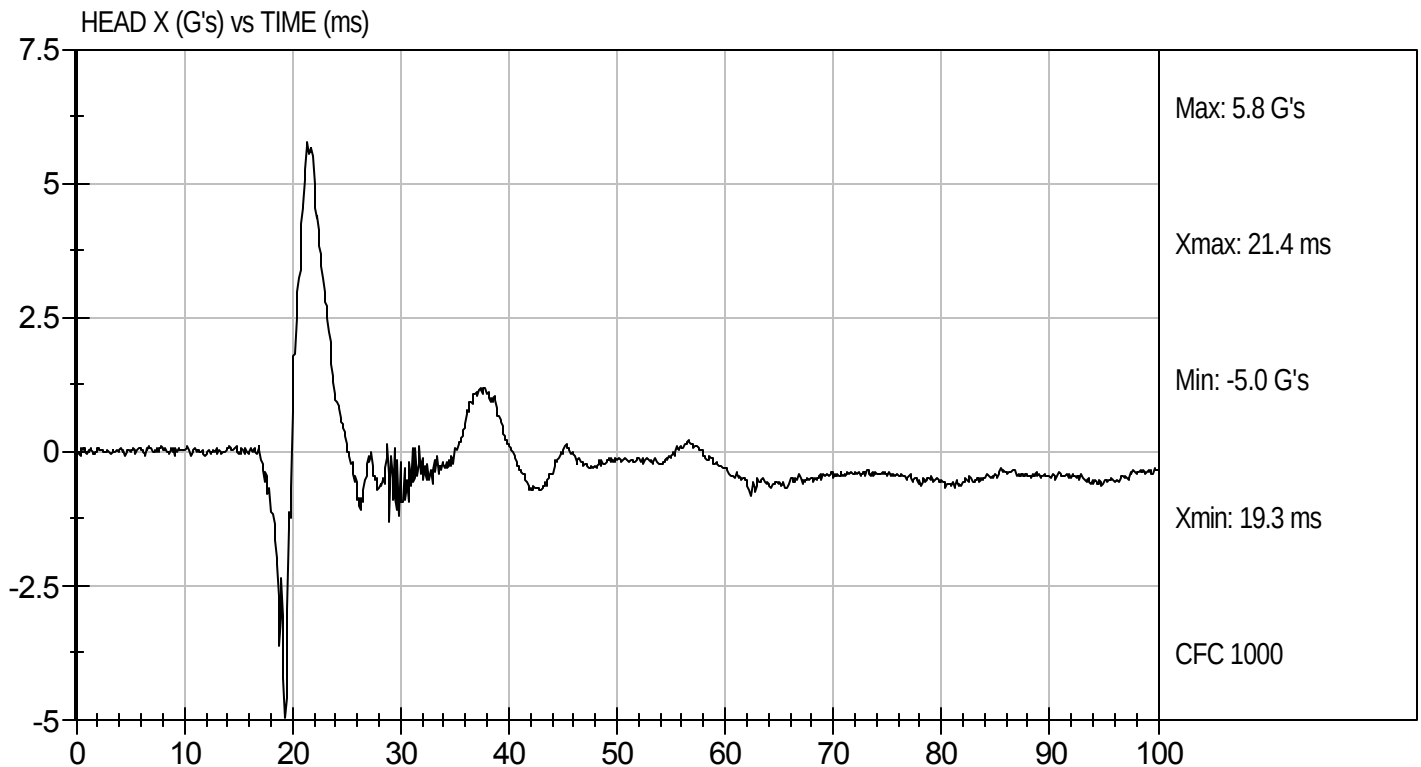
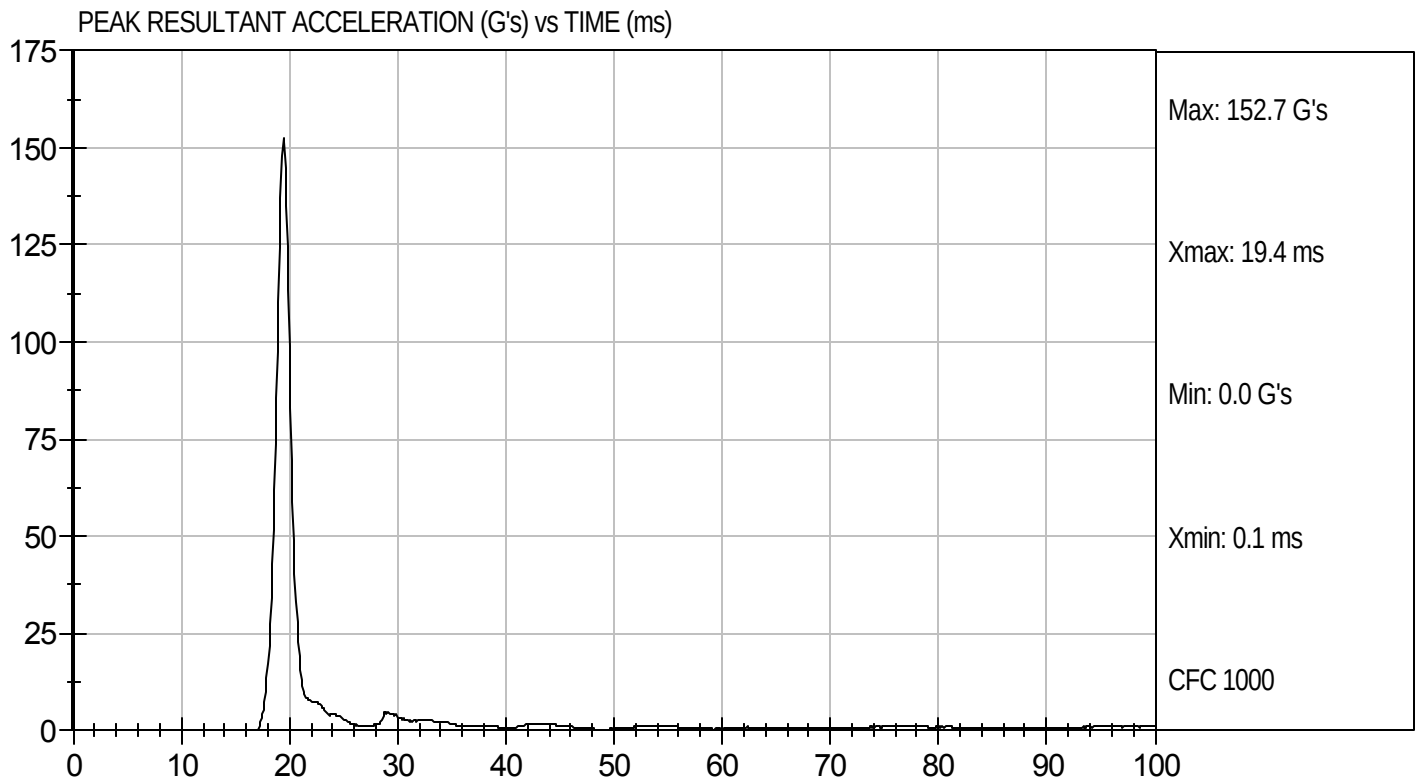
9/9/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D102931

Test Date: 9/9/10
Velocity: 0 ft/s, 0 m/s

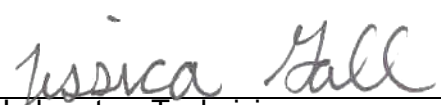


MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102932

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	18.0 to 22.0	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	43	Pass
Pendulum Speed		m/s	3.3 to 3.5	3.5	Pass
Pendulum Deceleration	1 ms	m/s	0.00 to -0.05	-0.02	Pass
	3 ms	m/s	-0.25 to -0.375	-0.32	Pass
	14 ms	m/s	-3.20 to -3.70	-3.38	Pass
Maximum Flexion Angle		deg	49.0 to 59.0	53.9	Pass
Time of Maximum Flexion Angle		ms	54.0 to 66.0	58.7	Pass
Head Rotation Decay Time to 0 degree		ms	53.0 to 88.0	57.7	Pass
Overall Test Results					Pass


 Laboratory Technician

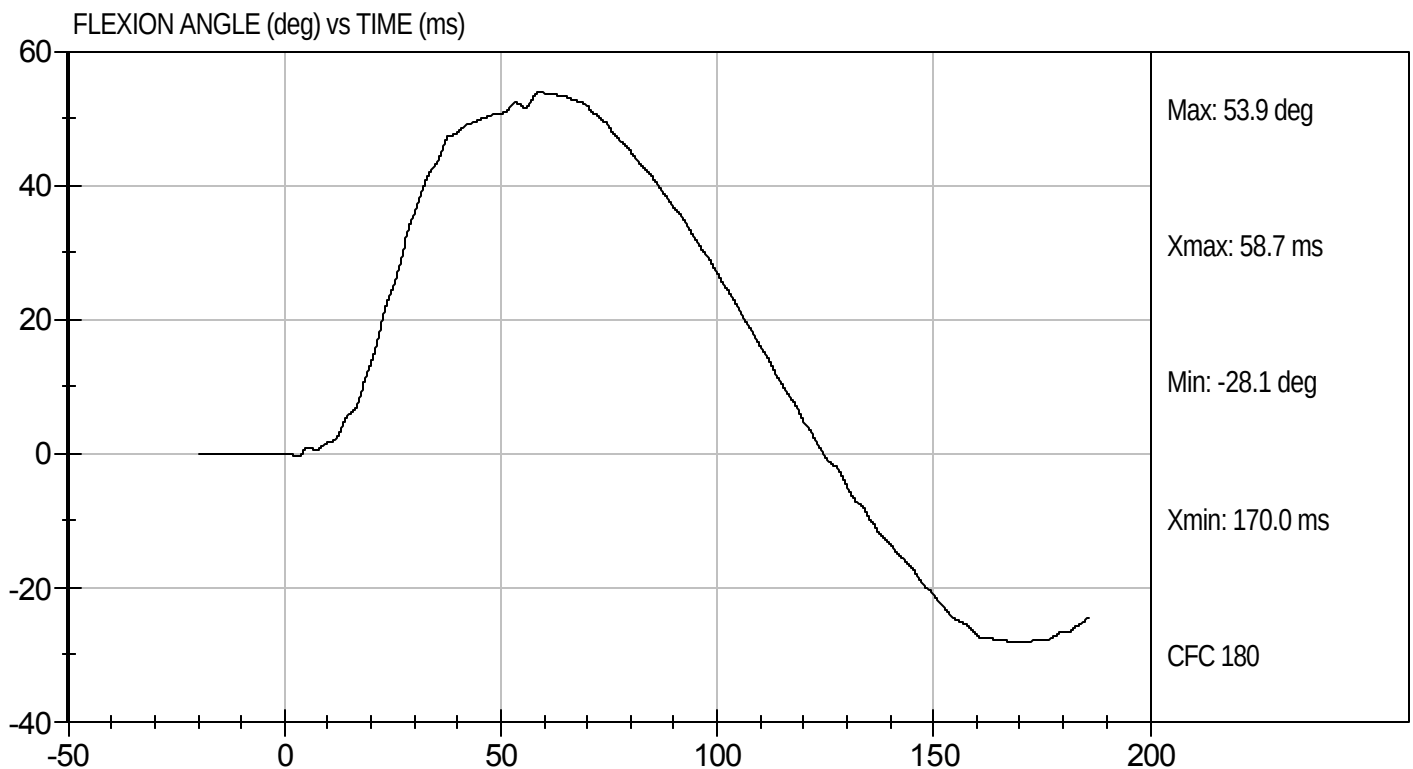
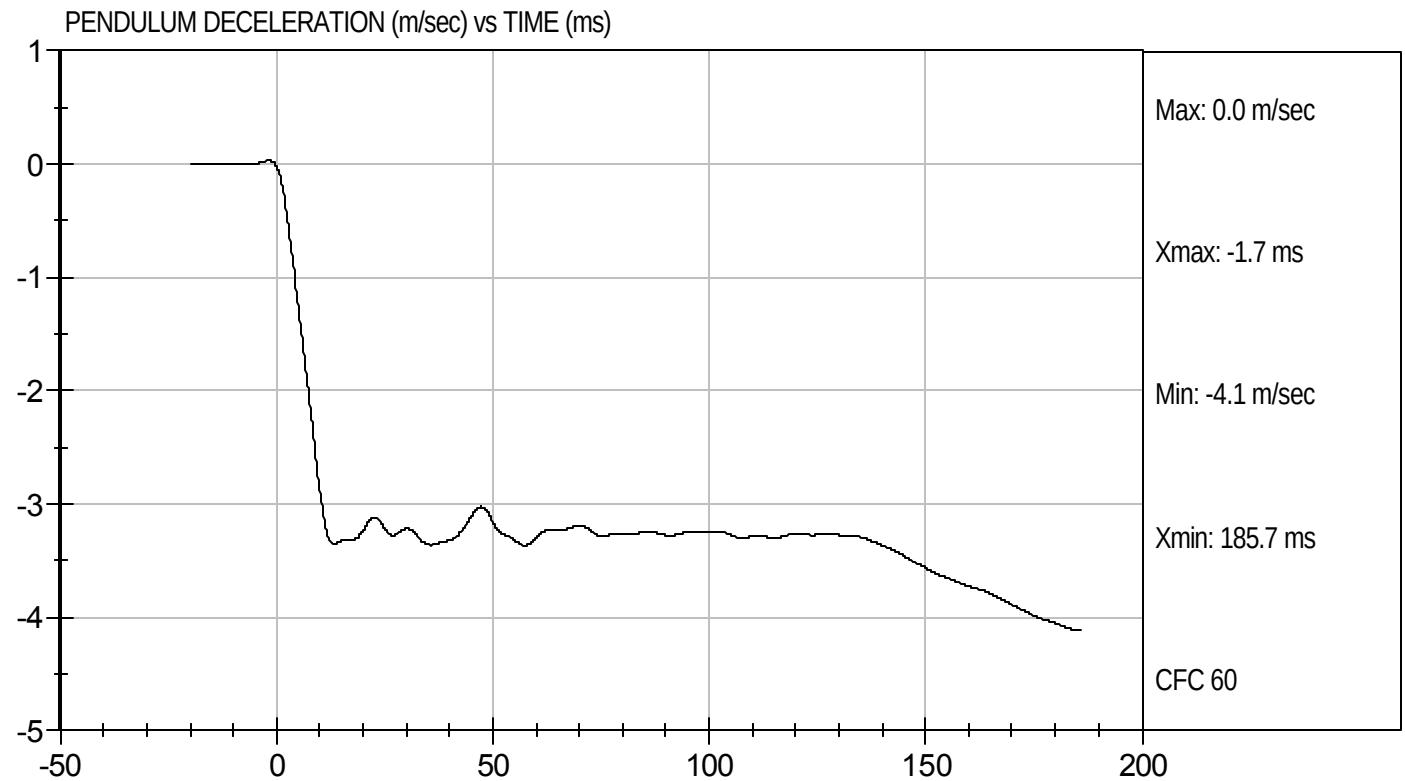
9/9/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D102932

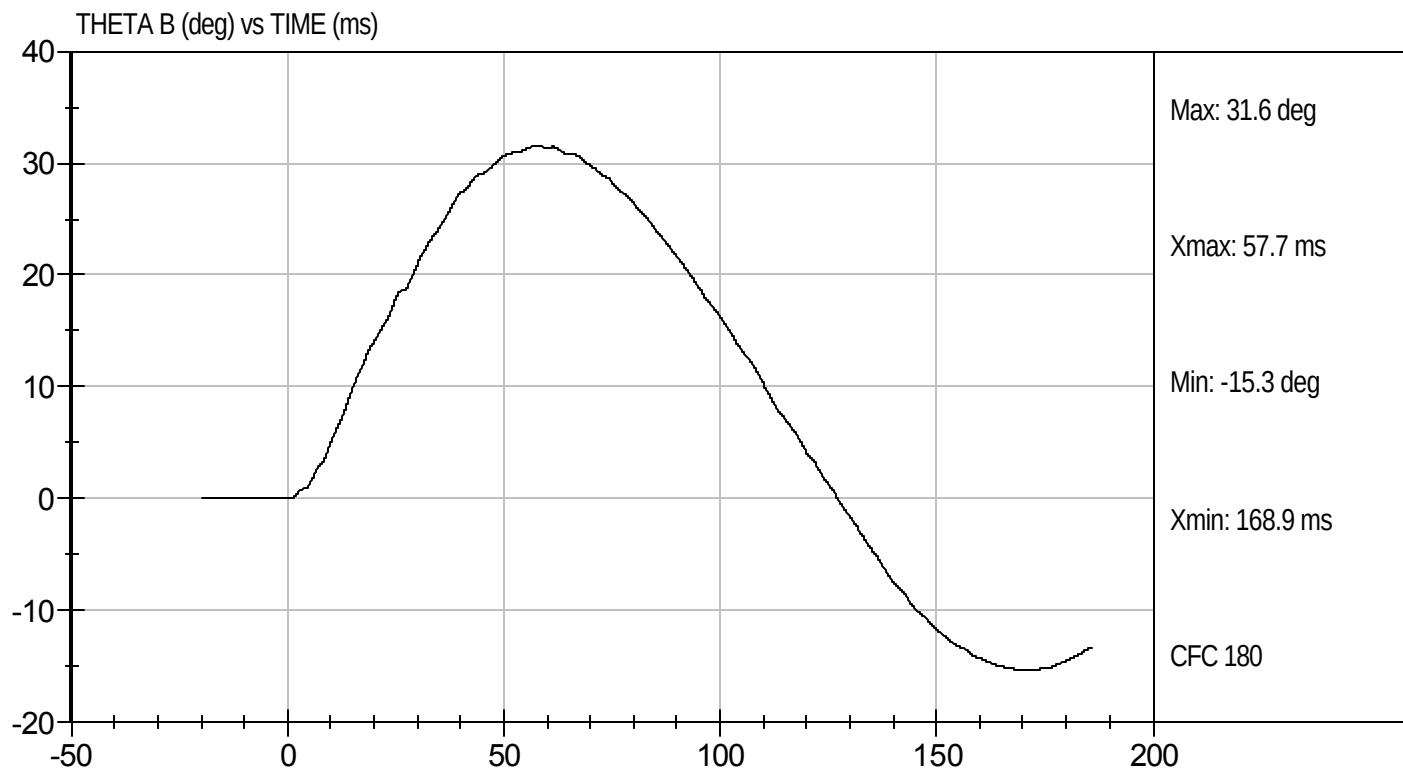
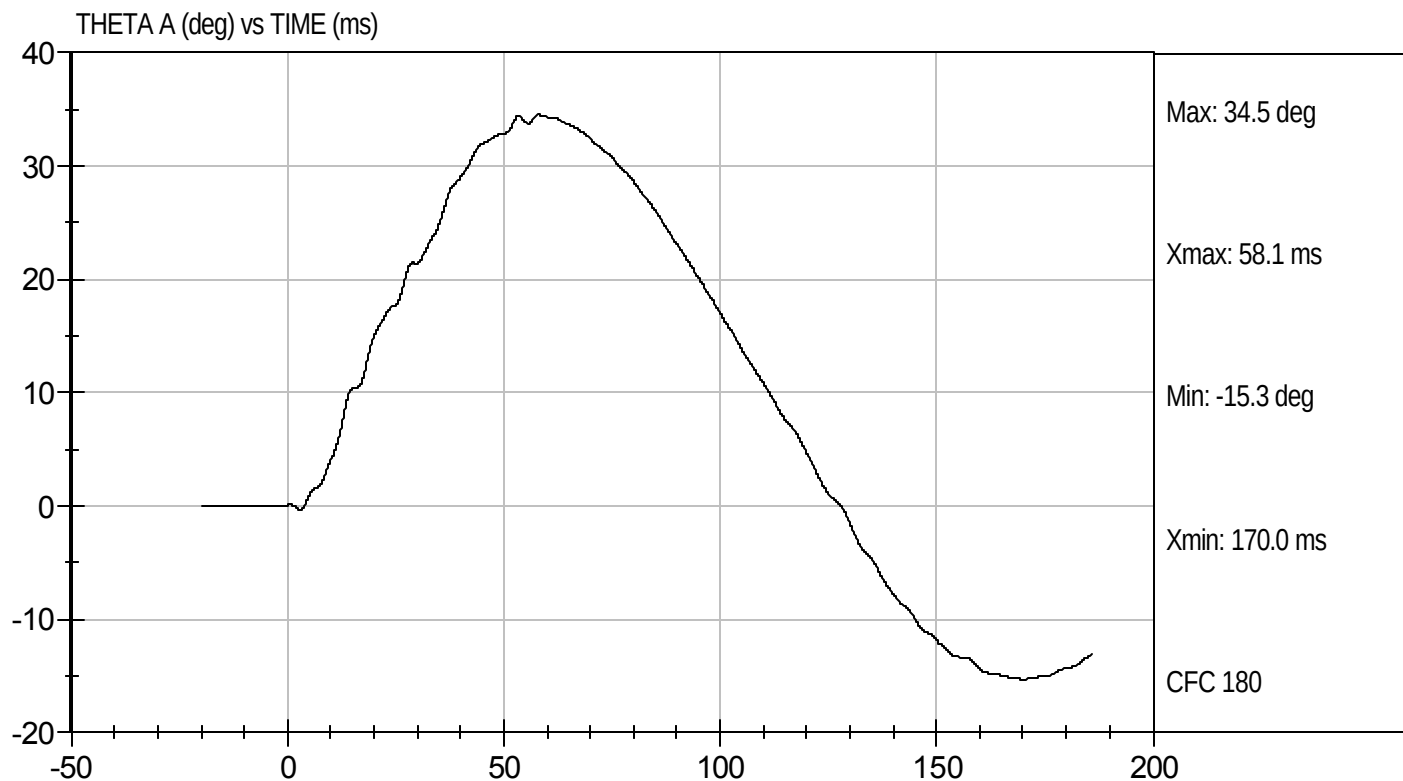
Test Date: 9/9/10
Velocity: 11.41 ft/s, 3.48 m/s





Test Desc: Neck Bending
Component ID: D102932

Test Date: 9/9/10
Velocity: 11.41 ft/s, 3.48 m/s



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102933

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Pendulum Speed	m/s	4.2 to 4.4	4.3	Pass
Peak Shoulder Acceleration	G's	7.5 to 10.5	9.7	Pass
Time of Peak Shoulder Acceleration	ms	NA	13.3	Pass
Overall Test Results			Pass	


Laboratory Technician

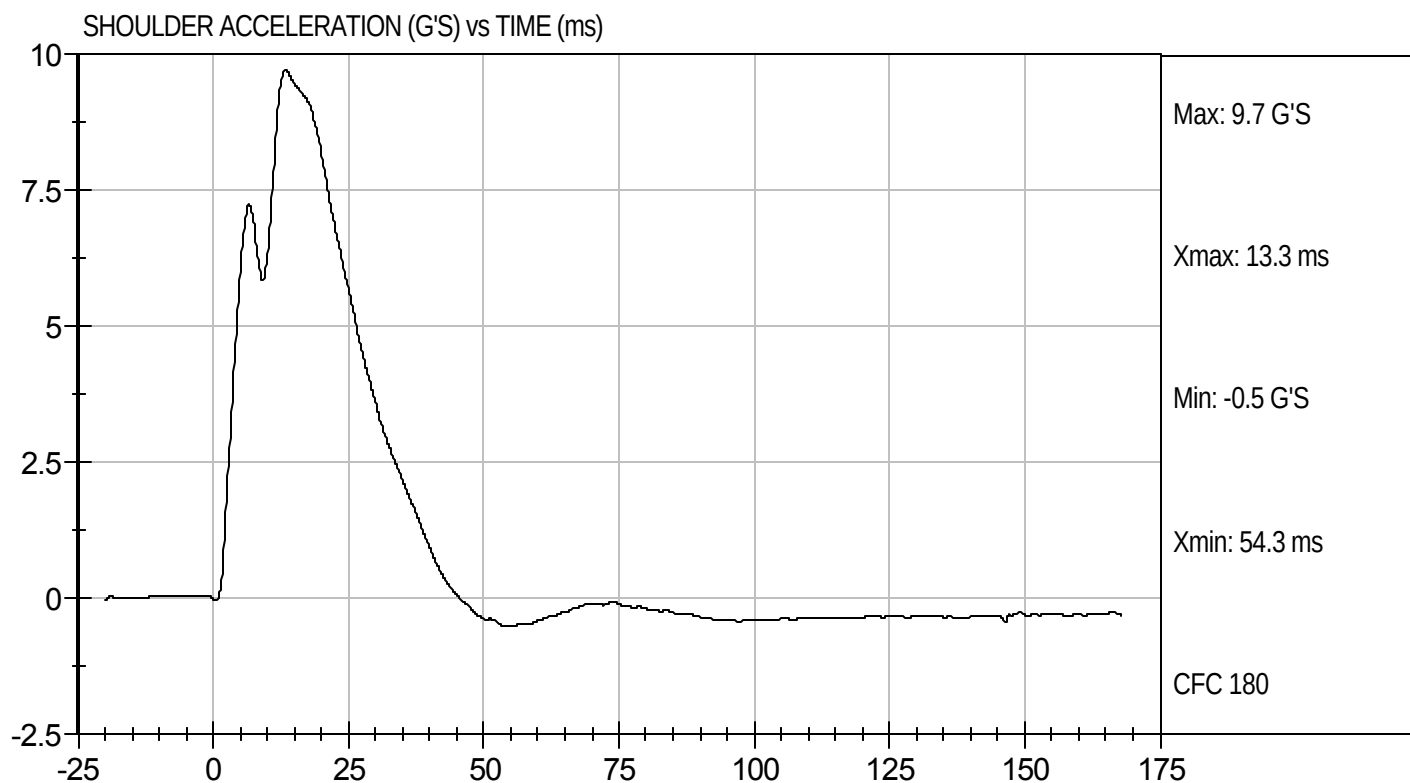
9/8/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D102933

Test Date: 9/8/10
Velocity: 14.00 ft/s, 4.3 m/s



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102934

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.1	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.0	Pass
			Overall Test Results	Pass


Laboratory Technician

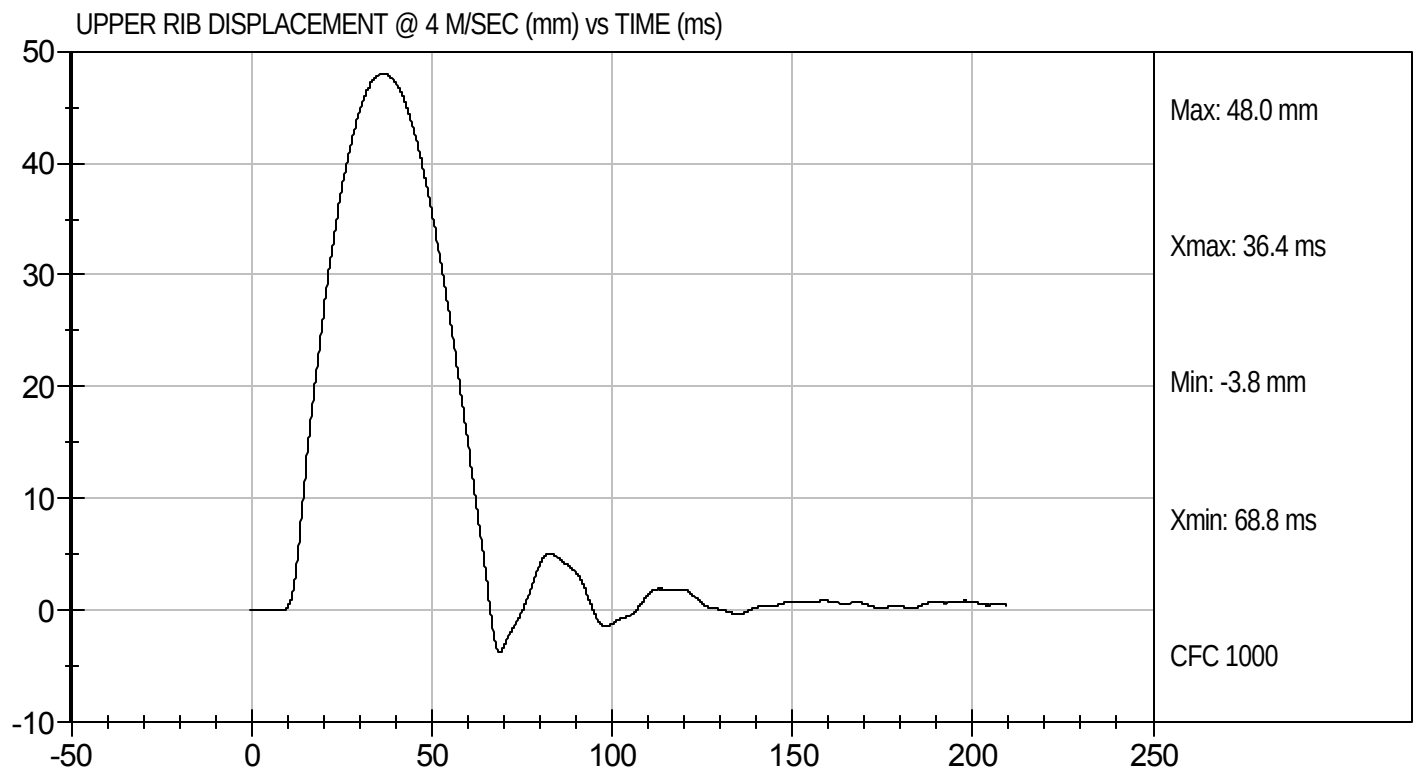
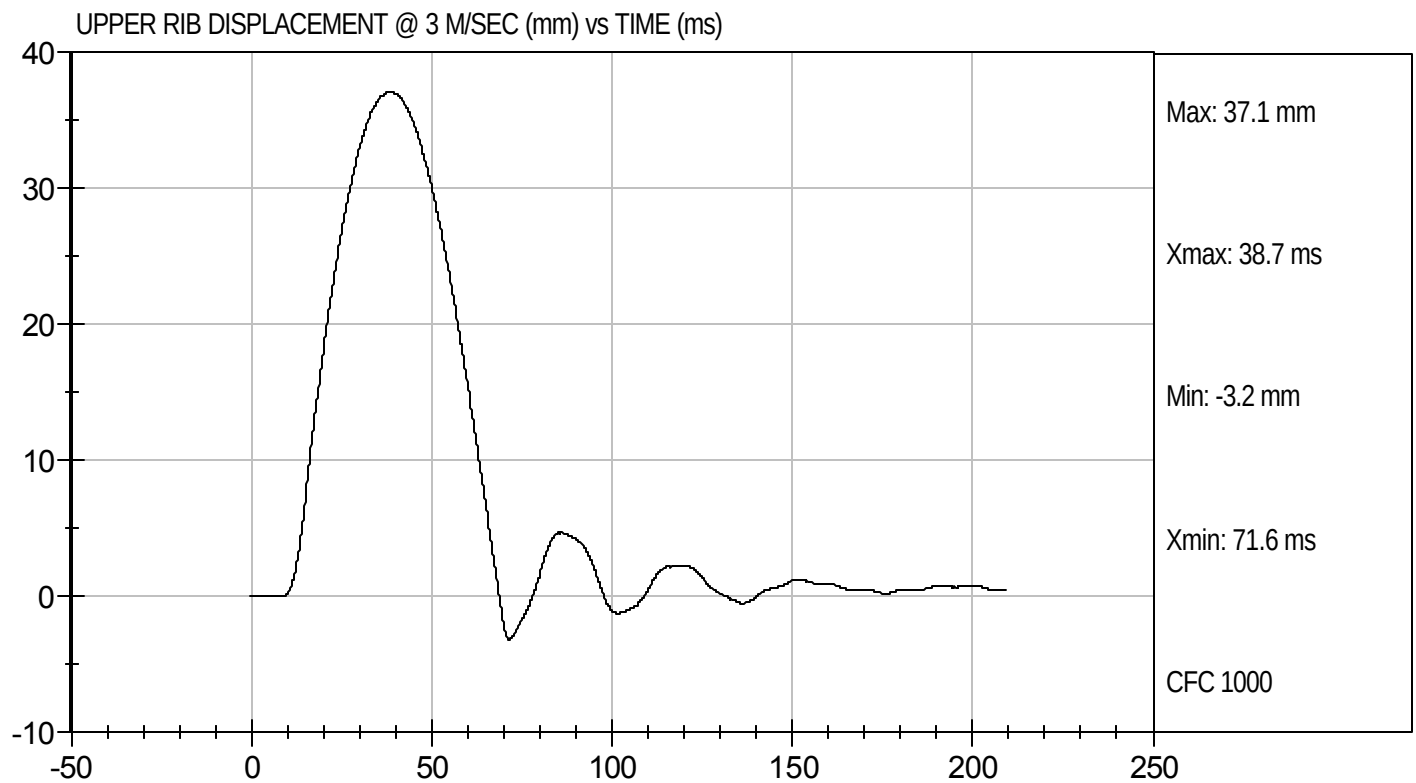
9/9/10
Test Date


Approved By



Test Desc: Rib Impact - Upper
Component ID: D102934

Test Date: 9/9/10



MGA RESEARCH CORPORATION

MID RIB TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102935

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	37.8	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	47.9	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

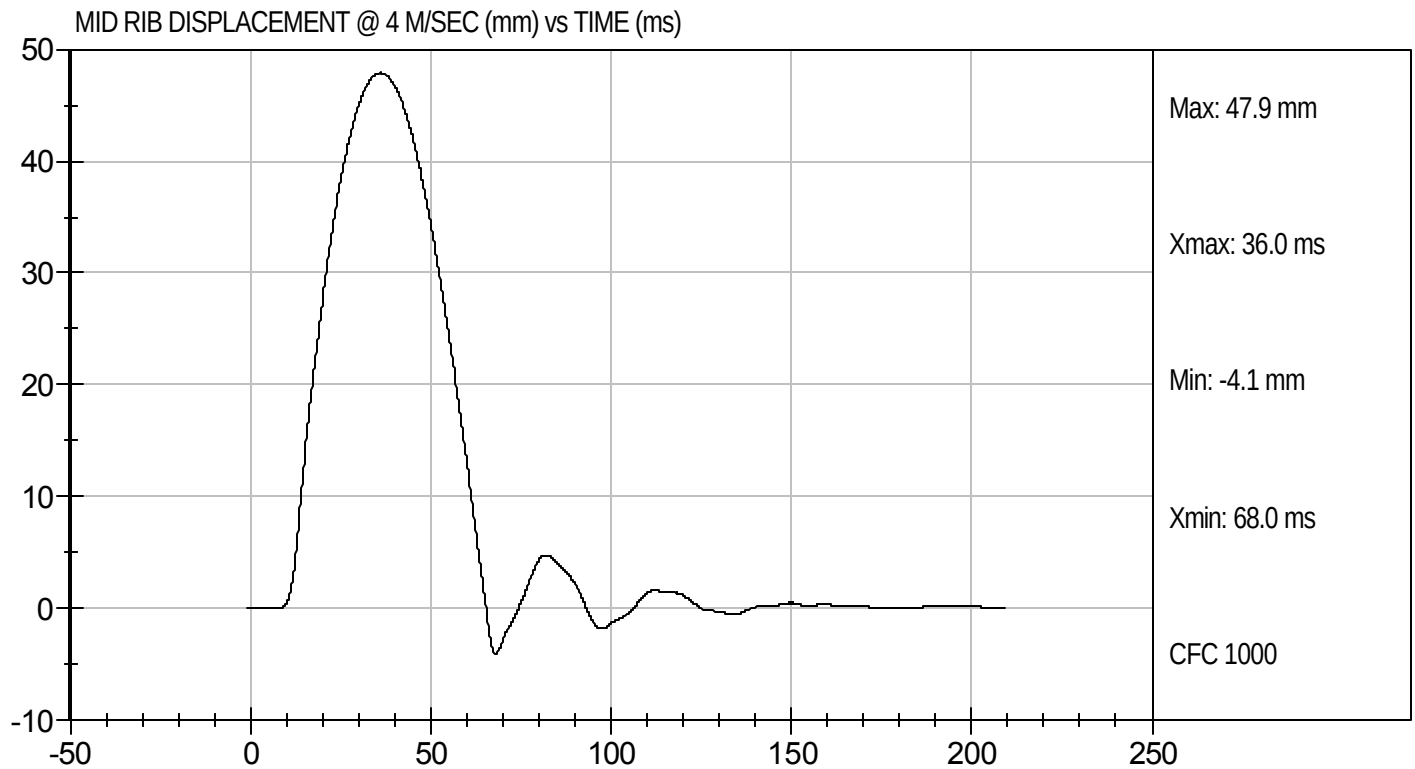
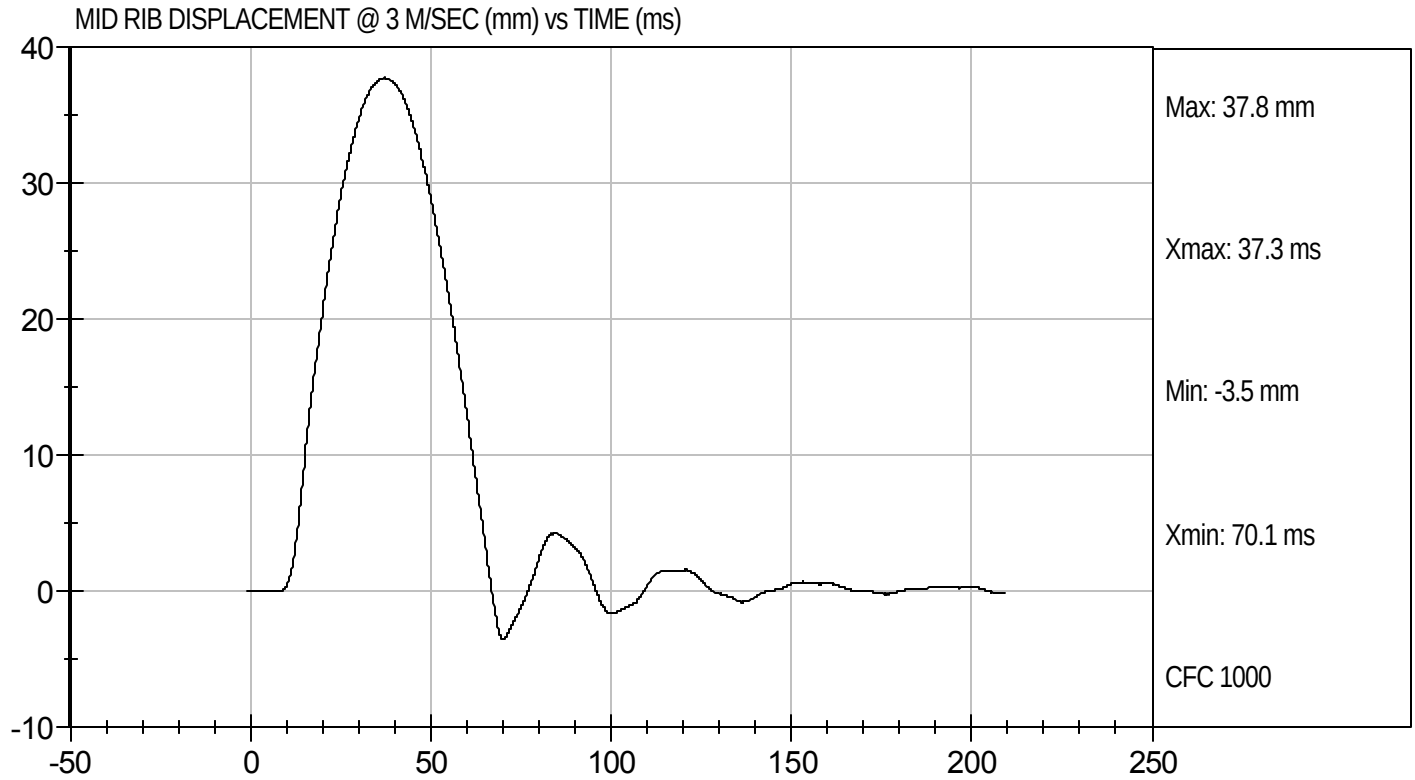
9/9/10
Test Date

David Winkelbauer
Approved By



Test Desc: Rib Impact - Mid
Component ID: D102935

Test Date: 9/9/10



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

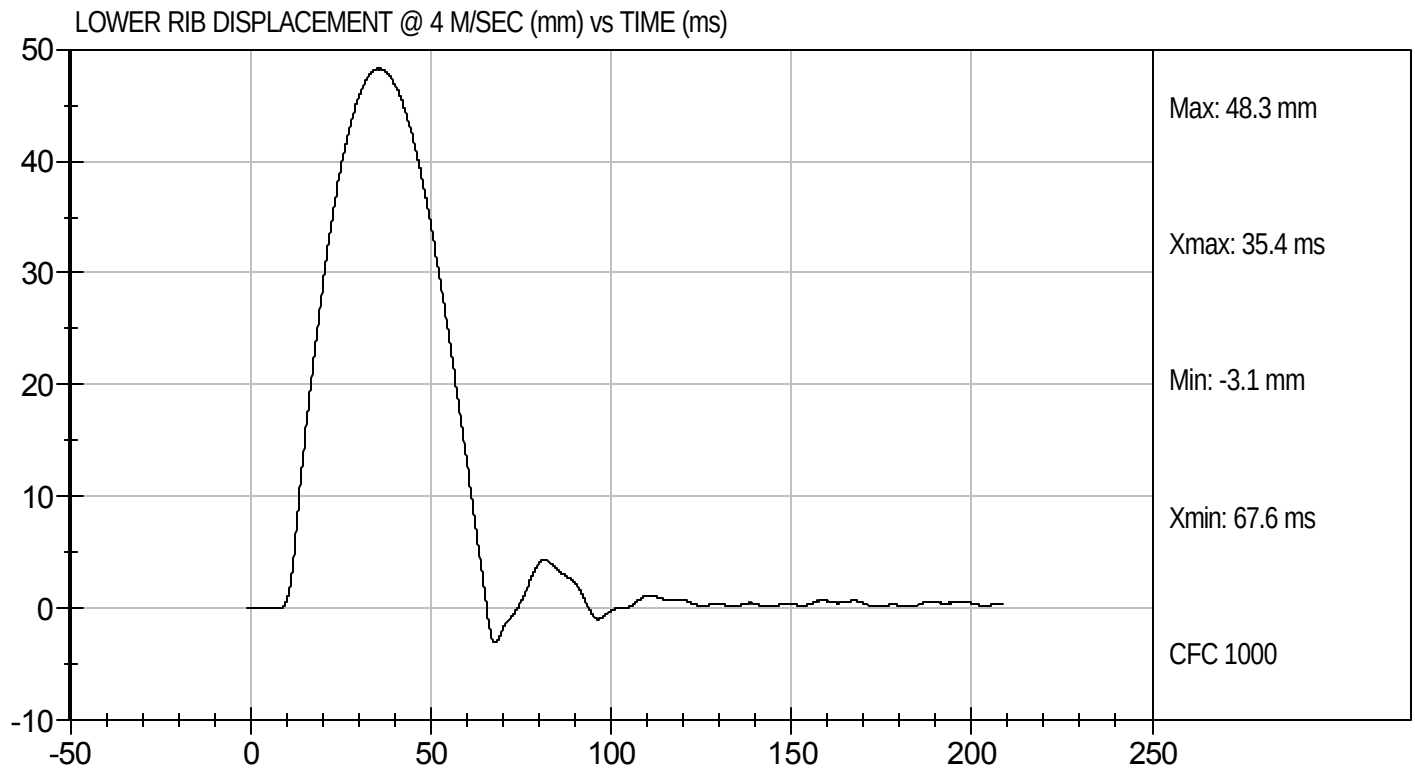
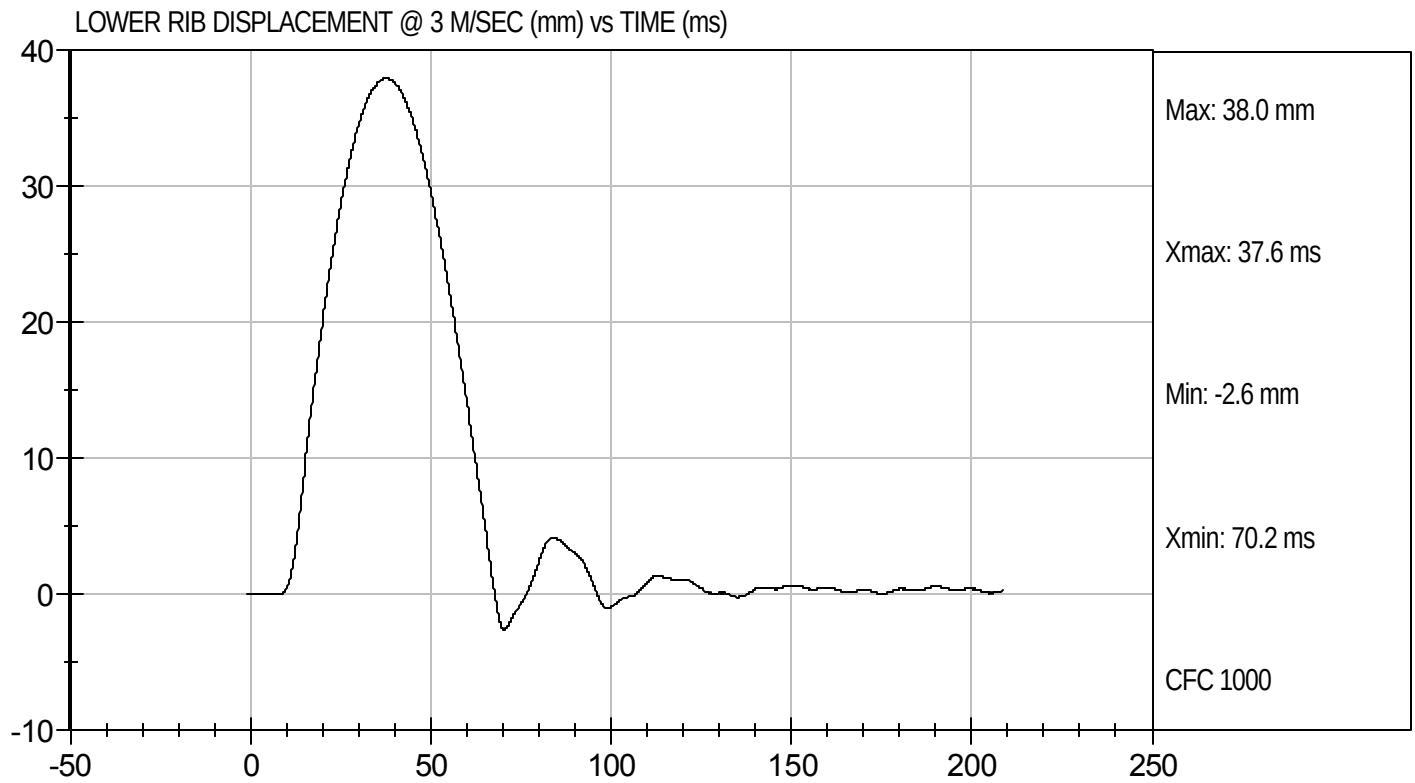
Test I.D: D102936

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	46	Pass
Displacement at 3 m/s	mm	36.0 to 40.0	38.0	Pass
Displacement at 4 m/s	mm	46.0 to 51.0	48.3	Pass
			Overall Test Results	Pass


Laboratory Technician

9/9/10
Test Date


Approved By



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102937

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Speed	m/s	3.90 to 4.10	4.10	Pass
Maximum Impact Force	kN	4.00 to 4.80	4.31	Pass
Time of Maximum Impact Force	ms	10.60 to 13.00	11.60	Pass
Maximum Total Abdomen Force	kN	2.20 to 2.70	2.44	Pass
Time of Maximum Abdomen Force	ms	10.00 to 12.30	11.20	Pass
Overall Test Results				Pass


Laboratory Technician

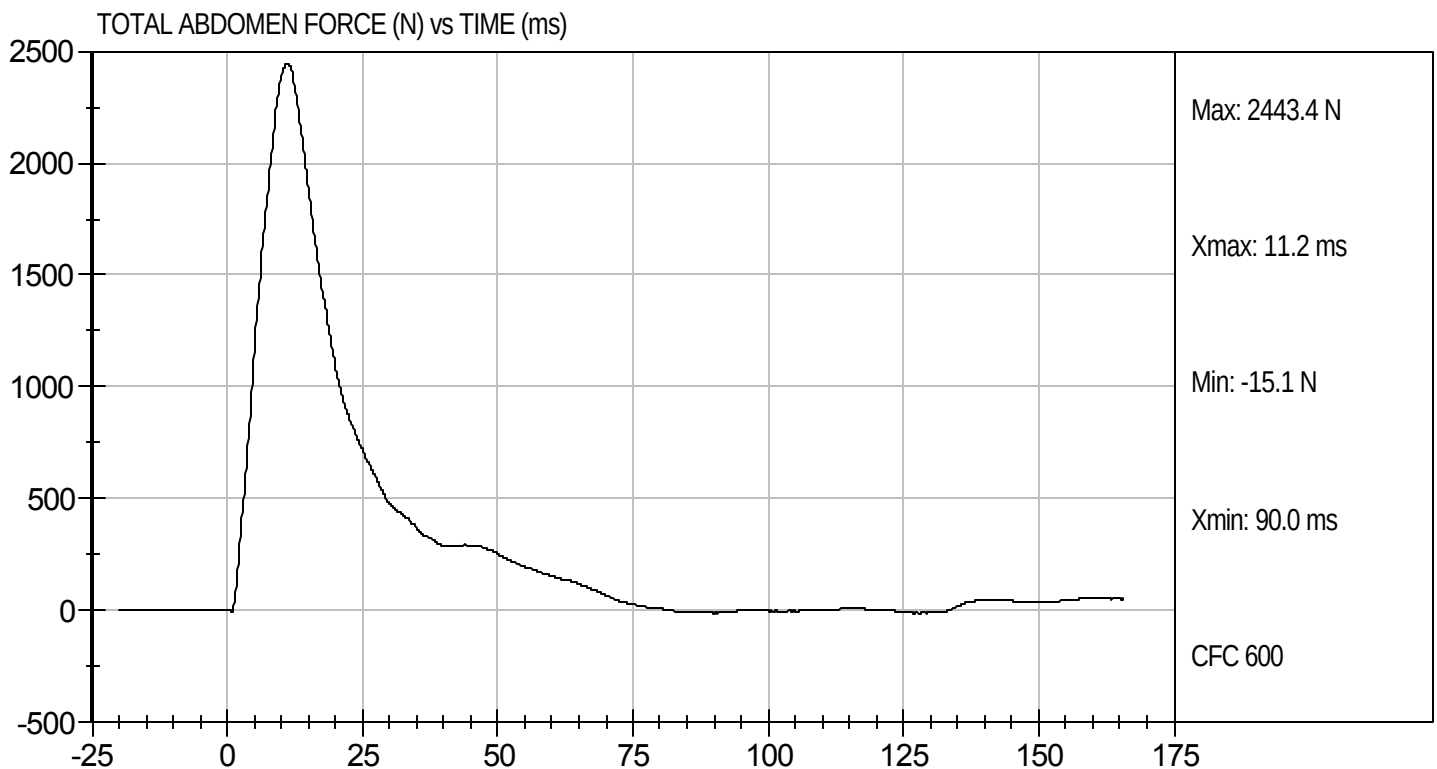
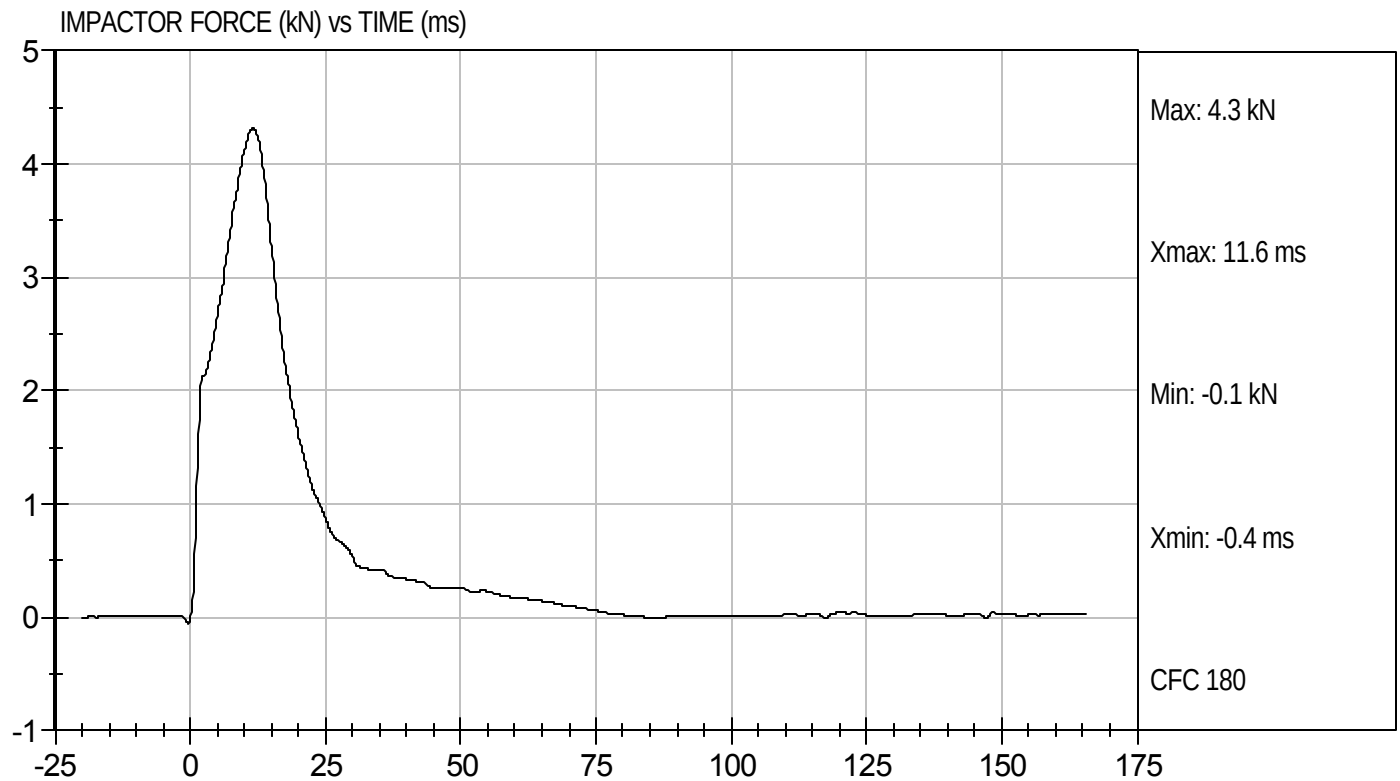
9/8/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D102937

Test Date: 9/8/10
Velocity: 13.44 ft/s, 4.1 m/s

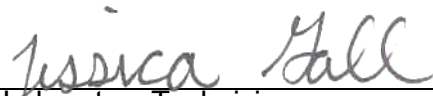


MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102938

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	44	Pass
Pendulum Speed		m/s	5.95 to 6.15	6.05	Pass
Pendulum Deceleration	1 ms	m/s	-0.05 to 0.00	-0.02	Pass
	3.7 ms	m/s	-0.425 to -0.24	-0.42	Pass
	27 ms	m/s	-6.50 to -5.80	-5.97	Pass
	30 ms	m/s	>= -6.5	-5.91	Pass
Maximum Flexion Angle		deg	45.0 to 55.0	47.6	Pass
Time of Maximum Flexion Angle		ms	39.0 to 53.0	39.8	Pass
Headform Rotation Decay to Initial Position		ms	37 to 57	40	Pass
Overall Results					Pass


 Laboratory Technician

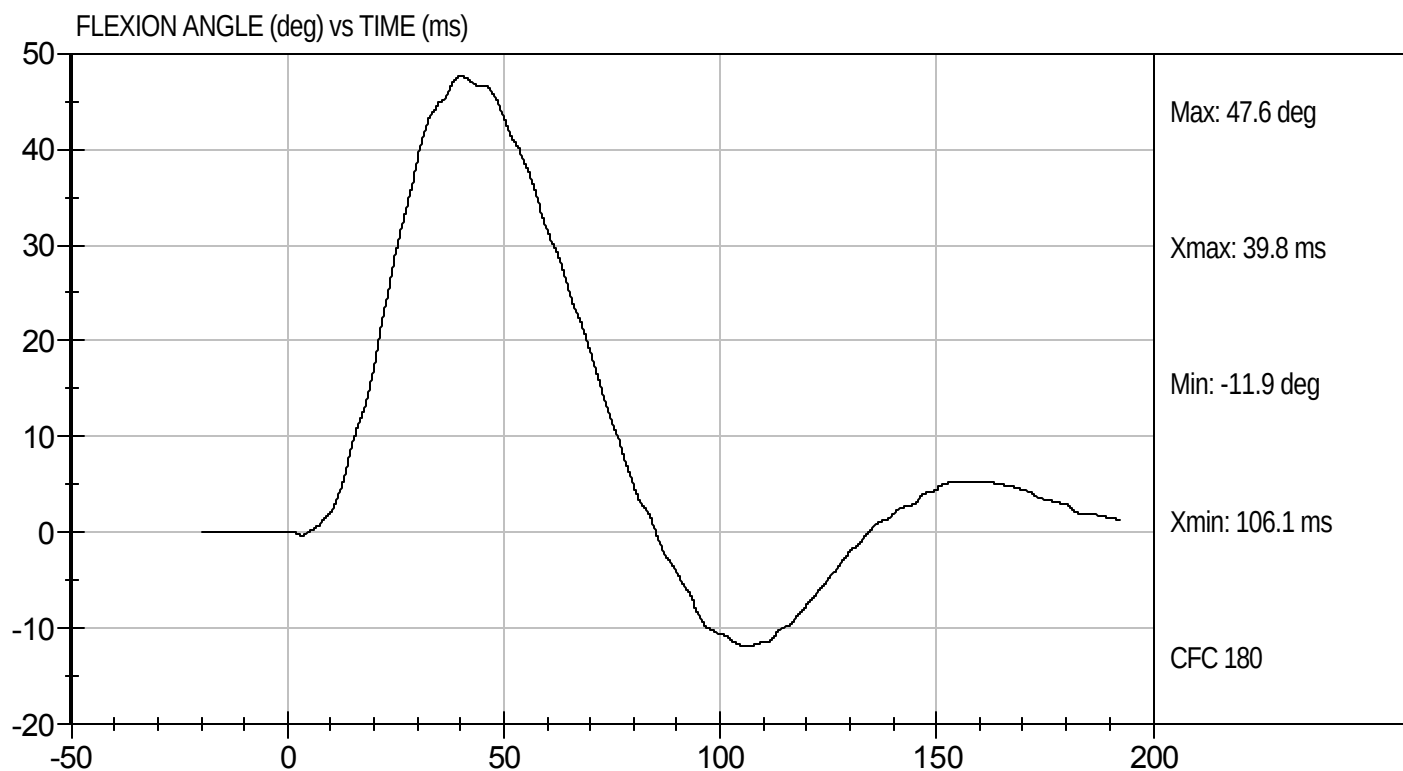
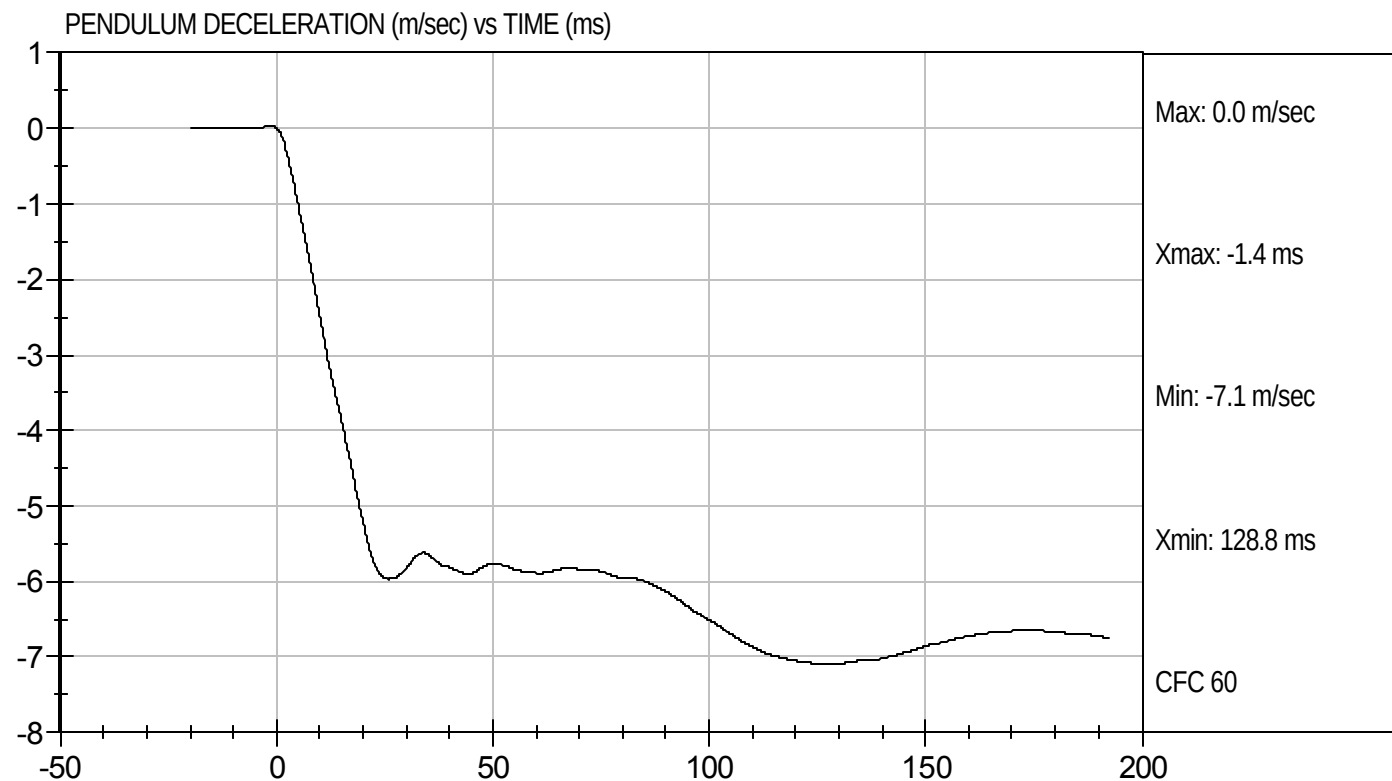
9/9/10
 Test Date


 Approved By



Test Desc: Lumbar Bending
Component ID: D102938

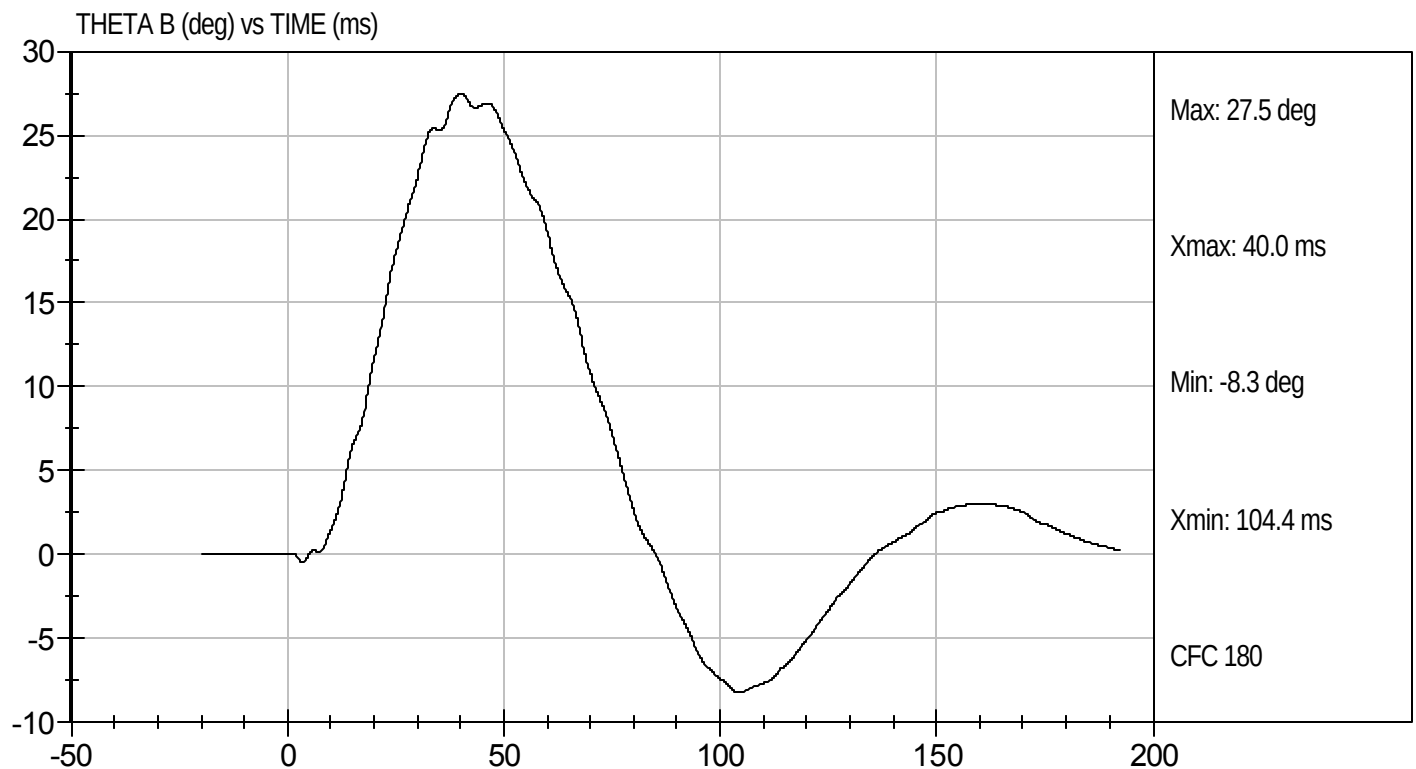
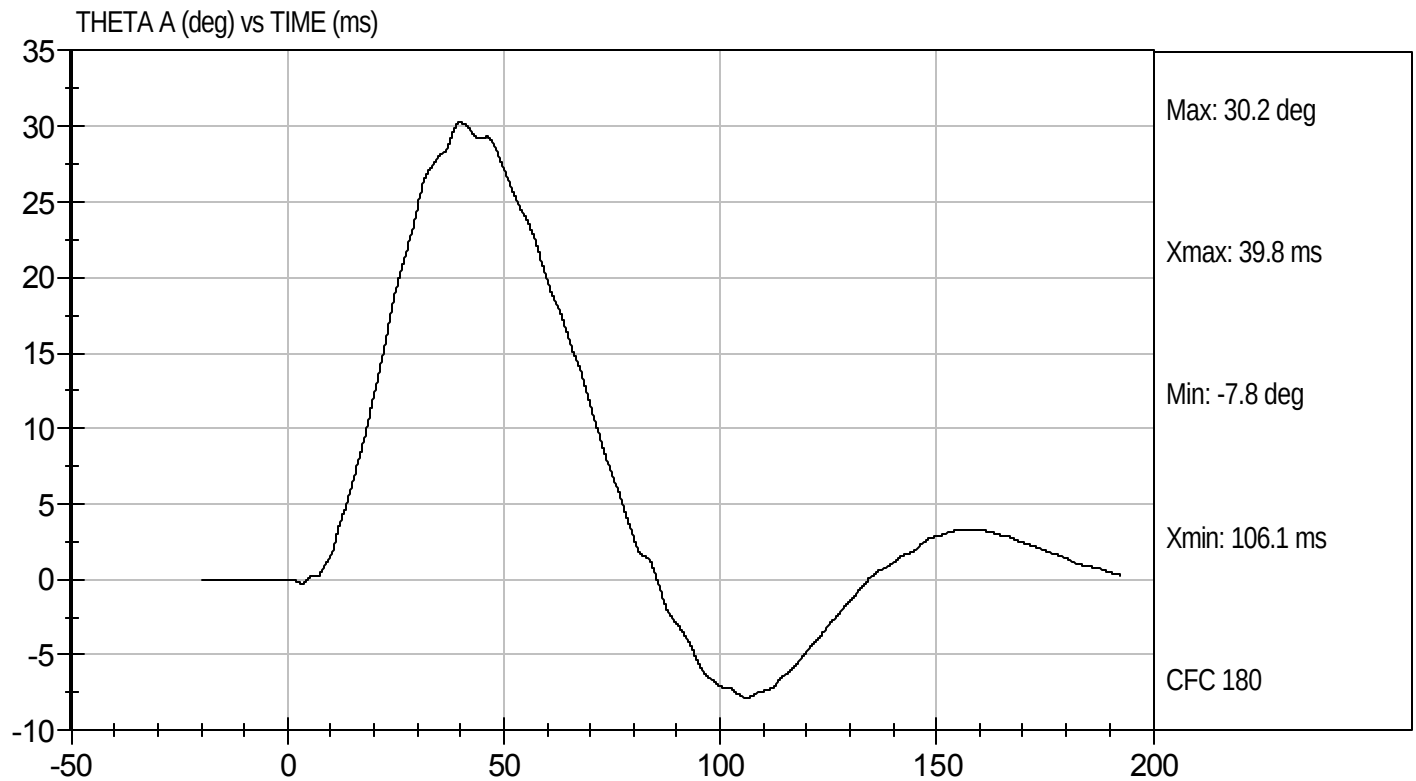
Test Date: 9/9/10
Velocity: 19.84 ft/s, 6.05 m/s





Test Desc: Lumbar Bending
Component ID: D102938

Test Date: 9/9/10
Velocity: 19.84 ft/s, 6.05 m/s



MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D102939

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Probe Speed	m/s	4.20 to 4.40	4.38	Pass
Maximum Impactor Force	kN	4.70 to 5.40	4.88	Pass
Time of Maximum Impactor Force	ms	11.80 to 16.10	13.70	Pass
Maximum Pubic Force	kN	1.23 to 1.59	1.41	Pass
Time of Maximum Pubic Force	ms	12.20 to 17.00	14.00	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

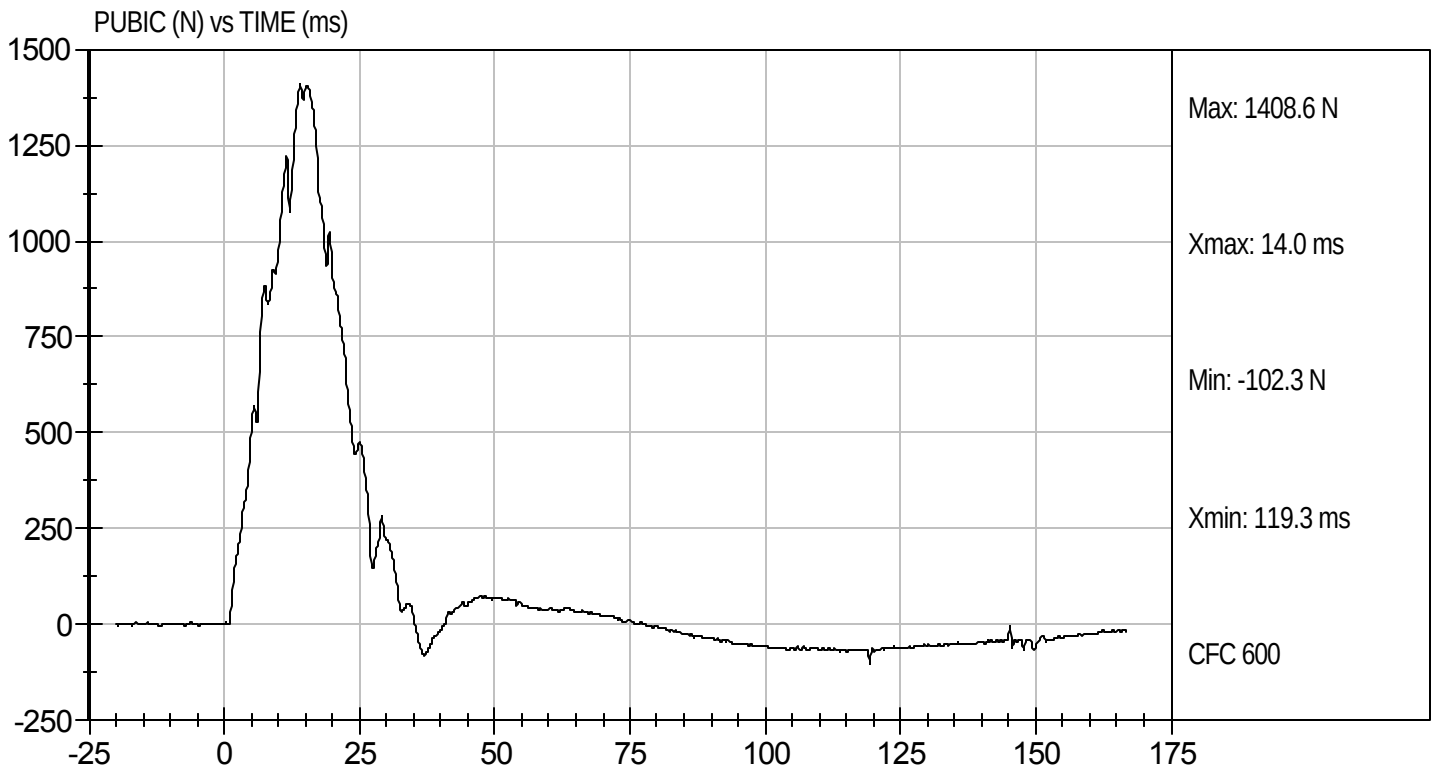
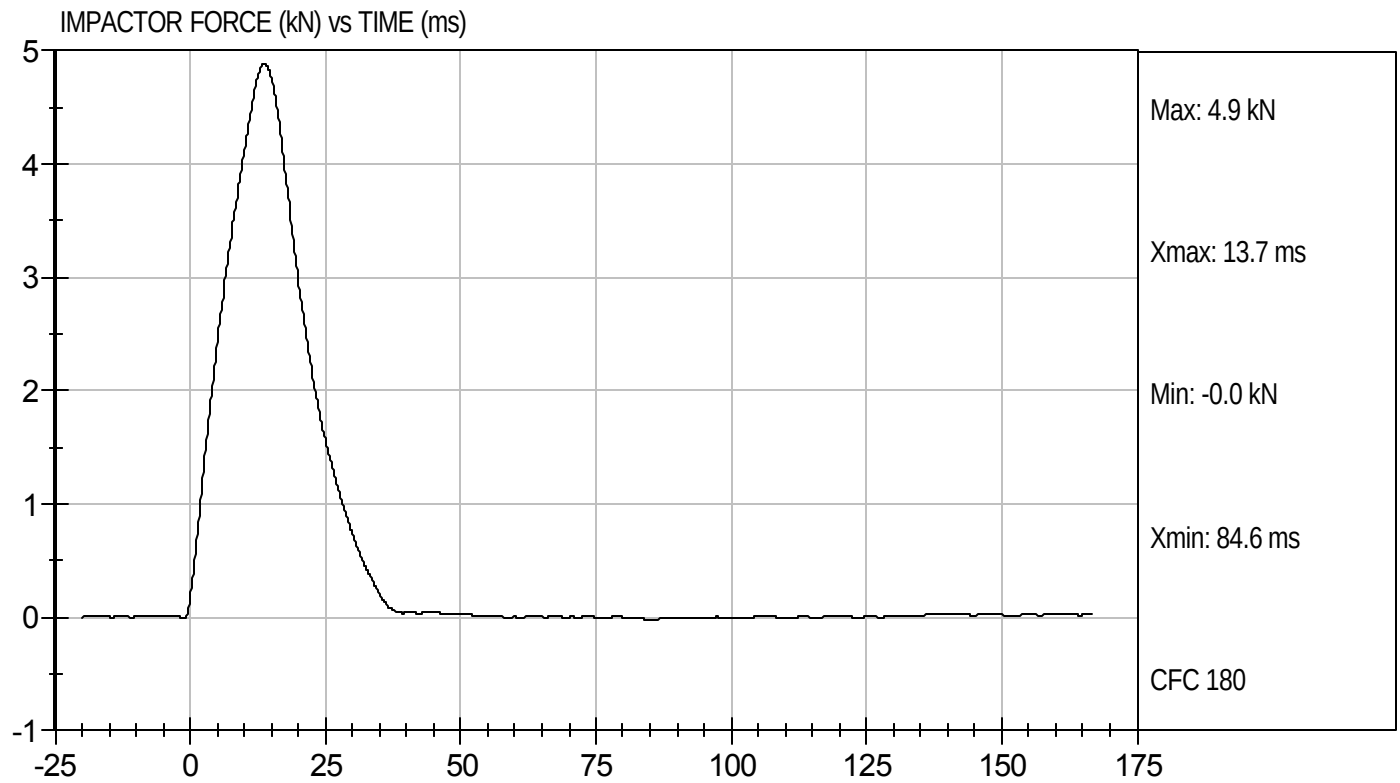
9/8/10
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D102939

Test Date: 9/8/10
Velocity: 14.36 ft/s, 4.38 m/s



MGA RESEARCH CORPORATION
FULL BODY THORAX IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D102930

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	45	Pass
Probe Speed	m/s	5.40 to 5.60	5.52	Pass
Maximum Impactor Force (after 6 ms)	kN	5.10 to 6.20	5.23	Pass
Upper Rib Displacement	mm	34.0 to 41.0	37.0	Pass
Middle Rib Displacement	mm	37.0 to 45.0	39.3	Pass
Lower Rib Displacement	mm	37.0 to 44.0	39.0	Pass
Overall Test Results			Pass	


Laboratory Technician

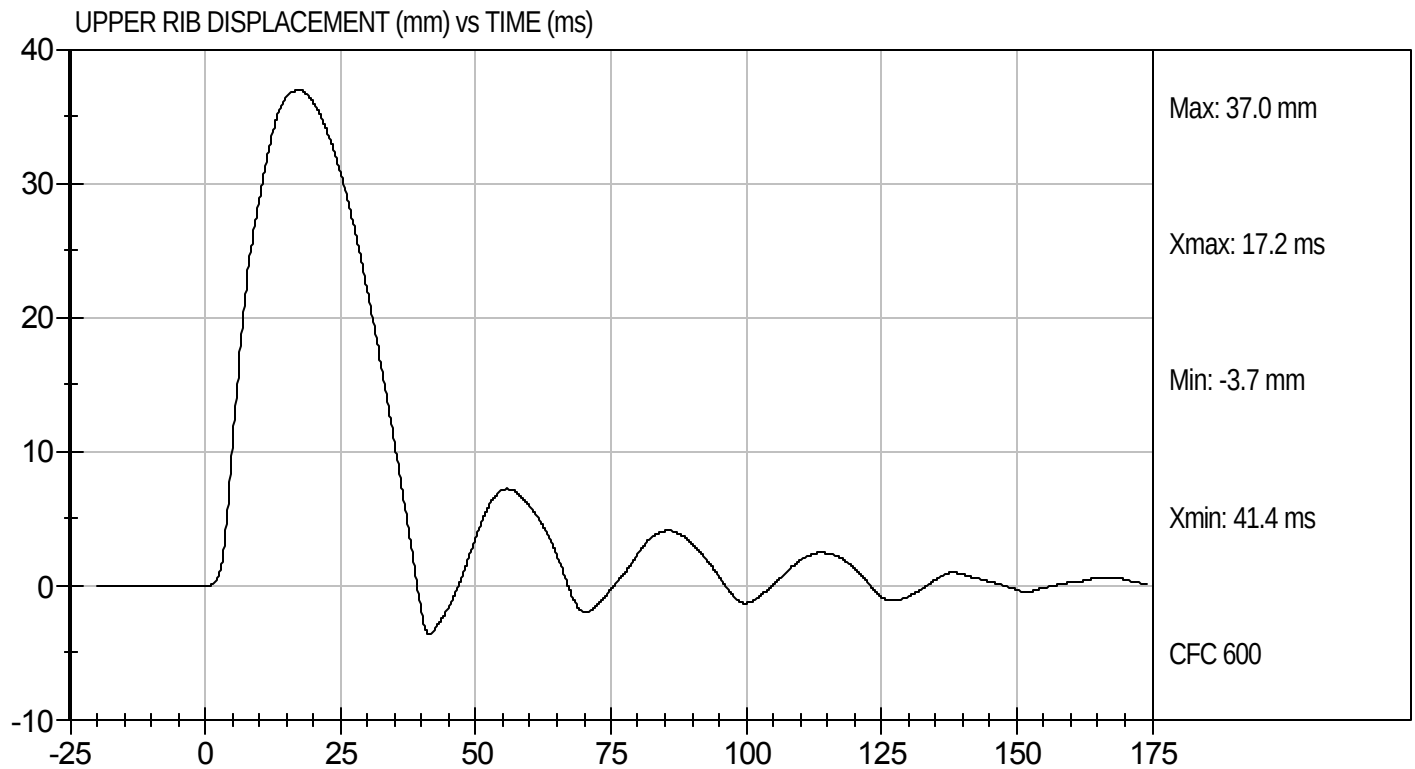
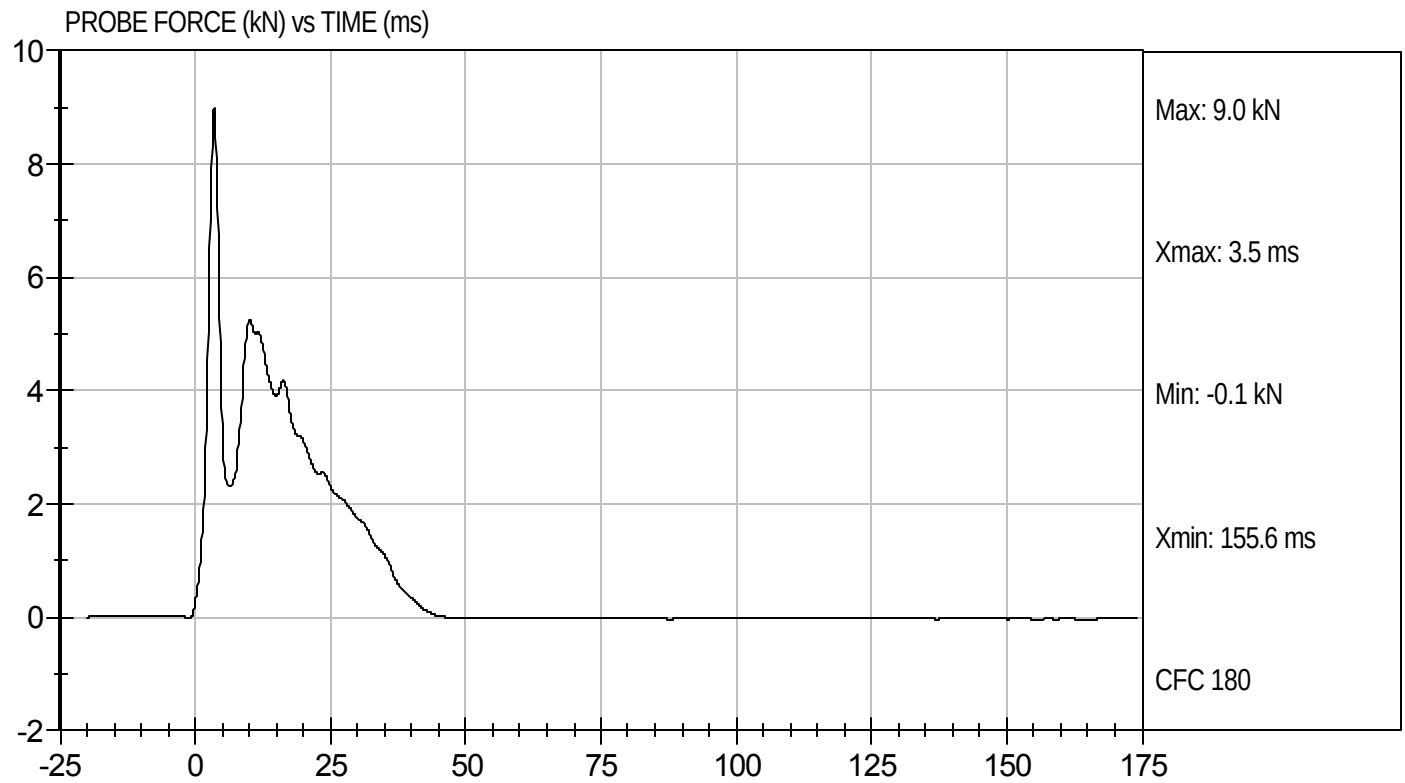
9/8/10
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D102930

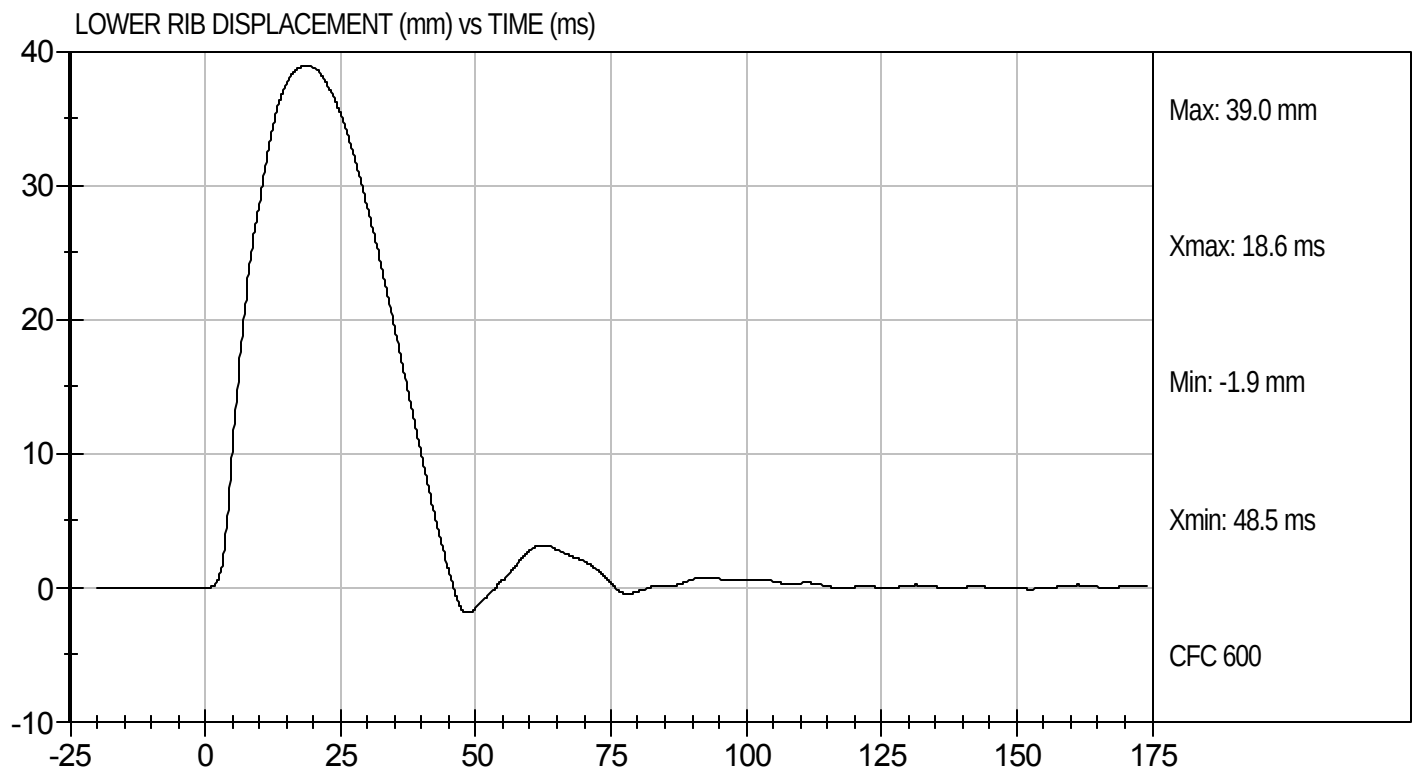
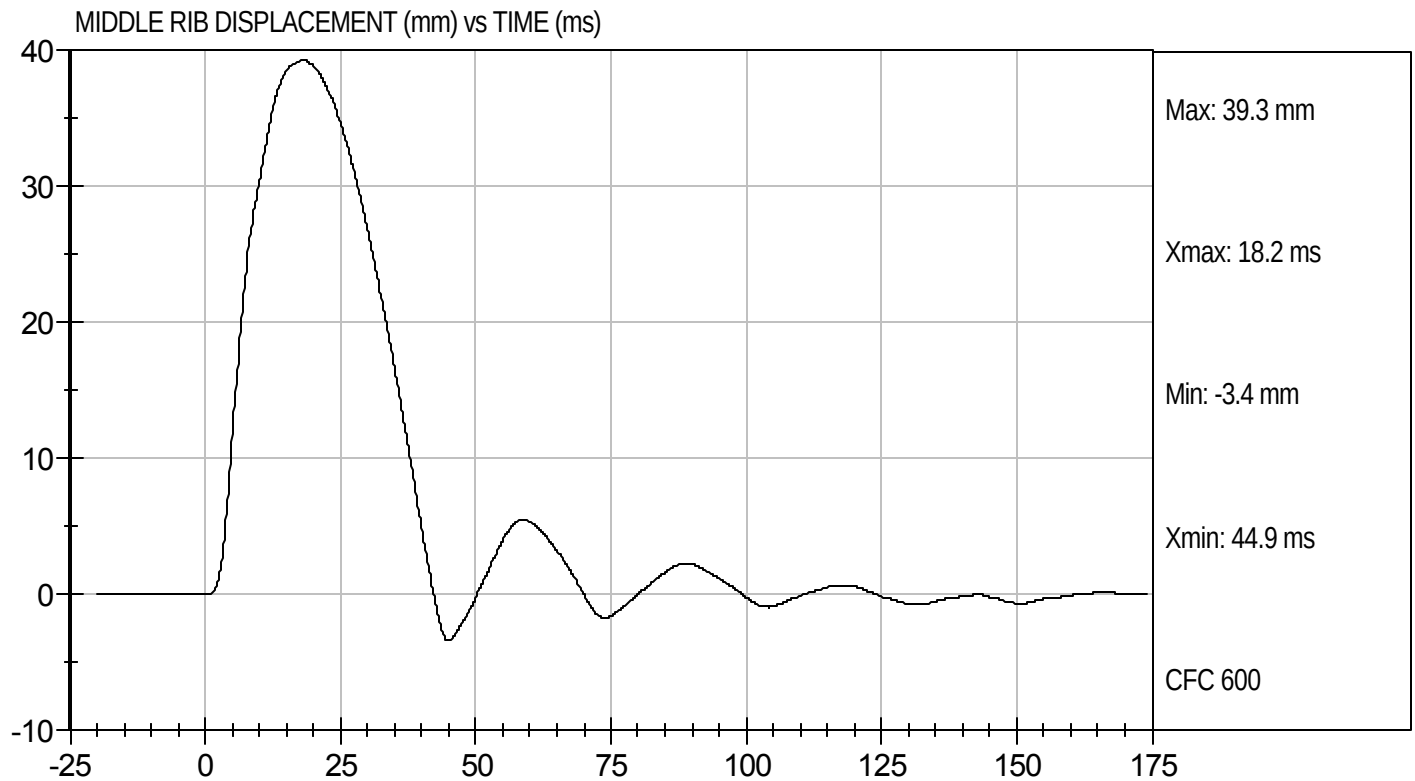
Test Date: 9/8/10
Velocity: 18.1 ft/s, 5.52 m/s





Test Desc: Thorax Impact
Component ID: D102930

Test Date: 9/8/10
Velocity: 18.1 ft/s, 5.52 m/s

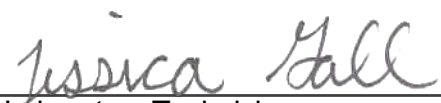


MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-ILs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D102851

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	55	Pass
Peak Resultant Acceleration	G's	115 to 137	123	Pass
Peak Lateral Acceleration	G's	+/- 15	5	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass


Laboratory Technician

9/2/10
Test Date

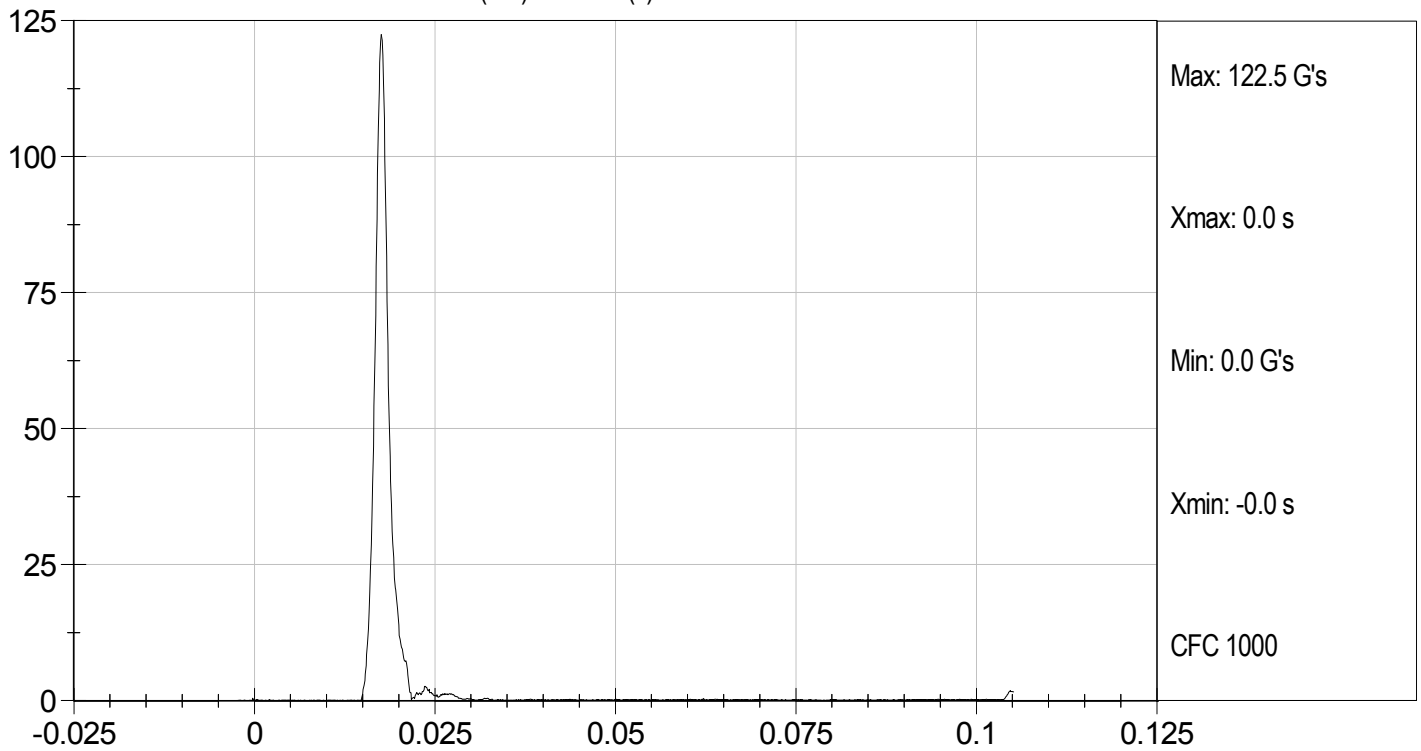

Approved By



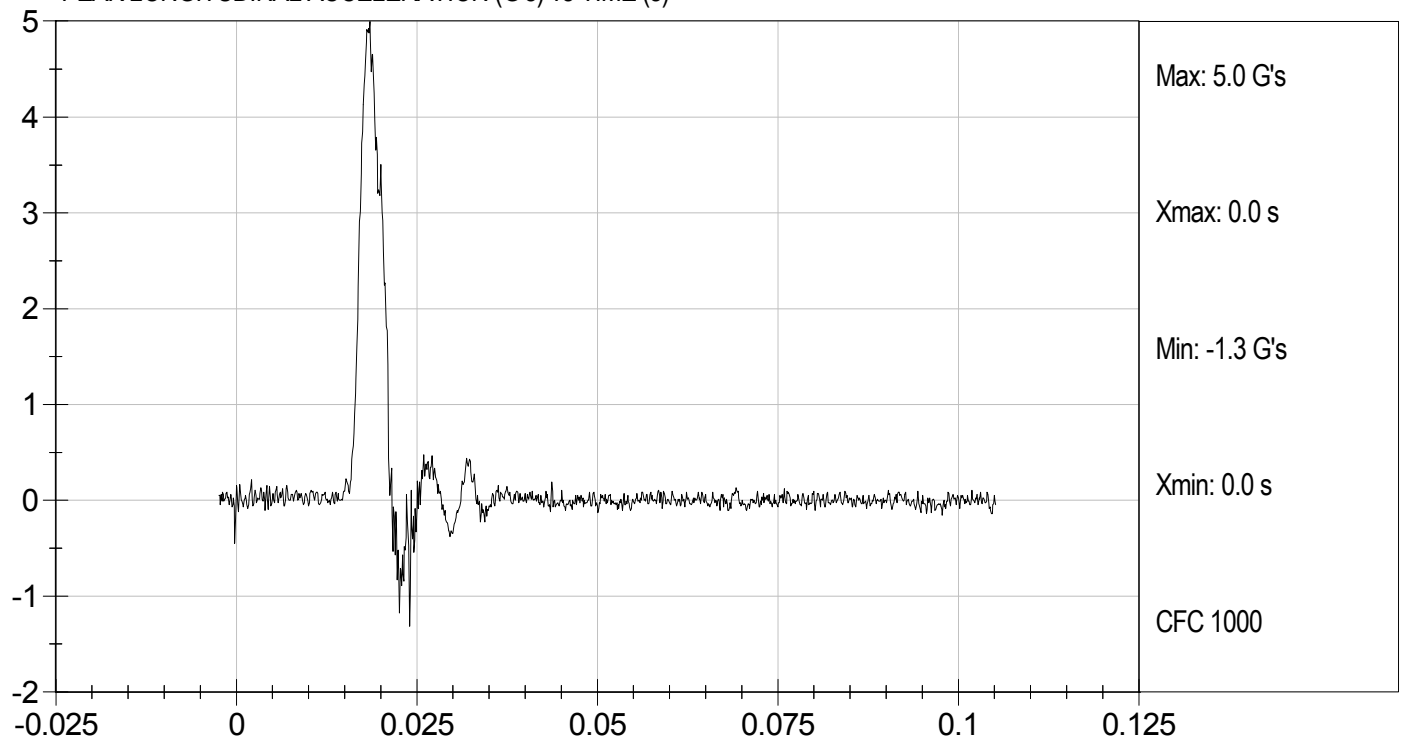
Test Desc: Head Drop
Component ID: D102851

Test Date: 9/2/10
Velocity: 0 ft/s, 0.00 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: D102852

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	21.3	Pass
Humidity		%	10 to 70	56	Pass
Impact Velocity		m/s	5.51 to 5.63	5.52	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.48	Pass
	15 ms	m/s	3.30 to 4.10	3.47	Pass
	20 ms	m/s	4.40 to 5.40	4.65	Pass
	25 ms	m/s	5.40 to 6.10	5.52	Pass
	25-100 ms	m/s	5.50 to 6.20	5.56	Pass
Maximum D-Plane Rotation		deg	71 to 81	71	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	58	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	113	Pass
Overall Test Results				Pass	


 Laboratory Technician

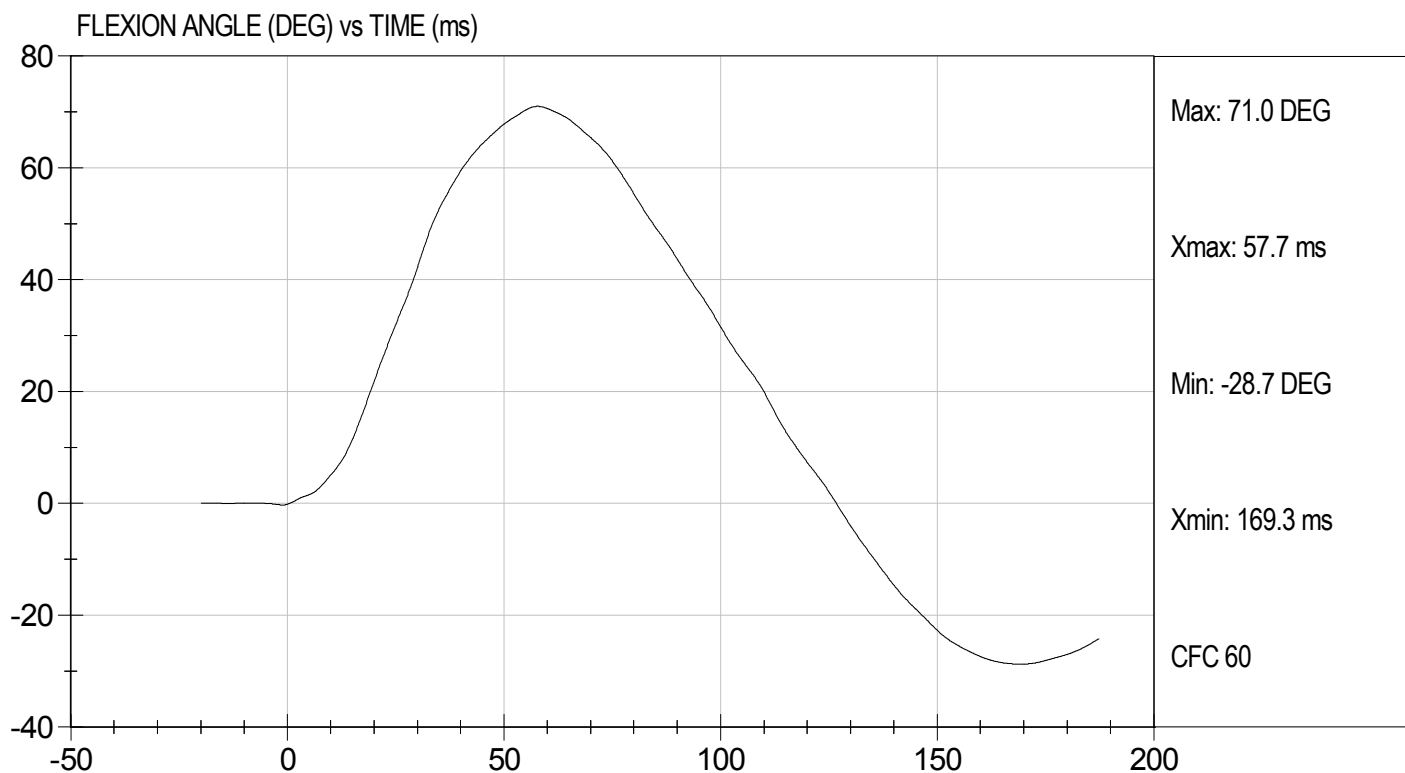
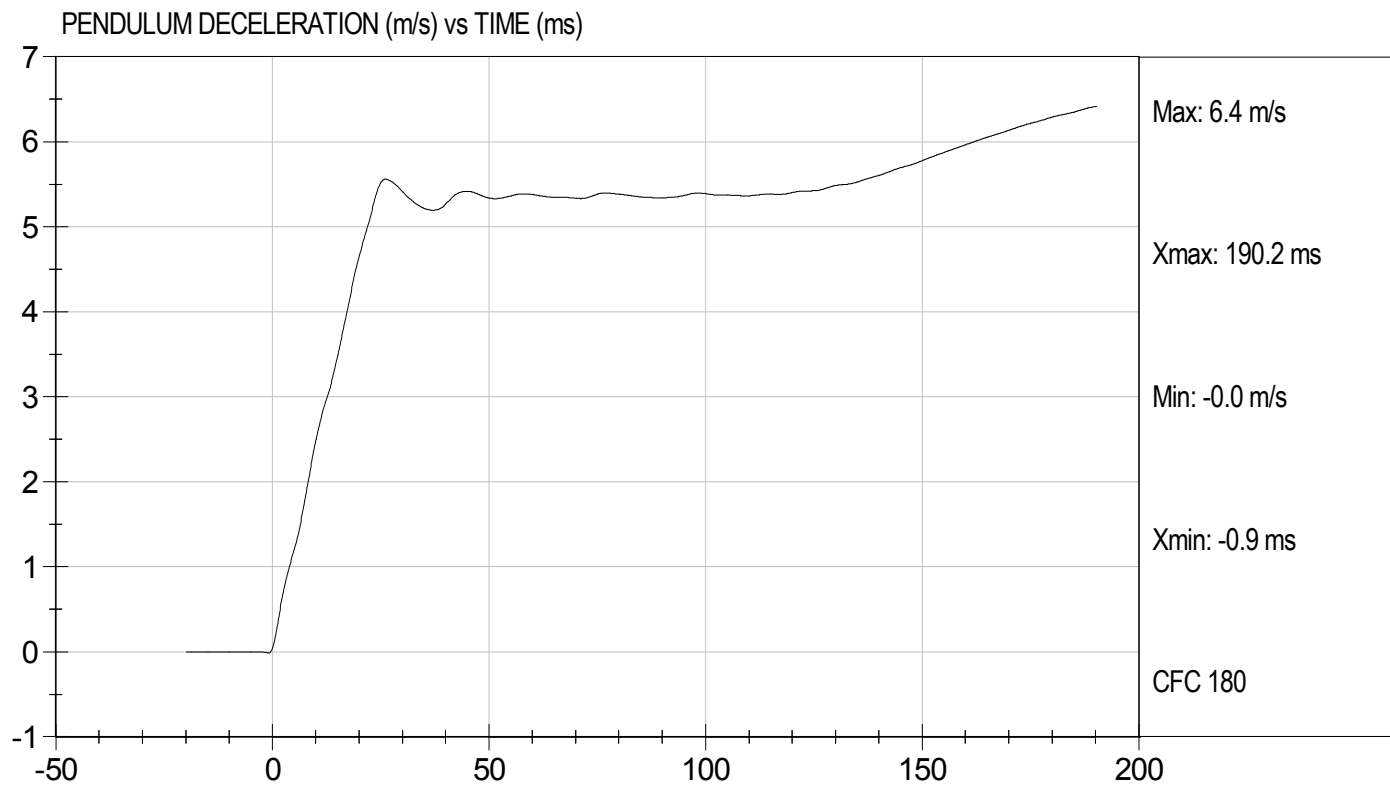
9/2/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D102852

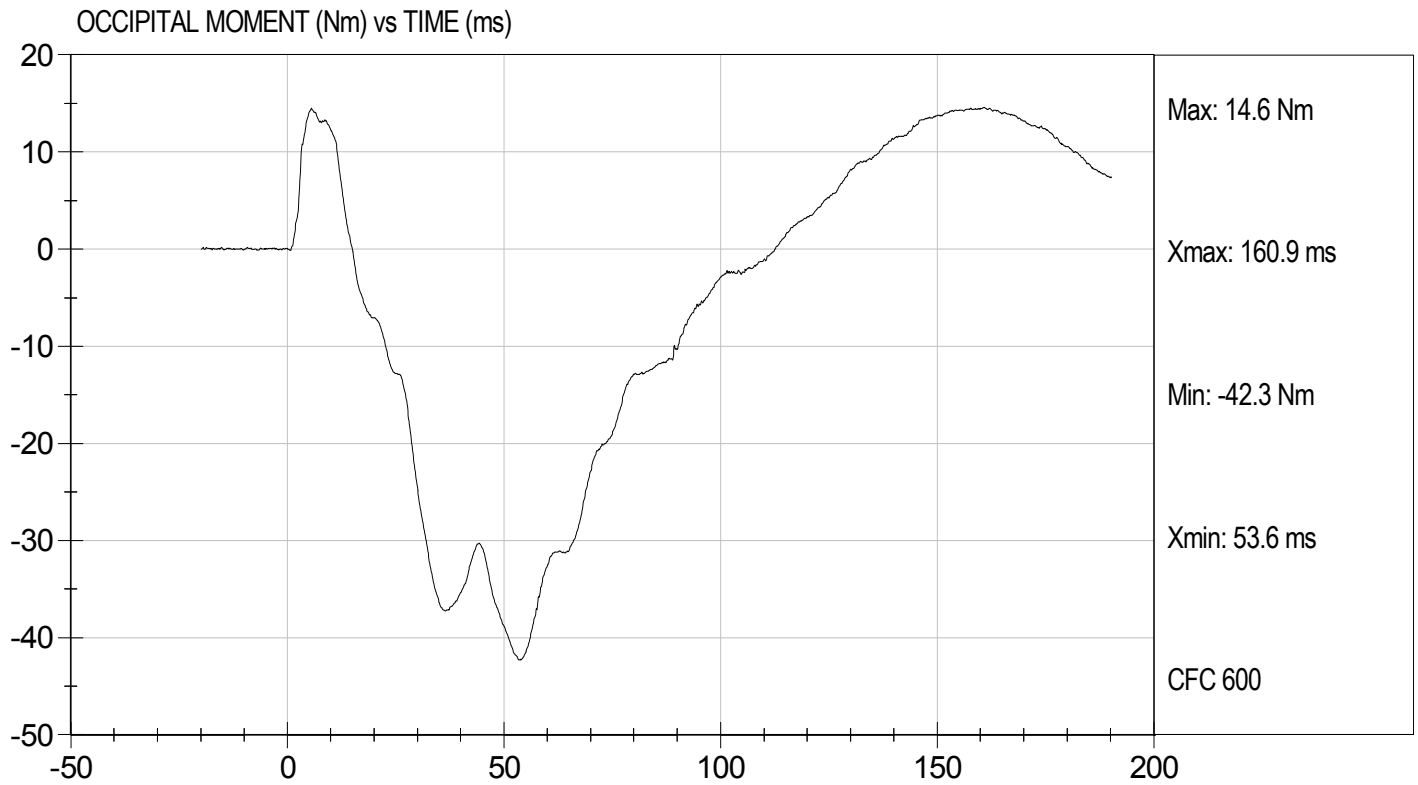
Test Date: 9/2/10
Velocity: 18.1 ft/s, 5.52 m/s





Test Desc: Neck Bending
Component ID: D102852

Test Date: 9/2/10
Velocity: 18.1 ft/s, 5.52 m/s

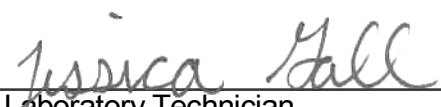


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-ILs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D102853

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	55	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	31	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	19	Pass
Overall Test Results				Pass


Laboratory Technician

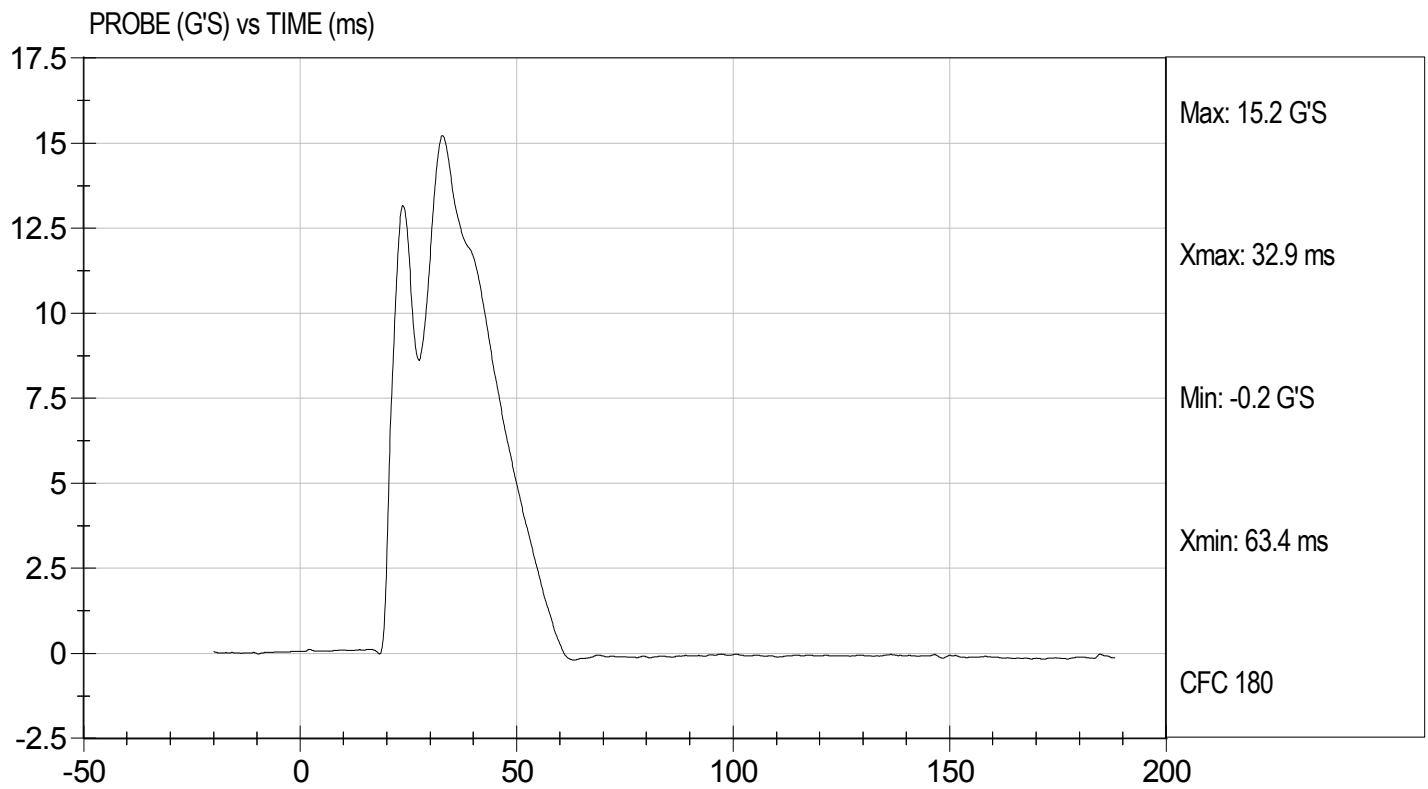
9/2/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D102853

Test Date: 9/2/10
Velocity: 14.1 ft/s, 4.30 m/s

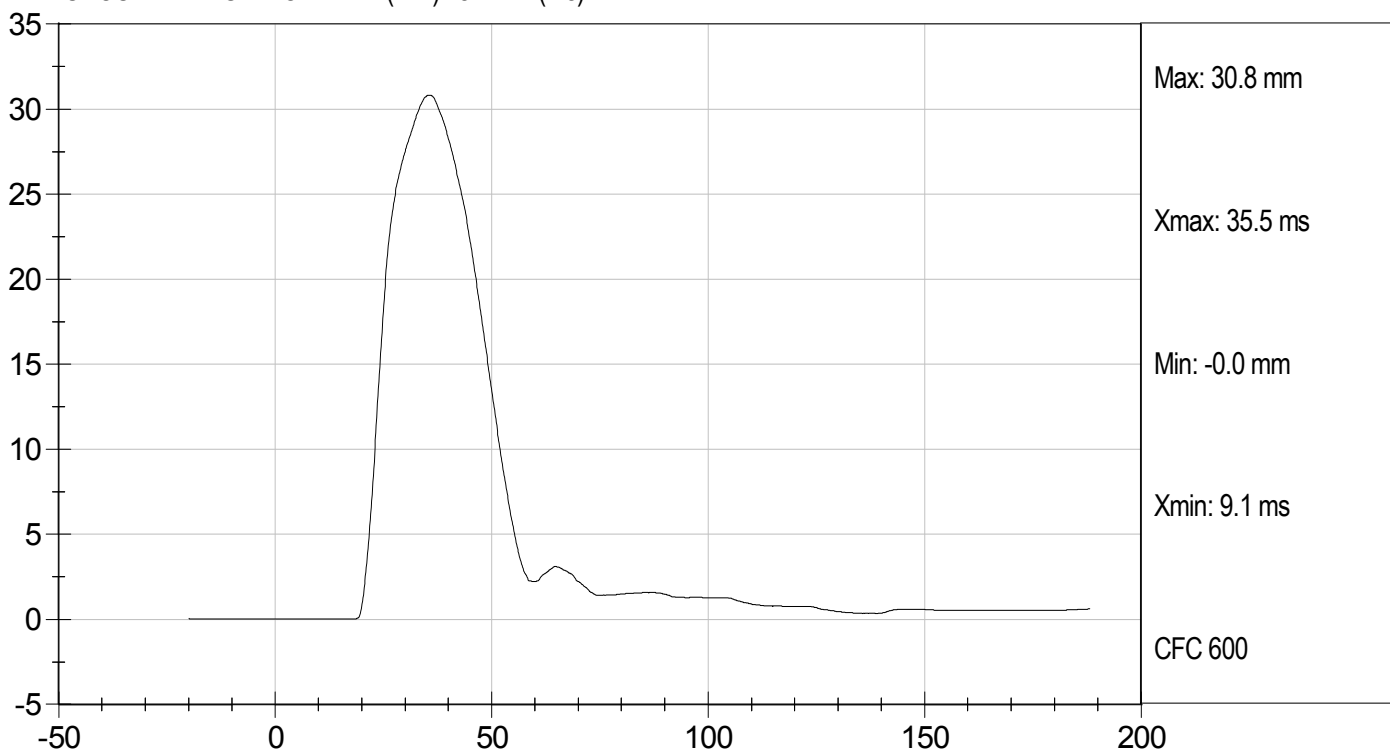




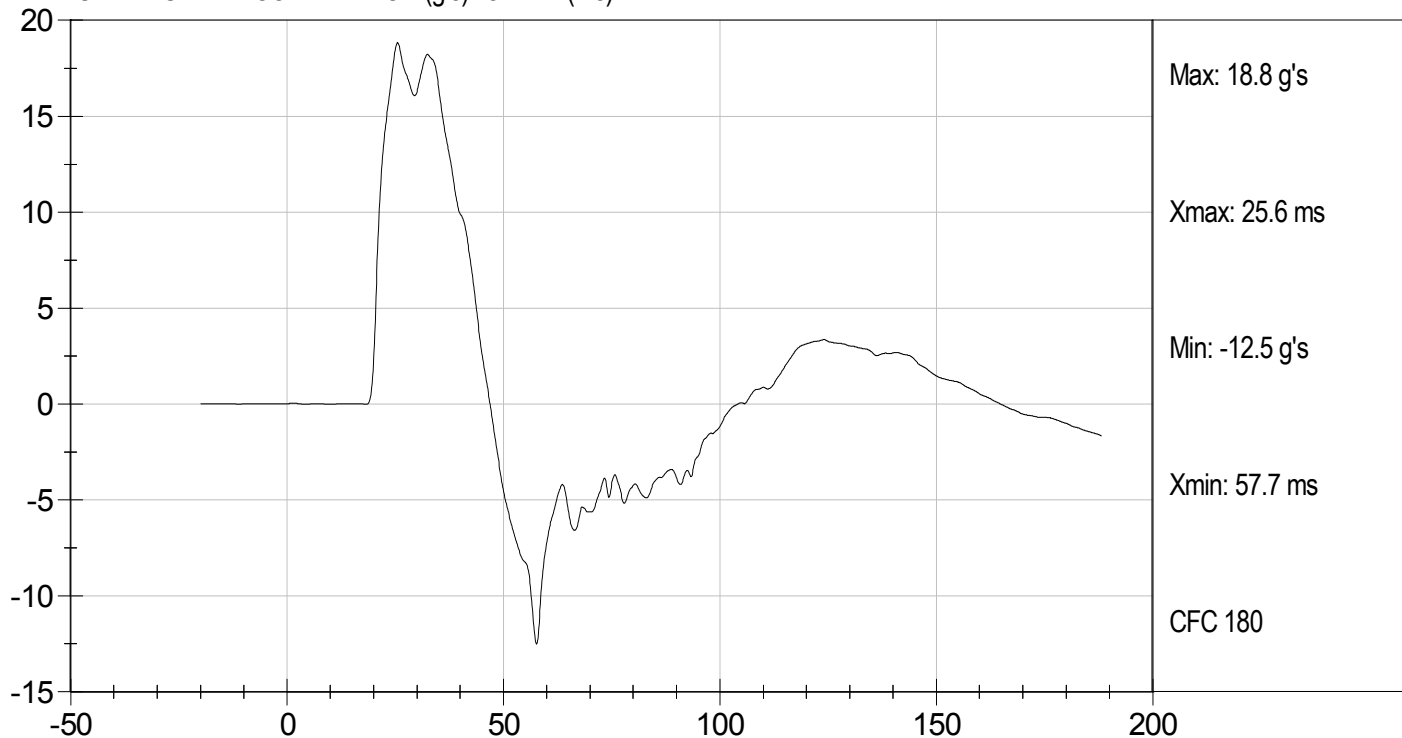
Test Desc: Shoulder Impact
Component ID: D102853

Test Date: 9/2/10
Velocity: 14.1 ft/s, 4.30 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



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

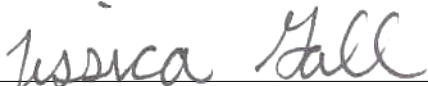


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D102854

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	55	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	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

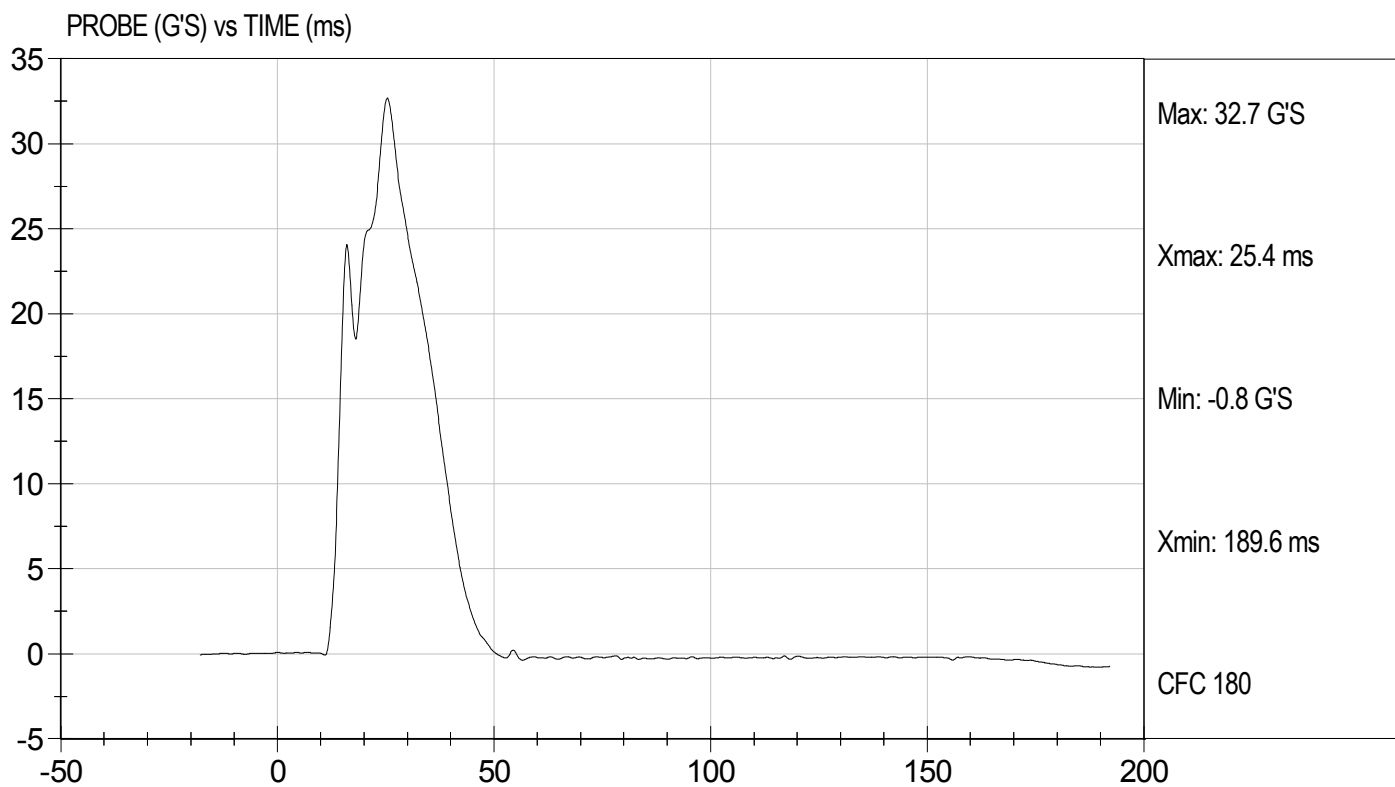
9/2/10
 Test Date


 Approved By



Test Desc: Thorax With Arm
Component ID: D102854

Test Date: 9/2/10
Velocity: 21.9 ft/s, 6.68 m/s

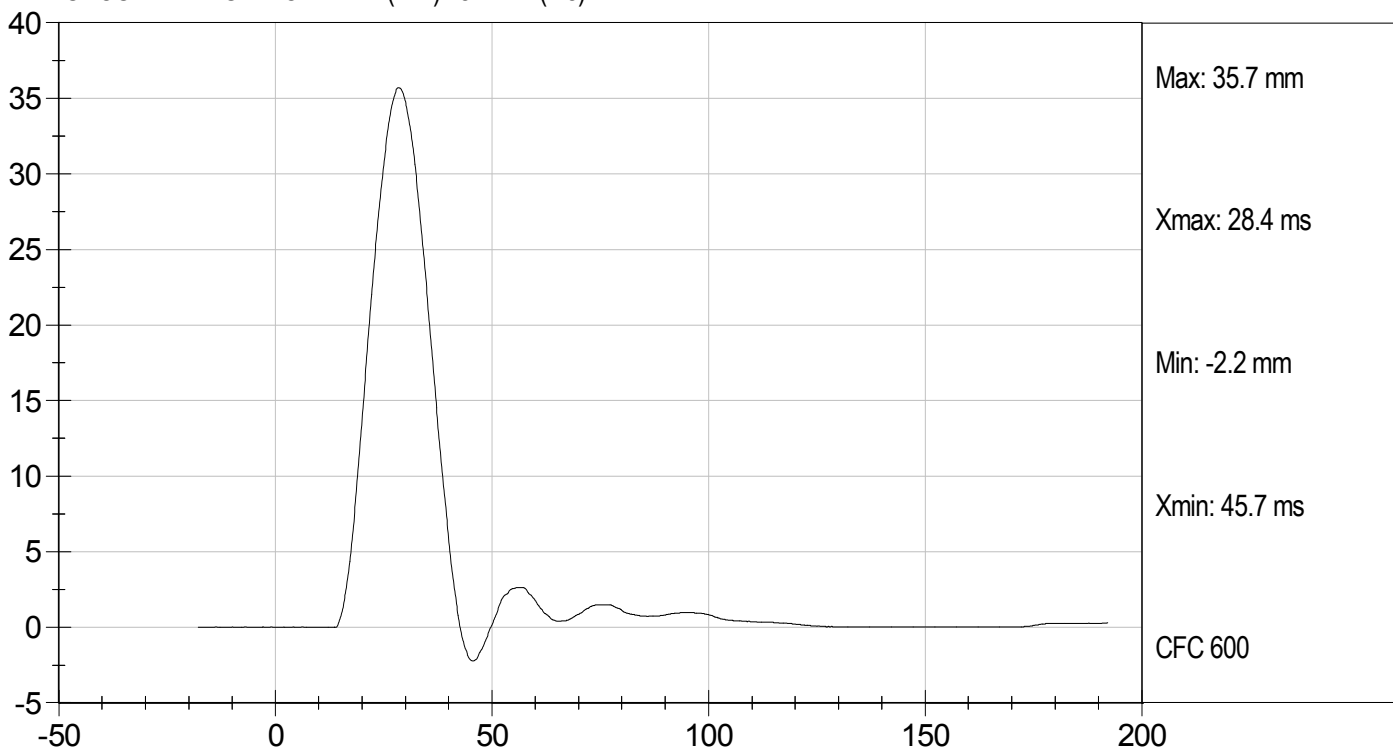




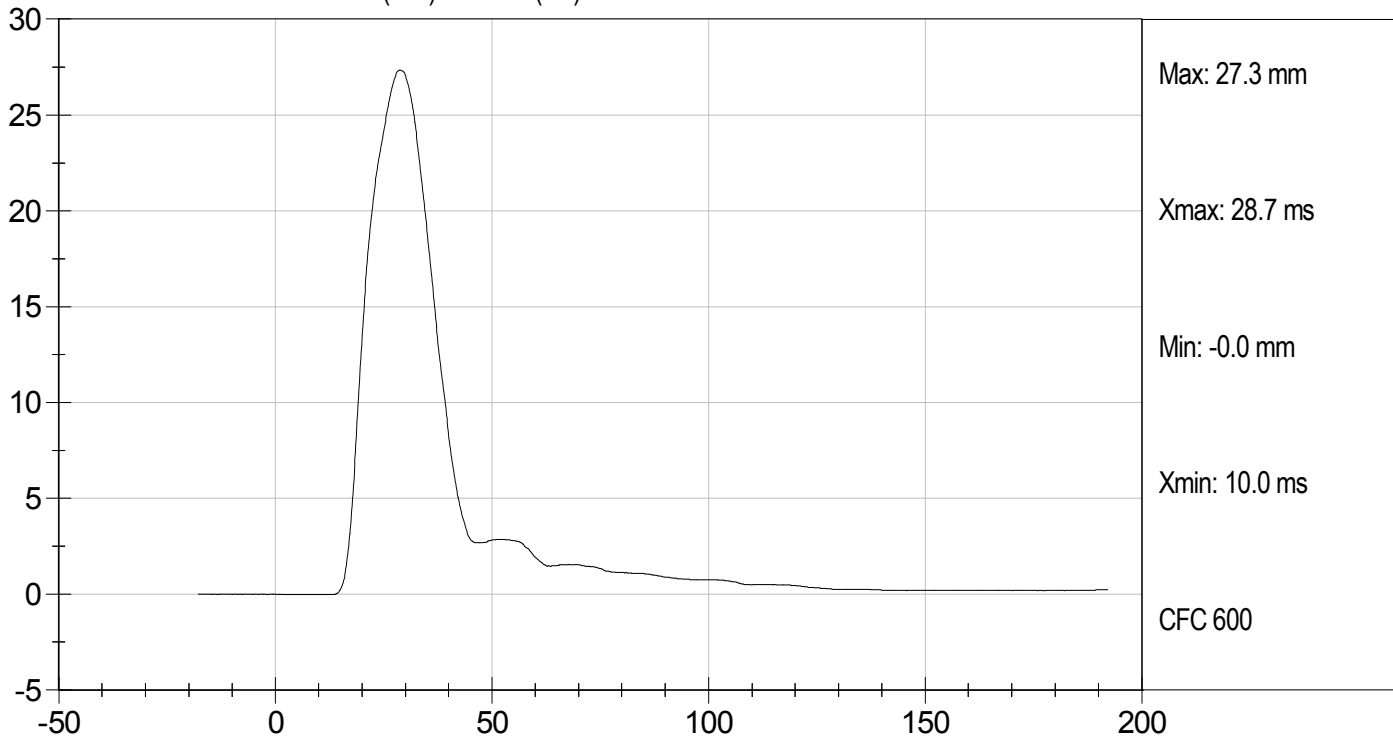
Test Desc: Thorax With Arm
Component ID: D102854

Test Date: 9/2/10
Velocity: 21.9 ft/s, 6.68 m/s

SHOULDER DISPLACEMENT (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT (mm) vs TIME (ms)

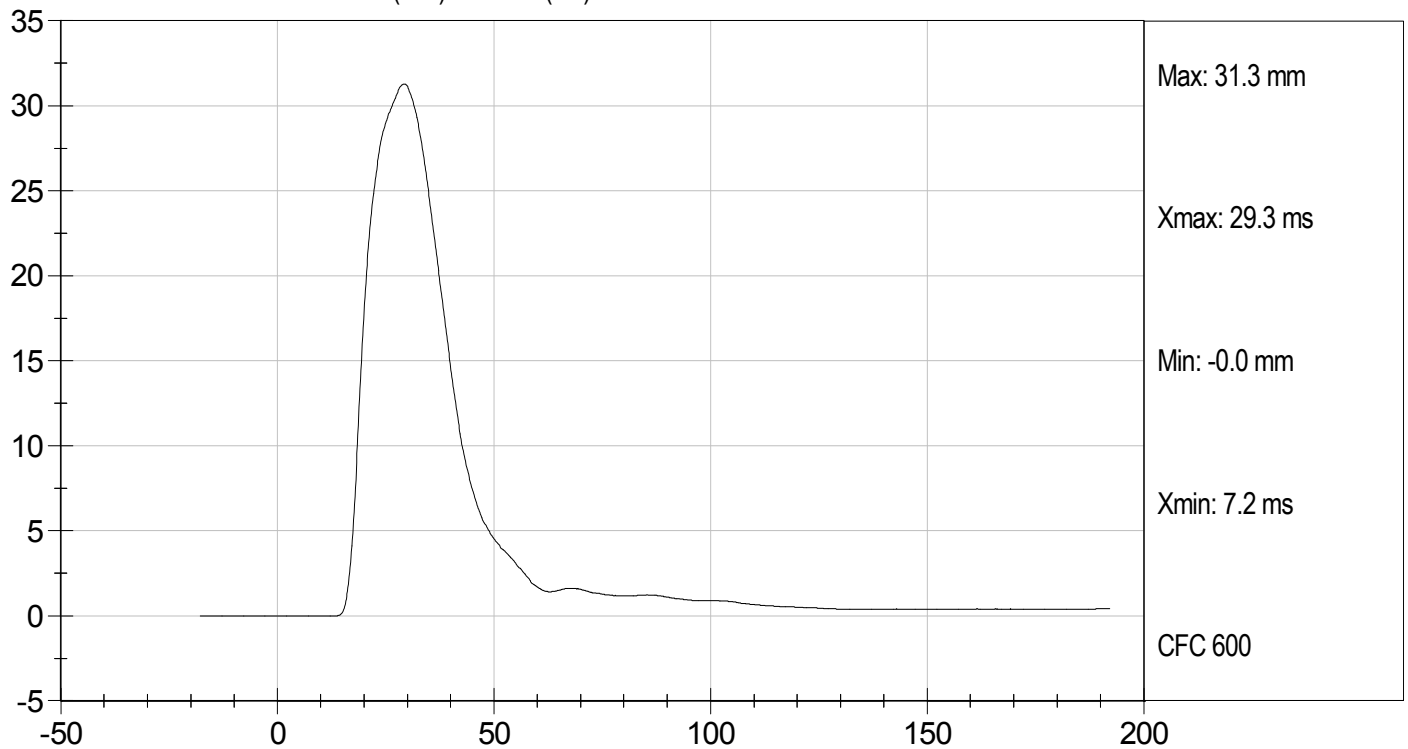




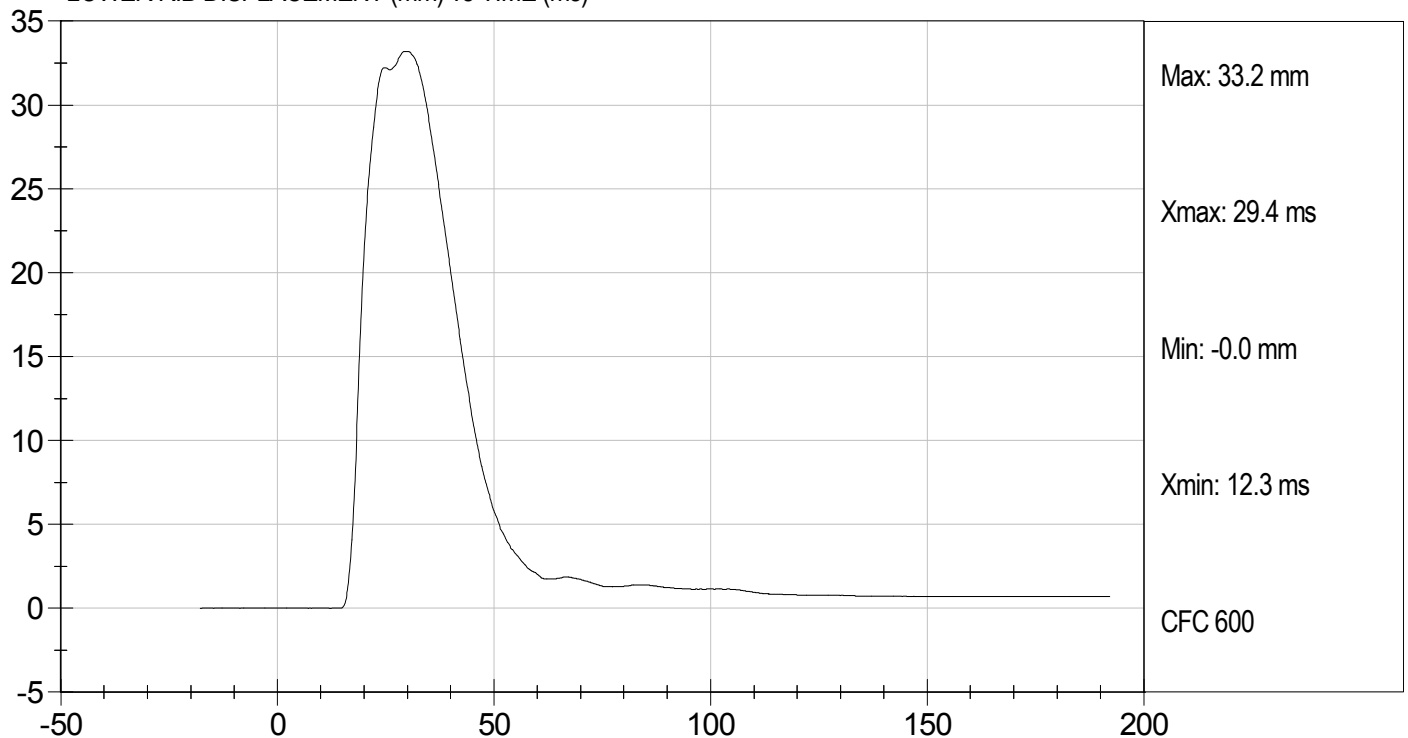
Test Desc: Thorax With Arm
Component ID: D102854

Test Date: 9/2/10
Velocity: 21.9 ft/s, 6.68 m/s

MIDDLE RIB DISPLACEMENT (mm) vs TIME (ms)



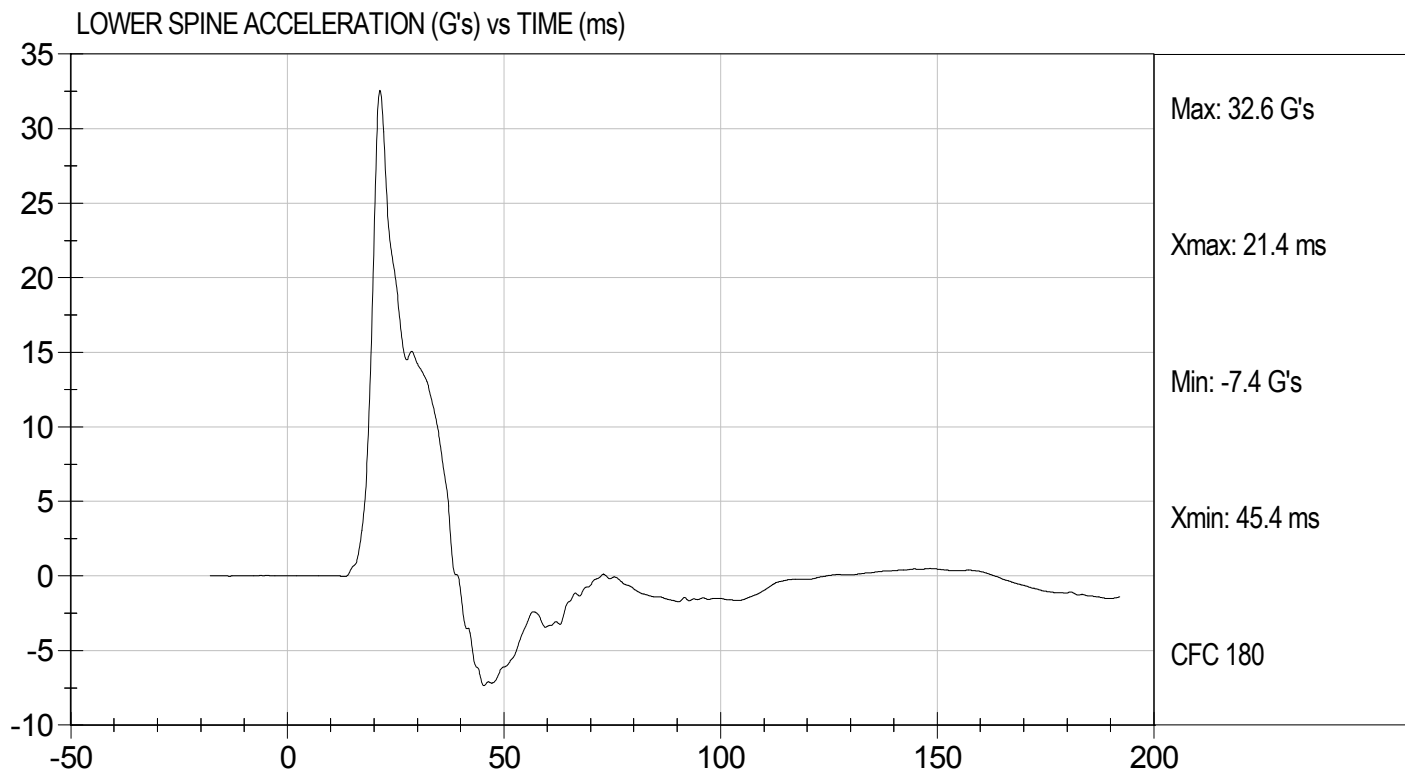
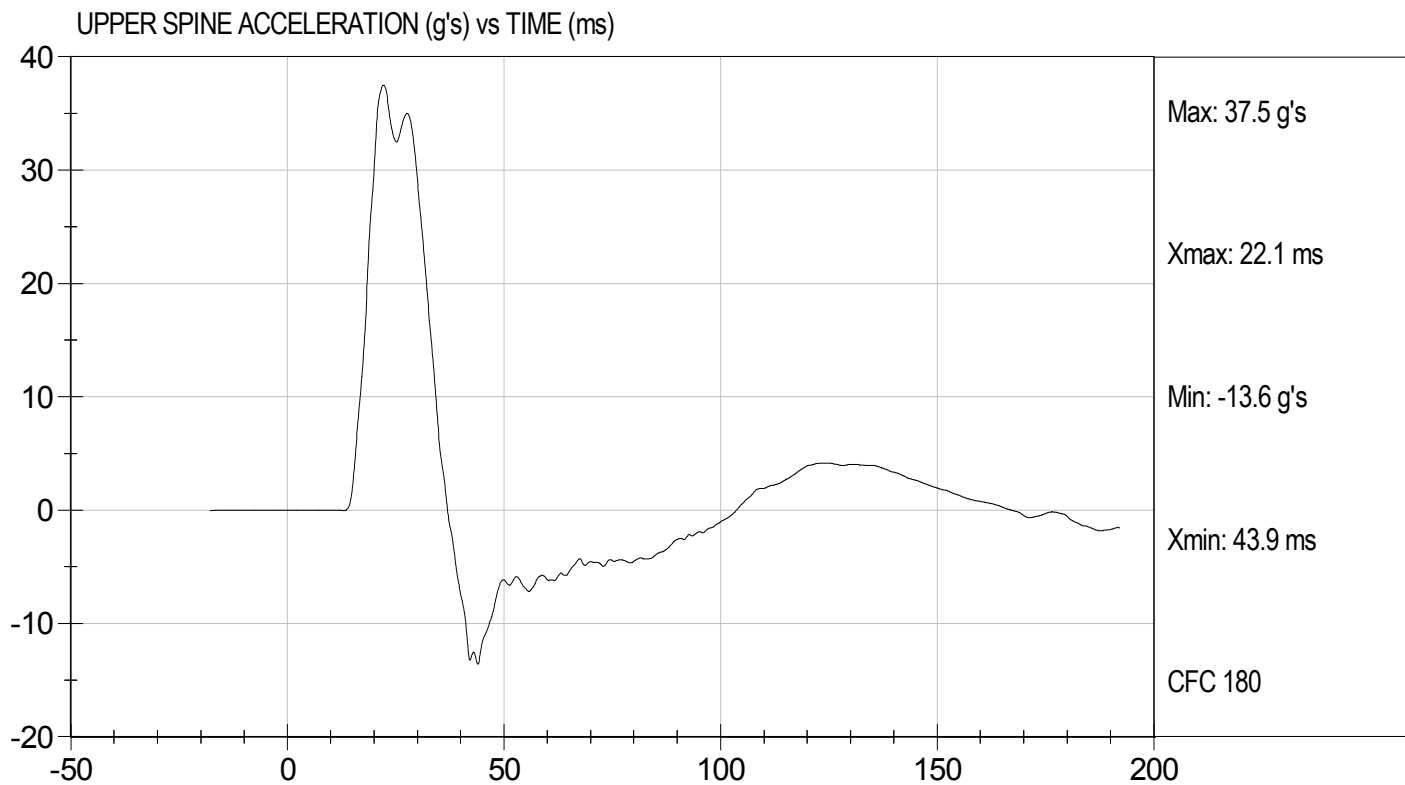
LOWER RIB DISPLACEMENT (mm) vs TIME (ms)





Test Desc: Thorax With Arm
Component ID: D102854

Test Date: 9/2/10
Velocity: 21.9 ft/s, 6.68 m/s

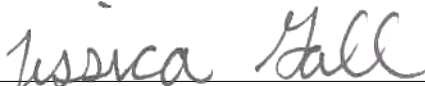


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D102855

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	55	Pass
Impact Velocity	m/s	4.20 to 4.40	4.23	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	39	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

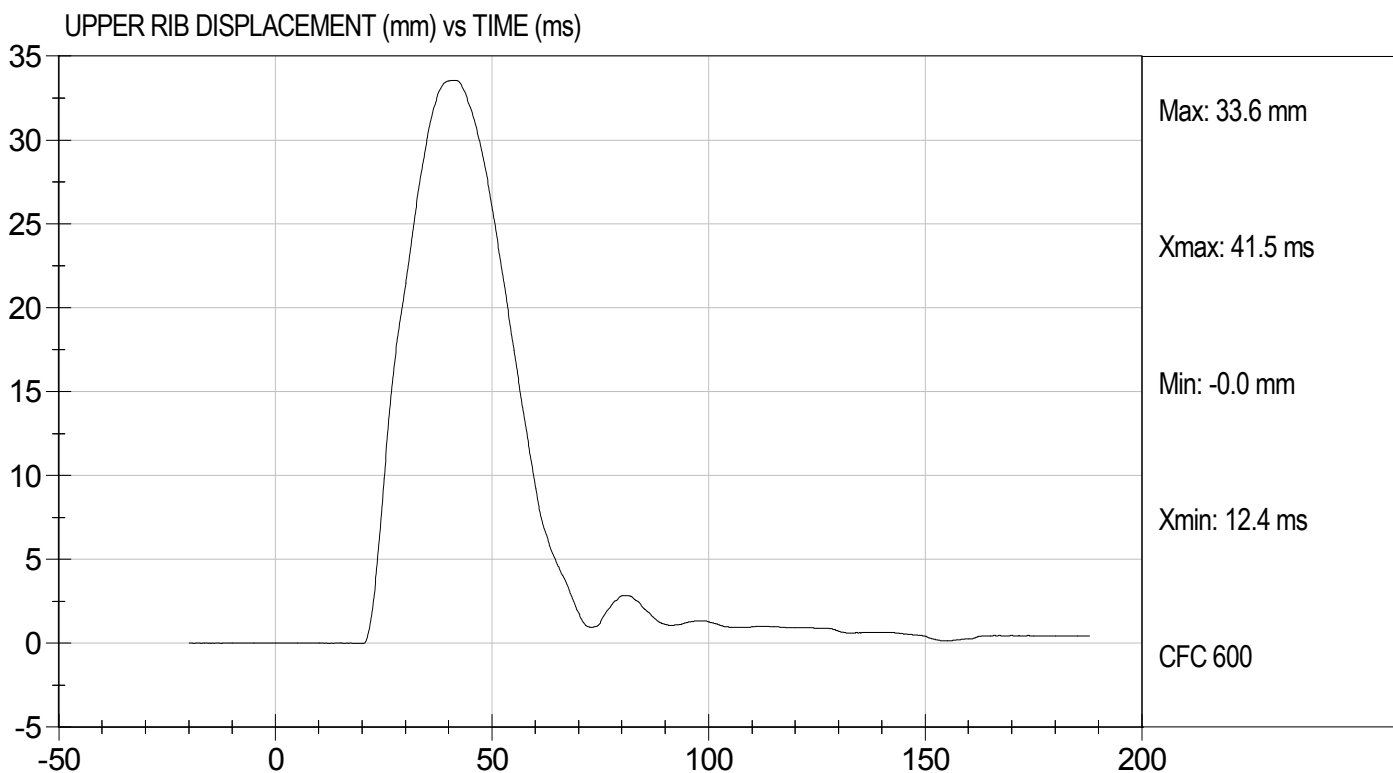
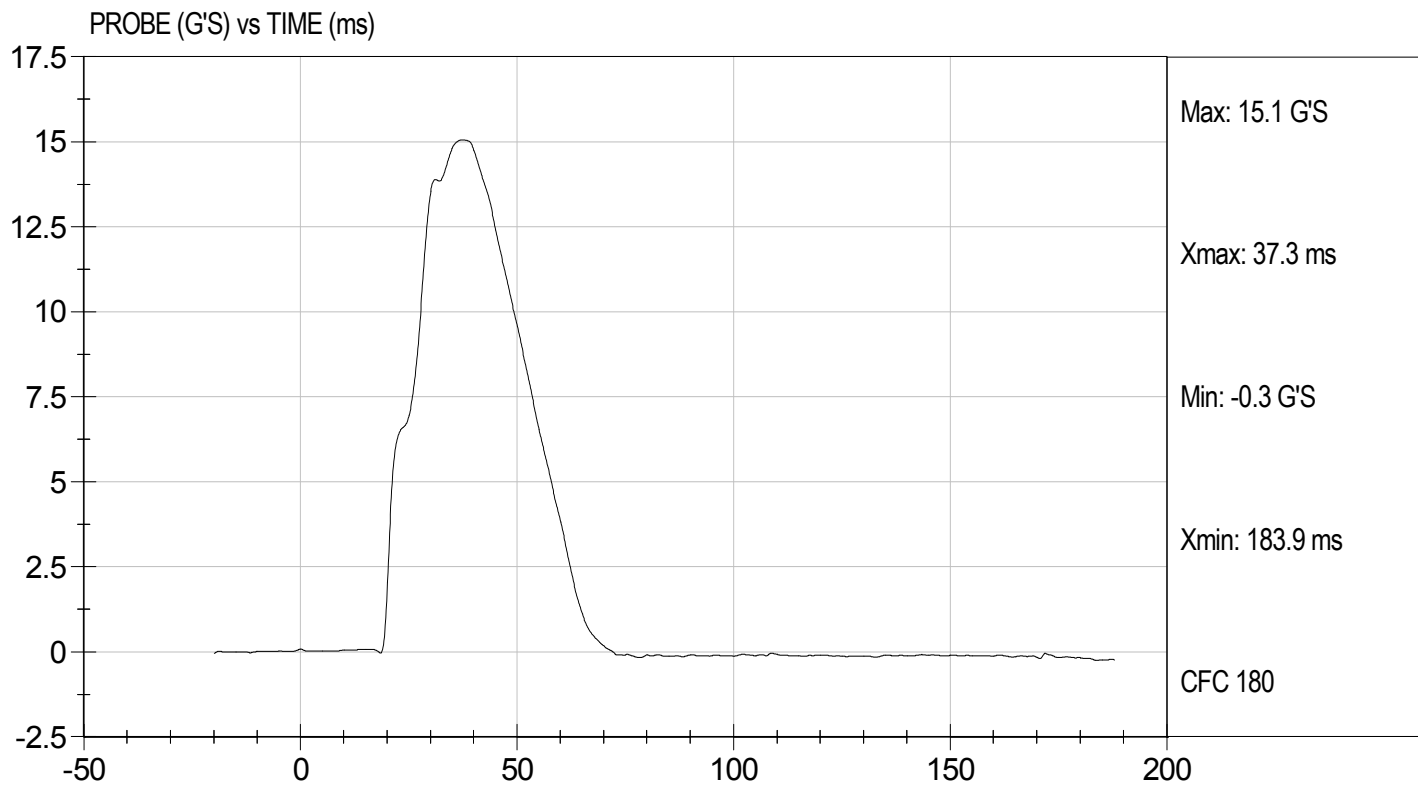
9/2/10
Test Date


Approved By



Test Desc: Thorax Without Arm
Component ID: D102855

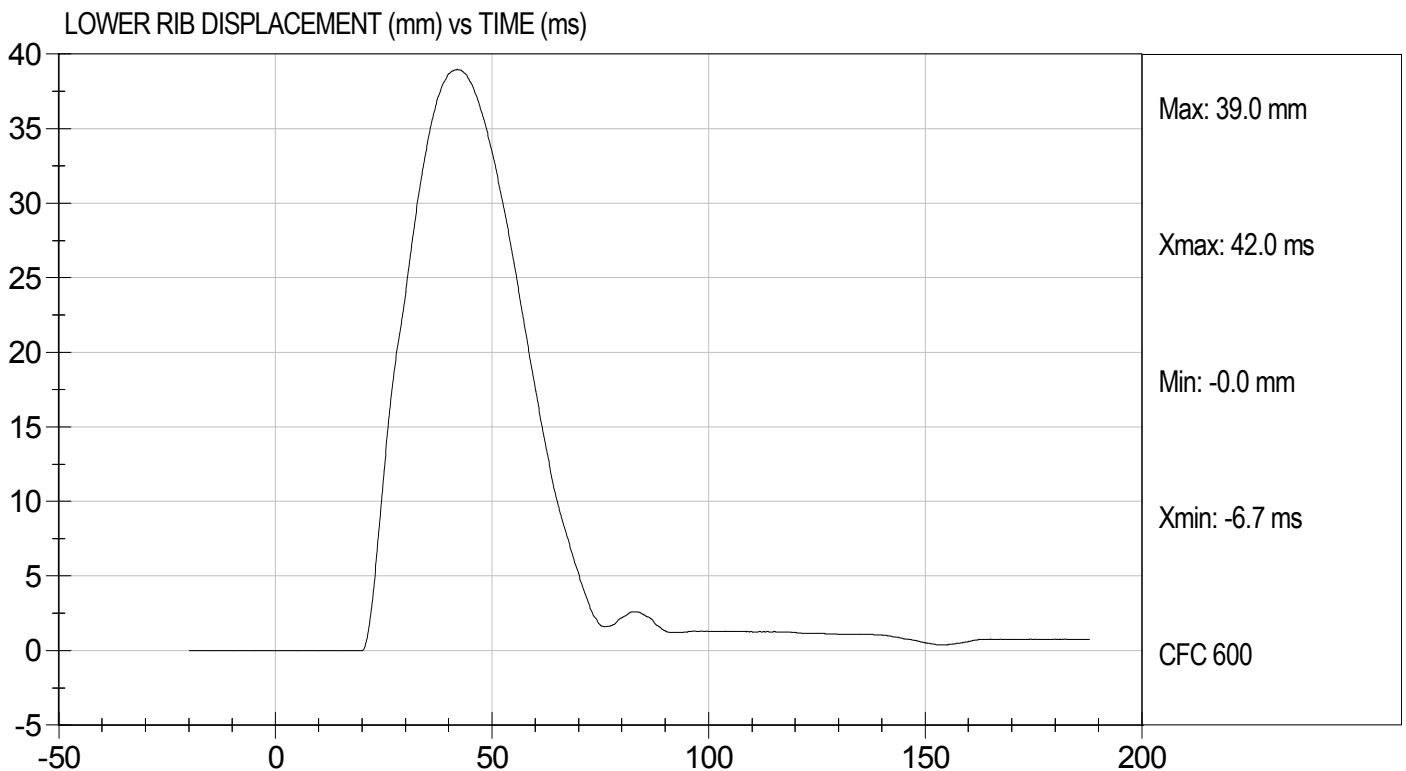
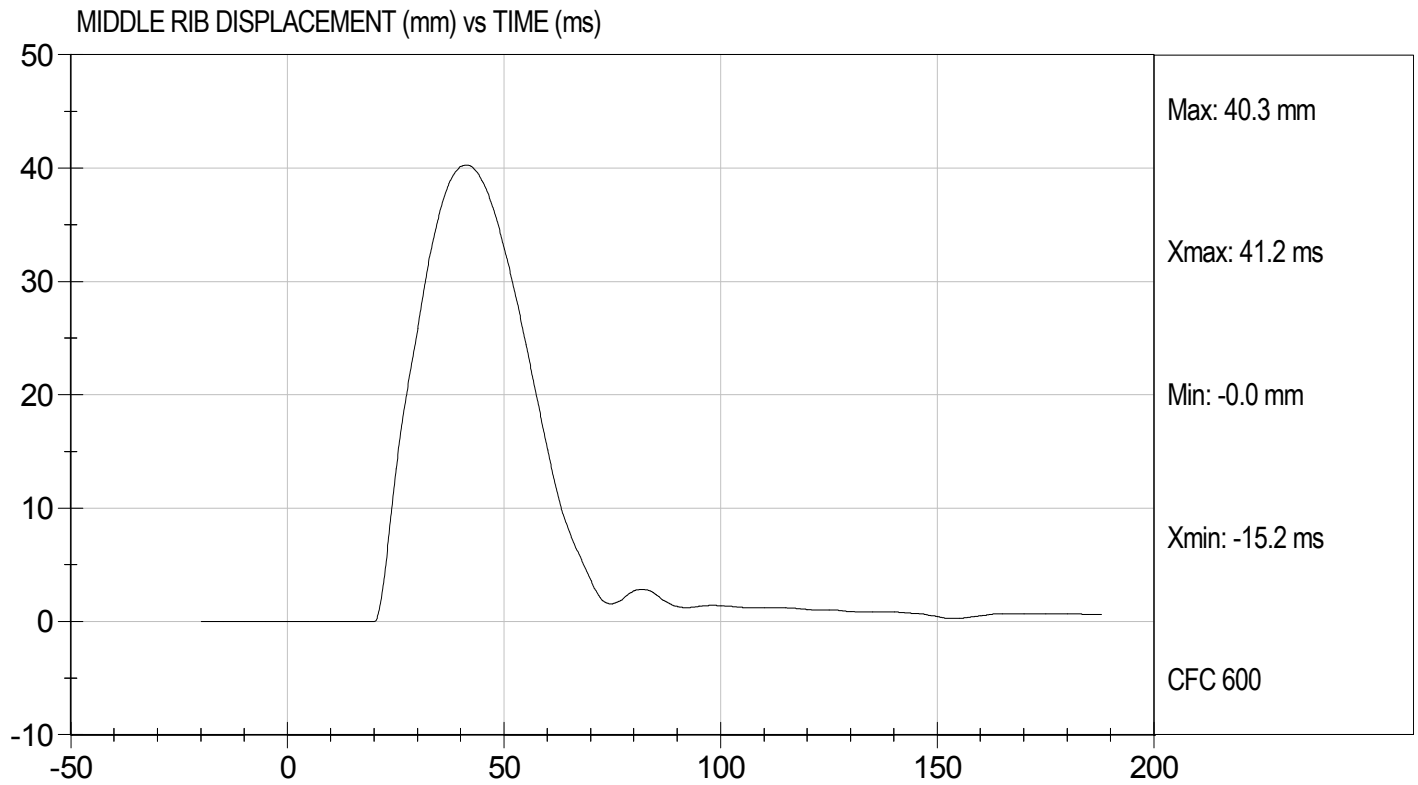
Test Date: 9/2/10
Velocity: 13.88 ft/s, 4.23 m/s





Test Desc: Thorax Without Arm
Component ID: D102855

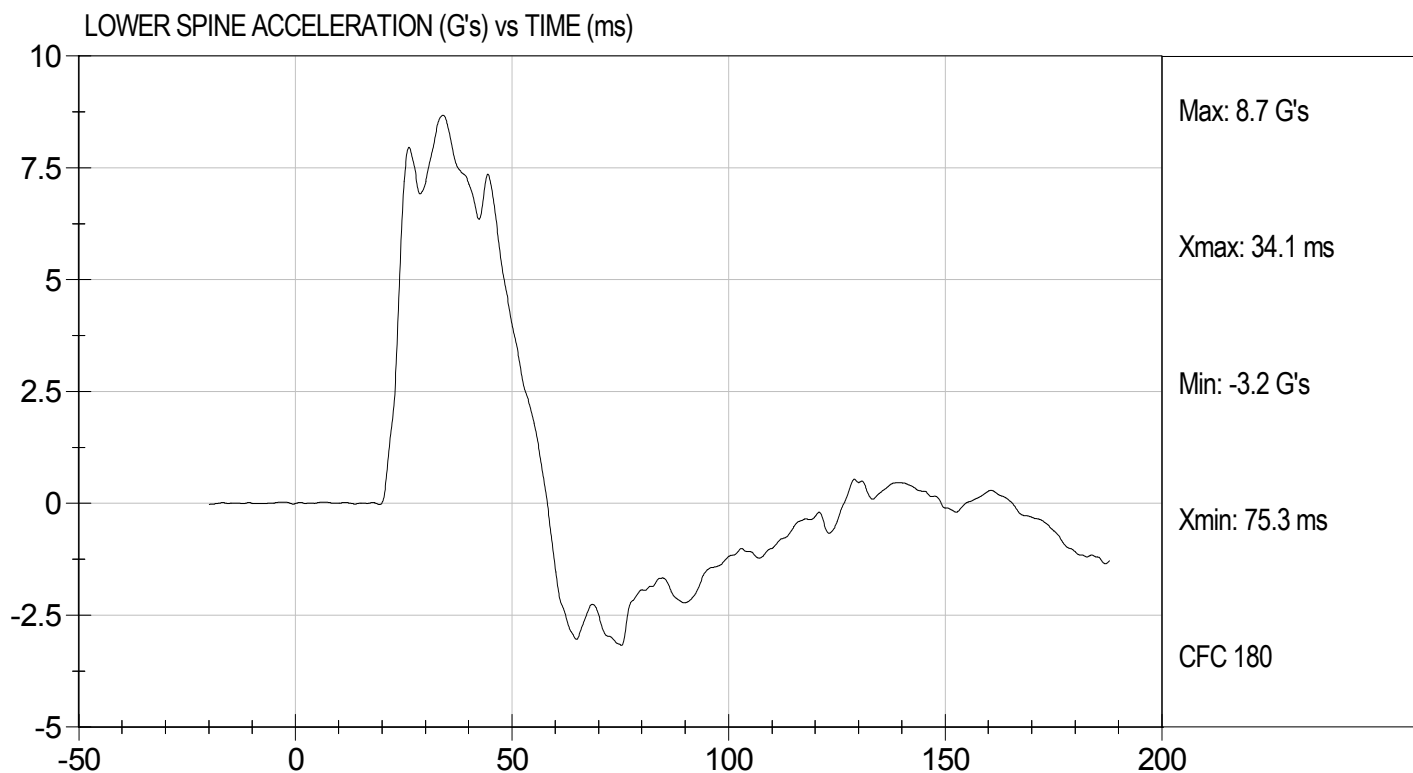
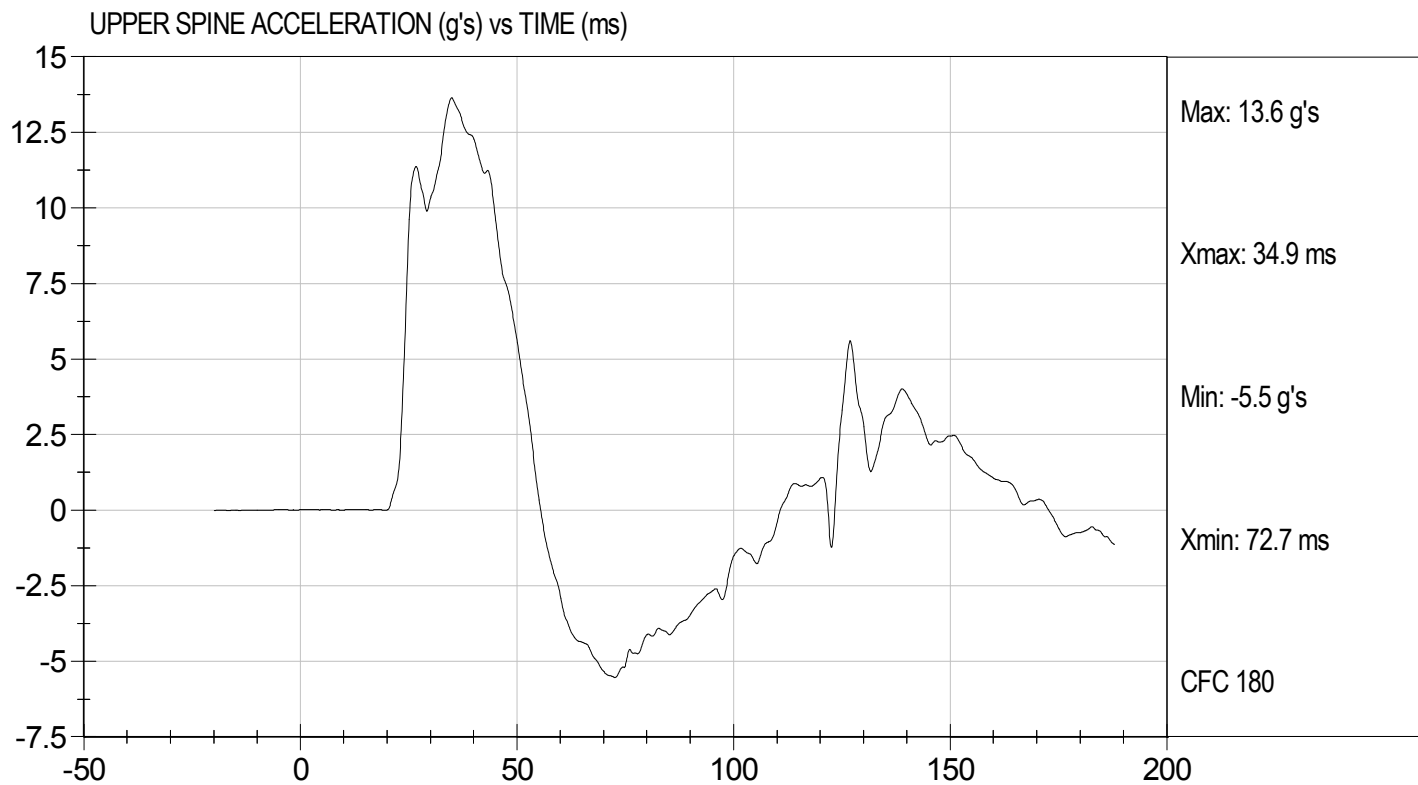
Test Date: 9/2/10
Velocity: 13.88 ft/s, 4.23 m/s





Test Desc: Thorax Without Arm
Component ID: D102855

Test Date: 9/2/10
Velocity: 13.88 ft/s, 4.23 m/s



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

ATD Serial No: 296

Test I.D: D102856

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	55	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	39	Pass
Lower Rib Displacement	mm	33 to 44	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
Overall Test Results			Pass	


Laboratory Technician

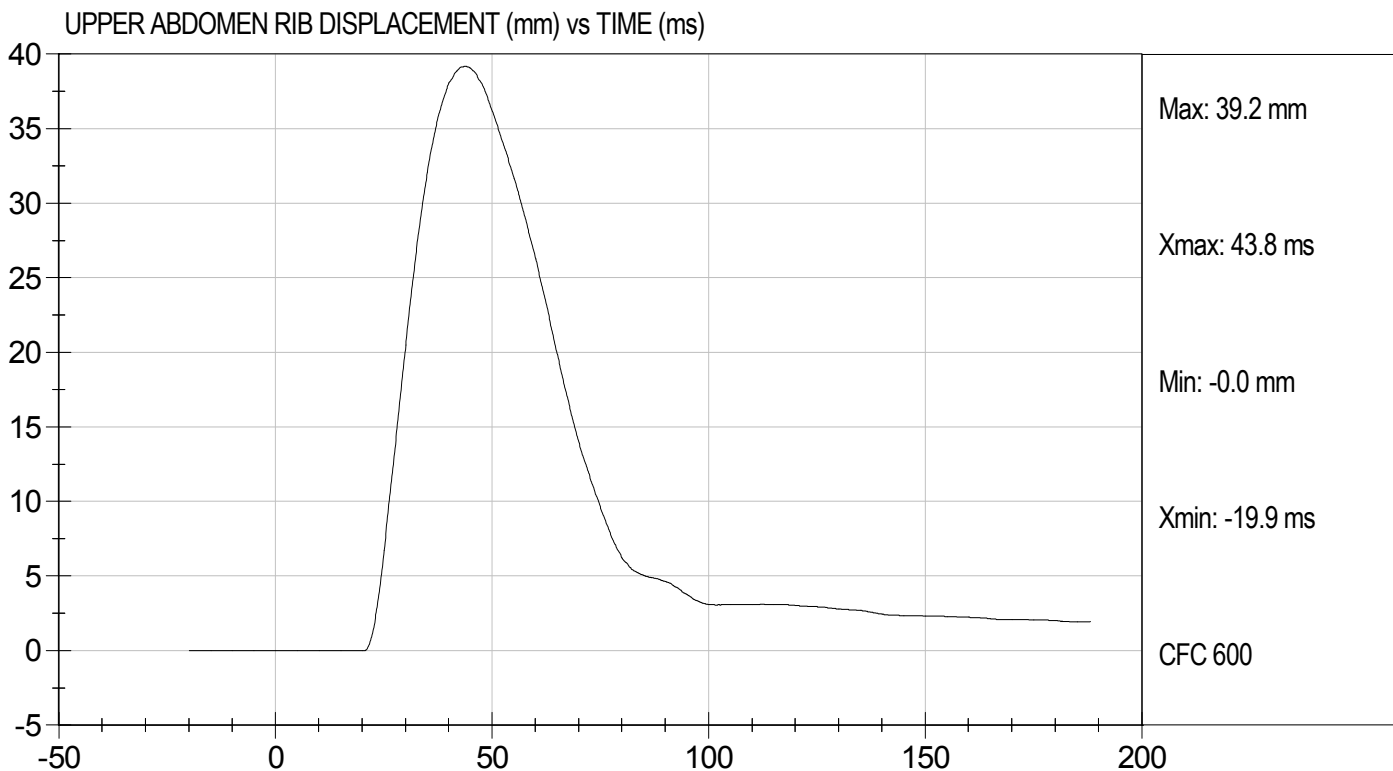
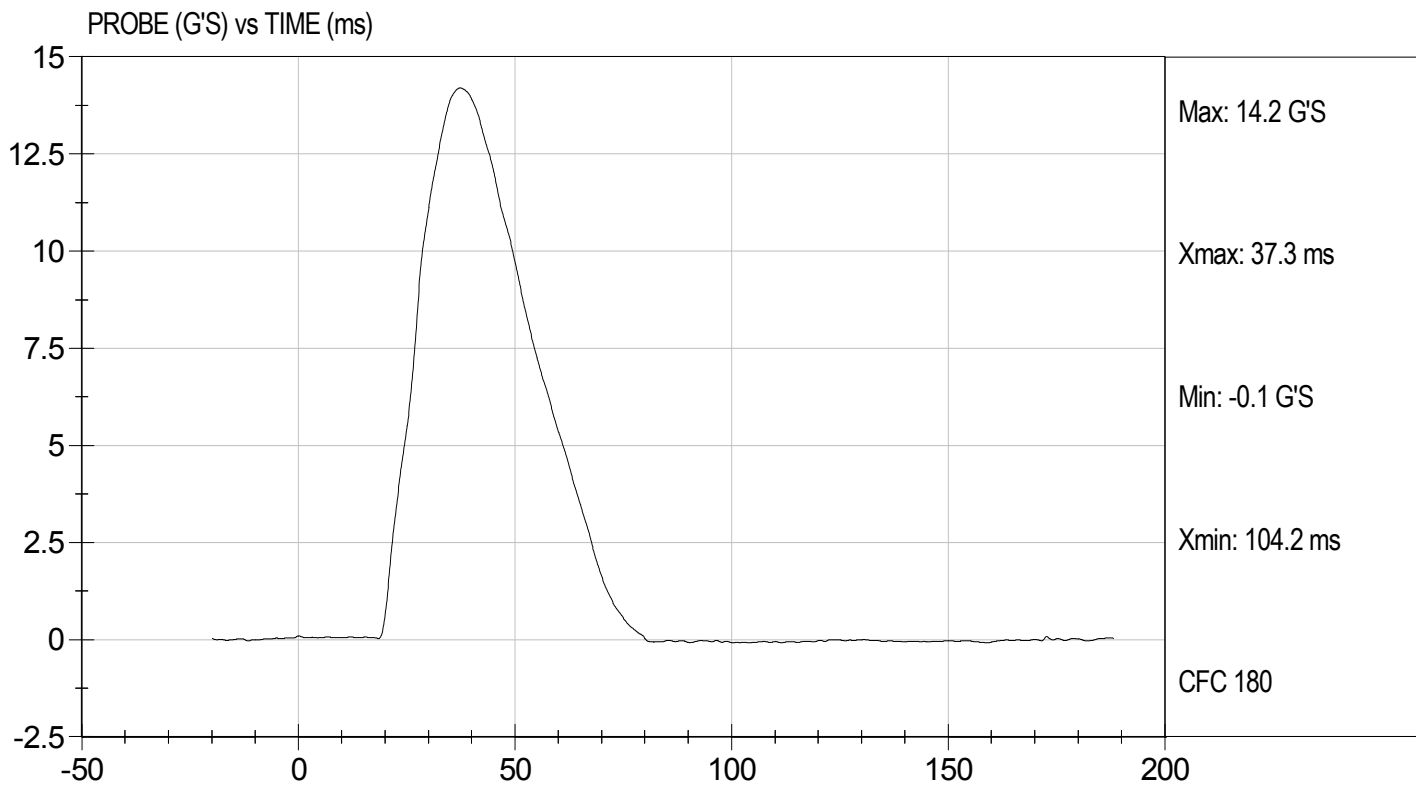
9/2/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D102856

Test Date: 9/2/10
Velocity: 14.36 ft/s, 4.38 m/s

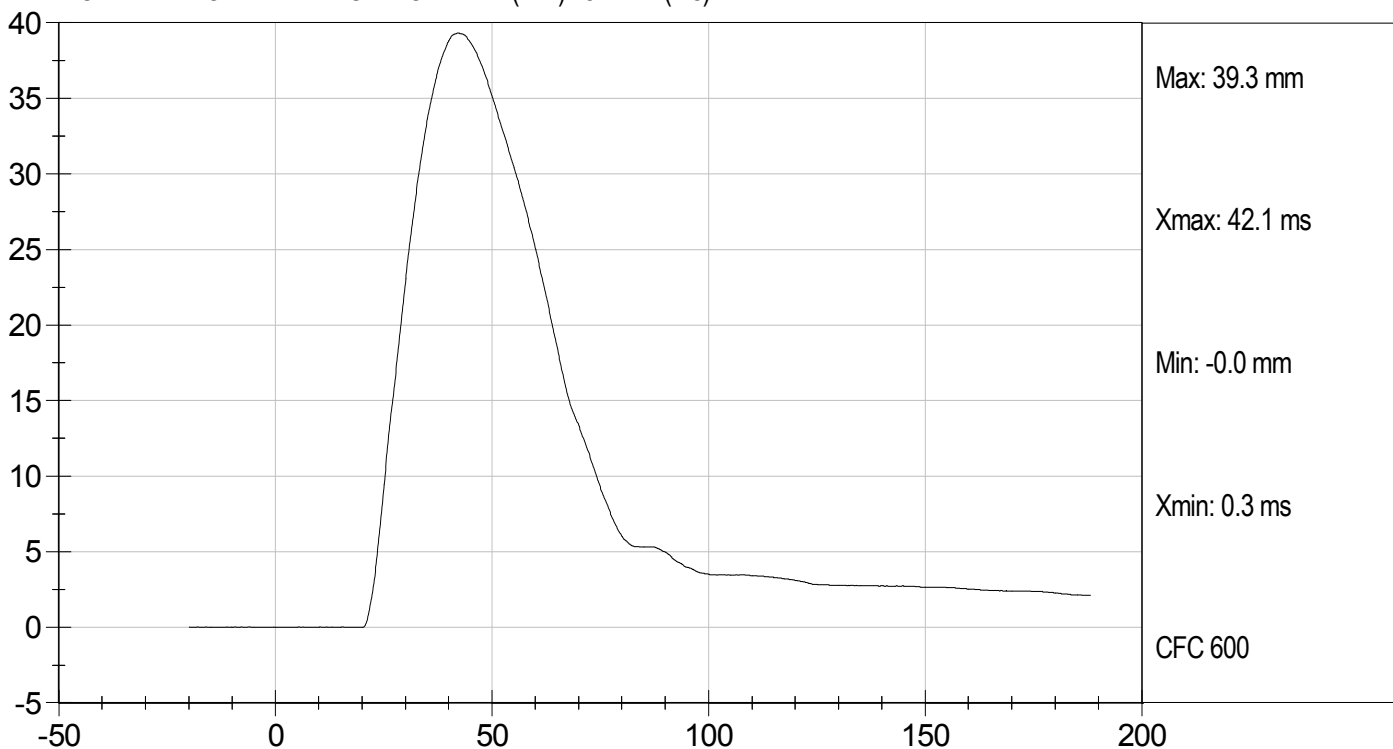




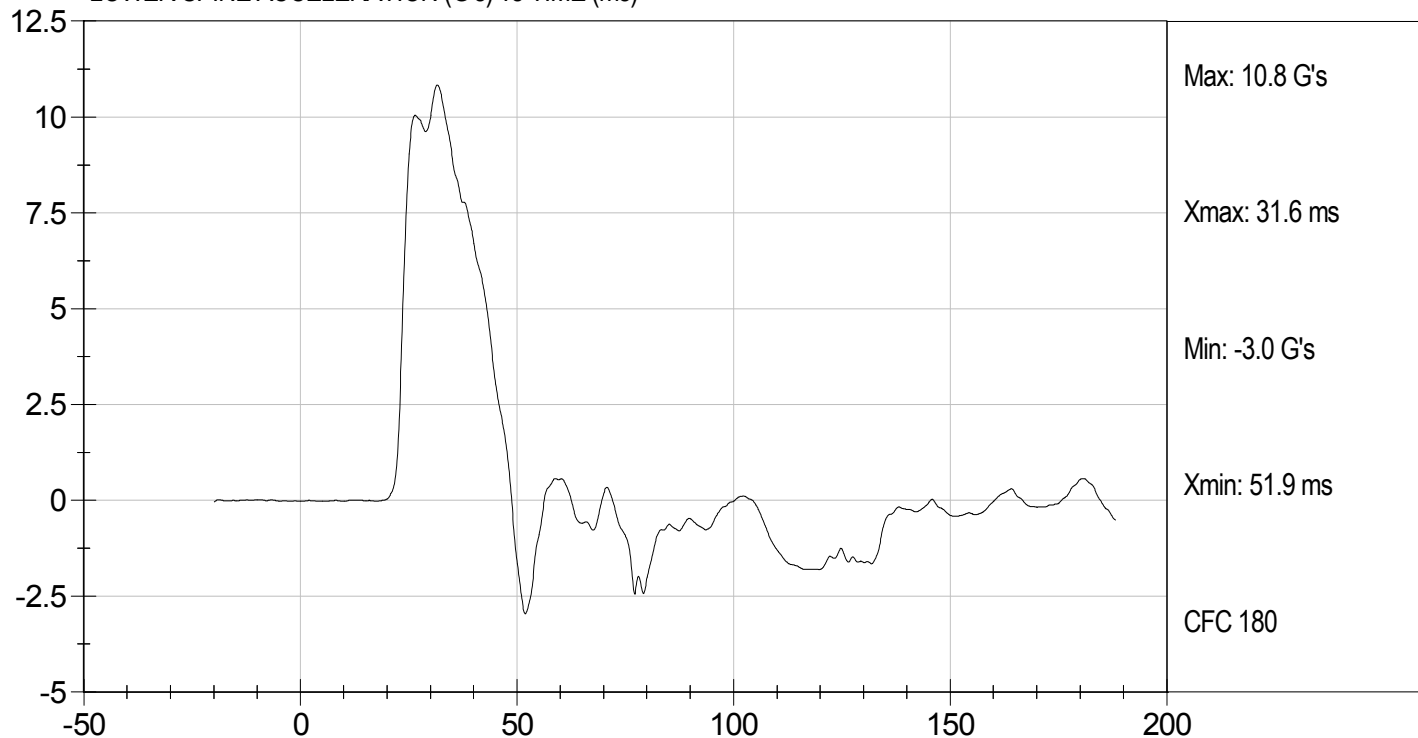
Test Desc: Abdomen Impact
Component ID: D102856

Test Date: 9/2/10
Velocity: 14.36 ft/s, 4.38 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: D102857

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	55	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	40	Pass
Peak Acetabulum Force	N	3600 to 4300	4146	Pass
Overall Test Results				Pass


Laboratory Technician

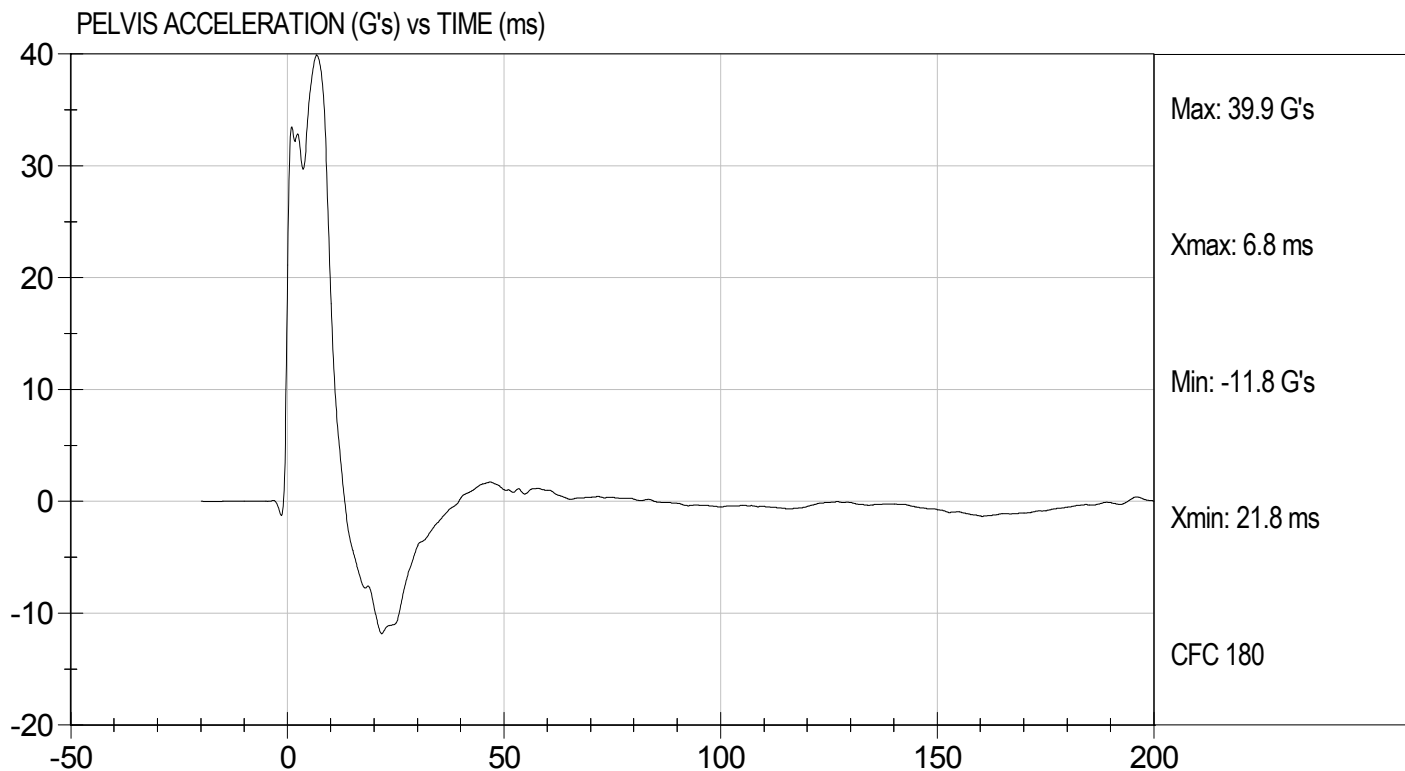
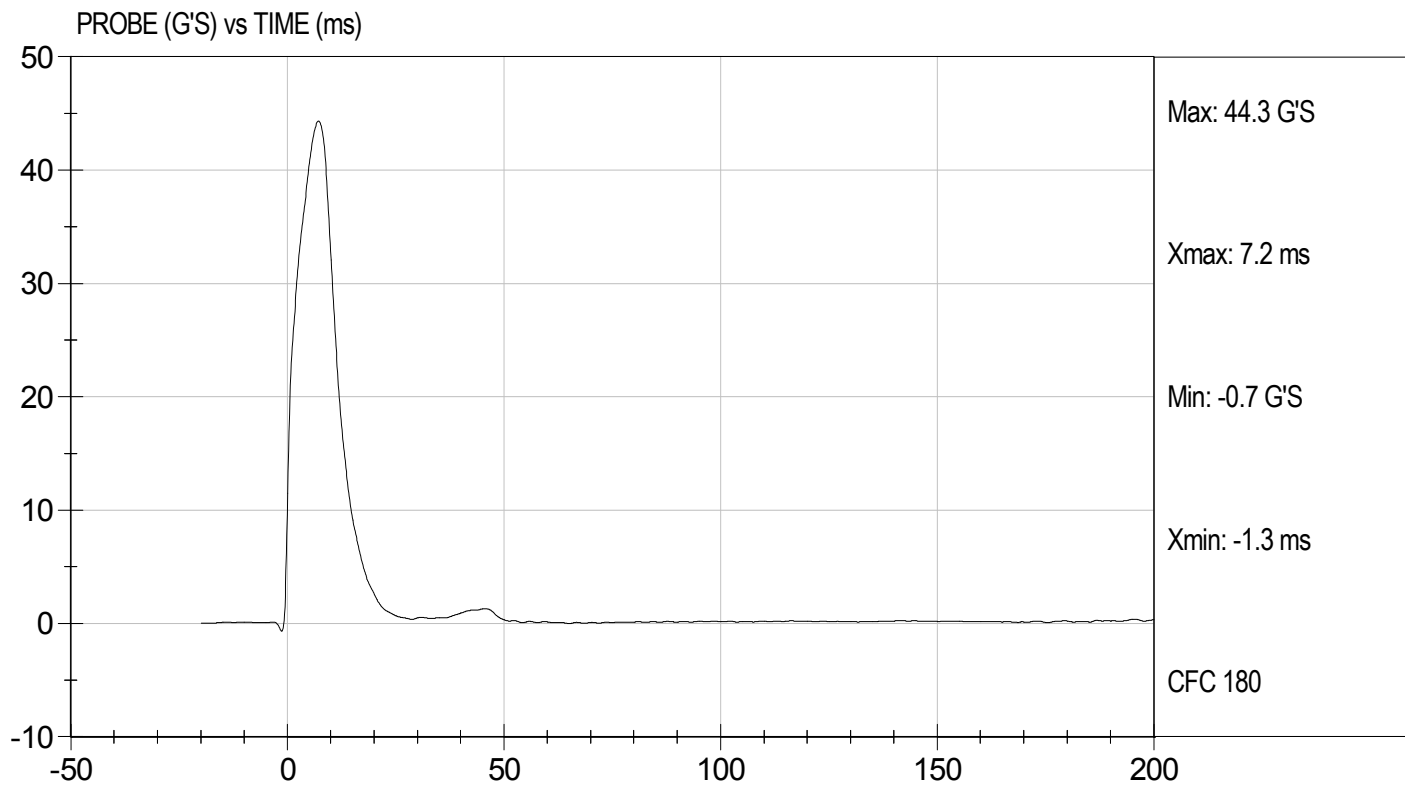
9/2/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D102857

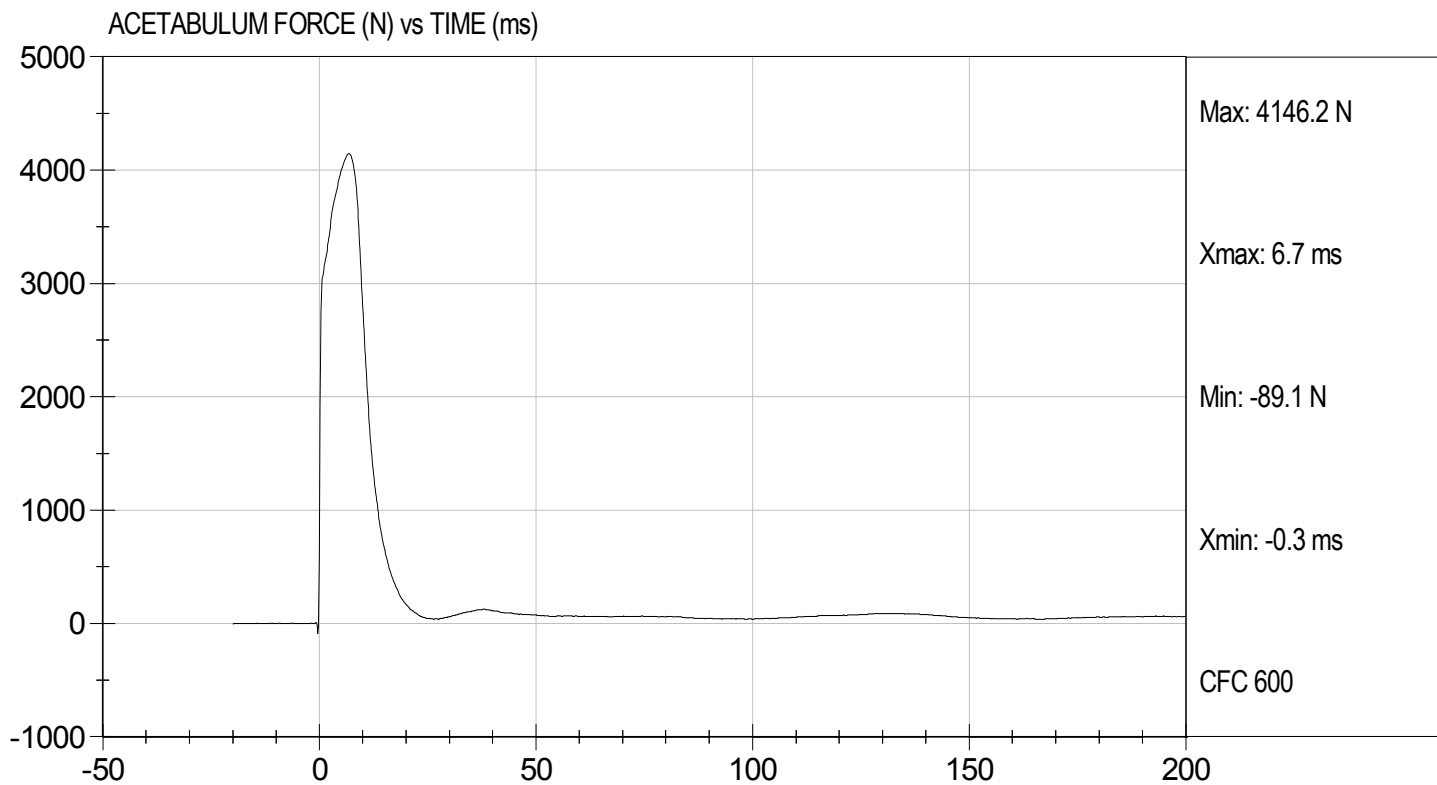
Test Date: 9/2/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Pelvis Impact
Component ID: D102857

Test Date: 9/2/10
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: D102858

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.2	Pass
Humidity	%	10 to 70	50	Pass
Impact Velocity	m/s	4.20 to 4.40	4.33	Pass
Peak Impactor Acceleration	G's	36 to 45	37	Pass
Pelvis Y Acceleration	G's	28 to 39	33	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4503	Pass
Overall Test Results			Pass	


Laboratory Technician

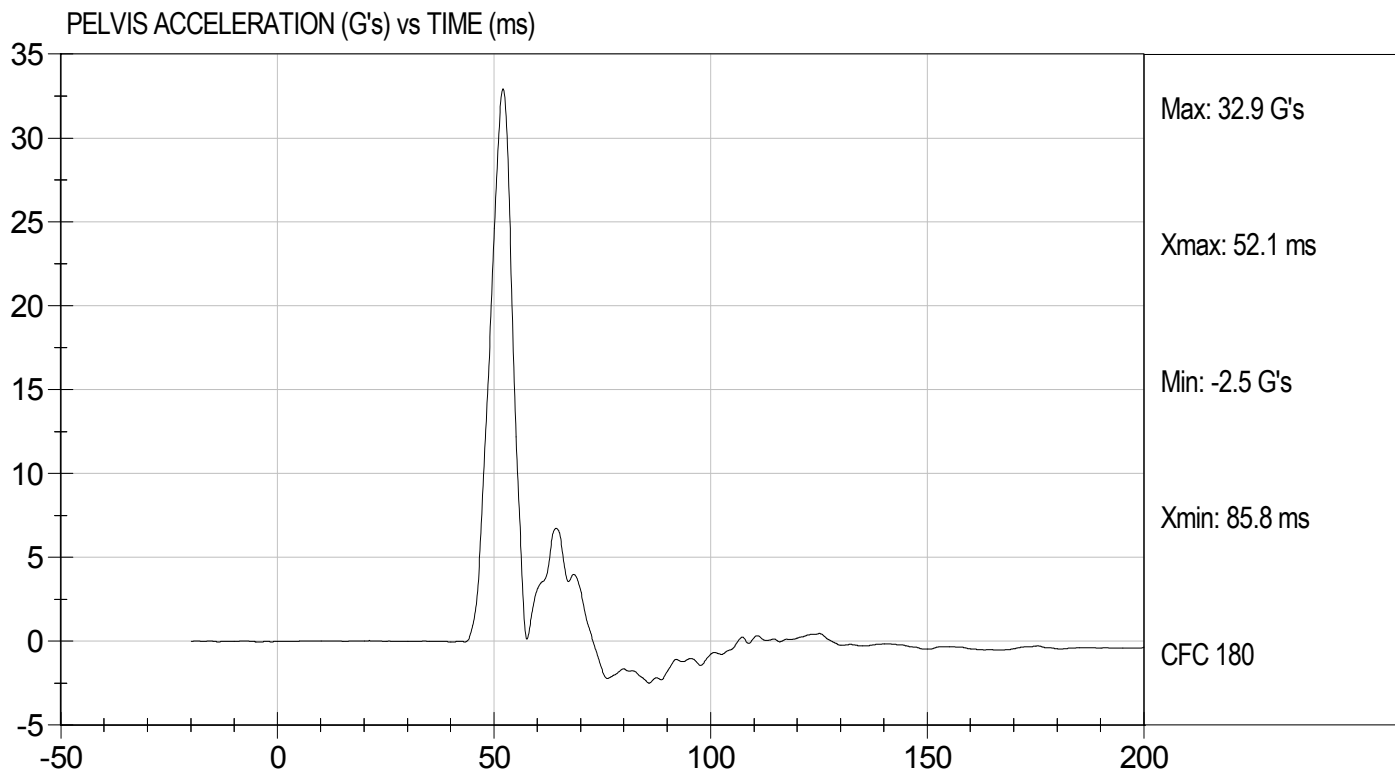
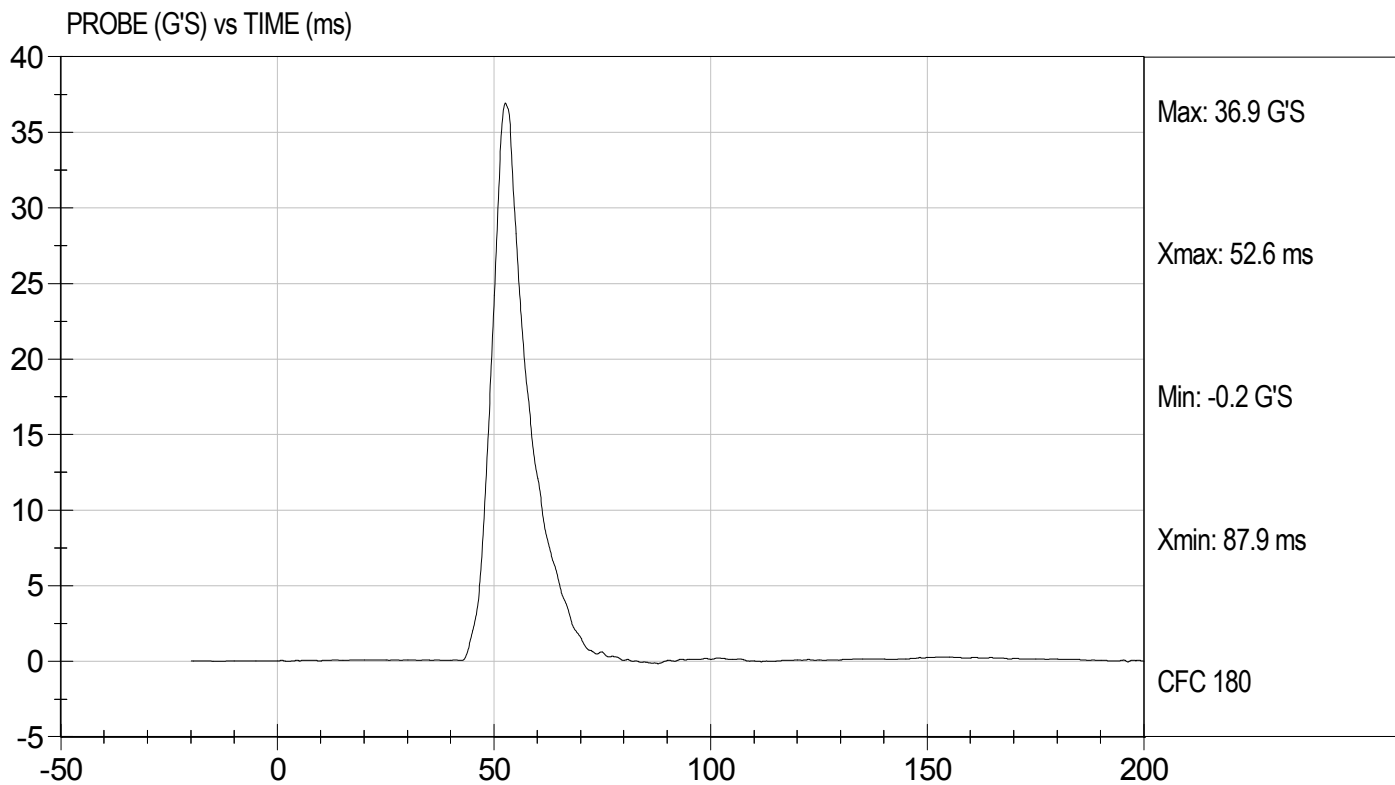
9/2/10
Test Date


Approved By



Test Desc: Iliac Impact
Component ID: D102858

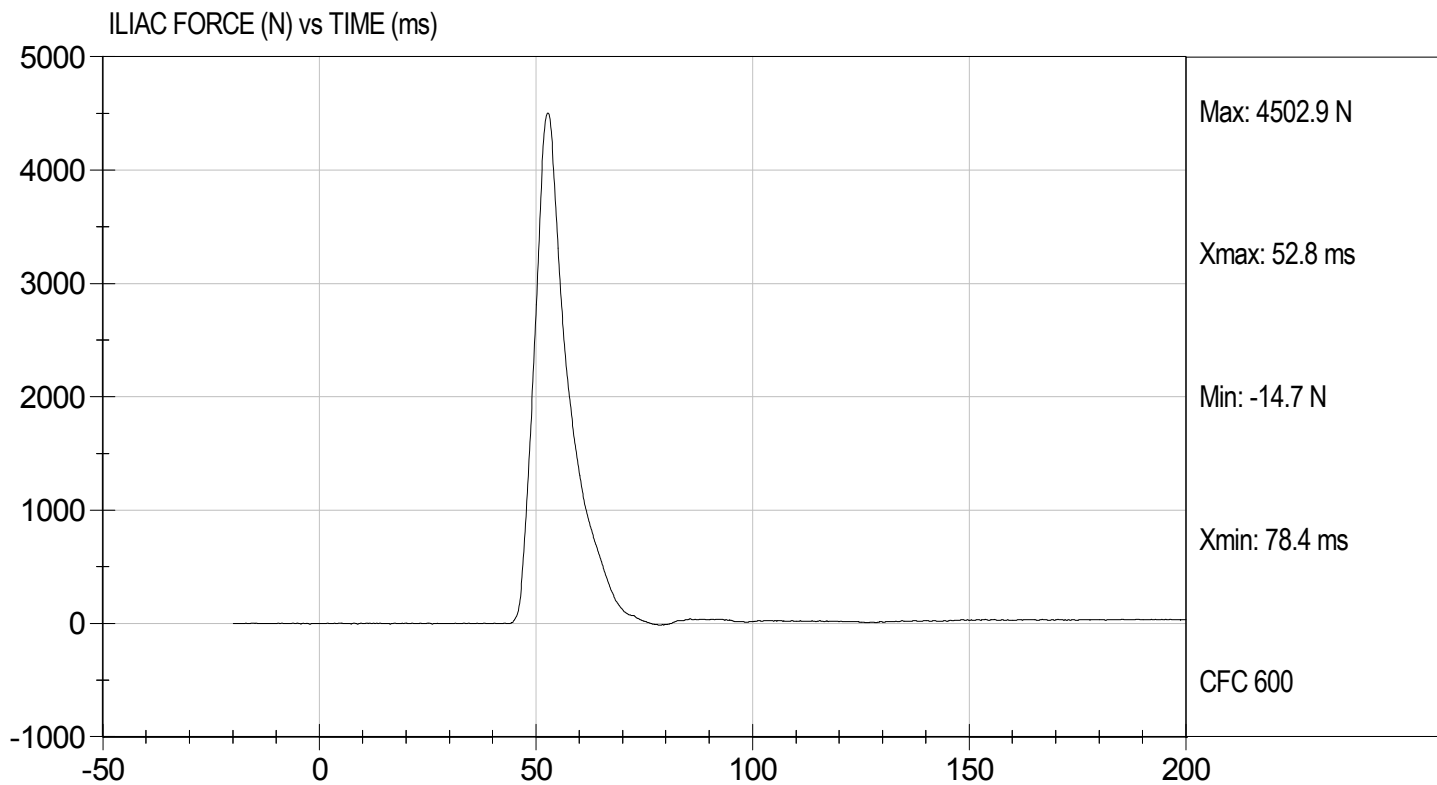
Test Date: 9/2/10
Velocity: 14.2 ft/s, 4.33 m/s





Test Desc: Iliac Impact
Component ID: D102858

Test Date: 9/2/10
Velocity: 14.2 ft/s, 4.33 m/s



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

ATD Serial No: 296

Test ID: D102941

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	115 to 137	120	Pass
Peak Lateral Acceleration	G's	+/- 15	2.2	Pass
Unimodal	N/A	<15%	Yes	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

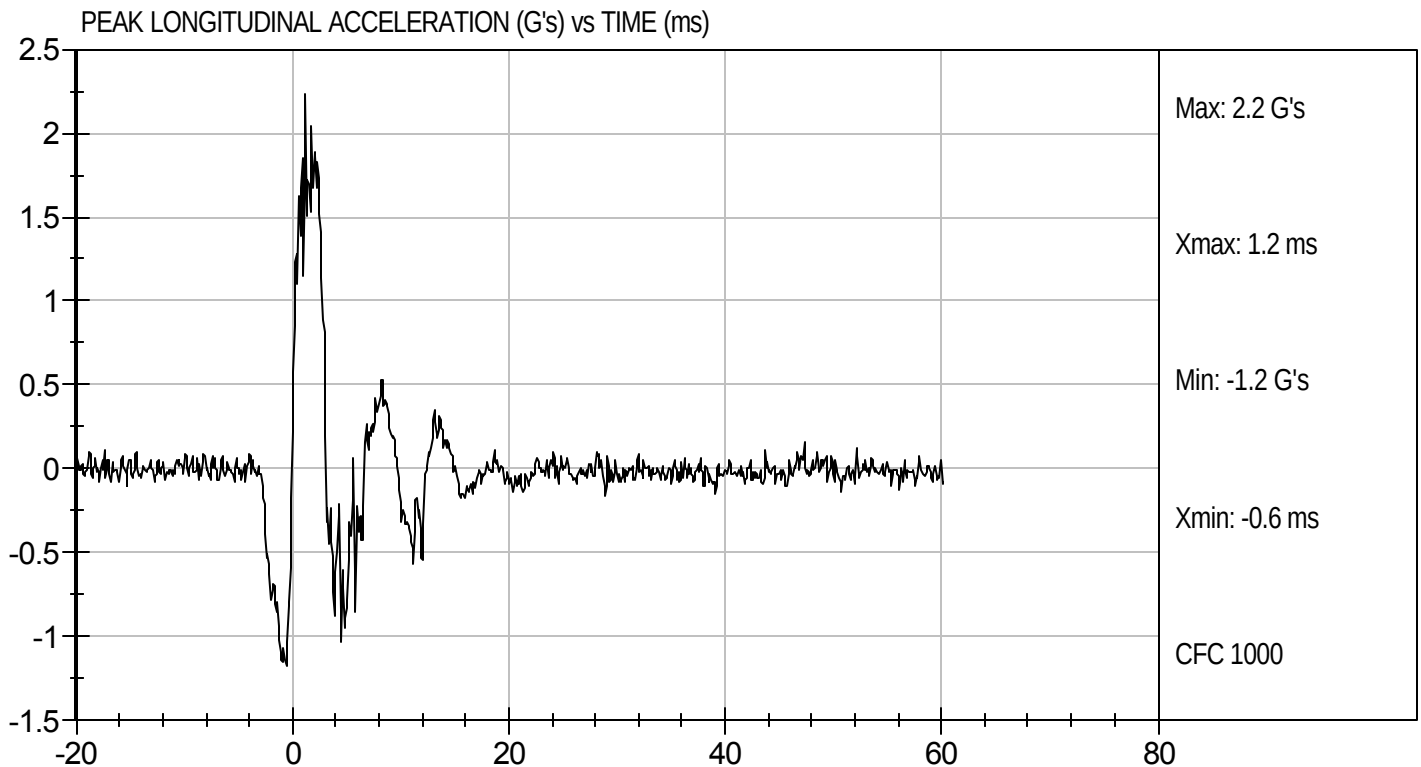
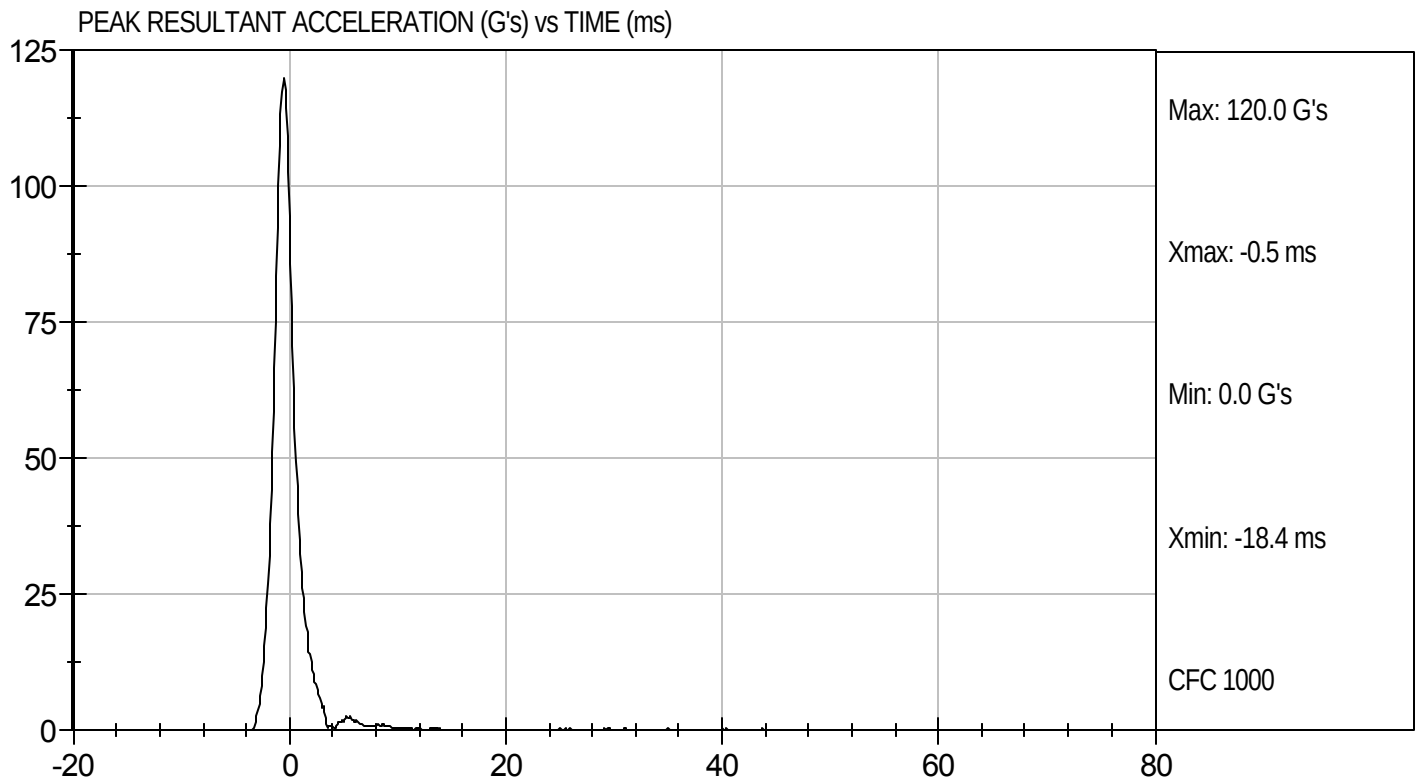
9/8/10
Test Date

David Winkelbauer
Approved By



Test Desc: Head Drop
Component ID: D102941

Test Date: 9/8/10
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: D102942

Tested Parameter		Units	Specification	Result	Pass/Fail
Temperature		deg C	20.6 to 22.2	22.0	Pass
Humidity		%	10 to 70	44	Pass
Impact Velocity		m/s	5.51 to 5.63	5.58	Pass
Delta Velocity	10 ms	m/s	2.20 to 2.80	2.52	Pass
	15 ms	m/s	3.30 to 4.10	3.64	Pass
	20 ms	m/s	4.40 to 5.40	4.88	Pass
	25 ms	m/s	5.40 to 6.10	5.52	Pass
	25-100 ms	m/s	5.50 to 6.20	5.53	Pass
Maximum D-Plane Rotation		deg	71 to 81	72	Pass
Time of Maximum D-Plane Rotation		ms	50 to 70	60	Pass
Maximum Occipital Condyle Moment during Rotation Interval Nm			-44 to -36	-43.5	Pass
Time of Moment Decay to 0 Nm		ms	102 to 126	115	Pass
Overall Test Results				Pass	


 Laboratory Technician

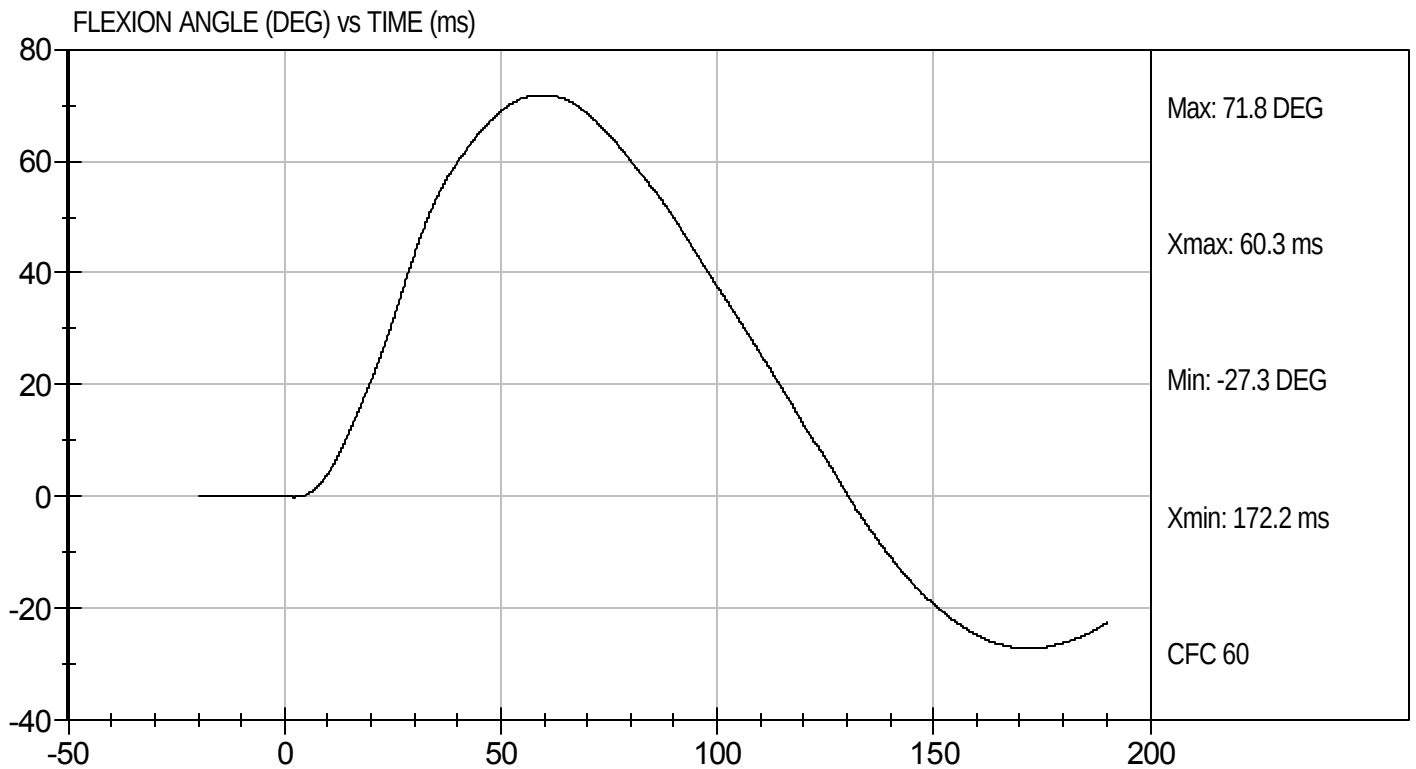
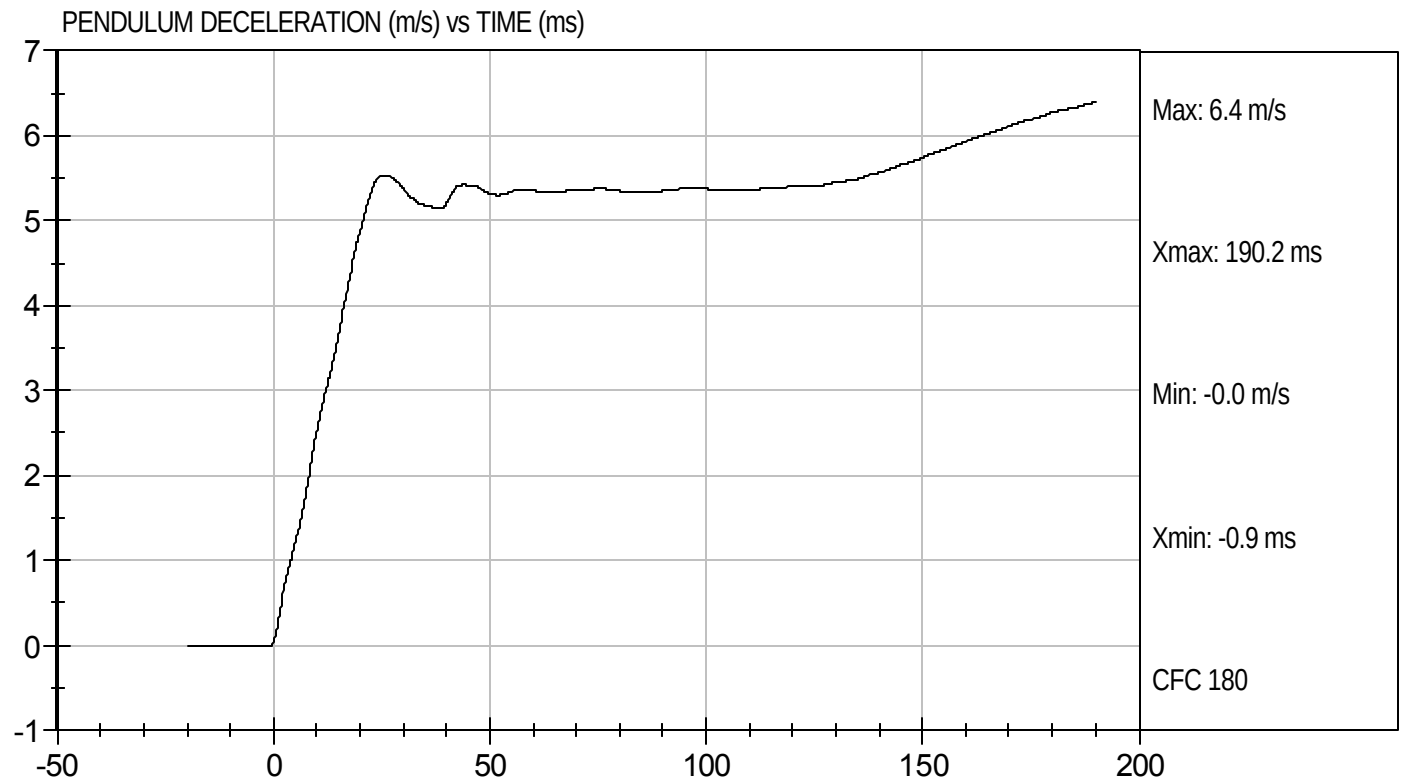
9/9/10
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D102942

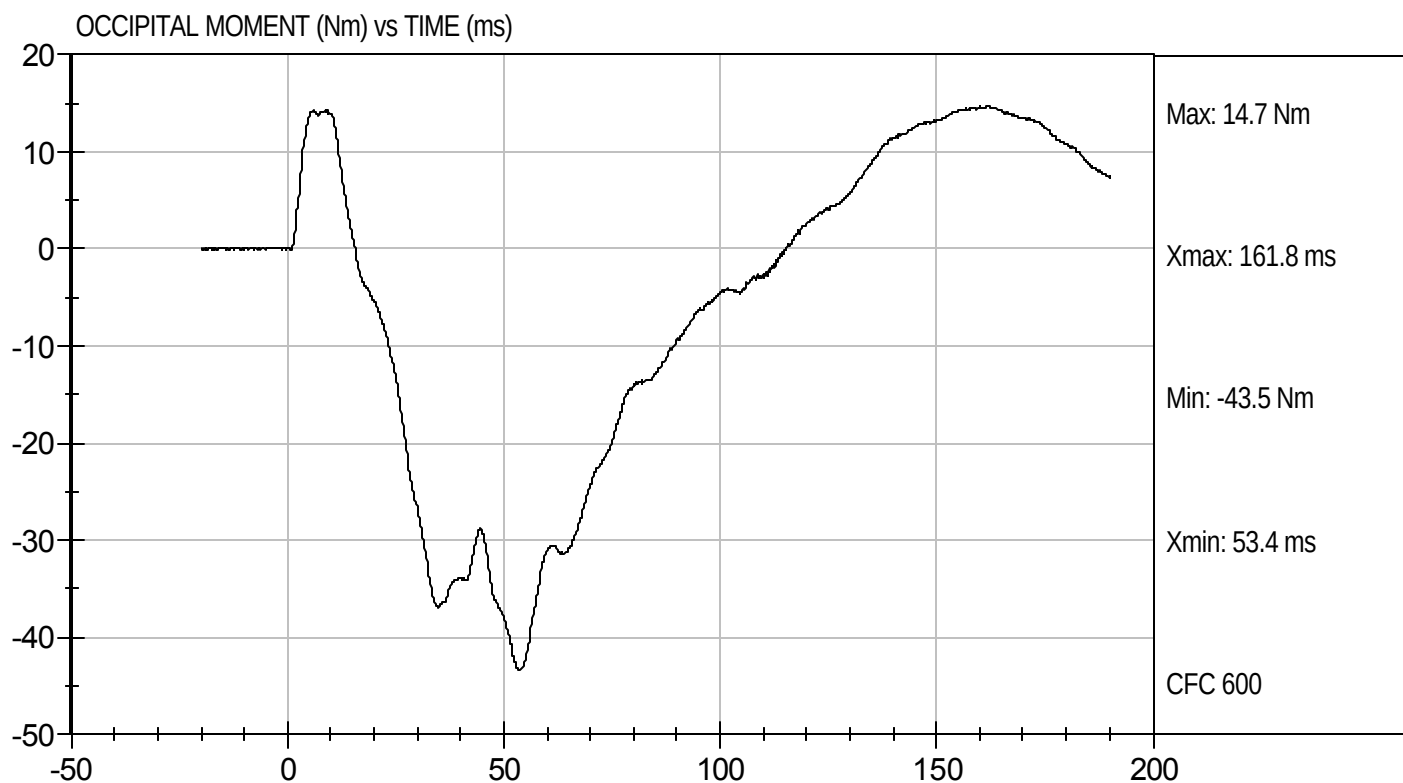
Test Date: 9/9/10
Velocity: 18.32 ft/s, 5.58 m/s





Test Desc: Neck Bending
Component ID: D102942

Test Date: 9/9/10
Velocity: 18.32 ft/s, 5.58 m/s

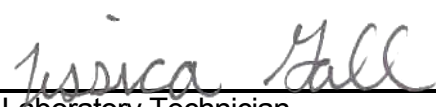


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-Its BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D102943

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	44	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	32	Pass
Upper Spine (T1) Y Acceleration	G's	17 to 22	18	Pass
Overall Test Results				Pass


Laboratory Technician

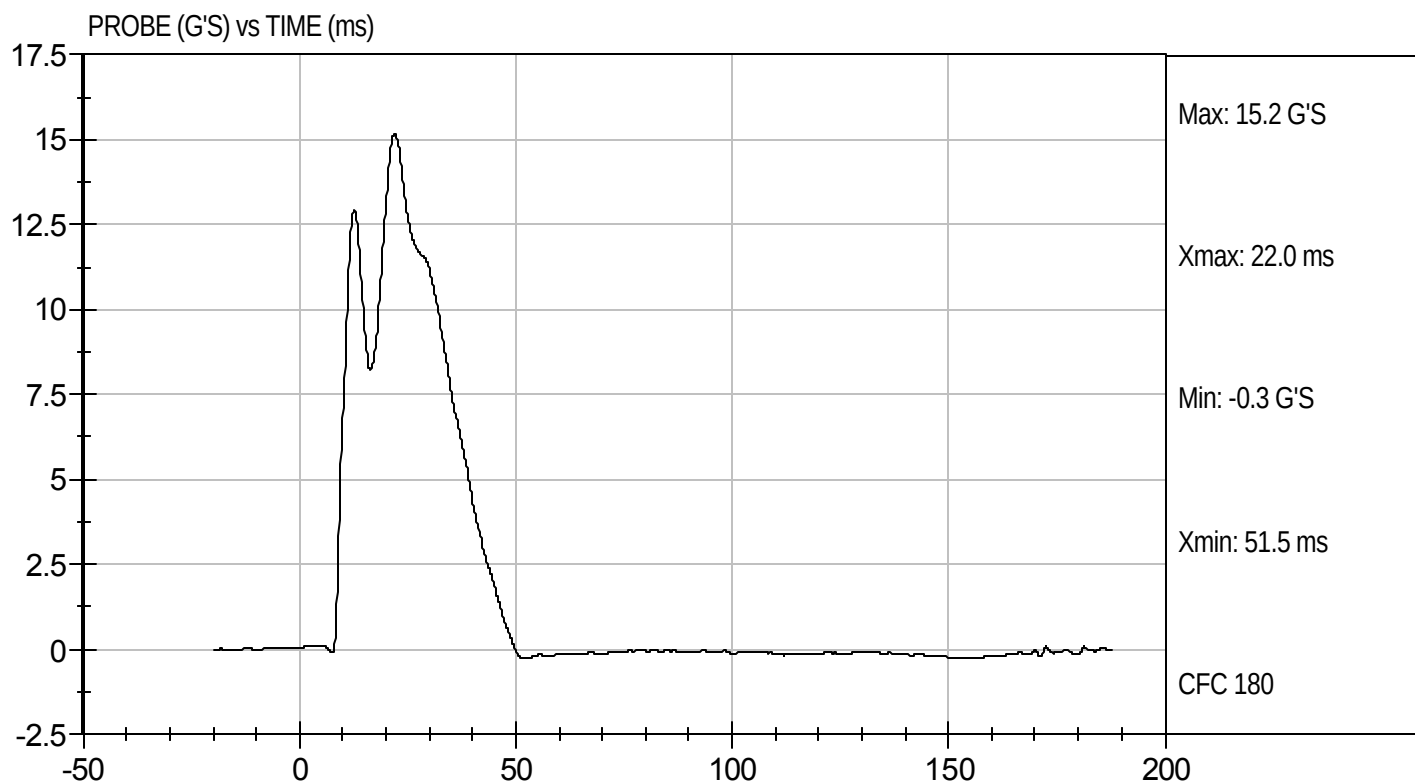
9/9/10
Test Date


Approved By



Test Desc: Shoulder Impact
Component ID: D102943

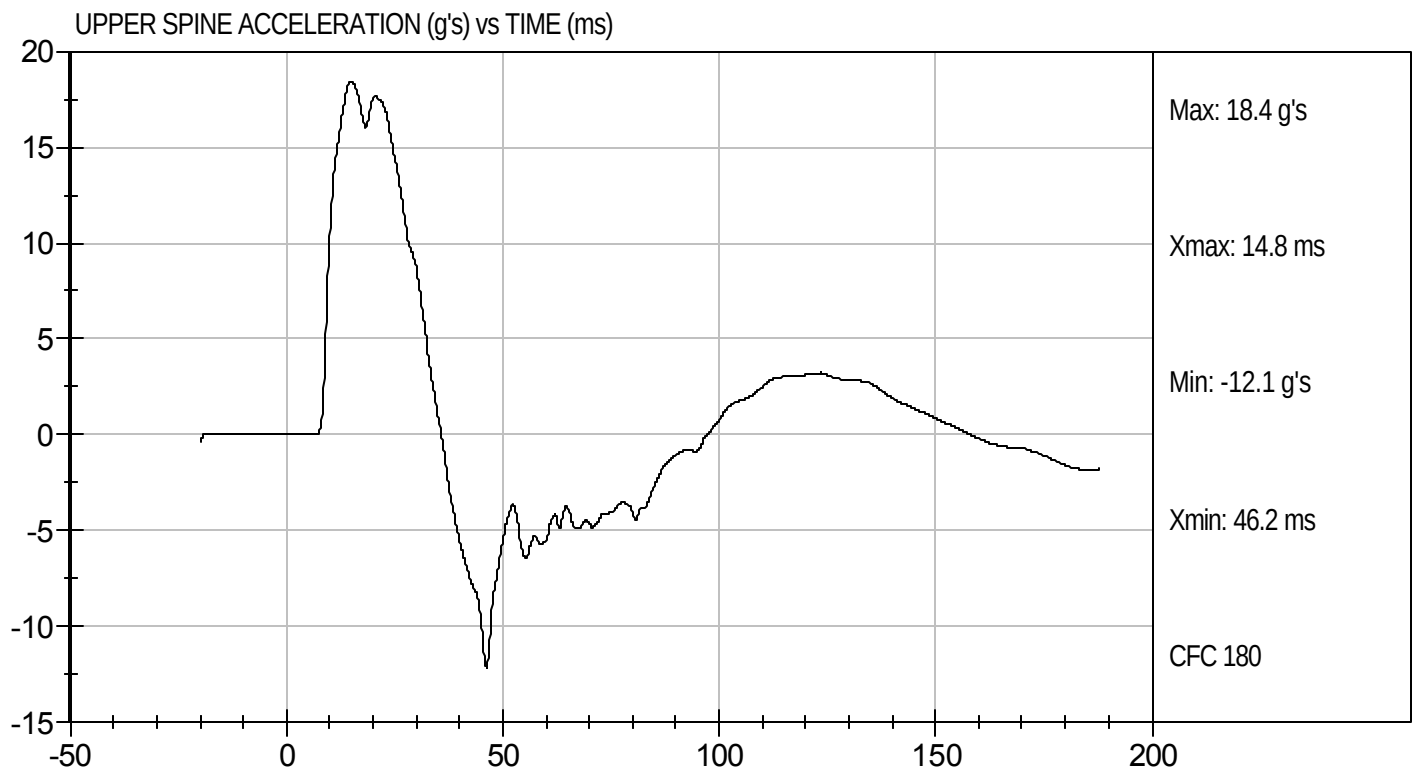
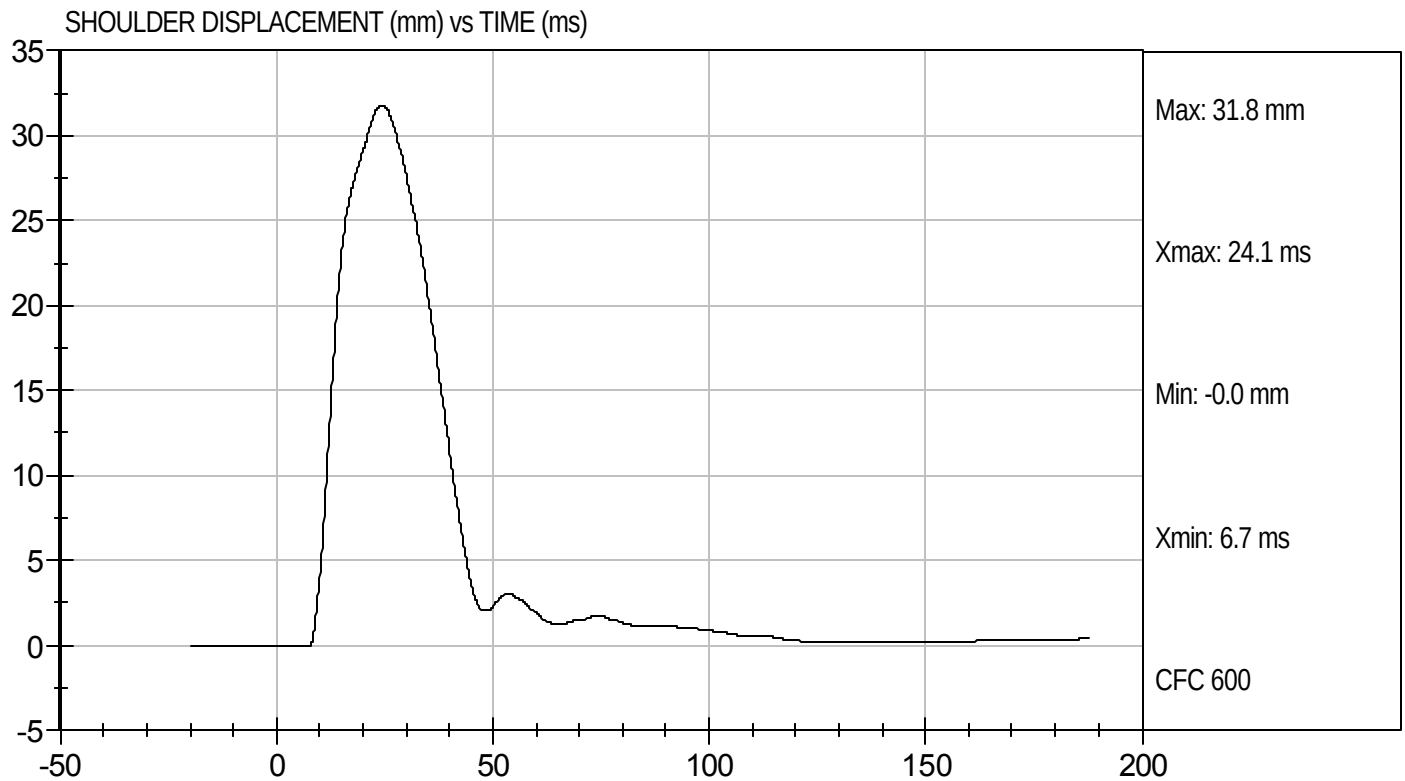
Test Date: 9/9/10
Velocity: 14.01 ft/s, 4.27 m/s





Test Desc: Shoulder Impact
Component ID: D102943

Test Date: 9/9/10
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: D102944

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.7	Pass
Humidity	%	10 to 70	44	Pass
Impact Velocity	m/s	6.60 to 6.80	6.77	Pass
Peak Impactor Acceleration	G's	30 to 36	32	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	34	Pass
Upper Spine (T1) Y Acceleration	G's	34 to 43	37	Pass
Lower Spine (T12) Y Acceleration	G's	29 to 37	32	Pass
Overall Test Results				Pass


Laboratory Technician

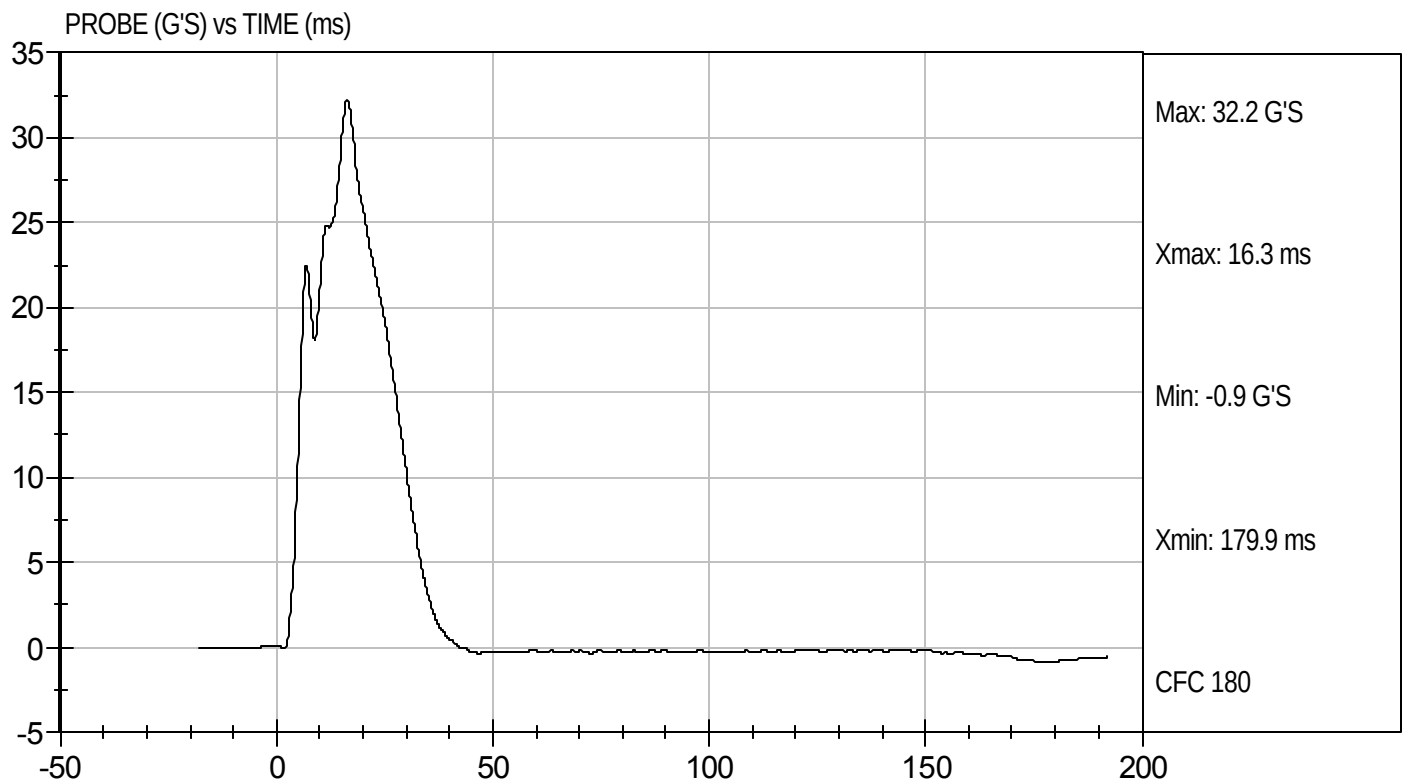
9/9/10
Test Date


Approved By



Test Desc: Thorax With Arm
Component ID: D102944

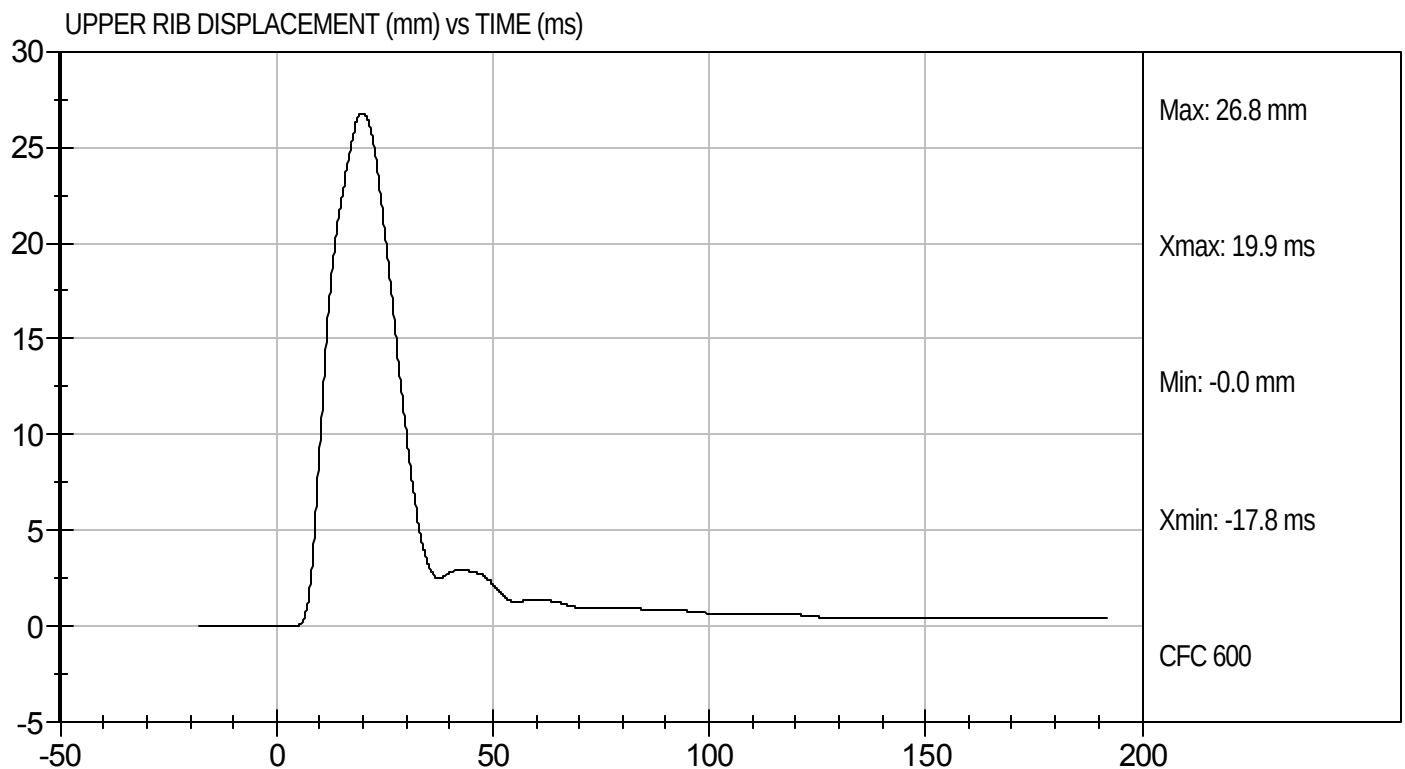
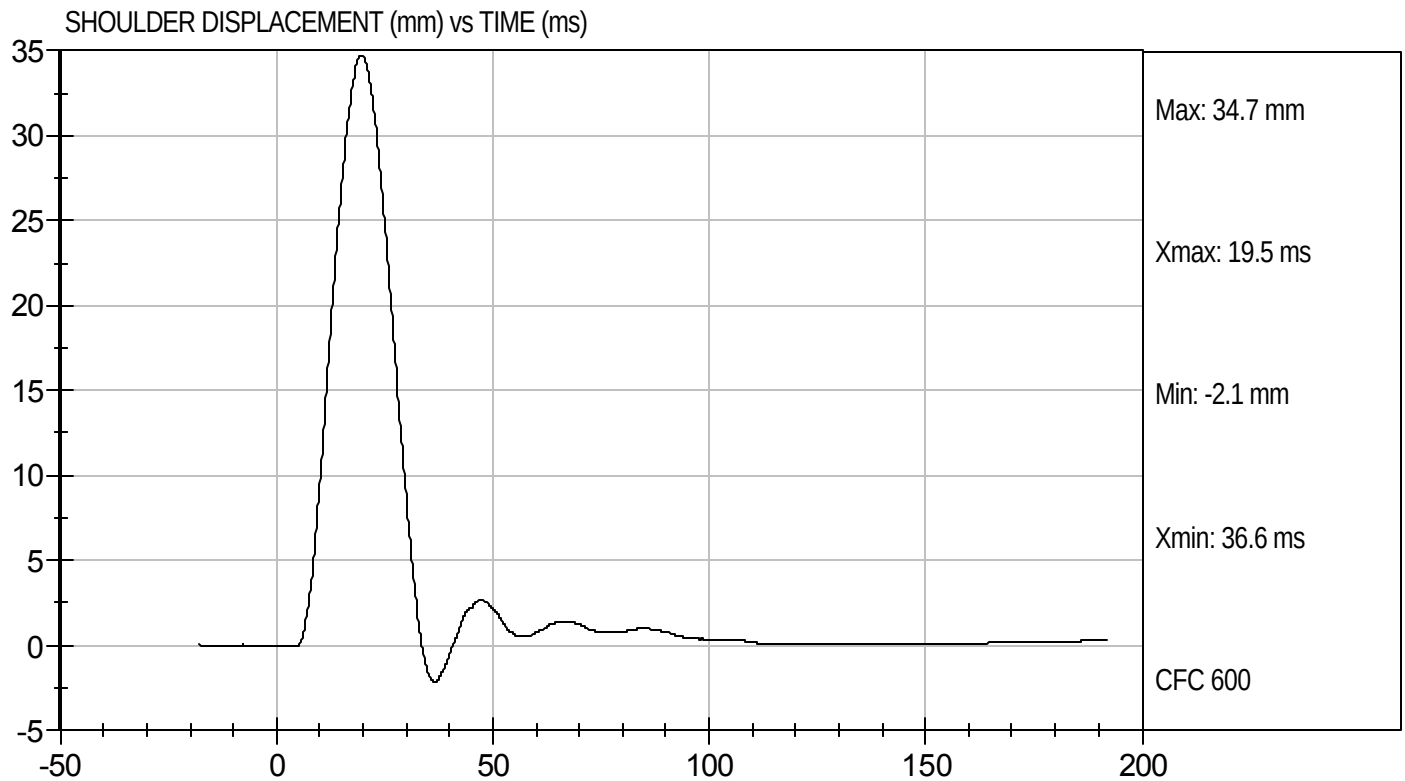
Test Date: 9/9/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D102944

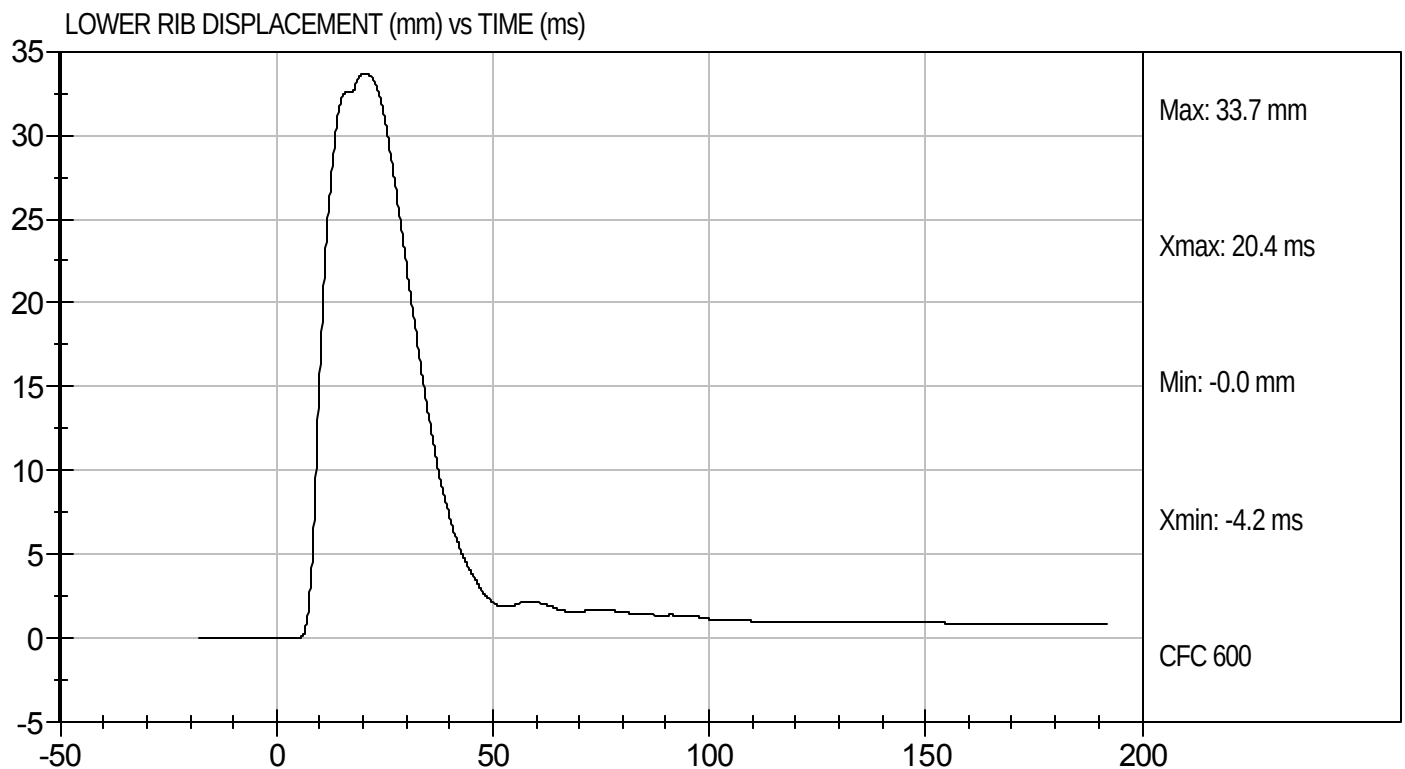
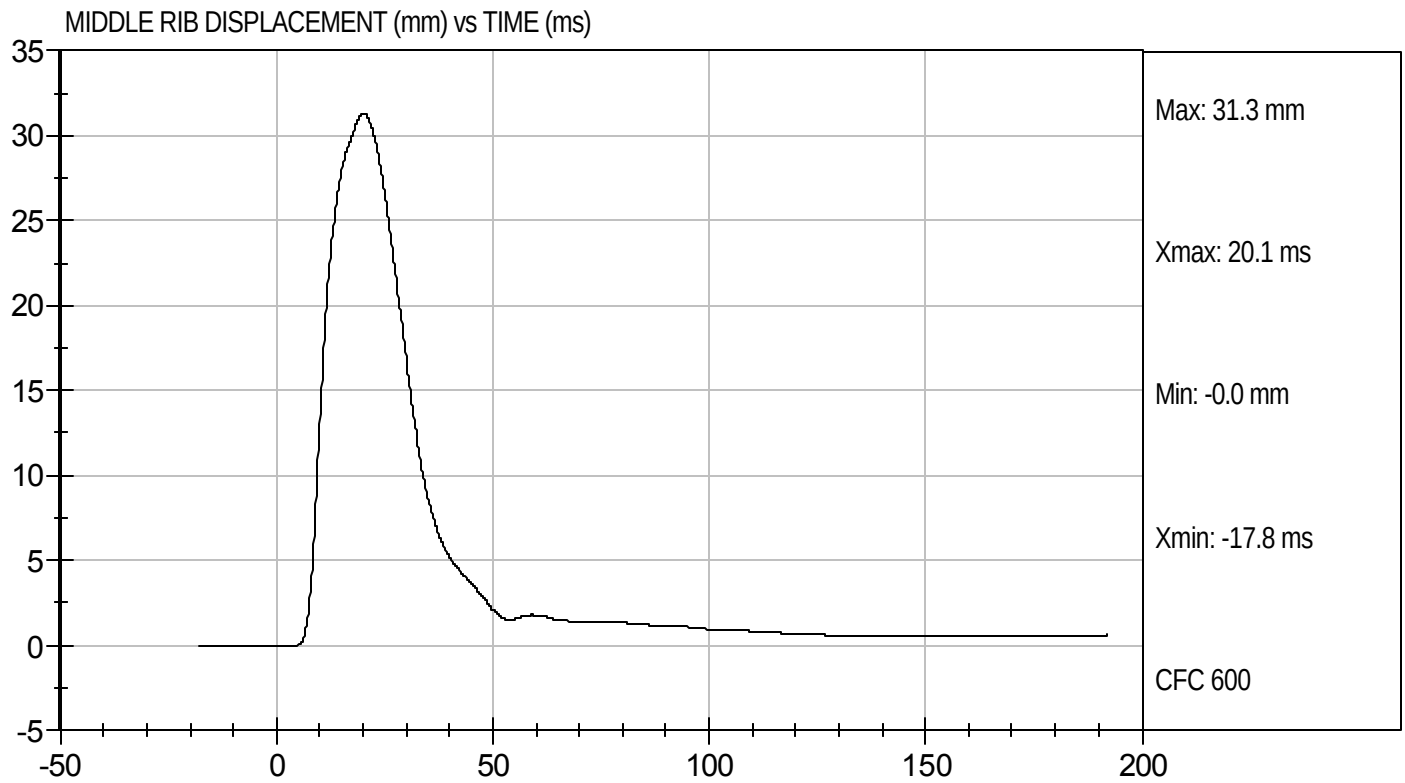
Test Date: 9/9/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D102944

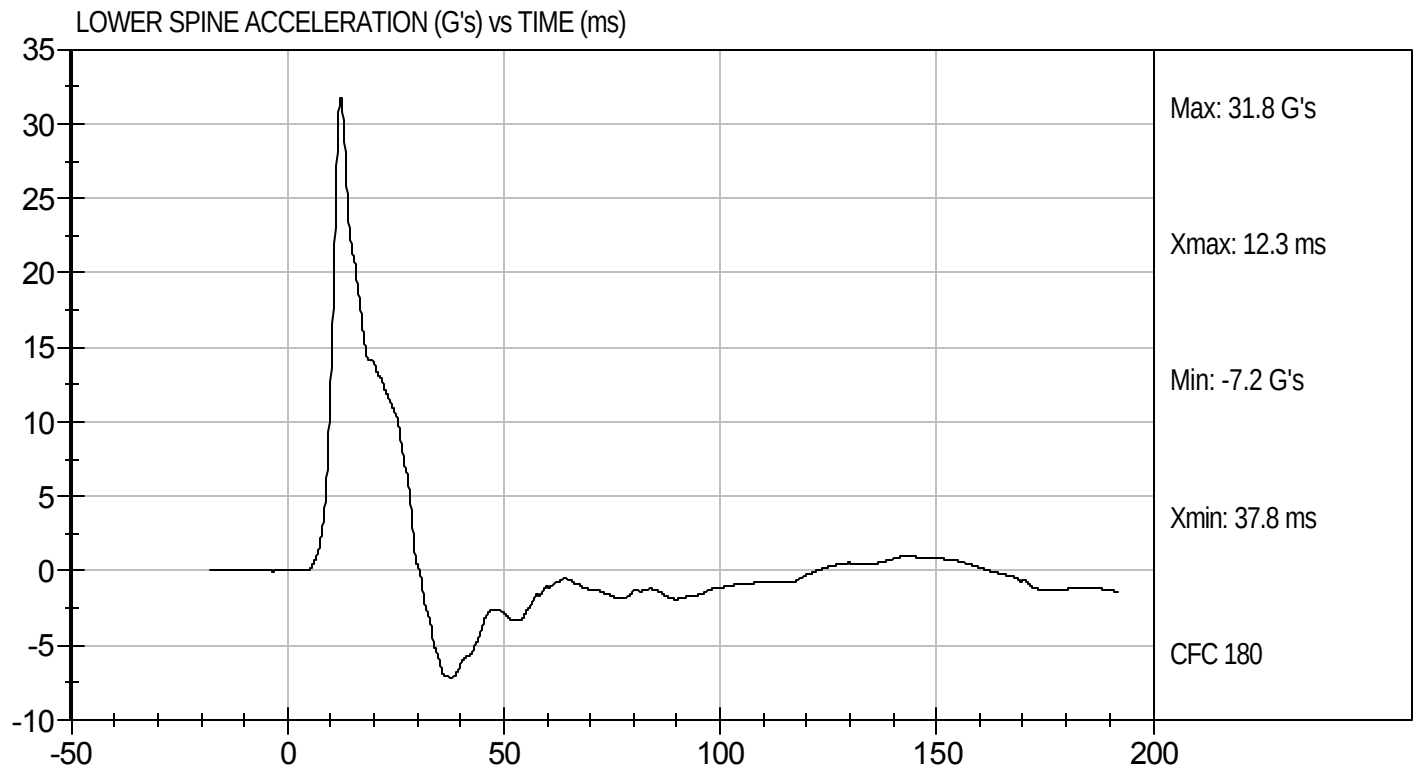
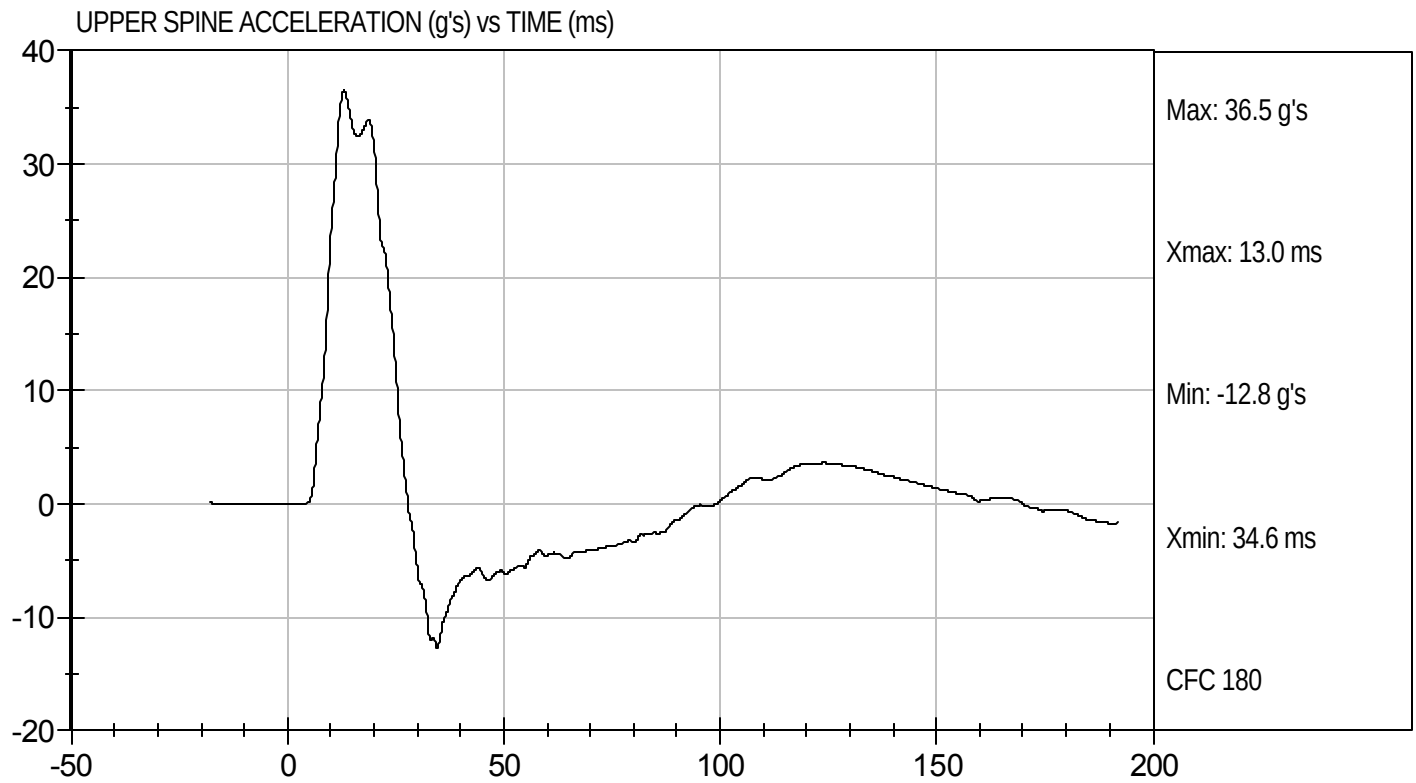
Test Date: 9/9/10
Velocity: 22.22 ft/s, 6.77 m/s





Test Desc: Thorax With Arm
Component ID: D102944

Test Date: 9/9/10
Velocity: 22.22 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: D102945

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	45	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	35	Pass
Middle Rib Displacement	mm	39 to 45	41	Pass
Lower Rib Displacement	mm	35 to 43	40	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	

Jessica Hall
Laboratory Technician

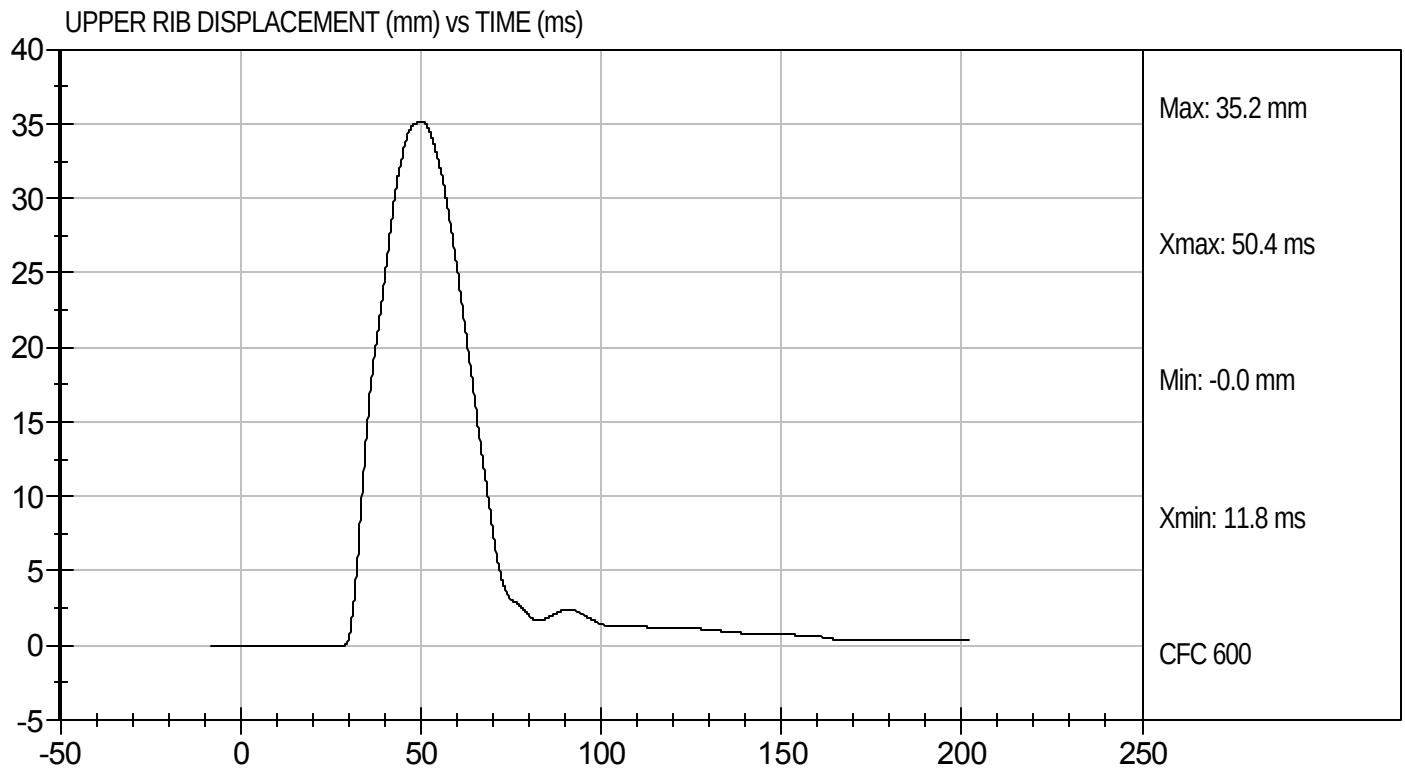
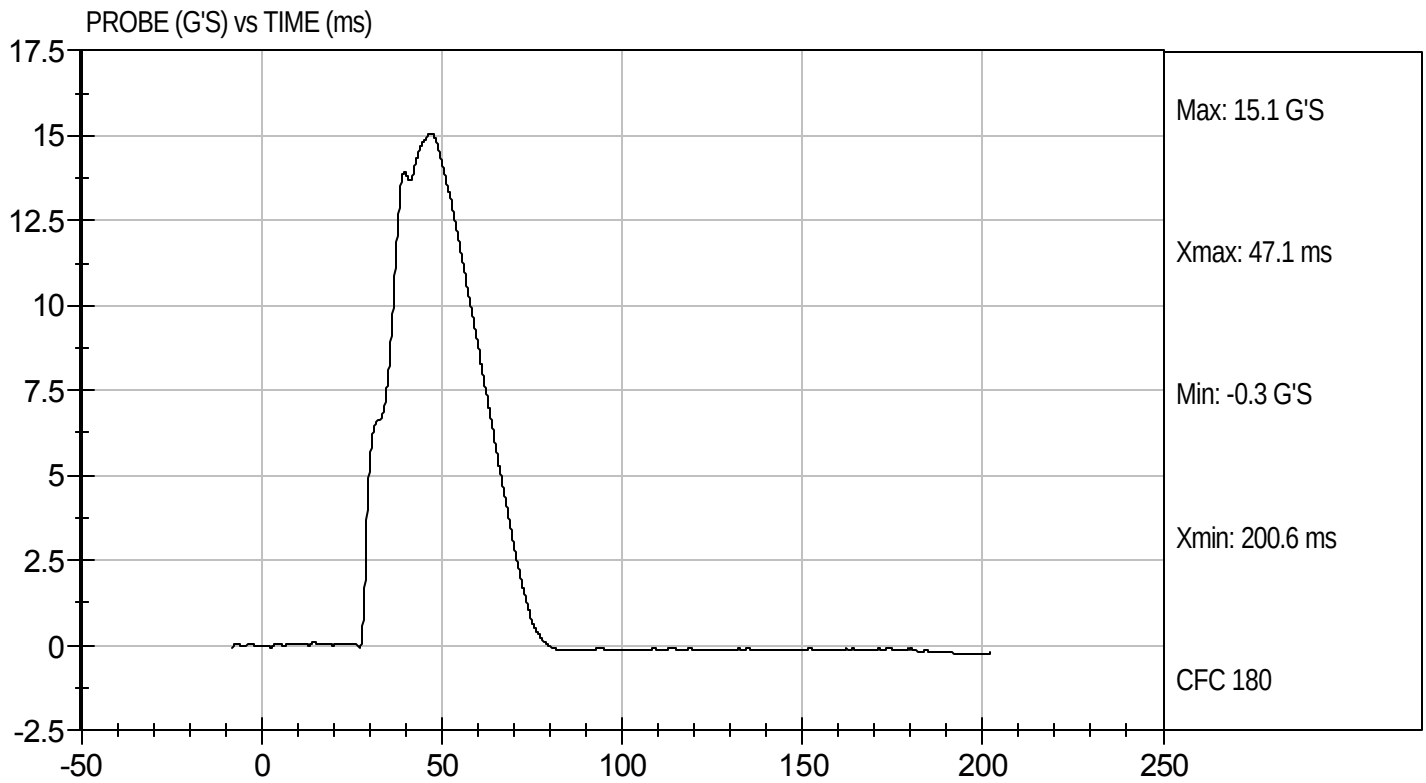
9/9/10
Test Date

David Winkelbauer
Approved By



Test Desc: Thorax Without Arm
Component ID: D102945

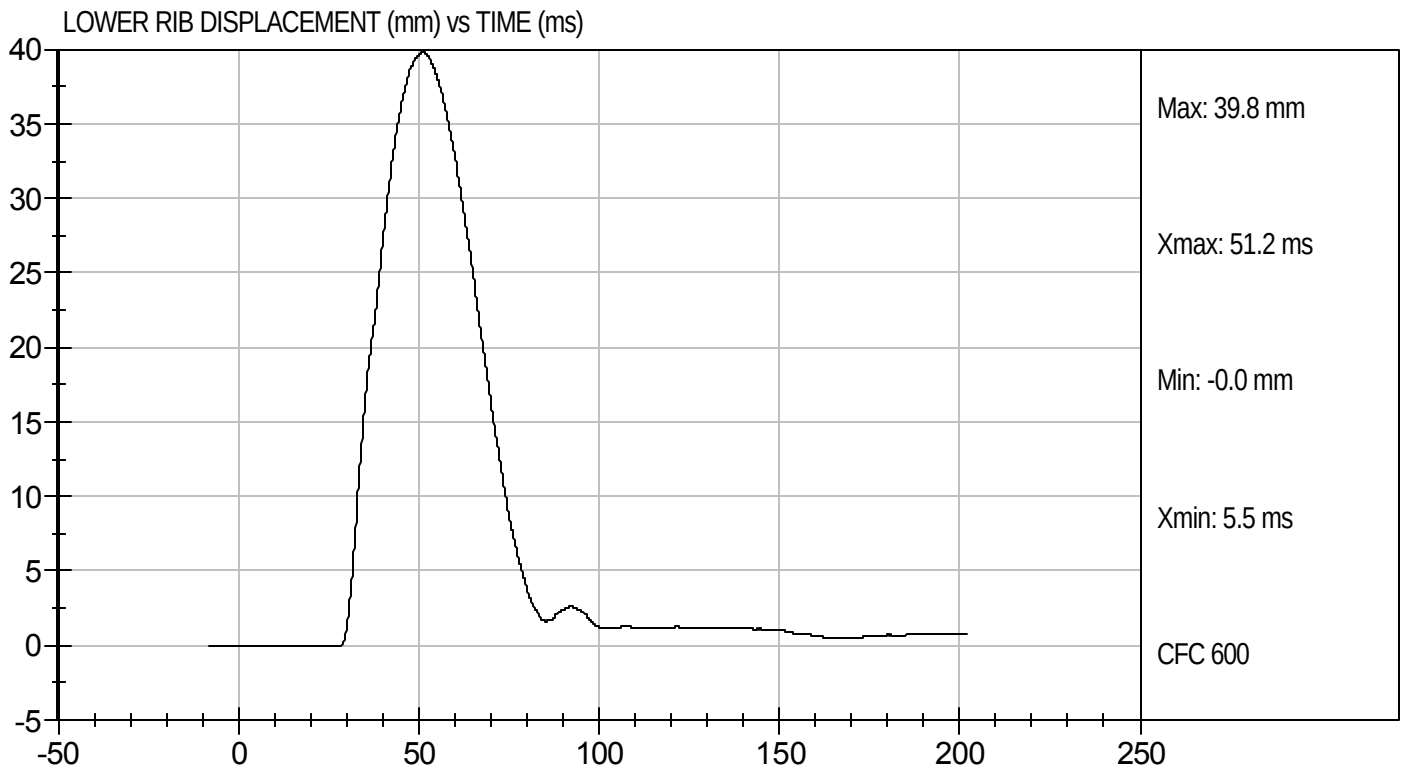
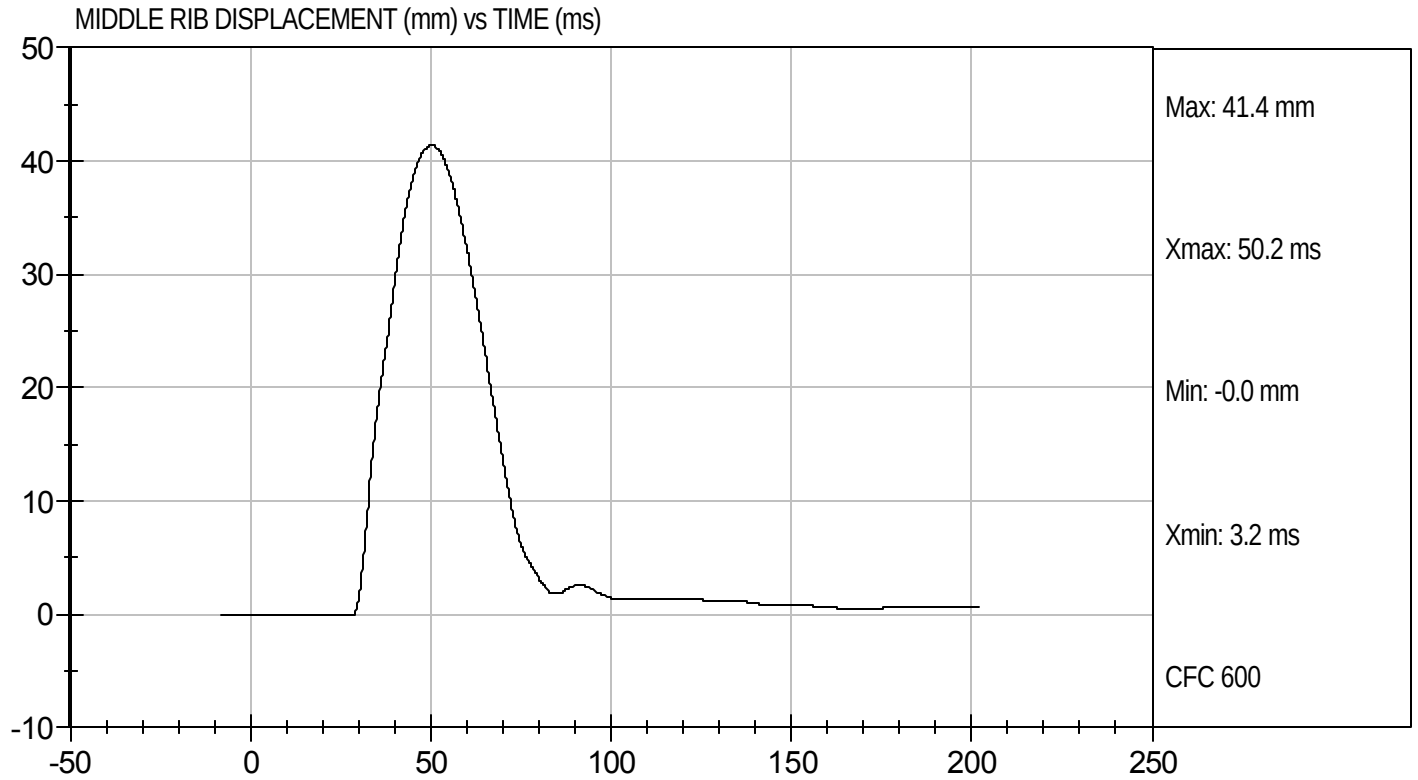
Test Date: 9/9/10
Velocity: 14.12 ft/s, 4.30 m/s





Test Desc: Thorax Without Arm
Component ID: D102945

Test Date: 9/9/10
Velocity: 14.12 ft/s, 4.30 m/s

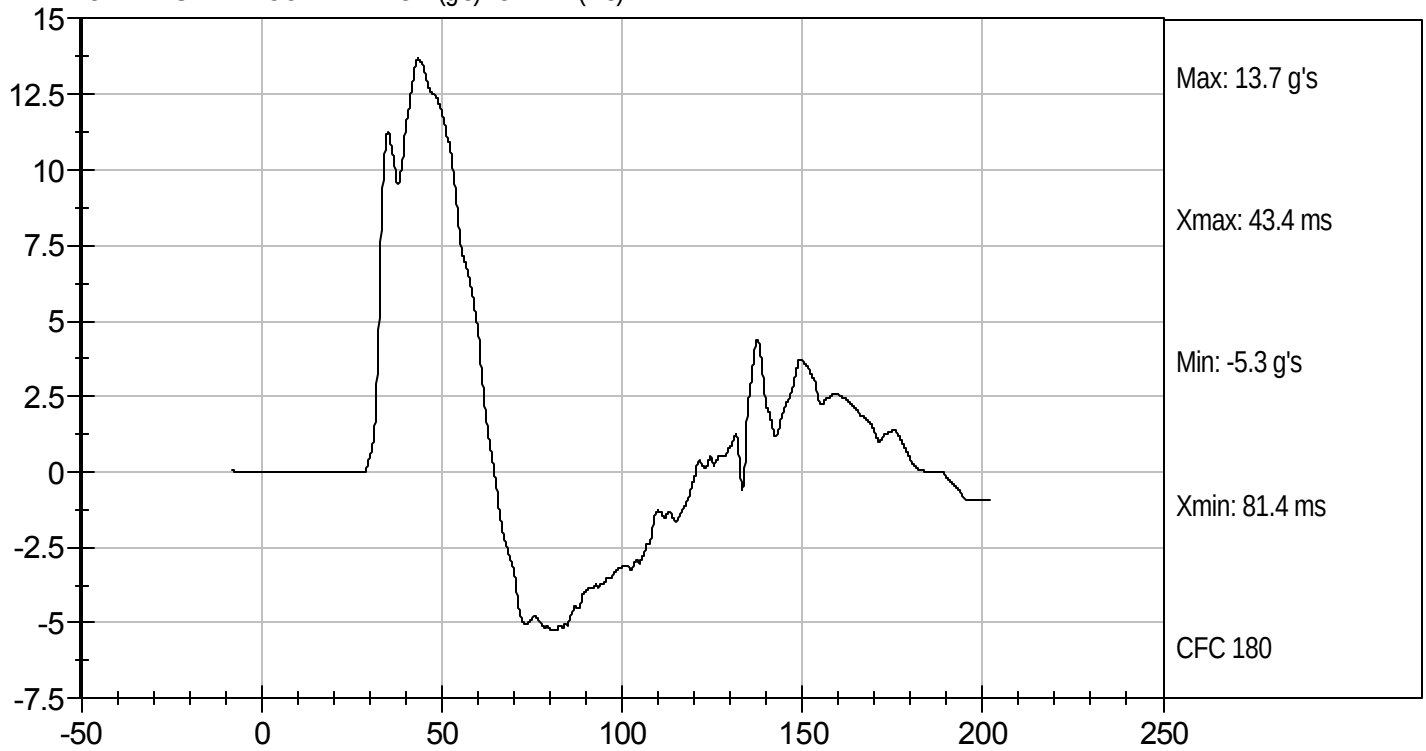




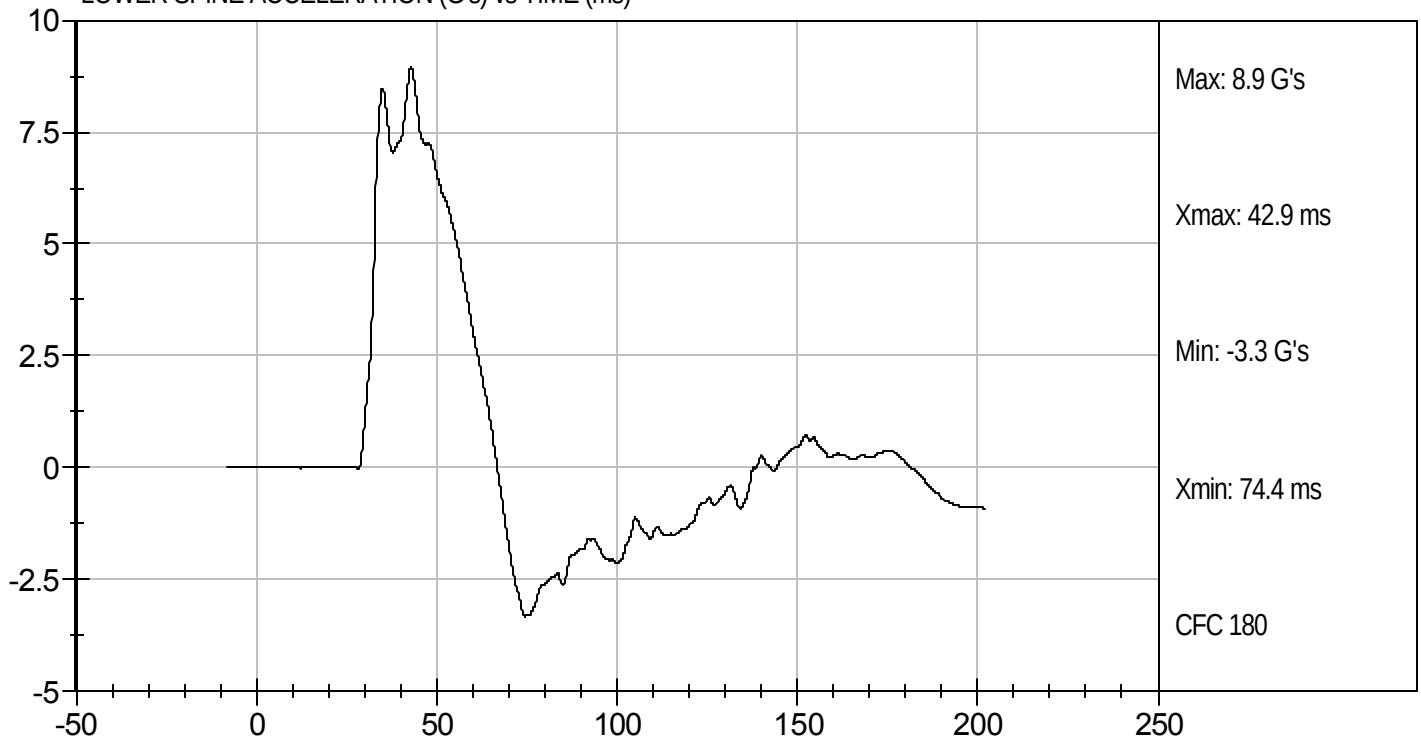
Test Desc: Thorax Without Arm
Component ID: D102945

Test Date: 9/9/10
Velocity: 14.12 ft/s, 4.30 m/s

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



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



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

ATD Serial No: 296

Test I.D: D102946

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.8	Pass
Humidity	%	10 to 70	45	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	39	Pass
Lower Spine (T12) Y Acceleration	G's	9 to 14	11	Pass
			Overall Test Results	Pass


Laboratory Technician

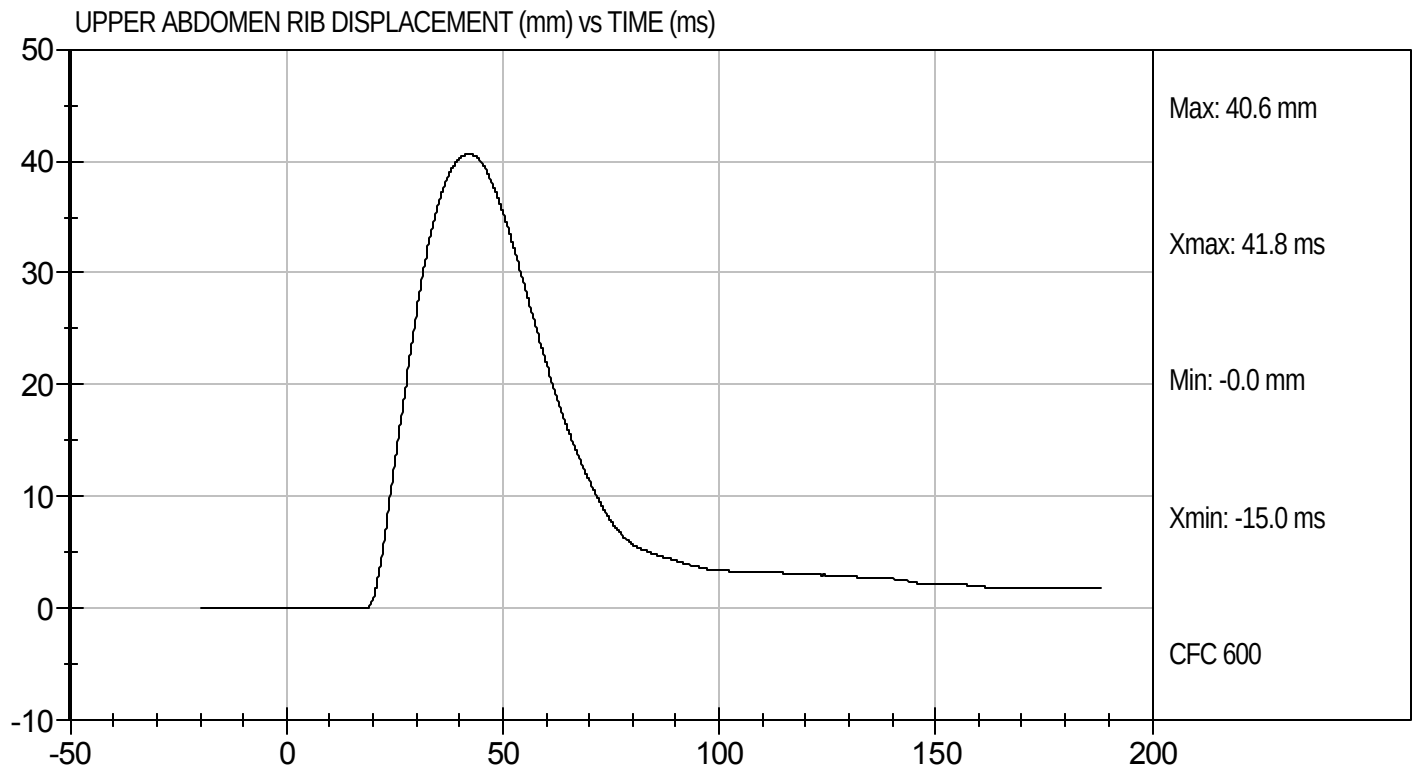
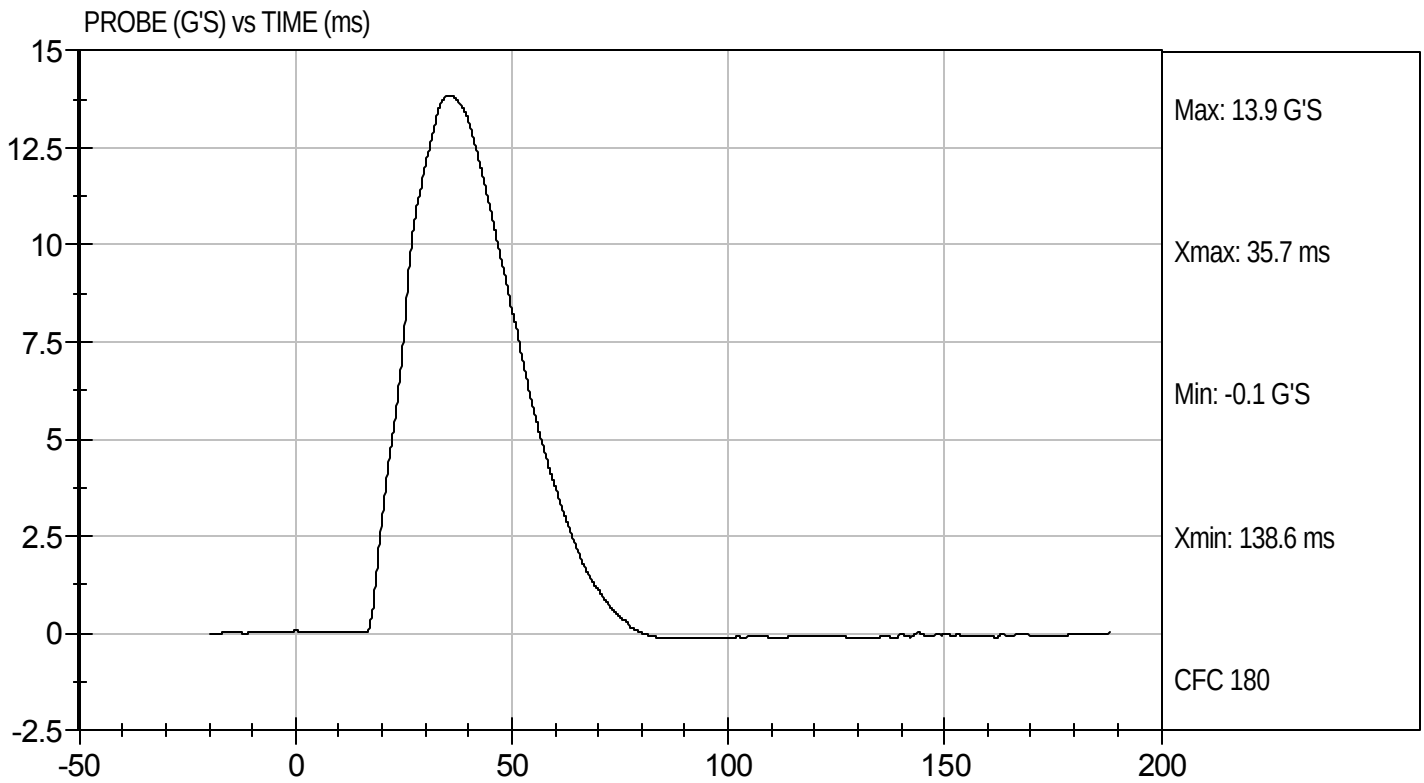
9/9/10
Test Date


Approved By



Test Desc: Abdomen Impact
Component ID: D102946

Test Date: 9/9/10
Velocity: 14.37 ft/s, 4.38 m/s

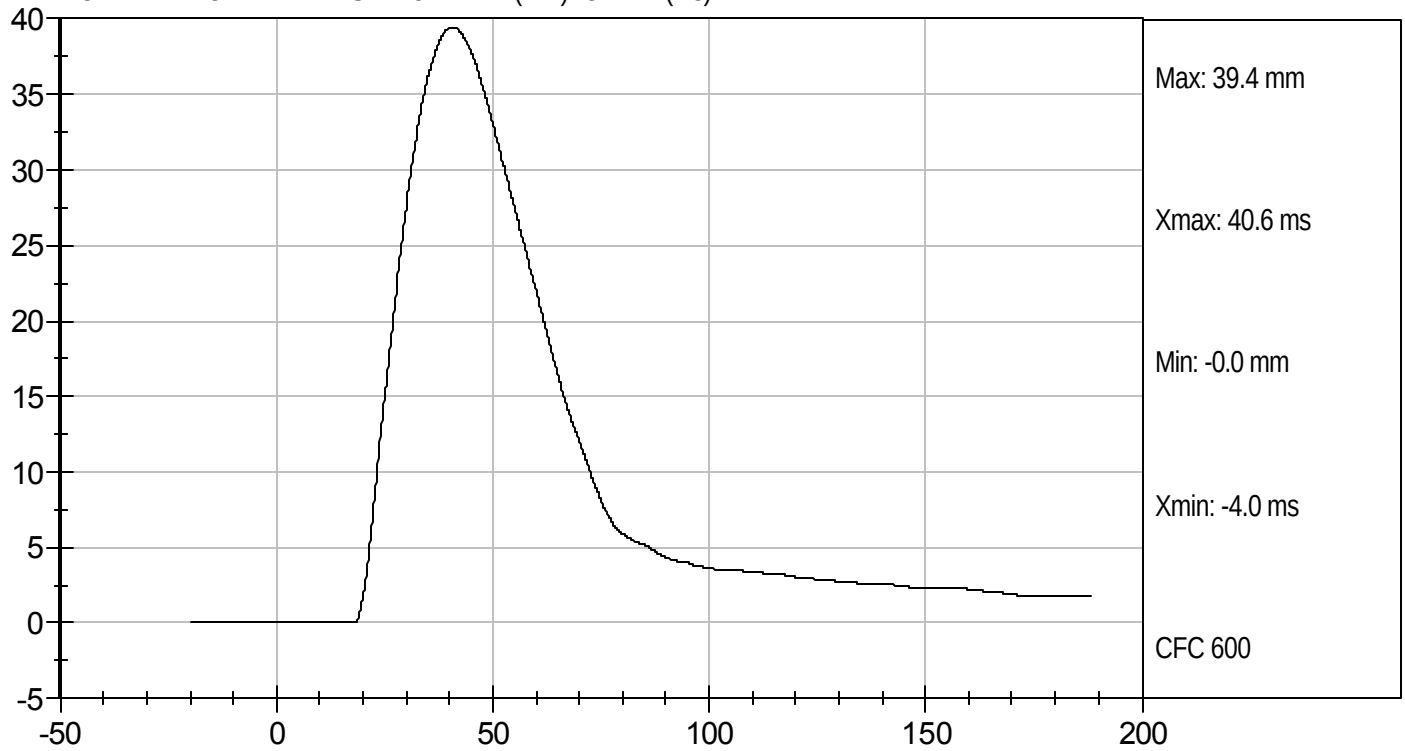




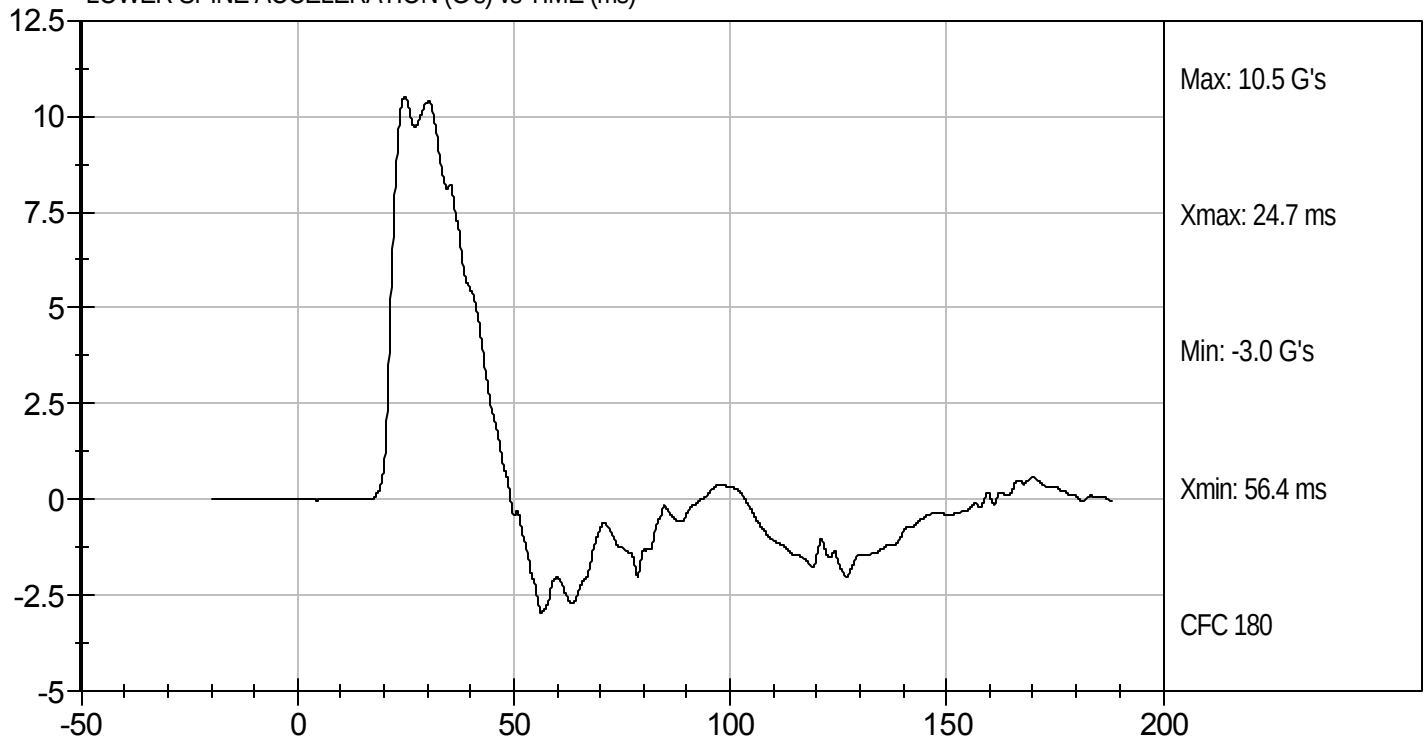
Test Desc: Abdomen Impact
Component ID: D102946

Test Date: 9/9/10
Velocity: 14.37 ft/s, 4.38 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: D102947

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	6.60 to 6.80	6.66	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	4289	Pass
Overall Test Results			Pass	


Laboratory Technician

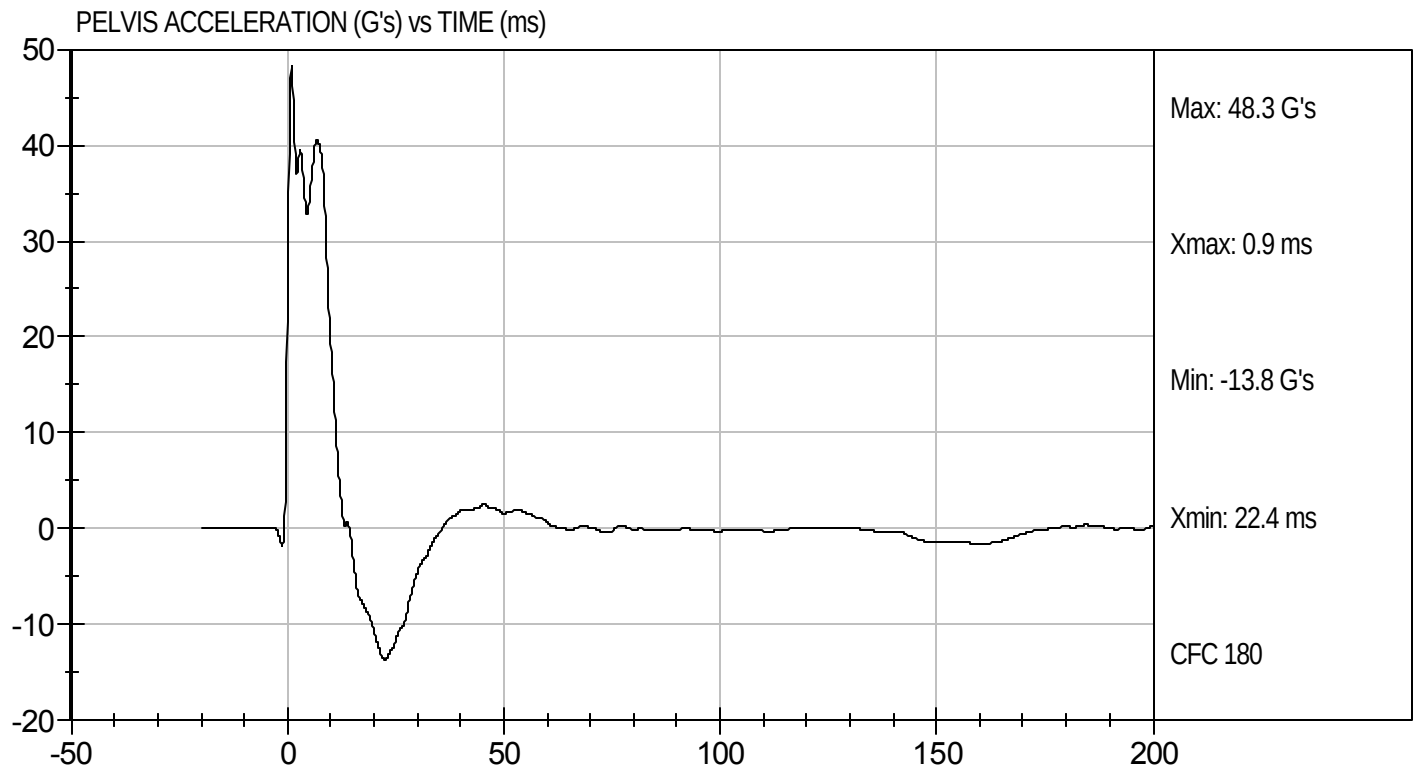
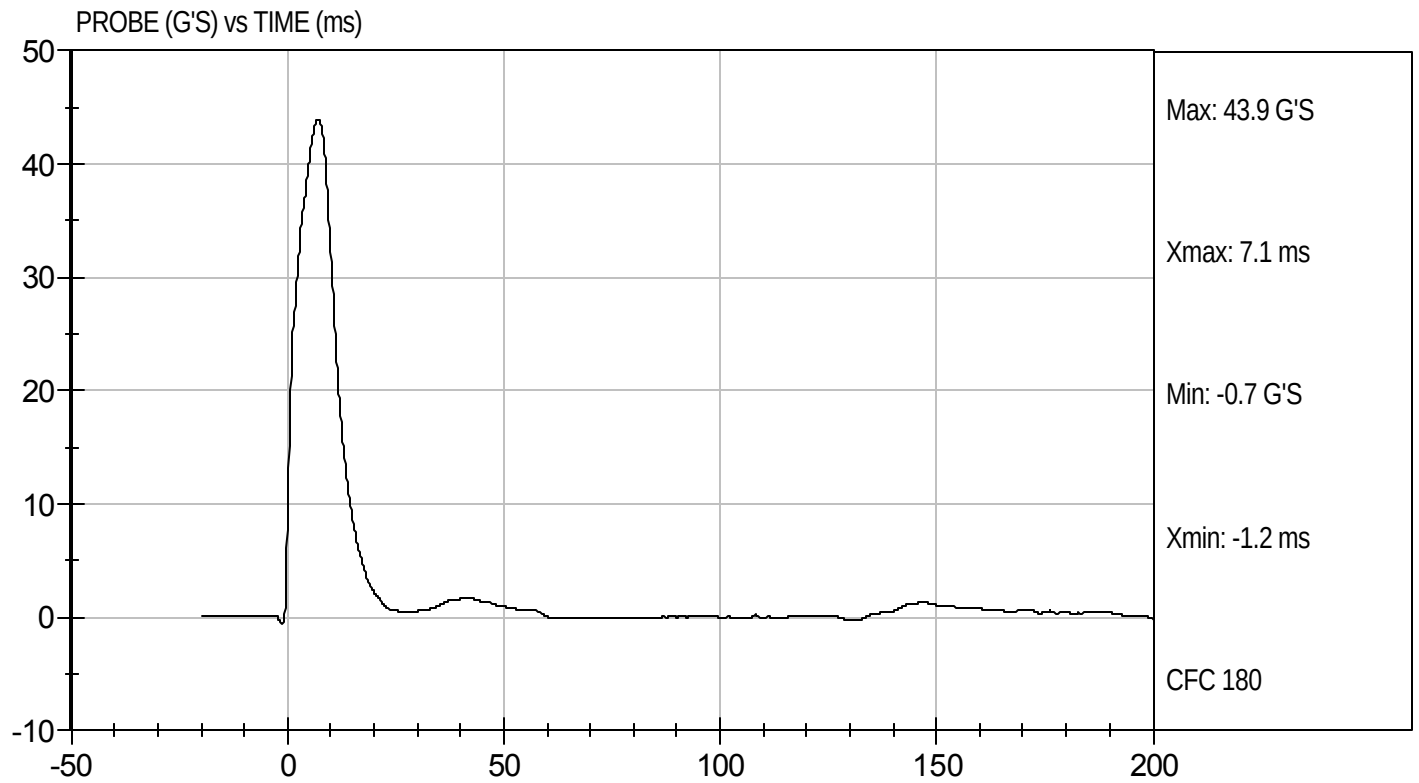
9/9/10
Test Date


Approved By



Test Desc: Pelvis Impact
Component ID: D102947

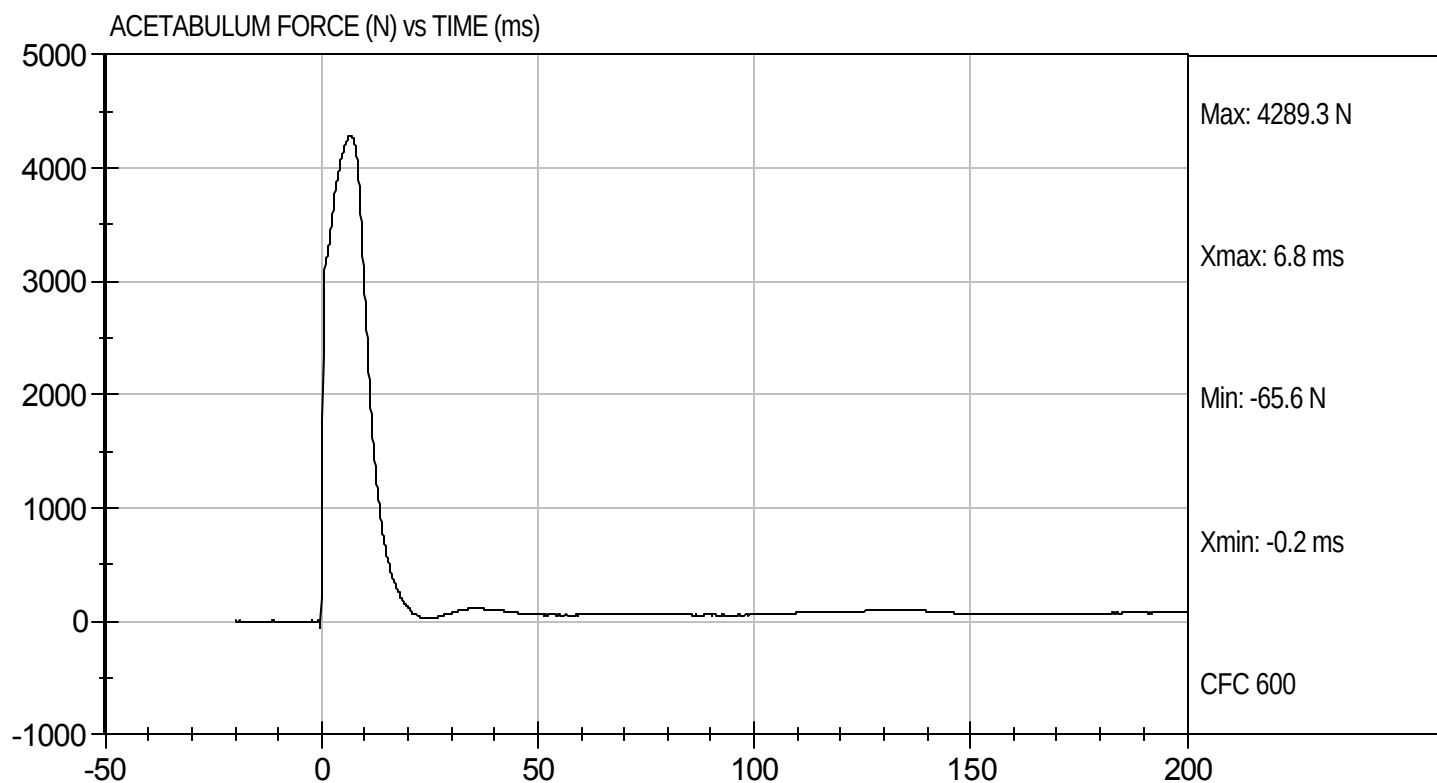
Test Date: 9/9/10
Velocity: 21.85 ft/s, 6.66 m/s





Test Desc: Pelvis Impact
Component ID: D102947

Test Date: 9/9/10
Velocity: 21.85 ft/s, 6.66 m/s



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

ATD Serial No: 296

Test I.D: D102948

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.1	Pass
Humidity	%	10 to 70	45	Pass
Impact Velocity	m/s	4.20 to 4.40	4.38	Pass
Peak Impactor Acceleration	G's	36 to 45	39	Pass
Pelvis Y Acceleration	G's	28 to 39	31	Pass
Peak Pelvis Iliac Force	N	4100 to 5100	4835	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

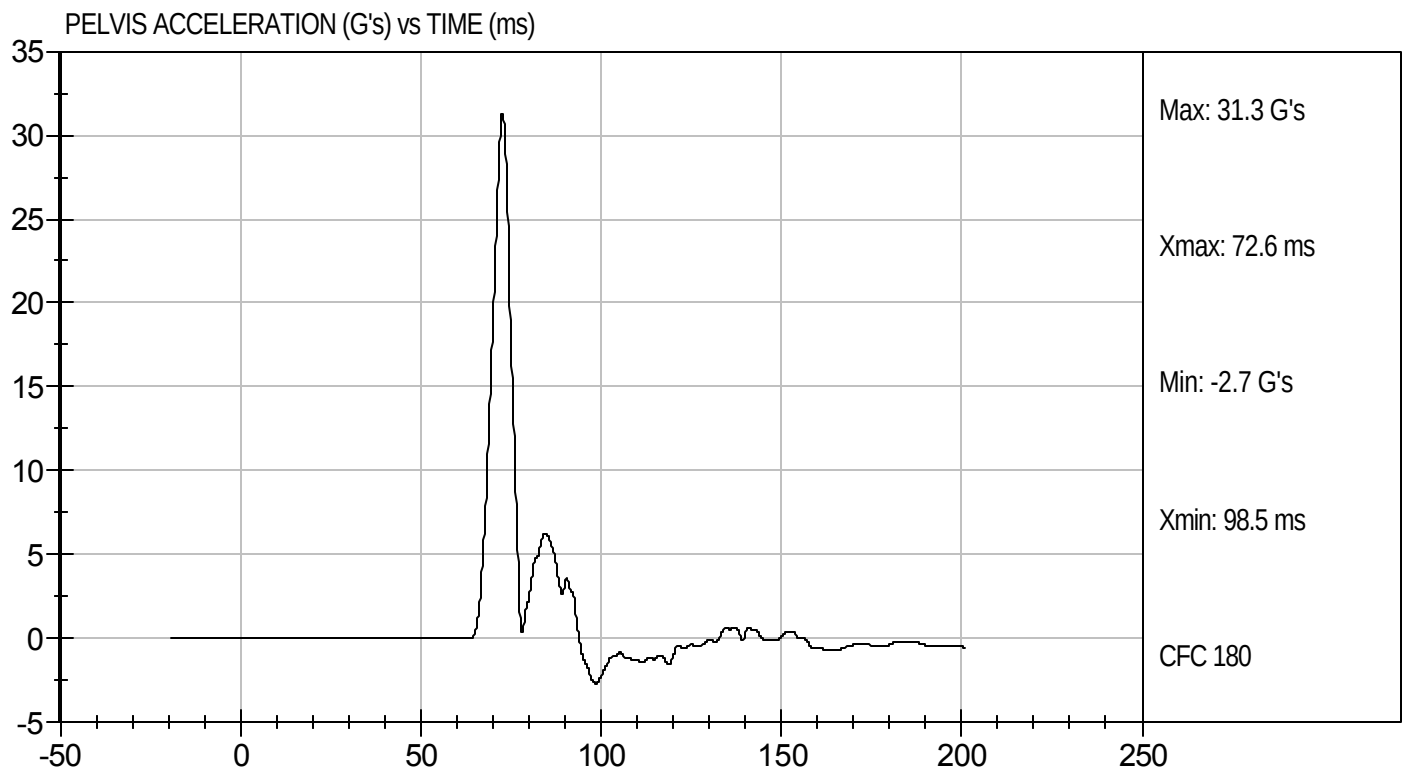
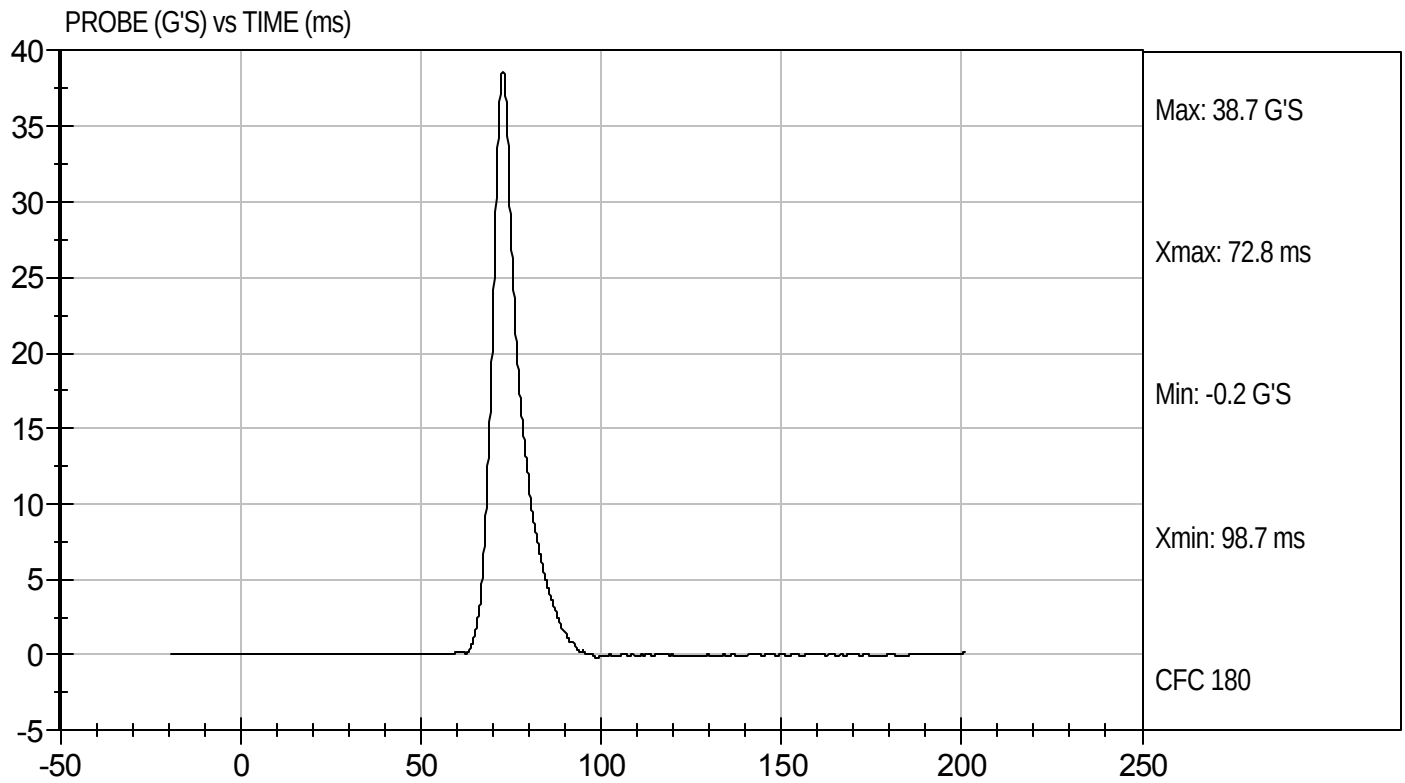
9/9/10
Test Date

David Winkelbauer
Approved By



Test Desc: Iliac Impact
Component ID: D102948

Test Date: 9/9/10
Velocity: 14.37 ft/s, 4.38 m/s





Test Desc: Iliac Impact
Component ID: D102948

Test Date: 9/9/10
Velocity: 14.37 ft/s, 4.38 m/s

