

REPORT NUMBER: NCAPSIDE-MGA-2009-008

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**FORD MOTOR COMPANY
2010 FORD MUSTANG 2-DR COUPE
NHTSA NUMBER: MA0203**

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



Test Date: April 30, 2009

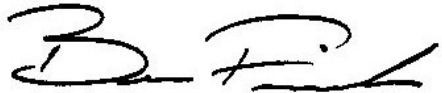
Report Date: June 3, 2009

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVENUE, SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-03-D-12005.

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Date: 6/03/2009

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Date: 6/03/2009

Technical Report Documentation Page

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16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2010 Ford Mustang 2-Dr Coupe to obtain new car assessment and research data indicant of FMVSS No. 214D performance. The test was conducted at MGA Research Corporation, in Burlington, Wisconsin, on April 30, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.3 km/h, and the ambient temperature at the struck side (drivers) of the vehicle was 21°C. The target vehicle's maximum post test static crush was 205 mm at level 2. The test vehicle's occupant performance is as follows: <table style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>DRIVER</u></th> <th style="text-align: center;"><u>PASS.</u></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) Accel., g</td> <td style="text-align: center;">33.4</td> <td style="text-align: center;">50.1</td> </tr> <tr> <td>Left Lower Rib (LLR) Accel., g</td> <td style="text-align: center;">30.7</td> <td style="text-align: center;">54.9</td> </tr> <tr> <td>Lower Spine (T₁₂) Accel., g</td> <td style="text-align: center;">40.9</td> <td style="text-align: center;">57.3</td> </tr> <tr> <td>Thoracic Trauma Index (TTI)</td> <td style="text-align: center;">37</td> <td style="text-align: center;">56</td> </tr> <tr> <td>Pelvis (PEV) Accel., g</td> <td style="text-align: center;">35.8</td> <td style="text-align: center;">39.9</td> </tr> <tr> <td>HIC</td> <td style="text-align: center;">110</td> <td style="text-align: center;">822</td> </tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					<u>DRIVER</u>	<u>PASS.</u>	Left Upper Rib (LUR) Accel., g	33.4	50.1	Left Lower Rib (LLR) Accel., g	30.7	54.9	Lower Spine (T ₁₂) Accel., g	40.9	57.3	Thoracic Trauma Index (TTI)	37	56	Pelvis (PEV) Accel., g	35.8	39.9	HIC	110	822
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17. Key Words New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID/HIII) Occupant Side Impact Protection		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Adm. Technical Ref. Division, 1200 New Jersey Ave, SE Washington, D.C. 20590																						
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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-03-D-12005. The purpose of this test was to evaluate side impact protection in a 2010 Ford Mustang 2-Dr Coupe manufactured by Ford Motor Company.

TEST PROCEDURE

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding MGA Research Corporation Test Procedure MGA-NHTSA5. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

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

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A model year 2010 Ford Mustang 2-Dr Coupe 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 62.3 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1782.2 kg and the test weight of the MDB was 1361.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on April 30, 2009.

One (1) real-time motion picture camera and nine (9) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre- and post-test photographs of the vehicle and Side Impact Dummies (SID/HIIIs) can be found in Appendix A. Two 50th percentile adult male SID/HIIIs were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty (20) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self contained on-board DTS TDAS Pro Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 205 mm at level 2, 300 mm rearward of the vertical impact point. The driver and passenger SID/HIIIs, Serial Nos. 271 and 272 respectively, were calibrated just prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HIII response data traces. Appendix C contains the dummy calibration data.

The occupant data is summarized below:

ATD position	HIC	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	110	44.7	80.7	37	35.8
Passenger	822	56.8	64.8	56	39.9

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Combo Airbag	Yes	Yes	No	
Curtain Airbag	No		No	

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

TEST NOTES

There was no valid data collected for:

- Left Lower B-Post Y
- Left Lower A-Post Y
- Left MDB Contact

DATA SHEET NO. 1**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2010 Ford Mustang 2-Dr CoupeNHTSA No. MA0203Test Program: NCAP Side ImpactTest Date: 4/30/2009**TEST VEHICLE INFORMATION**

Make	Ford
Model	Mustang
Body Style	Coupe
NHTSA No.	MA0203
VIN	1ZVBP8AN9A5105599
Color	Torch Red Clearcoat
Delivery Date	4/28/2009
Odometer Reading (mile)	132
Dealer	Boucher Fleet Group
Transmission	Automatic
Final Drive	Rear
Number of Cylinders	6
Engine Displacement (L)	4.0
Engine Placement	Longitudinal
Automatic Door Locks (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	Yes

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	No
Driver Side Combo Airbag	Yes
Rear Passenger Side Curtain Airbag	No
Rear Passenger Side Torso Airbag	No
Power Steering	Yes
Power Door Locks	Yes
Tilt Wheel	Yes
Anti-lock Brakes	Yes
Traction Control	Yes
All Wheel Drive	No
Power Seats	No
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	04/09

GVWR (kg)	2059
GAWR Front (kg)	993
GAWR Rear (kg)	1070

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket		
Number Of Occupants	2	2		4
Capacity Wt. (VCW) (kg)				326
Cargo Wt. (RCLW) (kg)				54

DATA SHEET NO. 1 (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2010 Ford Mustang 2-Dr CoupeNHTSA No. MA0203Test Program: NCAP Side ImpactTest Date: 4/30/2009**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	418.7	366.5		459.5	455.4	
Right	kg	429.5	358.4		429.1	438.2	
Ratio	%	53.9	46.1		49.9	50.1	
Totals	kg	848.2	724.9	1573.1	888.6	893.6	1782.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1573.1
Weight of 2 P572M ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	54
Calculated Vehicle Target Weight (TVTW)	kg	1788.6

* Actual As Tested Weight (ATW) will be TVTW -5/-10 kg

Weight of Ballast in Trunk (kg): 11.8**TEST VEHICLE ATTITUDES AND CG**

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	720	718	746	747	1253
As Tested	mm	709	712	719	720	1364
Fully Loaded	mm	707	712	711	720	

TEST VEHICLE VERTICAL IMPACT LINE DATA

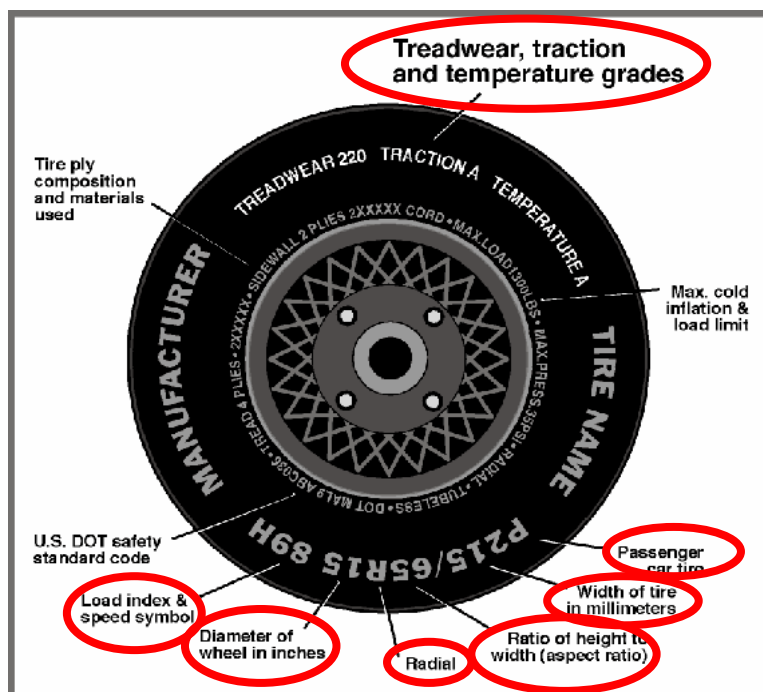
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2720
Target Impact Point Aft of Front Axle	mm	420
Actual Impact Point Aft of Front Axle	mm	410

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Test Pressure (kPa)	220	220
Recommended Tire Size	P215/60R17	P215/60R17
Tire Size on Vehicle	P215/60R17	P215/60R17
Tire Manufacturer	BF Goodrich	BF Goodrich
Tire Name	Traction T/A	Traction T/A
Tire Type	Passenger	Passenger
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	95T	95T
Treadwear	620	620
Traction Grade	A	A
Temperature Grade	B	B

DATA SHEET NO. 3 **TEST VEHICLE INFORMATION**

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

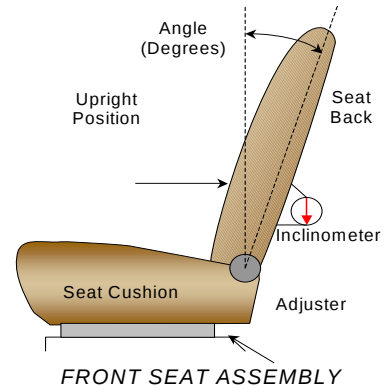
NHTSA No. MA0203
 Test Date: 4/30/2009

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows:
 For the driver seat, set at 13 degrees using the headrest post.
 The left rear passenger seat is fixed.

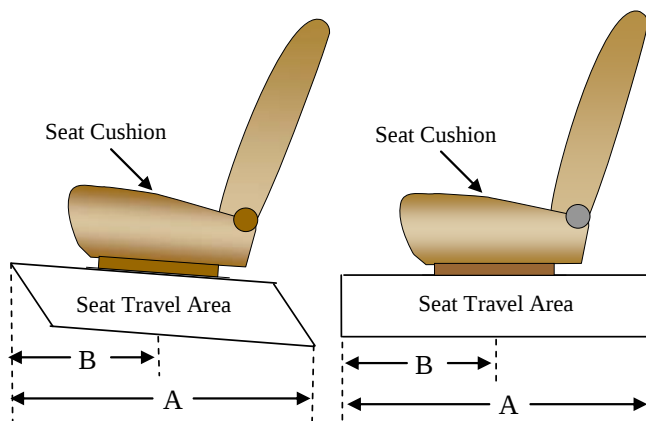
Driver seat back angle: 12.9 degrees at the headrest post

Passenger seat back angle: Fixed



SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	260 mm	130 mm
Rear Seat	Fixed	Fixed



DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

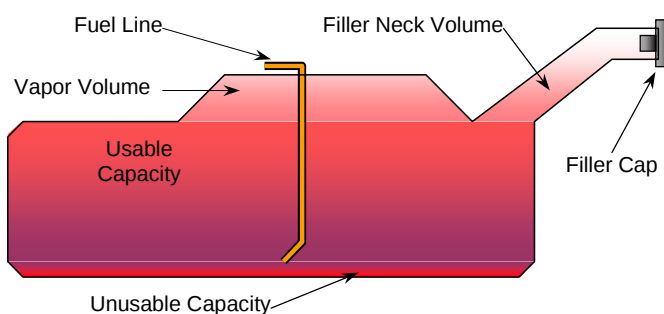
Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
Test Program: NCAP Side Impact

NHTSA No. MA0203
Test Date: 4/30/2009

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	60.6
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	55.7 to 56.9
Actual Amount of Solvent used	56.0
1/3 of Usable Capacity	20.2

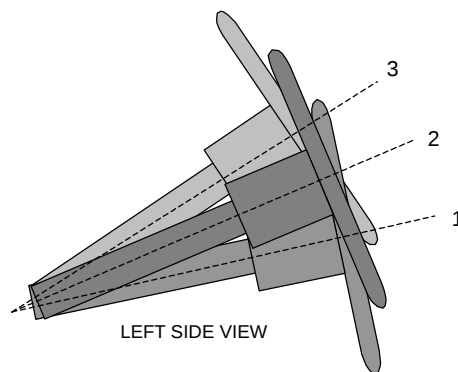
The test vehicle is equipped with an electric fuel pump. The electric fuel pump operates for 2 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following ignition actuation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is deactivated. Also, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude. The fuel pipe is on the left side.



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

	Fore/Aft (mm)	Degrees
Lowermost position No. 1		66.3
Geometric center position No. 2		68.5
Uppermost position No. 3		70.8

DATA SHEET NO. 4**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
Test Program: NCAP Side Impact

NHTSA No. MA0203
Test Date: 4/30/2009

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2592
C.G. 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 ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.3
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.4
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.7

**POST TEST OBSERVATIONS
MDB LEFT EDGE IMPACT POINT DATA**

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	10 forward
Vertical Offset	mm	+/-20	3 down

DATA SHEET NO. 5

POST TEST OBSERVATIONS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID HIII / 271	SID HIII / 272
Head Contact	Side Airbag, Headrest	Side Header, Seatback
Upper Torso Contact	Side Airbag	Interior Trim
Lower Torso Contact	Door Panel	Interior Trim
Left Knee Contact	Door Panel	Interior Trim
Right Knee Contact	Left Knee	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Struck side doors were unlocked; Non-struck side doors were unlocked	
Left Side Door Opening	Door remained closed and latched	
Right Side Door Opening	Door remained closed and latched; Door opened without tools	
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 Side Window
Other Notable Effects	None

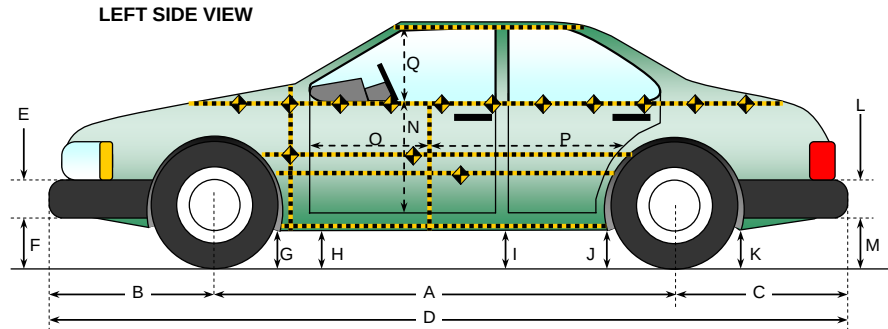
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Information	Left Front (Driver)		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Combo Airbag	Yes	Yes	No	
Curtain Airbag	No		No	

DATA SHEET NO. 6
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



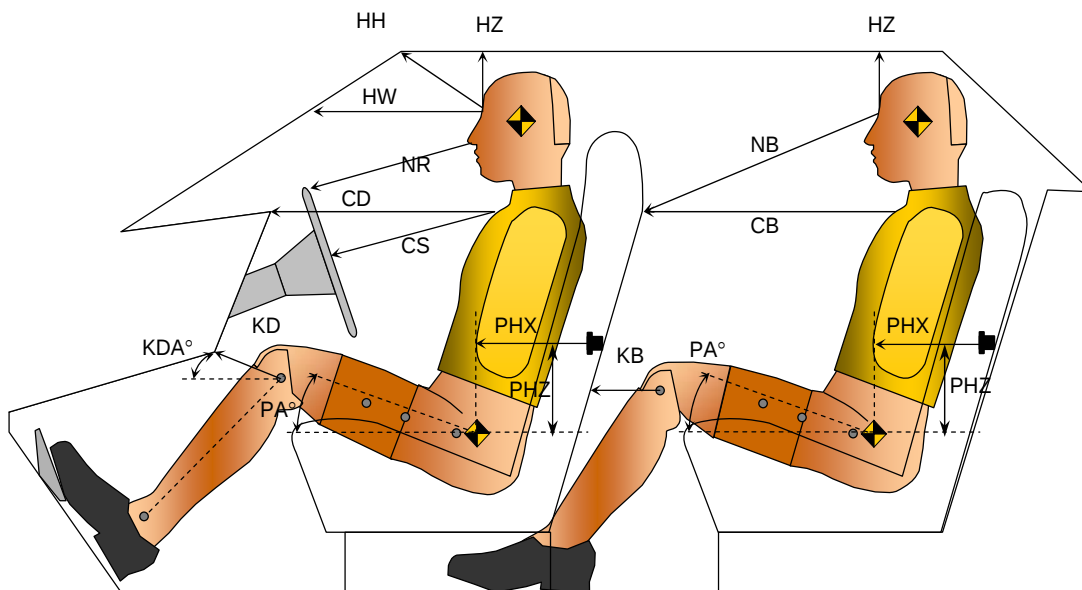
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2720	2725	-5
B	Front Axle to FSOV	902	919	-17
C	Rear Axle to RSOV	1146	1124	22
D	Total Length at Centerline	4768	4768	0
E	Front Bumper Thickness	126	126	0
F	Front Bumper Bottom to Ground	497	496	1
G	Sill Height at Front Wheel Well	135	137	-2
H	Sill Height at Front Door Leading Edge	136	138	-2
I	Sill Height at "B" Pillar	139	136	3
J1	Sill Height at Rear Wheel Well	131	134	-3
J2	Pinch Weld Height at Rear Wheel Well	133	139	-6
K	Sill Height Aft of Rear Wheel Well	207	200	7
L	Rear Bumper Thickness	107	107	0
M	Rear Bumper Bottom to Ground	350	348	2
N	Sill Height to Window Bottom Sill	727	604	123
O	Front Door Leading Edge to Impact CL	518	524	-6
P	Rear Door Trailing Edge to Impact CL	787	775	12
Q	Front Window Opening	280	270	10
R	Right Side Length	4161	4156	5
S	Left Side Length	4161	4132	29
T	Vehicle Width at "B" Post	1849	1720	129

DATA SHEET NO. 7
SID/HII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



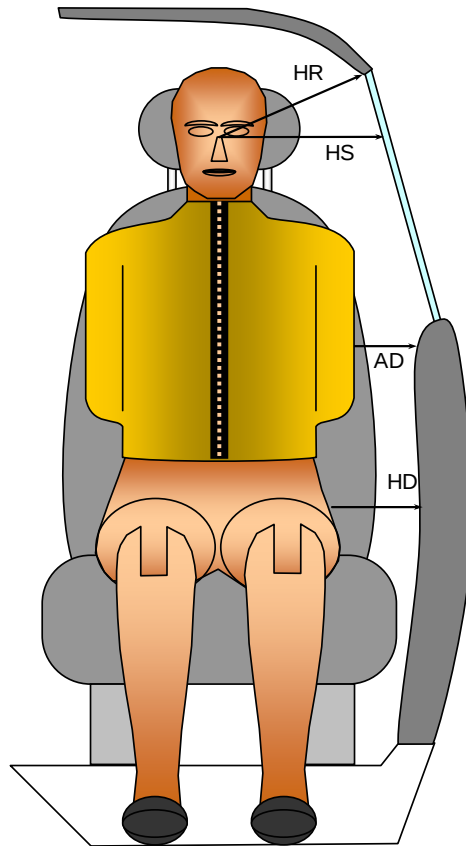
Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 272	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	332			
HW		Head to Windshield	540			
HZ	HZ	Head to Roof	145		113	
NR	NB	Nose to Rim/Nose to Seatback	390		497	
CD	CB	Chest to Dash or Seatback	507		445	
CS		Chest to Steering Wheel	297			
KDL	KBL	Left Knee to Dash or Seatback	132	23.5	138	27.5
KDR	KBR	Right Knee to Dash or Seatback	119	22.2	128	33.8
PA	PA	Pelvic Angle		24.4		29.5
PHX	PHX	H-Point to Striker (X-Axis)	488		330	
PHZ	PHZ	H-Point to Striker (Z-Axis)	228		210	

Note: Per Ford, in order to position the passenger dummy properly,
 the pelvic angle will be out of specification.

DATA SHEET NO. 8
SID/IIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



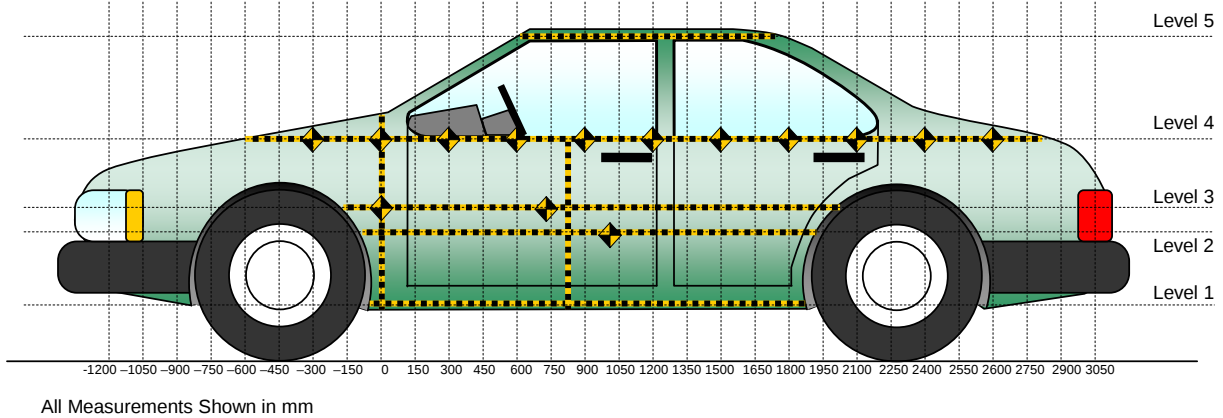
FRONT VIEW OF DUMMY

Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 272
HR	Head to Side Header	mm	198	285
HS	Head to Side Window	mm	312	420
AD	Arm to Door	mm	110	105
HD	H-Point to Door	mm	138	139

DATA SHEET NO. 9 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
 Measurements along the vertical 800 mm.
 All measurements below in mm.

Level	Measurement Description	Maximum Exterior Static Crush	Distance From Impact	Height Above Ground
5	Window	34	1650	1280
4	Window Sill	51	1350	923
3	Mid Door	171	300	595
2	Occupant H-Point	205	300	450
1	Sill Top	66	450	255
	Maximum Penetration	205		

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				328					327					-1	
-750				309					313					4	
-600				297					305					8	
-450				290					304					14	
-300				286					309					23	
-150				285					308					23	
0		189	182	281			290	295	302			101	113	21	
150	241	190	189	280		295	380	337	300		54	190	148	20	
300	234	189	186	274		299	394	357	306		65	205	171	32	
450	236	186	185	274		302	379	353	309		66	193	168	35	
600	235	183	185	273		294	375	352	309		59	192	167	36	
750	234	182	184	270		287	370	348	312		53	188	164	42	
900	235	181	184	270	481	290	368	343	314	493	55	187	159	44	12
1050	237	180	184	270	467	292	361	338	320	485	55	181	154	50	18
1200	236	180	183	271	466	294	358	337	321	483	58	178	154	50	17
1350	240	180	185	272	464	297	352	339	323	484	57	172	154	51	20
1500	241	181	185	274	464	298	350	329	323	487	57	169	144	49	23
1650	245	181	186	271	463	280	357	333	319	497	35	176	147	48	34
1800	249	183	179	262	466	265	308	342	302	489	16	125	163	40	23
1950			165	260	475			248	293	492			83	33	17
2100				262					288					26	
2250				266					288					22	
2400				279					288					14	
2550				281					291					10	
2700				289					298					9	
2850				304					309					5	
3000				322					324					2	

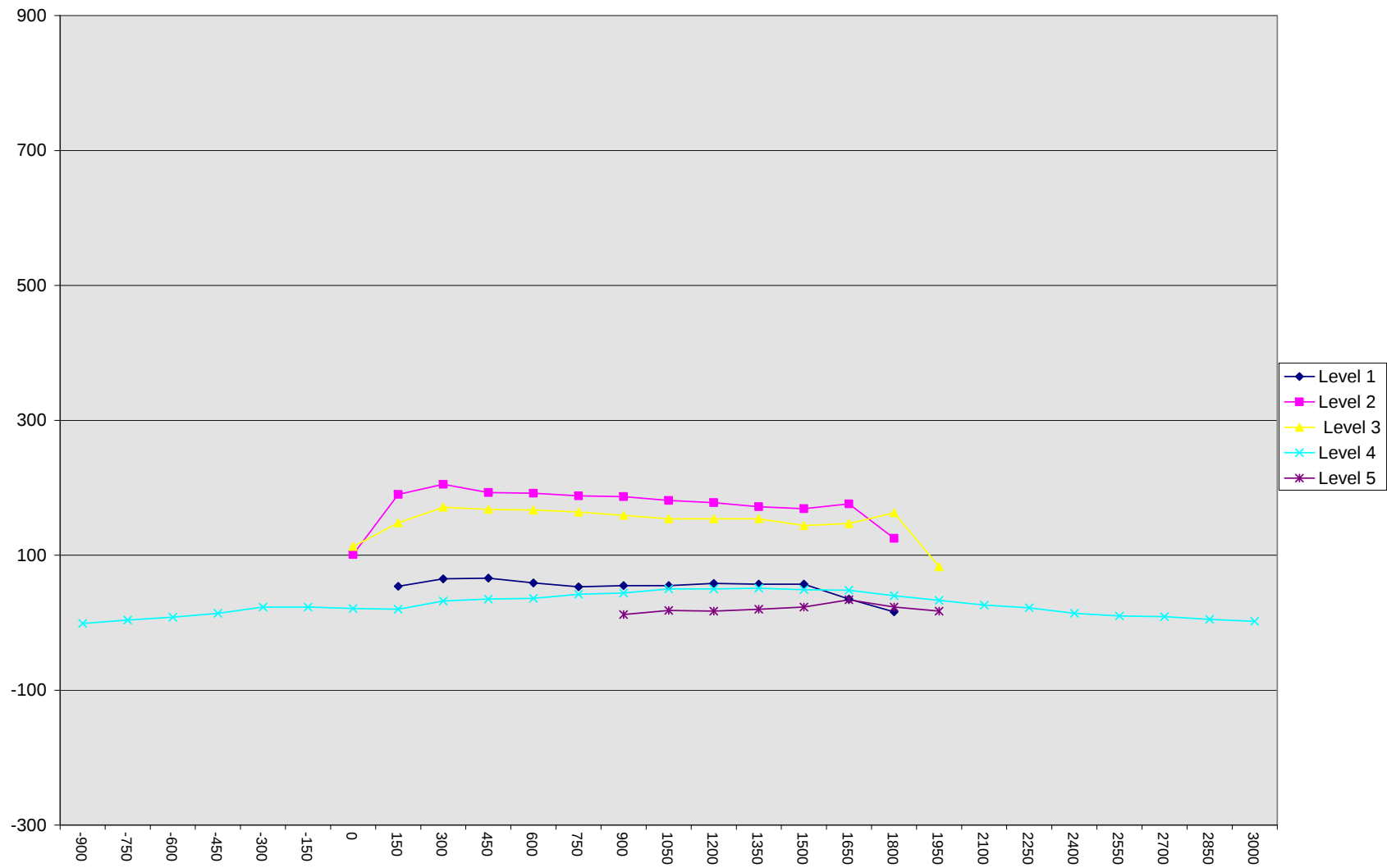
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
Test Program: NCAP Side Impact

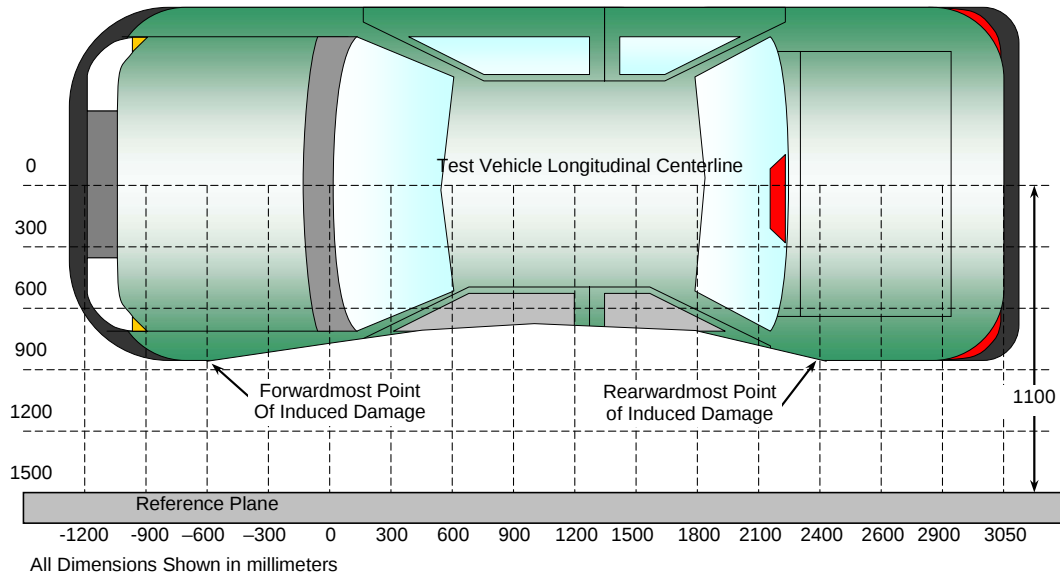
NHTSA No. MA0203
Test Date: 4/30/2009



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	3000	4	322	324	2
2	2226	4	265	286	21
3	1432	2	181	355	174
4	652	2	183	373	190
5	-122	4	284	307	23
6	-900	4	328	327	-1

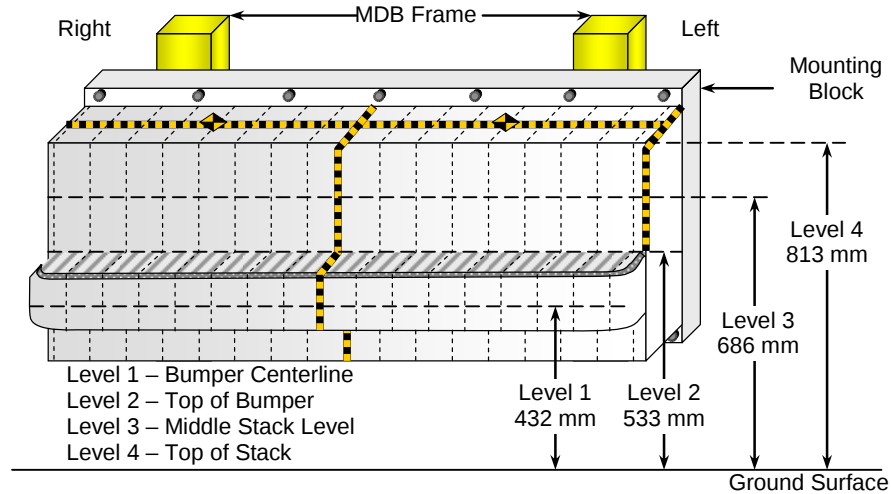
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



DEFORMABLE BARRIER STATIC CRUSH

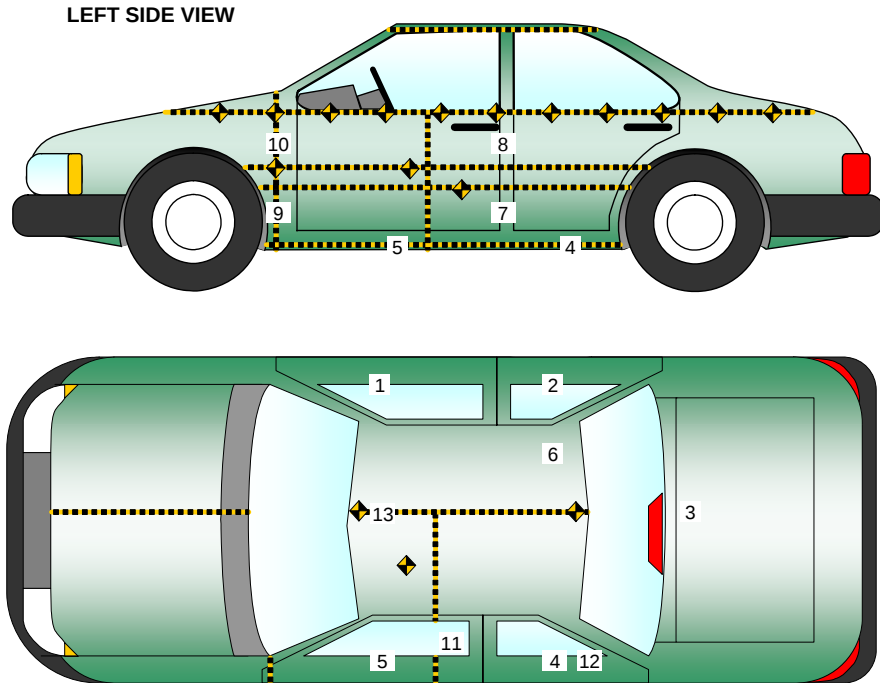
Stack Level	Distance Right of Center								C _L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	231	239	240	223	202	179	164	161	159	160	159	161	174	195	191	185	177
2	193	196	190	163	144	125	117	110	111	112	110	112	116	123	126	132	131
3	135	156	143	89	58	44	40	36	37	37	38	46	66	104	138	134	148
4	153	164	134	88	75	36	38	39	52	62	77	94	112	133	170	157	177

All Dimensions in mm

DATA SHEET NO. 13
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



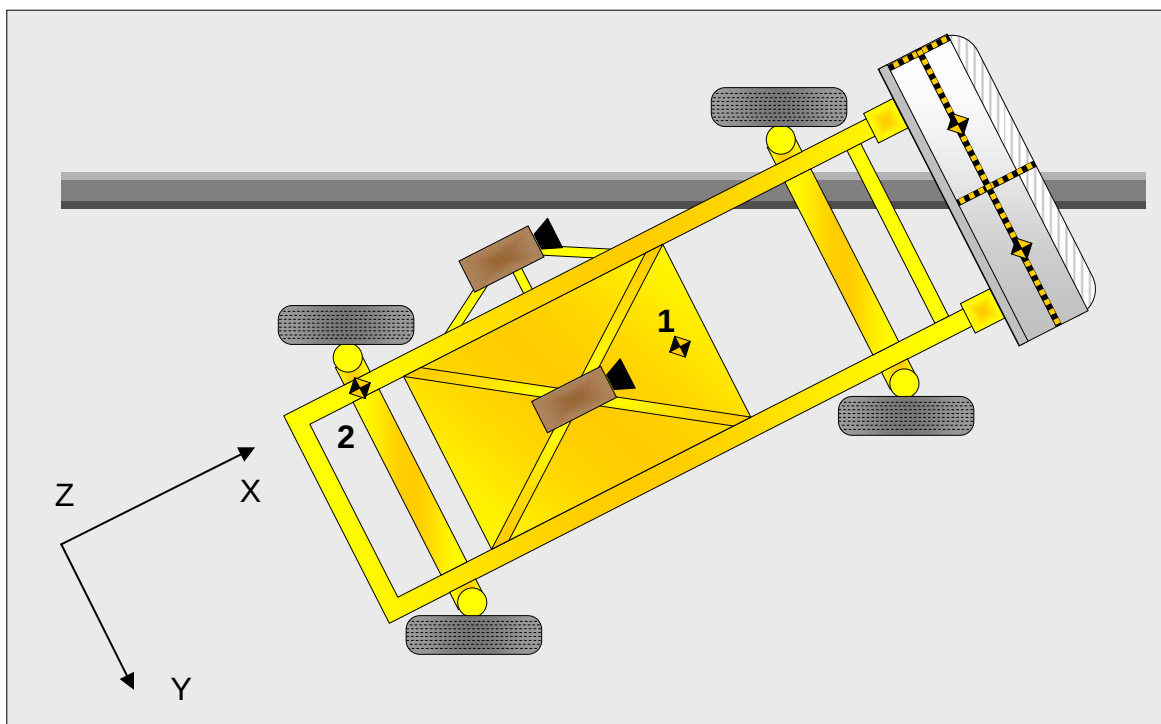
Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2290	739	-179
2	Right Sill at Rear Seat	1569	728	-180
3	Rear Floorpan Above Axle	1094	0	-634
4	Left Sill at Rear Door	1559	-738	-188
5	Left Sill at Front Door	2293	-742	-184
6	Rear Occupant Compartment	1835	389	-456
7	Left Lower B-Post	1864	-729	-589
8	Left Middle B-Post	1829	-729	-736
9	Left Lower A-Post	2994	-722	-485
10	Left Middle A-Post	3055	-811	-681
11	Front Seat Track	2155	-540	-306
12	Rear Seat Track or Structure			
13	Vehicle CG	2515	0	-478

Reference Points X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



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

Reference Points X - MDB Front Axle (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 15
VEHICLE STRUCTURAL MEASUREMENTS

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
Test Program: NCAP Side Impact

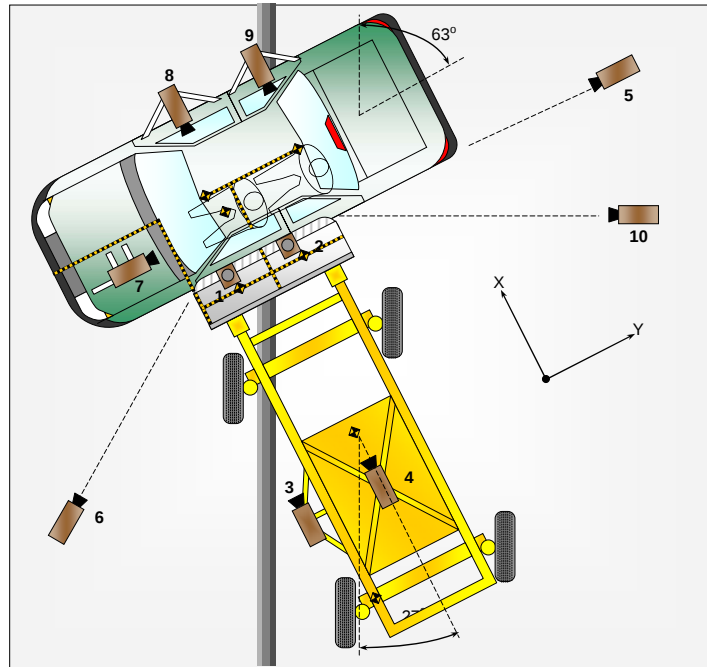
NHTSA No. MA0203
Test Date: 4/30/2009

	Elements	Pre-Test (mm)
1	Total Length	4768
2	Total Width	1849
3	Bumper Top Height	519
4	Bumper Bottom Height	394
5	Longitudinal Member Top Height	509
6	Distance between Longitudinal Members	926
7	Longitudinal Member Width	82
8	Engine Top Height	974
9	Engine Bottom Height	193
10	Engine and gearbox width	534
11	Front bumper-engine distance	786
12	Front shock absorber fixing height	881
13	Bonnet leading edge height	763
14	Front shock absorber fixing width	1080
15	Front bumper – front axle distance	928
16	Front axle – a pillar distance	729
17	A-pillar – B-pillar distance	1324
18	B-Pillar – rear axle distance	658
19	B-pillar – C-pillar distance	717
20	Roof sill bottom height	1326
21	Roof sill top height	1371
22	Floor sill bottom height	283
23	Floor sill top height	359

DATA SHEET NO. 16
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	-525	-235	-5055	50	1000
2	Overhead Overall	120	1260	-5050	14	1000
3	MDB Onboard, Impact Point Close-up				50	1000
4	MDB Onboard, Centerline of Impact				16	1000
5	Right Side, Ground Level, Overall	85	6640	-1090	24	1000
6	Left Side, Ground Level, Overall	-3270	-4840	-1090	24	1000
7	Vehicle Onboard Front SID/HIII, Front				12.5	1000
8	Vehicle Onboard Front SID/HIII, Side				8	1000
9	Vehicle Onboard Rear SID/HIII, Side				8	1000
10	Real Time Coverage				13	24

Reference Points X - Impact Line
 Y - MDB Left Edge Impact Point
 Z - Ground Plane

DATA SHEET NO. 17
SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2010 Ford Mustang 2-Dr Coupe
 Test Program: NCAP Side Impact

NHTSA No. MA0203
 Test Date: 4/30/2009

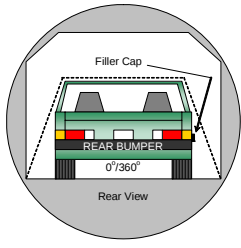
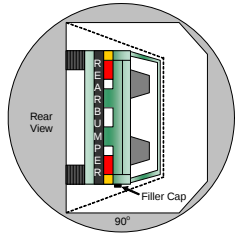
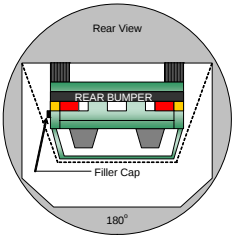
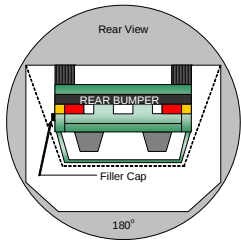
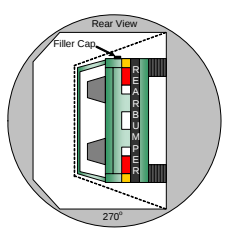
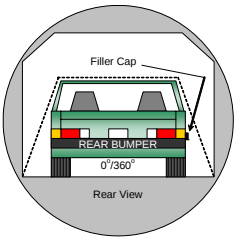
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 10:50 am

Stoddard Solvent Spillage Measurements

- 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

			1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds. 2. The position hold time at each position is 300 seconds (minimum). 3. Details of Stoddard Solvent spillage locations: None
0° to 90°		90° to 180°	
			
180° to 270°		270° to 360°	

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	119	300	First 5	0
90° to 180°	112	300	First 5	0
180° to 270°	109	300	First 5	0
270° to 360°	113	300	First 5	0

APPENDIX A
PHOTOGRAPHS

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Right Front $\frac{3}{4}$ View, As Received



Left Rear $\frac{3}{4}$ View, As Received



Manufacturer's Label



Tire Placard



Pre-Test Front View



Post-Test Front View



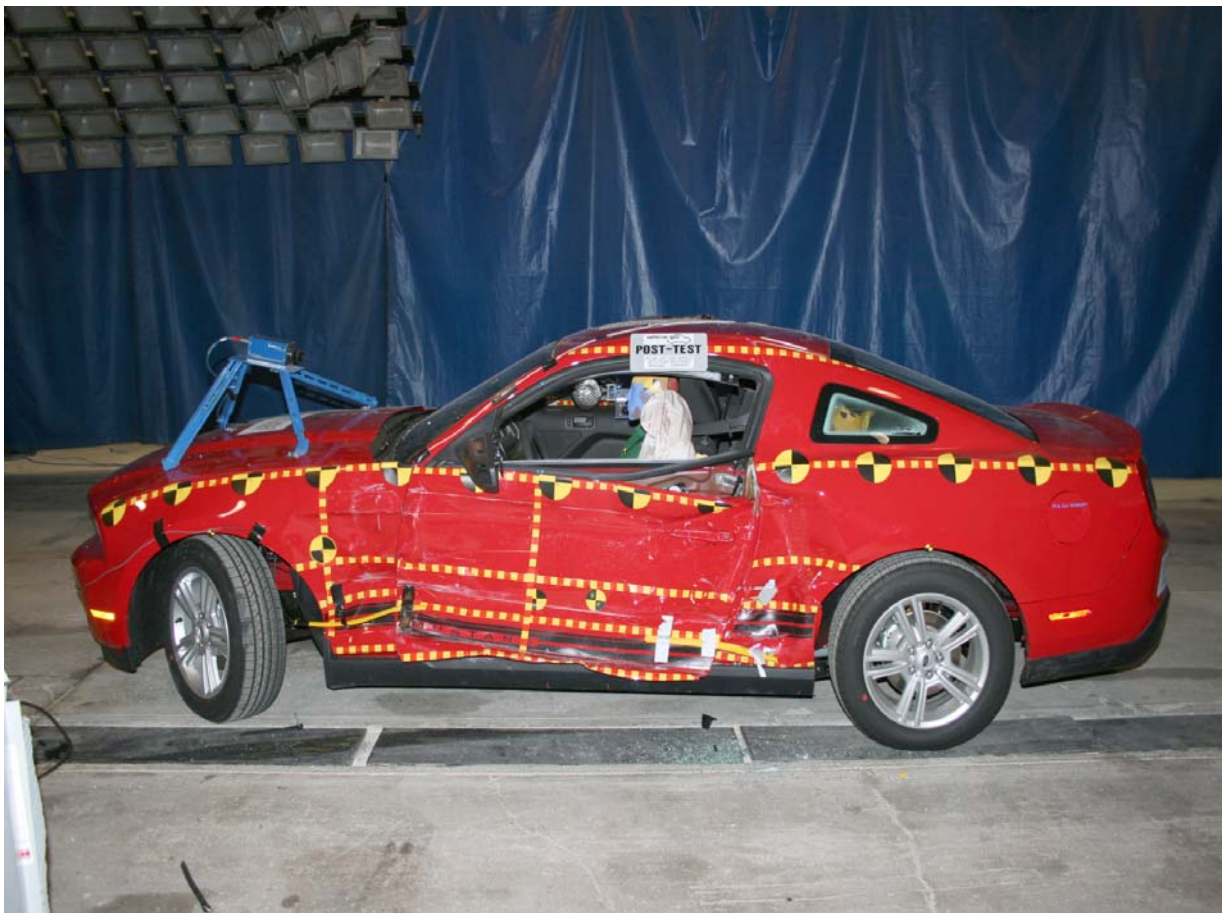
Pre-Test Left Front $\frac{3}{4}$ View



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



Pre-Test Left Side View



Post-Test Left Side View



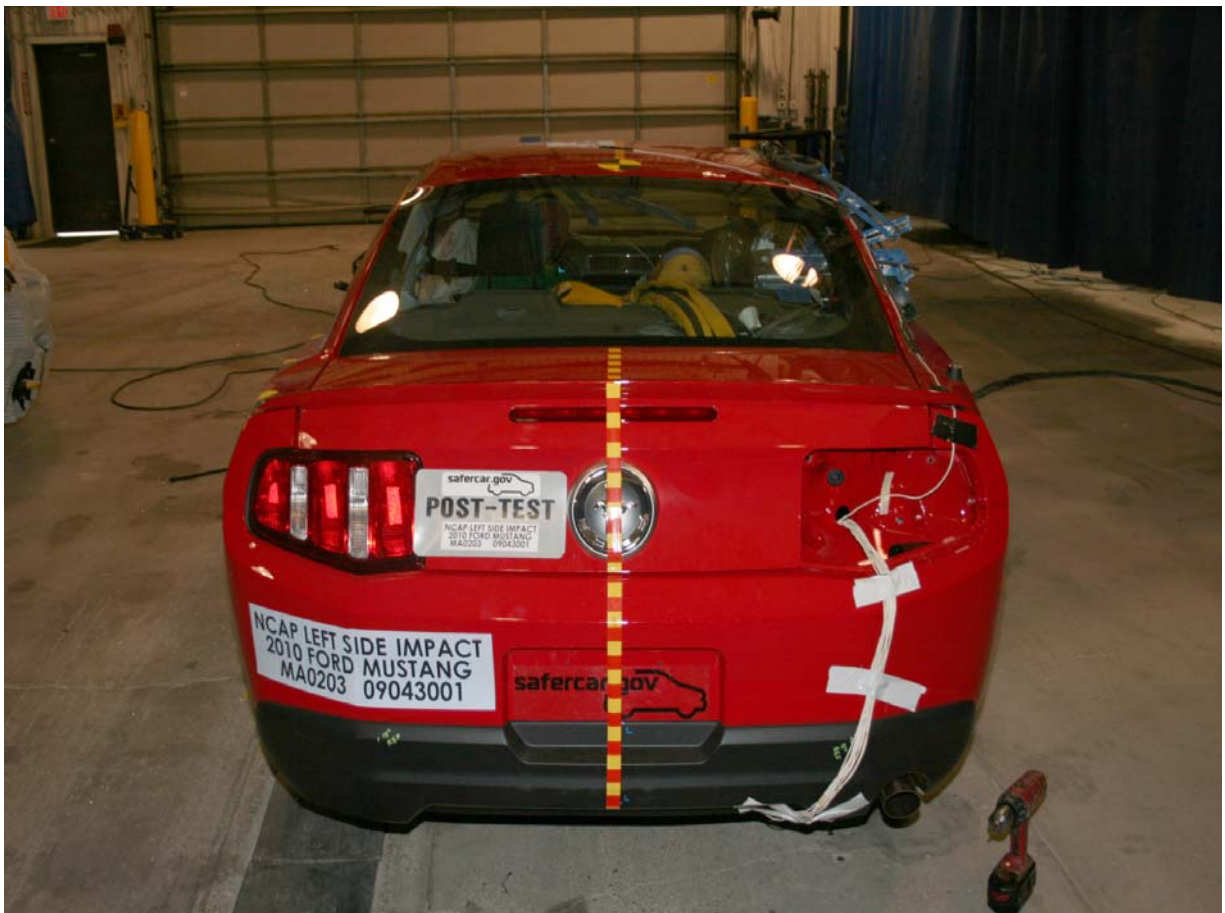
Pre-Test Left Rear 3/4 View



Post-Test Left Rear 3/4 View



Pre-Test Rear View



Post-Test Rear View



Pre-Test Right Rear $\frac{3}{4}$ View



Post-Test Right Rear $\frac{3}{4}$ View



Pre-Test Right Side View



Post-Test Right Side View



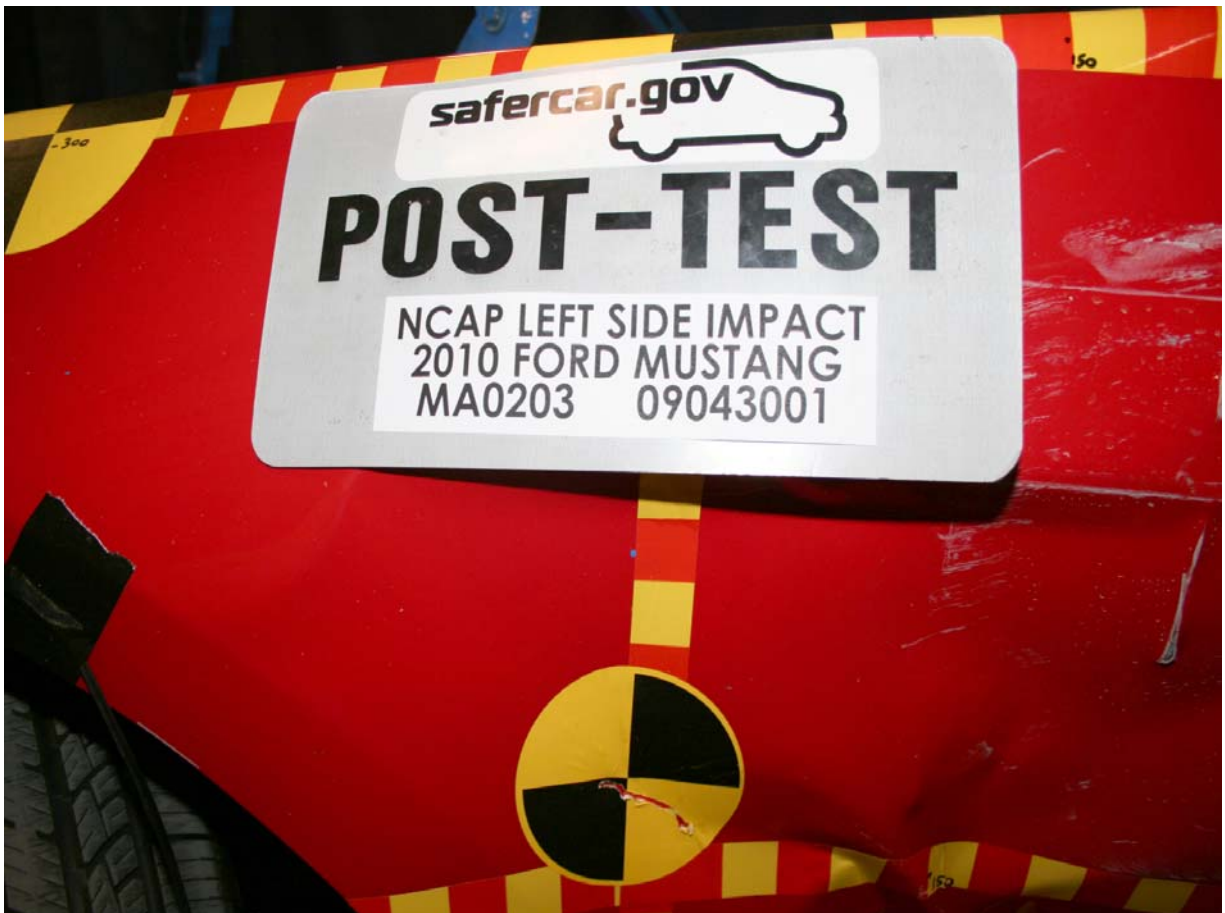
Pre-Test Right Front $\frac{3}{4}$ View



Post-Test Right Front $\frac{3}{4}$ View



Pre-Test Left Impact Point



Post-Test Left Impact Point



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



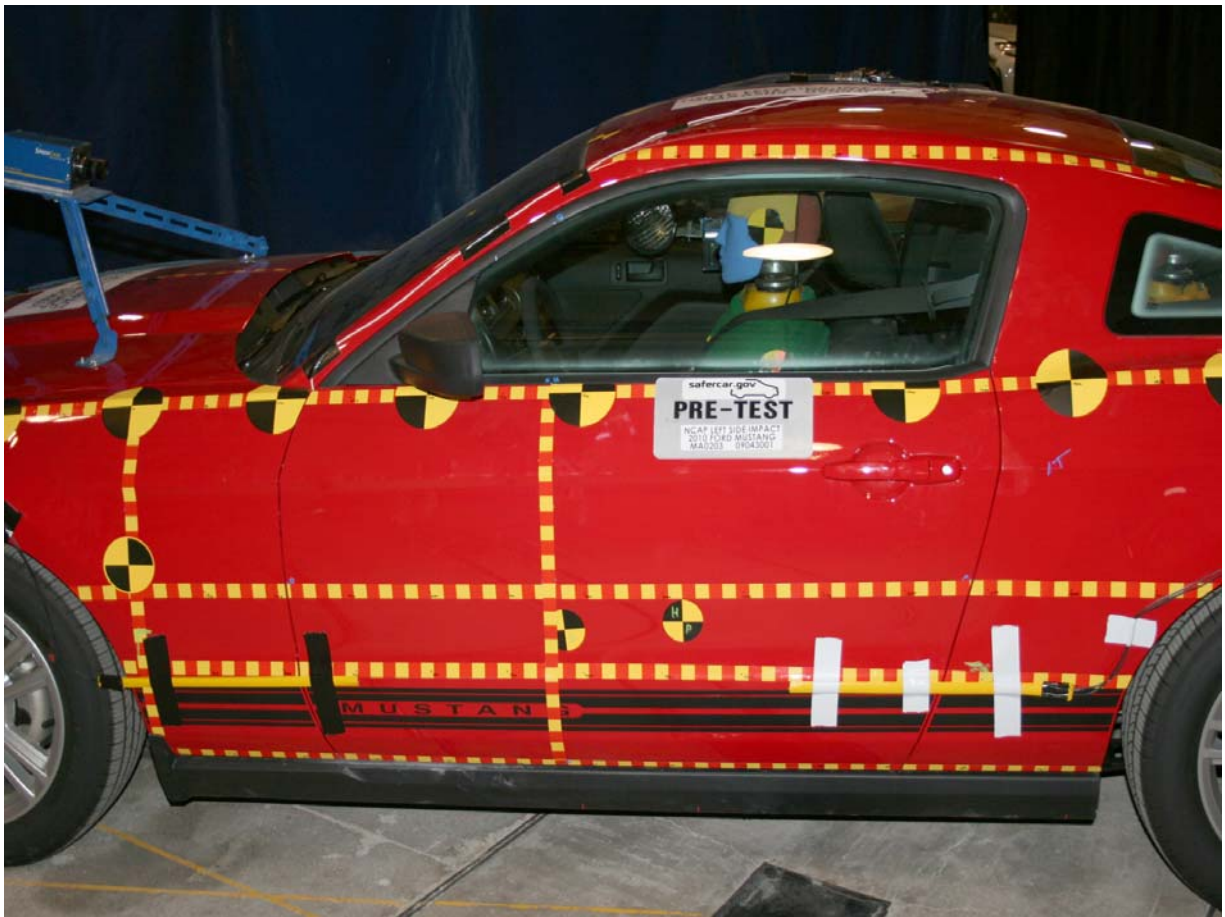
Post-Test Front $\frac{3}{4}$ View of Left Side Doors



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



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



Pre-Test Left Side Impact Close-up



Post-Test Left Side Impact Close-up



Pre-Test Overhead View



Post-Test Overhead View



Pre-Test Overhead Close-up View



Post-Test Overhead Close-up View



Pre-Test Driver Dummy (Door Open)



Pre-Test Driver Dummy Clearance From Door



Post-Test Driver Dummy Clearance From Door



Pre-Test Driver Dummy (Through Window)



Post-Test Driver Dummy (Through Window)



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Passenger Dummy (Door Open)



Pre-Test Passenger Dummy Clearance From Door



Post-Test Passenger Dummy Clearance From Door



Pre-Test Passenger Dummy (Through Window)



Post-Test Passenger Dummy (Through Window)



Pre-Test Passenger Dummy Right Side View



Post-Test Passenger Dummy Right Side View



Pre-Test Front View of Deformable Barrier



Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier



Post-Test Top View of Deformable Barrier



Pre-Test Right Side View of Deformable Barrier



Post-Test Right Side View of Deformable Barrier



Pre-Test Left Side View of Deformable Barrier



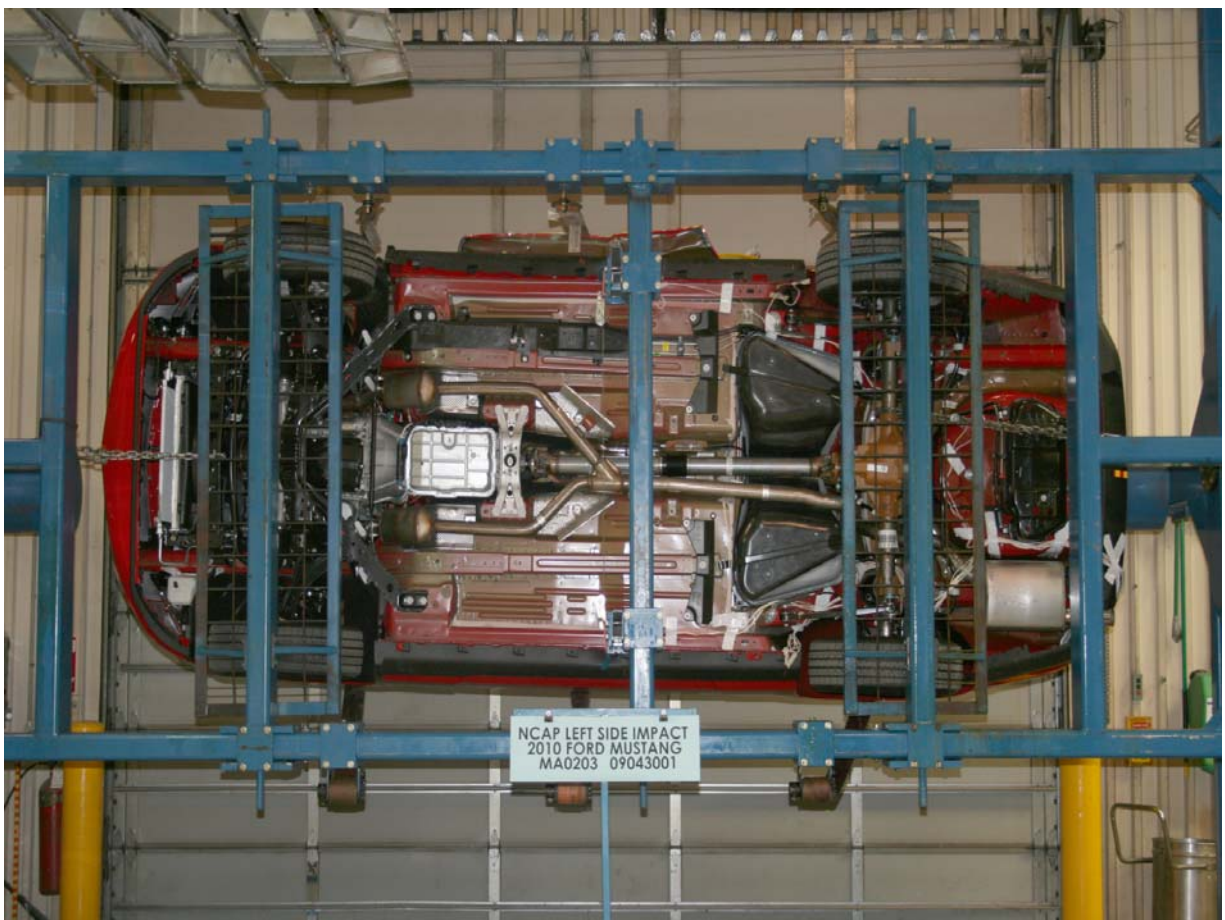
Post-Test Left Side View of Deformable Barrier



Vehicle on Rollover Device (90 Degrees)



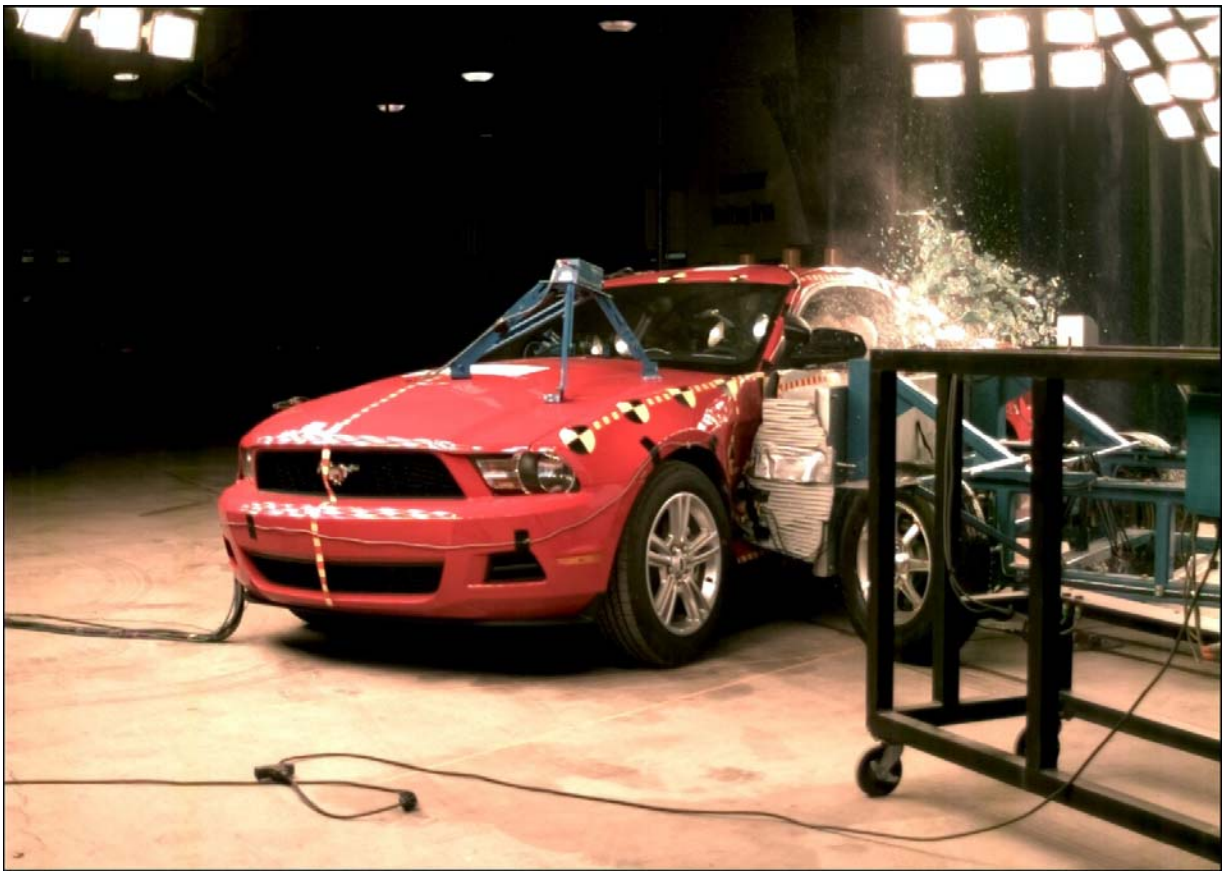
Vehicle on Rollover Device (180 Degrees)



Vehicle on Rollover Device (270 Degrees)



Vehicle on Rollover Device (360 Degrees)



Vehicle Impact



Post-Test Driver Dummy Head Contact View 1



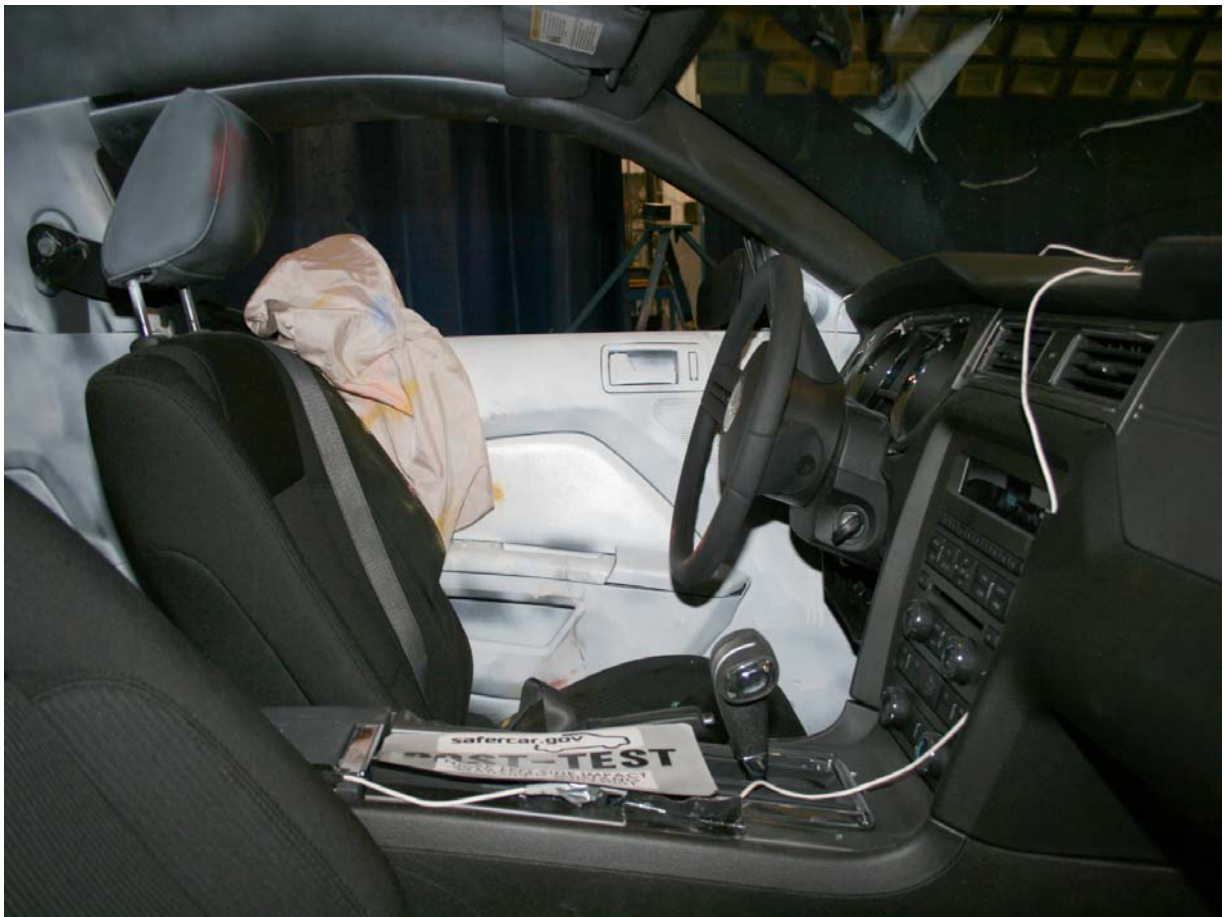
Post-Test Driver Dummy Head Contact View 2



Post-Test Driver Dummy Upper Torso Contact



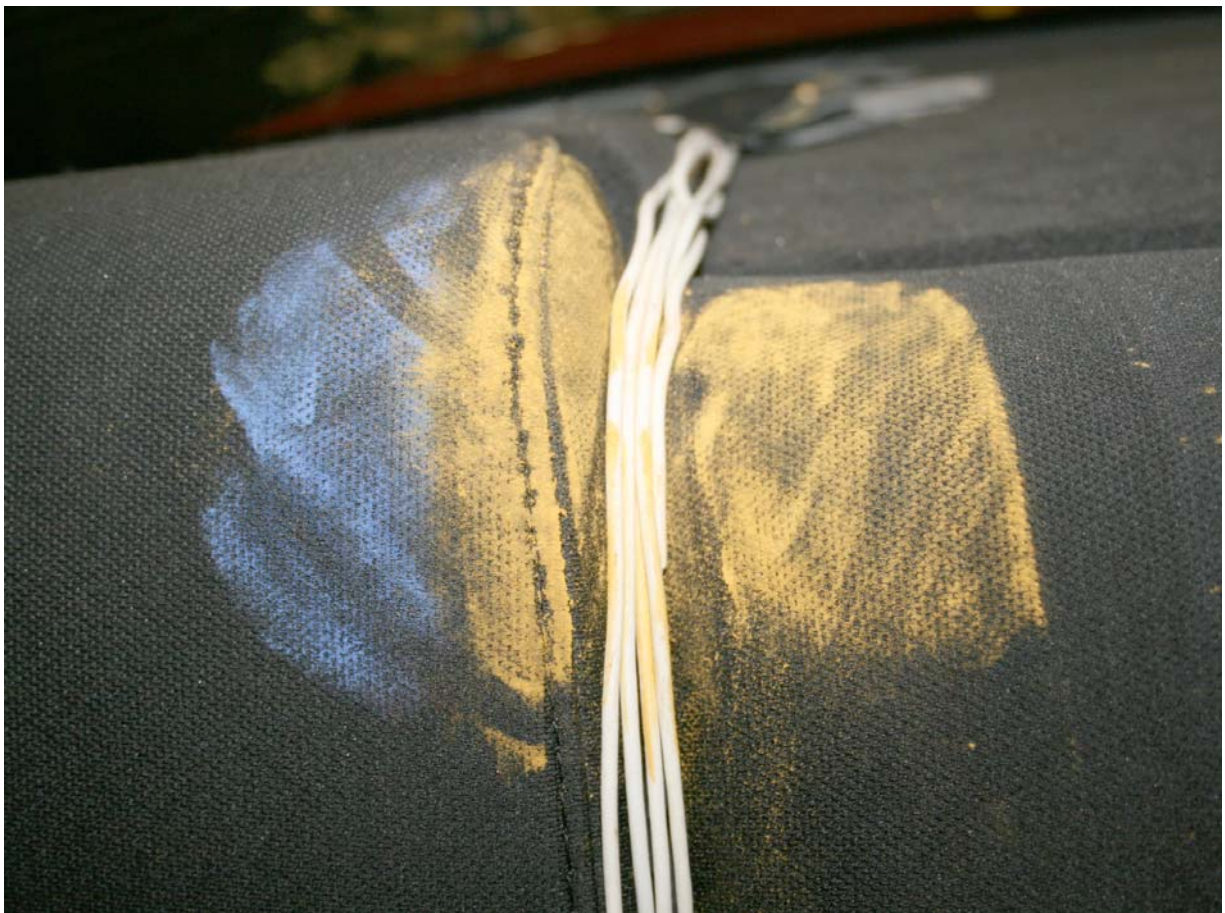
Post-Test Driver Dummy Lower Torso Contact



Post-Test Driver Dummy Contact



Post-Test Passenger Dummy Head Contact View 1



Post-Test Passenger Dummy Head Contact View 2



Post-Test Passenger Dummy Upper Torso Contact



Post-Test Passenger Dummy Lower Torso Contact



Post-Test Passenger Dummy Contact

APPENDIX B
SID/HIII RESPONSE DATA TRACES

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

Driver Head X Primary

Driver Head Y Primary

Driver Head Z Primary

Driver Head X Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force X

Driver Upper Neck Force Y

Driver Upper Neck Force Z

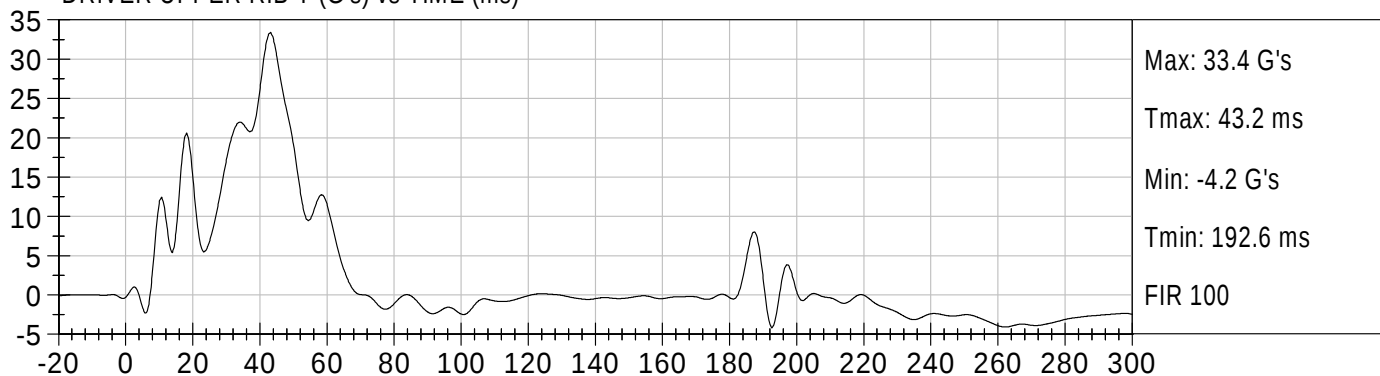
Driver Upper Neck Moment X

Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
Passenger Thorax Contact
Passenger Pelvis Contact
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z

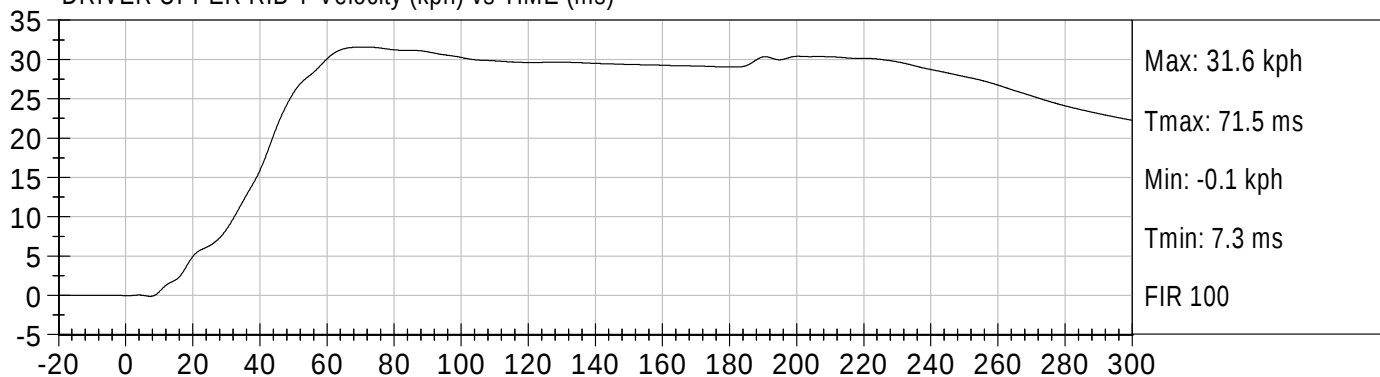
Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Right Rear Occupant Compartment
Vehicle B-Post Lower Y
Vehicle B-Post Middle Y
Vehicle A-Post Lower Y
Vehicle A-Post Middle Y
Vehicle Left Front Seat Track
Vehicle Left Rear Seat Track
Vehicle CG X
Vehicle CG Y
Vehicle CG Z
MDB CG X
MDB CG Y
MDB CG Z
MDB Rear X
MDB Rear Y
MDB Left Bumper Contact
MDB Right Bumper Contact



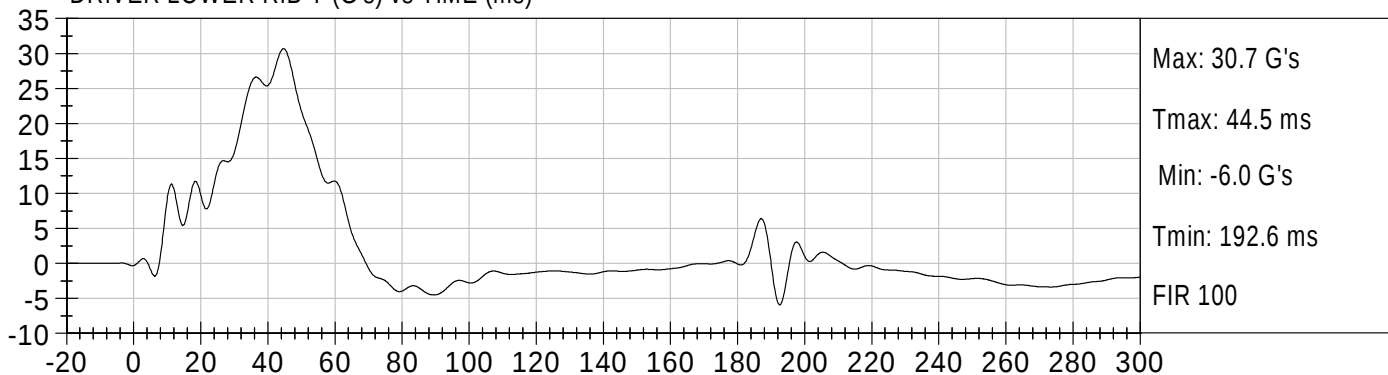
DRIVER UPPER RIB Y (G's) vs TIME (ms)



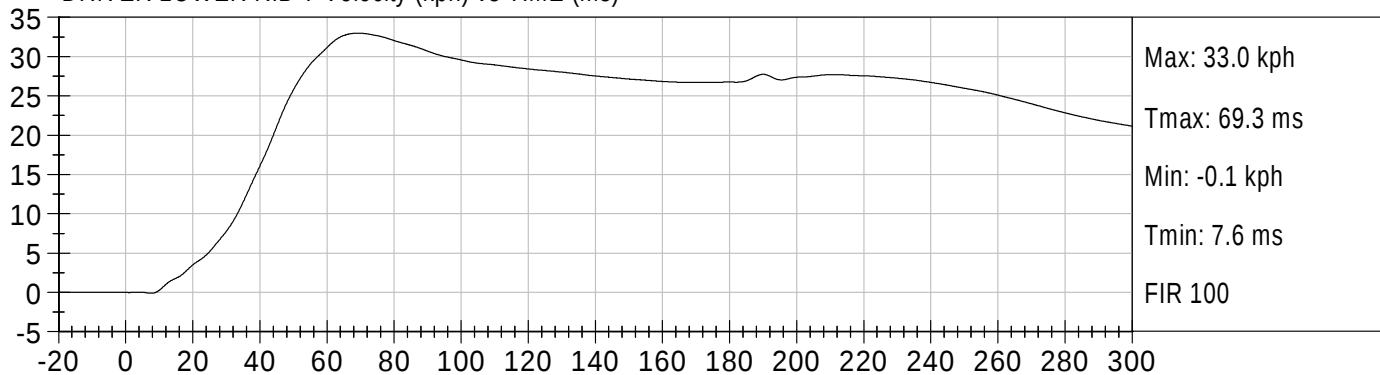
DRIVER UPPER RIB Y Velocity (kph) vs TIME (ms)

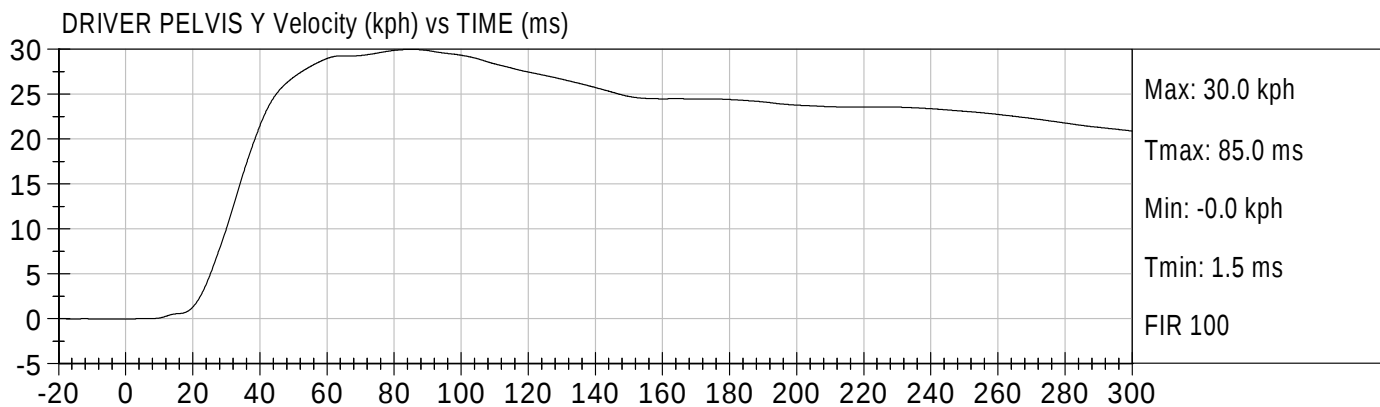
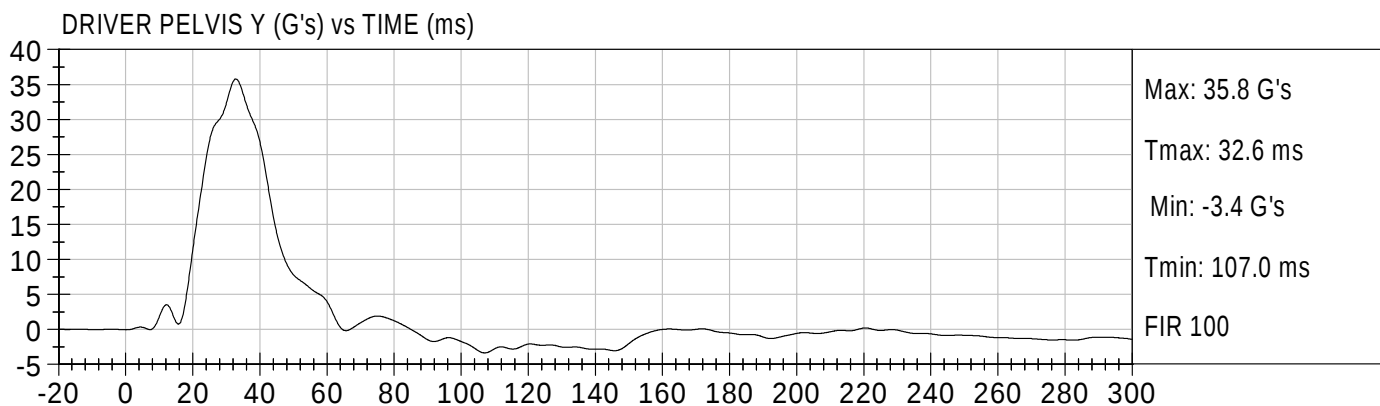
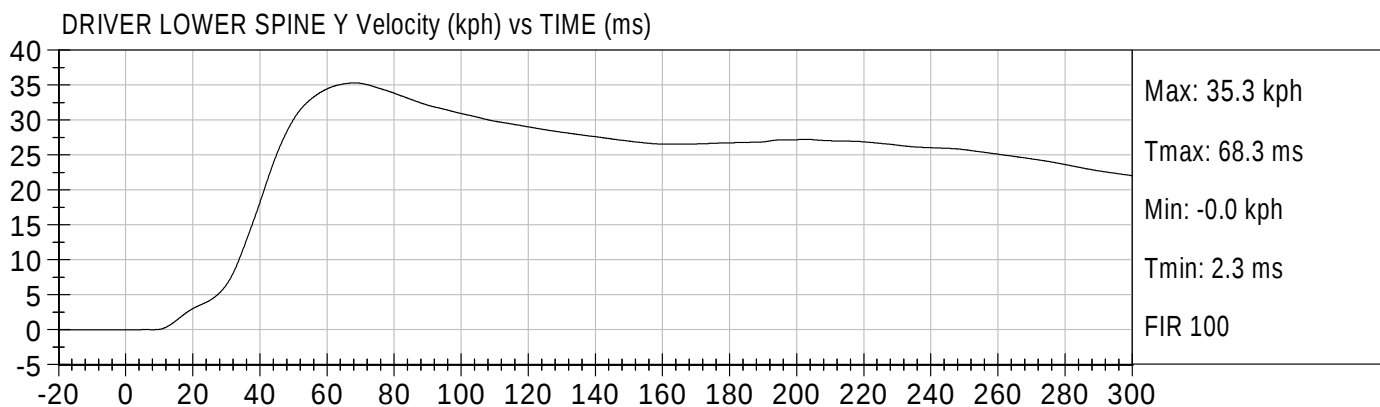
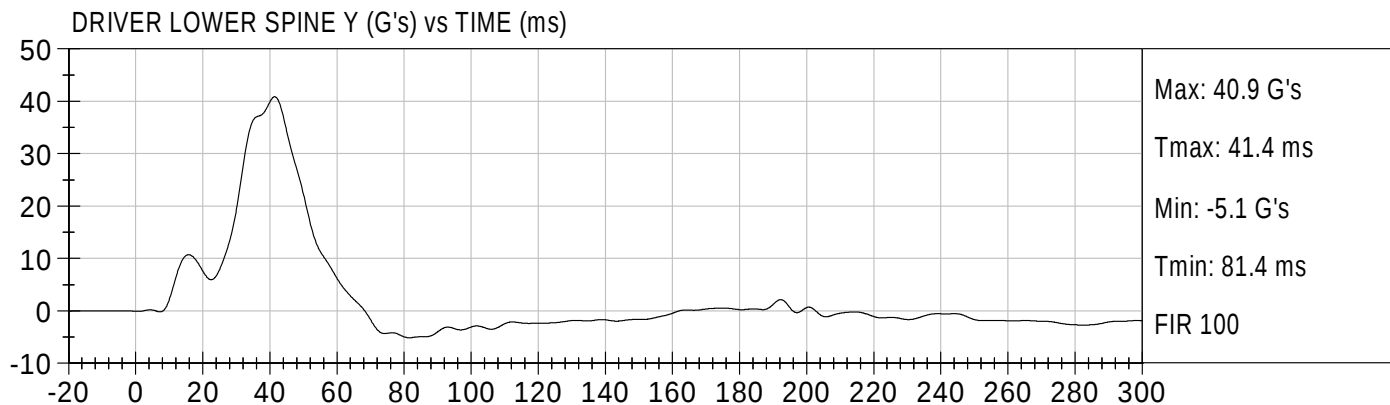


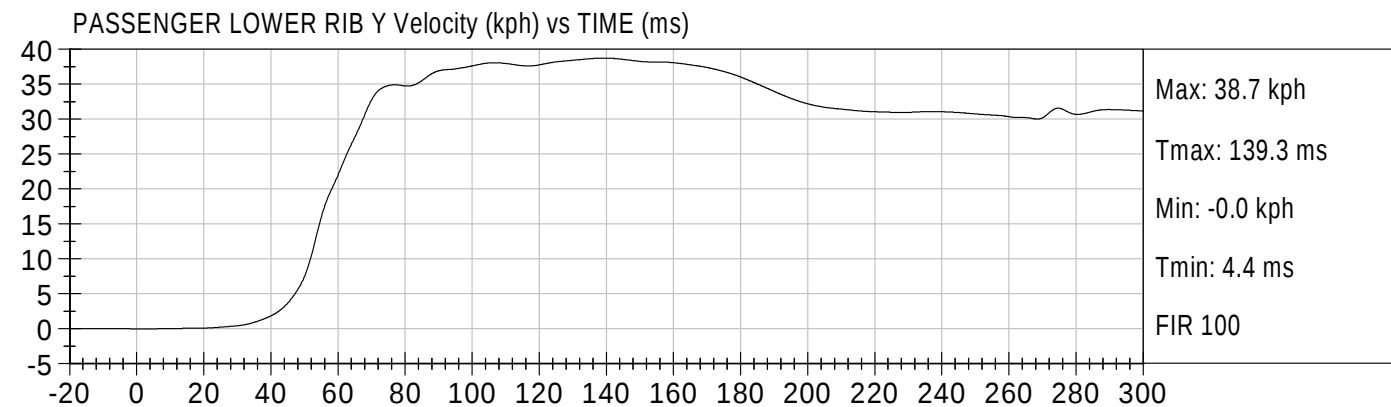
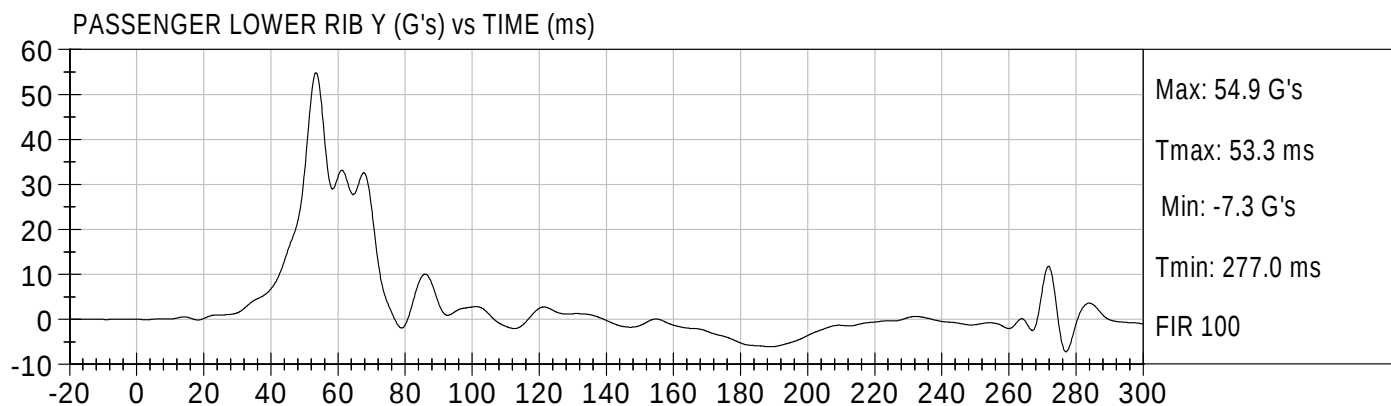
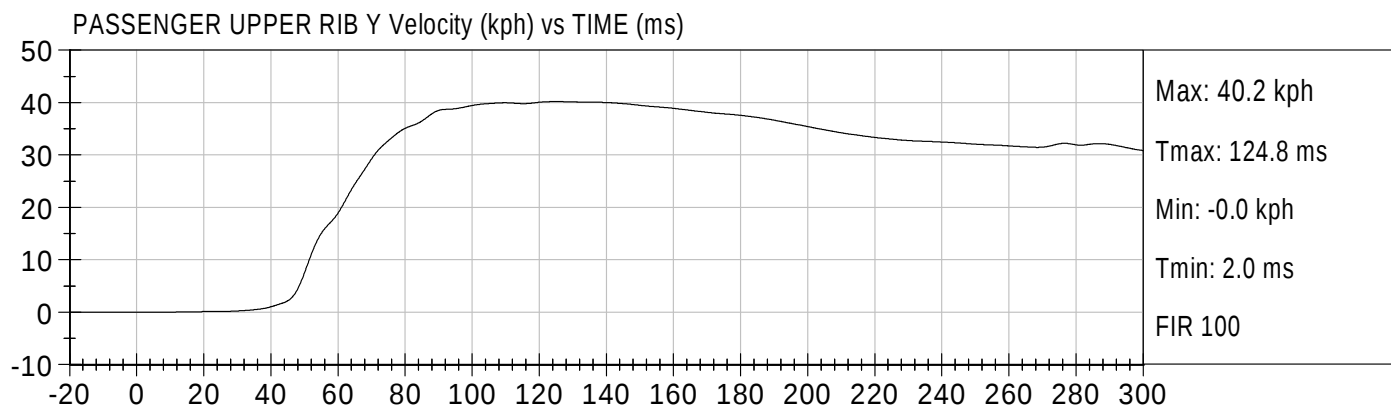
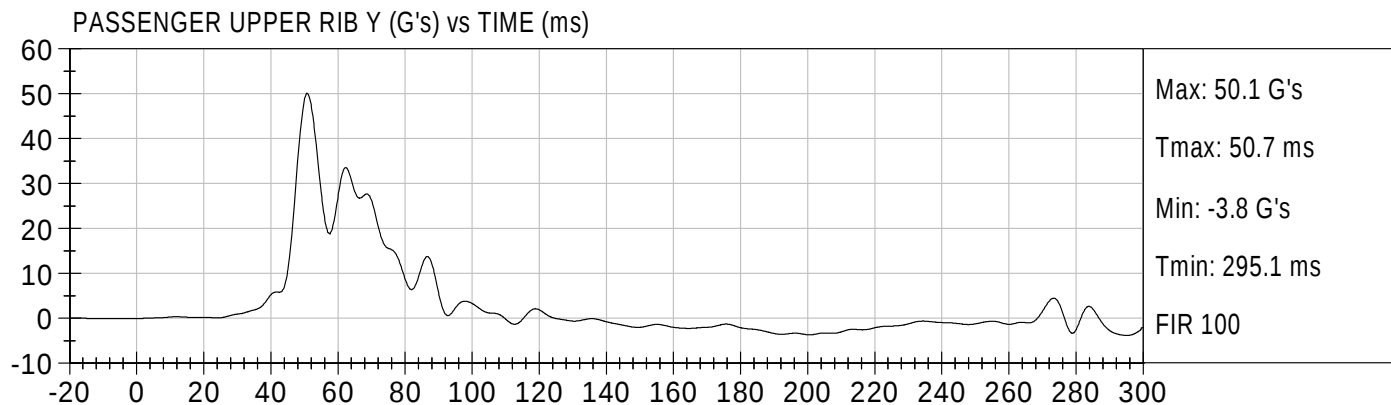
DRIVER LOWER RIB Y (G's) vs TIME (ms)

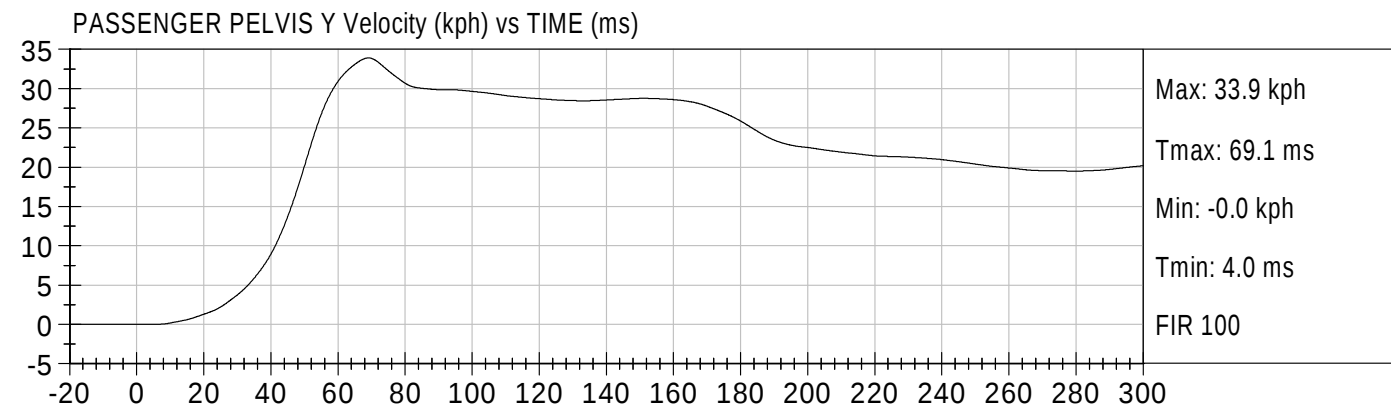
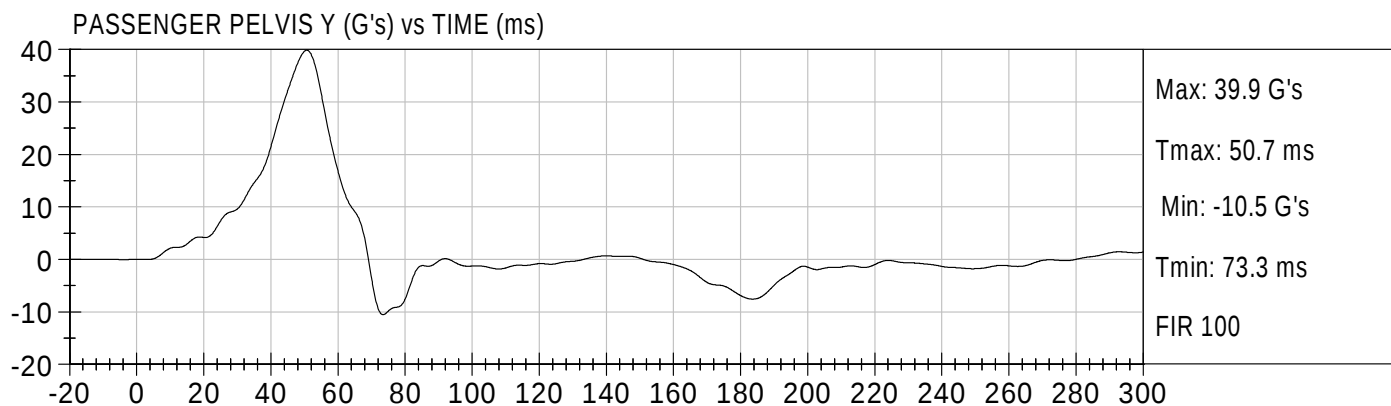
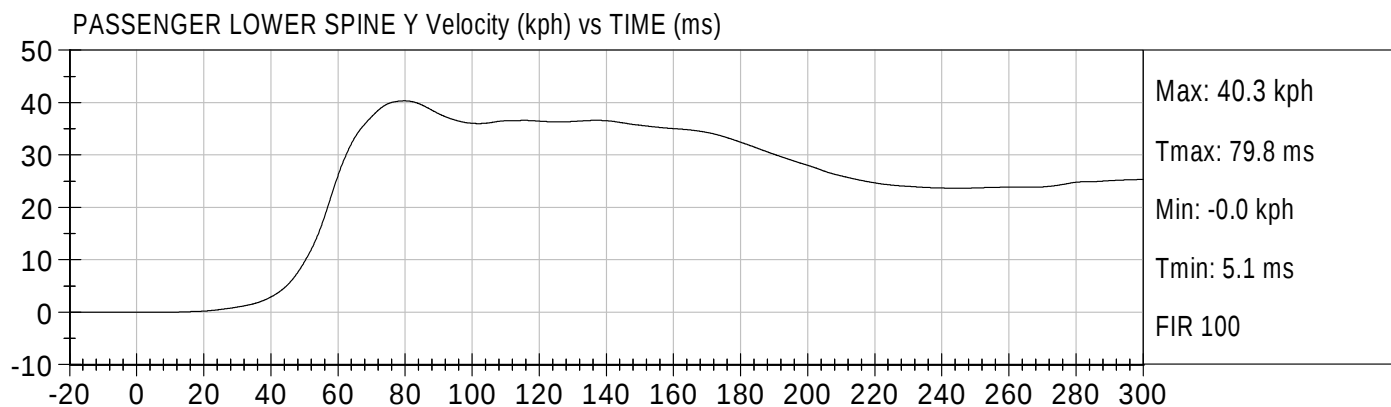
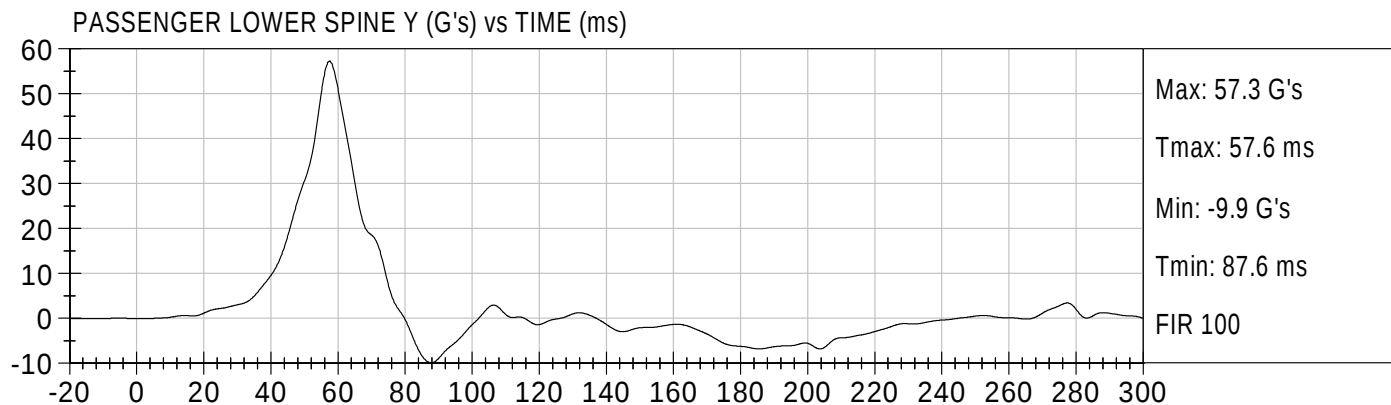


DRIVER LOWER RIB Y Velocity (kph) vs TIME (ms)









APPENDIX C
DUMMY CALIBRATION DATA

CERTIFICATION DATA

Dummy Serial Number: 271

Calibration Test Results Summary

Dummy Serial Number: 271

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 271

Test I.D: D08251

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	905	Pass
RH - Rib Height	mm	501 - 521	502	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	239	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	526	Pass
SW - Knee Pivot to Floor	mm	490 - 505	497	Pass
HW - Hip Width	mm	356 - 391	371	Pass
Overall Test Results			Pass	

Jessica Gall
Laboratory Technician

David Winkelbauer
Approved By

4/28/09

Test Date

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D09951

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	120 to 150	144	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	6.4	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

4/28/09
Test Date

David Winkelbauer
Approved By



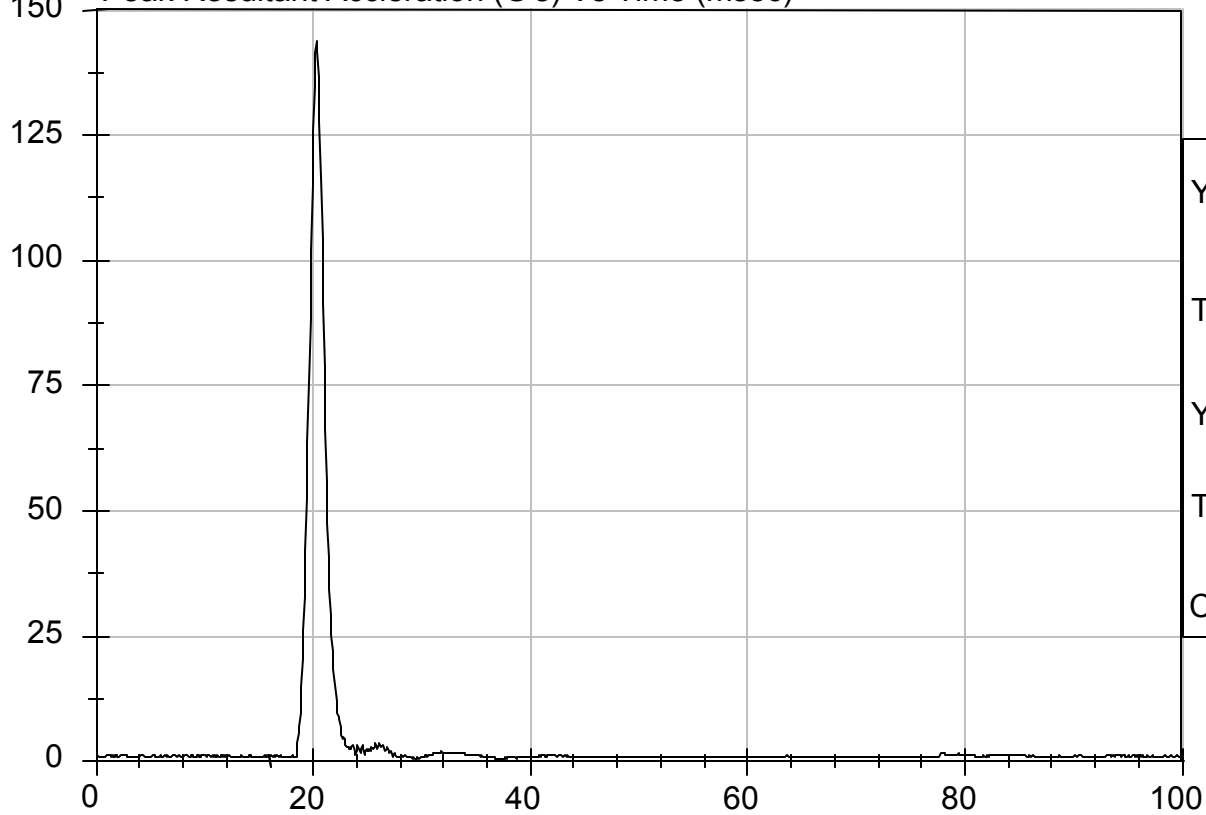
Test Description: Head Drop

Test Date: 4/28/09

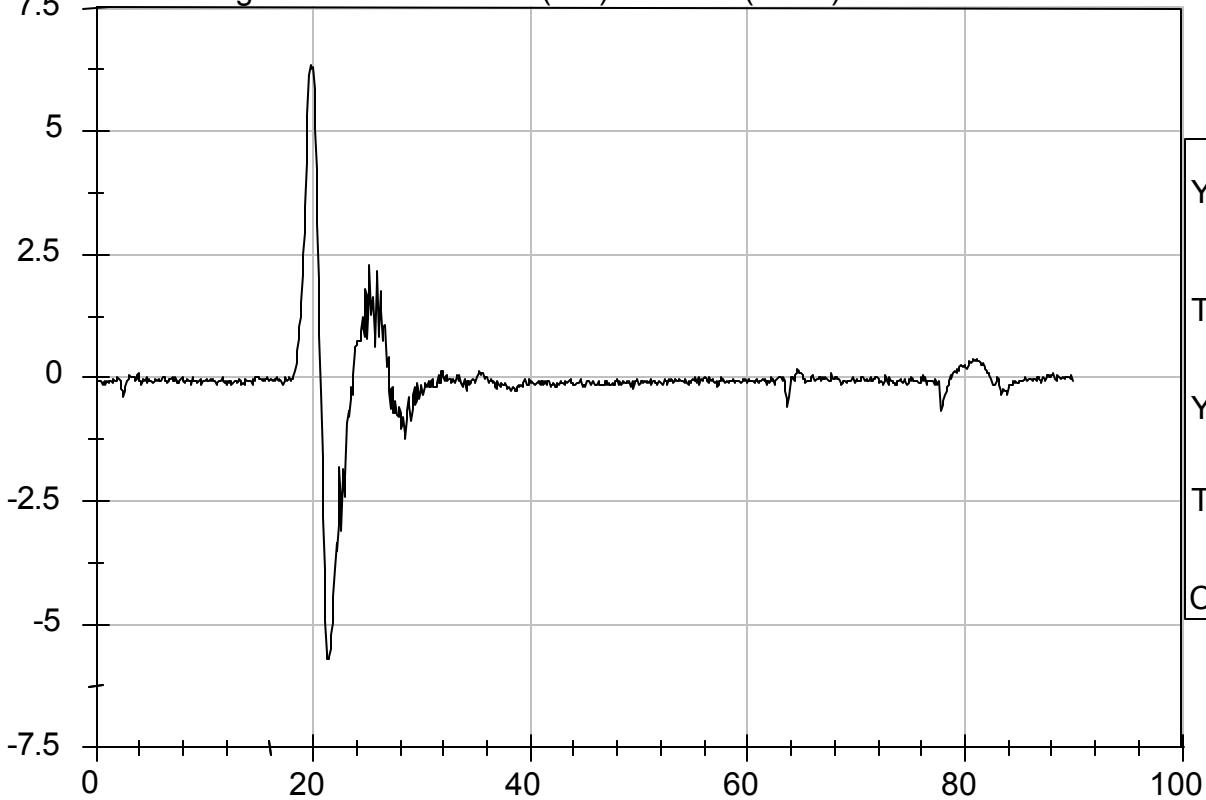
Component: D09951

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudnal Acceleration (G's) Vs Time (msec)

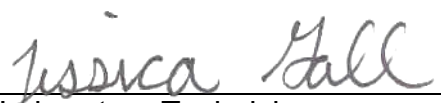


SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D09952

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	19	Pass
Overall Test Results				Pass


Laboratory Technician

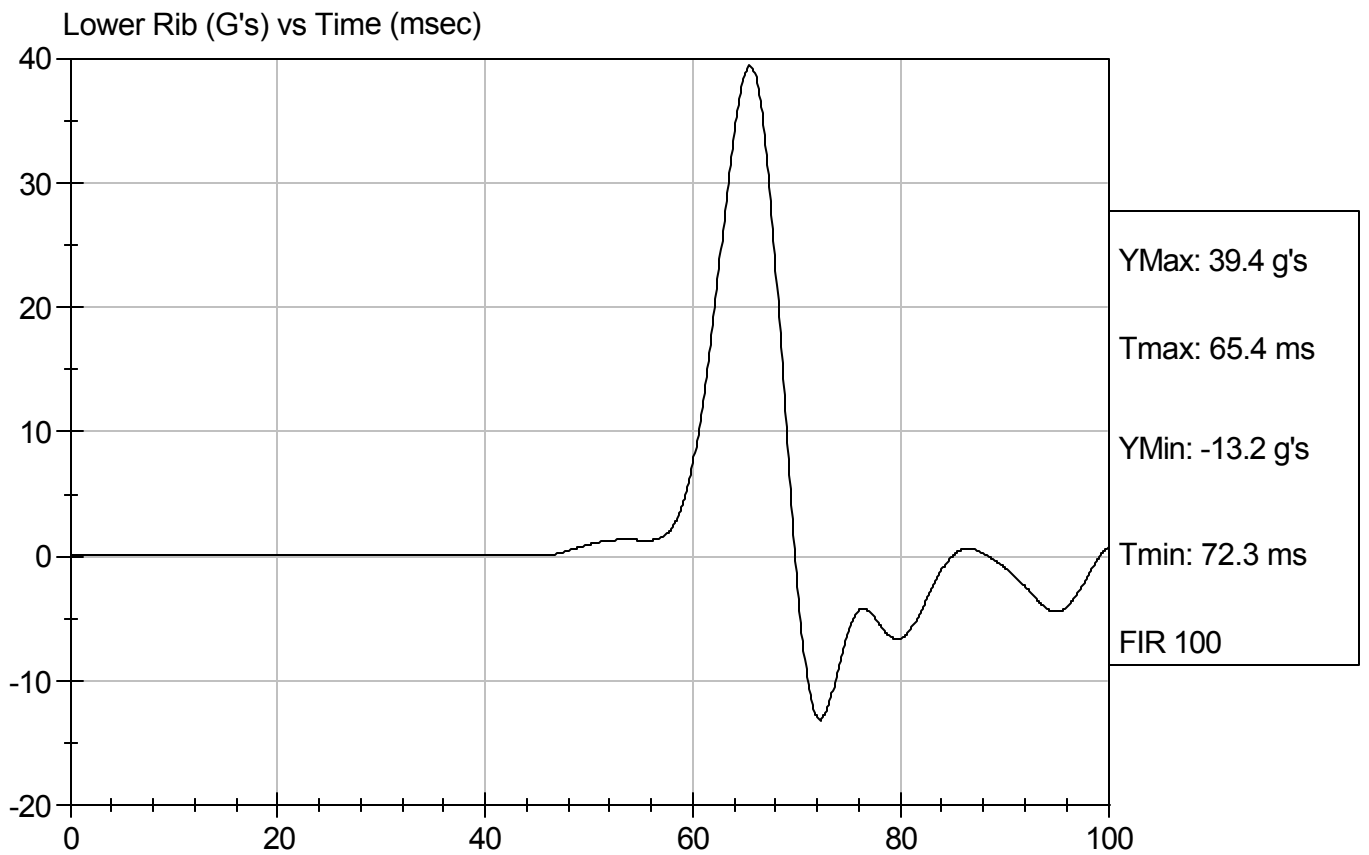
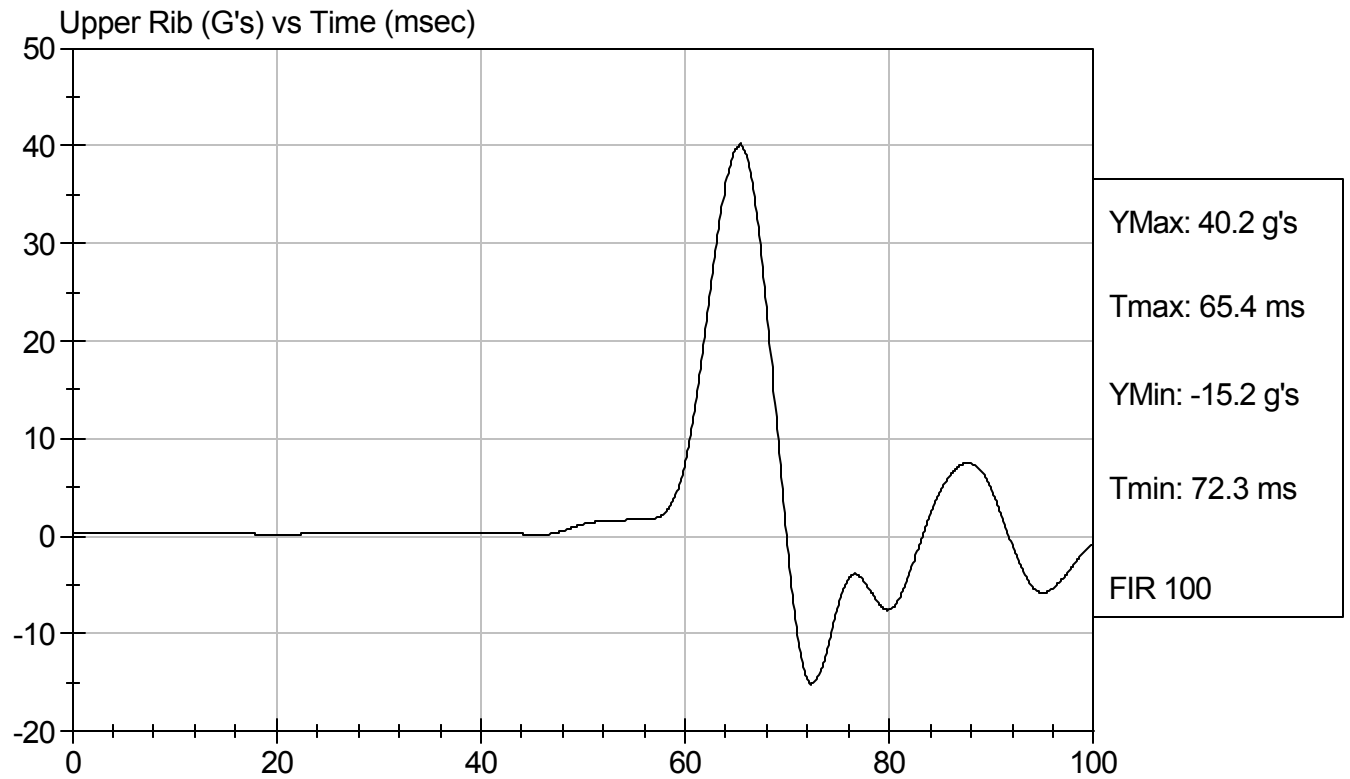
4/28/09
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D09952

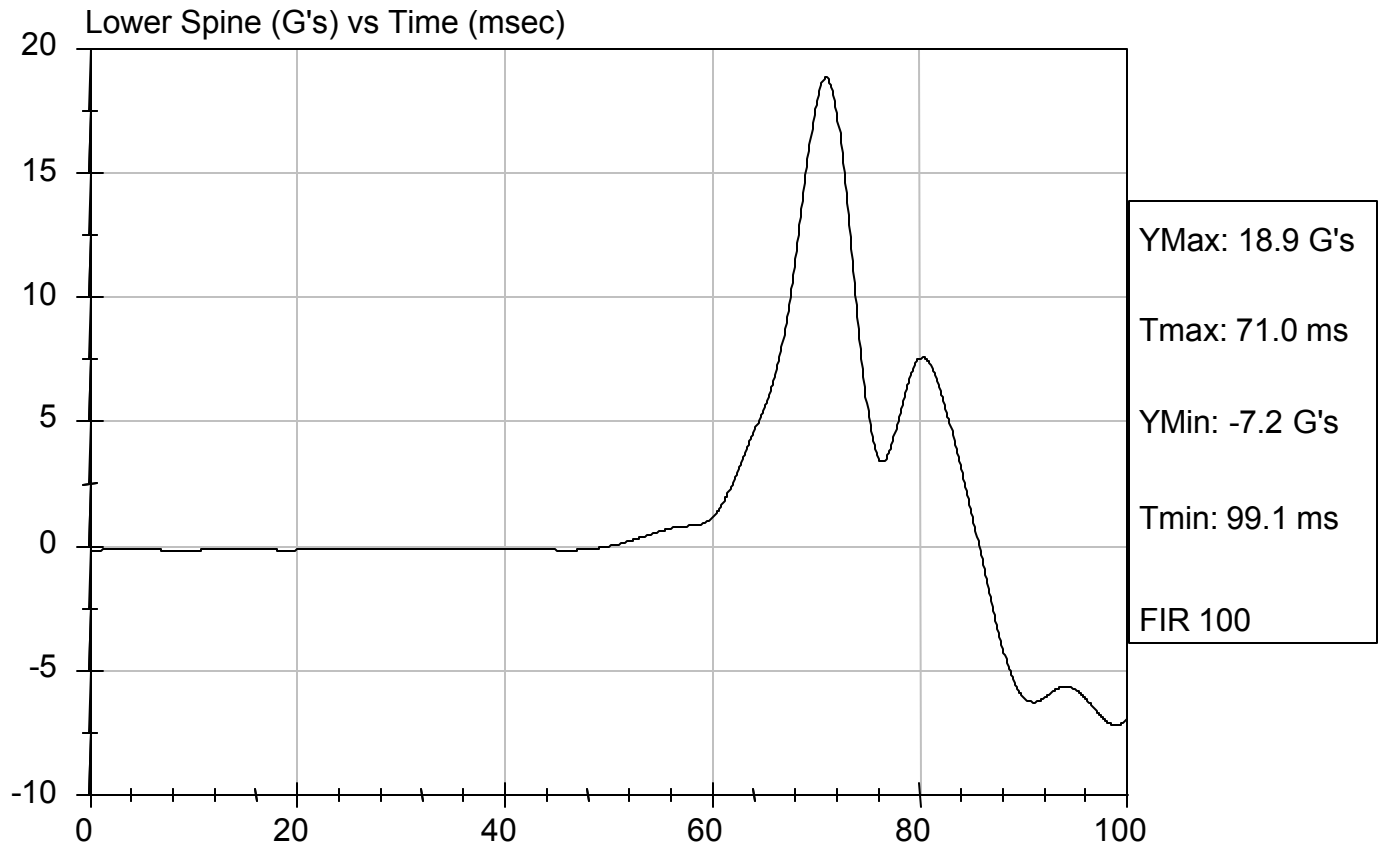
Test Date: 4/28/09
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D09952

Test Date: 4/28/09
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 271

Test I.D: D09953

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	43	Pass
			Overall Test Results	Pass

Jessica Gall
Laboratory Technician

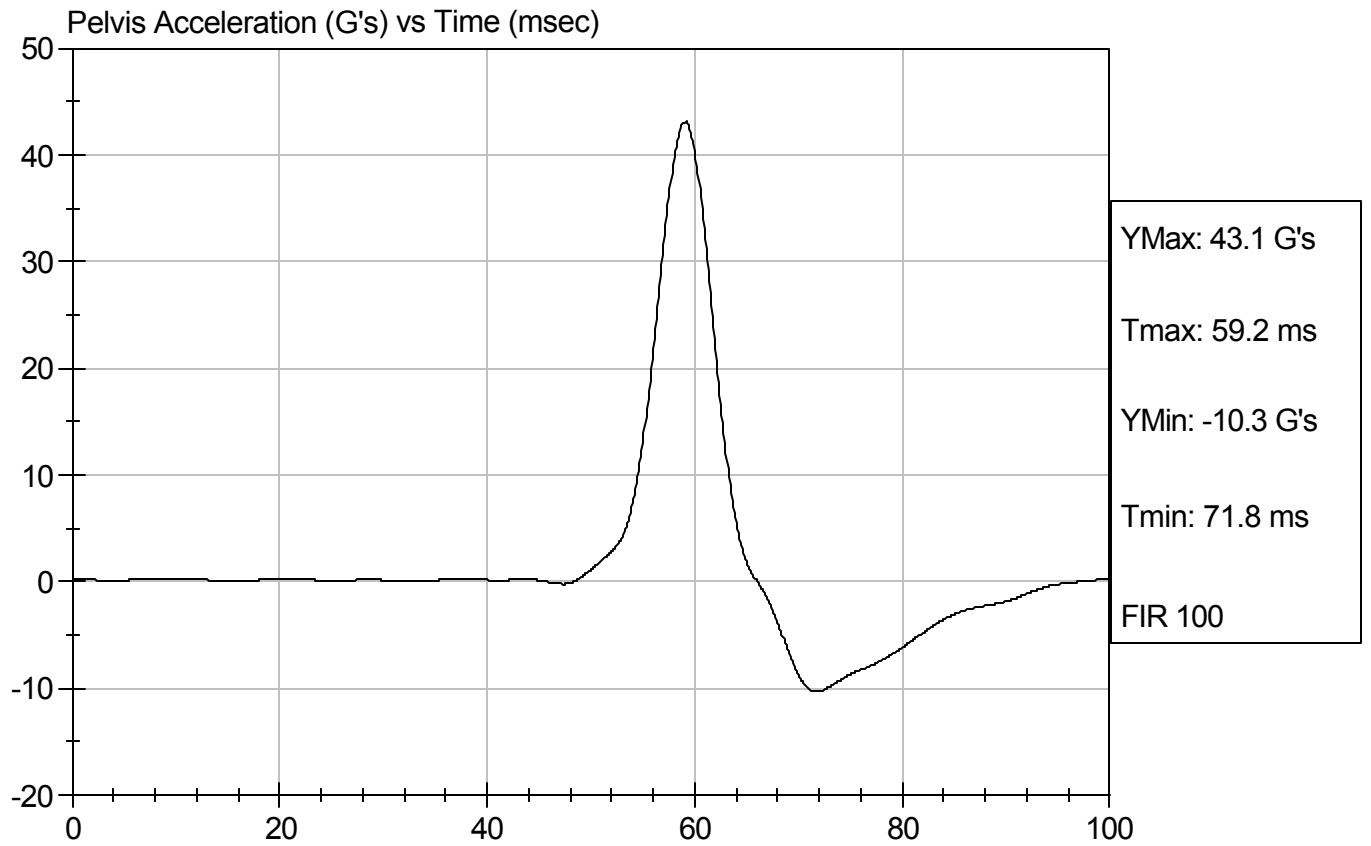
4/28/09
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D09953

Test Date: 4/28/09
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D09954

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Force At 12.7 mm	N	104 -162	144	Pass
Force At 19 mm	N	163 - 222	205	Pass
Force At 25.4 mm	N	222 - 280	279	Pass
Force At 33 mm	N	325 - 391	384	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

4/28/09
Test Date

David Winkelbauer
Approved By

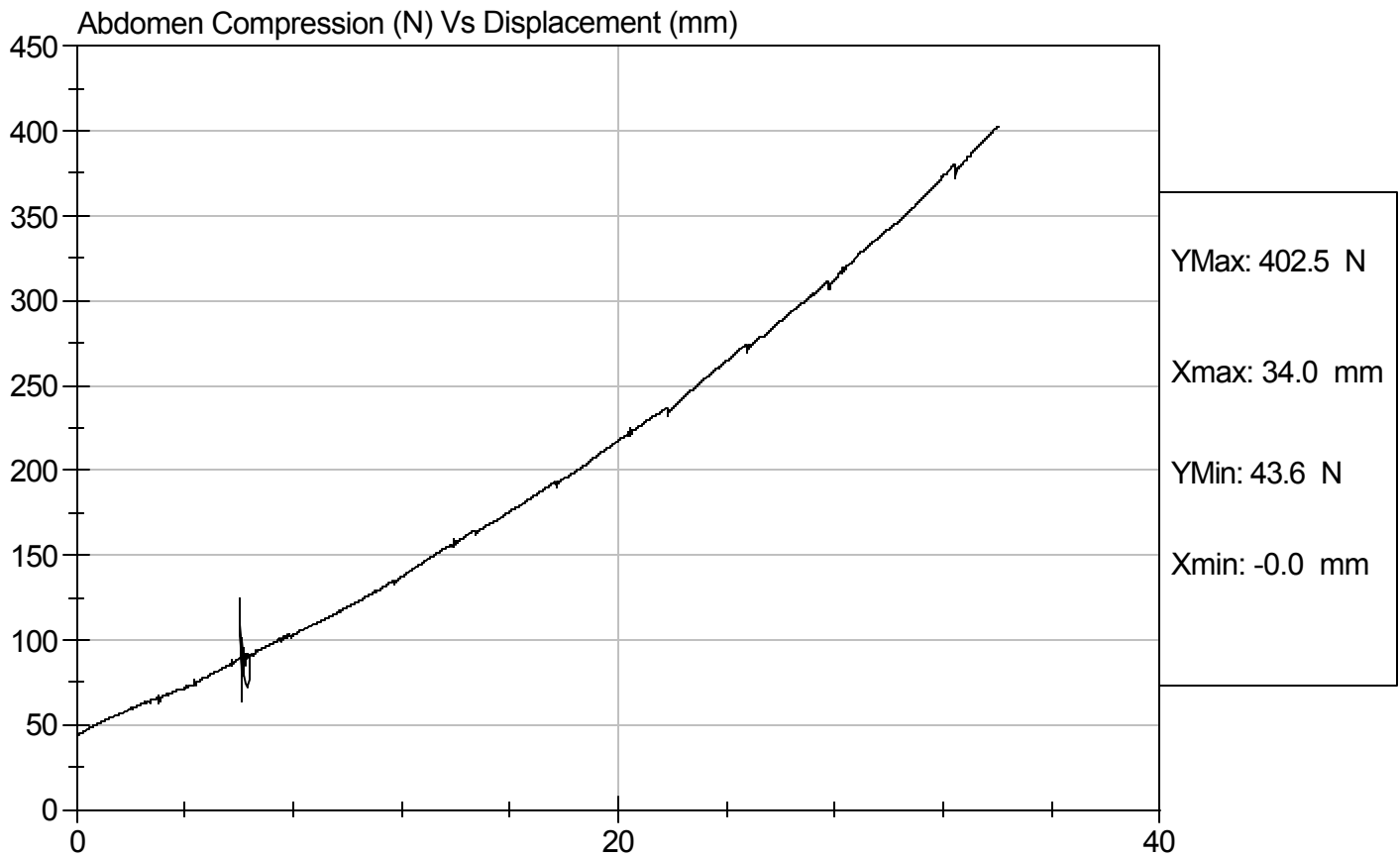


Test Description: Abdomen Compression

Test Date: 4/28/09

Component: D09954

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D09955

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	125.8	Pass
Force At 30 deg	N	151.2 - 204.6	202.1	Pass
Force At 40 deg	N	204.6 - 258.0	242.3	Pass
Return Angle	Deg	12 Maximum	5	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

4/28/09
Test Date

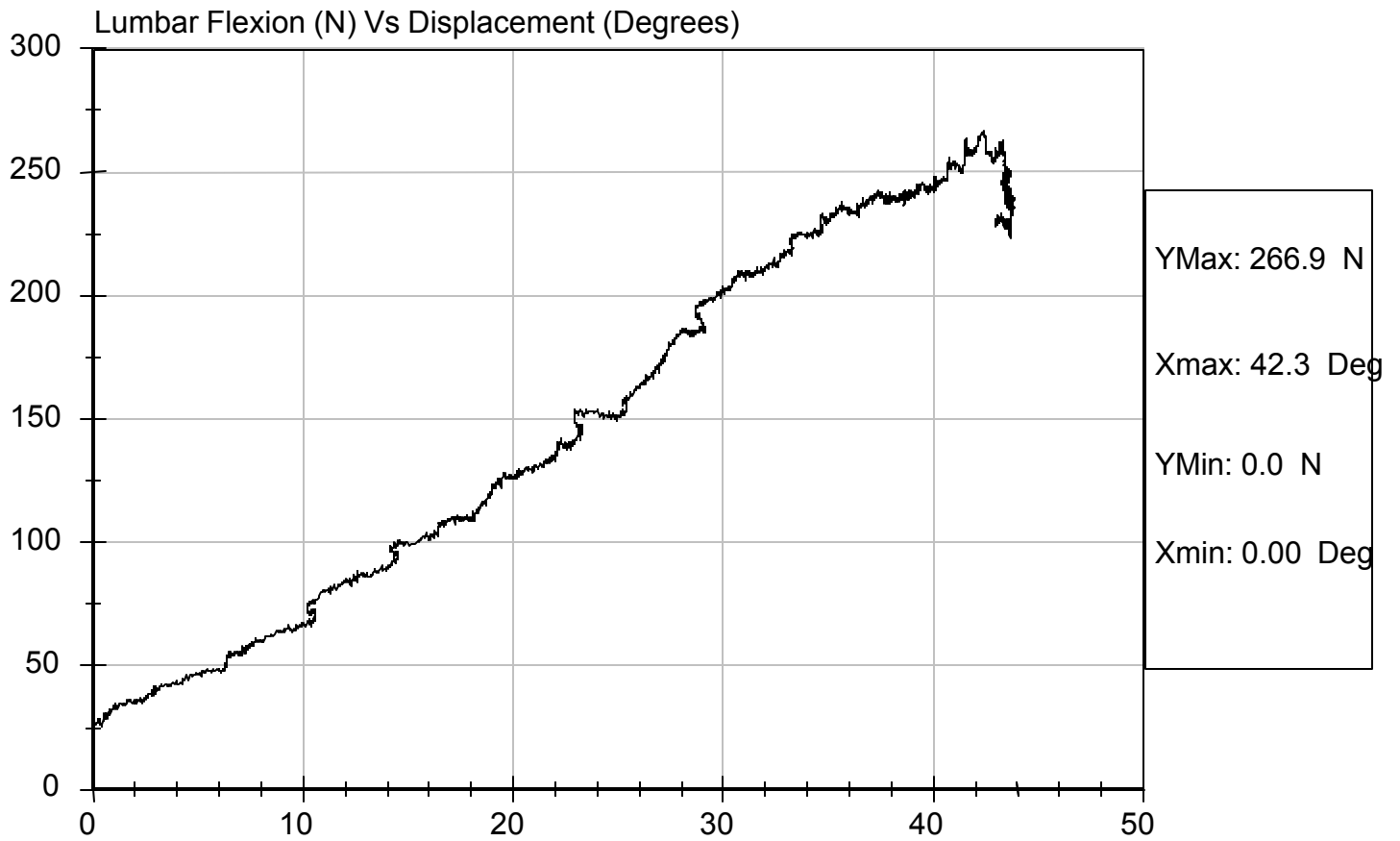


Test Description: Lumbar Flexion

Test Date: 4/28/09

Component: D09955

Speed: 0 ft/sec, 0 m/sec

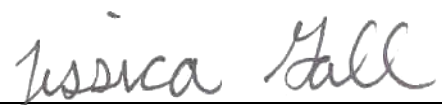


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D09959

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	34	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.37	Pass
	20 msec	m/s	4.12 to 5.10	4.67	Pass
	30 msec	m/s	5.73 to 7.01	6.57	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.79	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	70	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	75	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	49	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	2	Pass


 Laboratory Technician

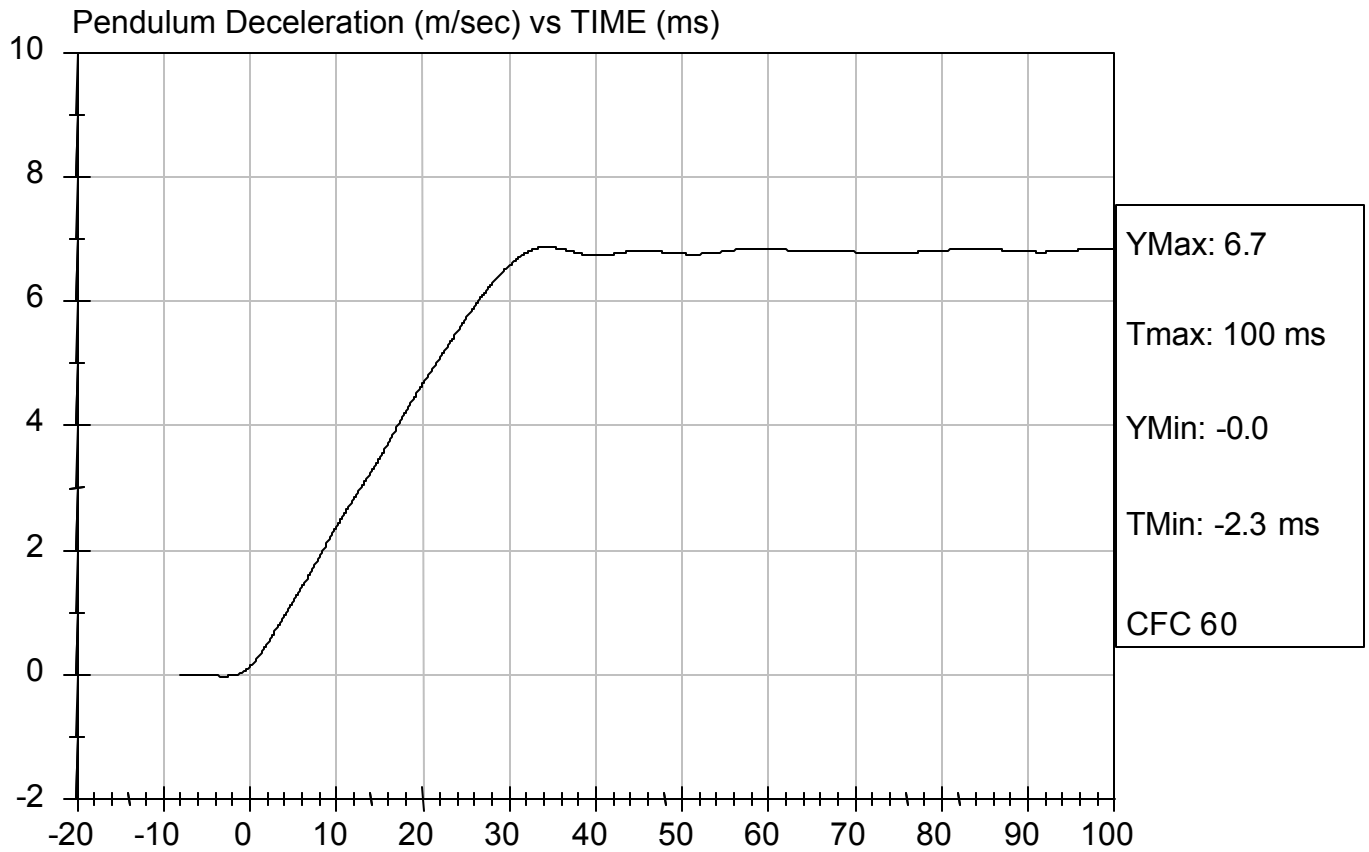
4/28/09
 Test Date


 Approved By



Test Desc: Neck Bending
Component ID: D09959

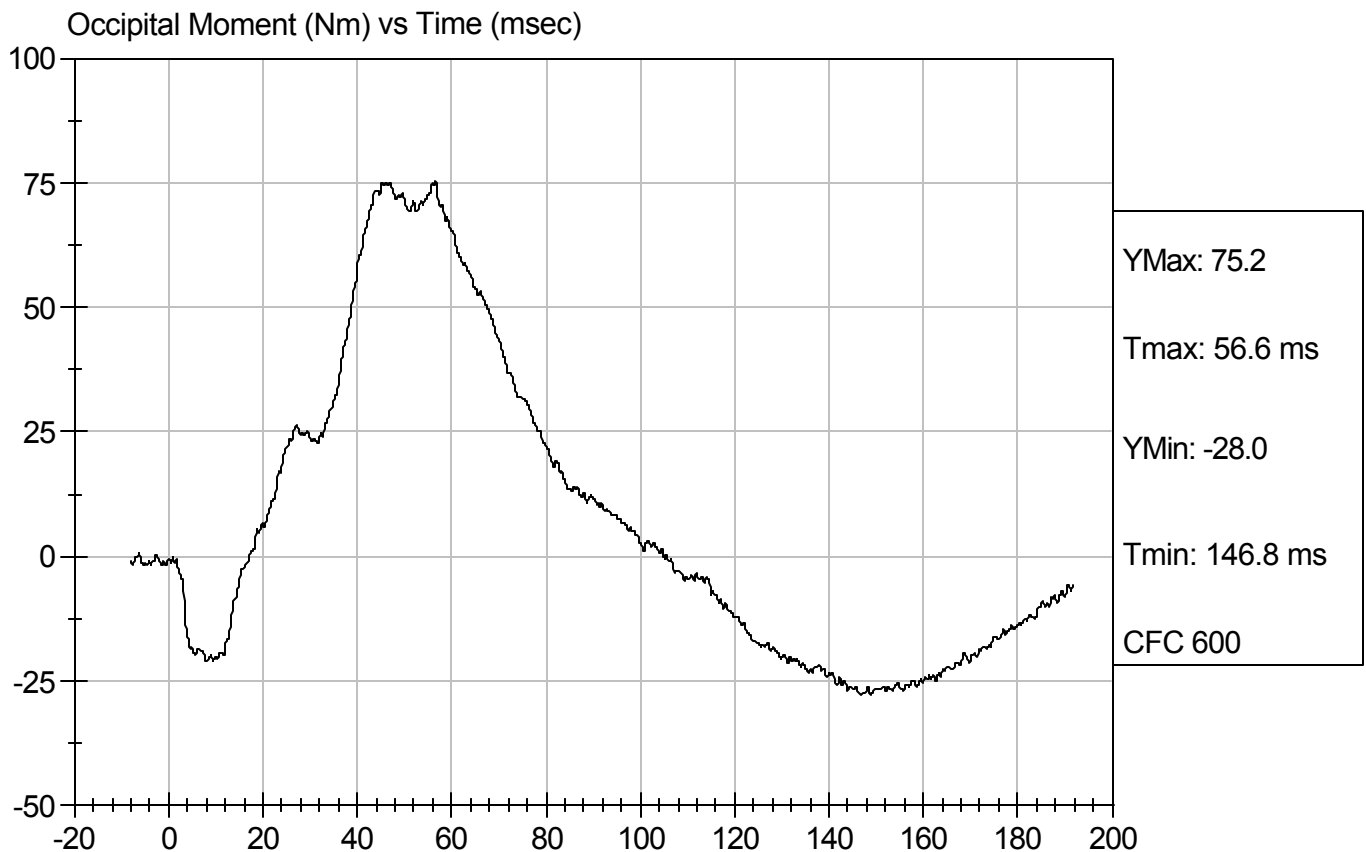
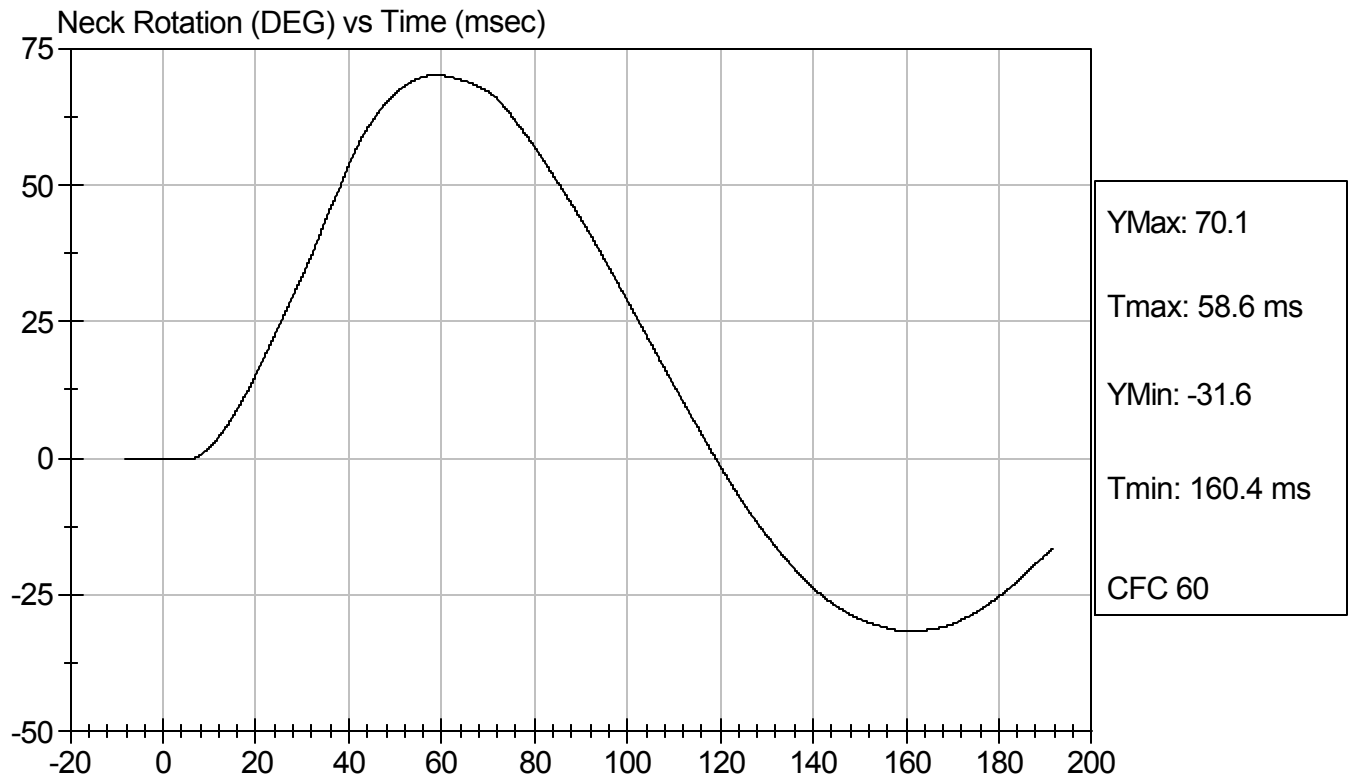
Test Date: 4/28/09
Speed: 23.15 ft/sec, 7.06 m/sec





Test Desc: Neck Bending
Component ID: D09959

Test Date: 4/28/09
Speed: 23.15 ft/sec, 7.06 m/sec



Calibration Test Results Summary

Dummy Serial Number: 271

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 271

Test I.D: D091011

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	120 to 150	147	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-7.0	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

David Winkelbauer
Approved By

5/4/09
Test Date



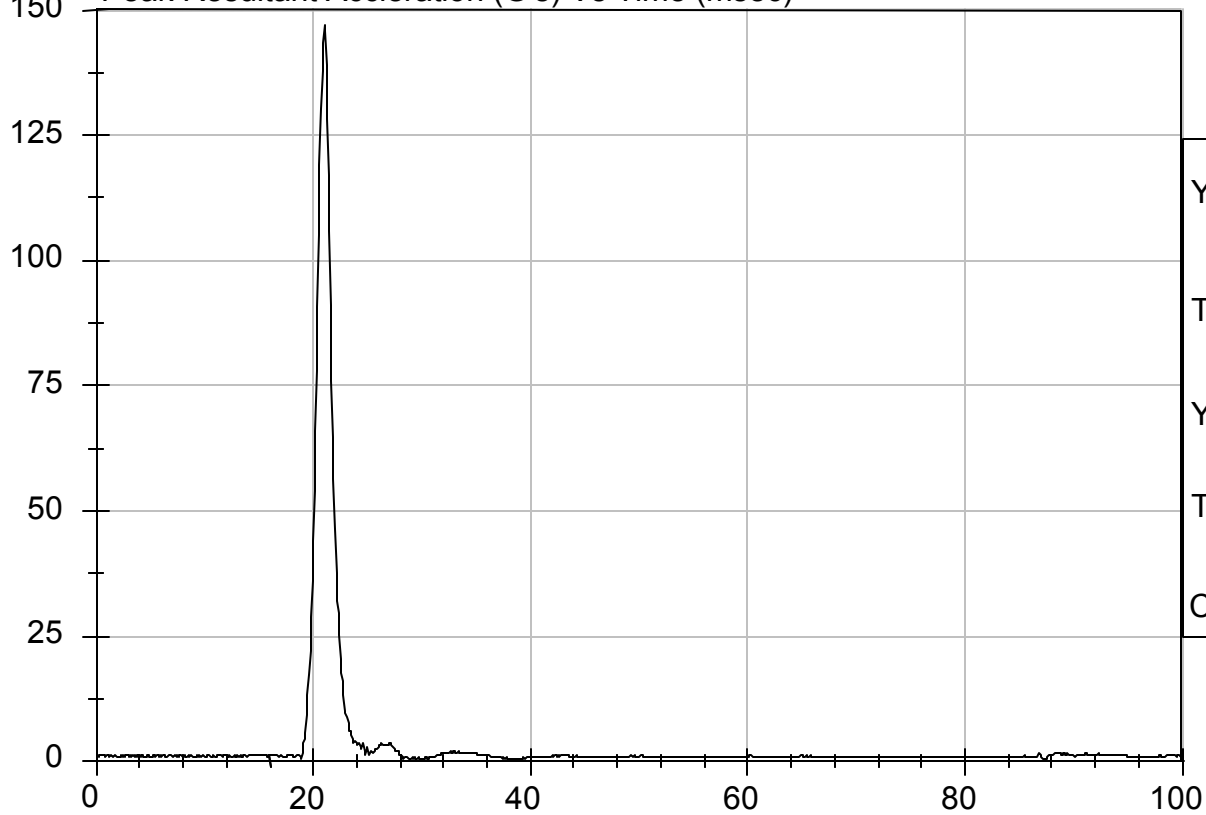
Test Description: Head Drop

Test Date: 5/4/09

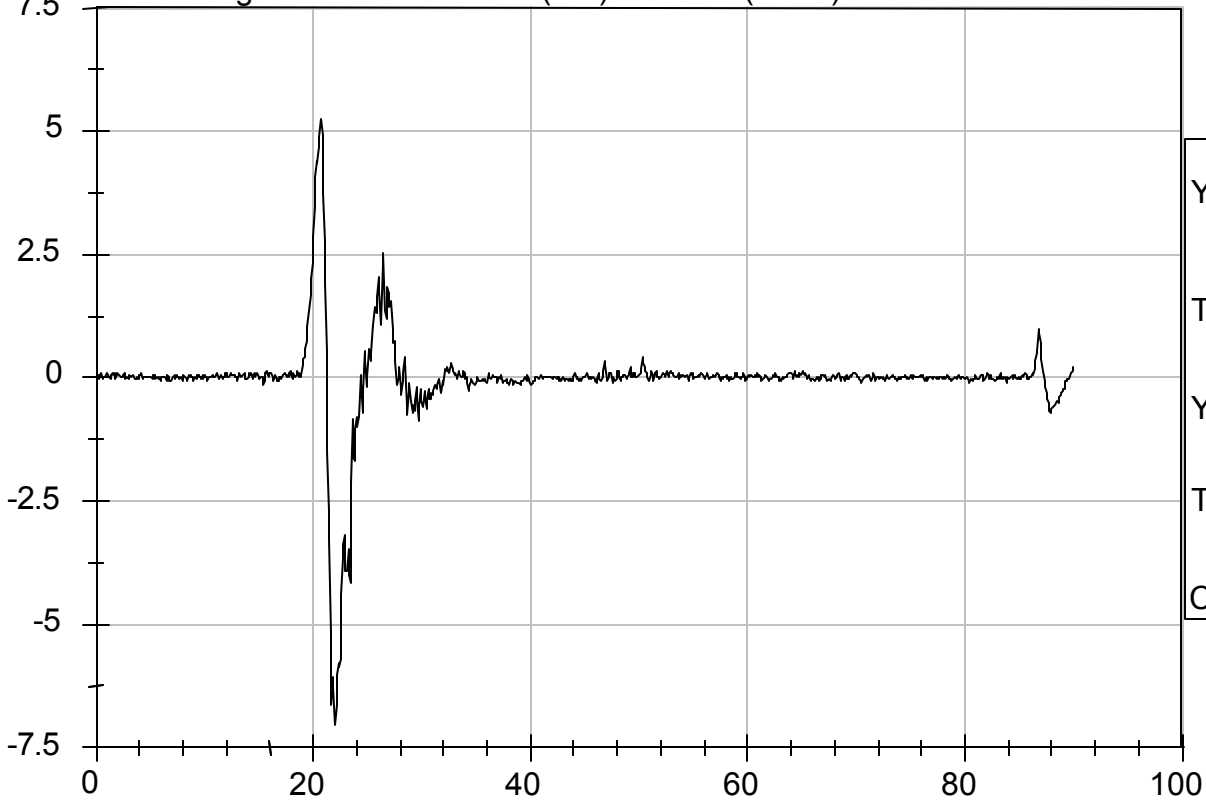
Component: D091011

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



Peak Longitudinal Acceleration (G's) Vs Time (msec)



SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 271

Test I.D: D091012

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	40	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	18	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

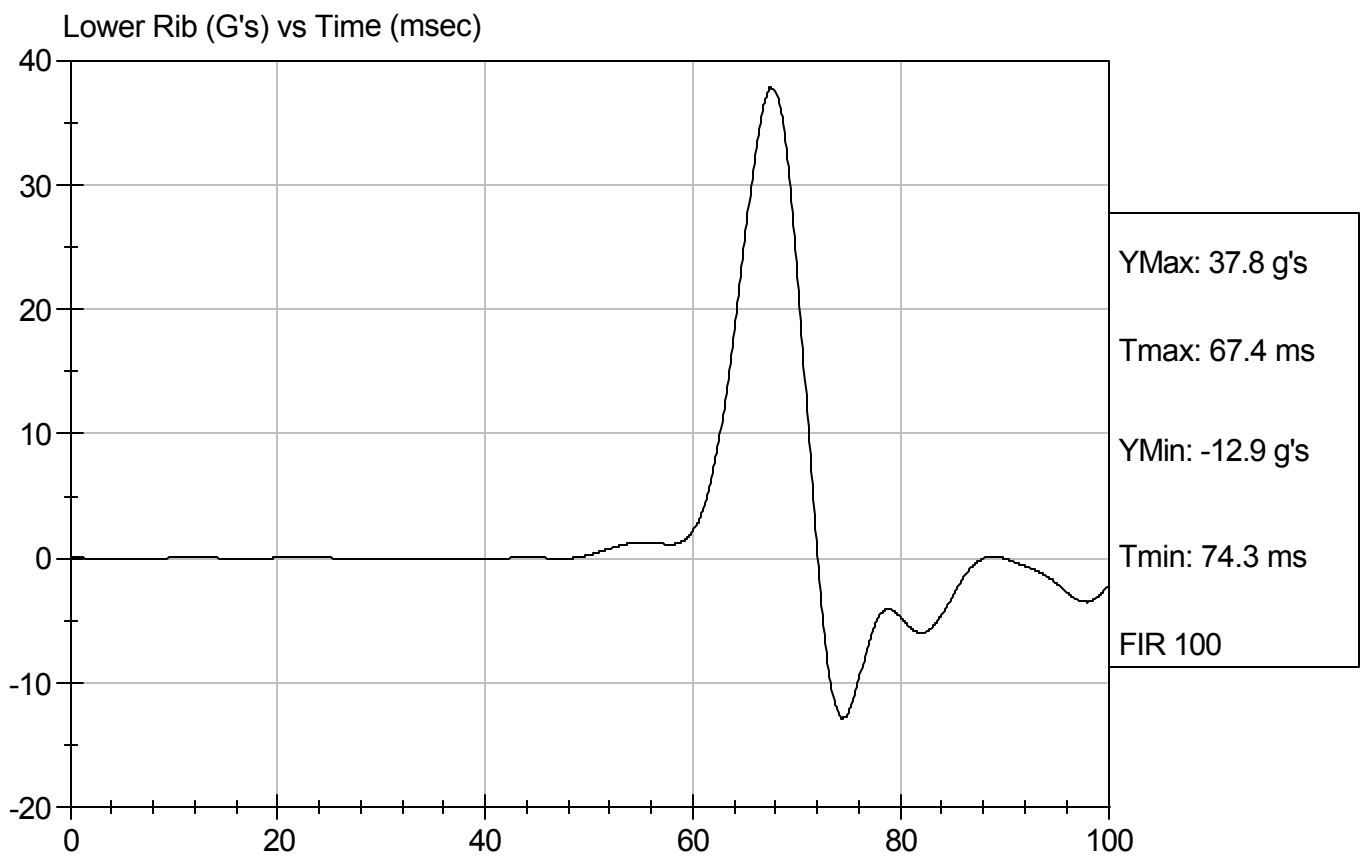
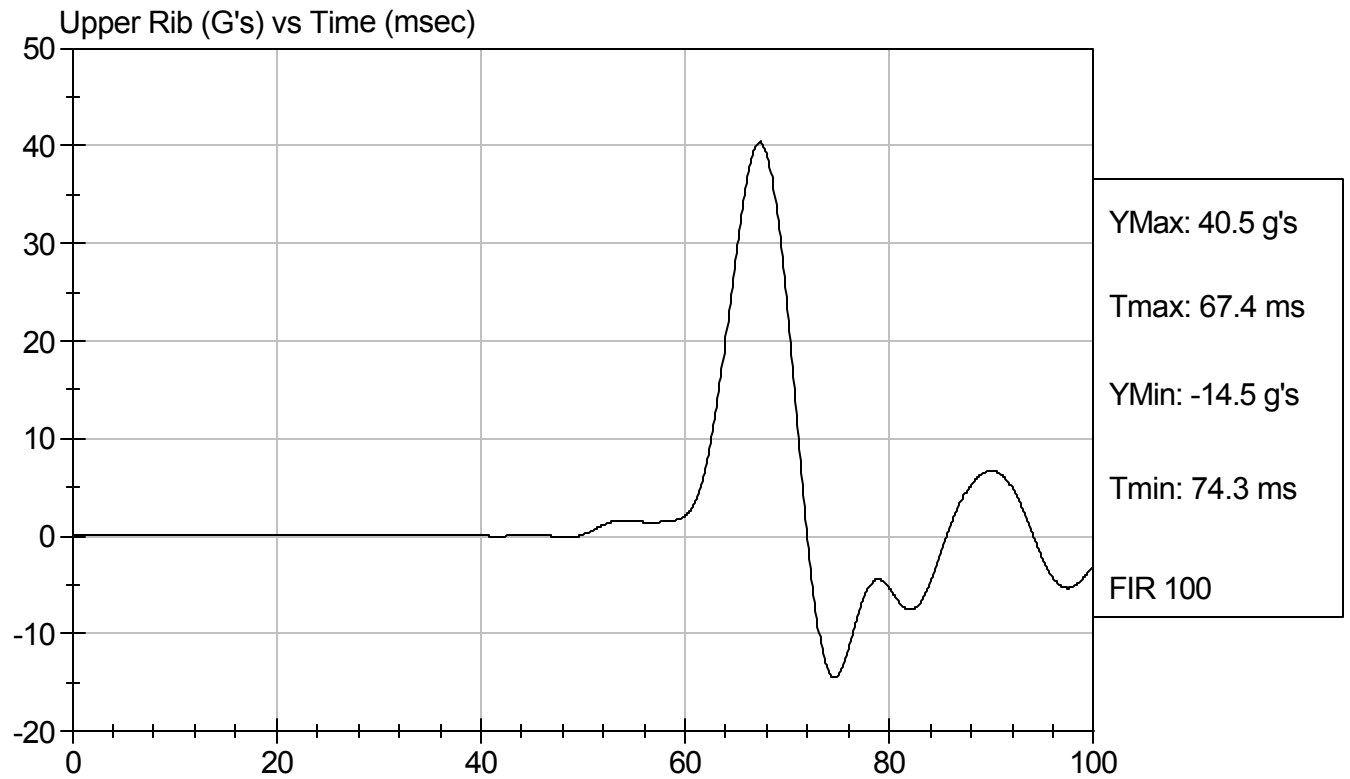
David Winkelbauer
Approved By

5/4/09
Test Date



Test Desc: Thorax Impact
Component ID: D091012

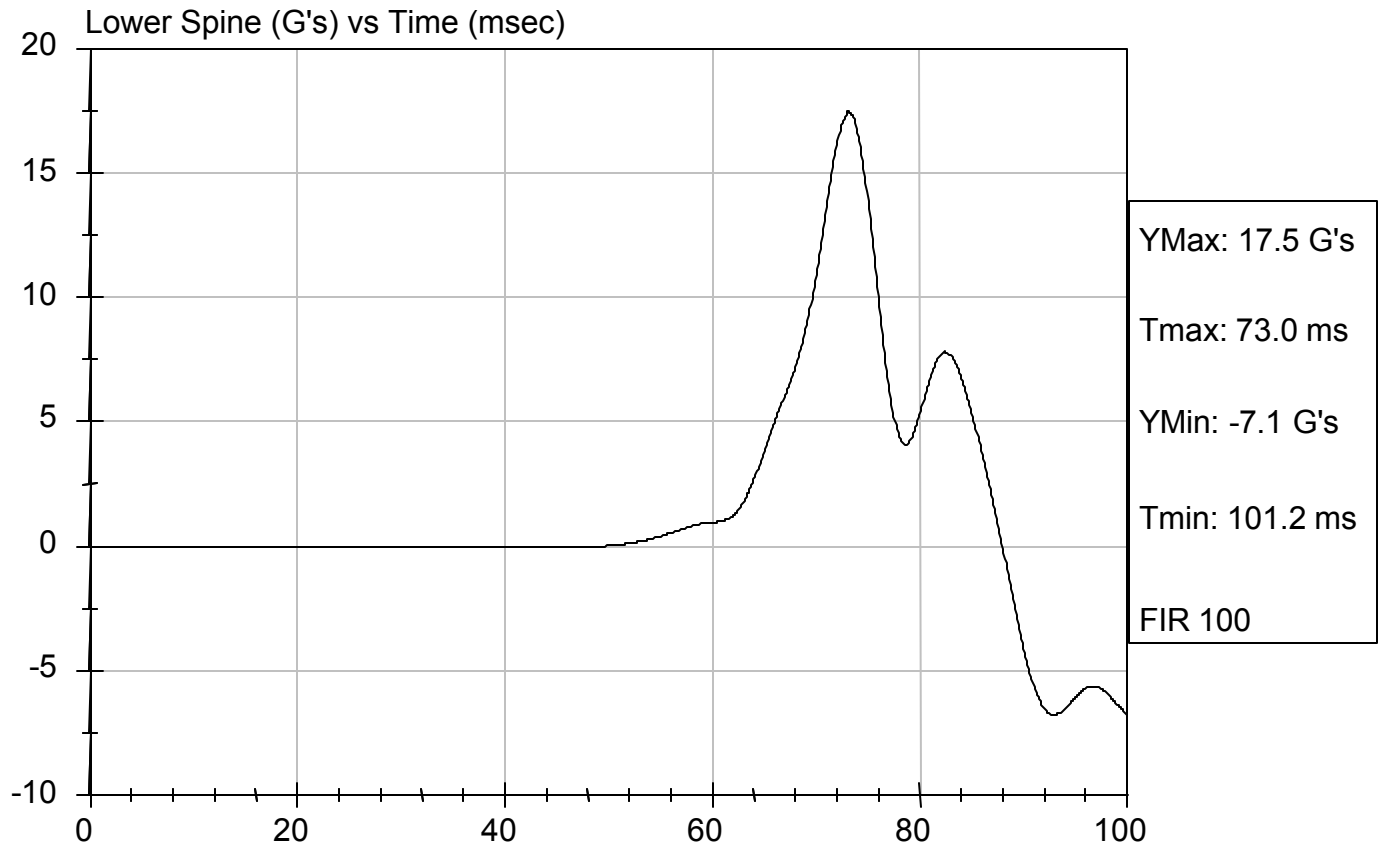
Test Date: 5/4/09
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D091012

Test Date: 5/4/09
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 271

Test I.D: D091013

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Probe Velocity	m/s	4.27 - 4.33	4.29	Pass
Pelvis Acceleration	G's	40 - 60	43	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

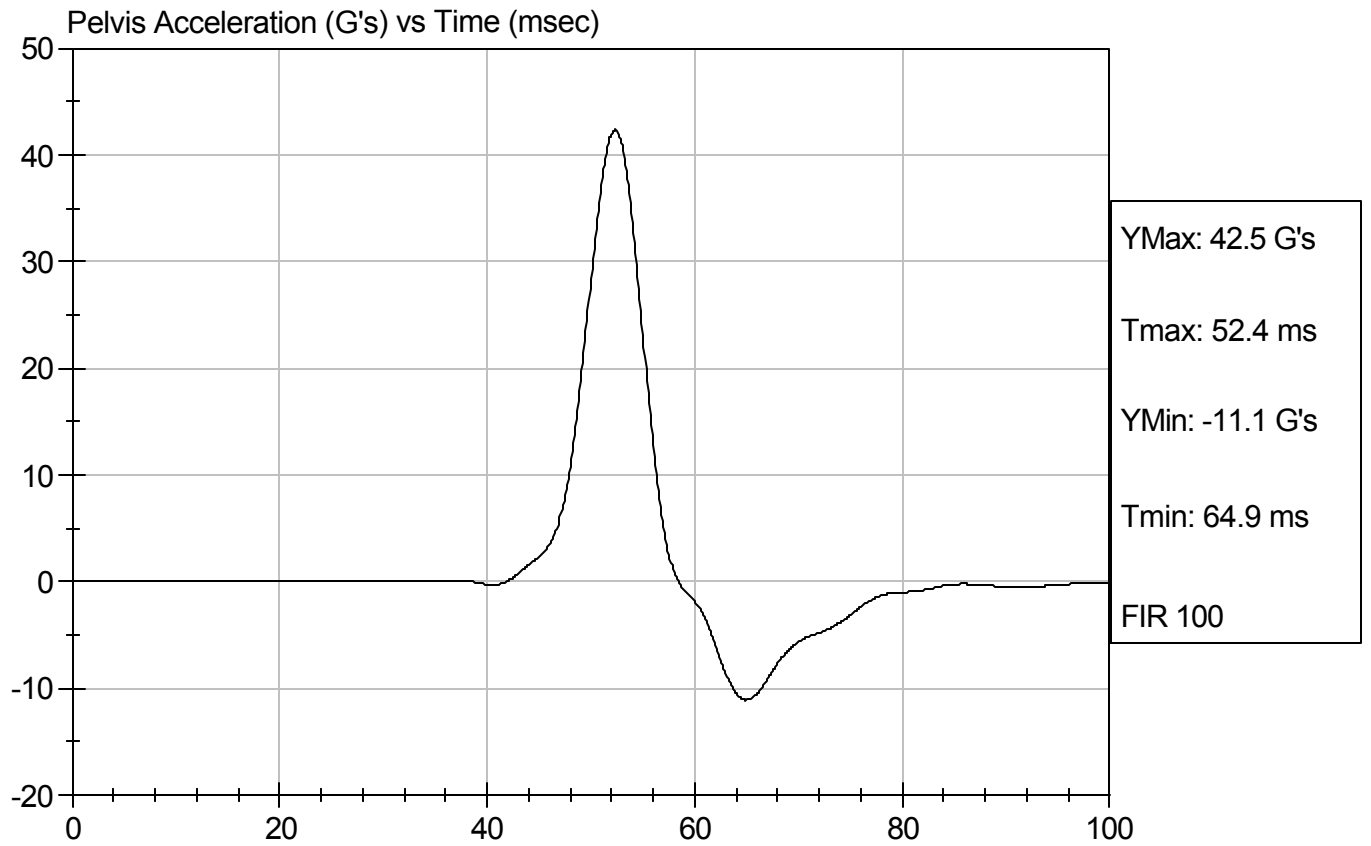
David Winkelbauer
Approved By

5/4/09
Test Date



Test Desc: Pelvis Impact
Component ID: D091013

Test Date: 5/4/09
Speed: 14.08 ft/sec, 4.29 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271

Test I.D: D091014

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Force At 12.7 mm	N	104 -162	150	Pass
Force At 19 mm	N	163 - 222	204	Pass
Force At 25.4 mm	N	222 - 280	280	Pass
Force At 33 mm	N	325 - 391	384	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

5/4/09
Test Date

David Winkelbauer
Approved By

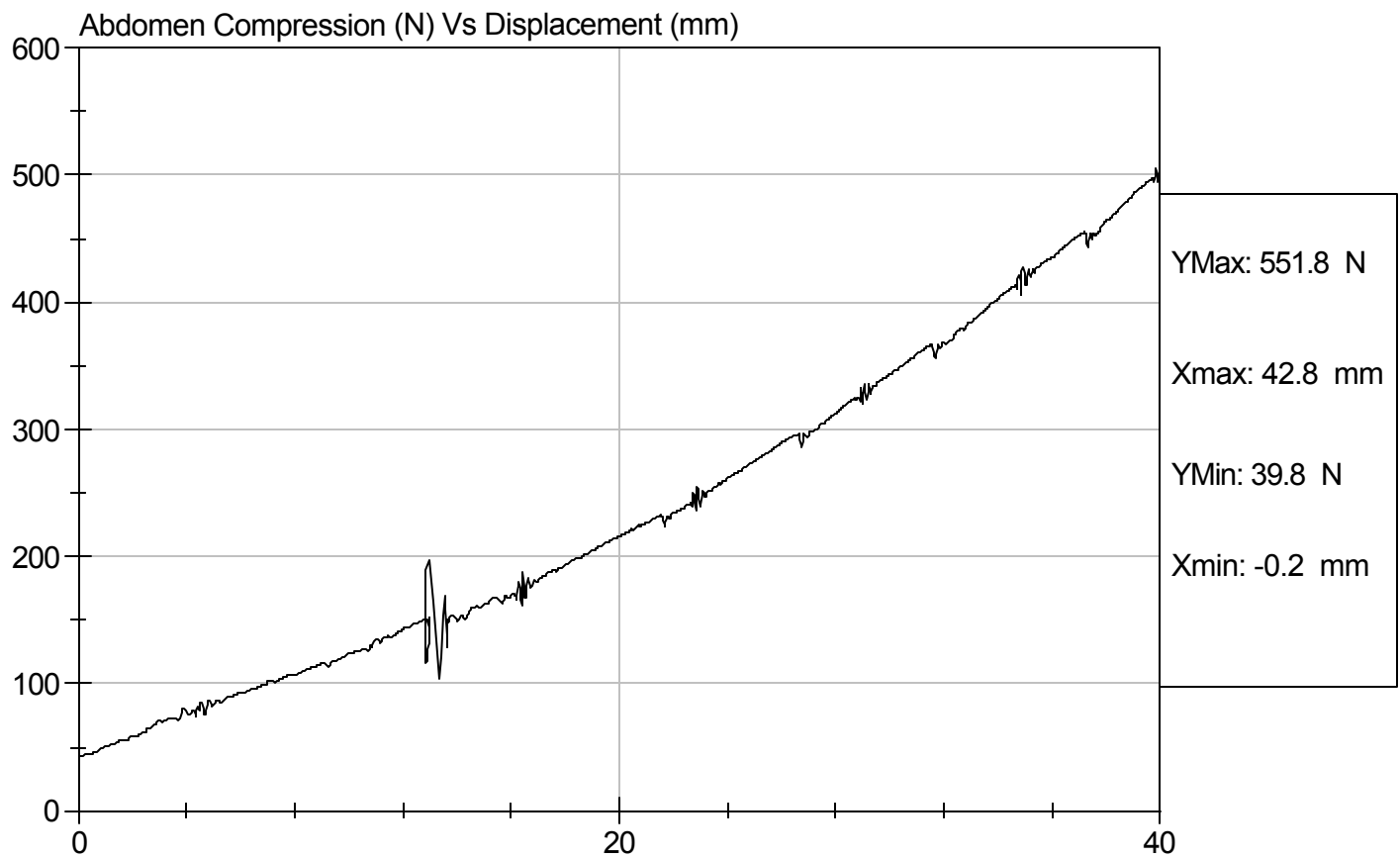


Test Description: Abdomen Compression

Test Date: 5/4/09

Component: D091014

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 271

Test I.D: D091015

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	104.5	Pass
Force At 30 deg	N	151.2 - 204.6	158.0	Pass
Force At 40 deg	N	204.6 - 258.0	243.3	Pass
Return Angle	Deg	12 Maximum	5	Pass
Overall Test Results			Pass	

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

5/4/09
Test Date

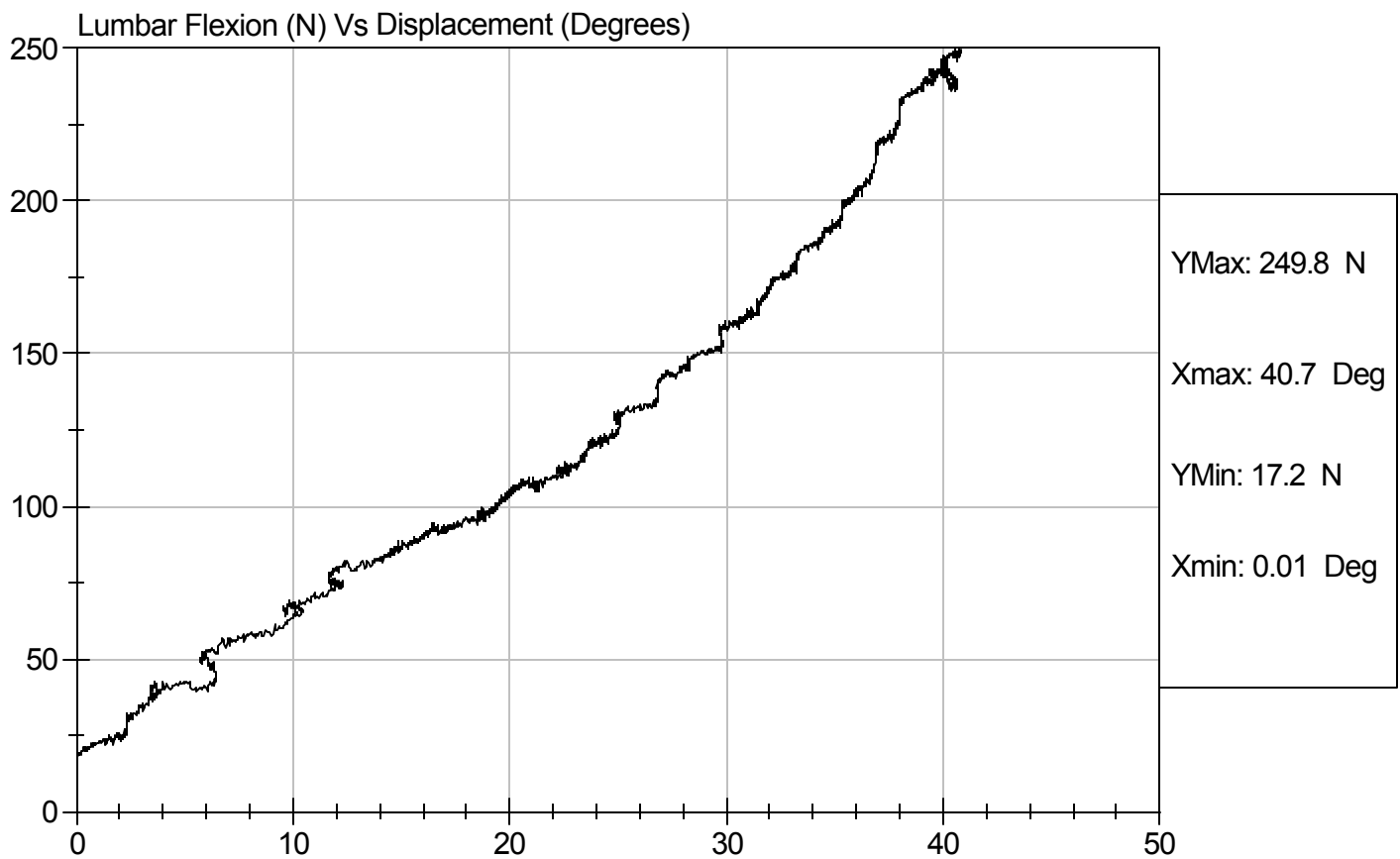


Test Description: Lumbar Flexion

Test Date: 5/4/09

Component: D091015

Speed: 0 ft/sec, 0 m/sec

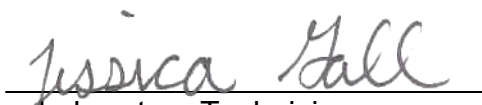


SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 271

Test I.D: D091019

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Impact Velocity		m/s	6.89 to 7.13	7.13	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.22	Pass
	20 msec	m/s	4.12 to 5.10	4.25	Pass
	30 msec	m/s	5.73 to 7.01	5.87	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.82	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	67	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	62	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	80	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	56	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	5	Pass


 Laboratory Technician

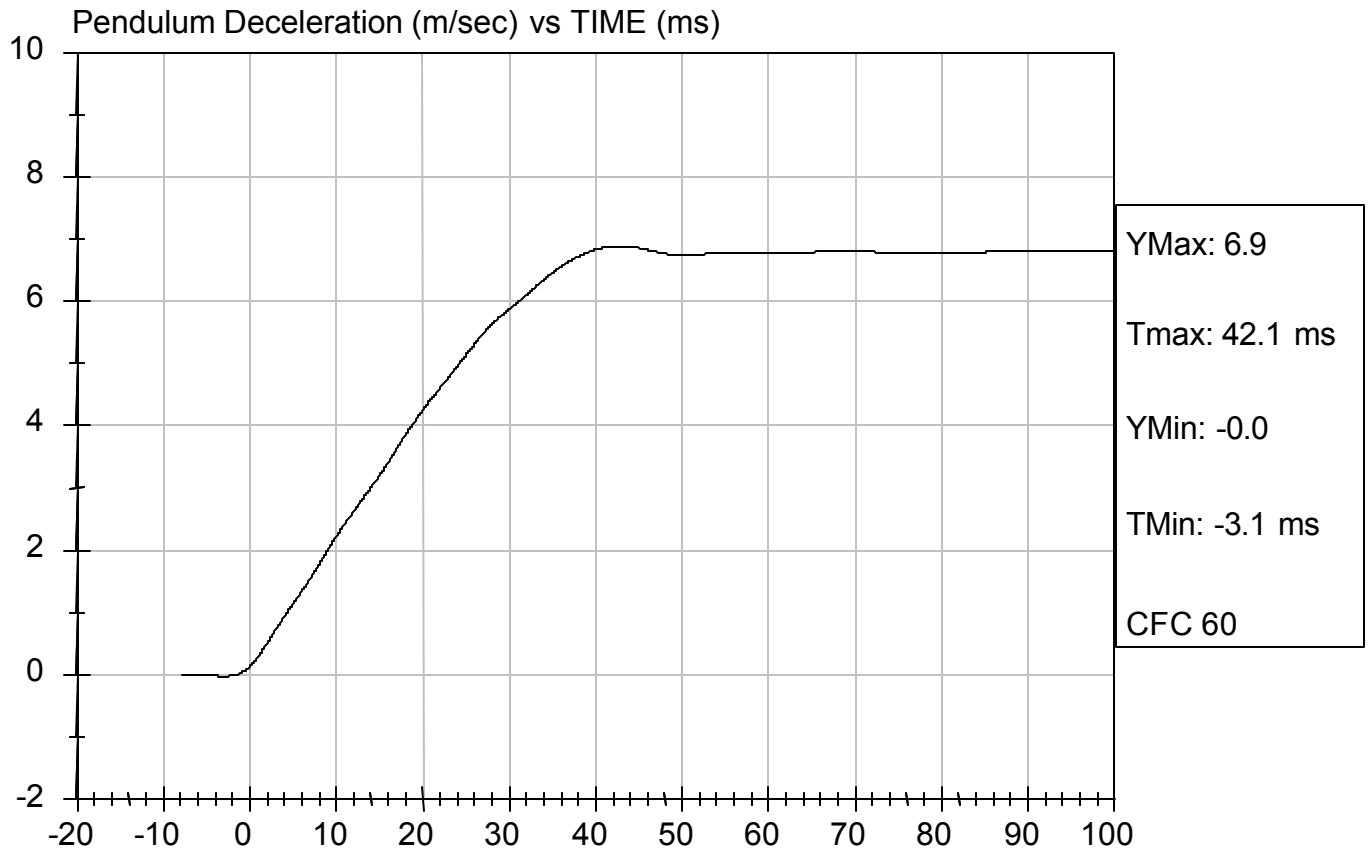

 Approved By

5/4/09
 Test Date



Test Desc: Neck Bending
Component ID: D091019

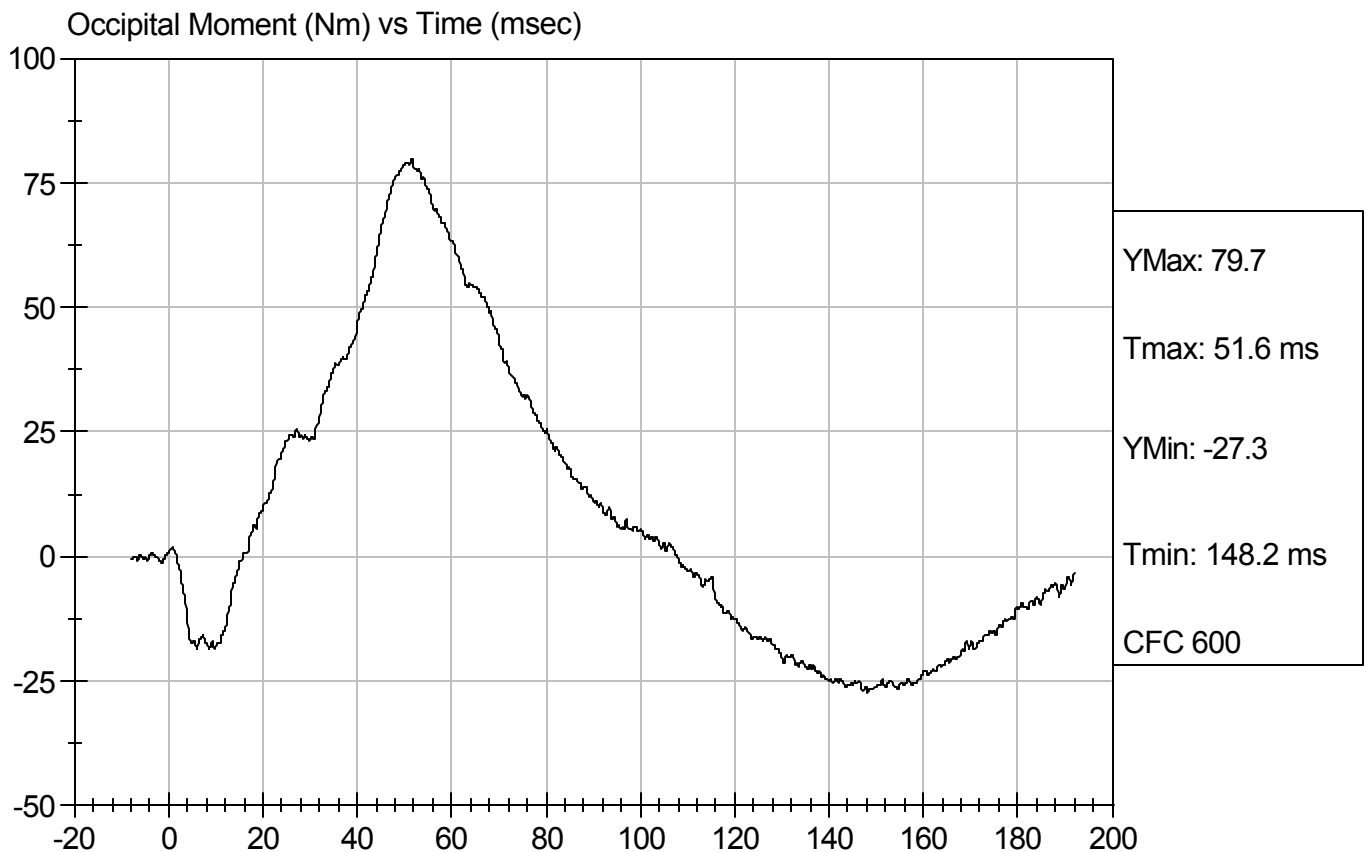
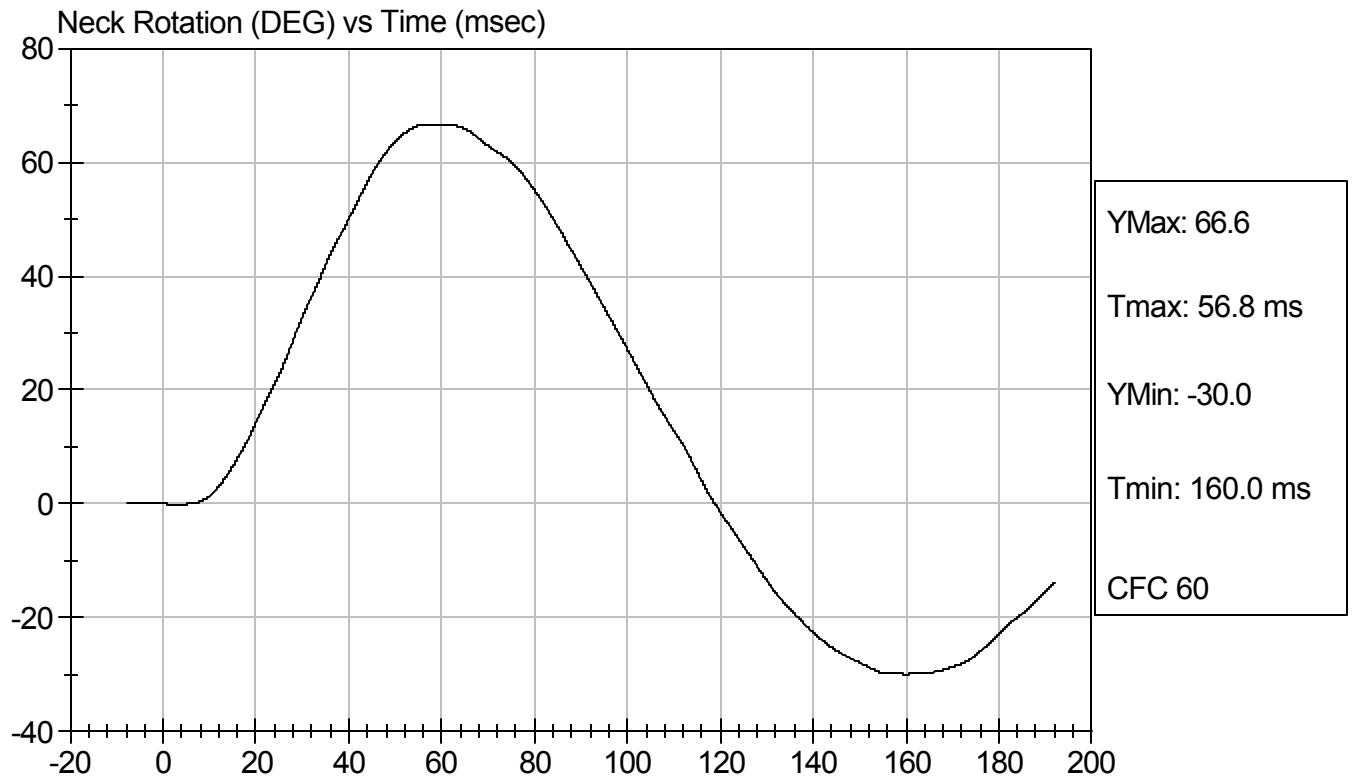
Test Date: 5/4/09
Speed: 23.4 ft/sec, 7.13 m/sec





Test Desc: Neck Bending
Component ID: D091019

Test Date: 5/4/09
Speed: 23.4 ft/sec, 7.13 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 271

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

Jessica Hall
Laboratory Technician
David Winkelbauer
Approved By

5/4/09

Test Date

CERTIFICATION DATA

Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID Calibration Data Sheet
Side Impact Dummy
External Measurements

ATD Serial No: 272

Test I.D: D08252

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	907	Pass
RH - Rib Height	mm	501 - 521	520	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	230	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	495	Pass
HW - Hip Width	mm	356 - 391	358	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

4/28/09

Test Date

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 272

Test I.D: D09961

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	120 to 150	126	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-6.2	Pass
Overall Test Results				Pass


Laboratory Technician


Approved By

4/28/09
Test Date



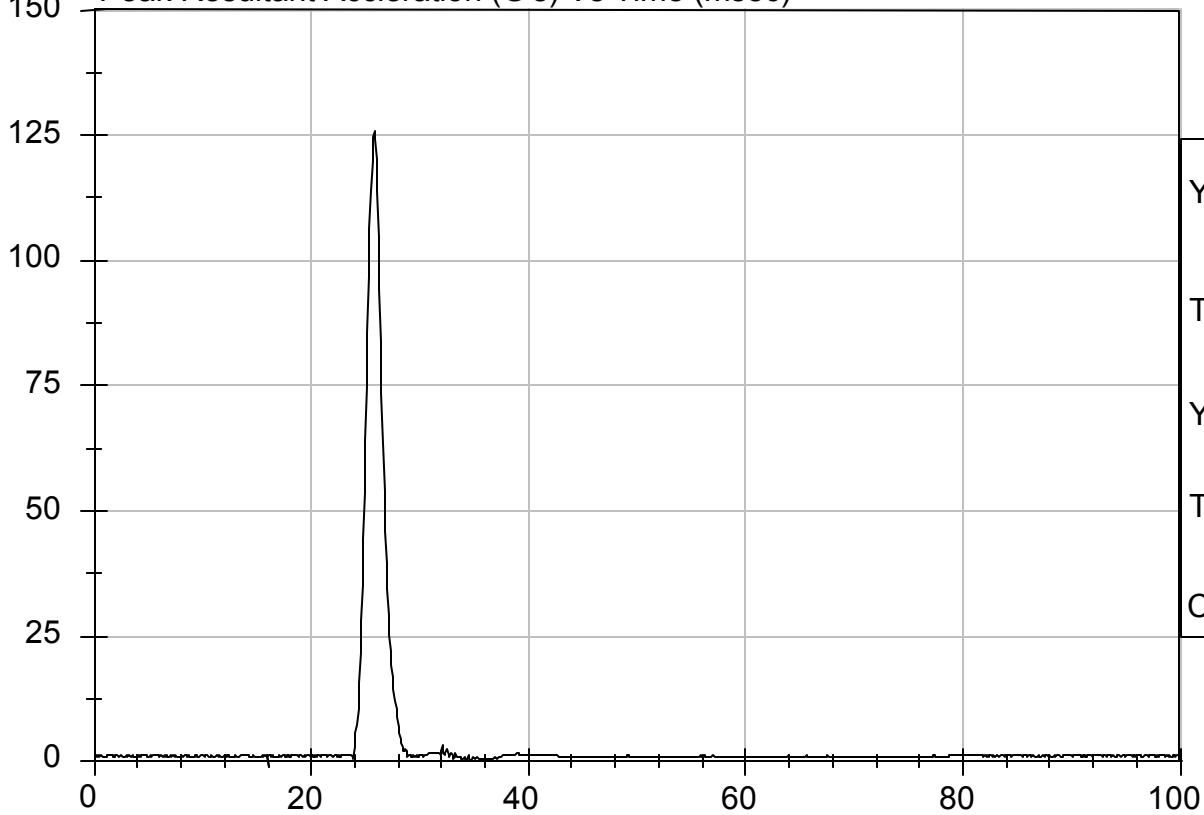
Test Description: Head Drop

Test Date: 4/28/09

Component: D09961

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



YMax: 125.8 G

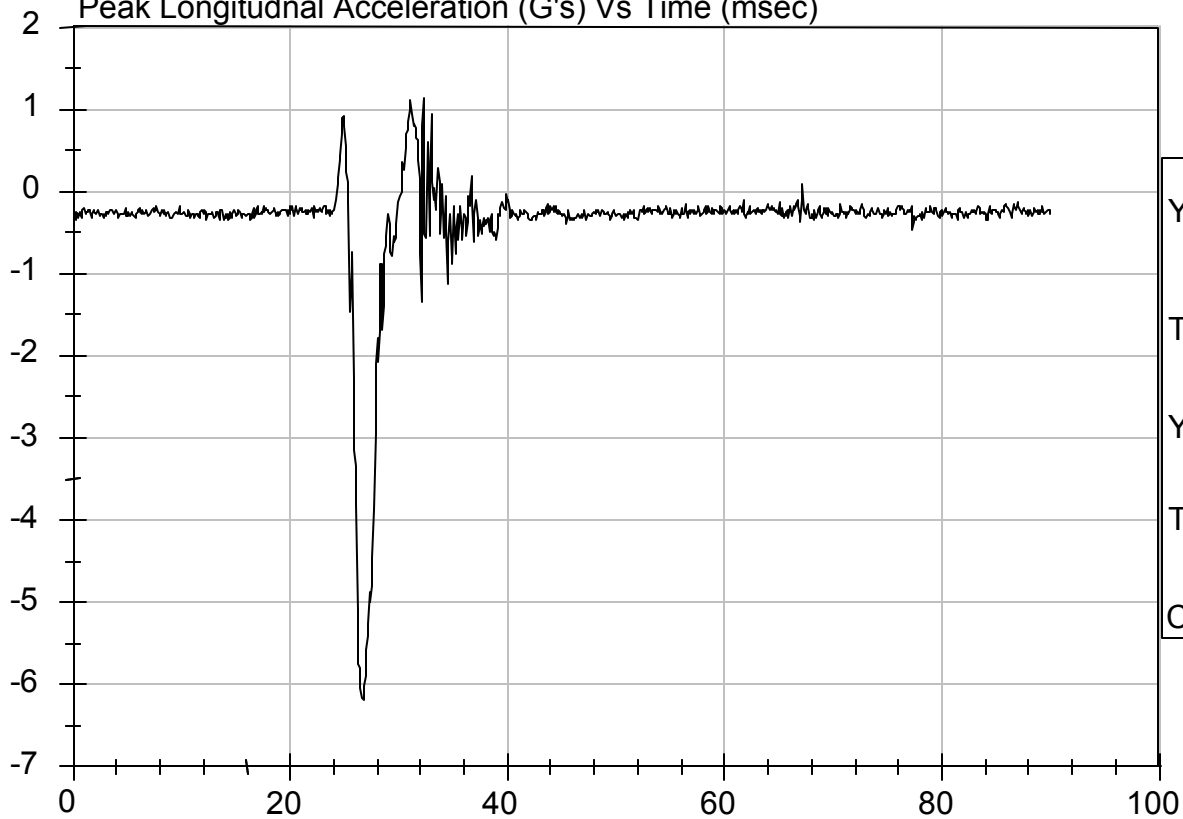
Tmax: 25.8 ms

YMin: 0.3 G

Tmin: 34.7 ms

CFC 1000

Peak Longitudnal Acceleration (G's) Vs Time (msec)



YMax: 1.1 G

Tmax: 32.3 ms

YMin: -6.2 G

Tmin: 26.7 ms

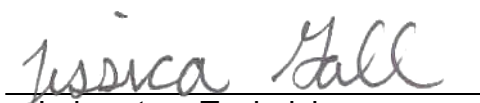
CFC 1000

SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 272

Test I.D: D09962

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	31	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	38	Pass
Lower Spine	G's	15 - 22	19	Pass
			Overall Test Results	Pass


Laboratory Technician

4/28/09

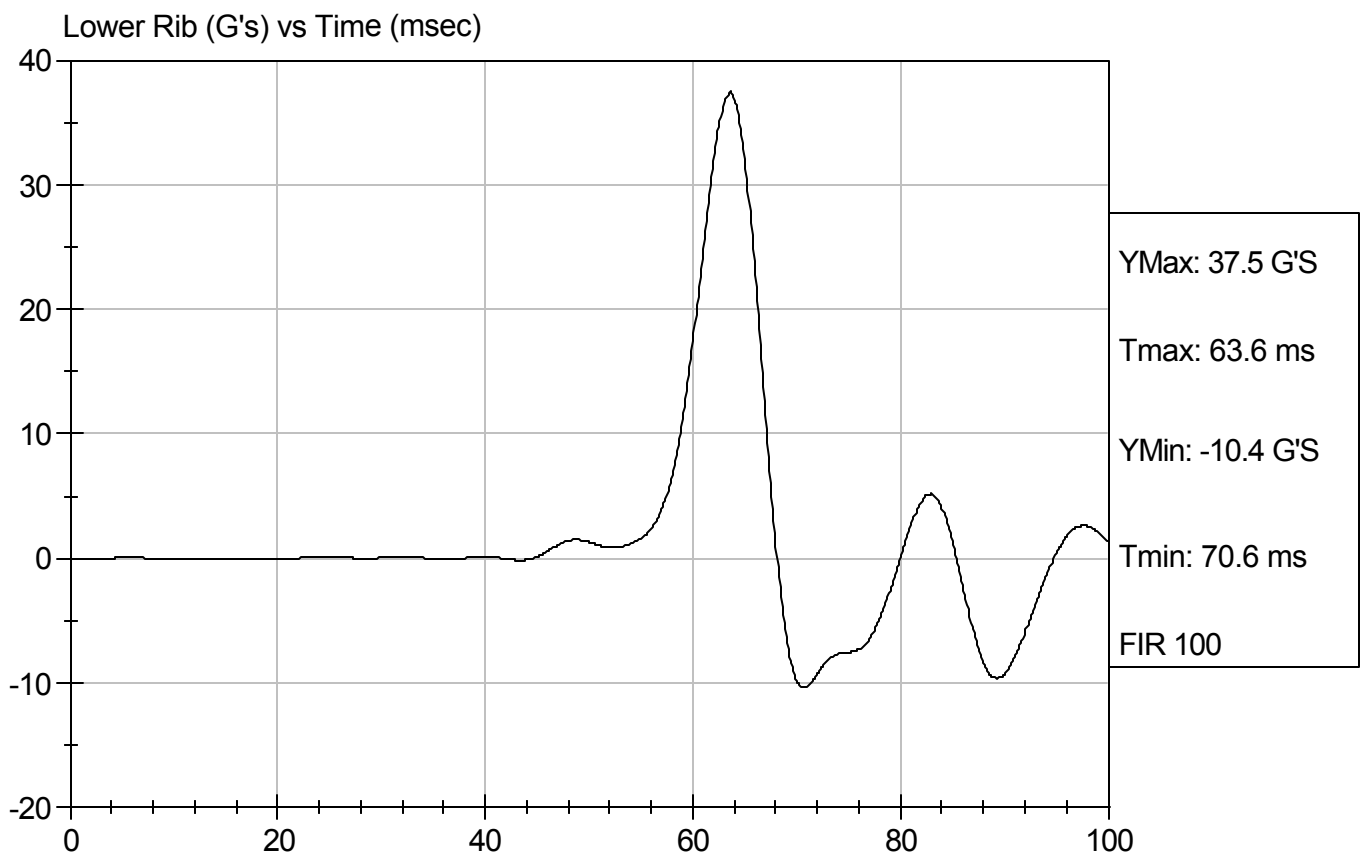
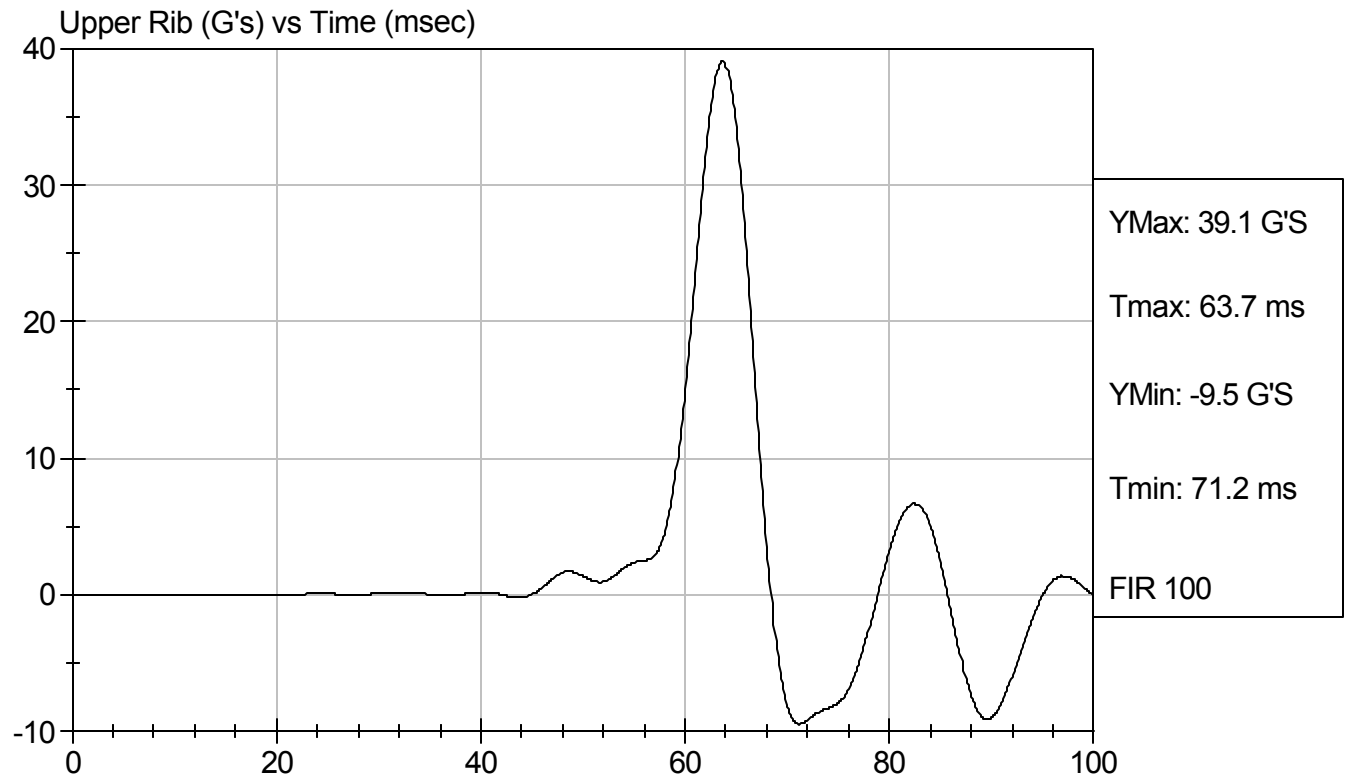
Test Date


Approved By



Test Desc: Thorax Impact
Component ID: D09962

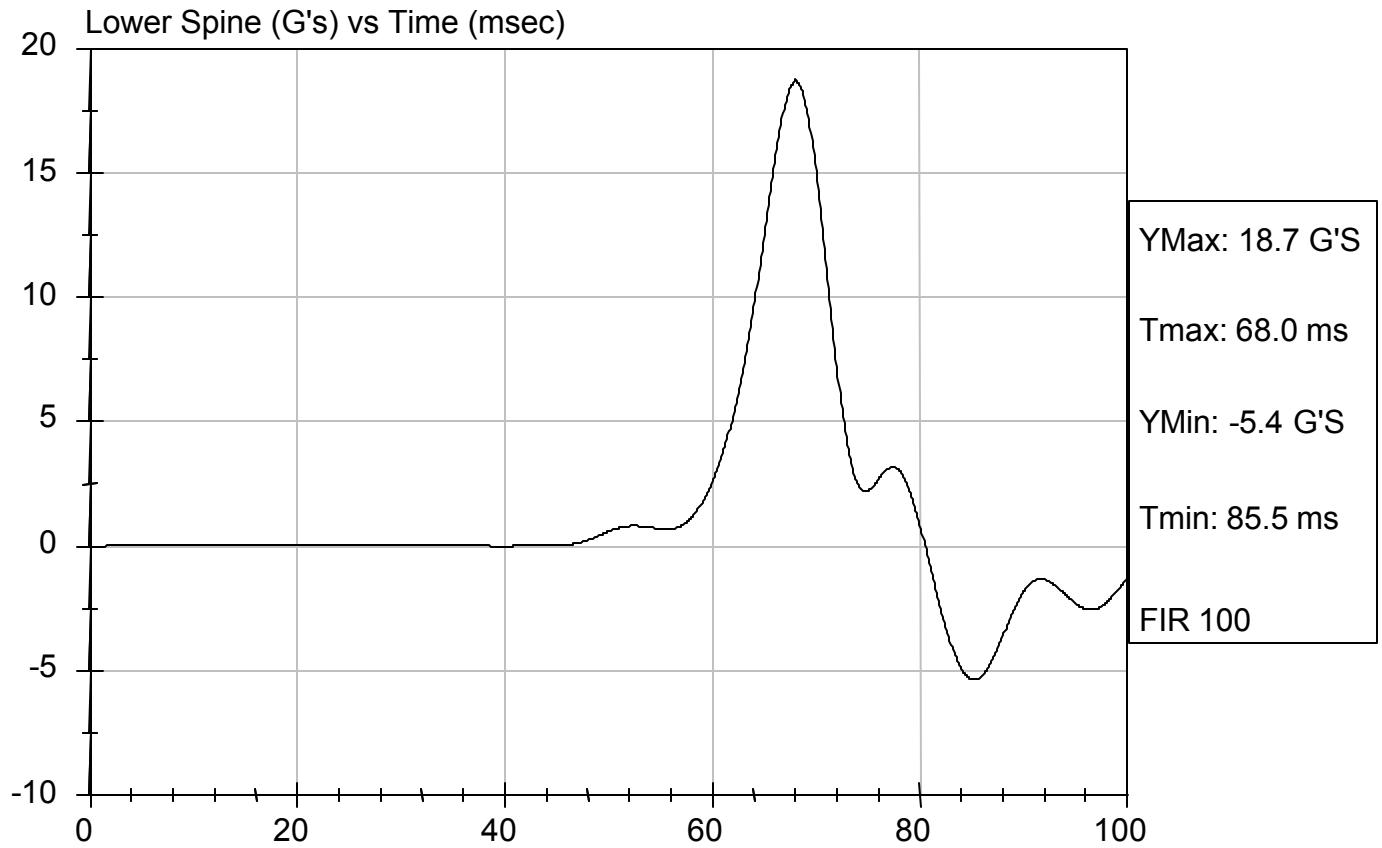
Test Date: 4/28/09
Speed: 14.1 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D09962

Test Date: 4/28/09
Speed: 14.1 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 272

Test I.D: D09963

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	32	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	43	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

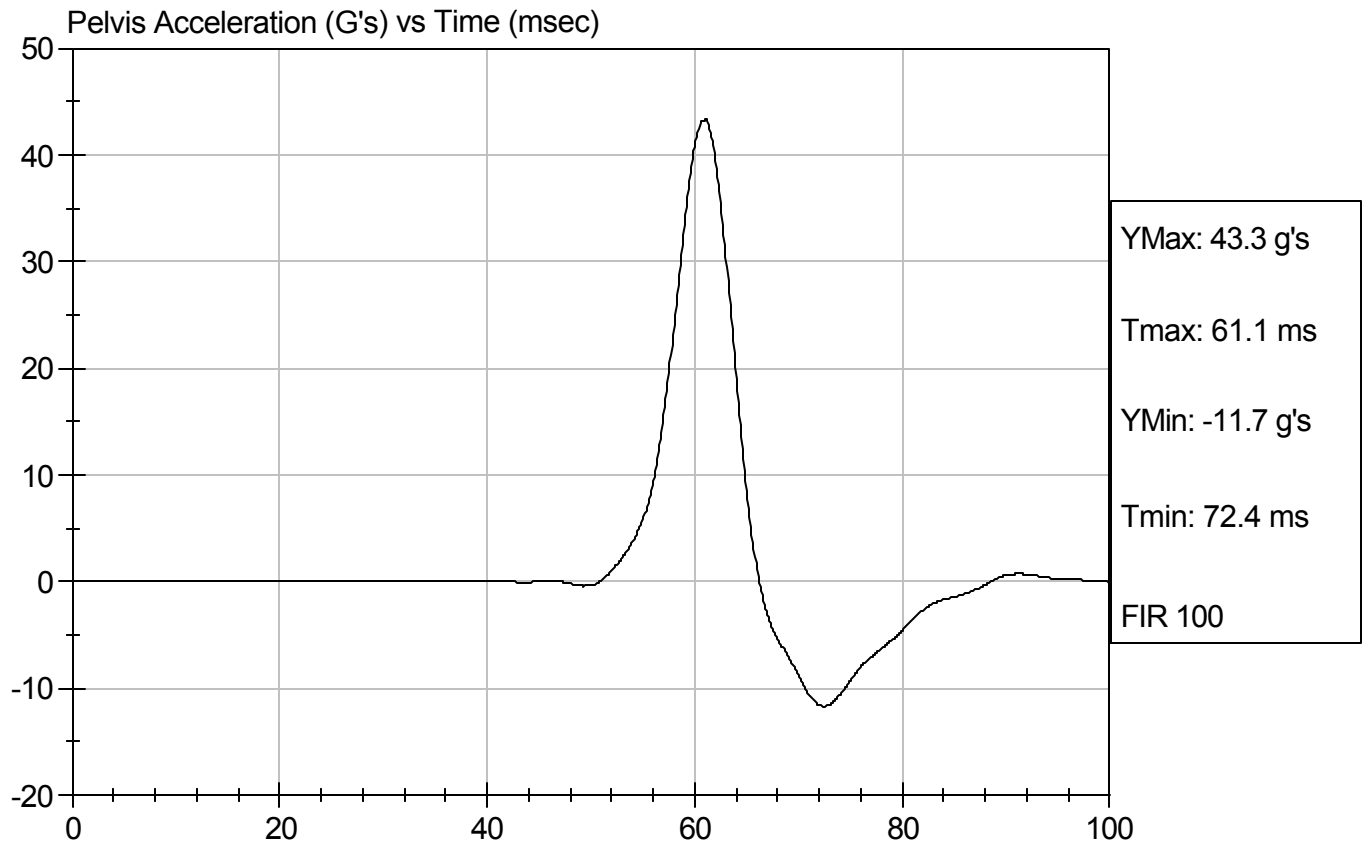
4/28/09
Test Date

David Winkelbauer
Approved By



Test Desc: Pelvis Impact
Component ID: D09963

Test Date: 4/28/09
Speed: 14.1 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 272

Test I.D: D09964

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	26	Pass
Force At 12.7 mm	N	104 -162	125	Pass
Force At 19 mm	N	163 - 222	175	Pass
Force At 25.4 mm	N	222 - 280	237	Pass
Force At 33 mm	N	325 - 391	333	Pass
Overall Test Results				Pass

Jessica Gall
Laboratory Technician

David Winkelbauer
Approved By

4/28/09
Test Date

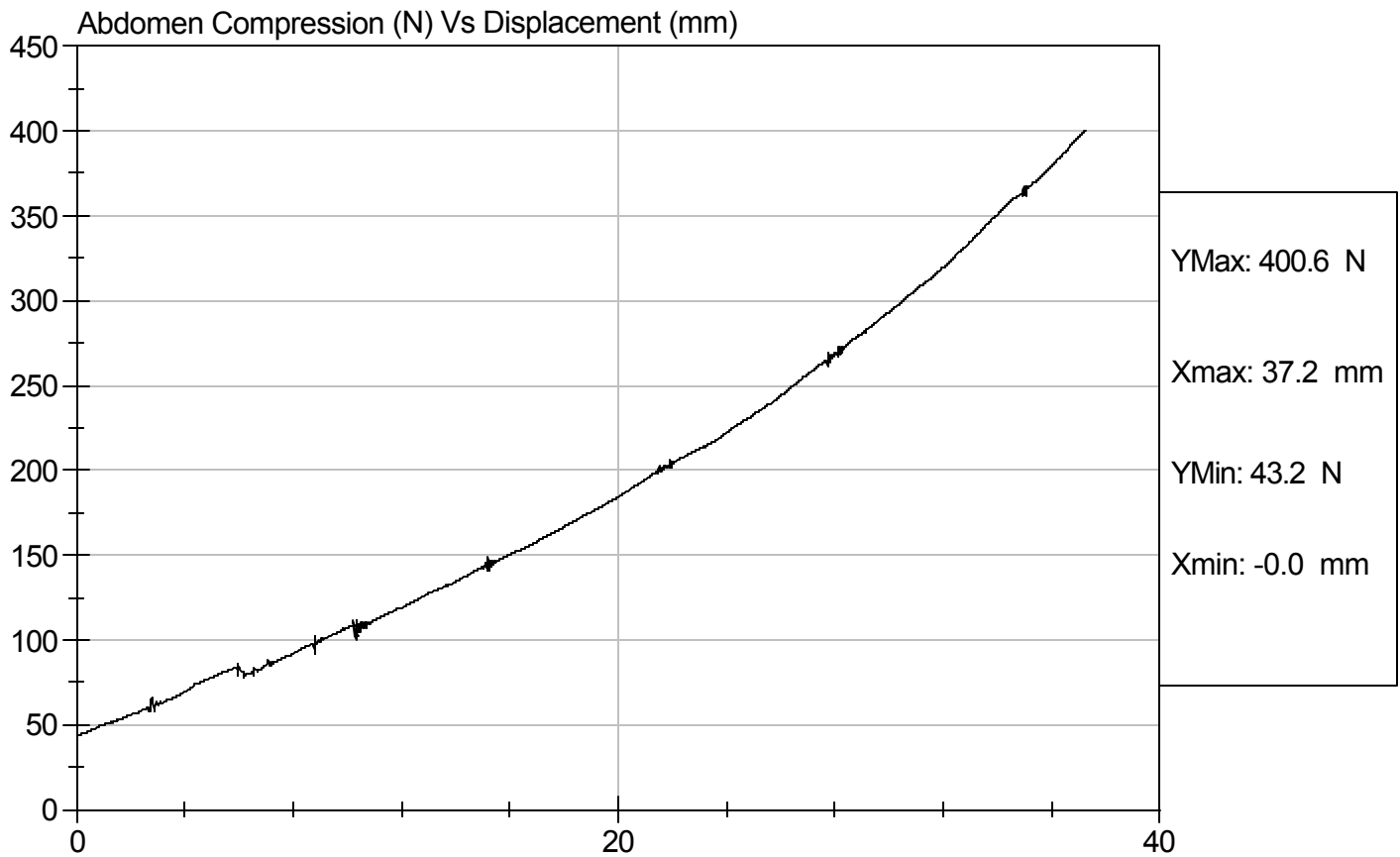


Test Description: Abdomen Compression

Test Date: 4/28/09

Component: D09964

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 272

Test I.D: D09965

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.2	Pass
Laboratory Relative Humidity	%	10 to 70	34	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	131.3	Pass
Force At 30 deg	N	151.2 - 204.6	185.2	Pass
Force At 40 deg	N	204.6 - 258.0	252.3	Pass
Return Angle	Deg	12 Maximum	5	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

4/28/09
Test Date

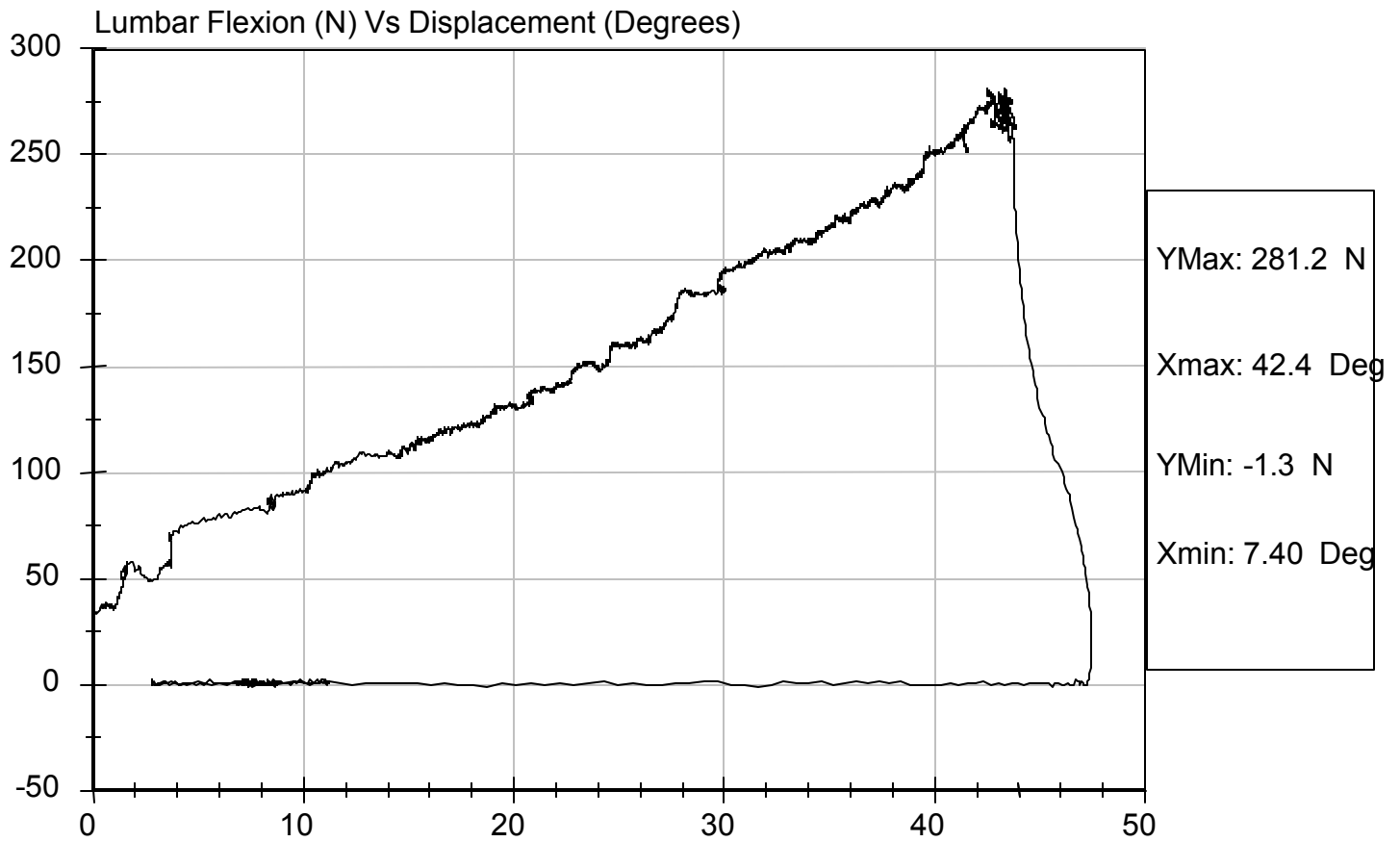


Test Description: Lumbar Flexion

Test Date: 4/28/09

Component: D09965

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

Test I.D: D09969

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	34	Pass
Impact Velocity		m/s	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.43	Pass
	20 msec	m/s	4.12 to 5.10	4.80	Pass
	30 msec	m/s	5.73 to 7.01	6.57	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.82	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	73	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	56	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass

Jessica Gall
Laboratory Technician

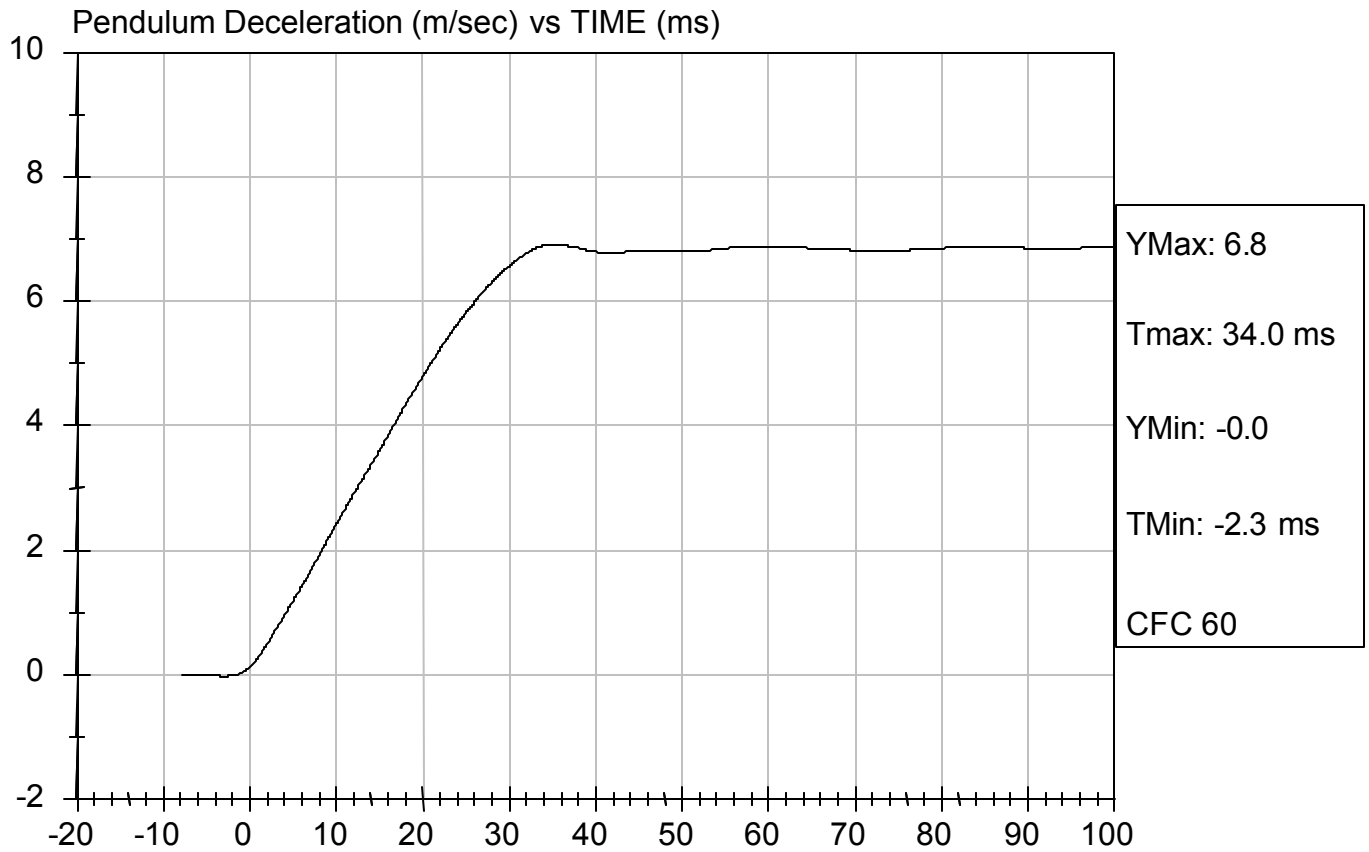
4/28/09
Test Date

David Winkelbauer
Approved By



Test Desc: Neck Bending
Component ID: D09969

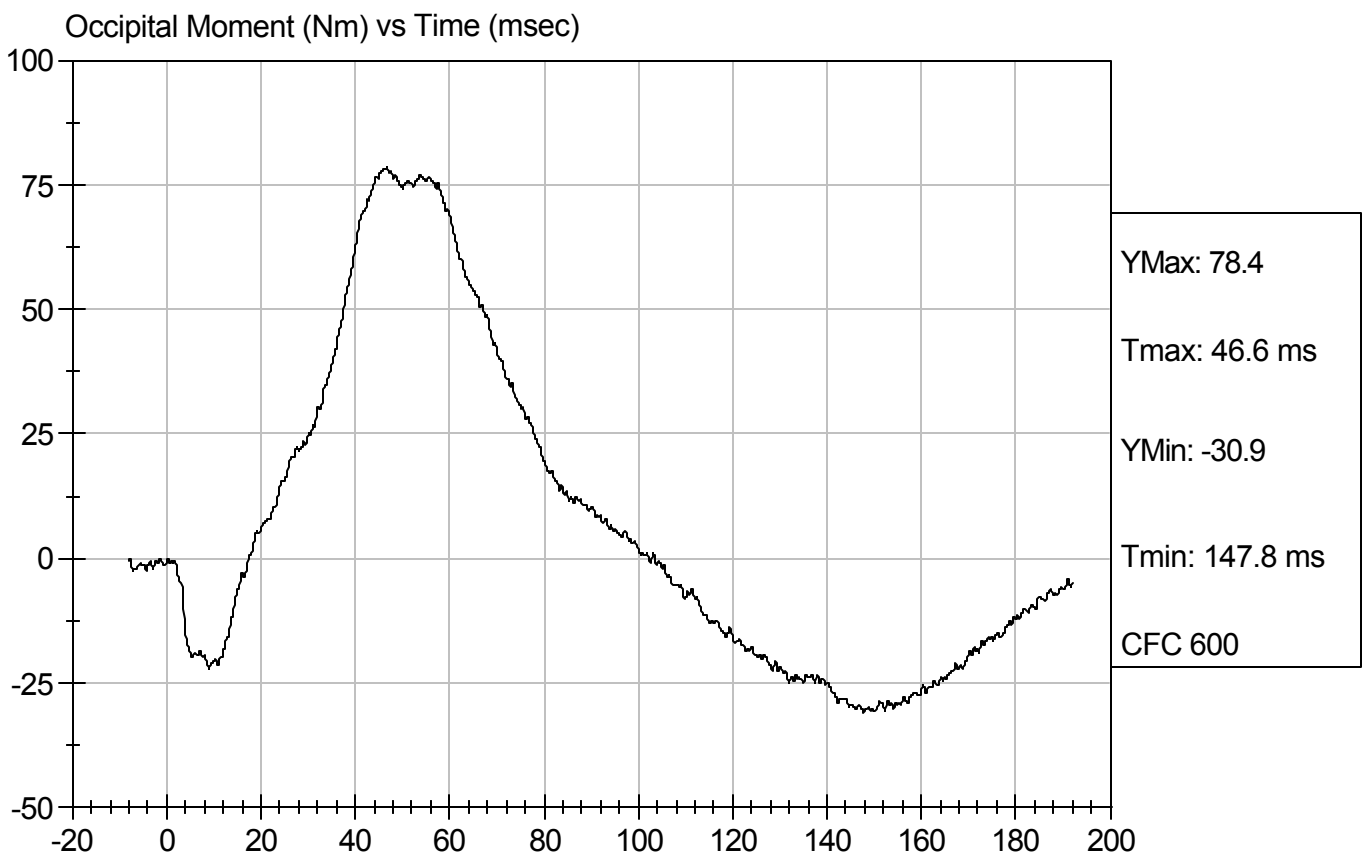
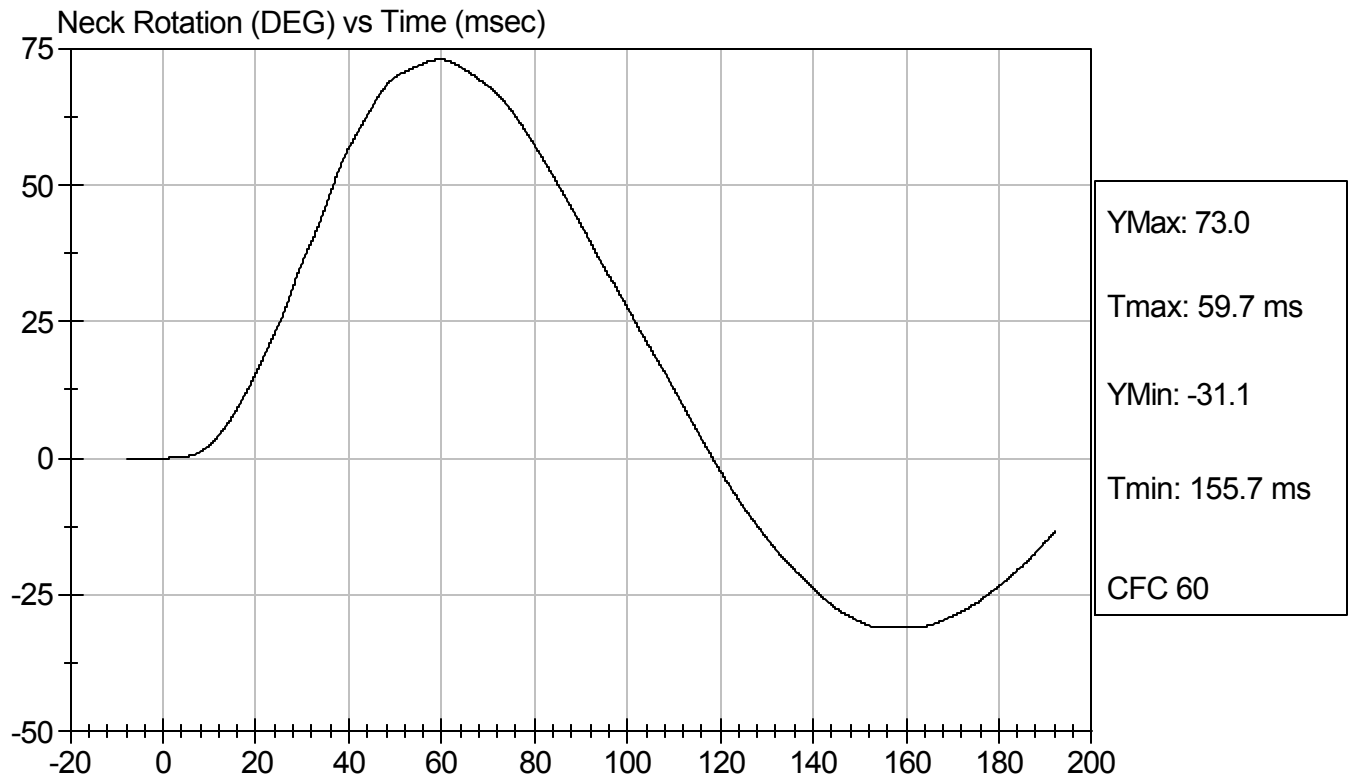
Test Date: 4/28/09
Speed: 23.15 ft/sec, 7.06 m/sec





Test Desc: Neck Bending
Component ID: D09969

Test Date: 4/28/09
Speed: 23.15 ft/sec, 7.06 m/sec



Calibration Test Results Summary

Dummy Serial Number: 272

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all pendulum test requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SID/HIII Calibration Data Sheet
Side Impact Dummy
Head Drop Calibration (Lateral)

ATD Serial No: 272

Test I.D: D091021

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Peak Resultant Acceleration	G's	120 to 150	140	Pass
Is Resultant Curve Unimodal?	N/A	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-9.4	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

5/4/09
Test Date

David Winkelbauer
Approved By



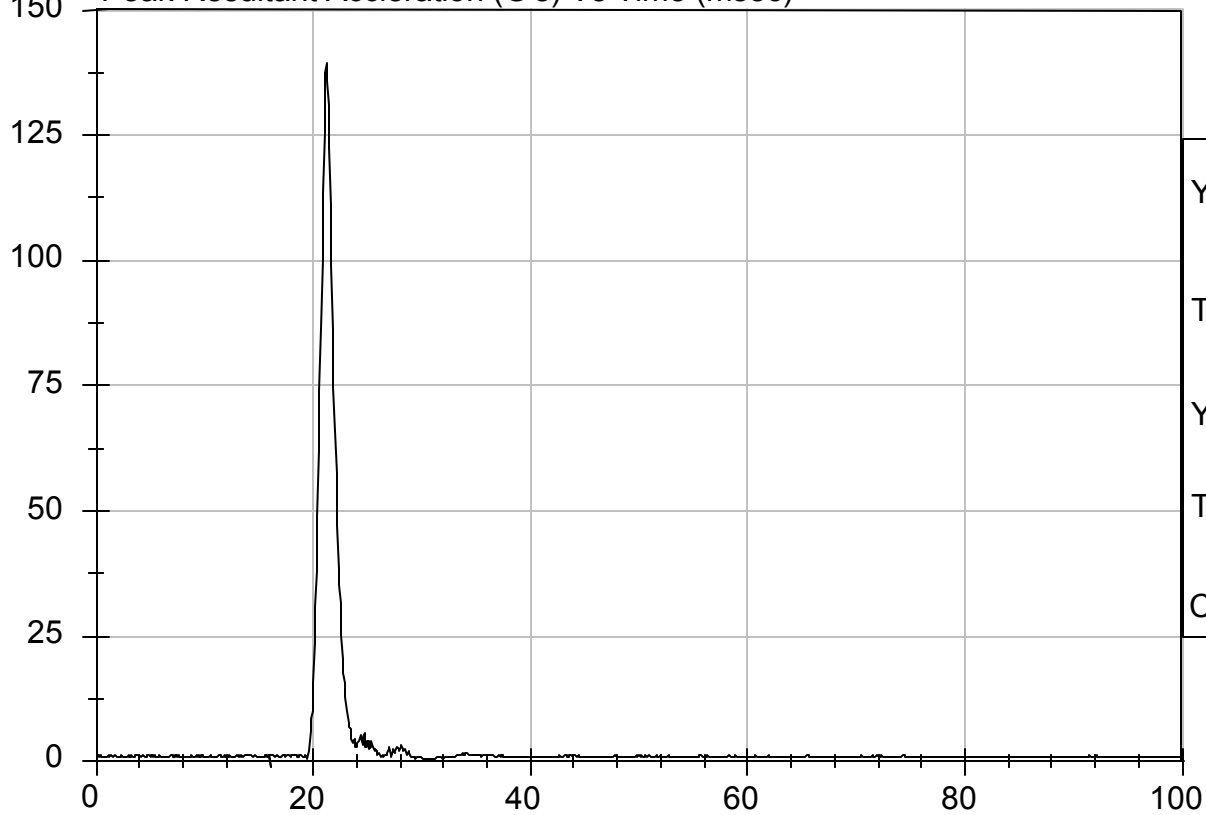
Test Description: Head Drop

Test Date: 5/4/09

Component: D091021

Speed: 0 ft/s, 0 m/s

Peak Resultant Acceleration (G's) Vs Time (msec)



YMax: 139.6 G

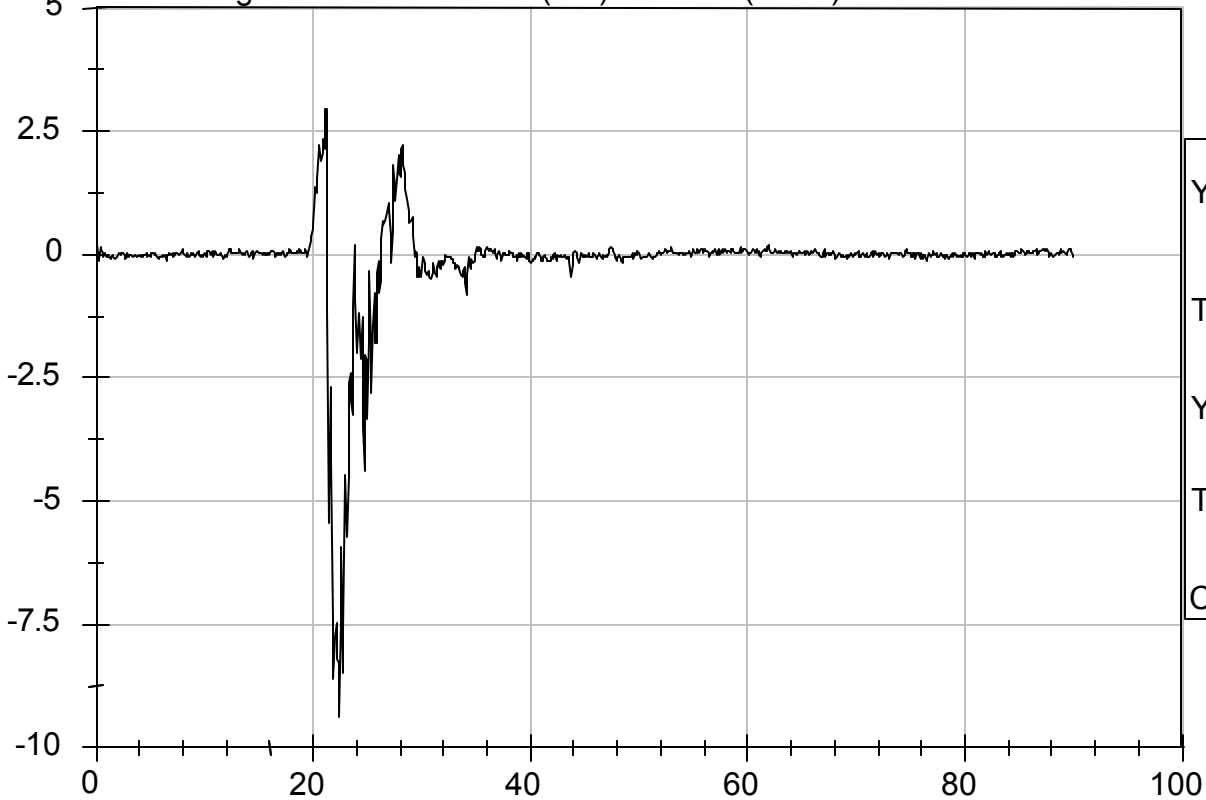
Tmax: 21.2 ms

YMin: 0.4 G

Tmin: 30.2 ms

CFC 1000

Peak Longitudnal Acceleration (G's) Vs Time (msec)



YMax: 3.0 G

Tmax: 21.1 ms

YMin: -9.4 G

Tmin: 22.4 ms

CFC 1000

SID/HIII Calibration Data Sheet
Side Impact Dummy
Thorax Impact Test

ATD Serial No: 272

Test I.D: D091022

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	37	Pass
Lower Spine	G's	15 - 22	19	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

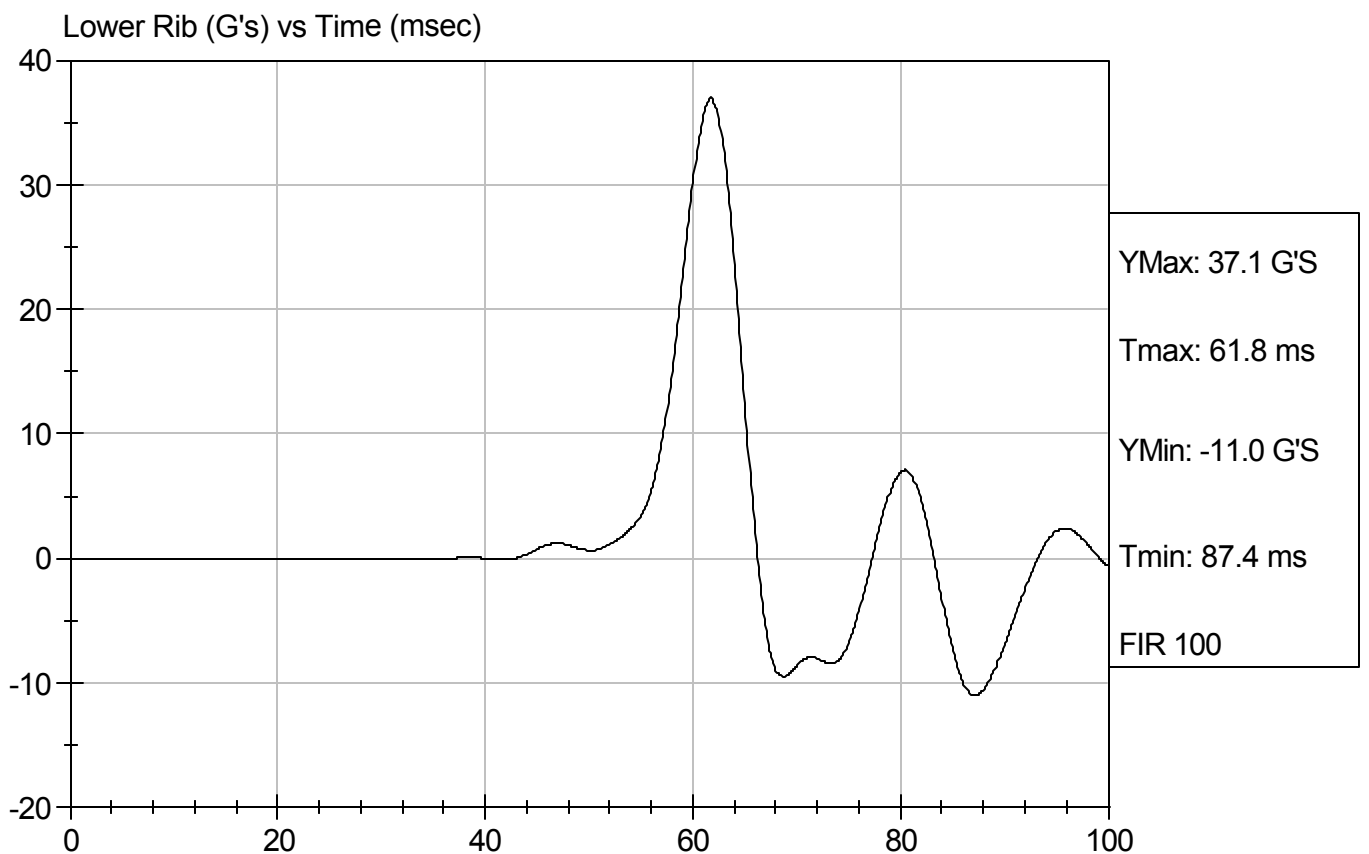
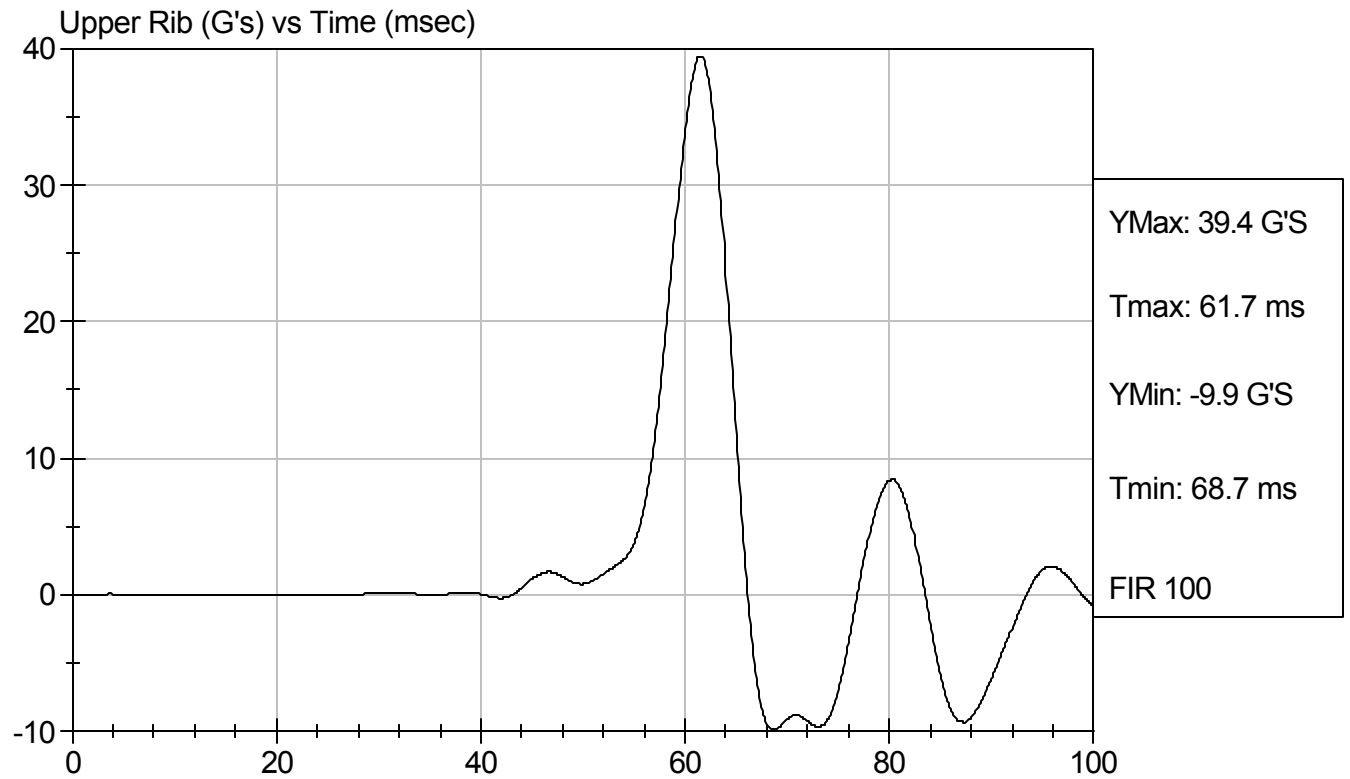
David Winkelbauer
Approved By

5/4/09
Test Date



Test Desc: Thorax Impact
Component ID: D091022

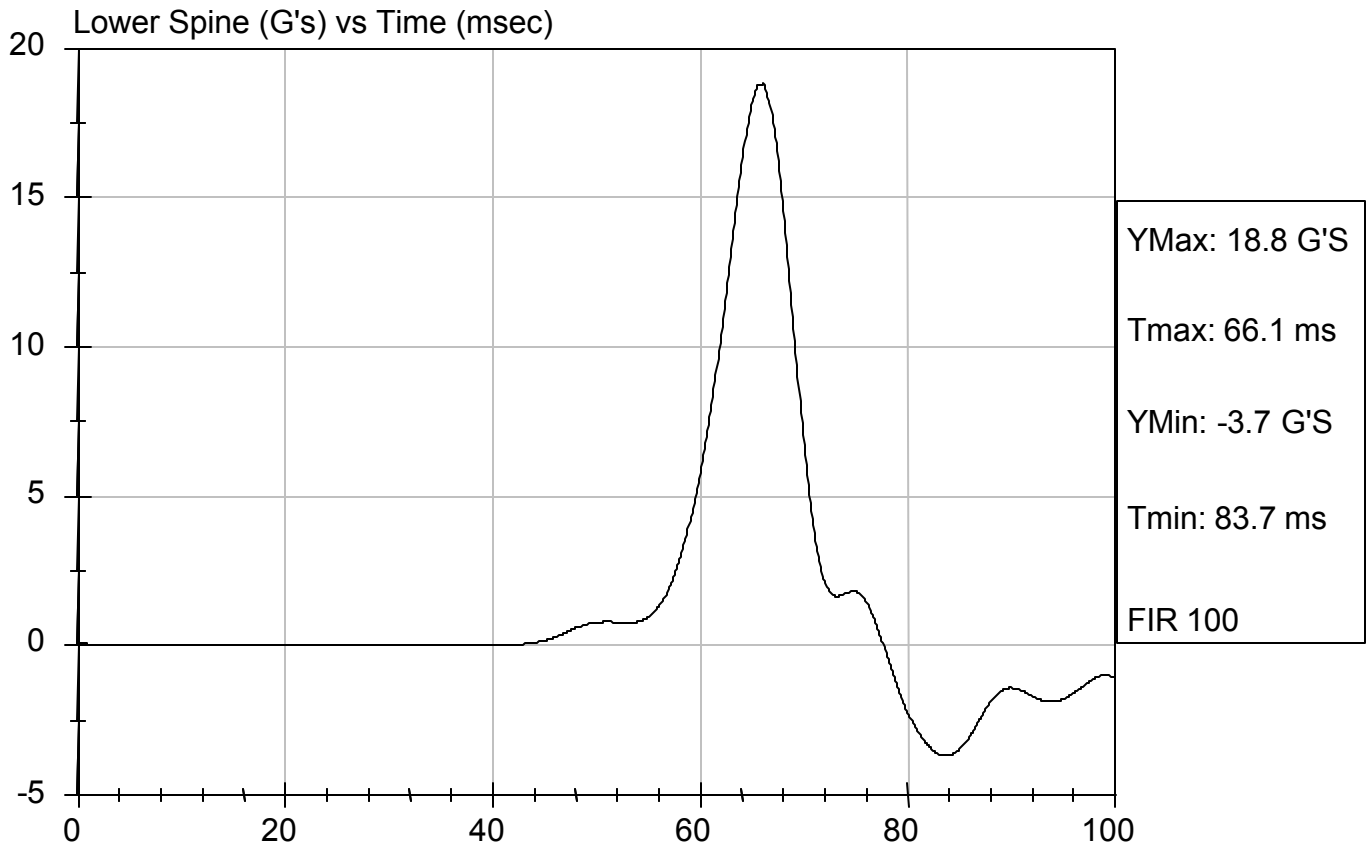
Test Date: 5/4/09
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D091022

Test Date: 5/4/09
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Pelvis Impact Test

ATD Serial No: 272

Test I.D: D091023

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	44	Pass
			Overall Test Results	Pass

Jessica Hall
Laboratory Technician

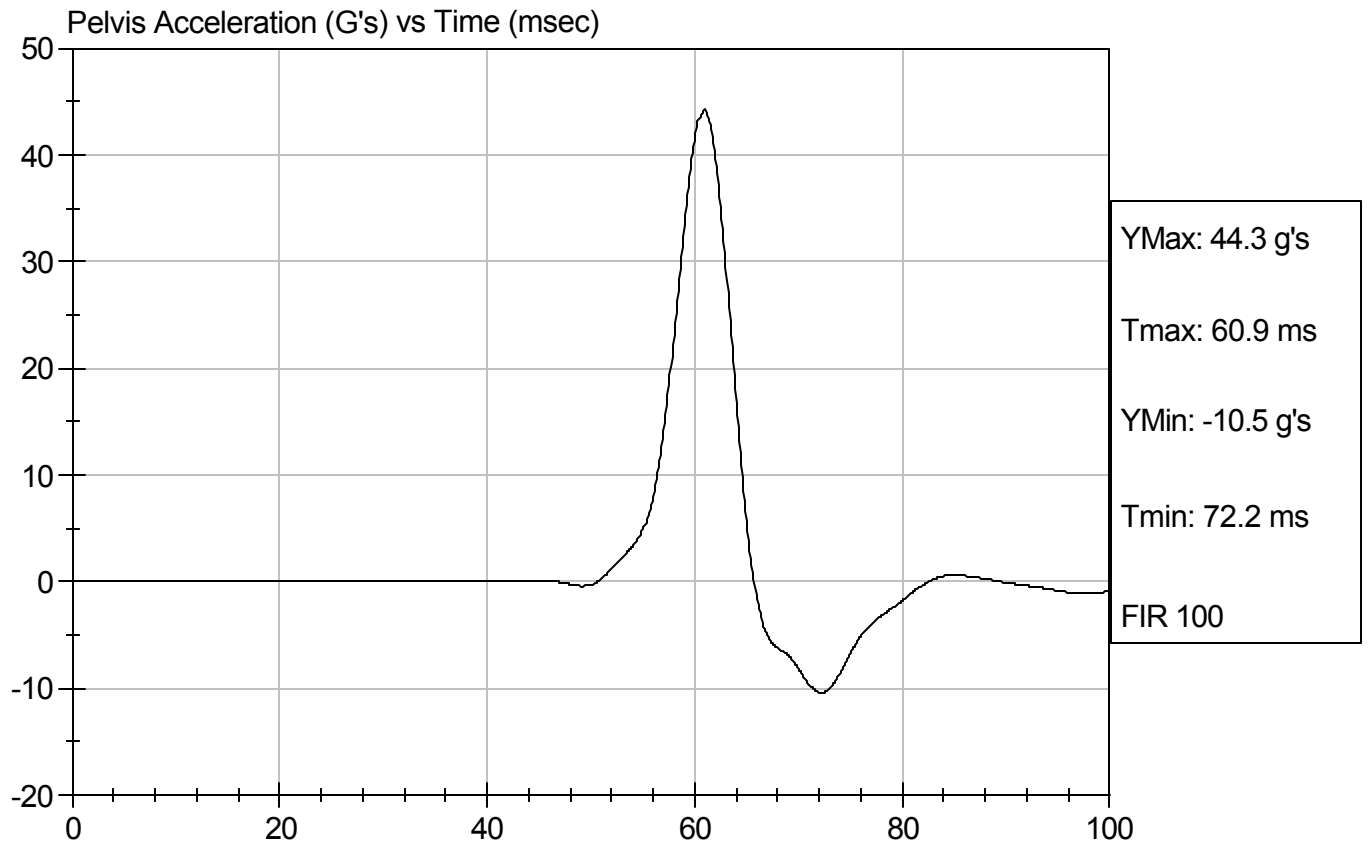
David Winkelbauer
Approved By

5/4/09
Test Date



Test Desc: Pelvis Impact
Component ID: D091023

Test Date: 5/4/09
Speed: 14.12 ft/sec, 4.30 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 272

Test I.D: D091024

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	33	Pass
Force At 12.7 mm	N	104 -162	130	Pass
Force At 19 mm	N	163 - 222	178	Pass
Force At 25.4 mm	N	222 - 280	242	Pass
Force At 33 mm	N	325 - 391	336	Pass
Overall Test Results				Pass

Jessica Hall
Laboratory Technician

David Winkelbauer
Approved By

5/4/09
Test Date

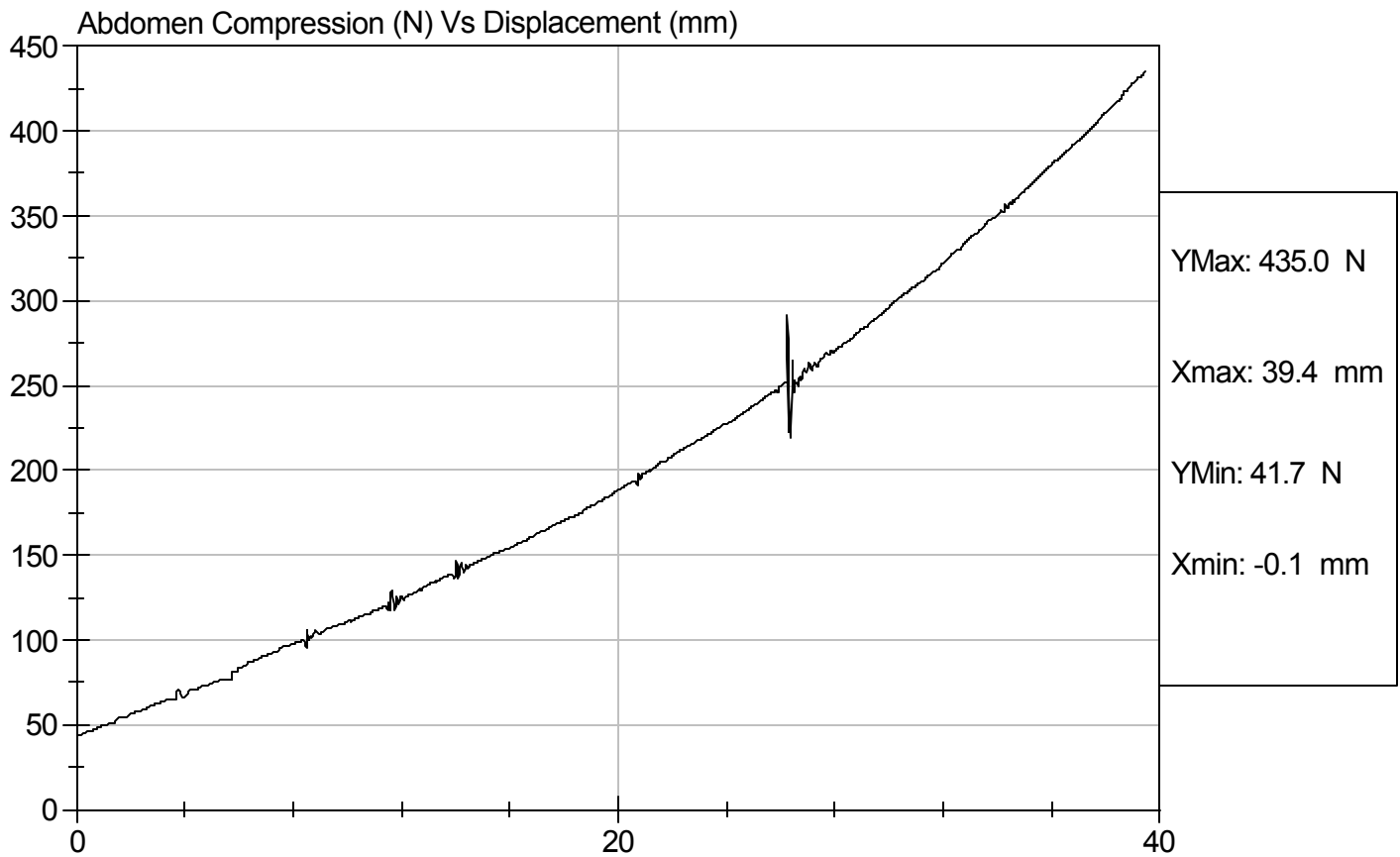


Test Description: Abdomen Compression

Test Date: 5/4/09

Component: D091024

Speed: 0 ft/sec, 0 m/sec

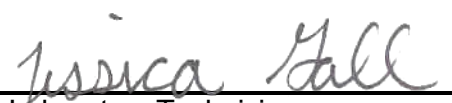


SID/HIII Calibration Data Sheet
Side Impact Dummy
Lumbar Flexion Calibration

ATD Serial No: 272

Test I.D: D091025

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Force At 0 deg	N	0 - 26.7	0	Pass
Force At 20 deg	N	97.9 - 151.2	133.3	Pass
Force At 30 deg	N	151.2 - 204.6	187.8	Pass
Force At 40 deg	N	204.6 - 258.0	225.4	Pass
Return Angle	Deg	12 Maximum	7	Pass
Overall Test Results			Pass	


Laboratory Technician


Approved By

5/4/09
Test Date

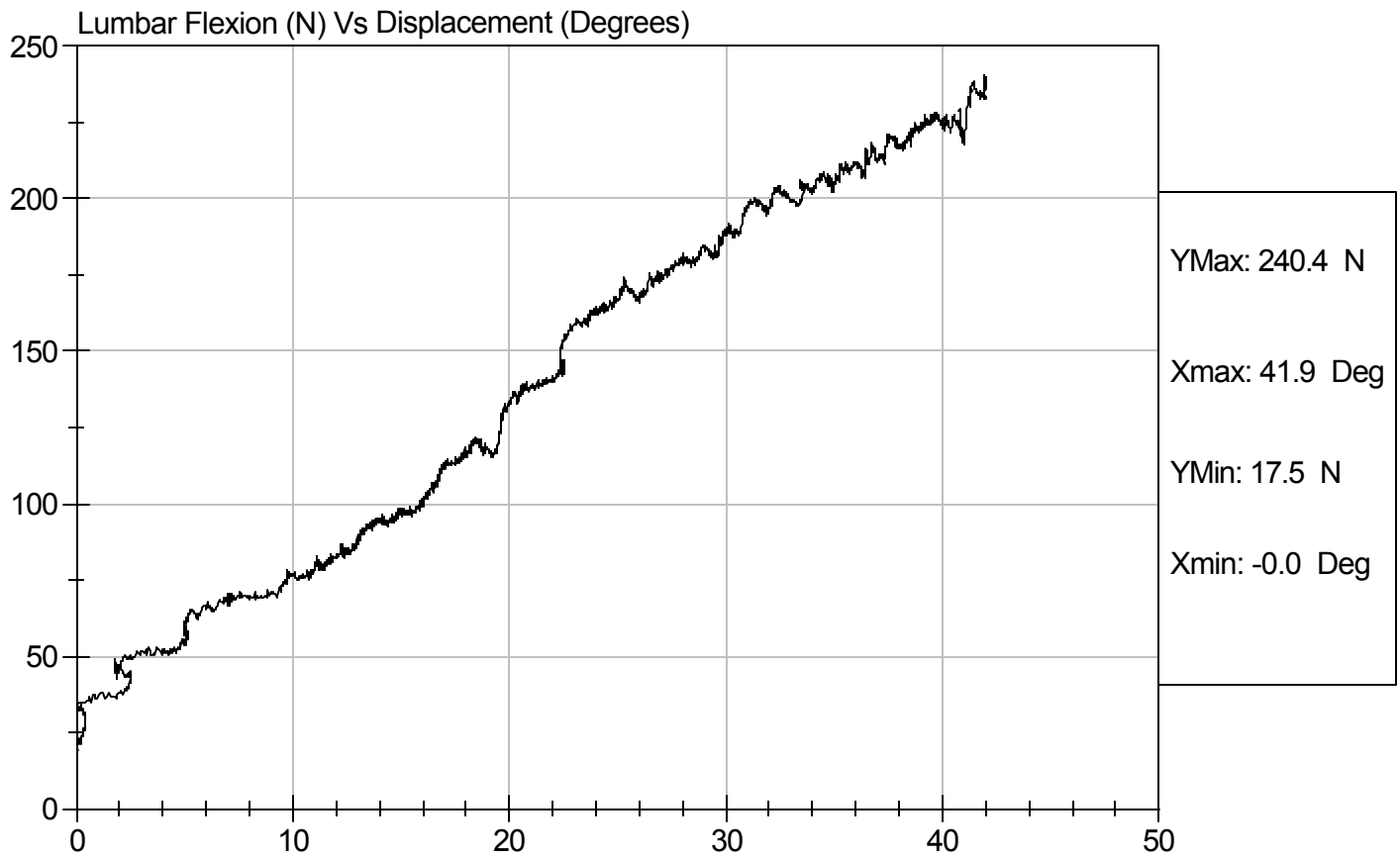


Test Description: Lumbar Flexion

Test Date: 5/4/09

Component: D091025

Speed: 0 ft/sec, 0 m/sec



SID/HIII Calibration Data Sheet
Side Impact Dummy
Neck Pendulum Test

ATD Serial No: 272

Test I.D: D091029

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.3	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Impact Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.14	Pass
	20 msec	m/s	4.12 to 5.10	4.16	Pass
	30 msec	m/s	5.73 to 7.01	5.88	Pass
	40 to 70 msec	m/s	6.27 to 7.64	6.81	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	67	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	59	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	74	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	55	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	8	Pass


 Laboratory Technician

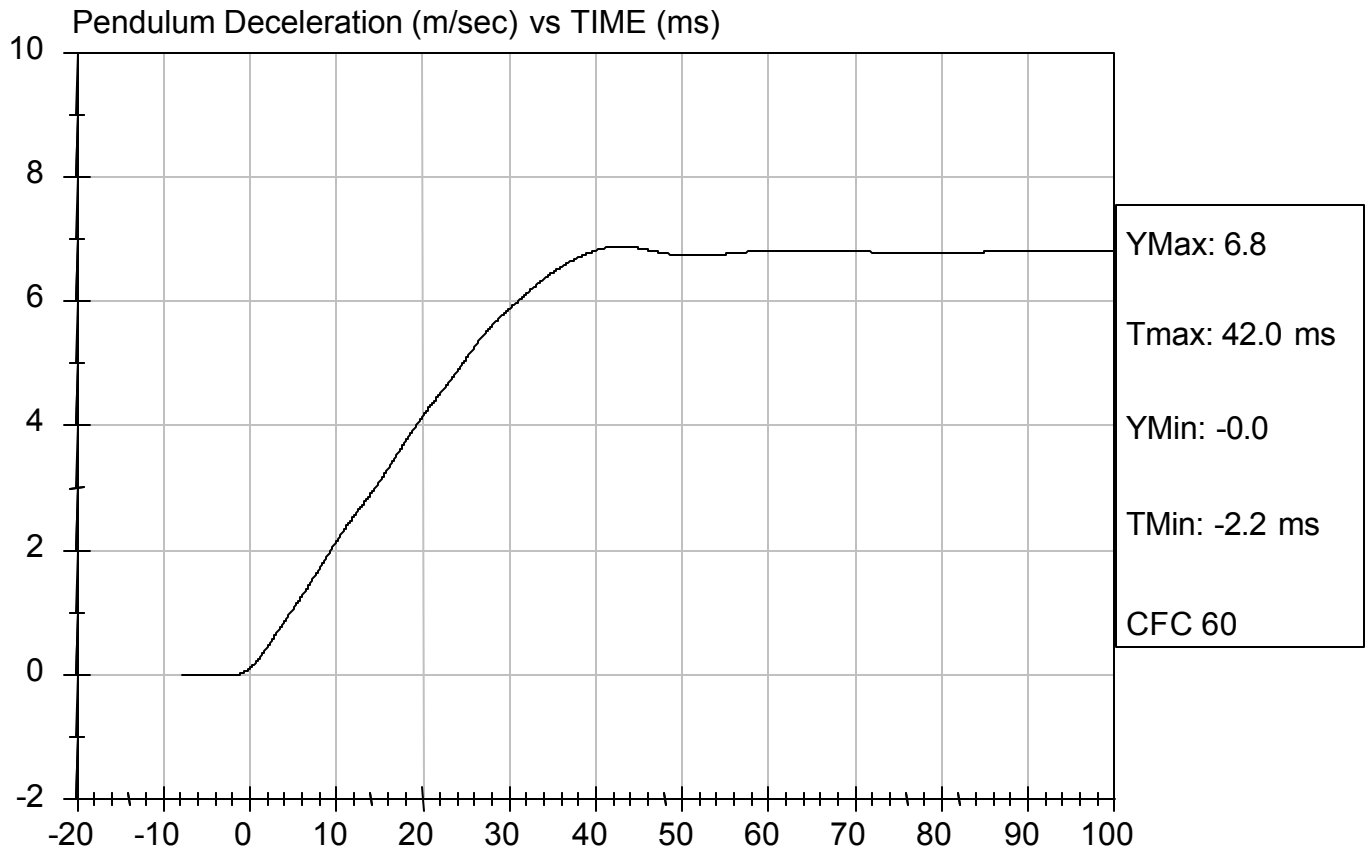

 Approved By

5/4/09
 Test Date



Test Desc: Neck Bending
Component ID: D091029

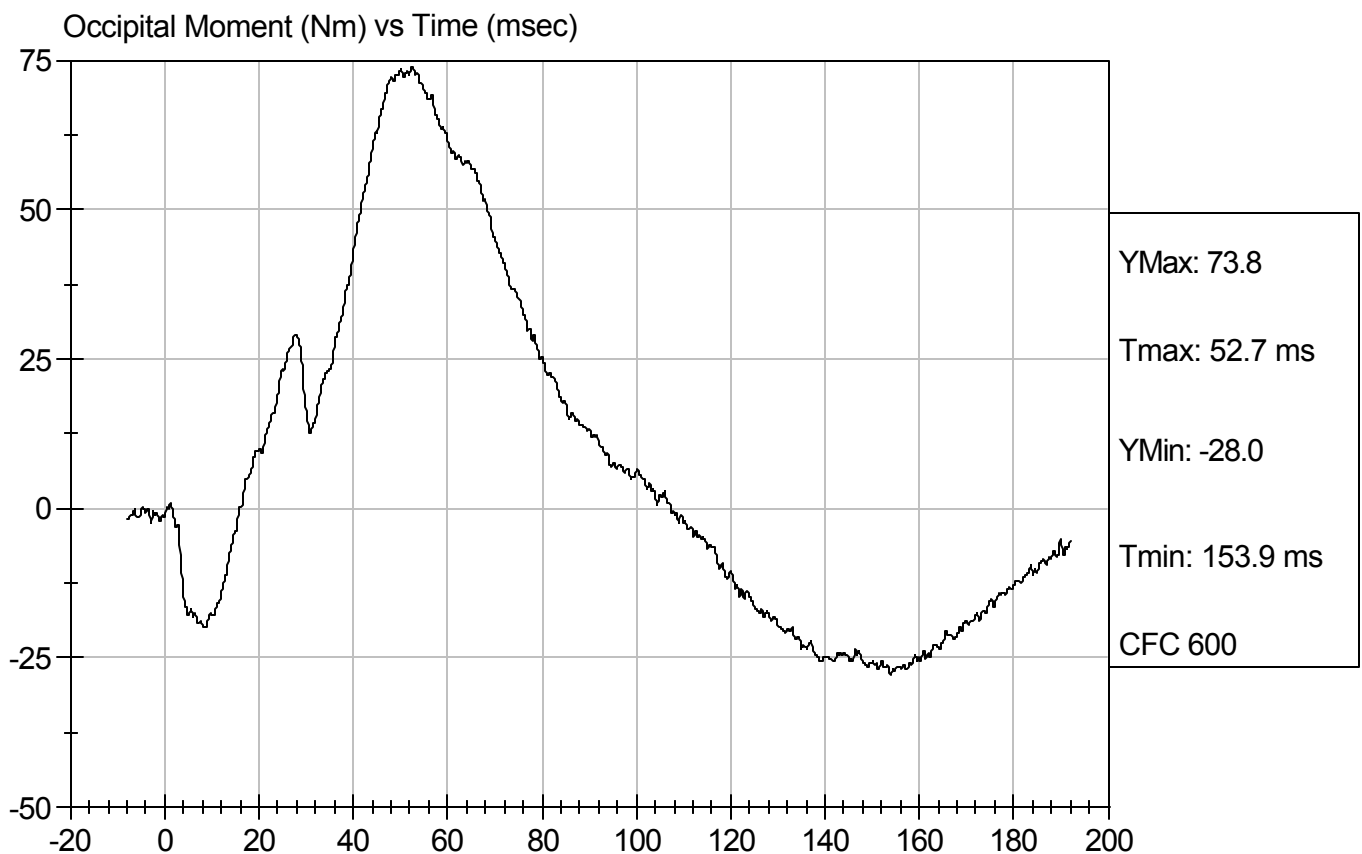
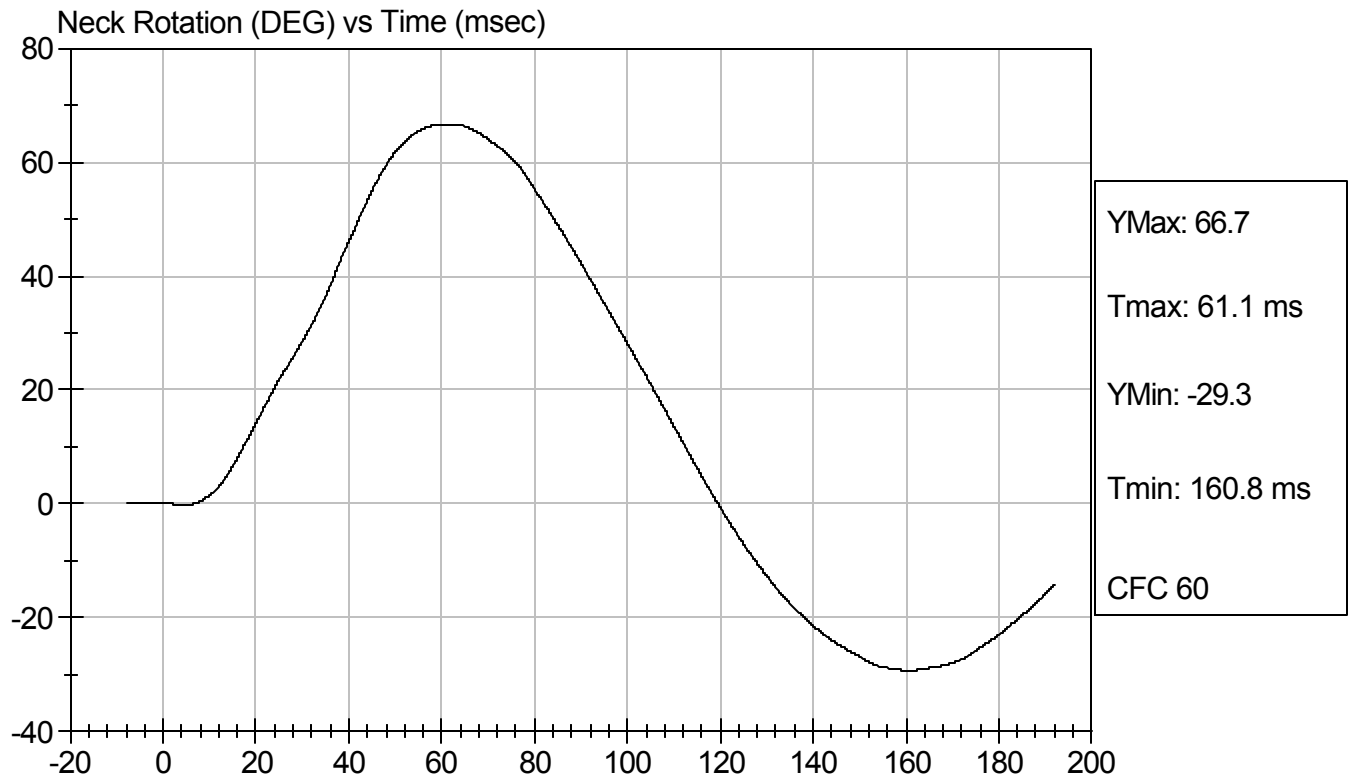
Test Date: 5/4/09
Speed: 23.1 ft/sec, 7.04 m/sec





Test Desc: Neck Bending
Component ID: D091029

Test Date: 5/4/09
Speed: 23.1 ft/sec, 7.04 m/sec



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 272

Test Part	Items Checked	Result
Skin	Visual inspection	Pass
Head	Visual, ballast, accelerometer mount	Pass
Neck	Visual	Pass
Spine Box	Visual, ballast, accelerometer mount	Pass
Rib Cage	Visual, measure	Pass
Sternum	Visual	Pass
Lumbar Spine	Visual	Pass
Abdomen	Visual	Pass
Pelvis	Visual, palpate, accelerometer mount	Pass
Upper Legs	Visual	Pass
Knees	Visual	Pass
Lower Legs	Visual, range of motion	Pass
Ankles	Visual, range of motion	Pass
Feet	Visual, range of motion	Pass
Joints	1 to 2 g range	Pass
Other		Pass

Jessica Hall
 Laboratory Technician
David Winkelbauer
 Approved By

5/4/09

Test Date