REPORT NUMBER: NCAPSIDE-MGA-2006-003

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

VOLKSWAGEN AG GERMANY
2006 VOLKSWAGEN PASSAT
NHTSA NUMBER: M65801

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

Test Date: September 20, 2005

Report Date: October 19, 2005

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
400 SEVENTH STREET, SW, ROOM 5311
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.

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: Shefalika Naik Date: 10/19/05
Shefalika Naik, Project Engineer

Reviewed by: David Winkelbauer Date: 10/19/05
David Winkelbauer, Facility Director

Technical Report Documentation Page

1. Report No. NCAPSIDE-MGA-2006-003	*2. Government Accession No.*	*3. Recipient's Catalog No.*	
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Testing of 2006 Volkswagen Passat NHTSA No.: M65801		*5. Report Date* October 19, 2005 *6. Performing Organization Code* MGA	
7. Author(s) Shefalika Naik, Project Engineer		*8. Performing Organization Report No.* NCAPSIDE-MGA-2006-003	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-03-D-12005	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards 400 Seventh Street, SW, Room 5311 Washington, D.C. 20590		*13. Type of Report and Period Covered: Final Report* 09/20/05 to 10/19/05 *14. Sponsoring Agency Code* NVS-111	
15. Supplementary Notes			

16. Abstract

A 55/28 km/h 90° Moving Deformable Barrier NCAP side impact was conducted on the subject 2006 Volkswagen Passat 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 September 20, 2005. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 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 297 mm at level 2. The test vehicle's occupant performance is as follows:

	DRIVER	PASS.
Left Upper Rib (LUR) Accel., g	35.4	78.5
Left Lower Rib (LLR) Accel., g	36.8	75.9
Lower Spine (T_{12}) Accel., g	48.8	54.8
Thoracic Trauma Index (TTI)	42.8	66.7
Pelvis (PEV) Accel., g	61.0	58.7
HIC	212.3	360.4

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.

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, Room 5108 (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590	
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* 144	22. Price

Form DOT F1700.7 (8-72)

TABLE OF CONTENTS

SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the FY' 2006 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 2006 Volkswagen Passat manufactured by Volkswagen AG Germany.

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 2006 Volkswagen Passat 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 61.8 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 1810.0 kg and the test weight of the MDB was 1360.8 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on September 20, 2005.

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-five (25) structural accelerometers and the MDB was instrumented with six (6) 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 297 mm at level 2, 1650 mm rearward of the left vertical impact point. The driver and passenger SID/HIIIs, Serial Nos. 271 and 904 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	212.3	38.6	70.0	42.8	61.0
Passenger	360.4	43.5	49.6	66.7	58.7

SUPPLEMENTAL RESTRAINT INFORMATION

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

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

TEST NOTES

The left side doors (struck side) were locked and right side doors (non struck side) were unlocked during test.

The following channels did not collect valid data:
Left Rear Sill Y

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

TEST VEHICLE INFORMATION

Make	Volkswagen
Model	Passat
Body Style	Sedan
NHTSA No.	M65801
VIN	WVWAK73C46P037162
Color	Light Blue Metallic
Delivery Date	9/9/05
Odometer Reading (mile)	49
Dealer	Boucher Volkswagen
Transmission	Automatic
Final Drive	Front
Number of Cylinders	4
Engine Displacement (L)	2.0
Engine Placement	Lateral
Automatic Door Locks (ADL)	Yes
Owner's Manual Details Instructions on Disabling ADLs	No

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Curtain Airbag	Yes
Driver Side Torso Airbag	Yes
Rear Passenger Side/Curtain Airbag	Yes
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	Yes
Pretensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen AG Germany
Date of Manufacture	07/05

GVWR (kg)	2040
GAWR Front (kg)	1100
GAWR Rear (kg)	990

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Buckets	Split Bench		
Number Of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				440
Cargo Wt. (RCLW) (kg)				102.1

DATA SHEET NO. 1 (continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	463.5	314.0		519.0	423.0	
Right	kg	454.5	322.5		465.5	402.5	
Ratio	%	59.1	40.9		54.4	45.6	
Totals	kg	918.0	636.5	1554.5	984.5	825.5	1810.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1554.5
Weight of 2 P572E ATDs	kg	161.5
Rated Cargo/Luggage Weight (RCLW)	kg	102.1
Calculated Vehicle Target Weight (TVTW)	kg	1818.1

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

Weight of Ballast in Cargo Area: 74.8 kg

TEST VEHICLE ATTITUDES AND CG

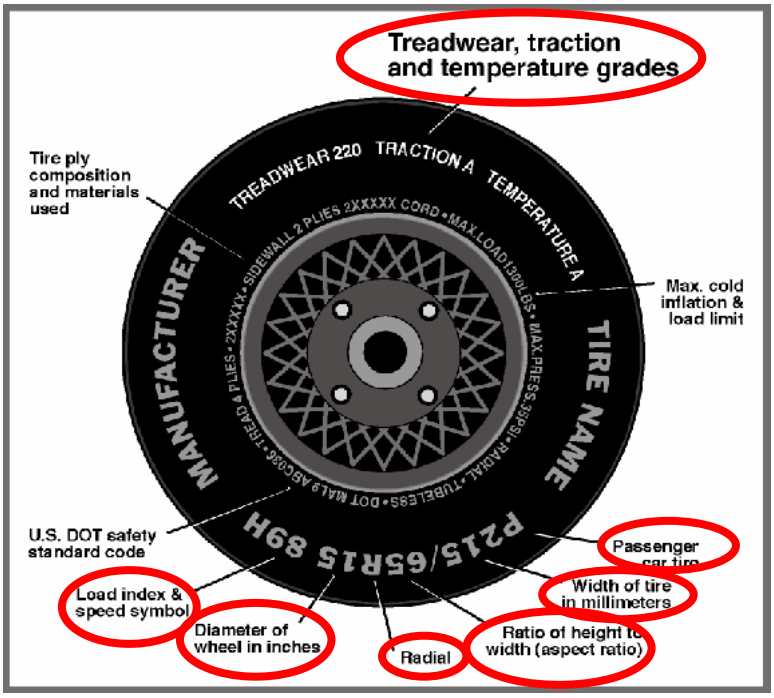
	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	694	698	702	698	1110
As Tested	mm	689	697	670	673	1236
Fully Loaded	mm	687	697	670	673	

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2710
Target Impact Point Aft of Front Axle	mm	415
Actual Impact Point Aft of Front Axle	mm	429

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	340	340
Cold / Test Pressure (kPa)	230	230
Recommended Tire Size	P215/55R16	P215/55R16
Tire Size on Vehicle	P215/55R16	P215/55R16
Tire Manufacturer	Good Year	Good Year
Tire Name	Eagle	Eagle
Tire Type	P	P
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	55	55
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	97H	97H
Treadwear	400	400
Traction Grade	A	A
Temperature Grade	A	A

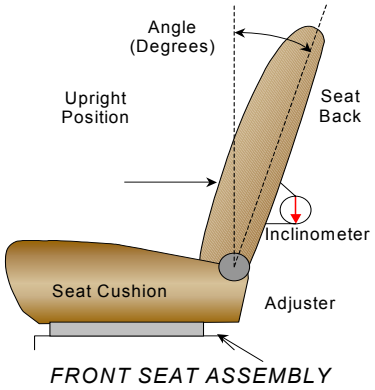
DATA SHEET NO. 3

TEST VEHICLE INFORMATION

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The seat back angle at test position, measured from upright position = 17.5 degrees.



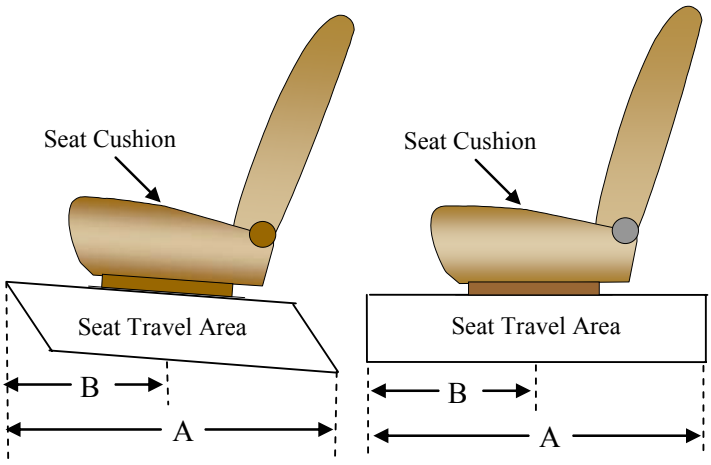
Driver seat back angle: (3.2° on head rest post)
Passenger seat back angle: non adjustable

SEAT FORE/AFT POSITIONS

Forward-most measurements and rearward-most measurements should be taken from the bottom of the seat cushion (including the plastic base if applicable).

SEAT FORE/AFT POSITIONS

	Total Fore/Aft Travel	Placed in position #
Driver Seat	300mm	150mm
Rear Seat	Non adjustable	Non adjustable



DATA SHEET NO. 3 (CONTINUED)

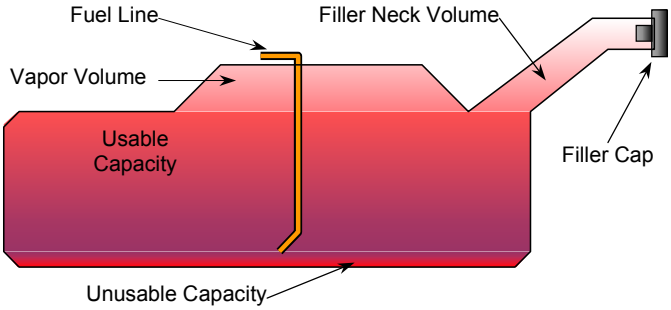
TEST VEHICLE INFORMATION

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	70.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	64.4 to 65.8
Actual Amount of Solvent used	65.2
1/3 of Usable Capacity	23.3

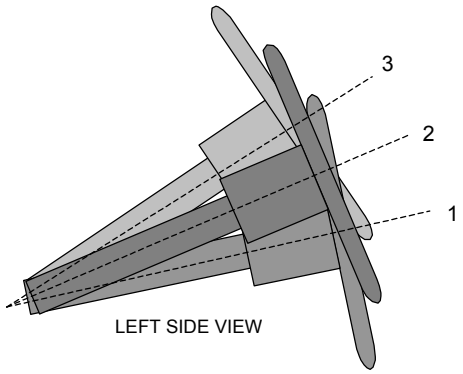
Fuel pump will pump fuel for 2 seconds after ignition is on. If engine doesn't start, it will stop pumping. It also stops when there is a crash signal.



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 POSITIONS

	Fore/Aft Position (mm)	Degrees
Lowermost position No. 1		21.8
Geometric center position No. 2		23.8
Uppermost position No. 3		25.8

DATA SHEET NO. 4

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2588
C.G. Location aft of Front Axle	1101

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	473.5	219.5	
Right	kg	308.3	359.5	
Ratio	%	57.5	42.5	
Totals	kg	781.8	579.0	1360.8

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.8
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	89.8

POST TEST OBSERVATIONS
MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	14mm right
Vertical Offset	mm	+/-20	9mm up

DATA SHEET NO. 5

POST TEST OBSERVATIONS

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID HIII / 271	SID HIII / 904
Head Contact	Curtain, Headrest	Curtain, Side Header, Headrest
Upper Torso Contact	Side Airbag, Door panel	Door Panel
Lower Torso Contact	Door panel	Door Panel
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
Locked/Unlocked Doors	Left side (struck) were locked Right side (unstruck) were unlocked	Left side (struck) were locked Right side (unstruck) were unlocked
Left Side Door Opening	Door remained closed and latched	Door remained closed and latched
Right Side Door Opening	Door remained closed and latched; Door opened without tools	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 Rear Passenger Window Broke
Other Notable Effects	None

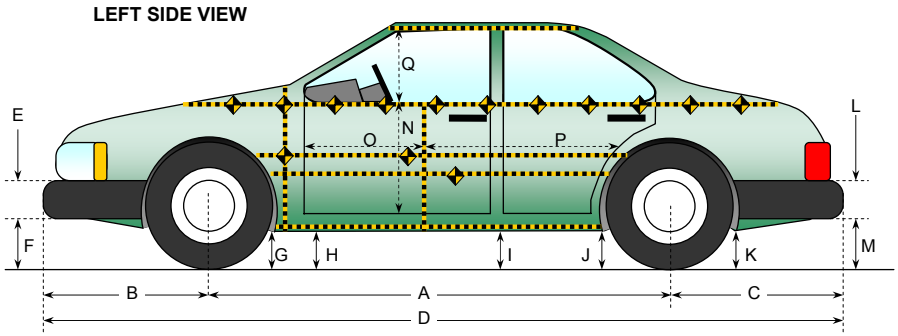
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Occupant Location 01		Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	No	
Side Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes		Yes	
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05



All Measurements in mm

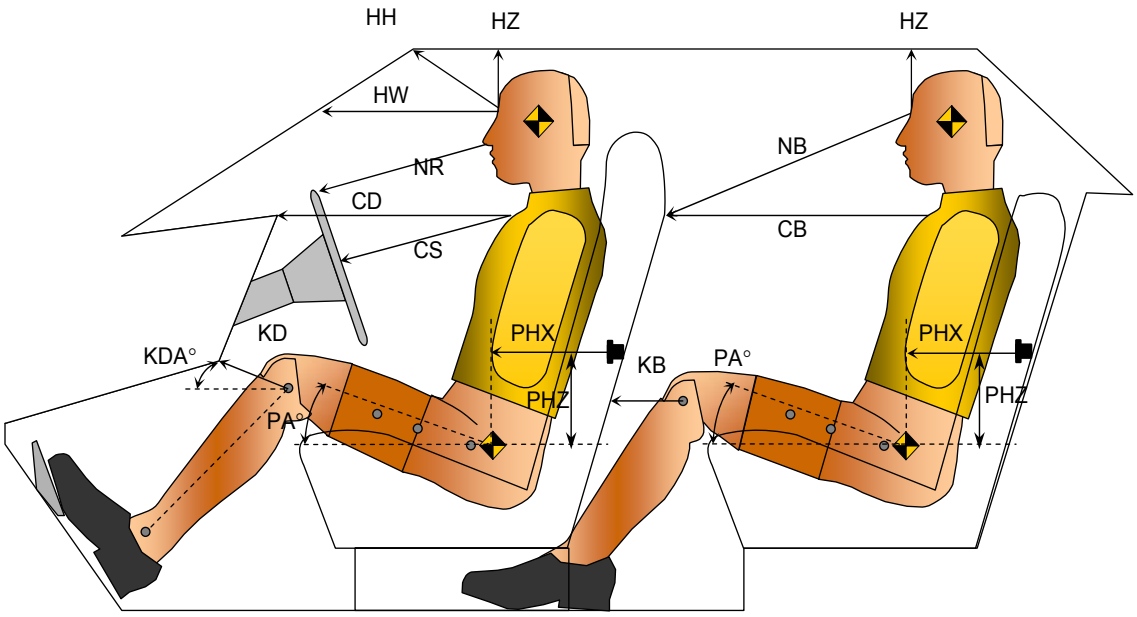
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2710	2685	25
B	Front Axle to FSOV	973	912	61
C	Rear Axle to RSOV	1098	1152	-54
D	Total Length at Centerline	4781	4749	32
E	Front Bumper Thickness	146	146	0
F	Front Bumper Bottom to Ground	257	270	-13
G	Sill Height at Front Wheel Well	173	164	9
H	Sill Height at Front Door Leading Edge	166	150	16
I	Sill Height at "B" Pillar	188	163	25
J1	Sill Height at Rear Wheel Well	178	166	12
J2	Pinch Weld Height at Rear Wheel Well	165	155	10
K	Sill Height Aft of Rear Wheel Well	165	170	-5
L	Rear Bumper Thickness	340	340	0
M	Rear Bumper Bottom to Ground	290	290	0
N	Sill Height to Window Bottom Sill	722	625	97
O	Front Door Leading Edge to Impact CL	804	705	99
P	Rear Door Trailing Edge to Impact CL	1146	1059	87
Q	Front Window Opening	405	398	7
R	Right Side Length	3974	3979	-5
S	Left Side Length	3975	3939	36
T	Vehicle Width at "B" Post	1813	1574	239

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Volkswagen Passat
Test Program: NCAP Side Impact

NHTSA No. M65801
Test Date: 09/20/05

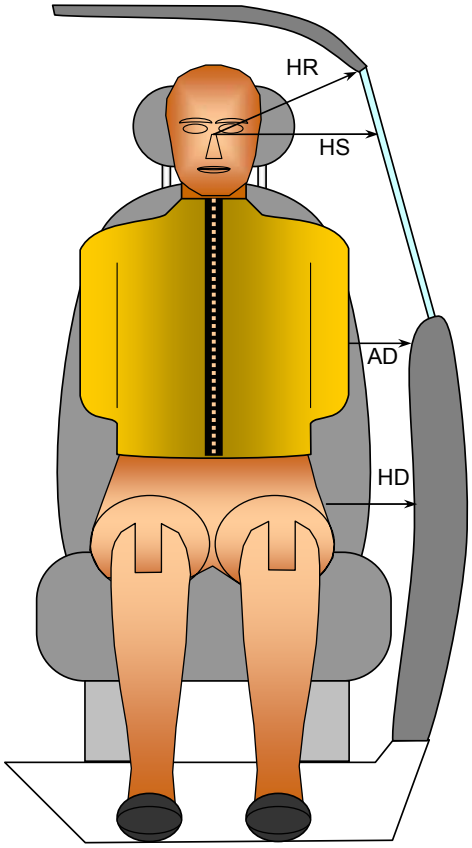


Driver Code	Pass. Code	Measurement Description	Driver S/N 271		Passenger S/N 904	
			Length(mm)	Angle(°)	Length(mm)	Angle(°)
HH		Head to Header	379			
HW		Head to Windshield	630			
HZ	HZ	Head to Roof	154		149	
NR	NB	Nose to Rim/Nose to Seatback	442		616	
CD	CB	Chest to Dash or Seatback	533		556	
CS		Chest to Steering Wheel	336			
KDL	KBL	Left Knee to Dash or Seatback	215	39.1	218	25.5
KDR	KBR	Right Knee to Dash or Seatback	184	39.4	233	24.8
PA	PA	Pelvic Angle		24.4		23.4
PHX	PHX	H-Point to Striker (X-Axis)	194		156	
PHZ	PHZ	H-Point to Striker (Z-Axis)	236		226	

DATA SHEET NO. 8

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05



FRONT VIEW OF DUMMY

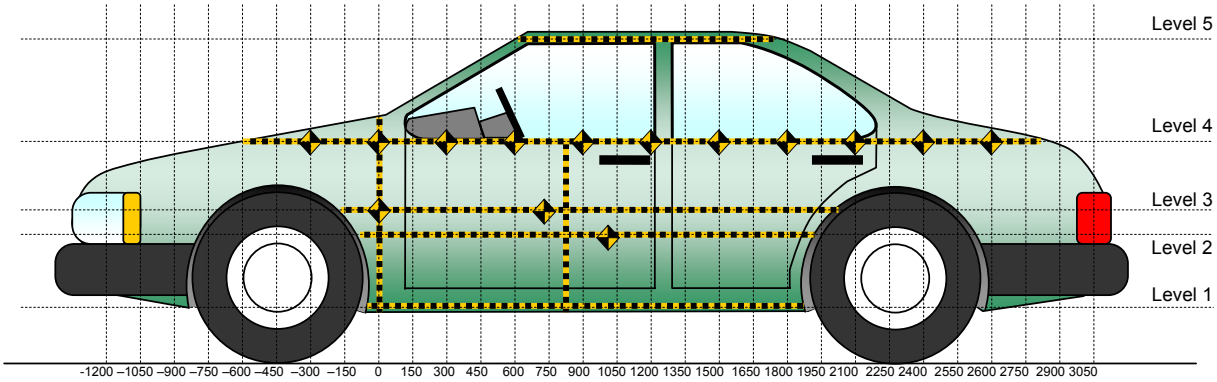
Code	Measurement Description	Units	Driver S/N 271	Passenger S/N 904
HR	Head to Side Header	mm	203	221
HS	Head to Side Window	mm	305	323
AD	Arm to Door	mm	72	87
HD	H-Point to Door	mm	158	160

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2006 Volkswagen Passat
Test Program: NCAP Side Impact

NHTSA No. M65801
Test Date: 09/20/05



All Measurements Shown in mm

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	58	1500	1375
4	Window Sill	178	1500	940
3	Mid Door	289	1650	613
2	Occupant H-Point	297	1650	465
1	Sill Top	230	1650	315
	Maximum Penetration	297		

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900			290	371				292	372				2	1	
-750			239	350				248	357				9	7	
-600				334					344					10	
-450				321					336					15	
-300				311					330					19	
-150			205	298				241	319				36	21	
0	230	214	211	289		251	249	260	318		21	35	49	29	
150	226	212	209	283		346	374	361	332		120	162	152	49	
300	224	209	206	278		393	439	399	349		169	230	193	71	
450	219	205	203	272		400	460	404	366		181	255	201	94	
600	218	203	202	269		409	468	411	380		191	265	209	111	
750	215	201	201	268	496	422	471	409	391	538	207	270	208	123	42
900	215	200	201	267	496	424	464	414	388	539	209	264	213	121	43
1050	213	199	201	268	496	419	465	427	392	544	206	266	226	124	48
1200	212	200	202	269	496	414	448	440	401	551	202	248	238	132	55
1350	214	200	204	272	500	430	480	455	414	554	216	280	251	142	54
1500	215	200	206	273	502	439	496	479	451	560	224	296	273	178	58
1650	216	202	208	278	506	446	499	497	451	564	230	297	289	173	58
1800	218	202	212	284	507	419	468	474	395	557	201	266	262	111	50
1950		200	213	293	513		431	356	341	549		231	143	48	36
2100			202	301				289	396				87	95	
2250			200	309				261	357				61	48	
2400			205	320				244	350				39	30	
2550			225	333				244	365				19	32	
2700			251	348				260	372				9	24	
2850			273	367				282	387				9	20	
3000			299	389				308	406				9	17	
3150			335					343					8		

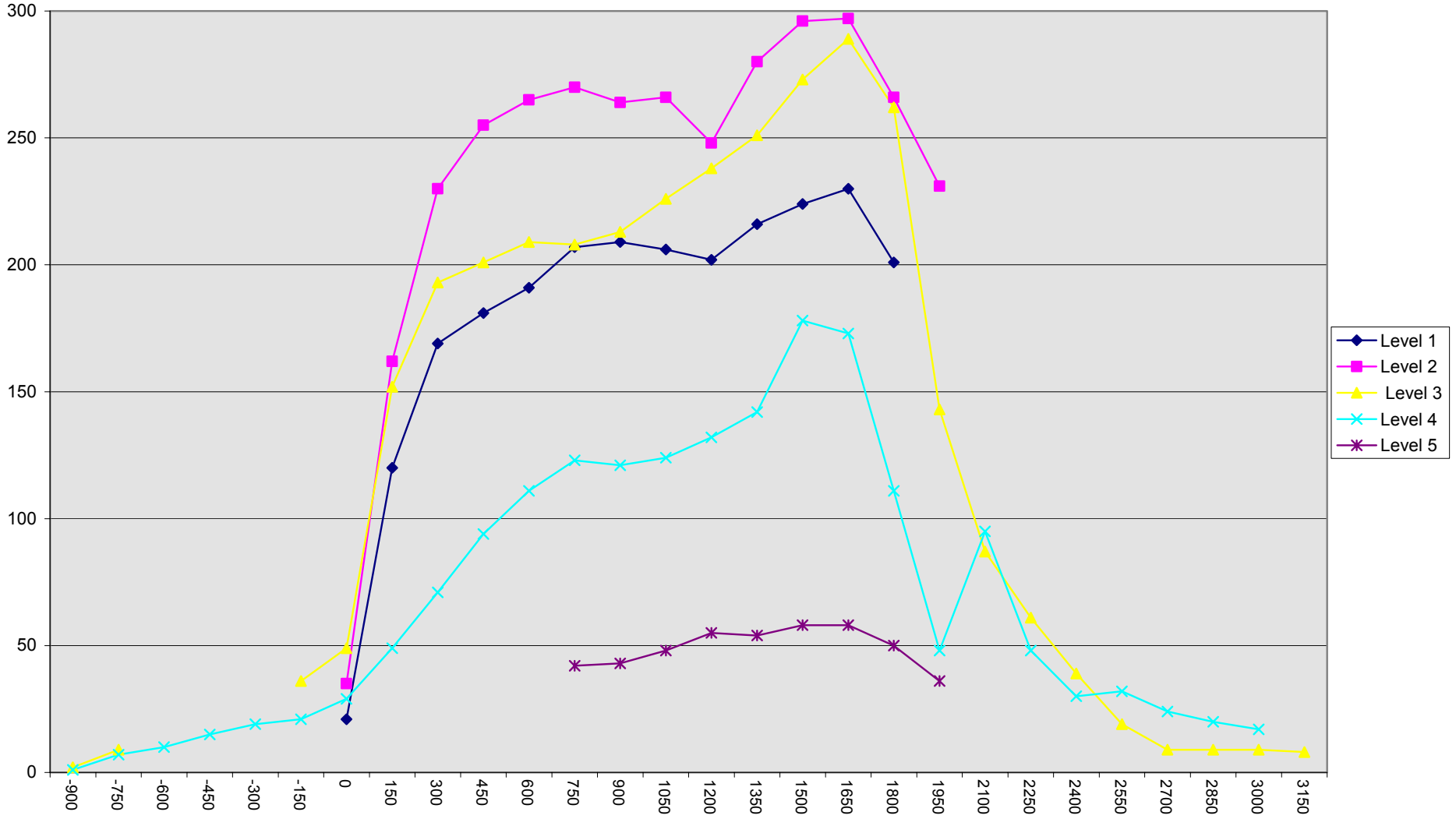
Reference plane is parallel to test vehicle longitudinal centerline.

Given dimensions = Reference plane to car body

DATA SHEET NO. 10... (continued)

VEHICLE EXTERIOR CRUSH PROFILES

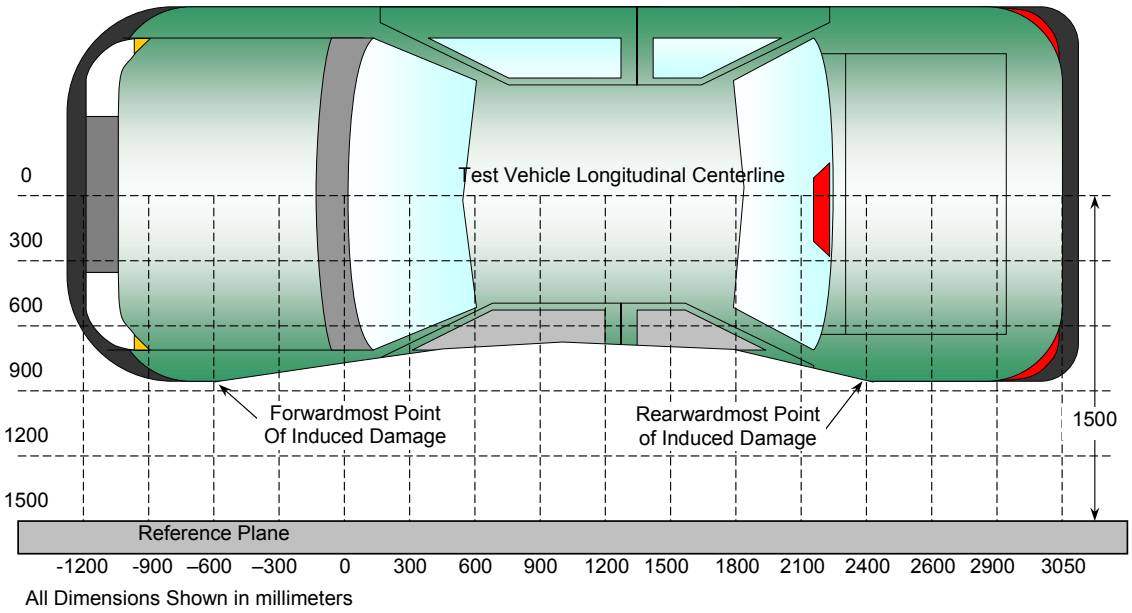
Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05



DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2006 Volkswagen Passat
Test Program: NCAP Side Impact
NHTSA No. M65801
Test Date: 09/20/05



TOP VIEW

DAMAGE PROFILE DISTANCES

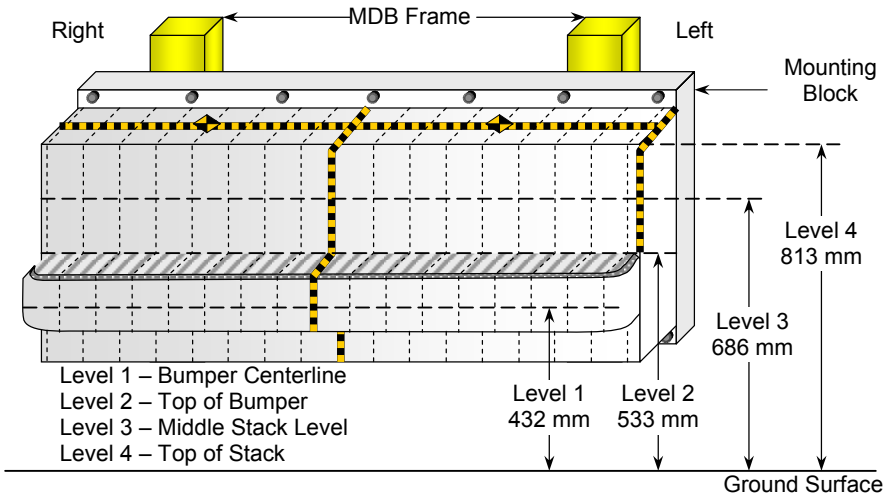
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	3150 mm	3	335	343	8
2	2345 mm	4	316	351	35
3	1514 mm	2	200	496	296
4	714 mm	2	202	470	268
5	-63 mm	3	208	252	44
6	-900 mm	4	371	372	1

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: 2006 Volkswagen Passat
Test Program: NCAP Side Impact
NHTSA No. M65801
Test Date: 09/20/05



DEFORMABLE BARRIER STATIC CRUSH

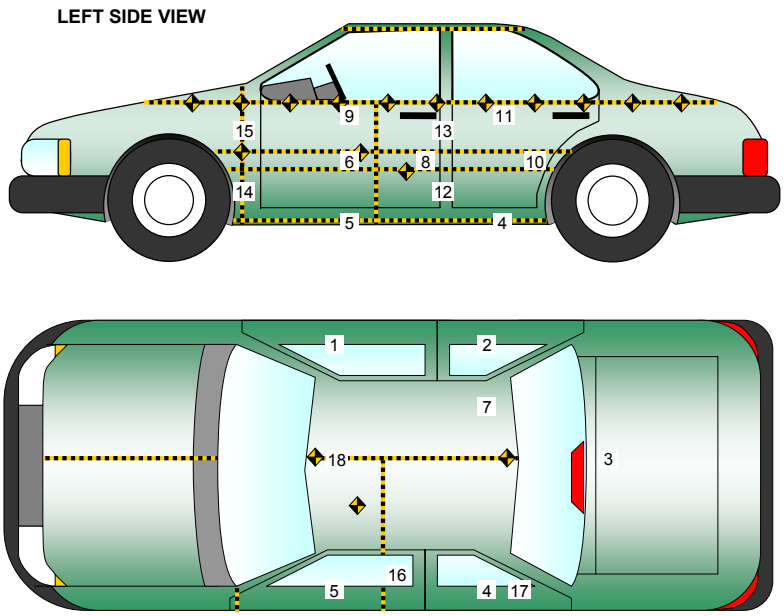
Stack Level	Distance Right of Center								C_L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	158	143	129	124	125	133	136	123	120	115	109	109	110	111	115	129	155
2	118	103	98	100	100	102	100	96	93	92	88	89	90	91	94	100	114
3	66	36	30	30	32	45	76	75	61	48	41	40	46	54	70	104	159
4	95	42	27	30	46	73	111	117	91	74	56	61	69	84	116	133	167

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2768	735	214
2	Right Sill at Rear Seat	1668	735	232
3	Rear Floorpan Above Axle	1002	0	515
4	Left Sill at Rear Door	1679	-735	254
5	Left Sill at Front Door	2791	-735	219
6	Left Front Door C/L	2786	-774	456
7	Rear Occupant Compartment	1984	340	395
8	Left Front Door Mid-Rear	2463	-776	450
9	Left Front Door Upper C/L	2778	-808	704
10	Left Rear Door Mid-Rear	1576	-764	646
11	Left Rear Door Upper C/L	1779	-804	654
12	Left Lower B-Post	2217	-706	514
13	Left Middle B-Post	2172	-730	840
14	Left Lower A-Post	3314	-792	474
15	Left Middle A-Post	3339	-798	803
16	Front Seat Track	2319	-610	343
17	Rear Seat Track or Structure			
18	Vehicle CG	2636	0	515

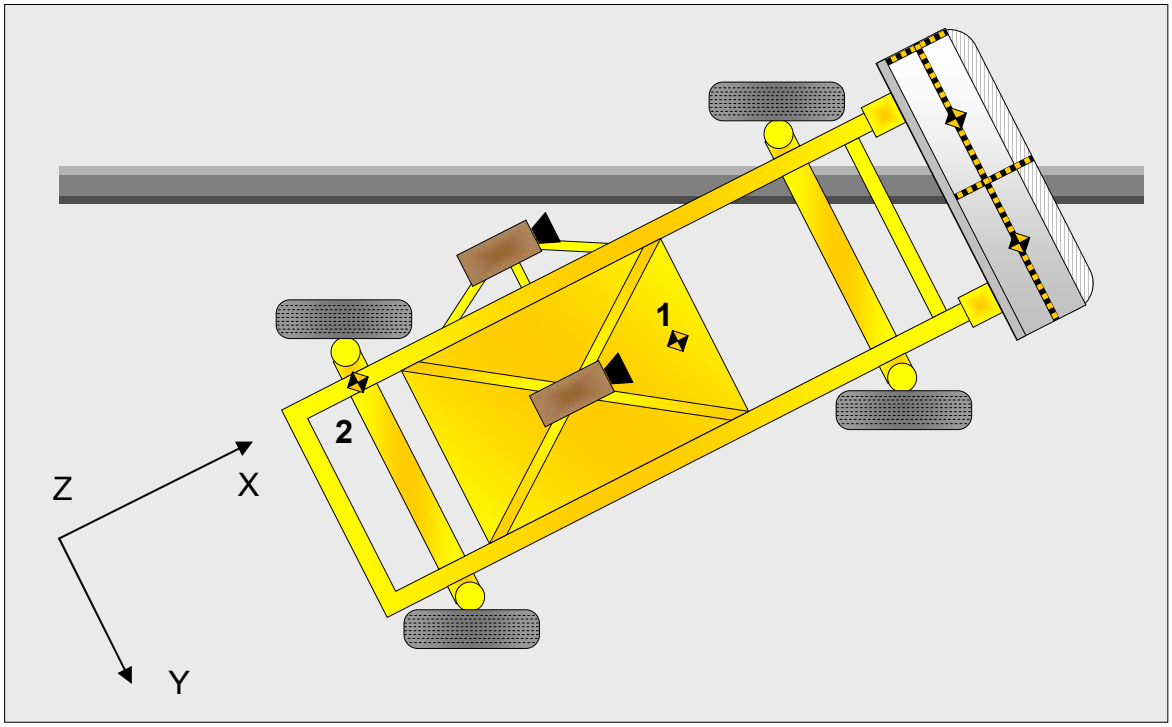
Reference Points
X - Test Vehicle Rear Bumper (+ forward)
Y - Test Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2006 Volkswagen Passat
Test Program: NCAP Side Impact

NHTSA No. M65801
Test Date: 09/20/05



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1092	0	-483
2	MDB Rear	-2591	-625	-622

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

DATA SHEET NO. 15

VEHICLE STRUCTURAL MEASUREMENTS

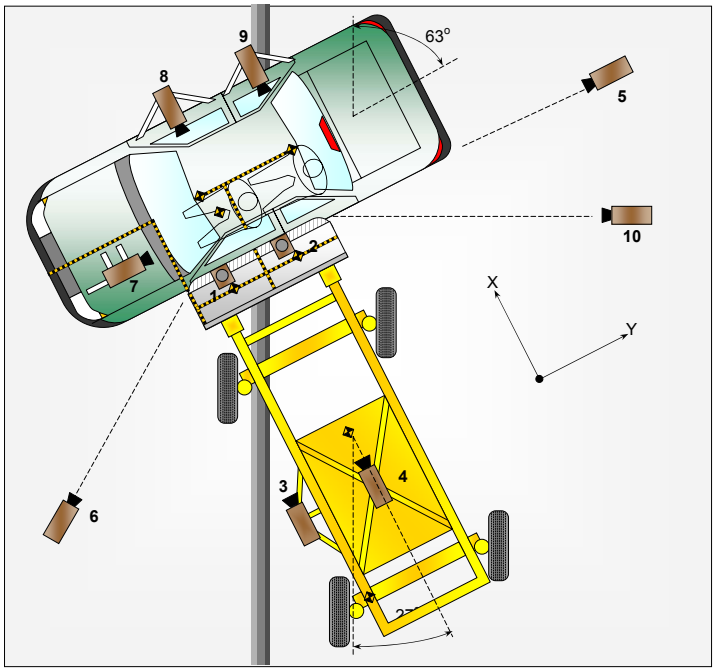
Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

	Elements	Pre-Test (mm)
1	Total Length	4781
2	Total Width	1813
3	Bumper Top Height	403
4	Bumper Bottom Height	257
5	Longitudinal Member Top Height	531
6	Distance between Longitudinal Members	1062
7	Longitudinal Member Width	123
8	Engine Top Height	874
9	Engine Bottom Height	168
10	Engine and gearbox width	807
11	Front bumper-engine distance	437
12	Front shock absorber fixing height	833
13	Bonnet leading edge height	727
14	Front shock absorber fixing width	1206
15	Front bumper – front axle distance	973
16	Front axle – a pillar distance	511
17	A-pillar – B-pillar distance	1041
18	B-Pillar – rear axle distance	1155
19	B-pillar – C-pillar distance	934
20	Roof sill bottom height	1372
21	Roof sill top height	1432
22	Floor sill bottom height	198
23	Floor sill top height	364

DATA SHEET NO. 16

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Close-up	110	-505	5450	50	1000
2	Overhead Overall	65	-220	5460	14	1000
3	MDB Onboard, Impact Point Close-up				50	1000
4	MDB Onboard, Centerline of Impact				25	1000
5	Right Side, Ground Level, Overall	-3180	8025	1410	35	1000
6	Left Side, Ground Level, Overall	1845	-4350	1500	24	1000
7	Vehicle Onboard Front SID/HIII, Front				12.5	500
8	Vehicle Onboard Front SID/HIII, Side				8	500
9	Vehicle Onboard Rear SID/HIII, Side				8	500
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: 2006 Volkswagen Passat NHTSA No. M65801
Test Program: NCAP Side Impact Test Date: 09/20/05

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21° C Test Time: 12:16 pm

Stoddard Solvent Spillage Measurements

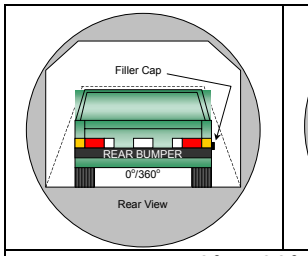
A. From impact until vehicle motion ceases: 0 oz.
(Maximum Allowable = 1 ounce)

B. For the 5 minute period after motion ceases: None
(Maximum allowable = 5 ounces)

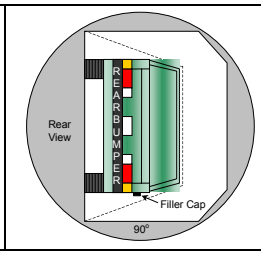
C. For the following 25 minutes: None
(Maximum allowable = 1 oz./minute)

D. Spillage Details: None

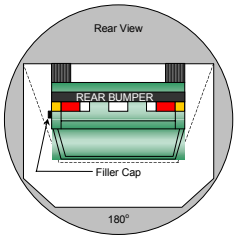
FMVSS 301 STATIC ROLLOVER DATA

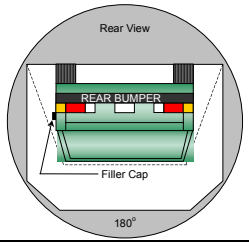


0° to 90°

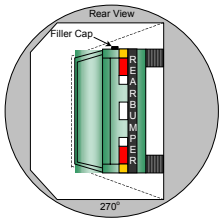


90° to 180°

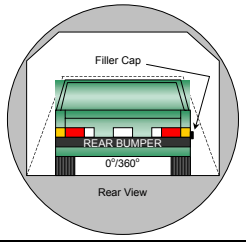




180° to 270°



270° to 360°



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**

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	165	300	First 5	0
90° to 180°	152	300	First 5	0
180° to 270°	135	300	First 5	0
270° to 360°	168	300	First 5	0

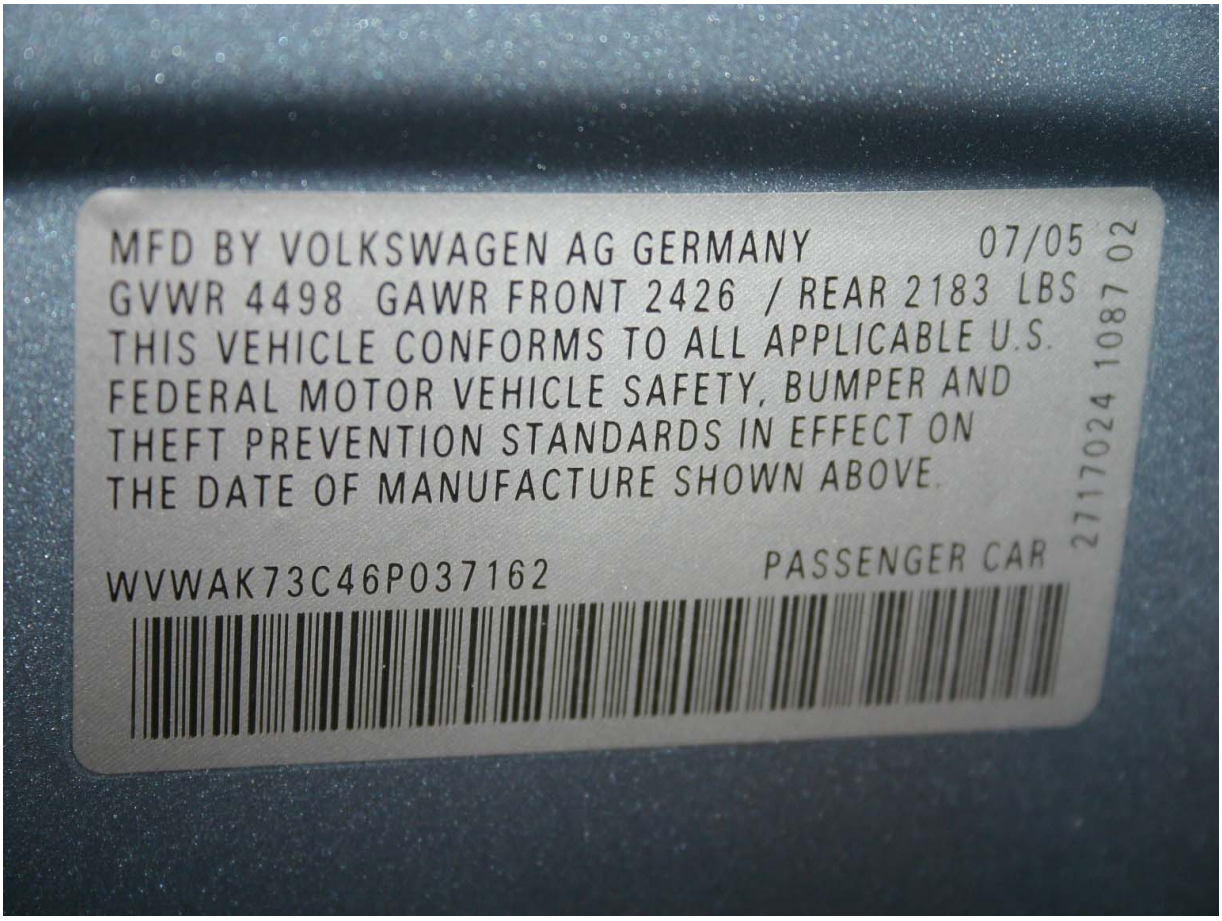
APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Left Front ¾ View, As Received

Right Rear ¾ View, As Received



Manufacturer's Label

Tire Placard

Pre-Test Front View

Post-Test Front View

Pre-Test Left Front ¾ View

Pre-Test Left Side View

Post-Test Left Side View

Pre-Test Left Rear ¾ View

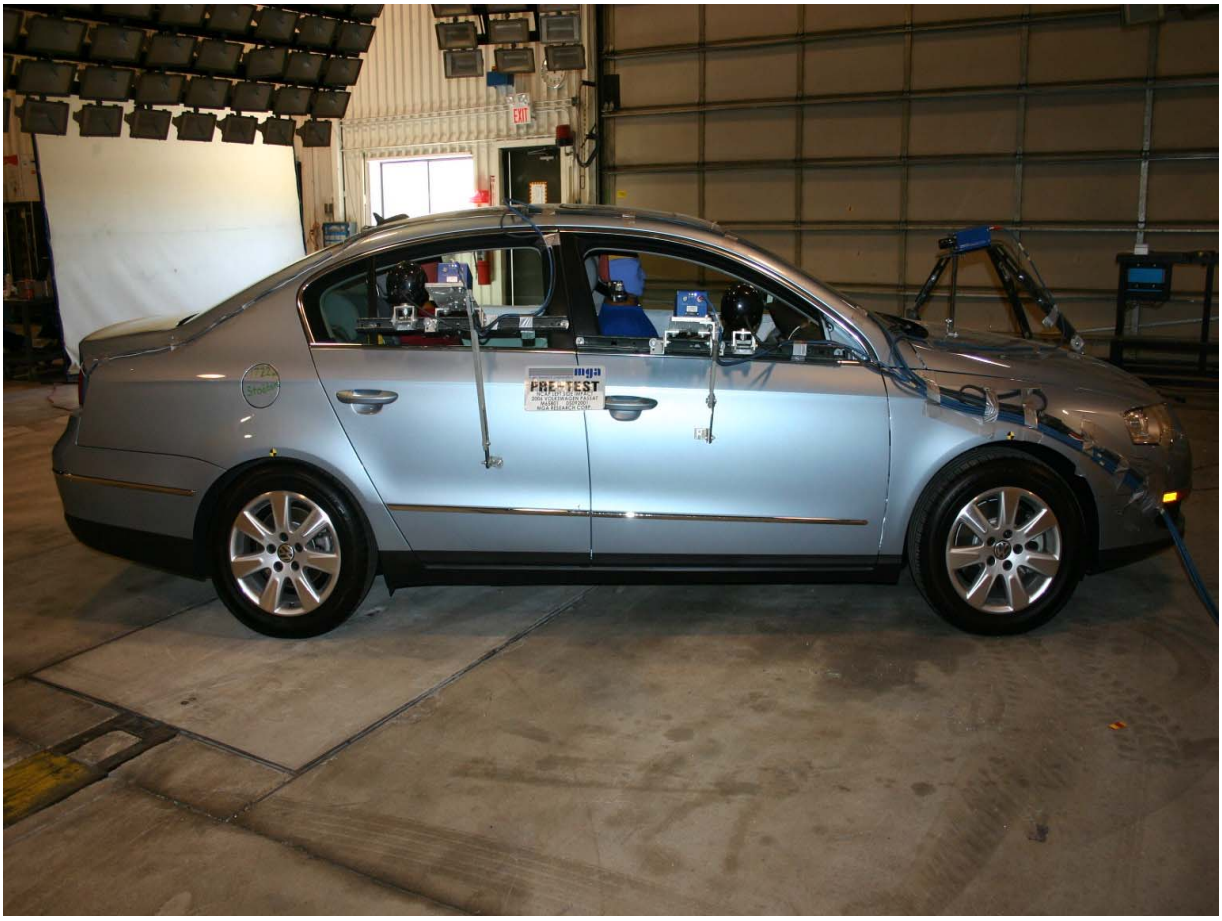
Post-Test Left Rear ¾ View

Pre-Test Rear View

Post-Test Rear View

Pre-Test Right Rear ¾ View

Post-Test Right Rear ¾ View



Pre-Test Right Side View

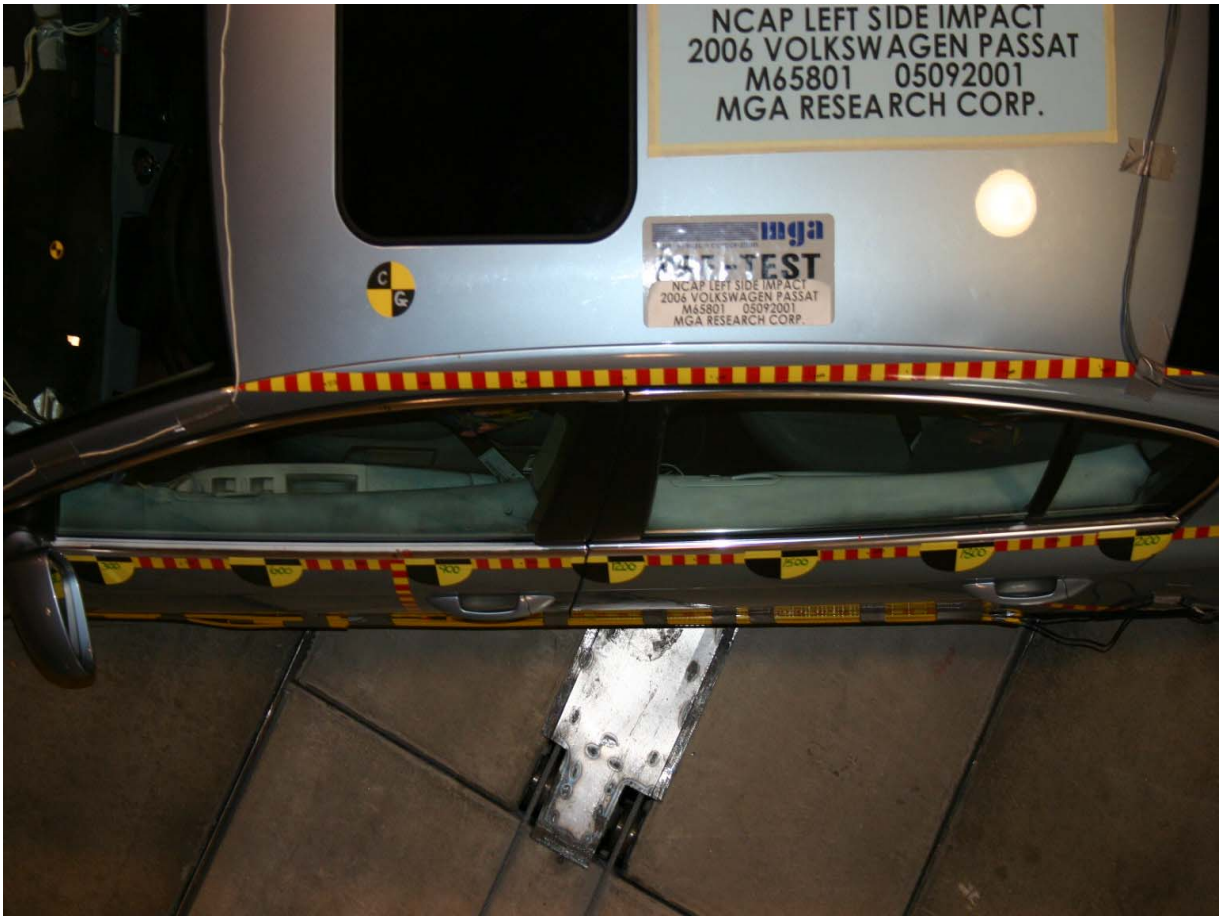
Post-Test Right Side View

Pre-Test Right Front ¾ View

Post-Test Right Front ¾ View

Pre-Test Overhead View

Post-Test Overhead View



Pre-Test Overhead Close-up View

Post-Test Overhead Close-up View

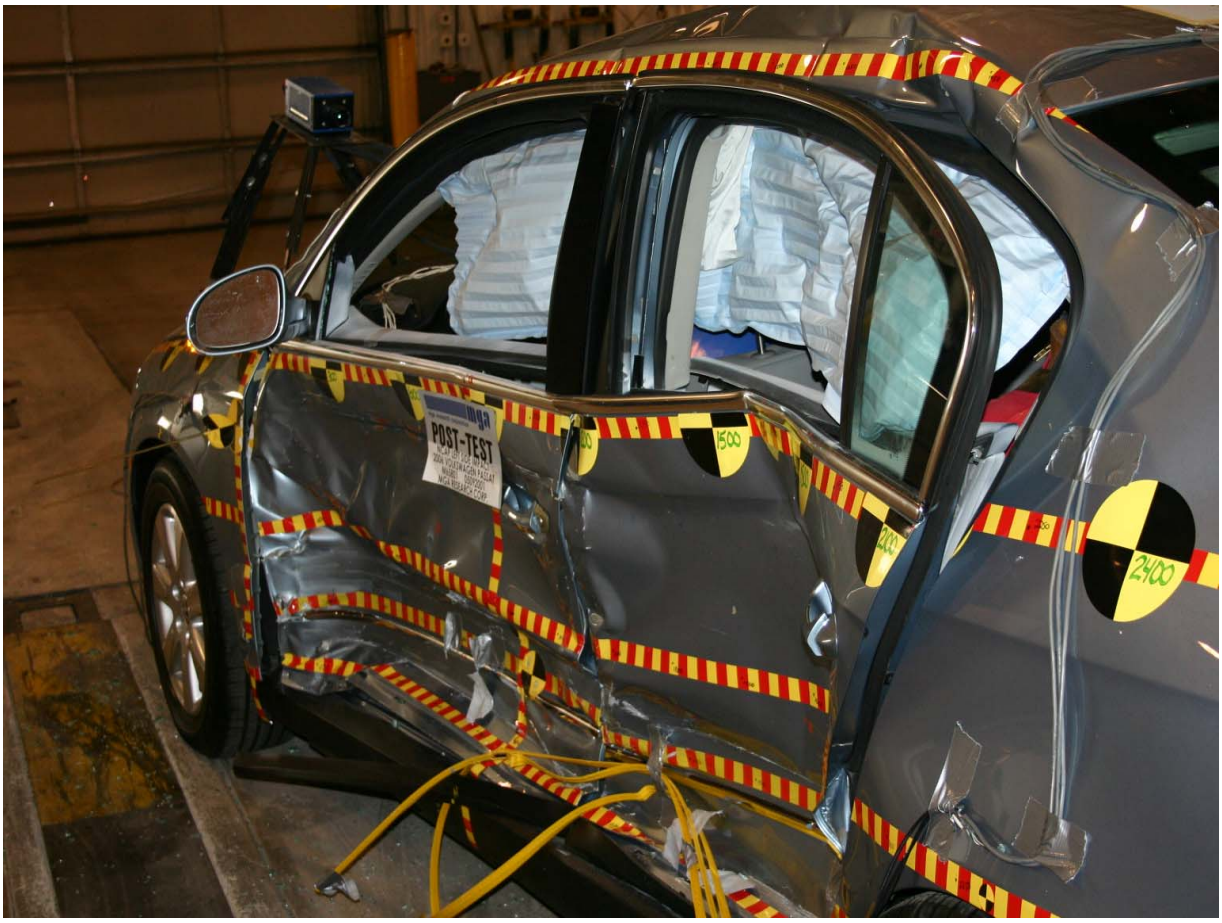
Pre-Test Left Impact Point

Post-Test Left Impact Point

Pre-Test Front ¾ View of Left Side Doors

Post-Test Front ¾ View of Left Side Doors

Pre-Test Rear ¾ View of Left Side Doors



Post-Test Rear ¾ View of Left Side Doors

Pre-Test Left Front Door

Post-Test Left Front Door

Pre-Test Left Rear Door

Post-Test Left Rear Door

Pre-Test Driver Dummy (Door Open)

Pre-Test Driver Dummy (Through Window)

Post-Test Driver Dummy (Through Window)

Pre-Test Driver Dummy Clearance From Door

Post-Test Driver Dummy Clearance From Door

Pre-Test Driver Dummy Right Side View

Post-Test Driver Dummy Right Side View

Post-Test Front Door Panel (Interior)

Pre-Test Passenger Dummy (Door Open)

Pre-Test Passenger Dummy (Through Window)

Post-Test Passenger Dummy (Through Window)

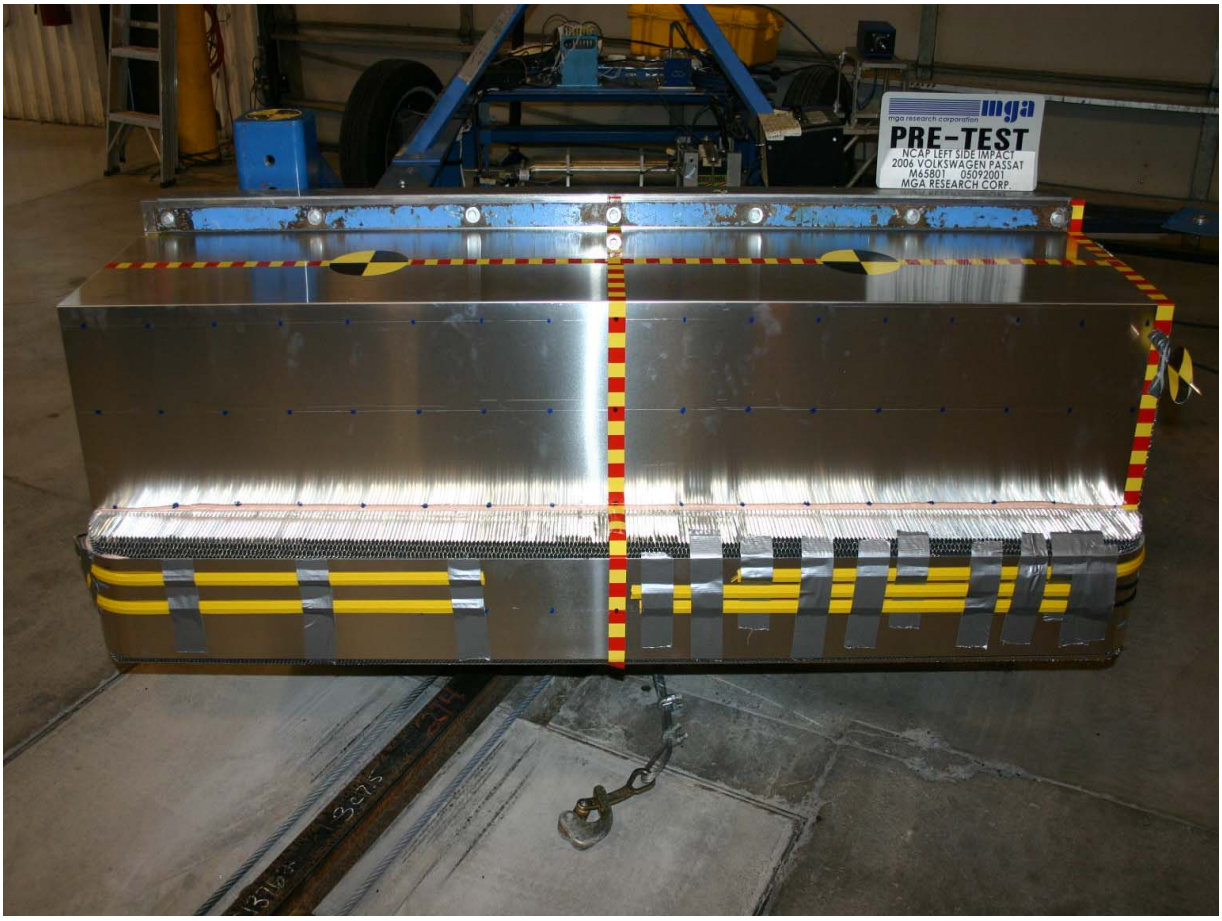
Pre-Test Passenger Dummy Clearance From Door

Post-Test Passenger Dummy Clearance From Door

Pre-Test Passenger Dummy Right Side View

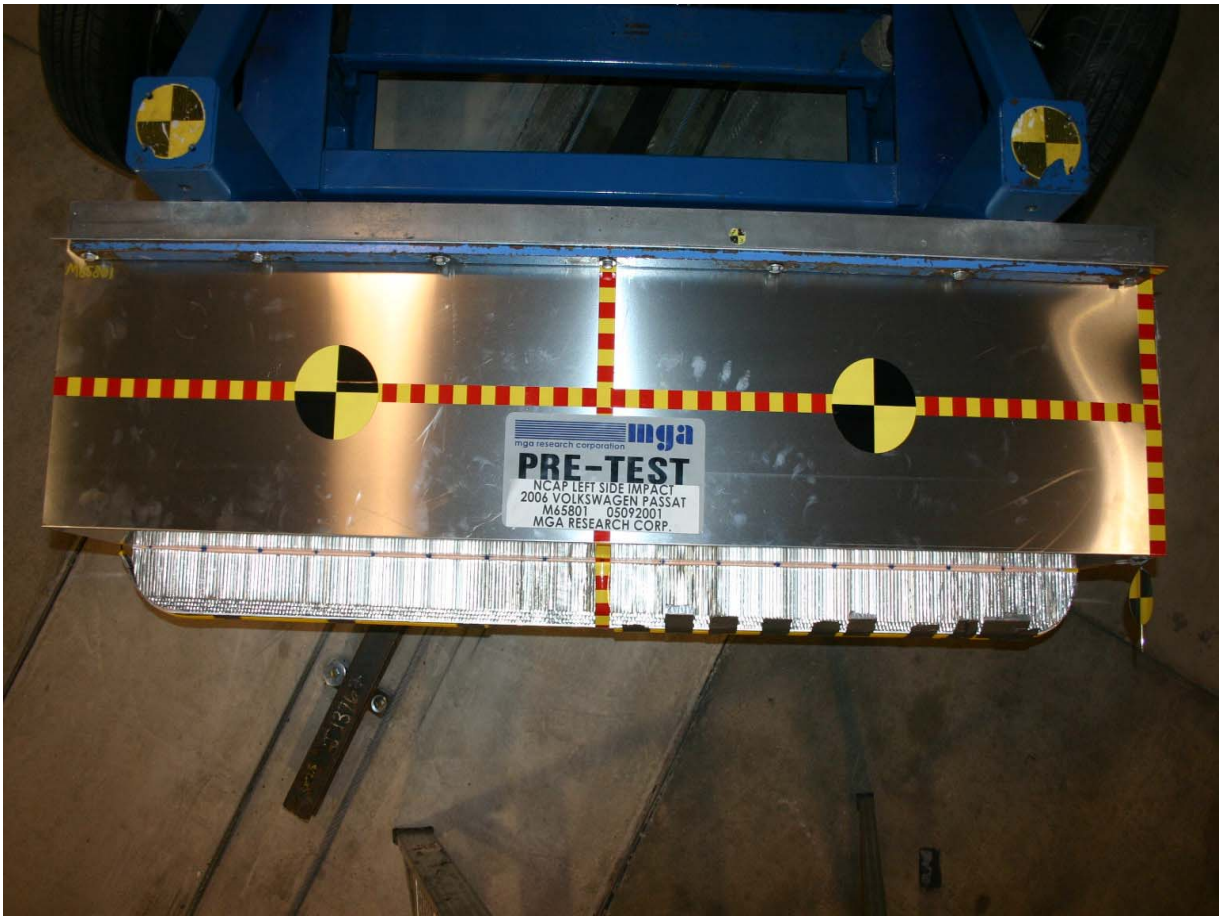
Post-Test Passenger Dummy Right Side View

Post-Test Rear Door Panel (Interior)



Pre-Test Front View of Deformable Barrier

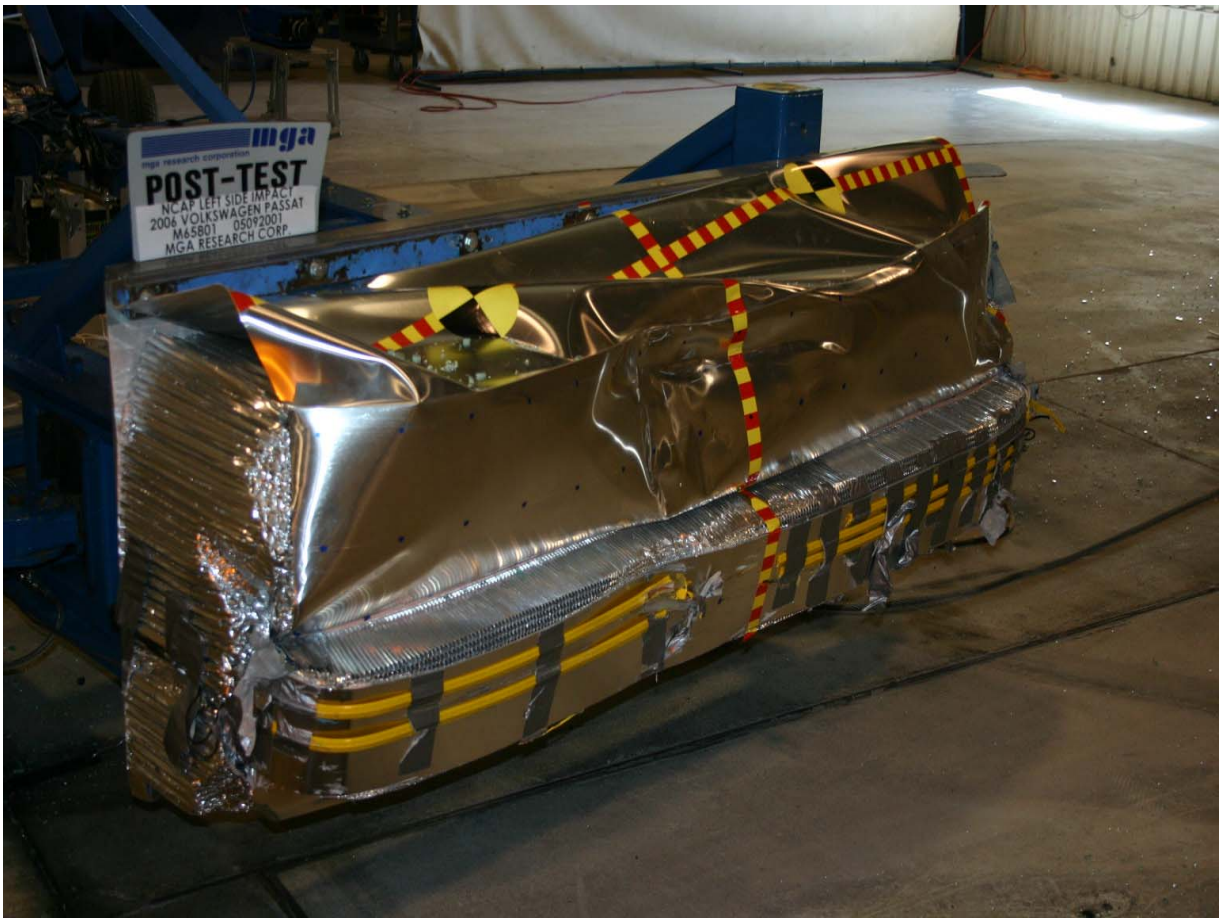
Post-Test Front View of Deformable Barrier



Pre-Test Top View of Deformable Barrier

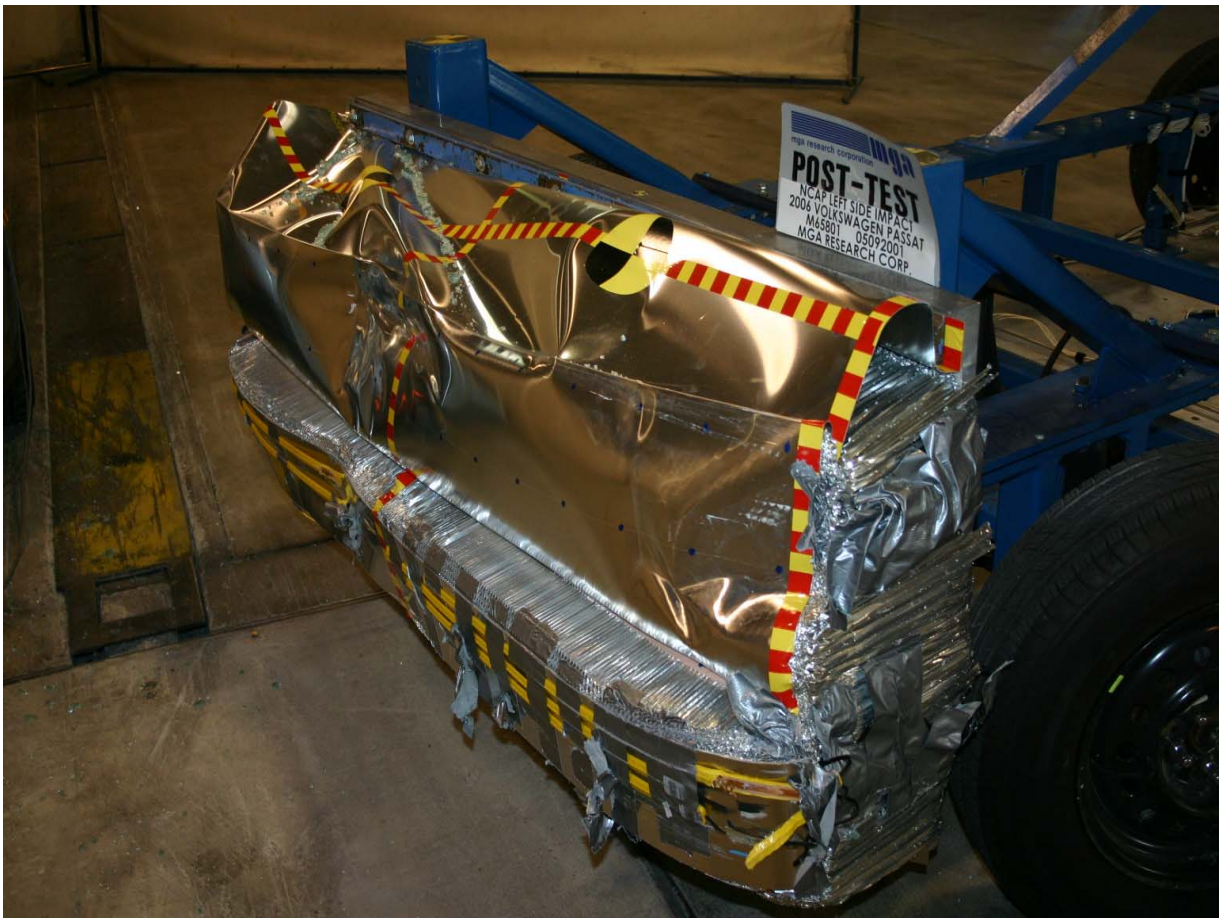
Post-Test Top View of Deformable Barrier

Pre-Test Right Side View of Deformable Barrier

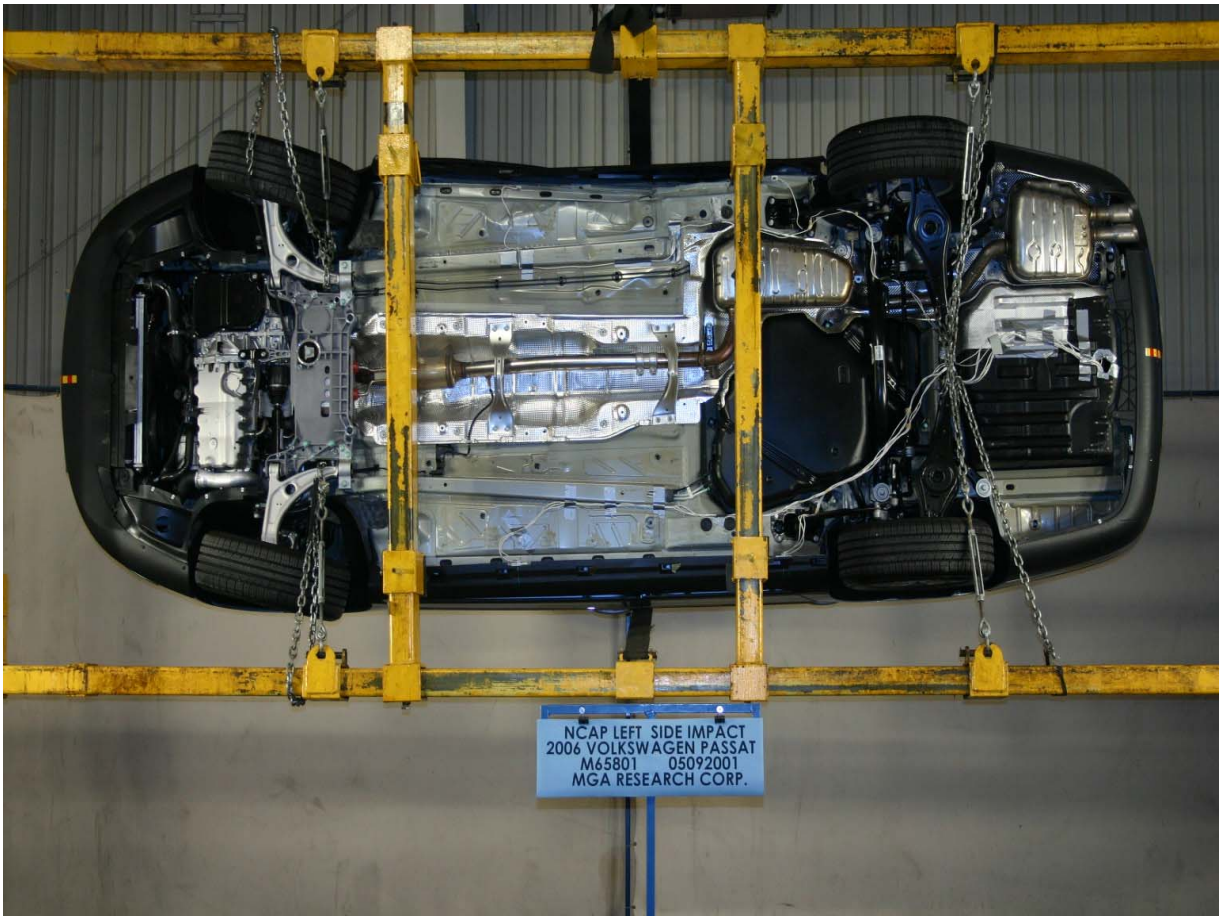


Post-Test Right Side View of Deformable Barrier

Pre-Test Left Side View of Deformable Barrier



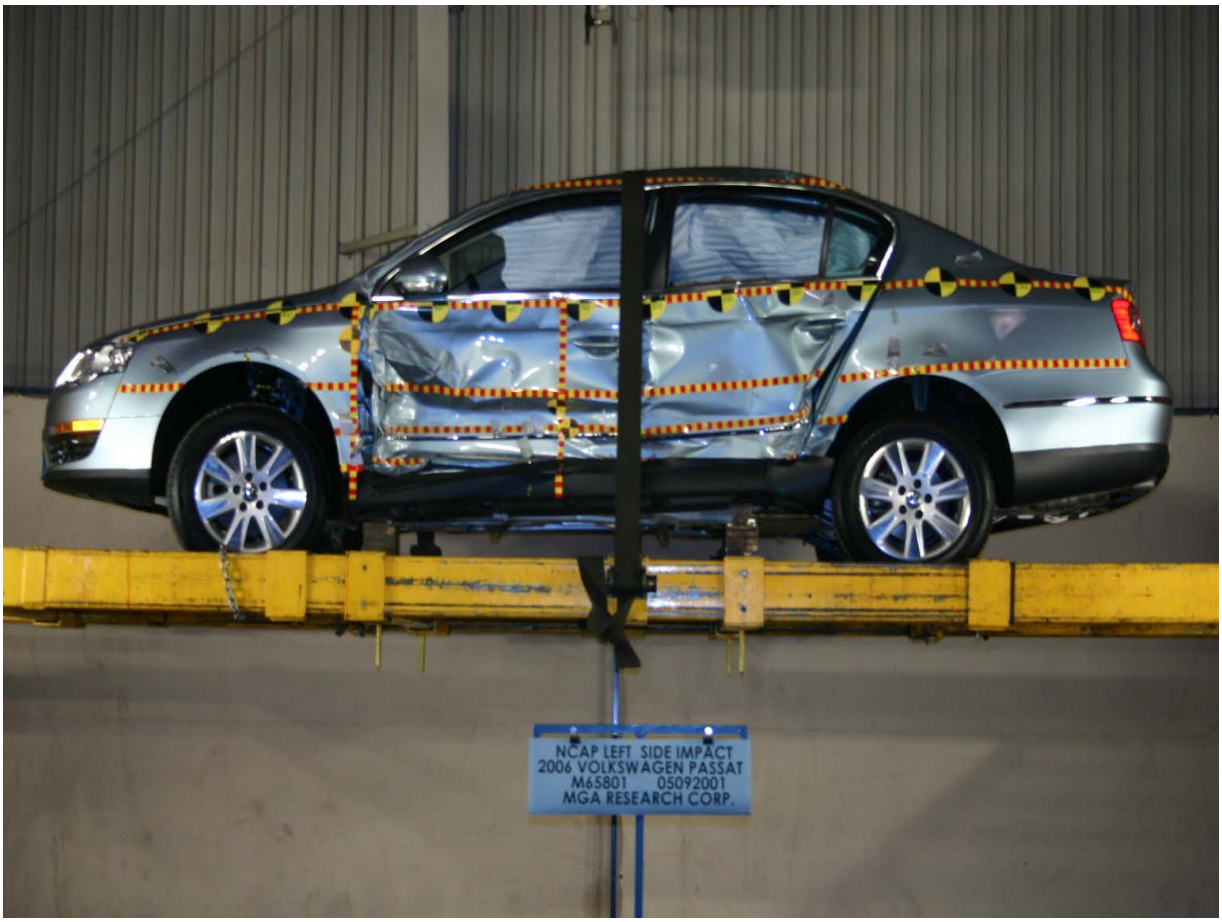
Post-Test Left Side View of Deformable Barrier



Vehicle on Rollover Device (90 Degrees)

Vehicle on Rollover Device (180 Degrees)

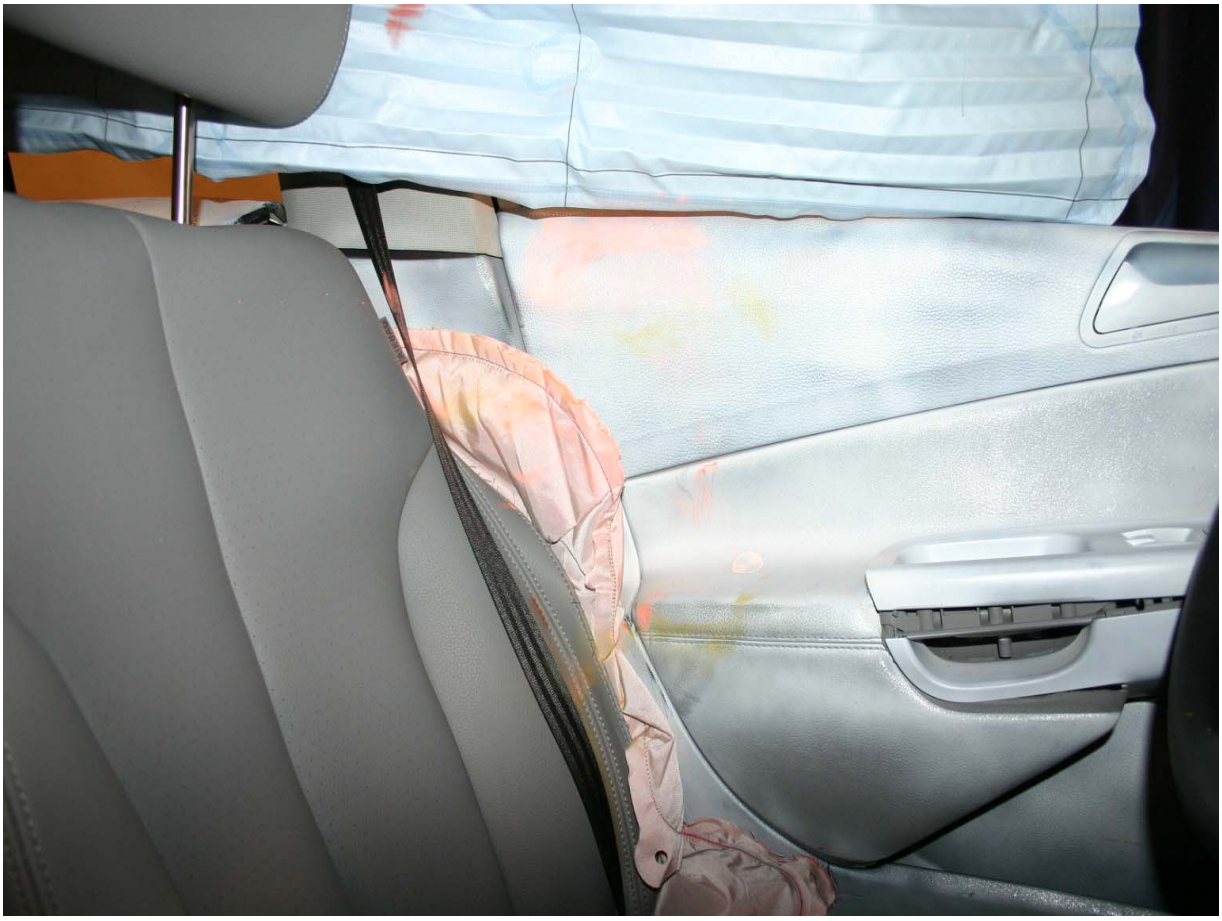
Vehicle on Rollover Device (270 Degrees)



Vehicle on Rollover Device (360 Degrees)

Vehicle Impact

Post-Test Driver Dummy Head Contact

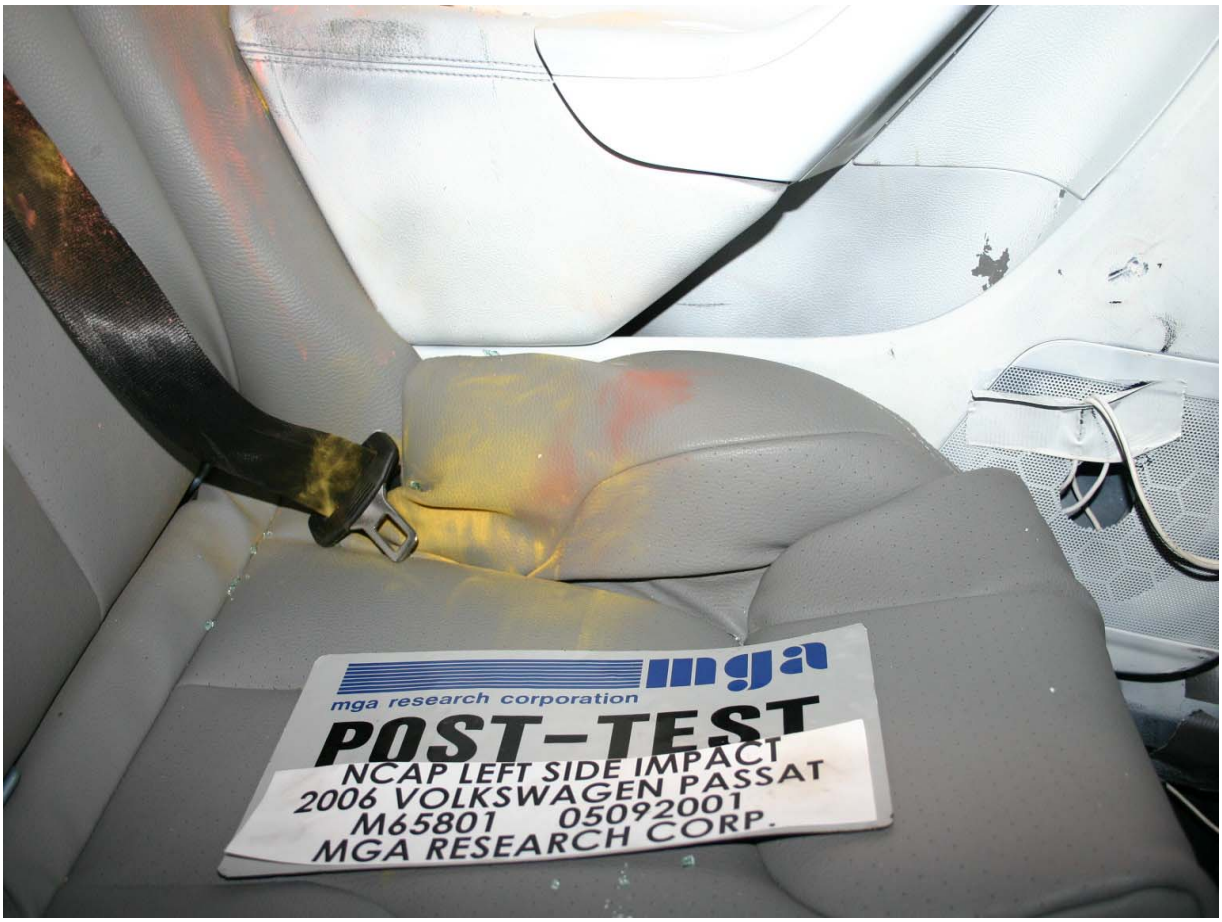


Post-Test Driver Dummy Upper Torso Contact

Post-Test Driver Dummy Lower Torso Contact

Post-Test Passenger Dummy Head Contact

Post-Test Passenger Dummy Upper Torso Contact



Post-Test Passenger Dummy Lower Torso Contact

APPENDIX B

SID/HIII RESPONSE DATA TRACES

TABLE OF DATA PLOTS

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 Left Front Door CL Y

Vehicle Right Rear Occupant Compartment

Vehicle Left Front Door Mid Rear Y

Vehicle Left Front Door Upper CL Y

Vehicle Left Rear Door Mid Rear Y

Vehicle Left Rear Door Upper CL Y

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 CG X

Vehicle CG Y

Vehicle CG Z

MDB CG X

MDB CG Y

MDB CG Z

MDB Rear X

MDB Rear Y

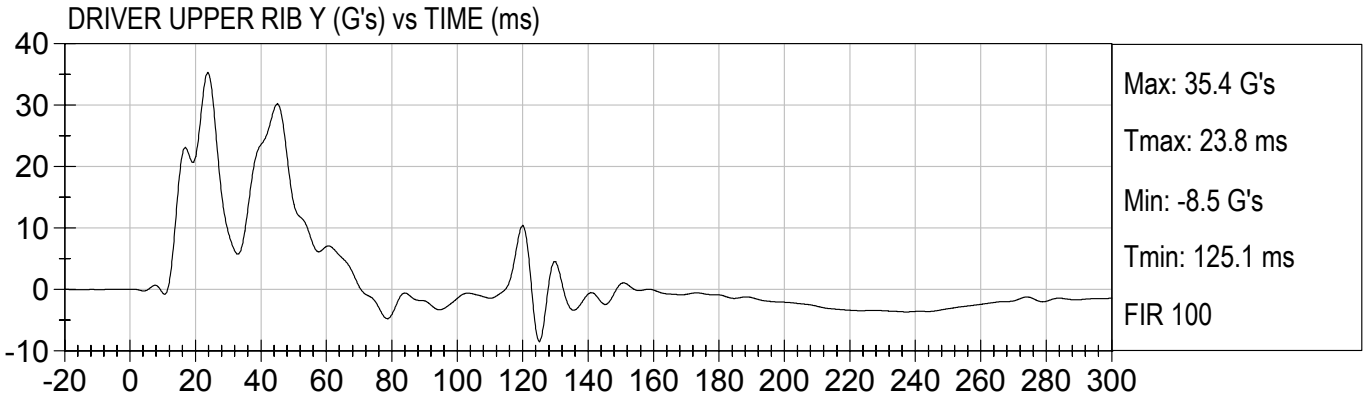
MDB Rear Z

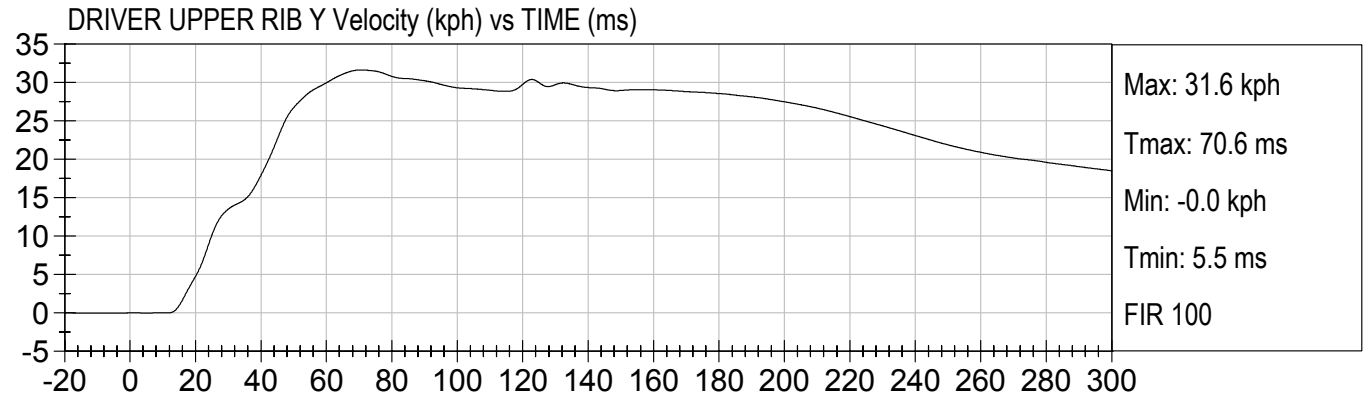
MDB Left Bumper Contact

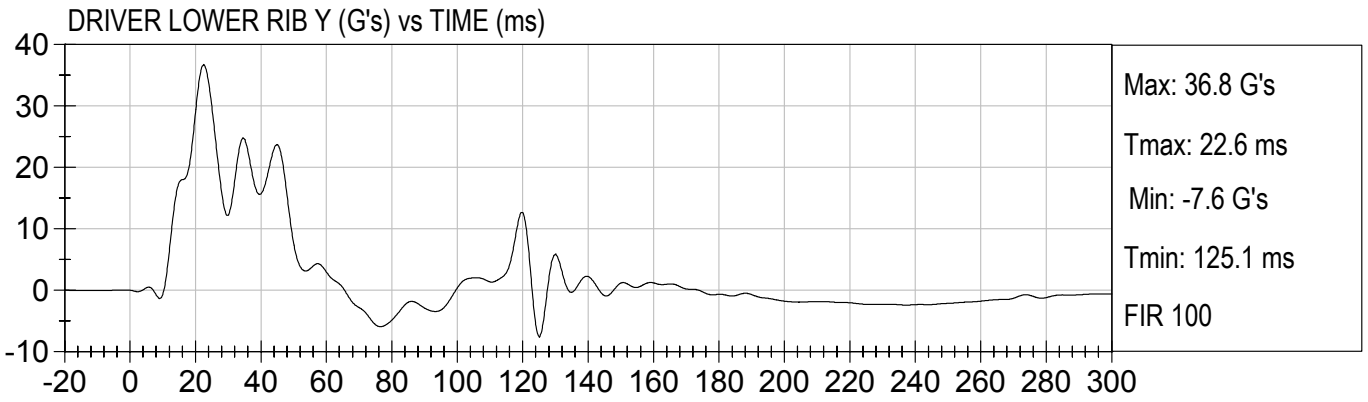
MDB Right Bumper Contact

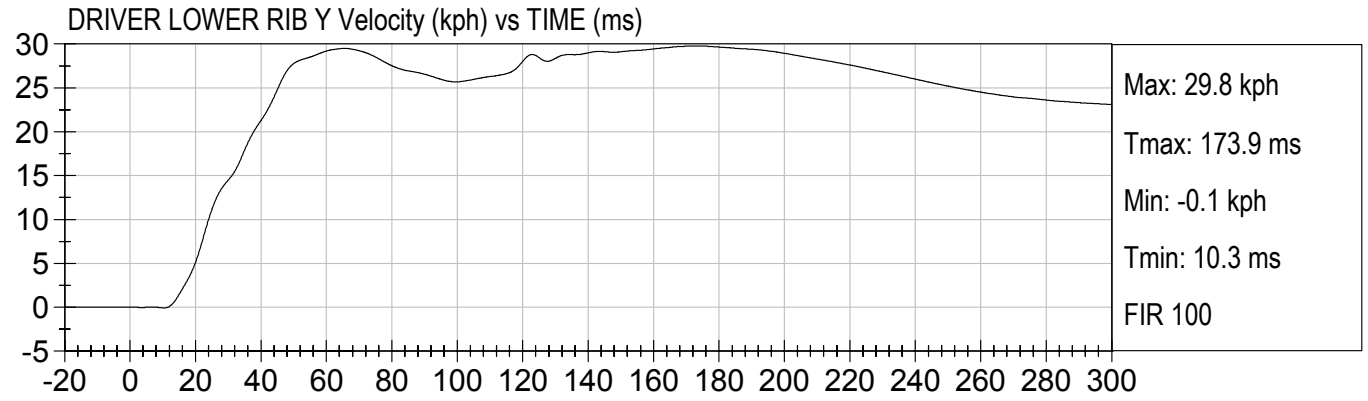
NCAP LEFT SIDE IMPACT
2006 VW PASSAT (M65801)

Test Date: 09/20/05
Speed: 38.4 mph (61.8 km/h)





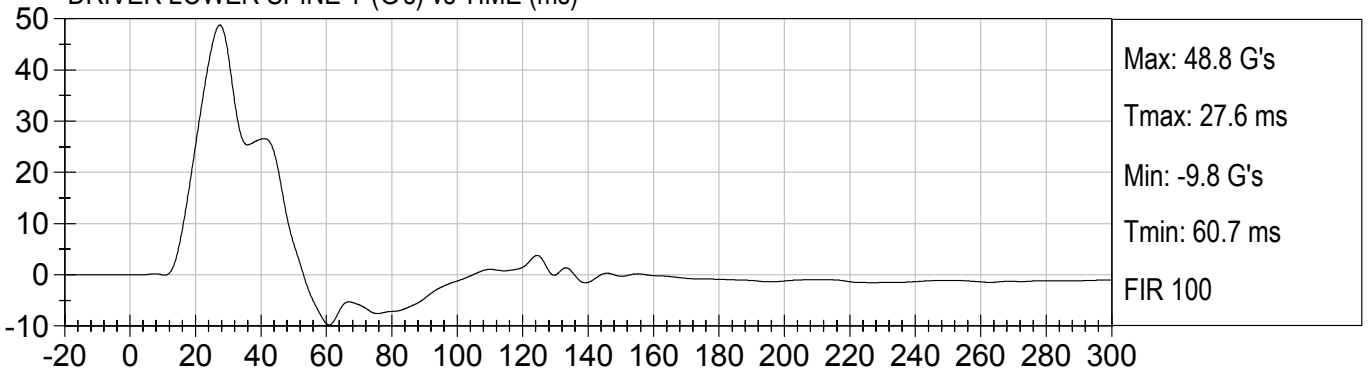




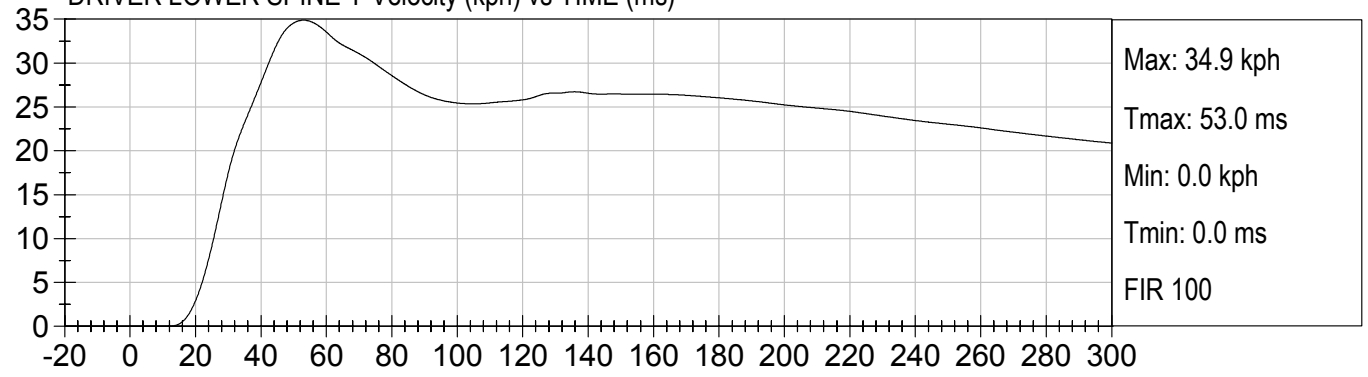
NCAP LEFT SIDE IMPACT
2006 VW PASSAT (M65801)

Test Date: 09/20/05
Speed: 38.4 mph (61.8 km/h)

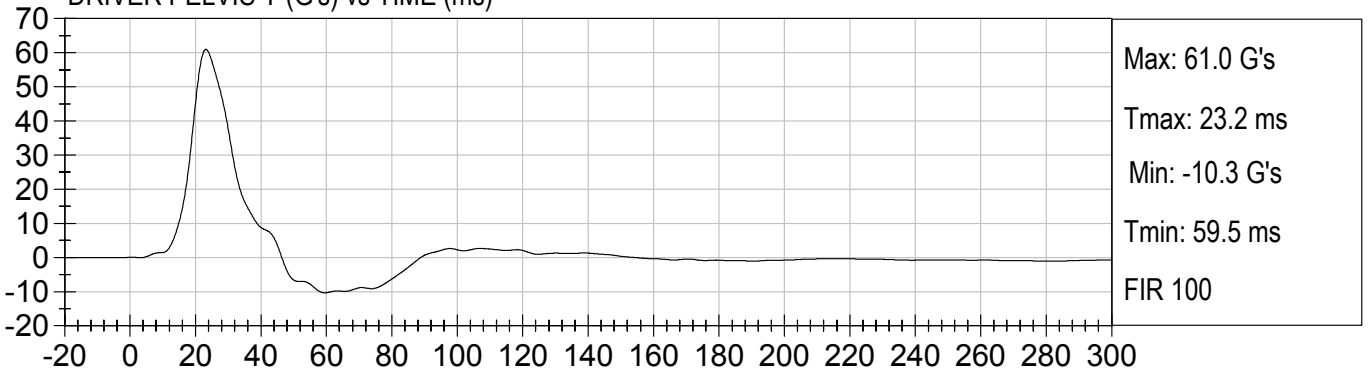
DRIVER LOWER SPINE Y (G's) vs TIME (ms)



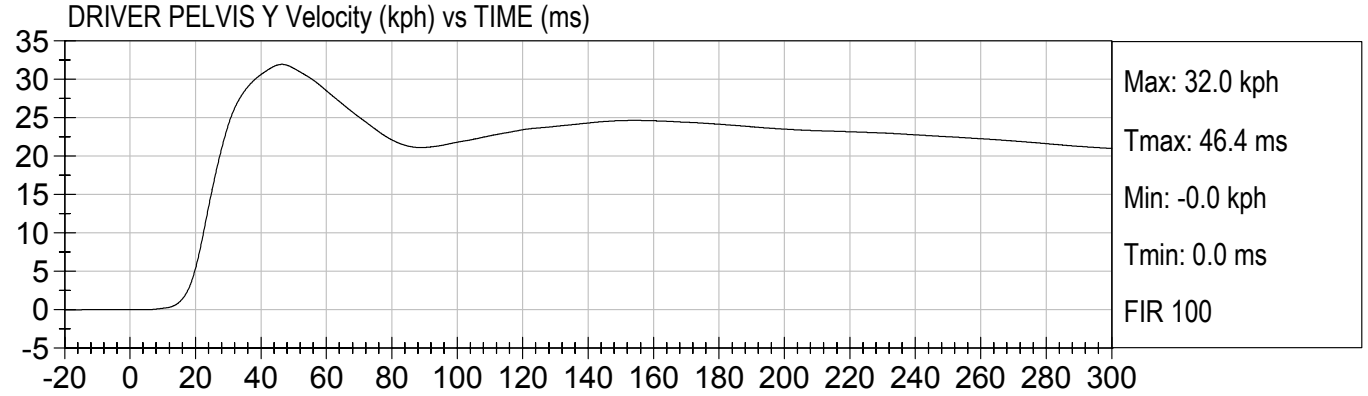
DRIVER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



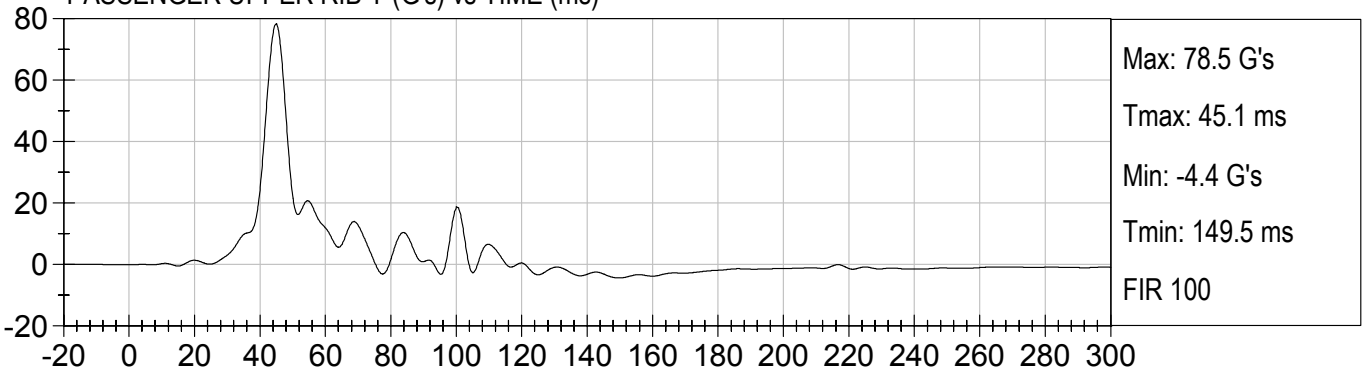
DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



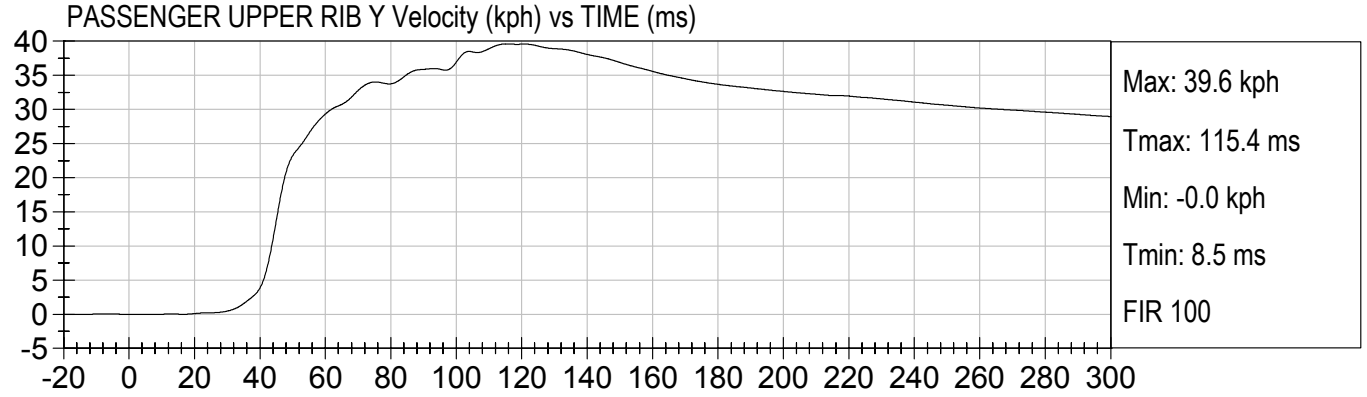
NCAP LEFT SIDE IMPACT
2006 VW PASSAT (M65801)

Test Date: 09/20/05
Speed: 38.4 mph (61.8 km/h)

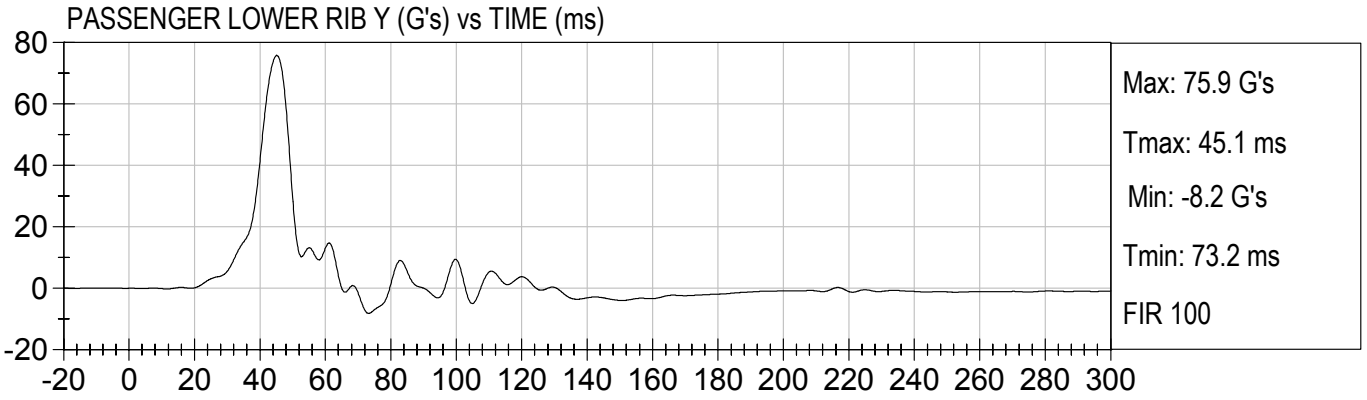
PASSENGER UPPER RIB Y (G's) vs TIME (ms)



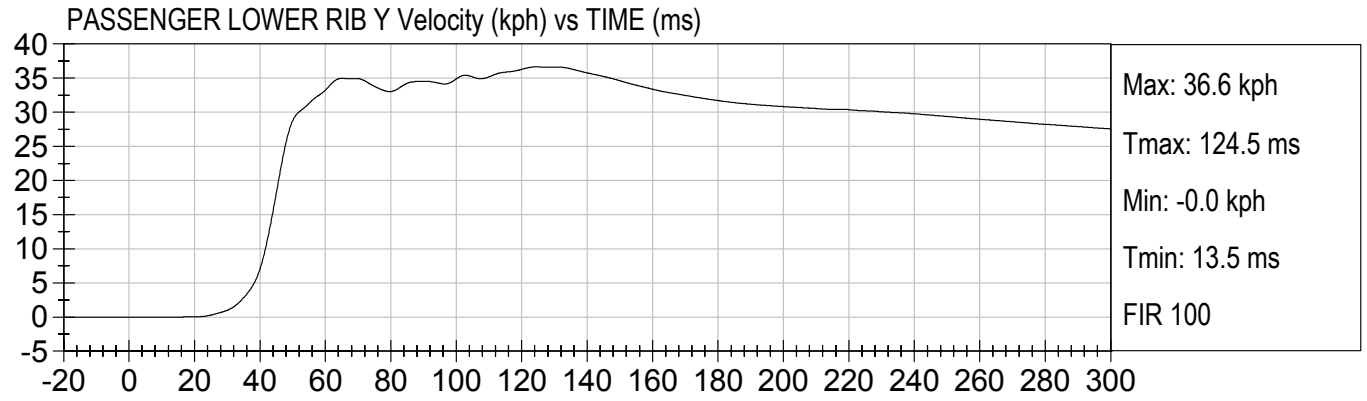
PASSENGER UPPER RIB Y Velocity (kph) vs TIME (ms)



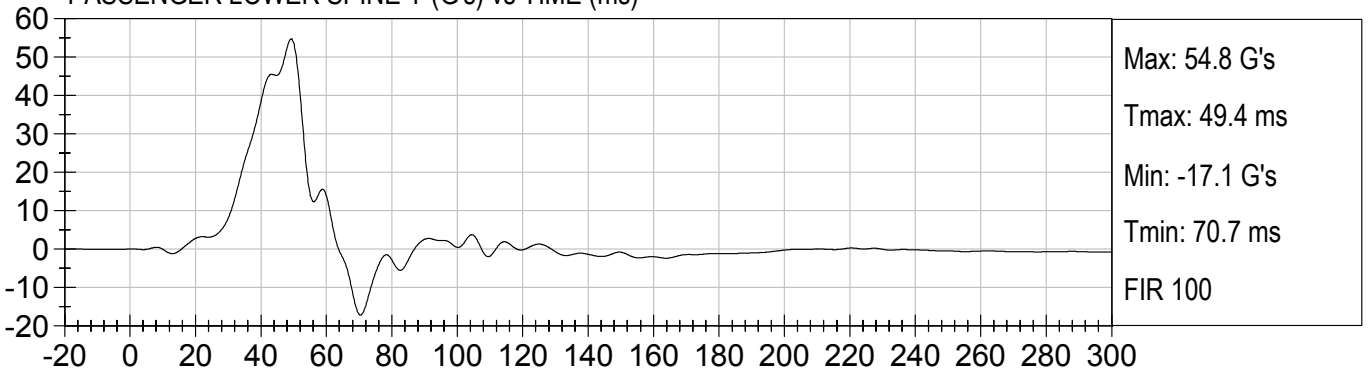
PASSENGER LOWER RIB Y (G's) vs TIME (ms)



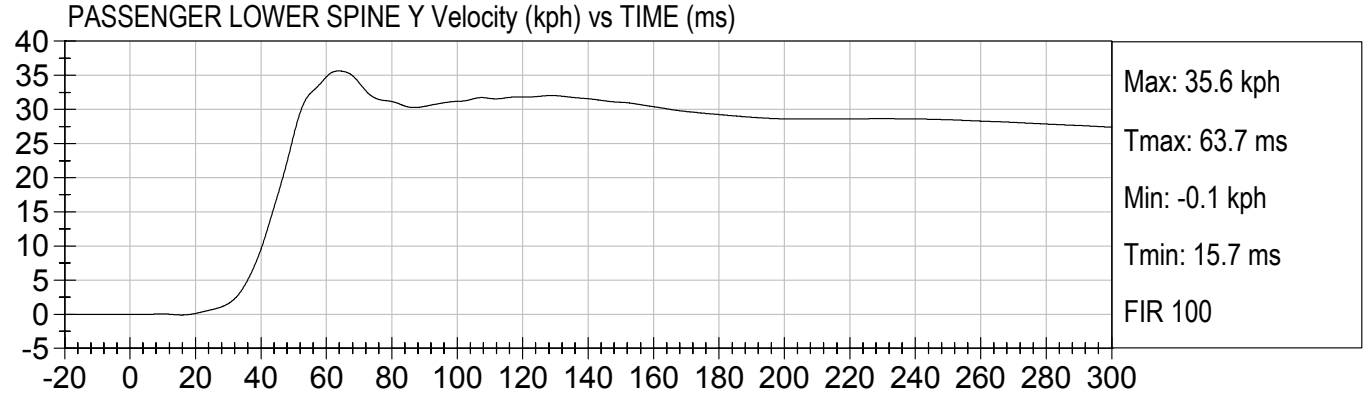
PASSENGER LOWER RIB Y Velocity (kph) vs TIME (ms)



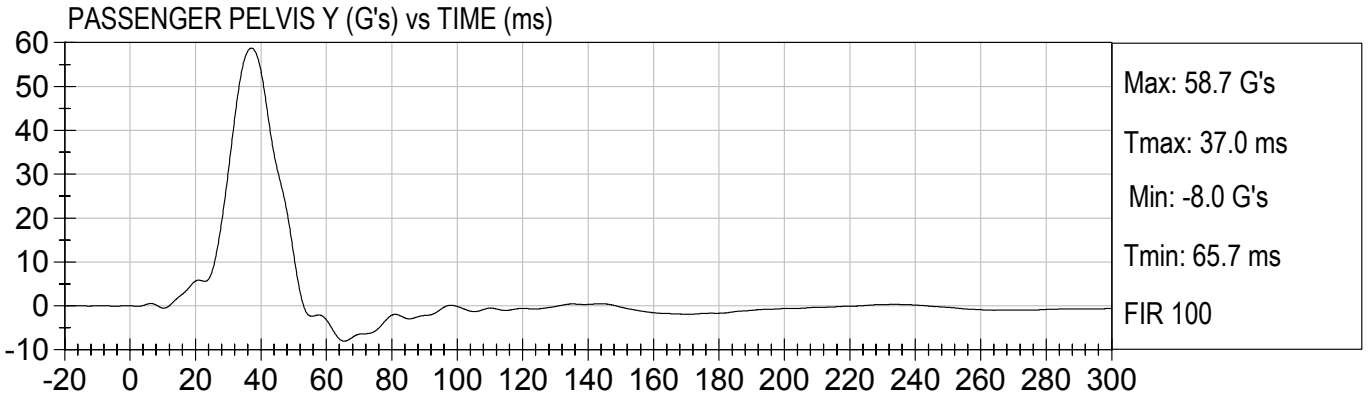
PASSENGER LOWER SPINE Y (G's) vs TIME (ms)



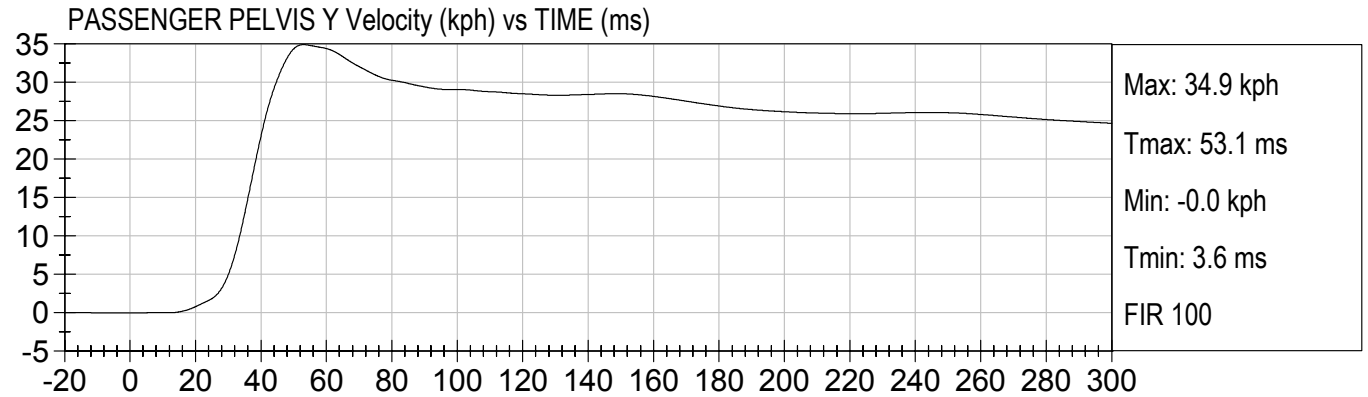
PASSENGER LOWER SPINE Y Velocity (kph) vs TIME (ms)



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



PASSENGER PELVIS 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:** D05234

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 Hall
Laboratory Technician

08/23/2005
Test Date

David Winkelbauer
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D052541

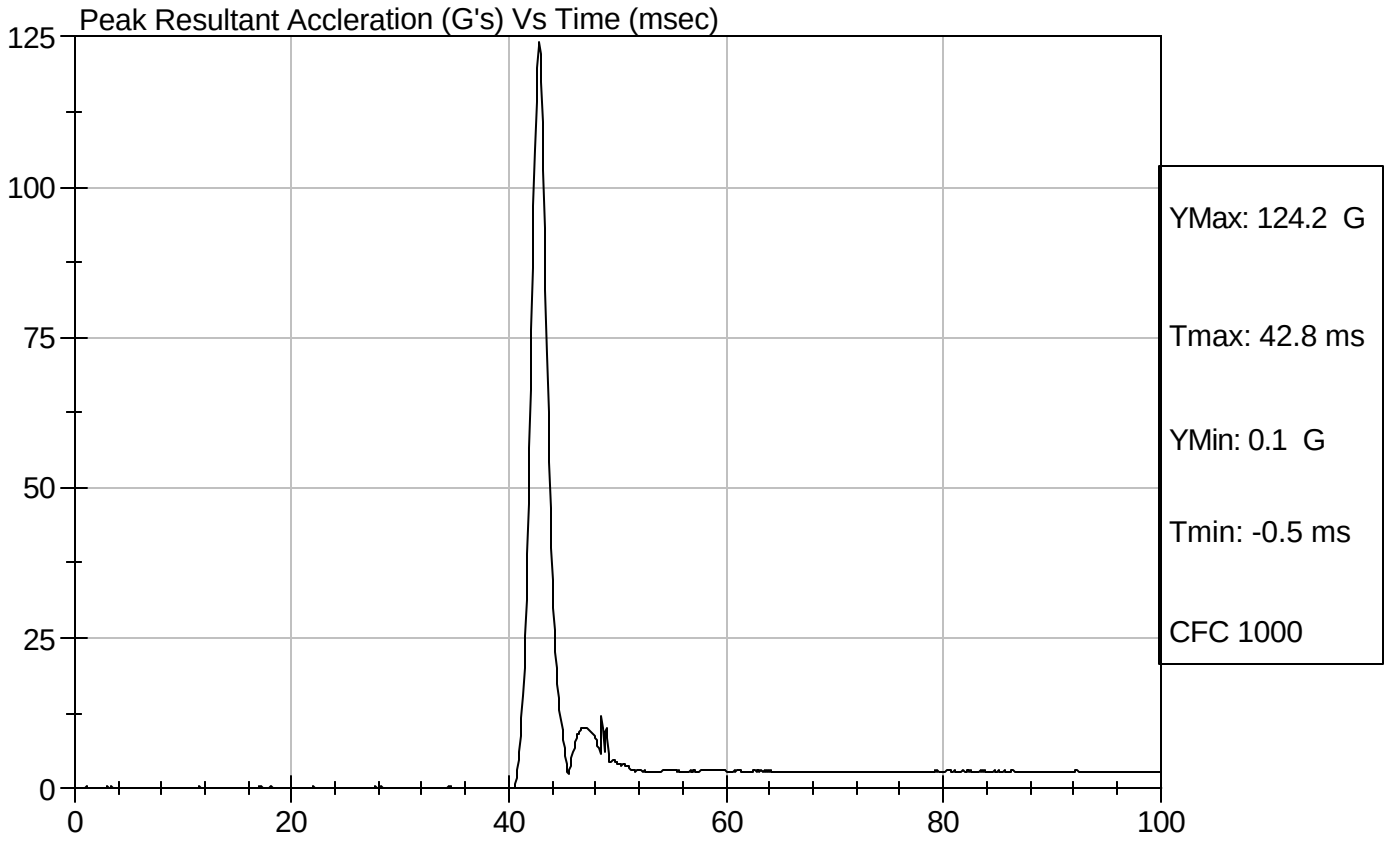
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	120 to 150	124	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
		Overall Test Results		Pass

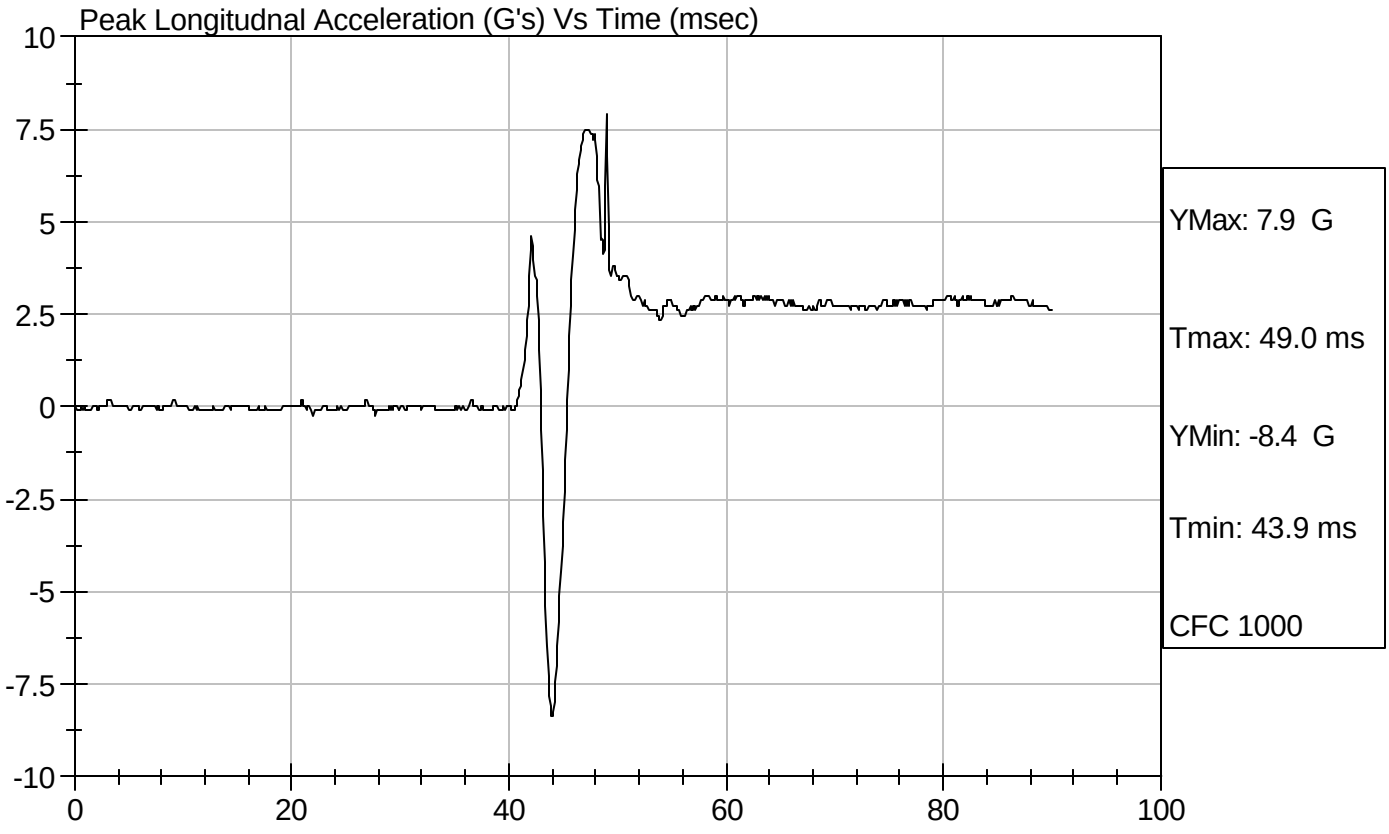
Jessica Hall
Laboratory Technician

09/14/2005
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/14/2005
	Component: D052541	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 271 **Test I.D:** D052542

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Probe Velocity	m/s	4.22 - 4.31	4.26	Pass
Upper Rib	G's	37 - 46	43	Pass
Lower Rib	G's	37 - 46	44	Pass
Lower Spine	G's	15 - 22	20	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

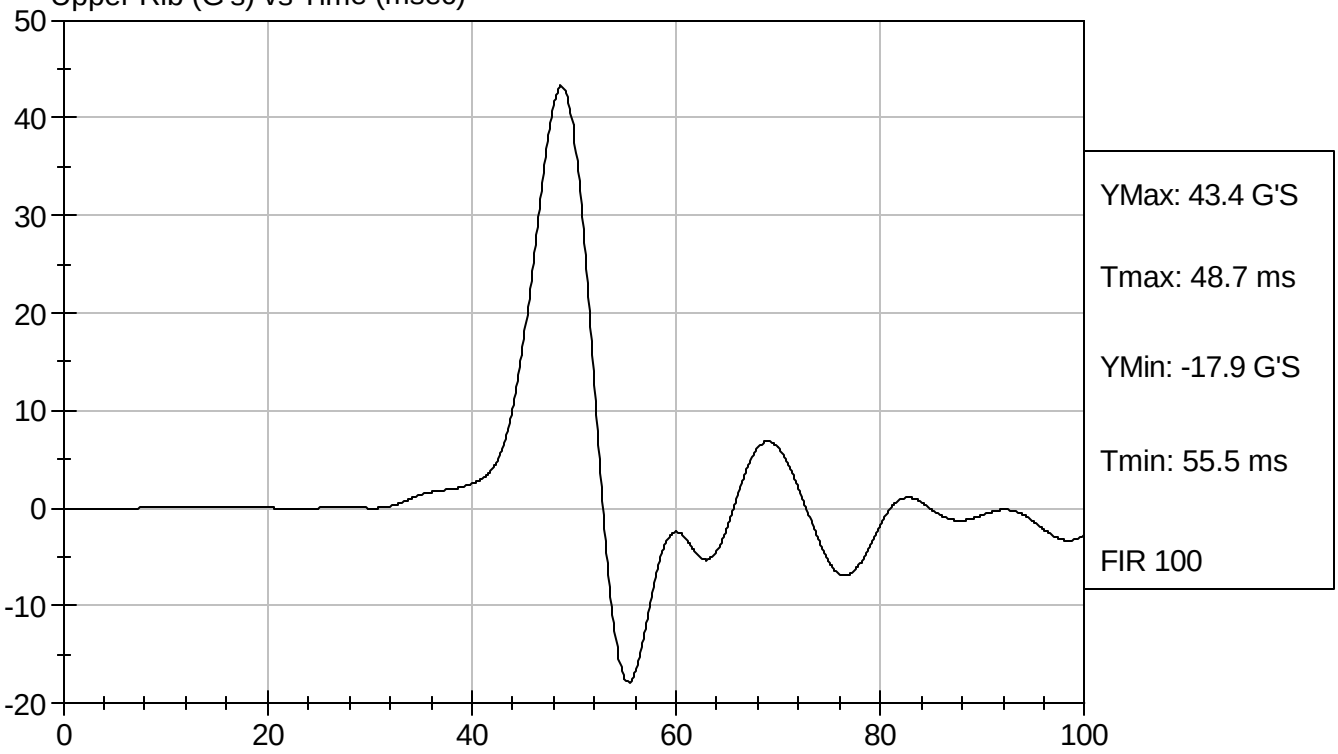
09/16/2005
Test Date

David Winkelbauer
Approved By

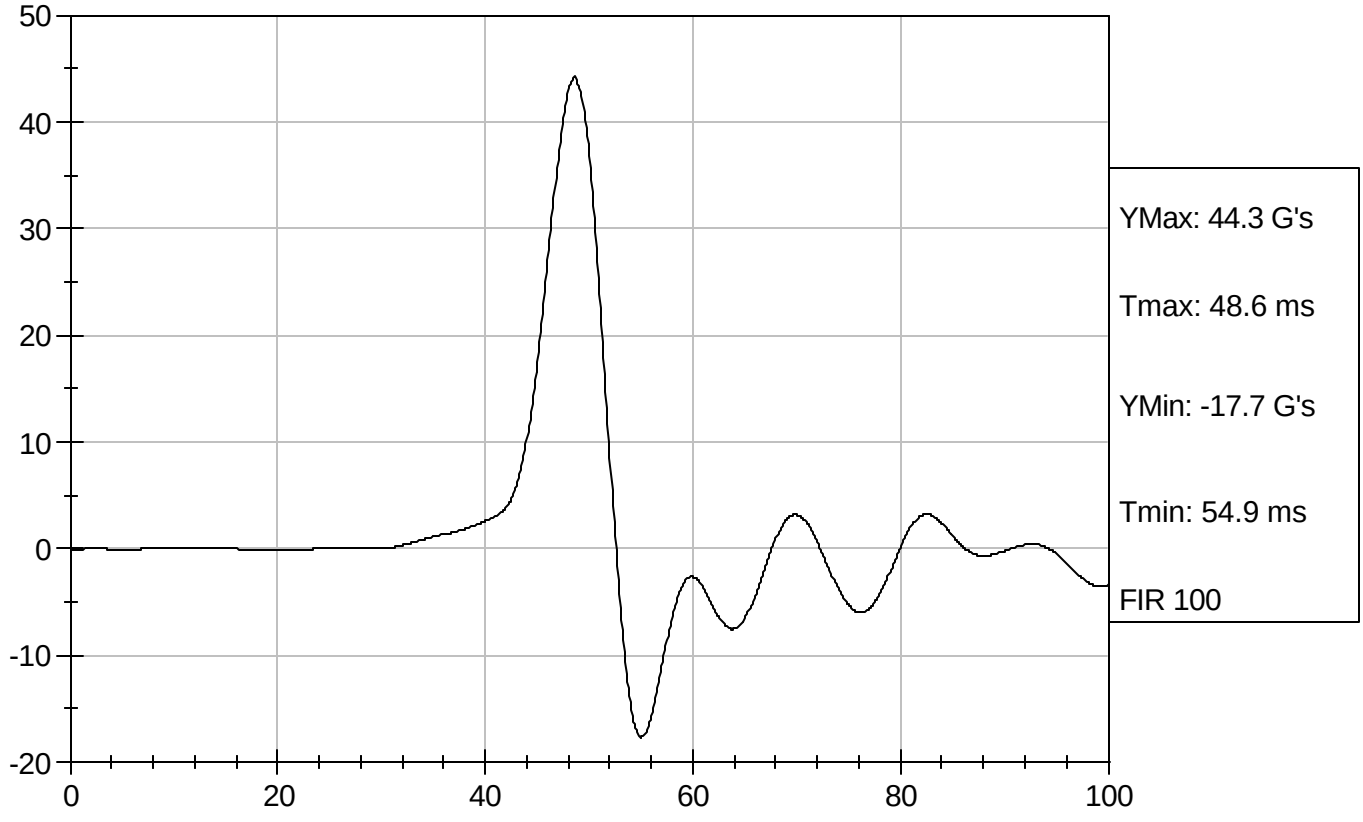
Test Desc: Thorax Impact
Component ID: D052542

Test Date: 09/16/2005
Speed: 13.99 ft/sec, 4.26 m/sec

Upper Rib (G's) vs Time (msec)

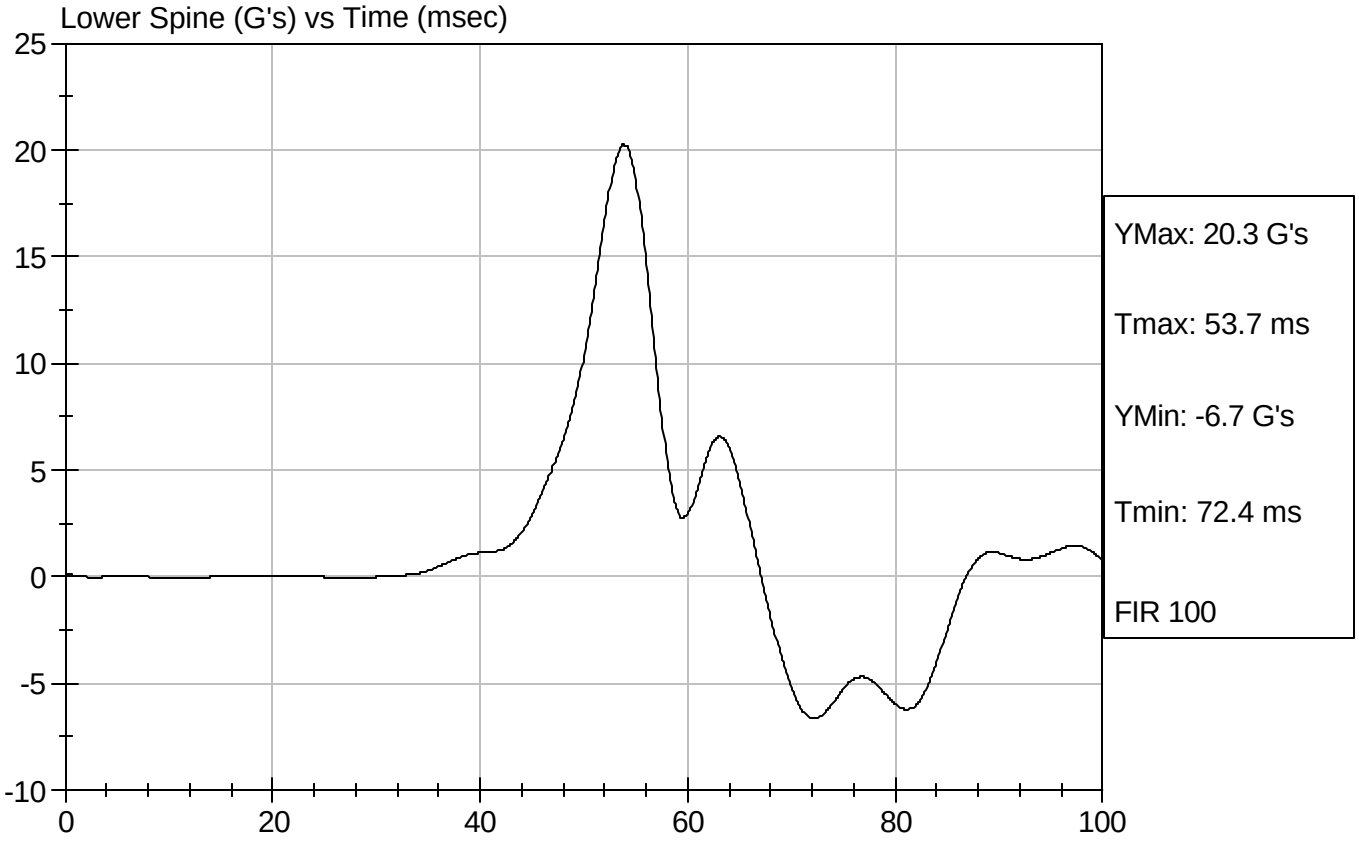


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D052542

Test Date: 09/16/2005
Speed: 13.99 ft/sec, 4.26 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D052543

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	47	Pass
Probe Velocity	m/s	4.27 - 4.33	4.30	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
		Overall Test Results		Pass

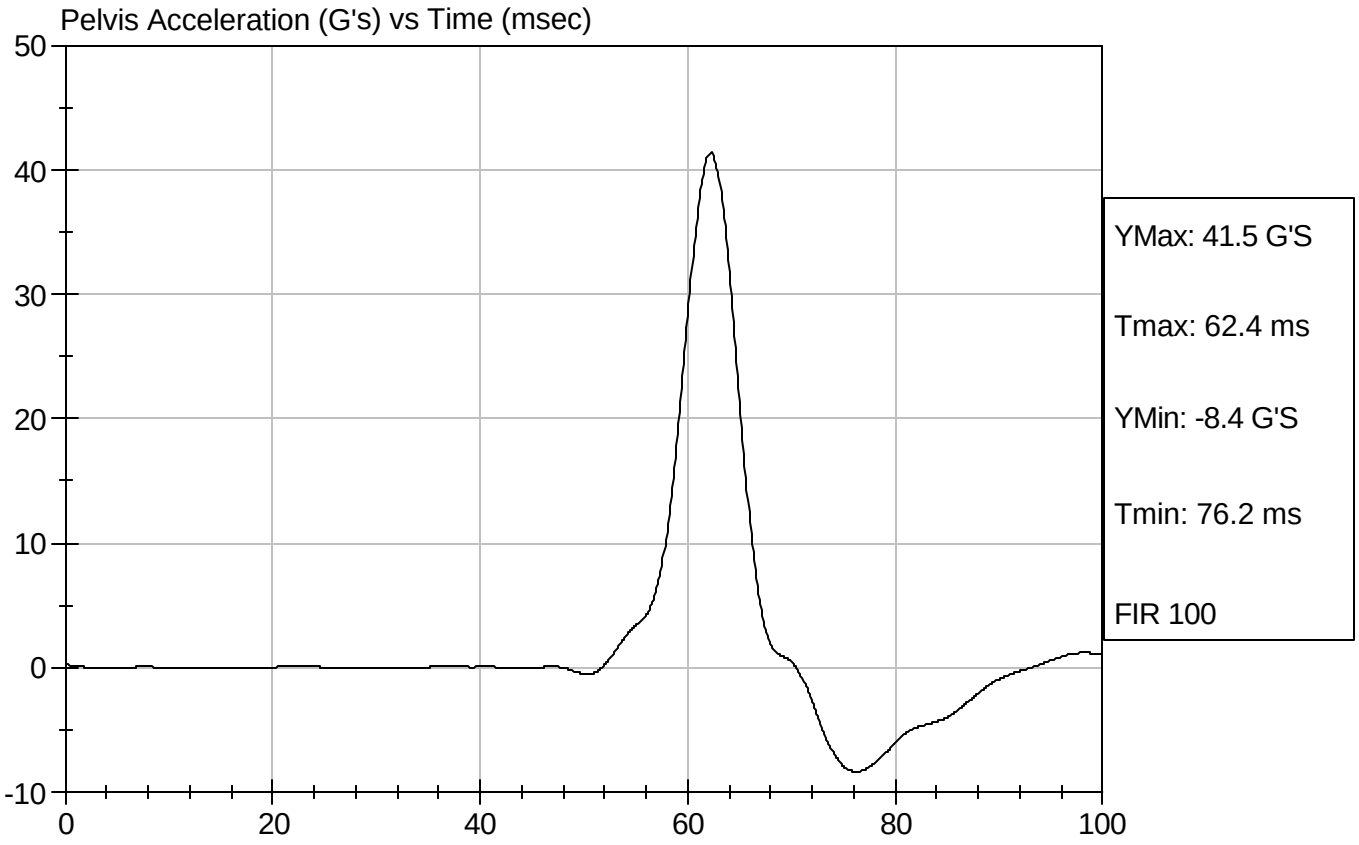
Jessica Hall
Laboratory Technician

09/19/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D052543

Test Date: 09/19/2005
Speed: 14.12 ft/sec, 4.30 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D052544

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Force At 12.7 mm	N	104 -162	145	Pass
Force At 19 mm	N	163 - 222	201	Pass
Force At 25.4 mm	N	222 - 280	274	Pass
Force At 33 mm	N	325 - 391	367	Pass
		Overall Test Results		Pass

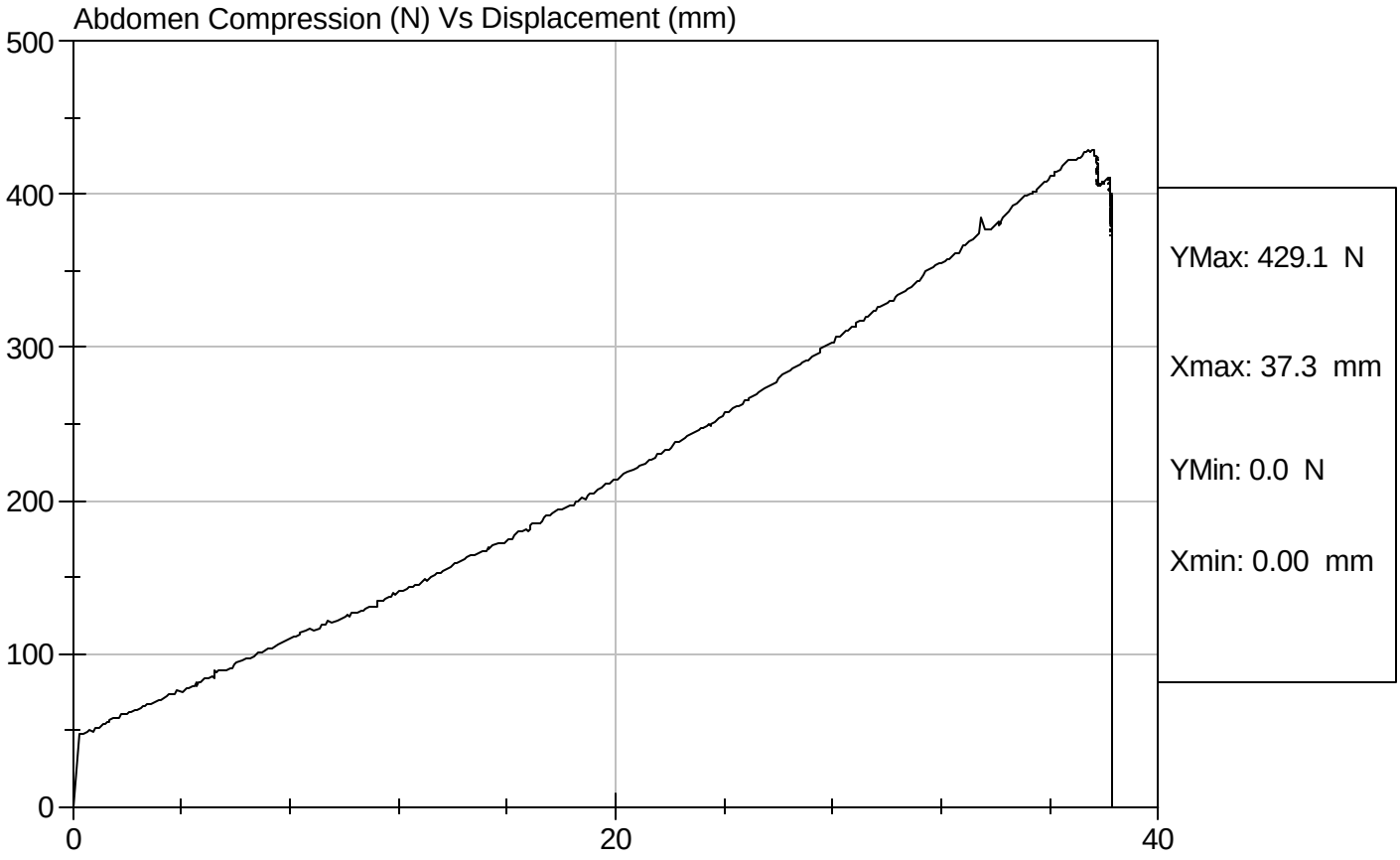
Jessica Hall
Laboratory Technician

09/15/2005
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/15/2005

Component: D052544 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D052545

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	149.5	Pass
Force At 30 deg	N	151.2 - 204.6	188.3	Pass
Force At 40 deg	N	204.6 - 258.0	234.9	Pass
Return Angle	Deg	12 Maximum	2	Pass
		Overall Test Results		Pass

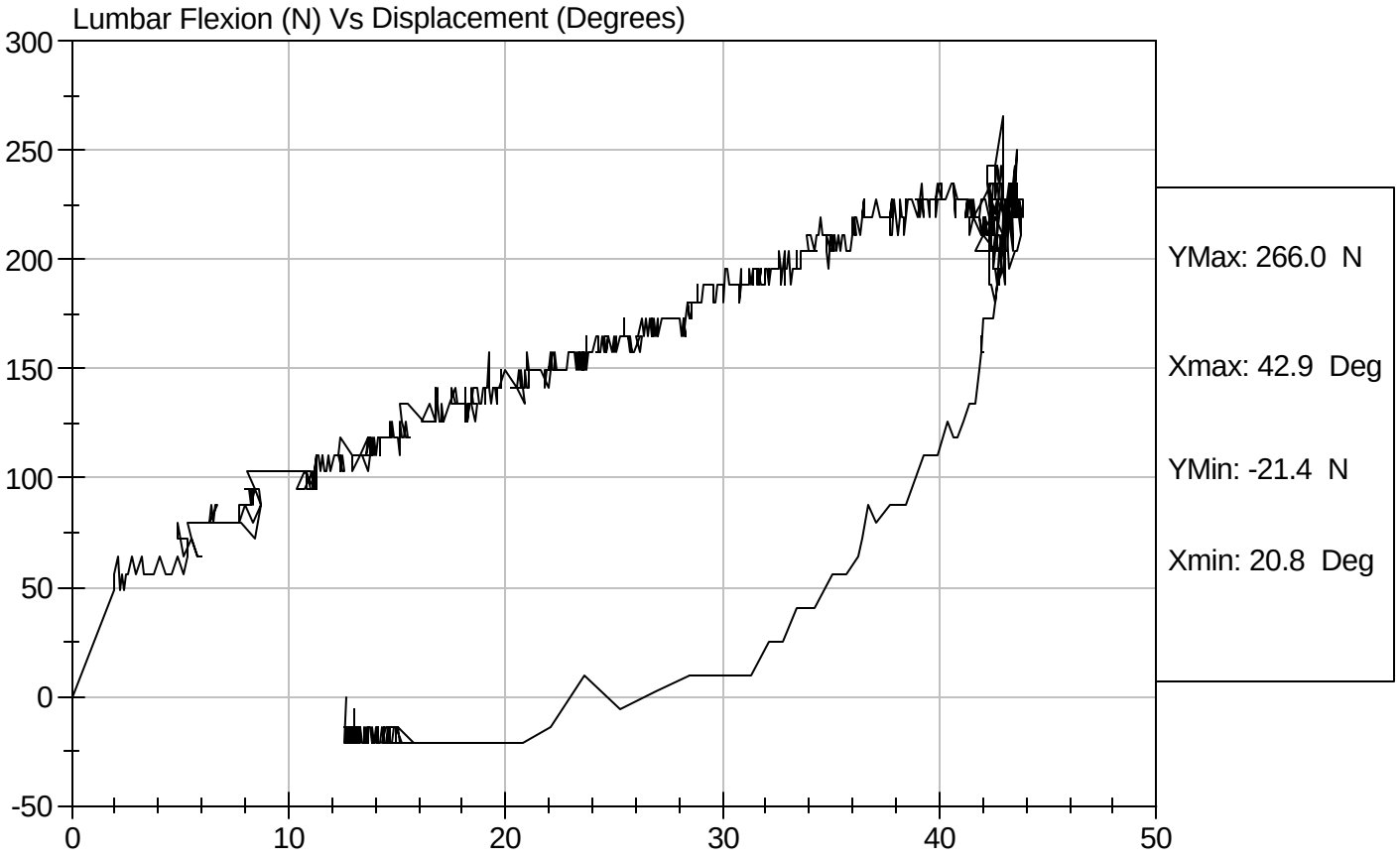
Jessica Hall
Laboratory Technician

09/15/2005
Test Date

David Winkelbauer
Approved By

Test Description: Lumbar Flexion | Test Date: 09/15/2005

Component: D052545 | Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D052549

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	39	Pass
Impact Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.33	Pass
	20 msec	m/s	4.12 to 5.10	4.60	Pass
	30 msec	m/s	5.73 to 7.01	6.41	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.24	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	74	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	78	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	61	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	12	Pass

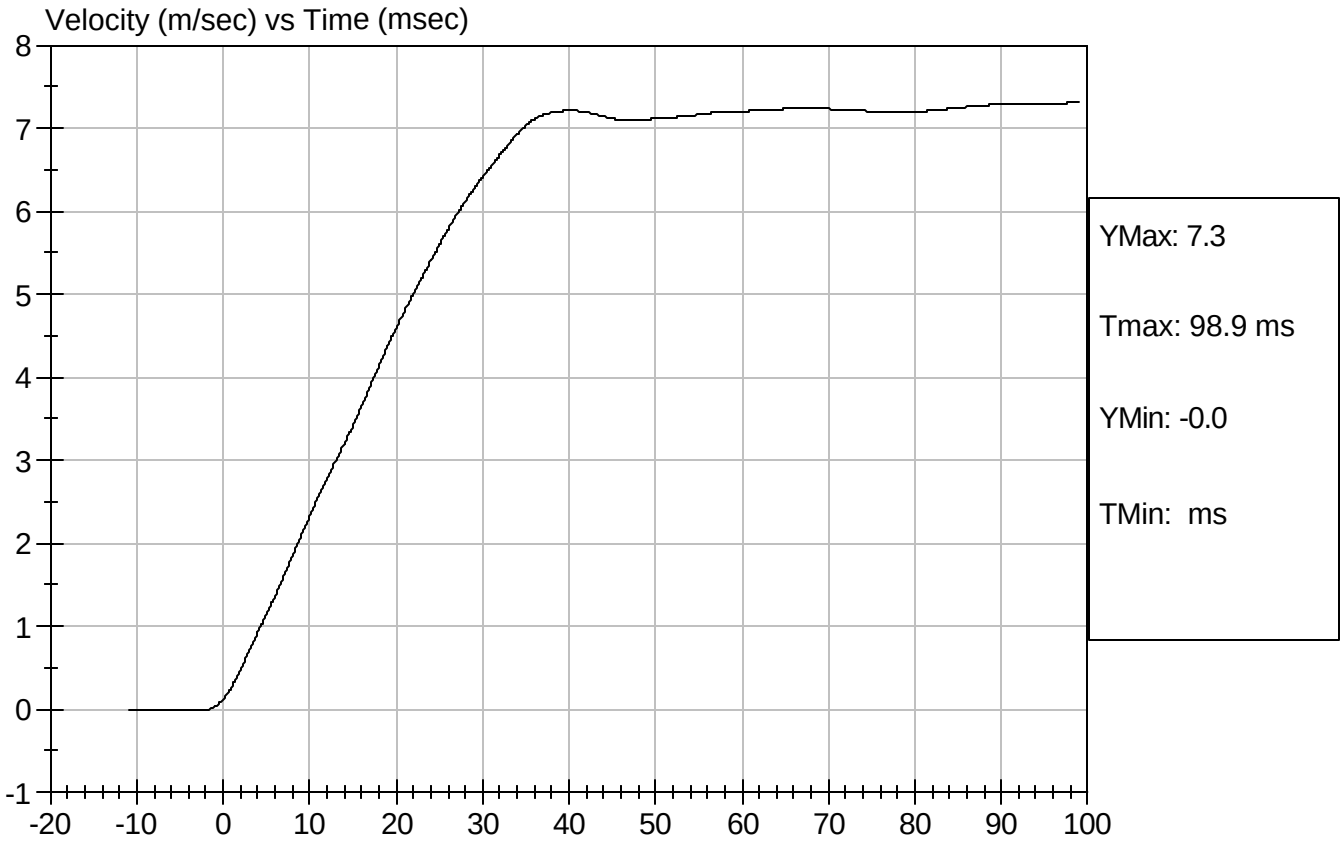
Jessica Hall
Laboratory Technician

09/15/2005
Test Date

David Winkelbauer
Approved By

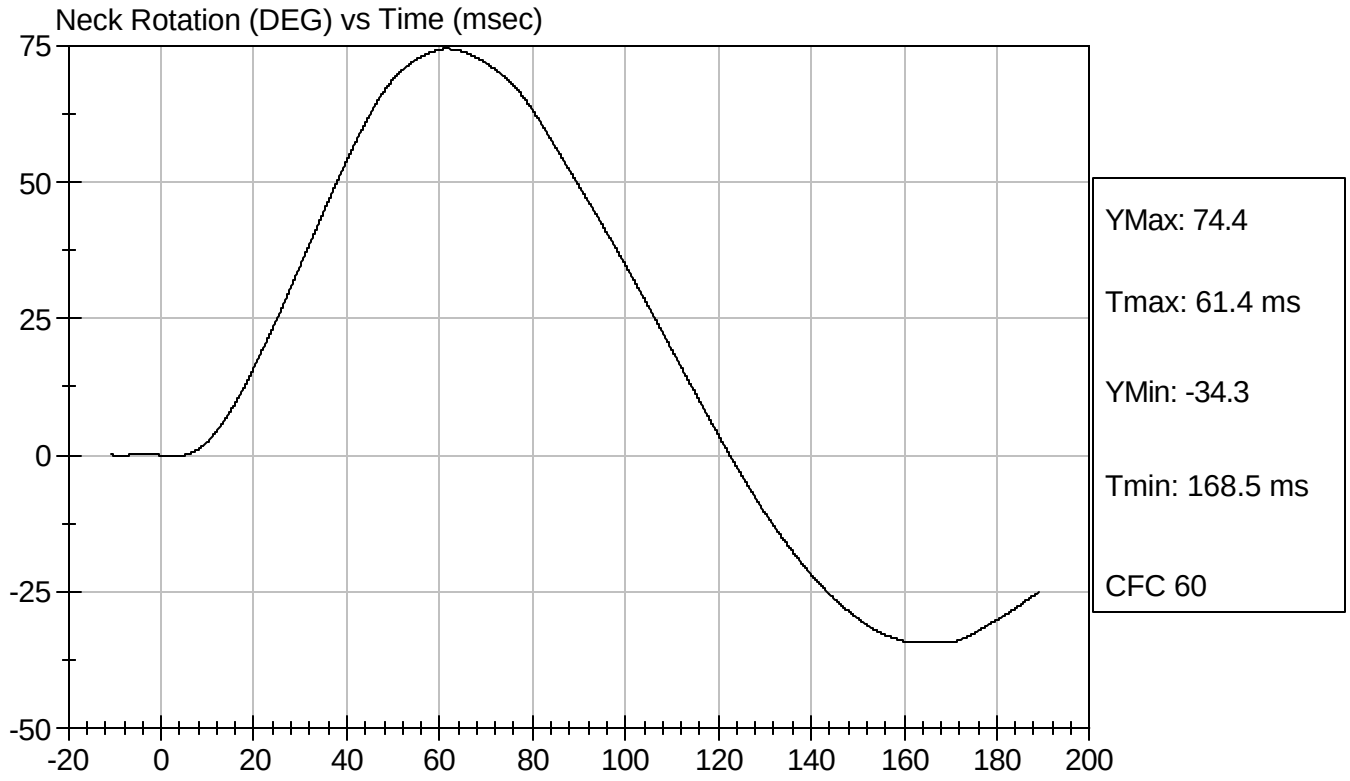
Test Desc: Neck Bending
Component ID: D052549

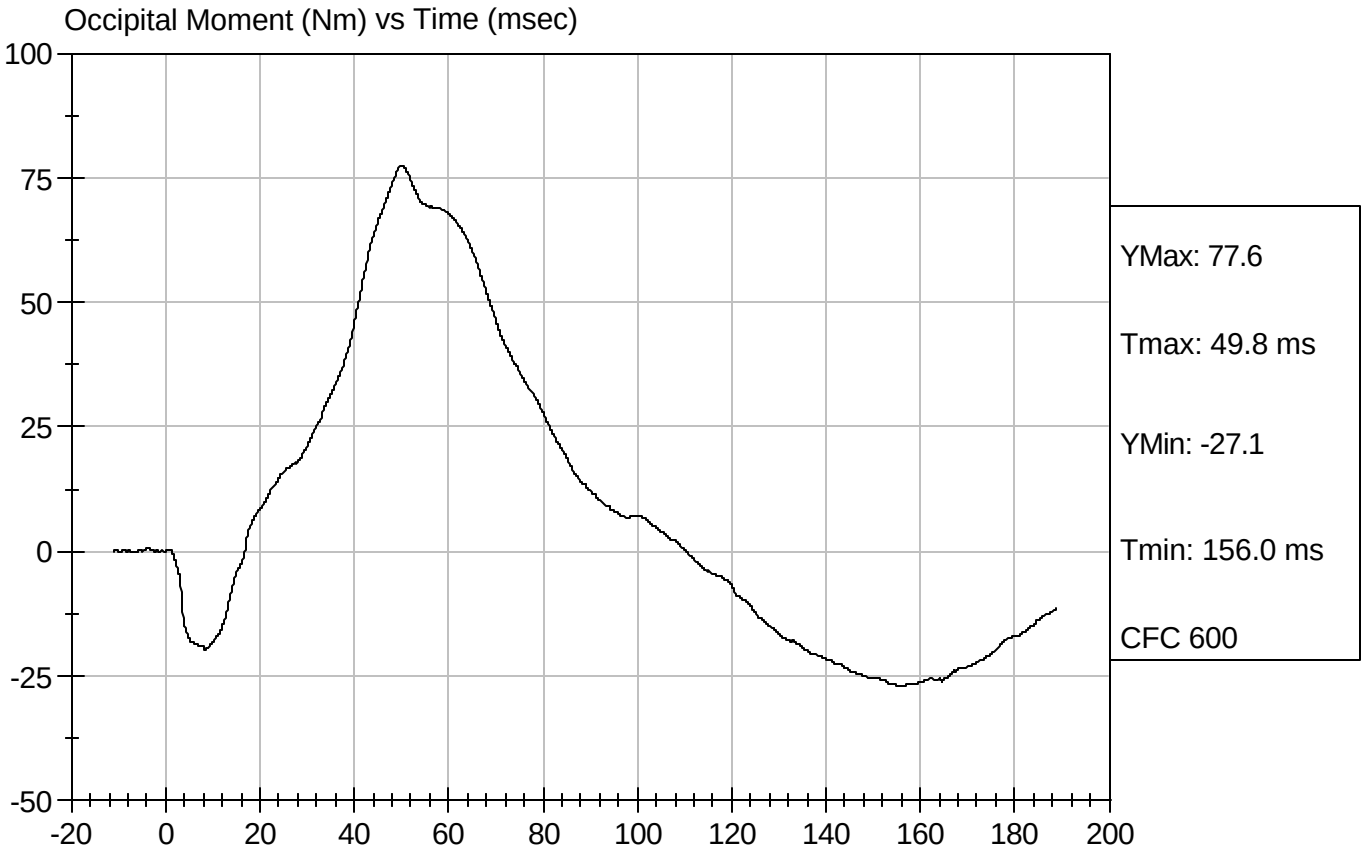
Test Date: 09/15/2005
Speed: 23.21 ft/sec, 7.07 m/sec



Test Desc: Neck Bending
Component ID: D052549

Test Date: 09/15/2005
Speed: 23.21 ft/sec, 7.07 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 Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 271 **Test I.D:** D052581

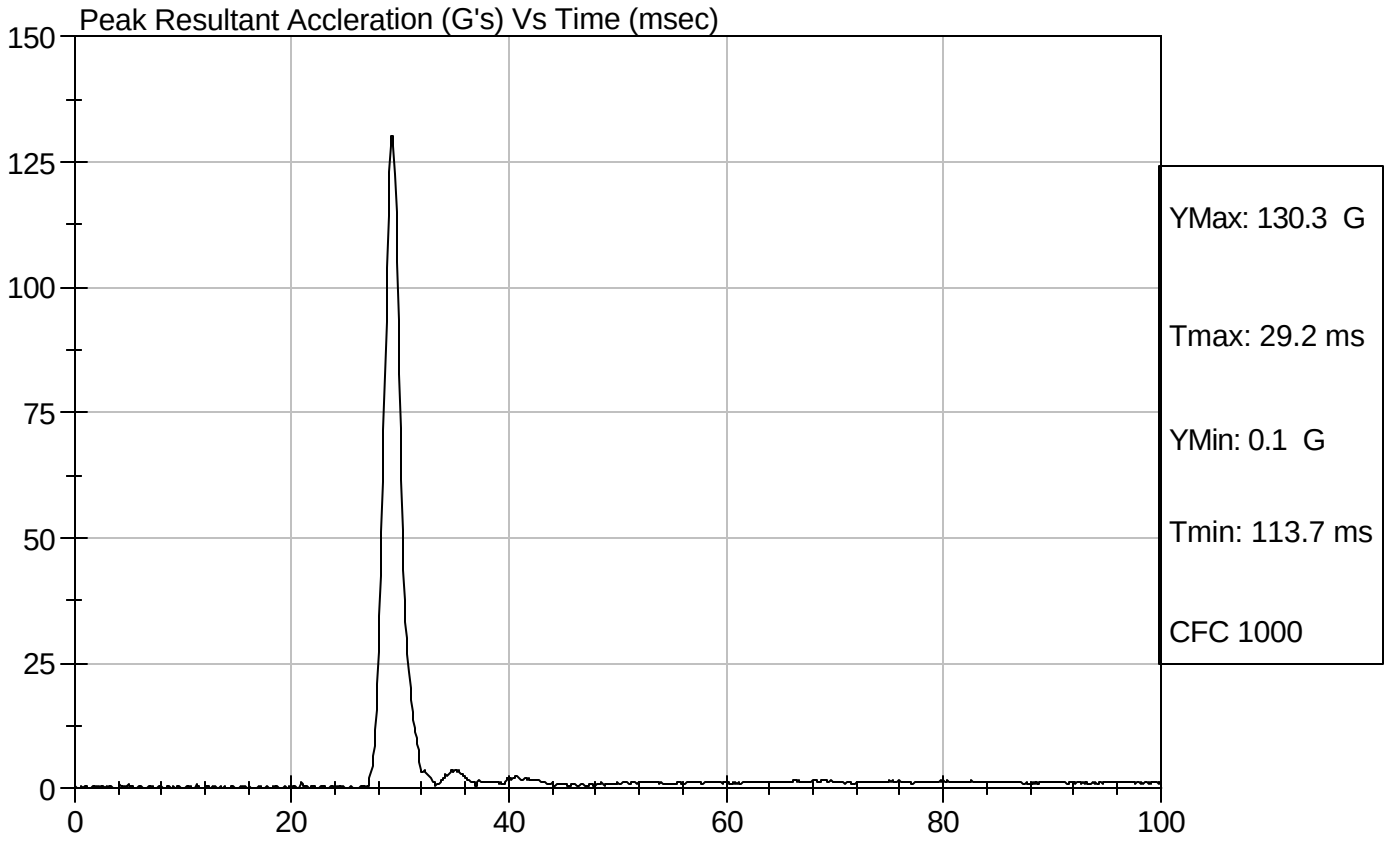
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	45	Pass
Peak Resultant Acceleration	G's	120 to 150	130	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
		Overall Test Results		Pass

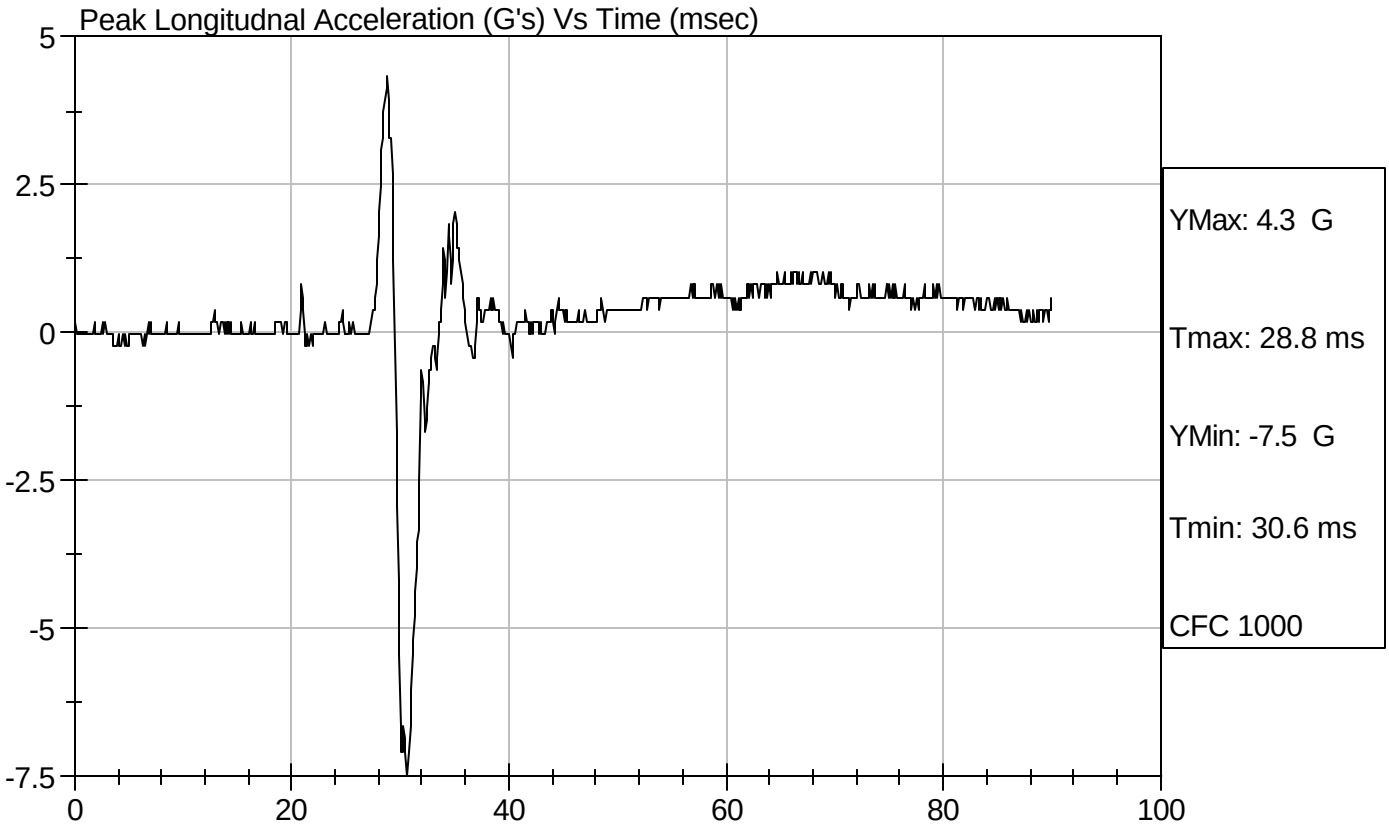
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/21/2005
	Component: D052581	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 271 **Test I.D:** D052582

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Probe Velocity	m/s	4.22 - 4.31	4.30	Pass
Upper Rib	G's	37 - 46	45	Pass
Lower Rib	G's	37 - 46	45	Pass
Lower Spine	G's	15 - 22	20	Pass
		Overall Test Results		Pass

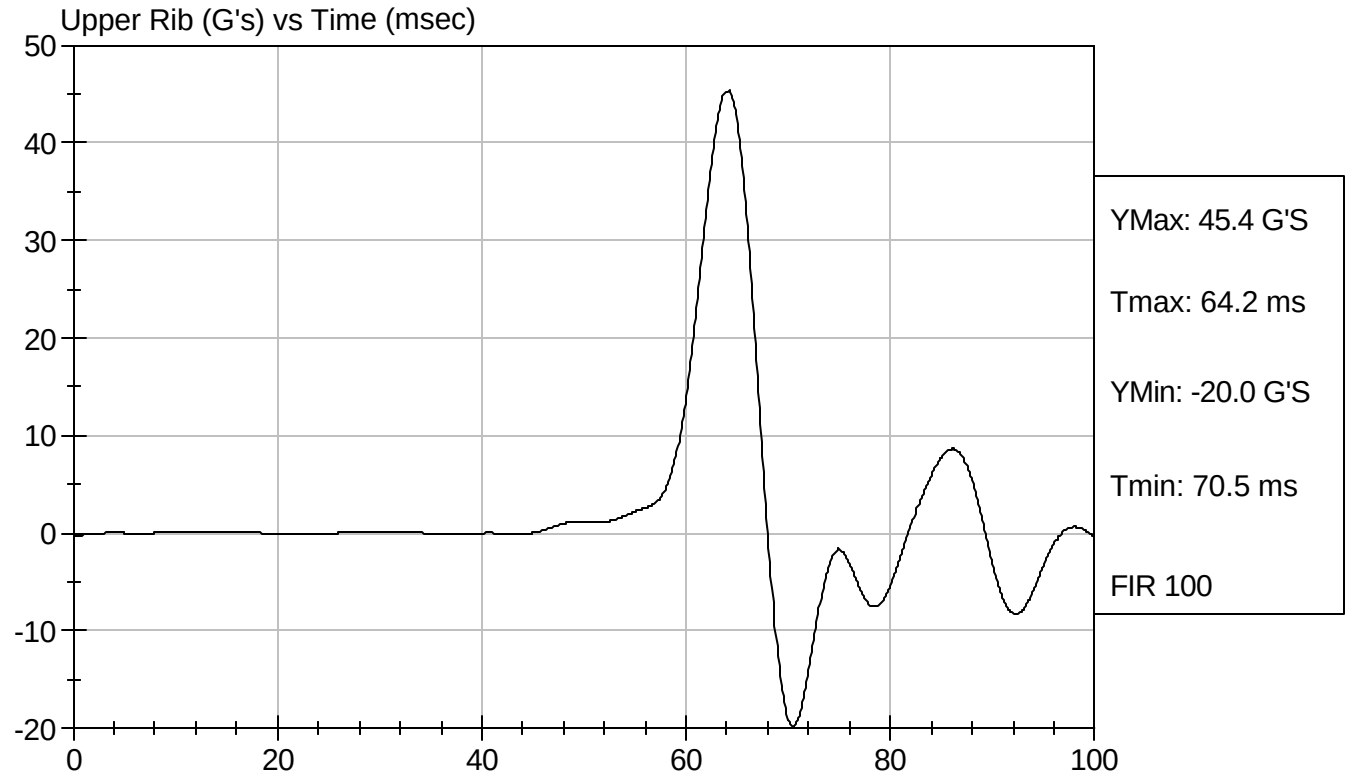
Jessica Hall
Laboratory Technician

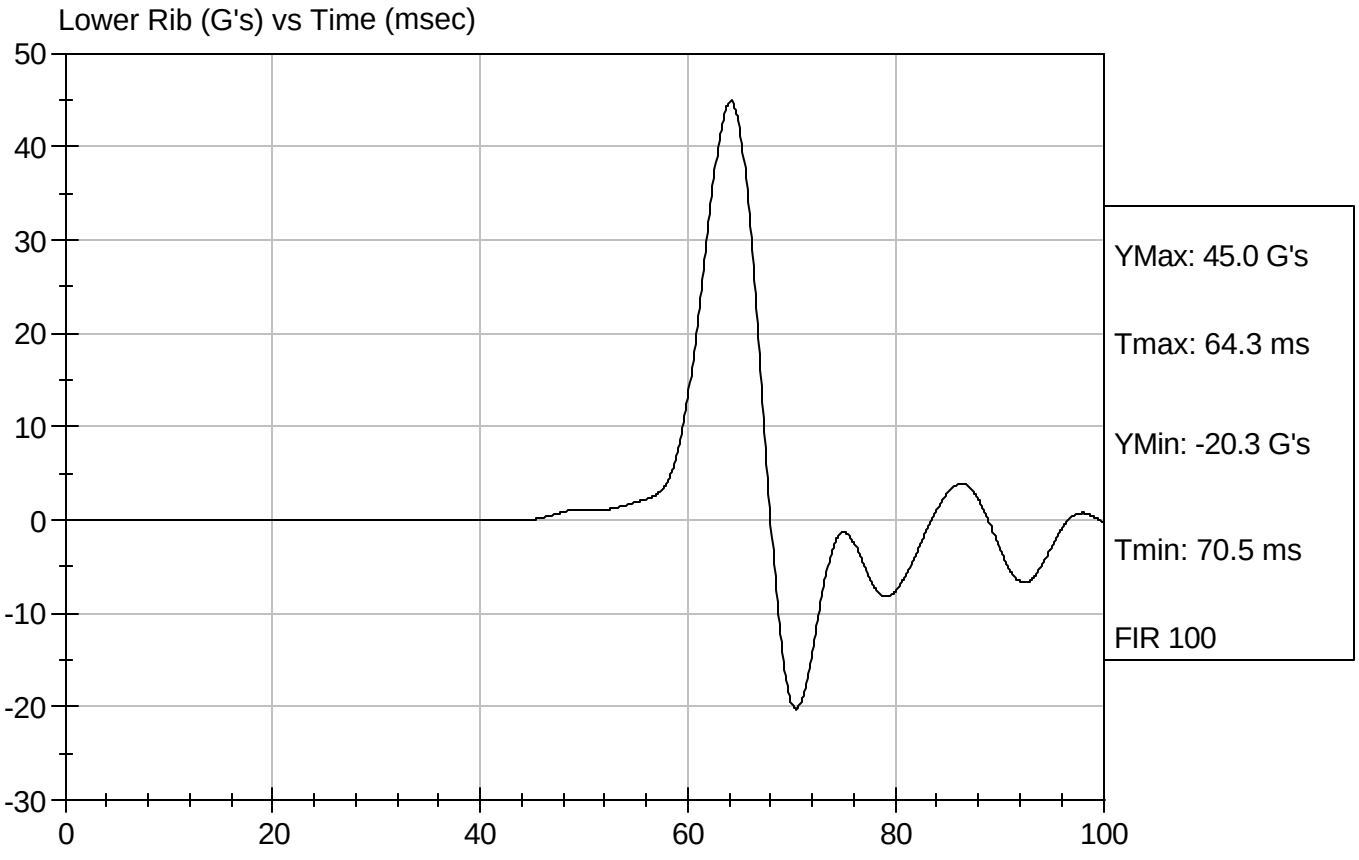
09/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D052582

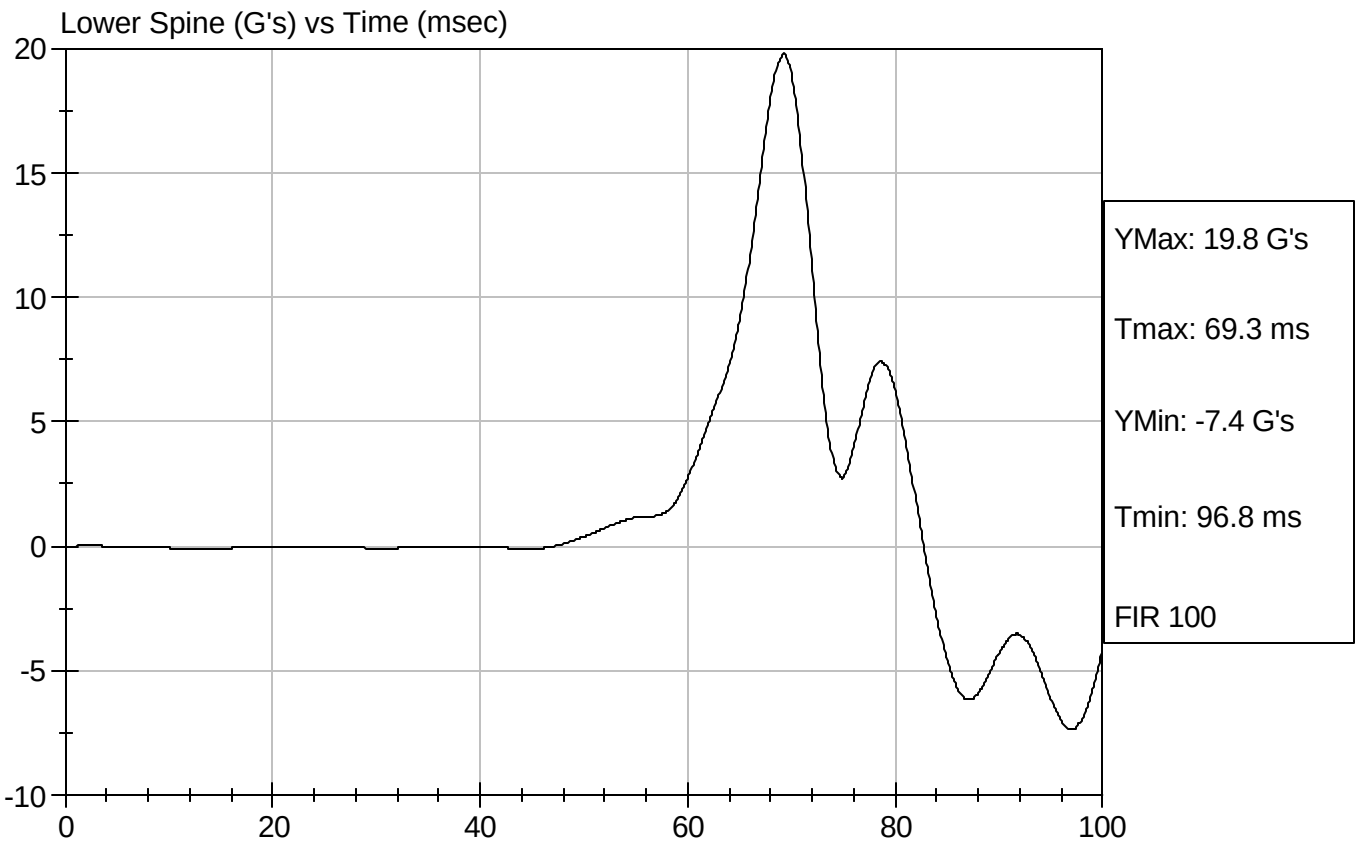
Test Date: 09/21/2005
Speed: 14.12 ft/sec, 4.30 m/sec





Test Desc: Thorax Impact
Component ID: D052582

Test Date: 09/21/2005
Speed: 14.12 ft/sec, 4.30 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 271 **Test I.D:** D052583

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	4.27 - 4.33	4.32	Pass
Pelvis Acceleration	G's	40 - 60	42	Pass
		Overall Test Results		Pass

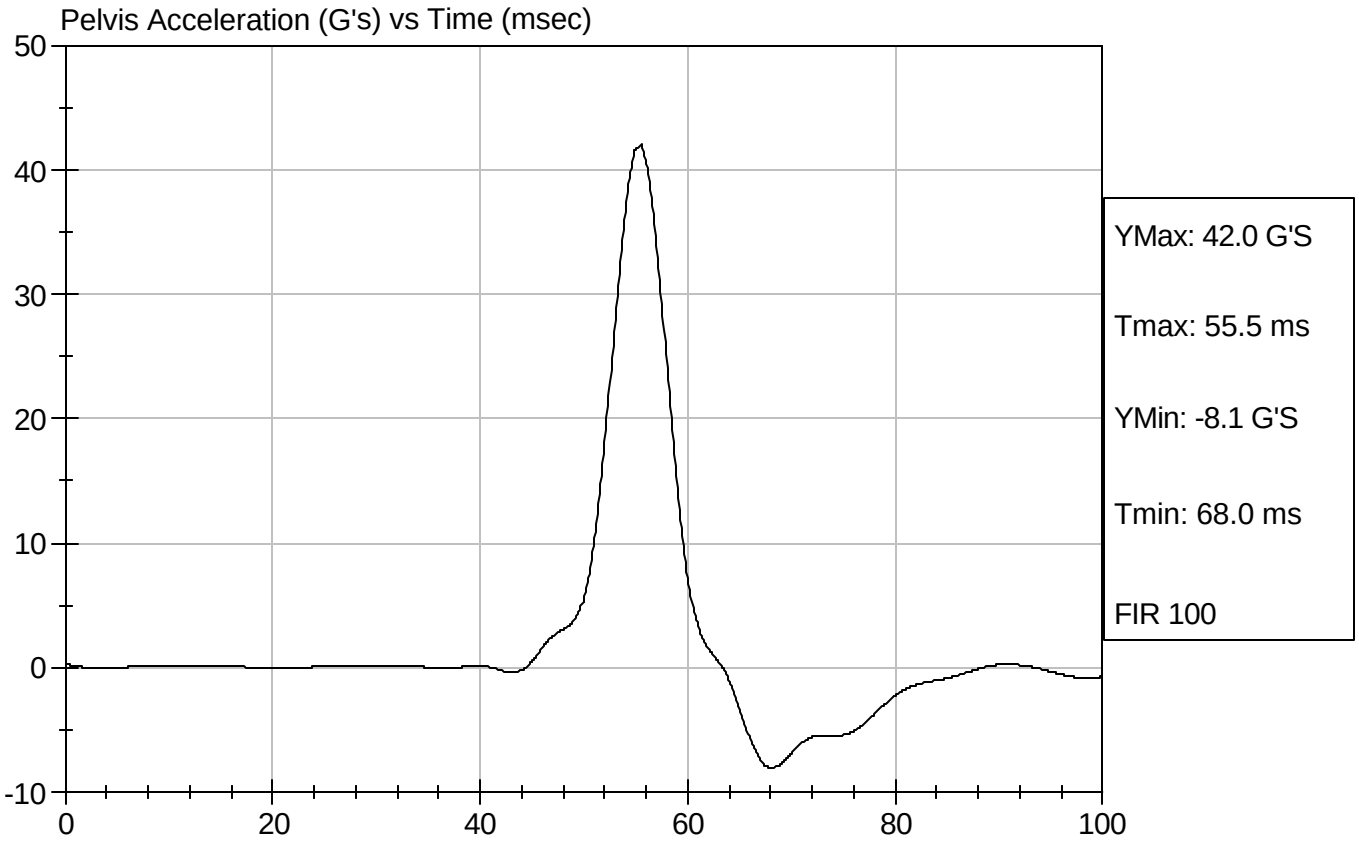
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: d052583

Test Date: 09/21/2005
Speed: 14.18 ft/sec, 4.32 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 271 **Test I.D:** D052584

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Force At 12.7 mm	N	104 -162	118	Pass
Force At 19 mm	N	163 - 222	170	Pass
Force At 25.4 mm	N	222 - 280	238	Pass
Force At 33 mm	N	325 - 391	332	Pass
		Overall Test Results		Pass

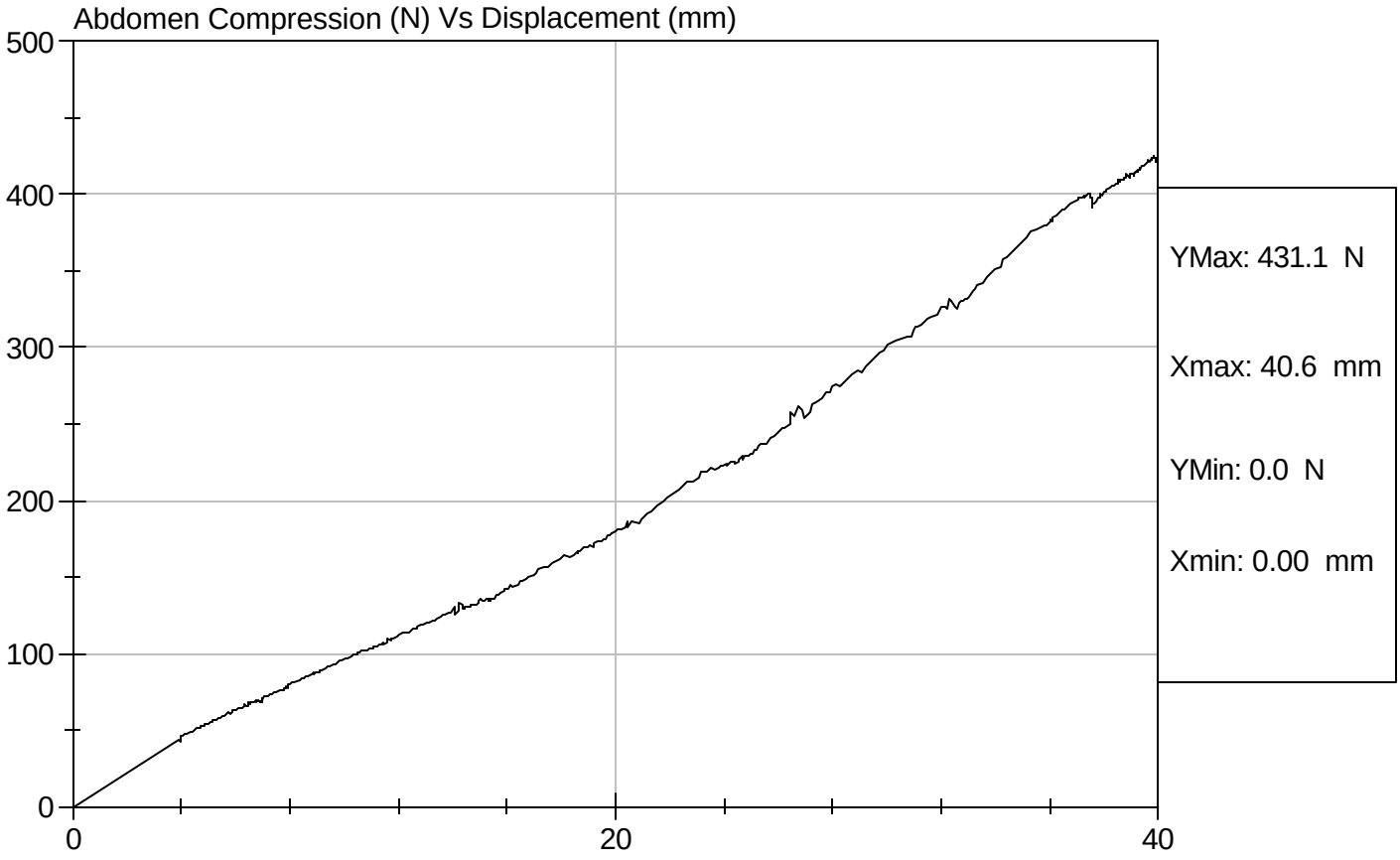
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/21/2005

Component: D052584 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 271 **Test I.D:** D052585

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	116.2	Pass
Force At 30 deg	N	151.2 - 204.6	186.1	Pass
Force At 40 deg	N	204.6 - 258.0	224.9	Pass
Return Angle	Deg	12 Maximum	6	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

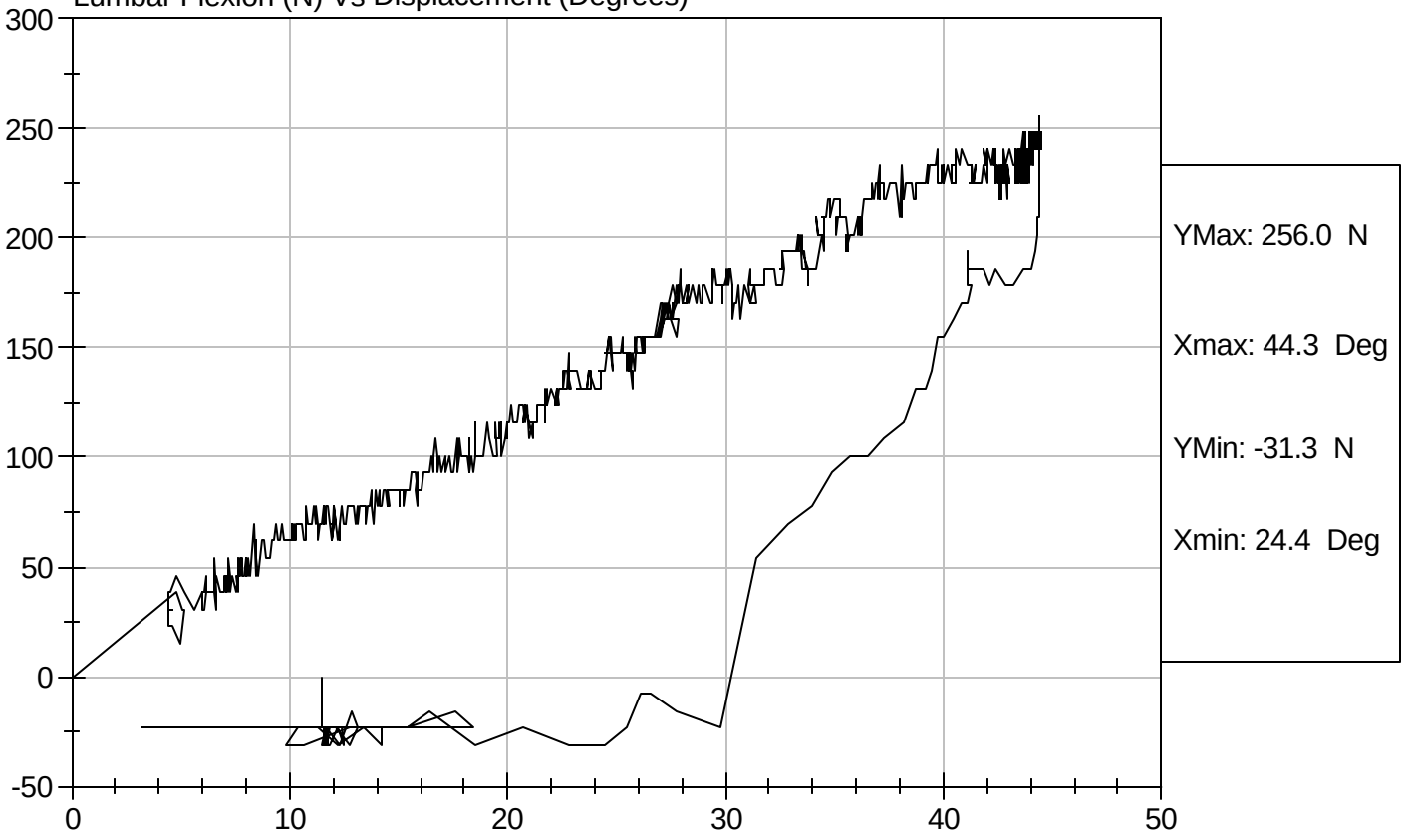
09/21/2005
Test Date

David Winkelbauer
Approved By

Test Description: Lumbar Flexion | Test Date: 09/21/2005

Component: D052585 | Speed: 0 ft/sec, 0 m/sec

Lumbar Flexion (N) Vs Displacement (Degrees)



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 271 **Test I.D:** D052589

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	45	Pass
Impact Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.48	Pass
	20 msec	m/s	4.12 to 5.10	4.81	Pass
	30 msec	m/s	5.73 to 7.01	6.63	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.17	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	75	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	61	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	76	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	59	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	11	Pass

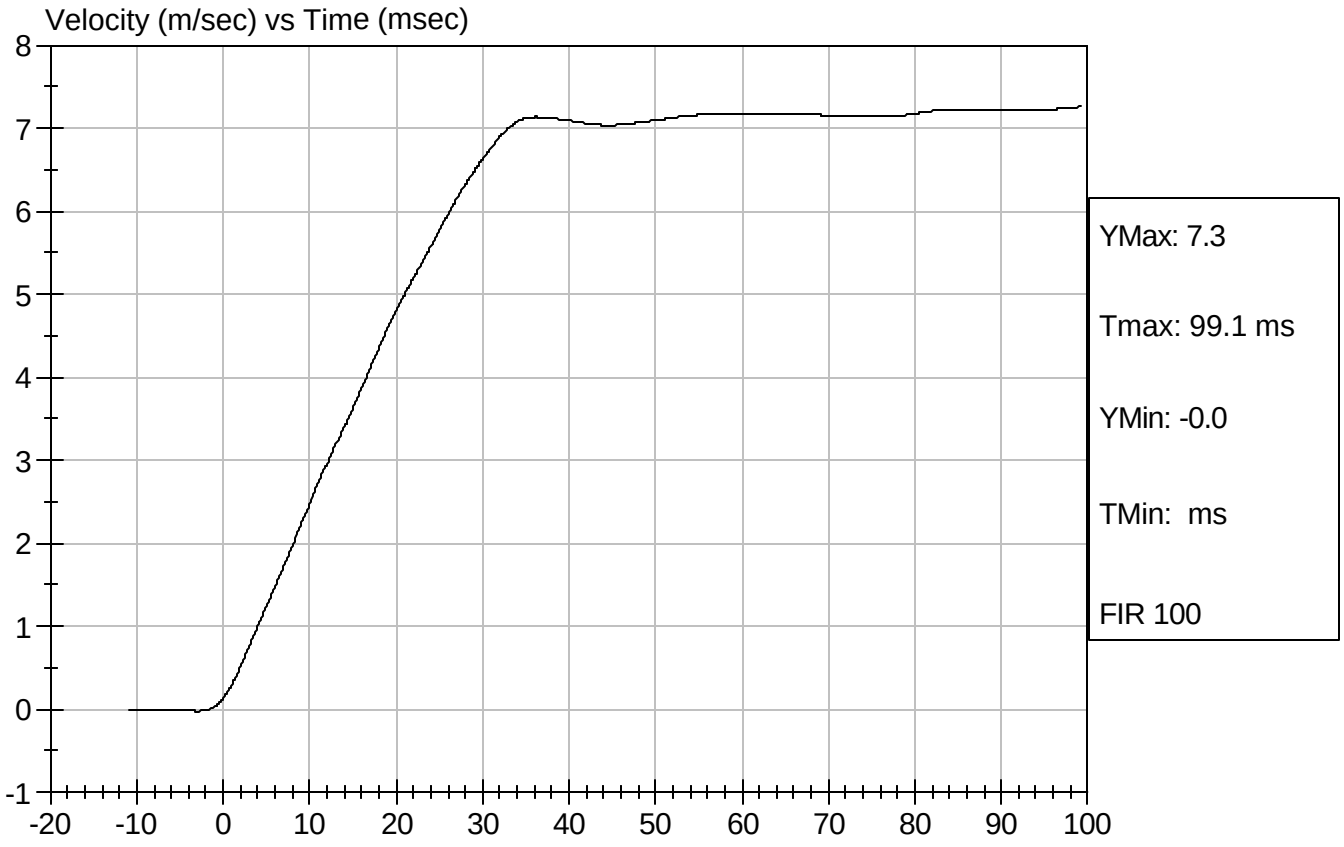
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

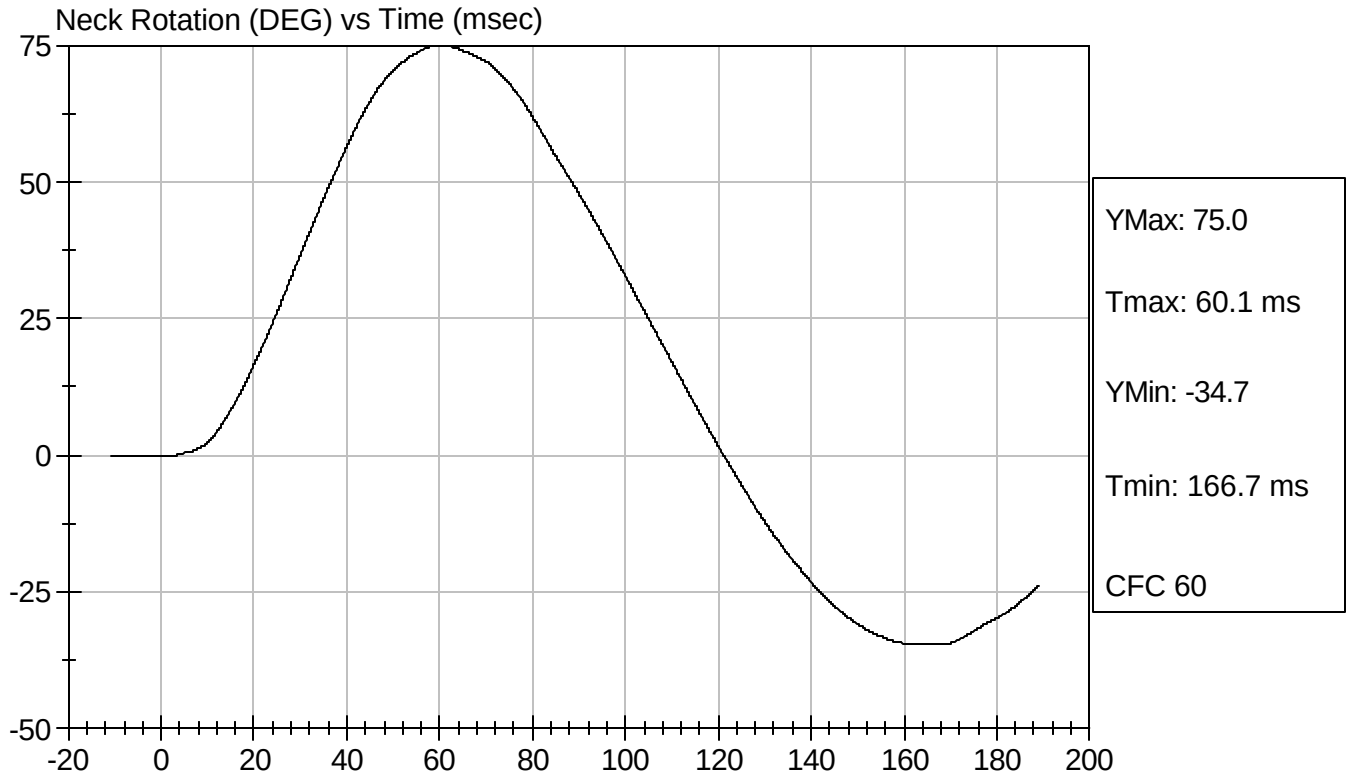
Test Desc: Neck Bending
Component ID: D052589

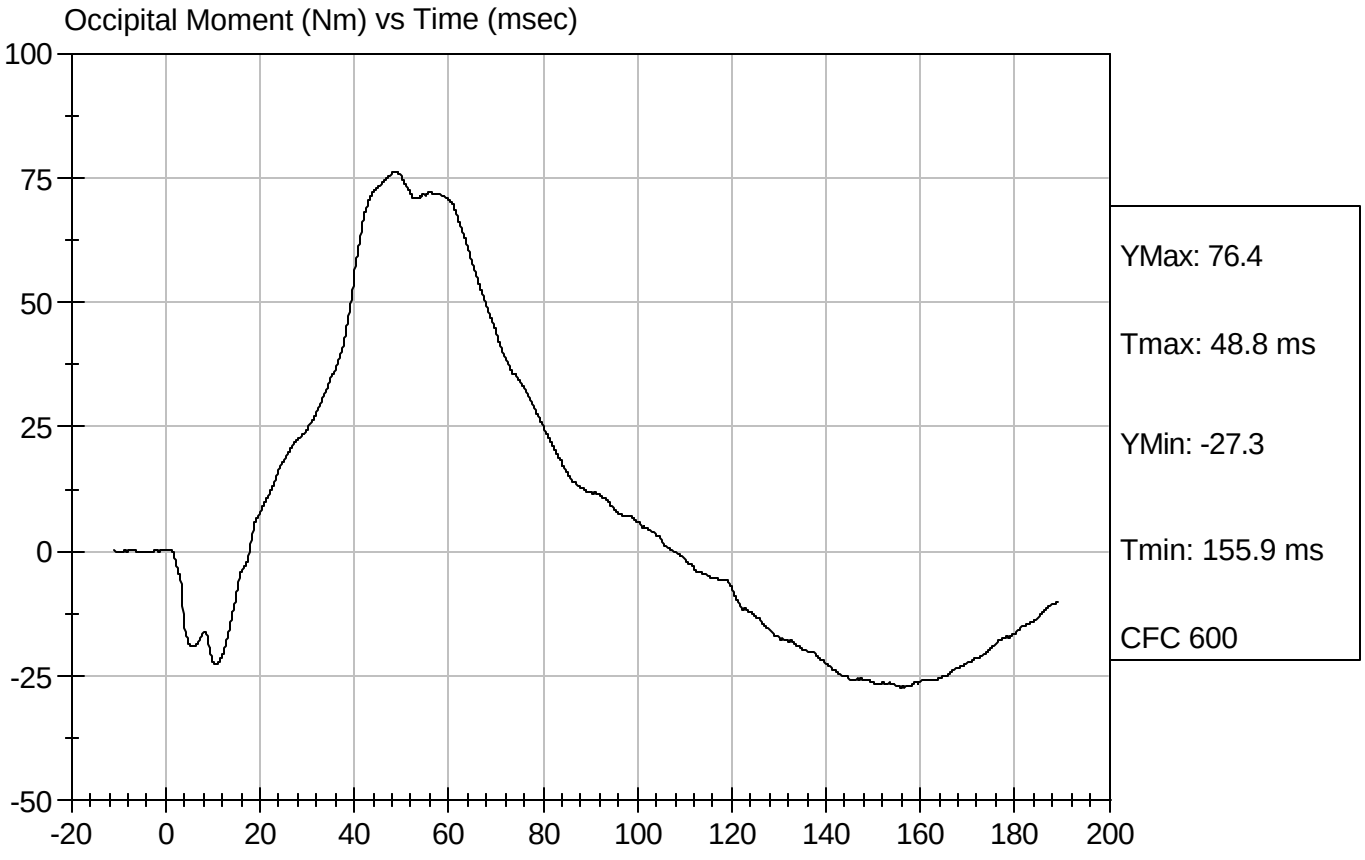
Test Date: 09/21/2005
Speed: 23.1 ft/sec, 7.04 m/sec



Test Desc: Neck Bending
Component ID: D052589

Test Date: 09/21/2005
Speed: 23.1 ft/sec, 7.04 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

09/20/2005
Test Date

David Winkelbauer
Approved By

CERTIFICATION DATA

Dummy Serial Number: 904

Calibration Test Results Summary

Dummy Serial Number: 904

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: 904 **Test I.D:** D05235

Tested Parameter	Units	Specification	Result	Pass/Fail
SH - Seated Height	mm	889 - 909	903	Pass
RH - Rib Height	mm	501 - 521	509	Pass
HP - Hip Pivot Height	mm	99 ref.	99	Pass
RD - Rib from Back Line	mm	229 - 241	240	Pass
KV - Knee Pivot to Back Line	mm	511 - 526	525	Pass
SW - Knee Pivot to Floor	mm	490 - 505	500	Pass
HW - Hip Width	mm	356 - 391	368	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

08/23/2005
Test Date

David Winkelbauer
Approved By

SID Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D052551

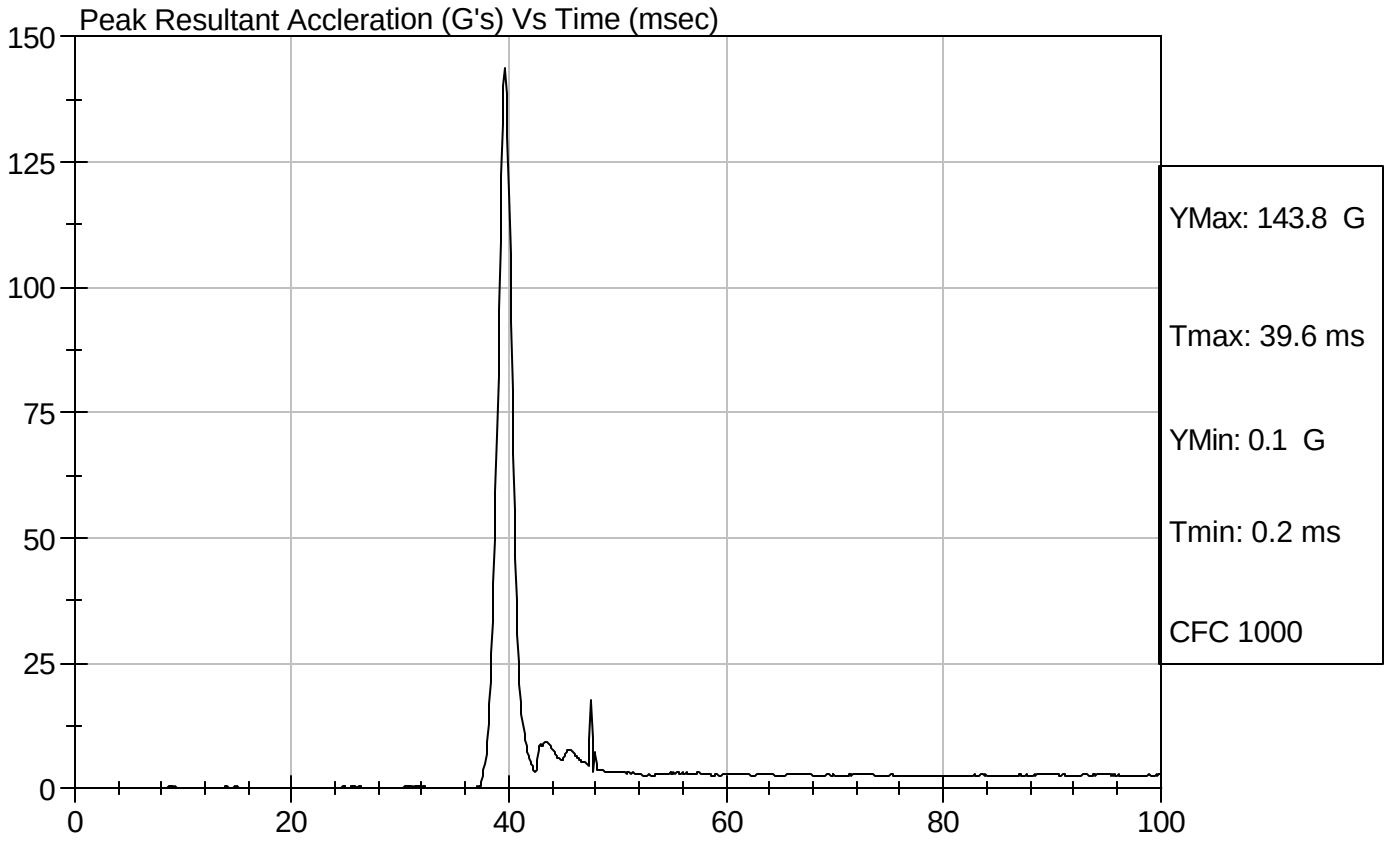
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.3	Pass
Laboratory Relative Humidity	%	10 to 70	39	Pass
Peak Resultant Acceleration	G's	120 to 150	144	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
		Overall Test Results		Pass

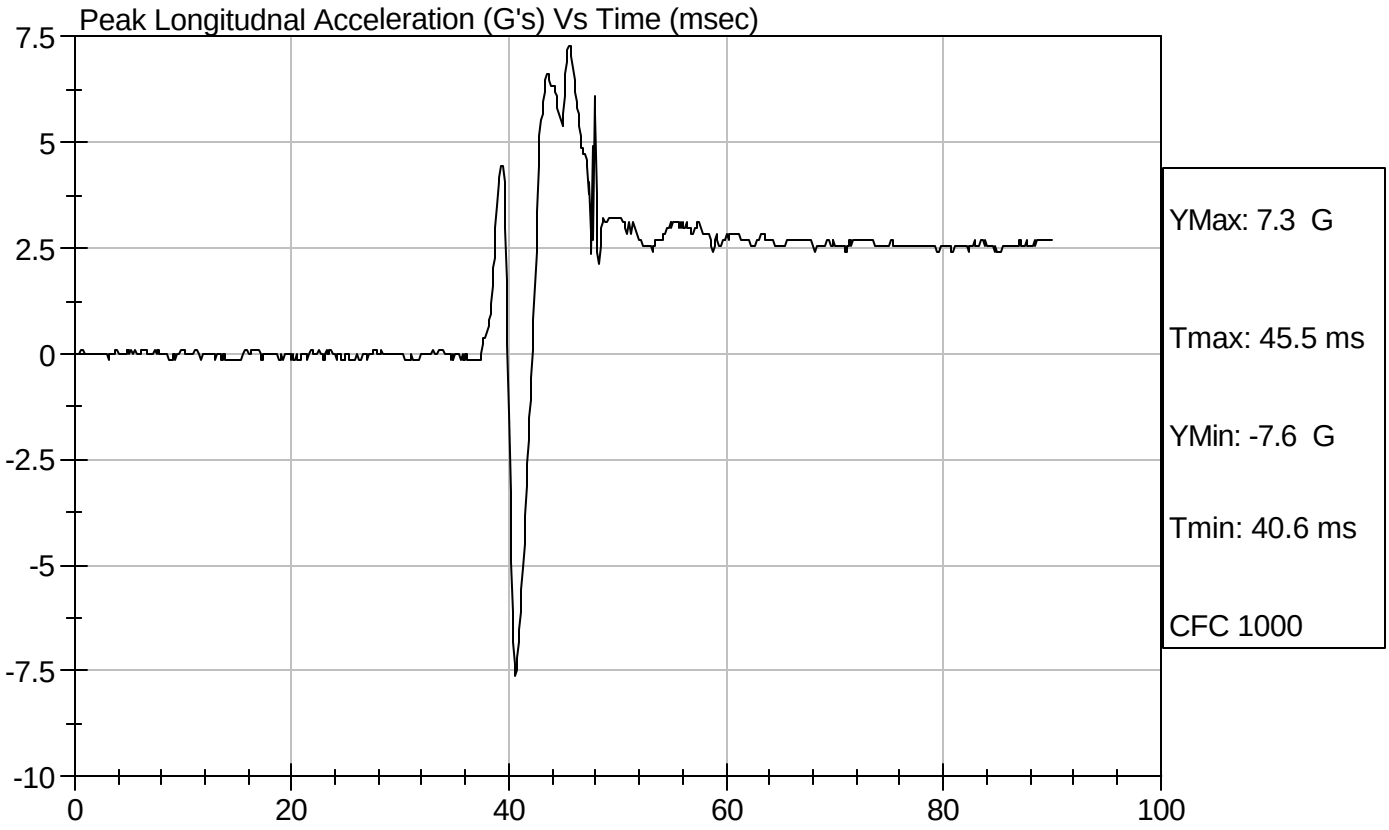
Jessica Hall
Laboratory Technician

09/14/2005
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/14/2005
	Component: D052551	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 904 **Test I.D:** D052552

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	4.22 - 4.31	4.31	Pass
Upper Rib	G's	37 - 46	44	Pass
Lower Rib	G's	37 - 46	41	Pass
Lower Spine	G's	15 - 22	21	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

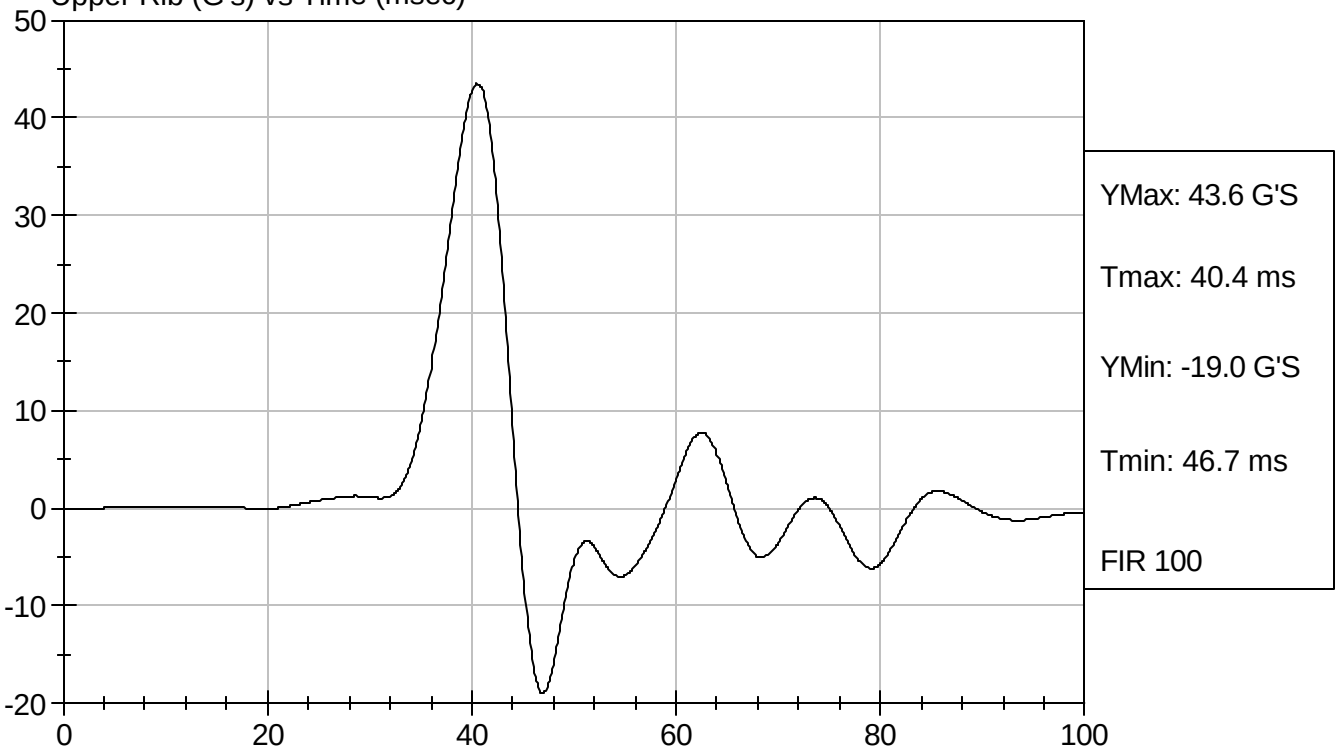
09/16/2005
Test Date

David Winkelbauer
Approved By

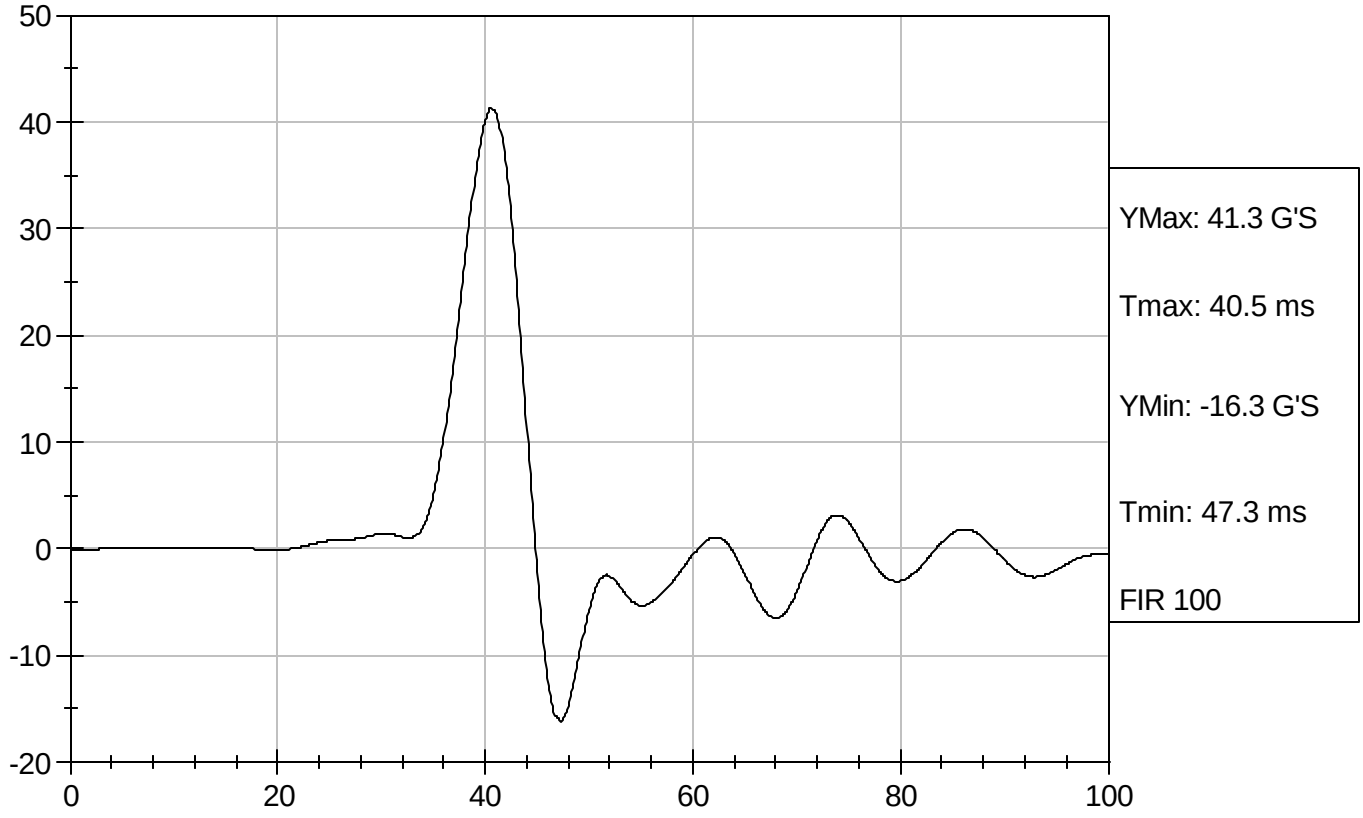
Test Desc: Thorax Impact
Component ID: D052552

Test Date: 09/16/2005
Speed: 14.13 ft/sec, 4.31 m/sec

Upper Rib (G's) vs Time (msec)

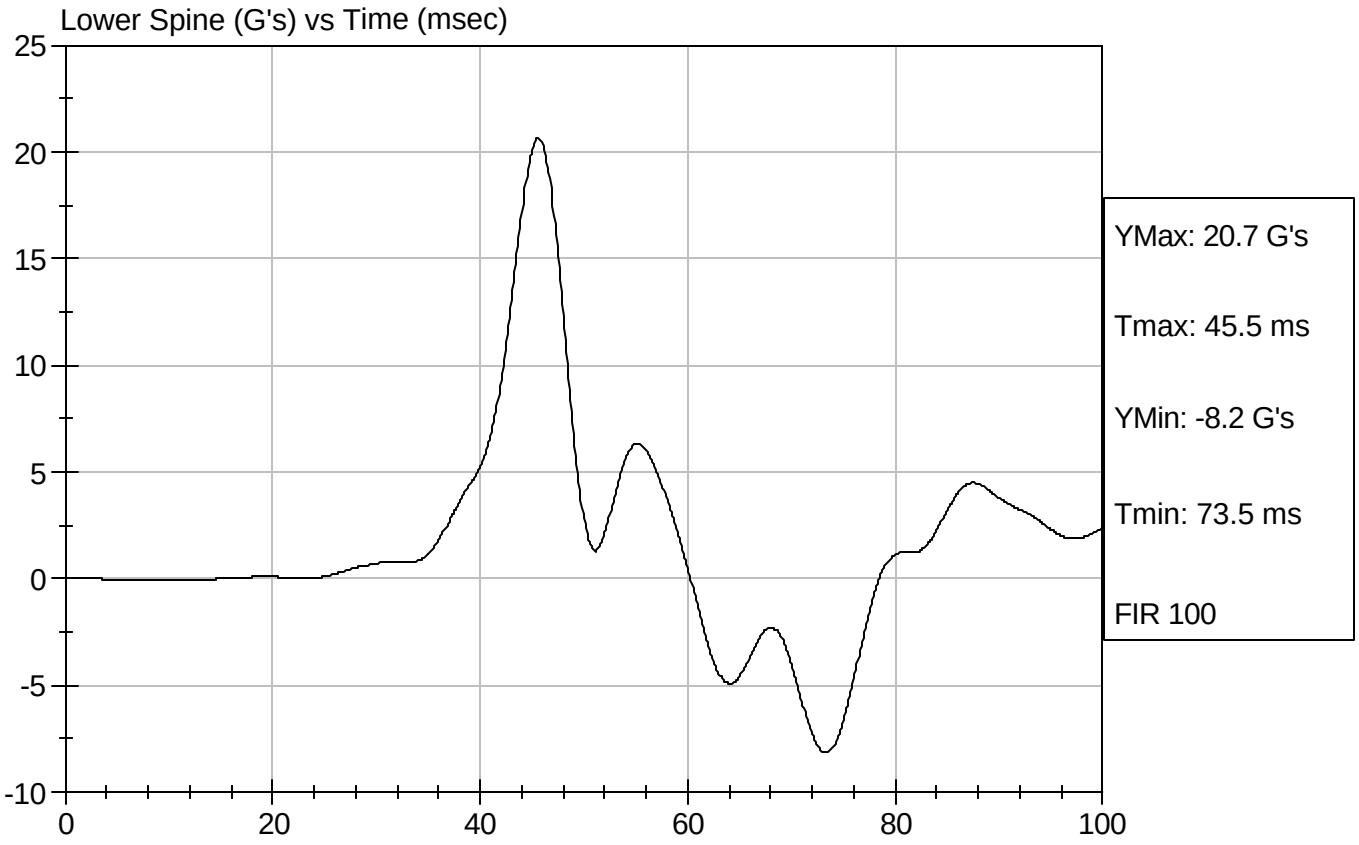


Lower Rib (G's) vs Time (msec)



Test Desc: Thorax Impact
Component ID: D052552

Test Date: 09/16/2005
Speed: 14.13 ft/sec, 4.31 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** D052553

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	43	Pass
Probe Velocity	m/s	4.27 - 4.33	4.33	Pass
Pelvis Acceleration	G's	40 - 60	41	Pass
		Overall Test Results		Pass

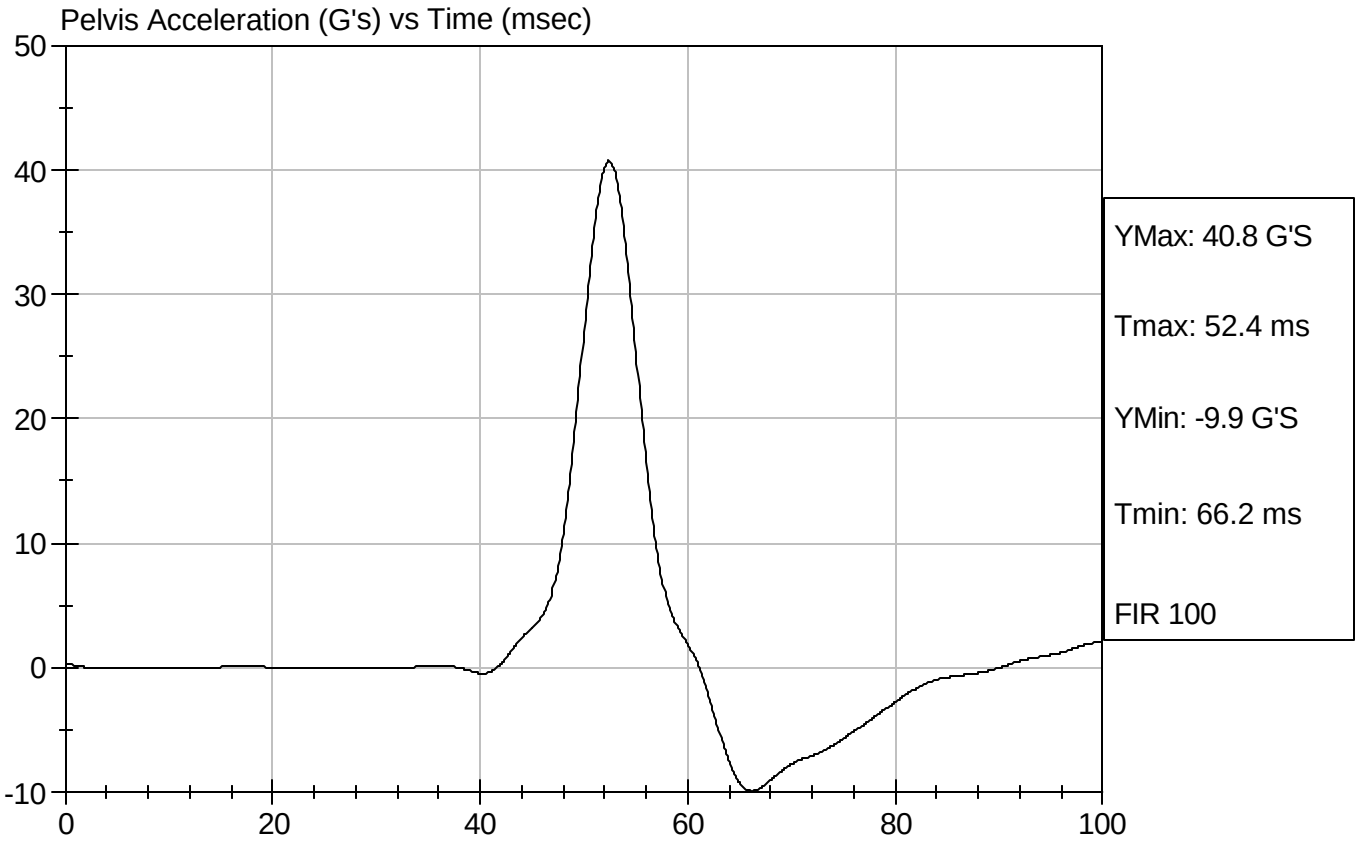
Jessica Hall
Laboratory Technician

09/16/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: D052553

Test Date: 09/16/2005
Speed: 14.2 ft/sec, 4.33 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904 **Test I.D:** D052554

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	37	Pass
Force At 12.7 mm	N	104 -162	138	Pass
Force At 19 mm	N	163 - 222	187	Pass
Force At 25.4 mm	N	222 - 280	254	Pass
Force At 33 mm	N	325 - 391	350	Pass
		Overall Test Results		Pass

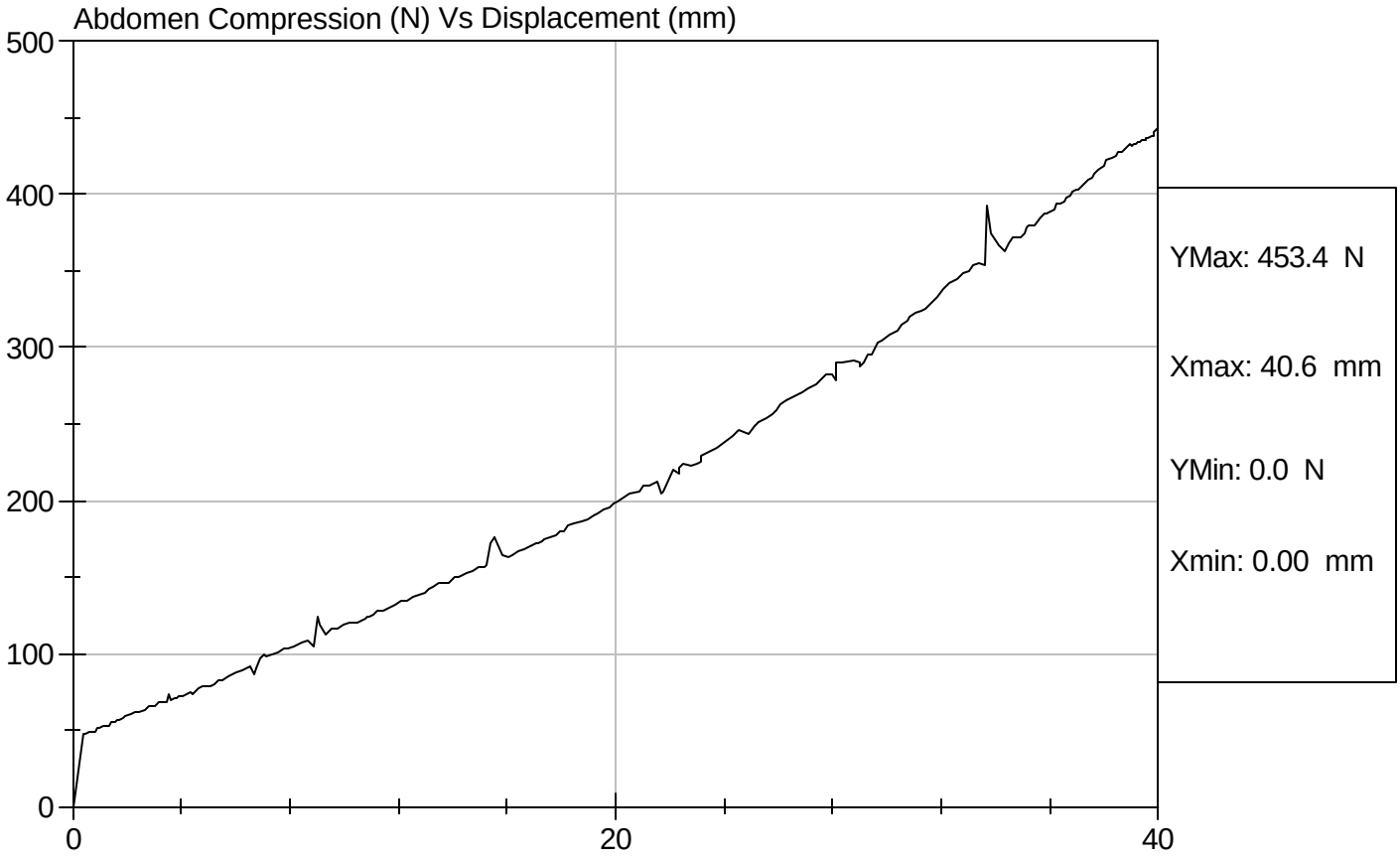
Jessica Hall
Laboratory Technician

09/15/2005
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression | Test Date: 09/15/2005

Component: D052554 | Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 904 **Test I.D:** D052555

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	38	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	136.7	Pass
Force At 30 deg	N	151.2 - 204.6	198.8	Pass
Force At 40 deg	N	204.6 - 258.0	206.6	Pass
Return Angle	Deg	12 Maximum	4	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

09/15/2005
Test Date

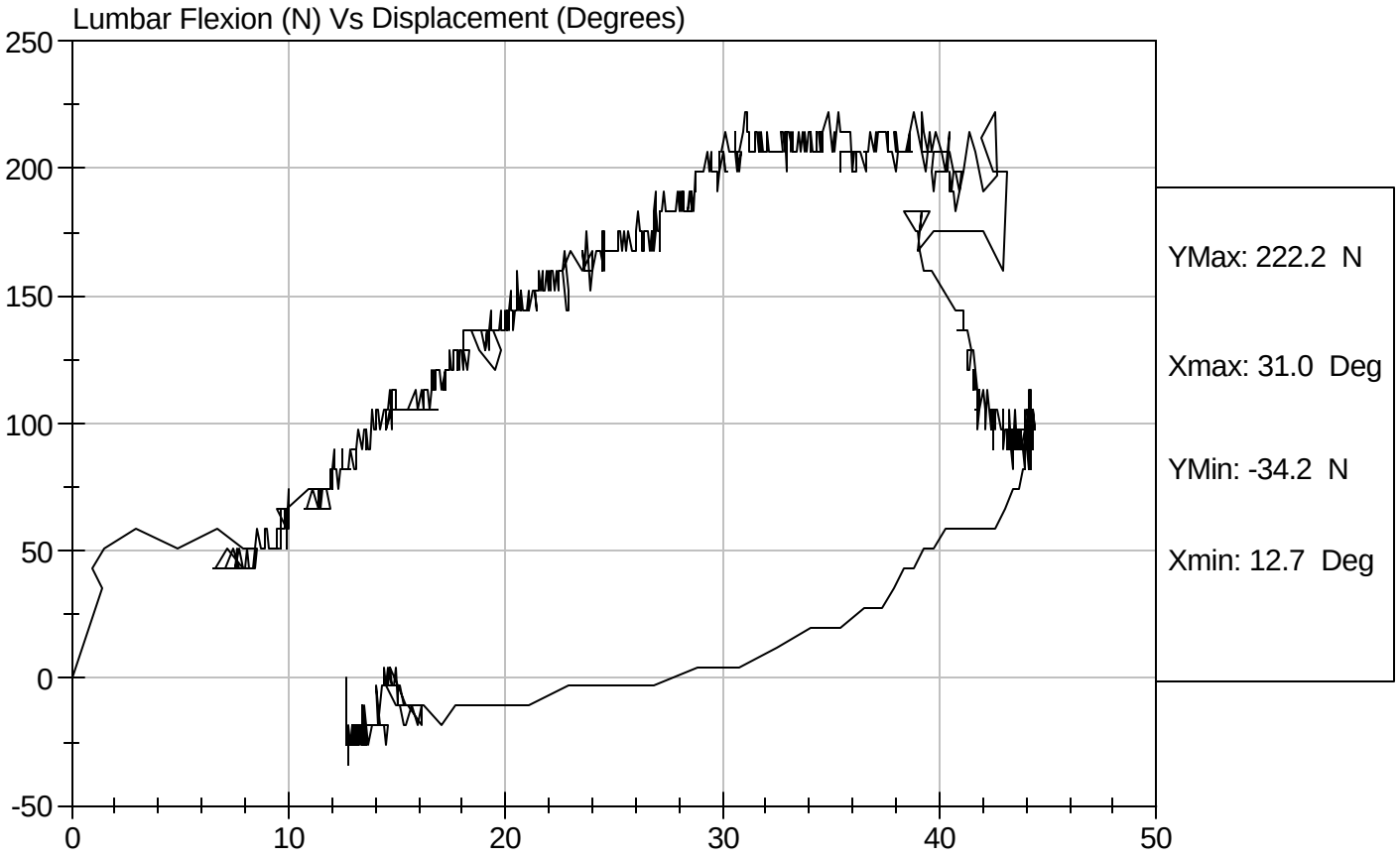
David Winkelbauer
Approved By

Test Description: Lumbar Flexion

Test Date: 09/15/2005

Component: D052555

Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 904 **Test I.D:** D052559

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	37	Pass
Impact Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.47	Pass
	20 msec	m/s	4.12 to 5.10	4.88	Pass
	30 msec	m/s	5.73 to 7.01	6.90	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.23	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	78	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	60	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	77	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	52	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	4	Pass

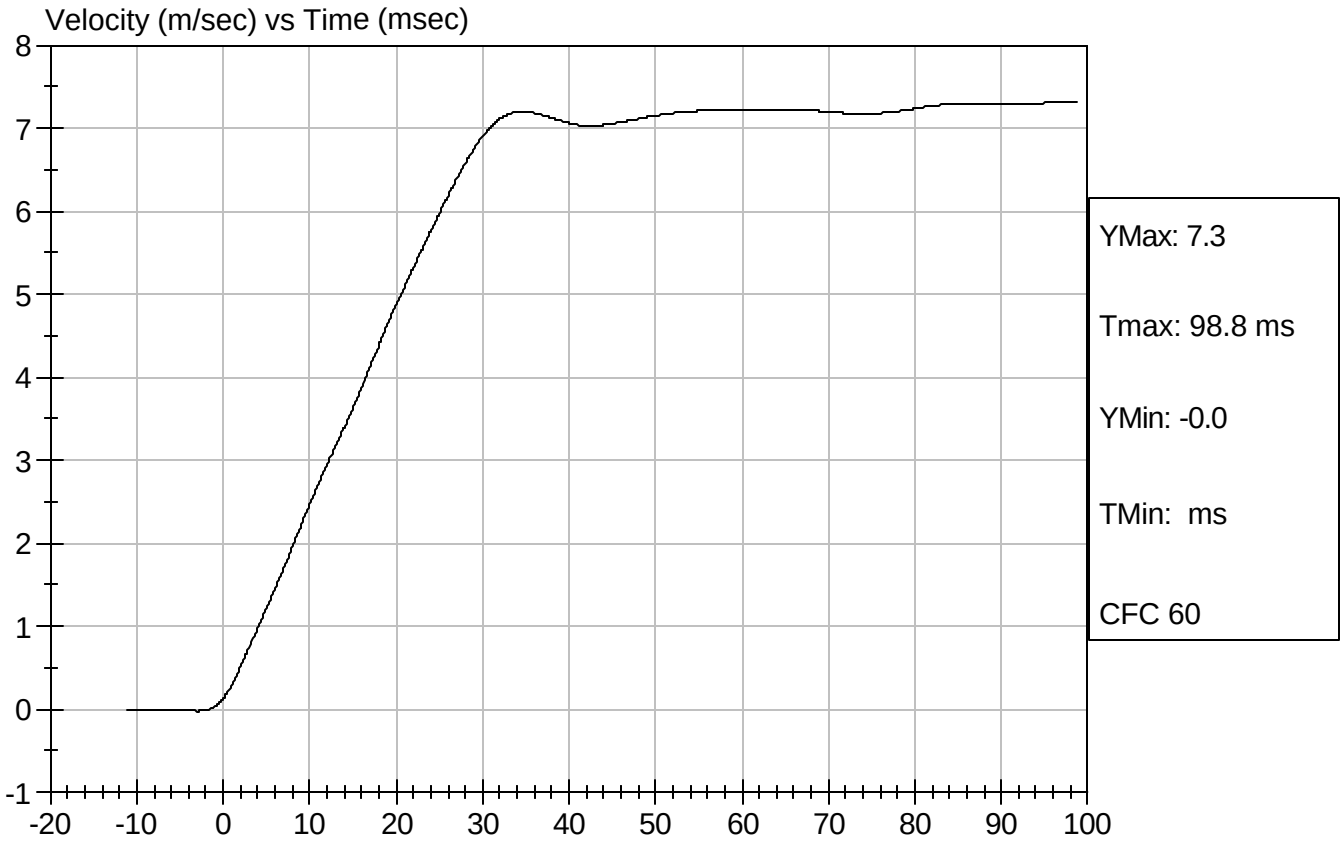
Jessica Hall
Laboratory Technician

09/15/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D052559

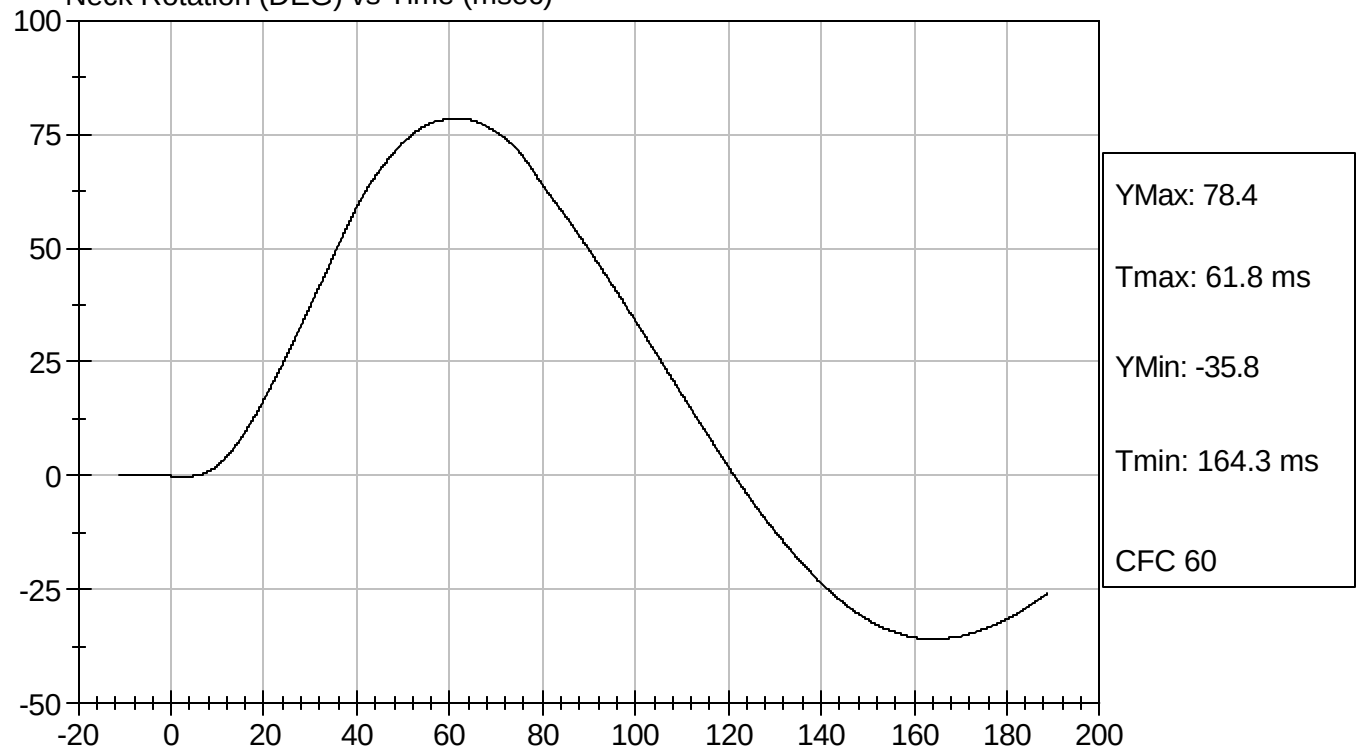
Test Date: 09/15/2005
Speed: 23.21 ft/sec, 7.07 m/sec



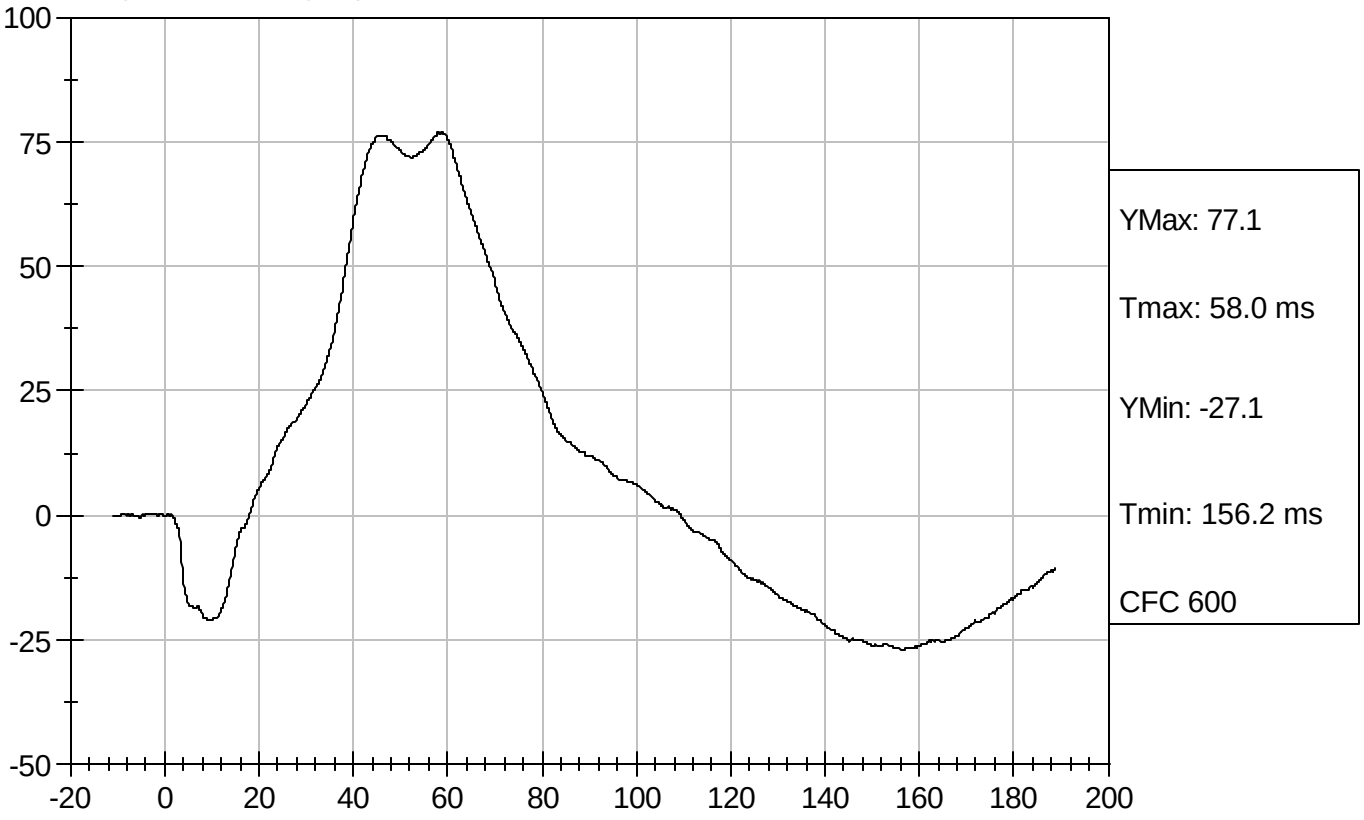
Test Desc: Neck Bending
Component ID: D052559

Test Date: 09/15/2005
Speed: 23.21 ft/sec, 7.07 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



Calibration Test Results Summary

Dummy Serial Number: 904

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 Calibration Data Sheet

Side Impact Dummy

Head Drop Calibration (Lateral)

ATD Serial No: 904 **Test I.D:** D052591

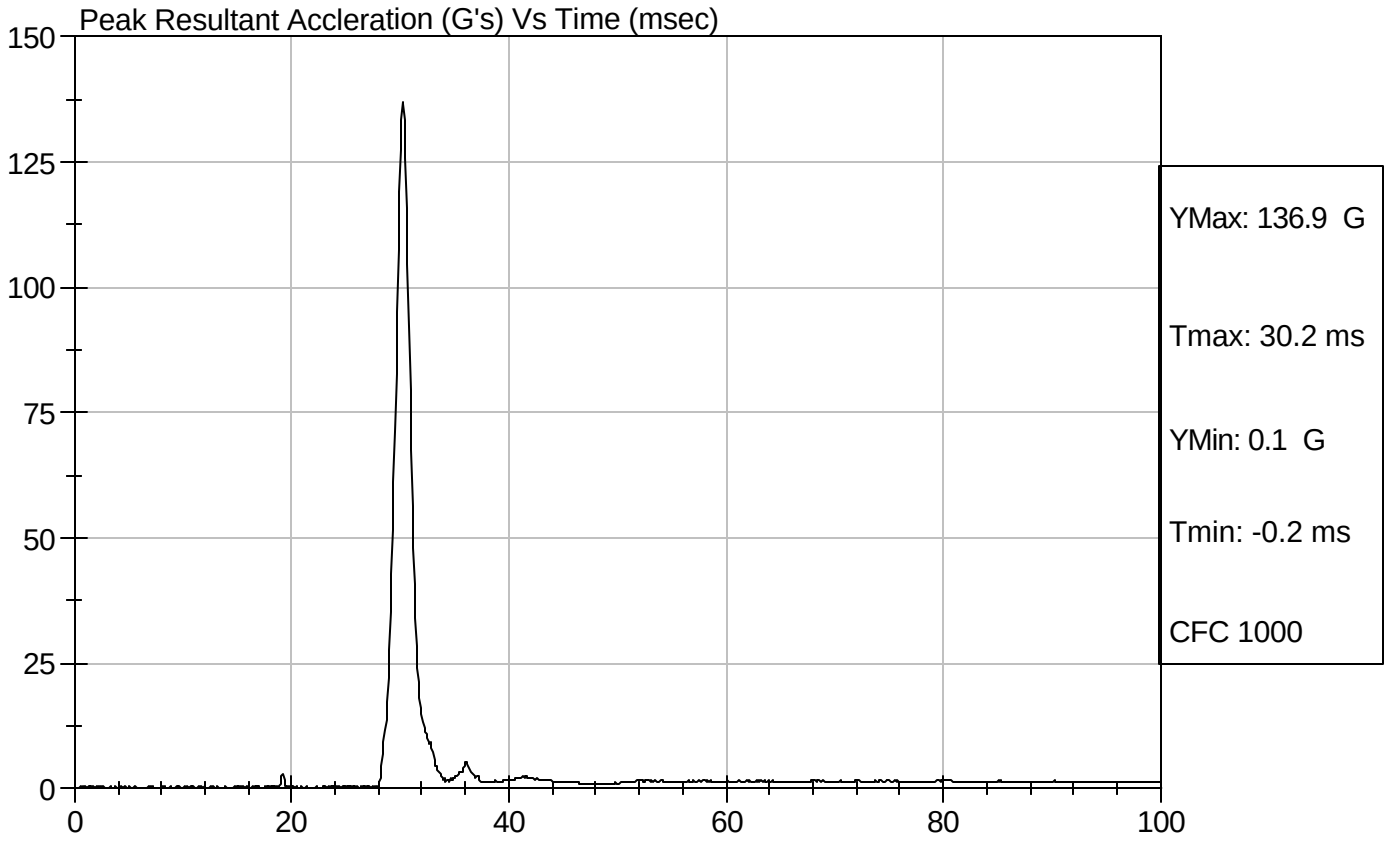
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Peak Resultant Acceleration	G's	120 to 150	137	Pass
Is Resultant Curve Unimodal?	Yes/No	15% of peak	Yes	Pass
Peak Longitudnal Acceleration	G's	+/- 15	-8	Pass
		Overall Test Results		Pass

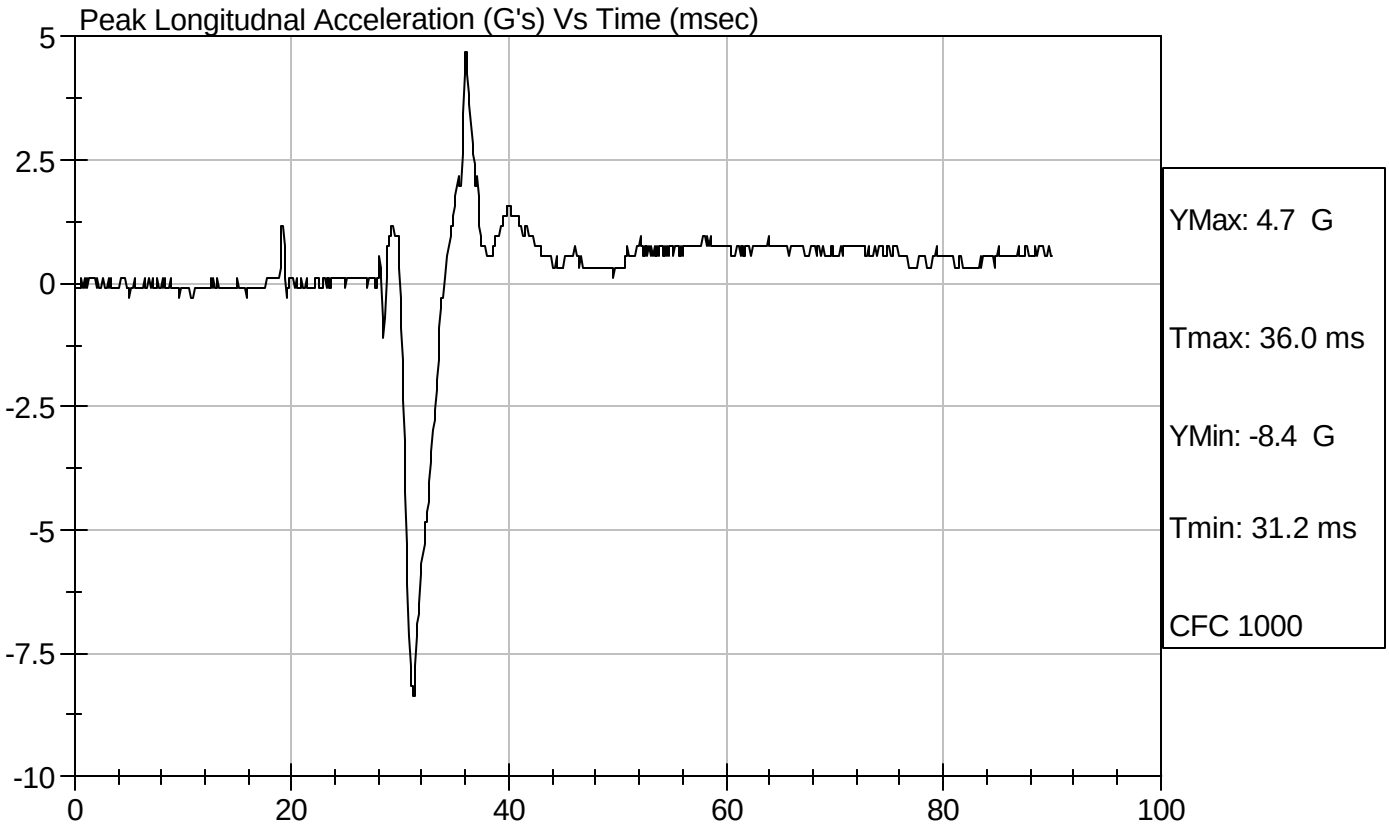
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

	Test Description: Head Drop	Test Date: 09/21/2005
	Component: D052591	Speed: 0 ft/s, 0.00 m/s





SID Calibration Data Sheet

Side Impact Dummy

Thorax Impact Test

ATD Serial No: 904 **Test I.D:** D052592

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Probe Velocity	m/s	4.22 - 4.31	4.28	Pass
Upper Rib	G's	37 - 46	39	Pass
Lower Rib	G's	37 - 46	39	Pass
Lower Spine	G's	15 - 22	22	Pass
		Overall Test Results		Pass

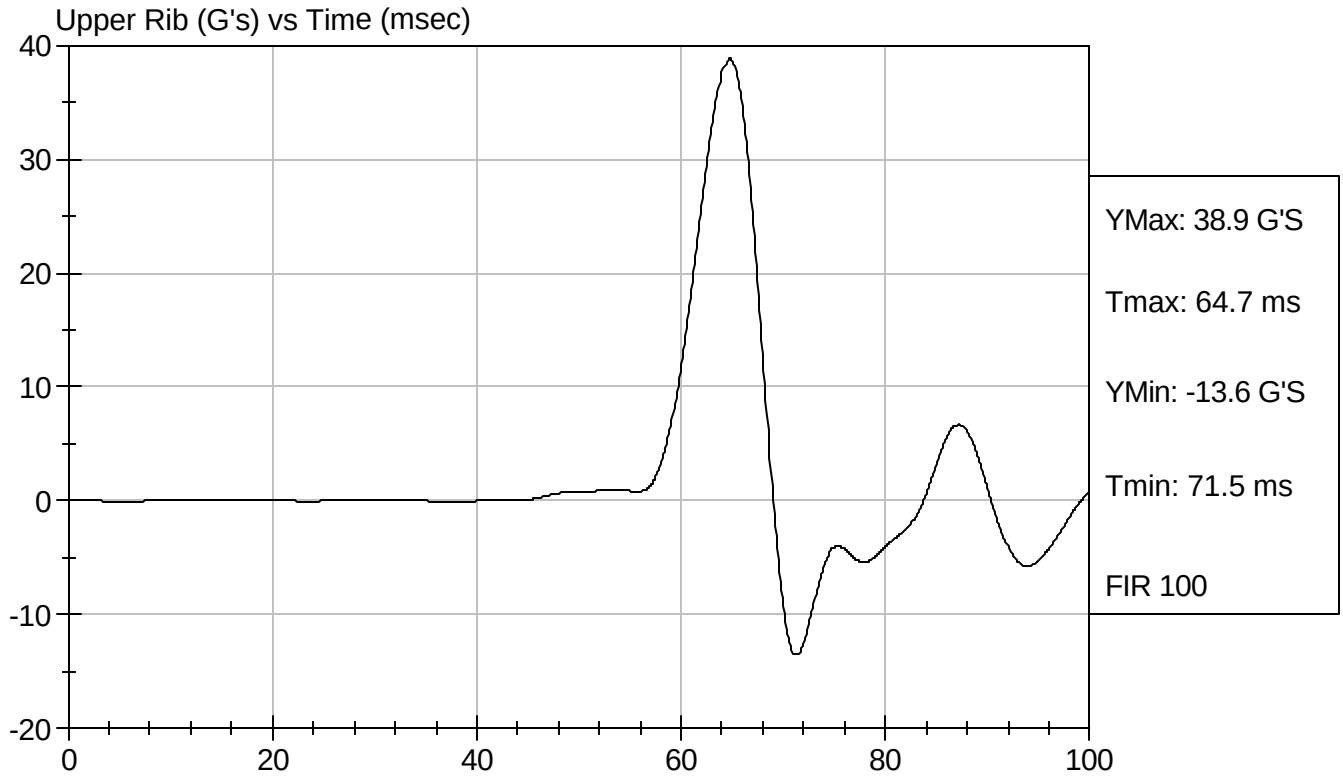
Jessica Hall
Laboratory Technician

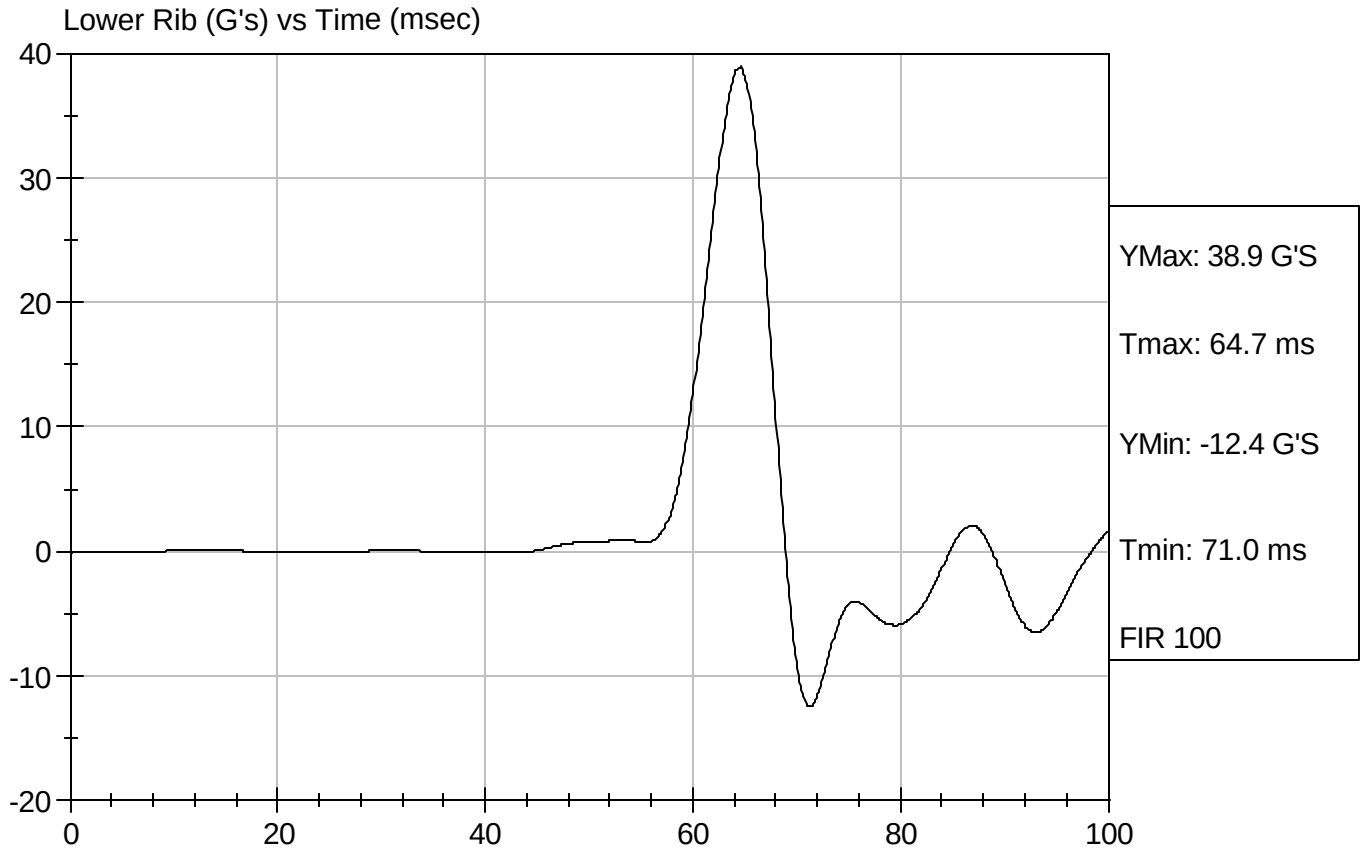
09/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D052592

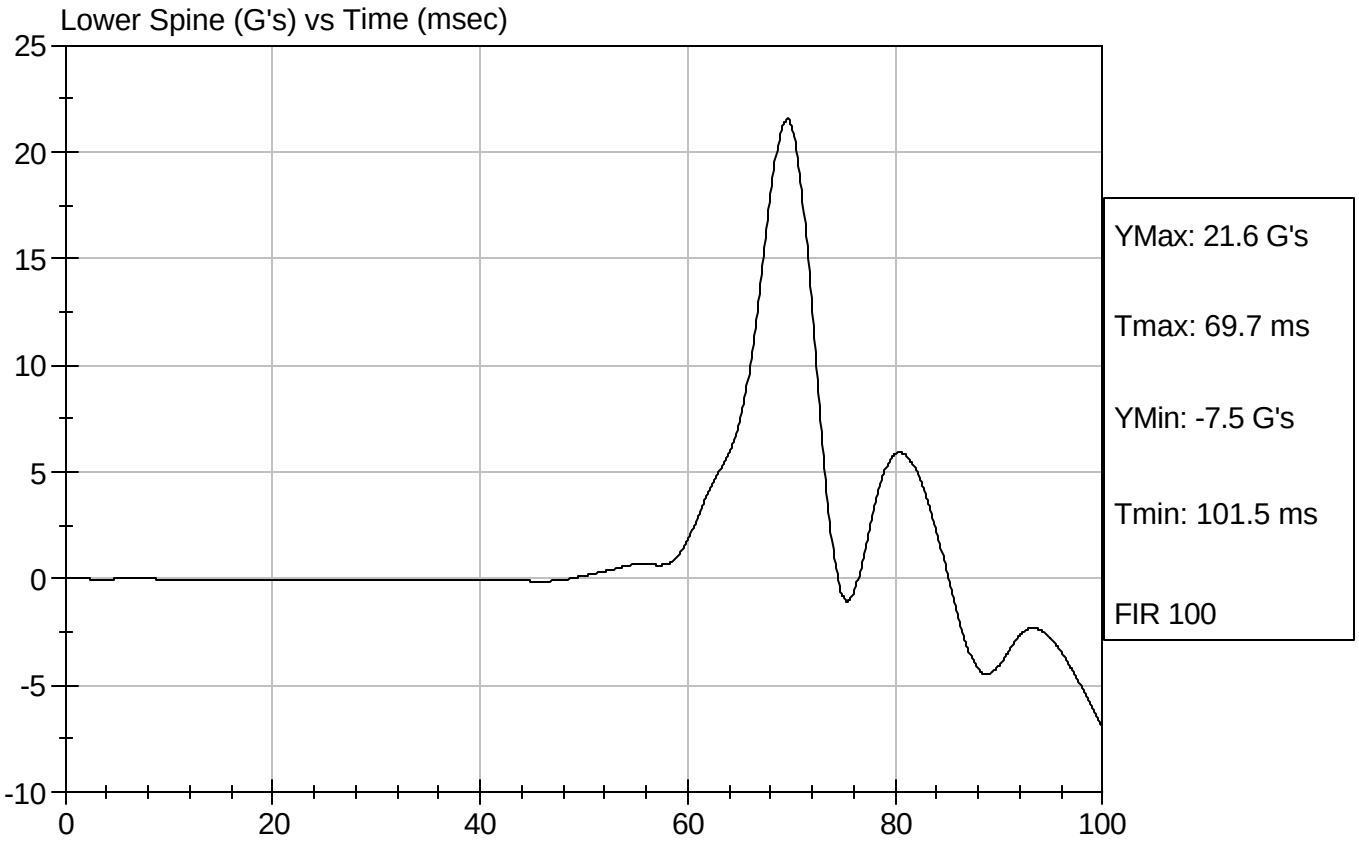
Test Date: 09/21/2005
Speed: 14.03 ft/sec, 4.28 m/sec





Test Desc: Thorax Impact
Component ID: D052592

Test Date: 09/21/2005
Speed: 14.03 ft/sec, 4.28m/sec



SID Calibration Data Sheet

Side Impact Dummy

Pelvis Impact Test

ATD Serial No: 904 **Test I.D:** d052593

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	43	Pass
Probe Velocity	m/s	4.27 - 4.33	4.33	Pass
Pelvis Acceleration	G's	40 - 60	45	Pass
		Overall Test Results		Pass

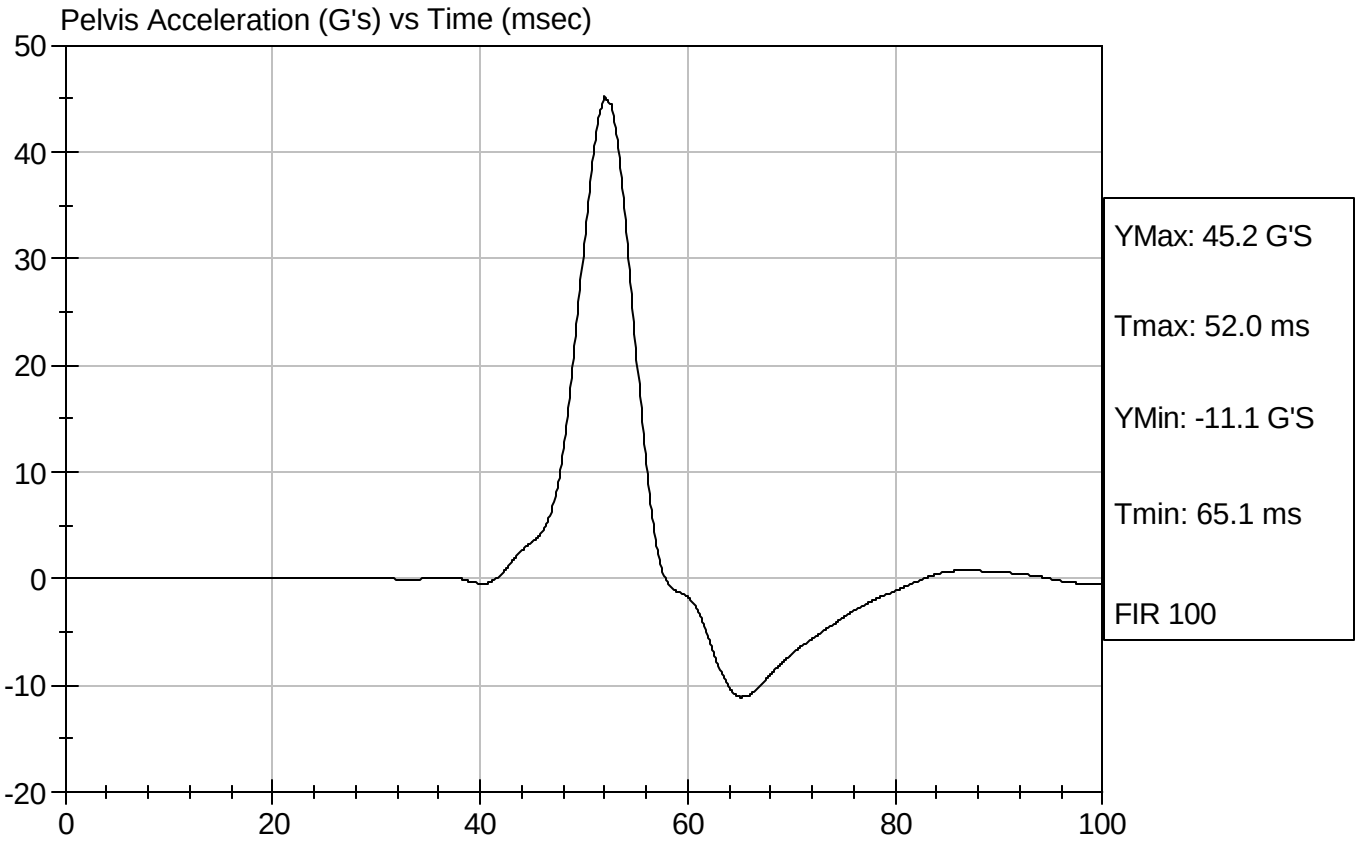
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Pelvis Impact
Component ID: d052593

Test Date: 09/21/2005
Speed: 14.19 ft/sec, 4.33 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Abdominal Compression Calibration (Pre-Load = 10 lbs)

ATD Serial No: 904 **Test I.D:** D052594

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 12.7 mm	N	104 -162	140	Pass
Force At 19 mm	N	163 - 222	191	Pass
Force At 25.4 mm	N	222 - 280	260	Pass
Force At 33 mm	N	325 - 391	353	Pass
		Overall Test Results		Pass

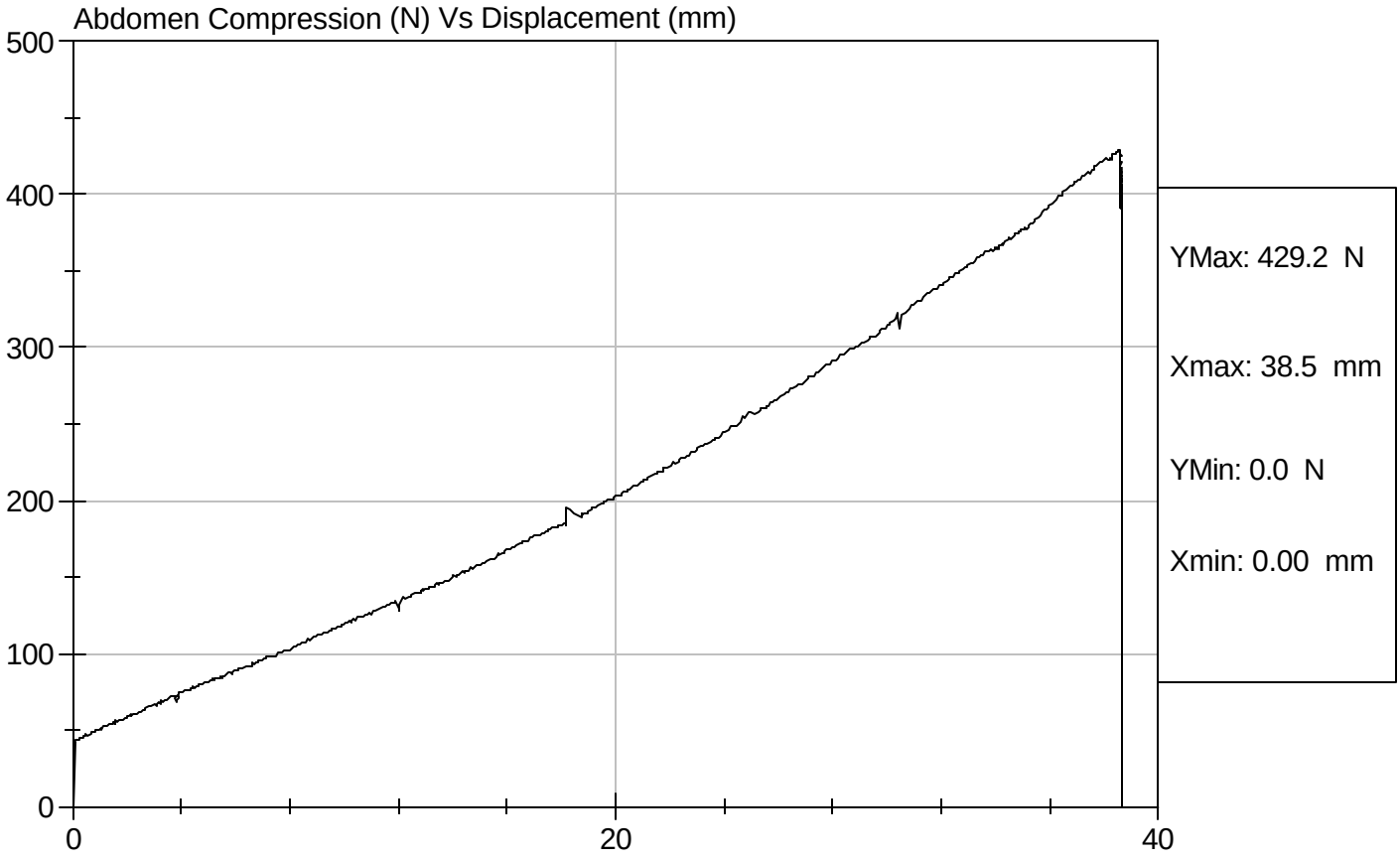
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Description: Abdomen Compression Test Date: 09/21/2005

Component: D052594 Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy

Lumbar Flexion Calibration

ATD Serial No: 904 **Test I.D:** D052595

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.5	21.8	Pass
Laboratory Relative Humidity	%	10 to 70	44	Pass
Force At 0 deg	N	0 - 26.7	0.0	Pass
Force At 20 deg	N	97.9 - 151.2	106.3	Pass
Force At 30 deg	N	151.2 - 204.6	160.6	Pass
Force At 40 deg	N	204.6 - 258.0	207.2	Pass
Return Angle	Deg	12 Maximum	2	Pass
		Overall Test Results		Pass

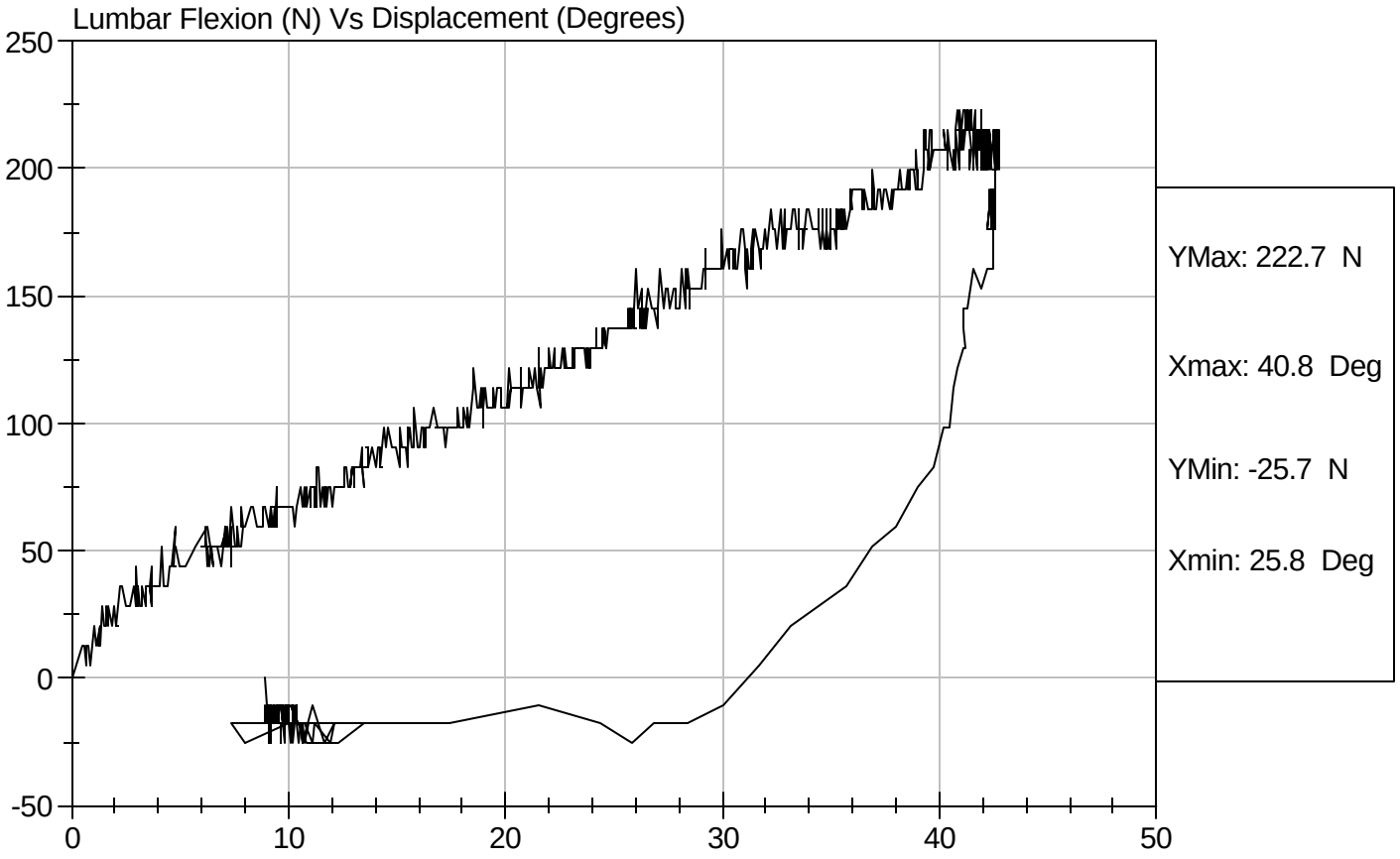
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Description: Lumbar Flexion | Test Date: 09/21/2005

Component: D052595 | Speed: 0 ft/sec, 0 m/sec



SID Calibration Data Sheet

Side Impact Dummy (SID)

Neck Pendulum Test

ATD Serial No: 904 **Test I.D:** D052599

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
Impact Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 msec	m/s	1.96 to 2.55	2.39	Pass
	20 msec	m/s	4.12 to 5.10	4.65	Pass
	30 msec	m/s	5.73 to 7.01	6.48	Pass
	40 to 70 msec	m/s	6.27 to 7.64	7.10	Pass
Midsaggital Plane Max Rotation		deg	66 to 82	75	Pass
Head Rotation Peak to Zero - Decay Time		msec	58 to 67	58	Pass
Max. Mx at Occipital Condyles		Nm	73 to 88	79	Pass
Mx Peak To Zero - Decay Time		msec	49 to 64	59	Pass
Mx Peak to Max. Head Rotation		msec	2 to 16	13	Pass

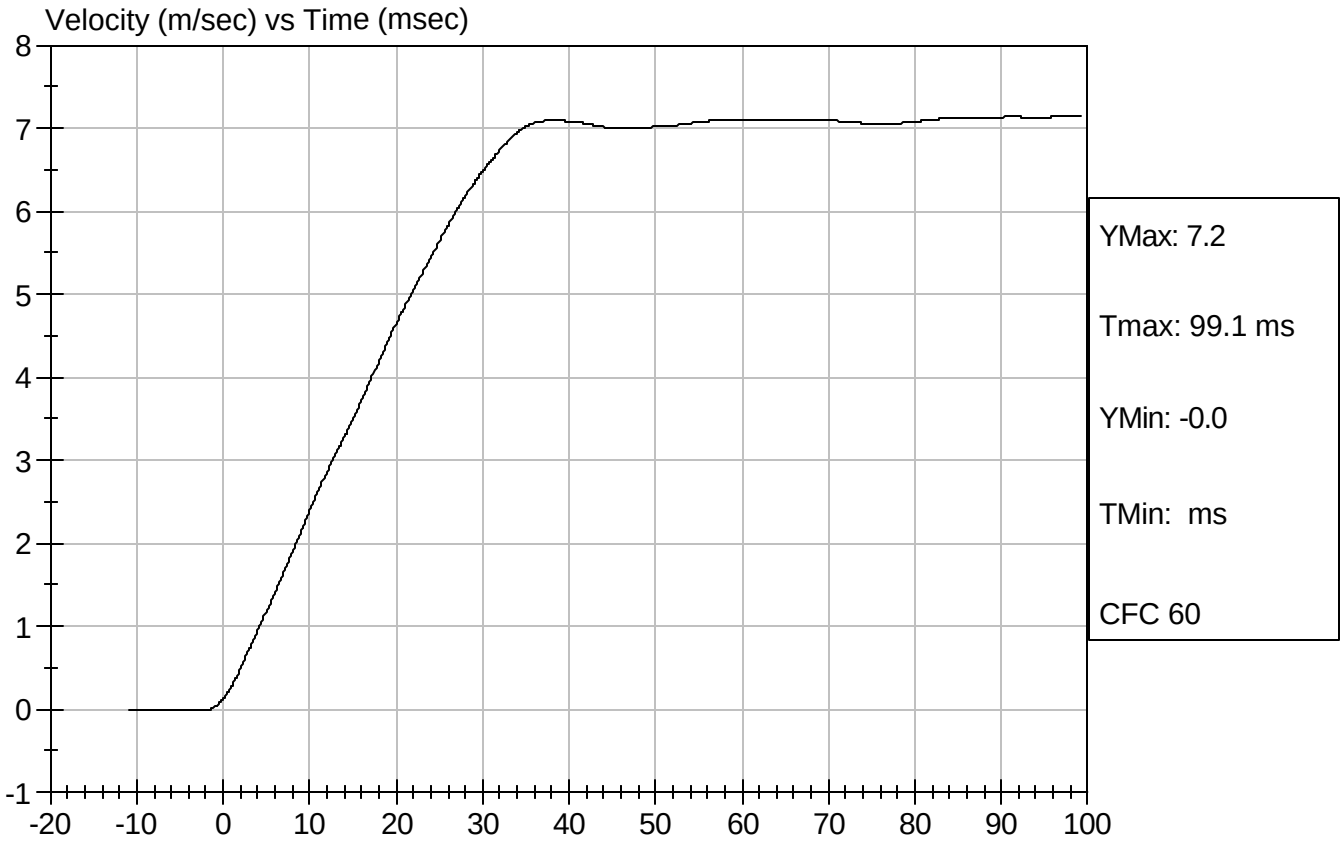
Jessica Hall
Laboratory Technician

09/21/2005
Test Date

David Winkelbauer
Approved By

Test Desc: Neck Bending
Component ID: D052599

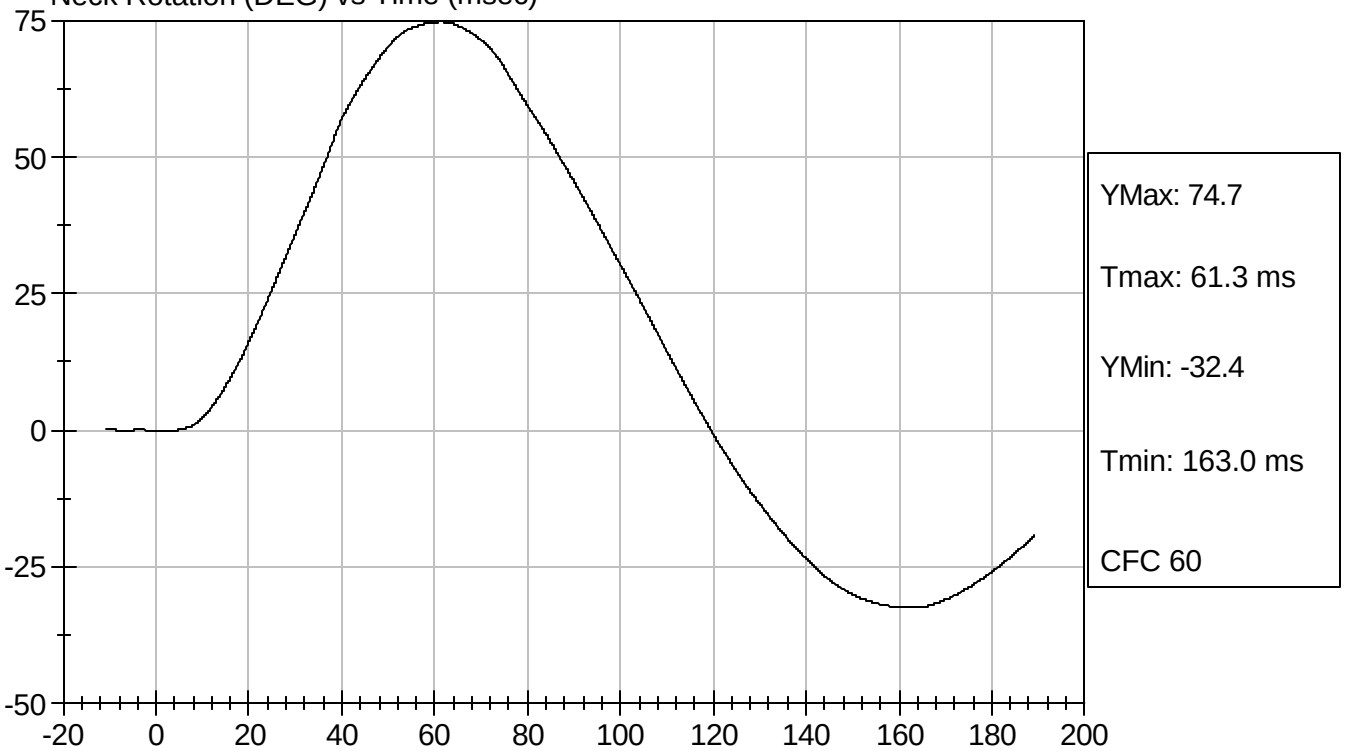
Test Date: 09/21/2005
Speed: 23.11 ft/sec, 7.04 m/sec



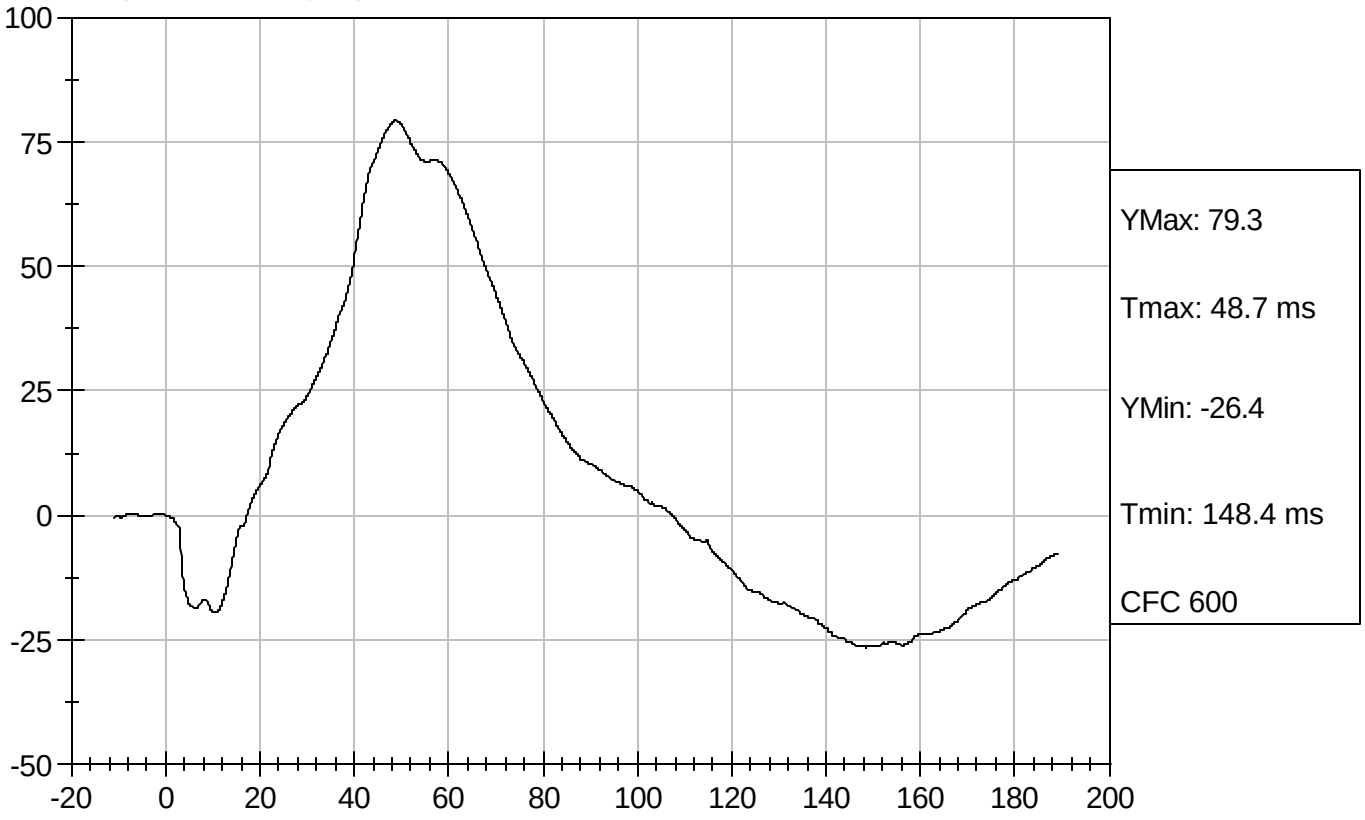
Test Desc: Neck Bending
Component ID: D052599

Test Date: 09/21/2005
Speed: 23.11 ft/sec, 7.04 m/sec

Neck Rotation (DEG) vs Time (msec)



Occipital Moment (Nm) vs Time (msec)



SID Calibration Data Sheet
Side Impact Dummy
Inspection Checklist

ATD Serial No: 904

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

09/20/2005
Test Date

David Winkelbauer
Approved By