FINAL REPORT NUMBER: SPNCAP-TRC-12-003

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

Volkswagen De Mexico S.A.
2012 Volkswagen Beetle 2DR Coupe
NHTSA NUMBER: MC5801

PREPARED BY:
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Report Date: March 8, 2012

FINAL REPORT

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

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Report Approved By: Margaret Susan

Margaret Susan, Project Manager

Approval Date: 3/8/2012

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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16. Abstract

A 32.2 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject vehicle, a 2012 Volkswagen Beetle 2DR Coupe, in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on January 4, 2012.

The impact velocity was 32.3 km/h, and the ambient temperature at the struck side of the target vehicle at the time of impact was 22° C. The test vehicle's post-test maximum crush was 312 mm at Level 2.

The test or target vehicle's performance is given below:

	Unit	Threshold	Front SID-IIs
Head Injury Criteria (HIC_{36}):	NA	1000	235
Resultant Lower Spine Acceleration:	g's	82	54.0
Total Pelvic Force: (sum of acetabular and iliac forces)	N	5525	3576.8
Maximum Thoracic Rib Deflection	mm	38	18.1
Maximum Abdomen Rib Deflection	mm	45	21.1

The door struck by the pole did not totally 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 Pole Part 572V SID-IIs	18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE, Room E12-100 Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

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SECTION 1
TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY12 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test is to generate comparative side impact performance in a 2012 Volkswagen Beetle 2DR Coupe manufactured by Volkswagen De Mexico S.A. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated August 30, 2011.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2012 Volkswagen Beetle 2DR. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.3 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on January 4, 2012. Pre-test and post-test photographs of the test vehicle and the side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated August 30, 2011. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly: OCWS Side NCAP Pole Laboratory Test Procedure

Head CG Triaxial Accelerometers
Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
Abdomen Upper and Lower Rib Displacement Potentiometers
Lower Spine (T12) Triaxial Accelerometers
Iliac Load Cell
Acetabulum Load Cell

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

Injury readings for the SID-IIs dummy were recorded as follows:

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC_{36})	NA	1000	235
Lower Spine Acceleration	G	82	54.0
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3576.8
Maximum Thoracic Rib Deflection	Mm	38*	18.1
Maximum Abdominal Rib Deflection	mm	45*	21.1

* Proposed IARV

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear Passenger Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	NA	NA		
Side Airbag (Head/Torso)	Yes	Yes	NA	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	NA	NA	NA	NA

GENERAL COMMENTS

The driver door remained latched and closed during impact. The fuel system remained intact impact and no fuel leakage occurred throughout the test. The side airbag and seat belt pretensioner deployed as expected to provide adequate protection to the occupant. No driver performance value exceeded the threshold.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MC5801	Traction Control System (TCS)	Yes
Model Year	2012	Auto-Leveling System	No
Make	Volkswagen	Automatic Door Locks (ADL)	No
Model	Beetle	Power Window Auto-Reverse	Yes
Body Style	2-door Coupe	Other Optional Feature	NA
VIN	3VWJX7AT1CM612661	Driver Frontal Airbag	Yes
Body Color	Red	Driver Curtain Airbag	No
Odometer Reading (miles)	186	Driver Head/Torso Airbag	Yes
Engine Displacement (L)	2.5	Driver Torso Airbag	No
Number of Cylinders	4	Driver Torso/Pelvis Airbag	No
Engine Placement	Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Rear Passenger Curtain Airbag	No
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Passenger Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof / T-Top	No	Rear Passenger Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rr. Pass. Seat Belt Pretensioner	Yes
Power Seats	No	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Passenger Load Limiter	No
All-Wheel Drive (AWD)	No	Other Safety Restraint	NA

Does owner's manual provide instructions to turn off automatic door locks? NA

DATA FROM CERTIFICATION LABEL

Manufactured By	Volkswagen De Mexico S.A.	GVWR (lb)[1]	3924
Date of Manufacture	10/11	GAWR Front (lb)[1]	2227
Vehicle Type	2-door	GAWR Rear (lb)[1]	1808

[1] Certification Label states weight in pounds.

VEHICLE SEATING AND WEIGHT CAPACITY DATA

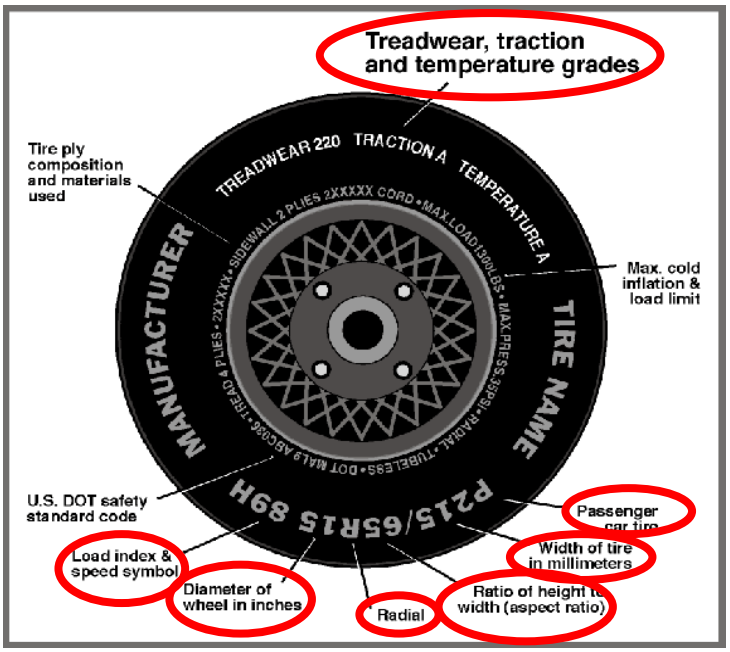
	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	2	0	4
Vehicle Capacity Weight (VCW) (kg)				370
DSC x 68.04 kg				4
Rated Cargo and Luggage Weight (RCLW) (kg)				98.0

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	Yes	No	No		No	No	Yes
Rear or Second Row Seat	No	No	Yes	No	Yes	No	No
Third Row Seat	No	No	No	No	No	No	No

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



TIRE PLACARD INFORMATION

Measured Parameter	Front	Rear
Recommended Cold Tire Pressure (kPa)	200	200
Recommended Tire Size	215/55R17	215/55R17

TIRE SIDEWALL INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Manufacturer	Hankook	Hankook
Tire Name	Optimo H426	Optimo H426
Tire Type	Grand Touring All-Season	Grand Touring All-Season
Tire Width	215	215
Aspect Ratio	55	55
Radial	Yes	Yes
Wheel Diameter	17	17
Load Index/ Speed Symbol	94H	94H
Treadwear	440	440
Traction Grade	A	A
Temperature Grade	A	A
Tire Material	Rubber	Rubber

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	NA	NA	NA	NA
Tire Placard	kPa	200	200	200	200
Owner's Manual	kPa	NA	NA	NA	NA
As Tested	kPa	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	421.6	262.2		453.4	295.8		442.2	330.8	
Right	kg	440.6	252.8		467.8	301.2		447.0	312.2	
Ratio	%	62.6	37.4		60.7	39.3		58.0	42.0	
Totals	kg	862.2	515.0	1377.2	921.2	597.0	1518.2	889.2	643.0	1532.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1377.2	(A)
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	49.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	98.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1524.2	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? X YES □ NO

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast (if any)	0.0
Tail lights, 4 hub caps & trim rings, rear hatch weather strip, right door weather strip, right door window motor, right door sill plate, and right kick panel	11.9

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	0.8	1.0	0.1	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	0.7	0.7	0.0	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	0.3	0.7	0.2	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	0.2	0.1	0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	950	999	1065	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	950	999	-.9	

* ND=Nose Down (-), NU=Nose Up (+) ** LD=Left Down (-), LU=Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for "Meets Requirements".

DATA SHEET NO. 2

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

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

SEAT POSITIONING

The driver seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL(°)		
	Max.	Min.	Mid
Driver Seat	6.4	1.8	4.1
Front Passenger Seat	6.4	1.8	4.1
Front Center Seat*	NA	NA	NA
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat*	NA	NA	NA

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore/Aft	Forward-Most
Driver Seat	4.1	54.4	Max.	77.3	85.5	96.3
			Mid	35.8	46.0	54.4
			Min.	28.5	36.3	47.3
Front Passenger Seat	4.1	54.4	Max.	77.1	85.5	96.3
			Mid	35.8	46.1	54.4
			Min.	28.4	36.6	47.4
Front Center Seat*	NA	NA	Max.	NA	NA	NA
			Mid	NA	NA	NA
			Min.	NA	NA	NA
Struck Side Rear Seat	Fixed	Fixed	Max.	NA	NA	NA
			Mid	NA	NA	NA
			Min.	NA	NA	NA
Non-Struck Side Rear Seat	Fixed	Fixed	Max.	NA	NA	NA
			Mid	NA	NA	NA
			Min.	NA	NA	NA
Rear Center Seat*	NA	NA	Max.	NA	NA	NA
			Mid	NA	NA	NA
			Min.	NA	NA	NA

* If applicable.

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

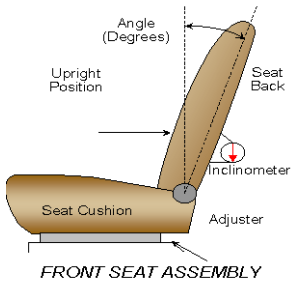
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	254	38	0	0
Front Passenger Seat	254	38	0	0
Front Center Seat*	NA	NA	NA	NA
Struck Side Rear Seat	NA	NA	NA	NA
Non-Struck Side Rear Seat	NA	NA	NA	NA
Rear Center Seat*	NA	NA	NA	NA

* If applicable.

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1. For the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/ Seated Dummy	76	NA	18	NA
Front Passenger Seat	76	NA	18	NA
Front Center Seat*	NA	NA	NA	NA
Struck Side Rear Seat	Fixed	NA	16.9	NA
Non-Struck Side Rear Seat	Fixed	NA	16.3	NA
Rear Center Seat*	NA	NA	NA	NA

* If applicable.

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted with the information provided by the manufacturer on Form No. 1

	Total # of Positions	Placed in Position #
Driver Seat	1	0

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	5	Lowest

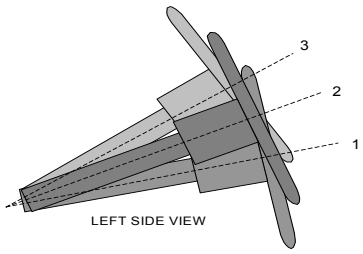
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	21.8	NA
Geometric Center, Position No. 2	24.4	NA
Uppermost, Position No. 3	26.9	NA
Telescoping Steering Wheel Travel		58
Test Position	24.4	29

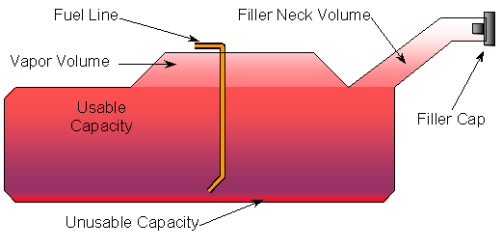


STEERING COLUMN ASSEMBLY

FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler neck:

The fuel tank is located under the rear seat area. The fuel filler neck enters on the right rear corner of the fuel tank. The fuel filler cap is located on the right rear quarter panel. The fuel lines run under the right floorpan area.



VEHICLE FUEL TANK ASSEMBLY

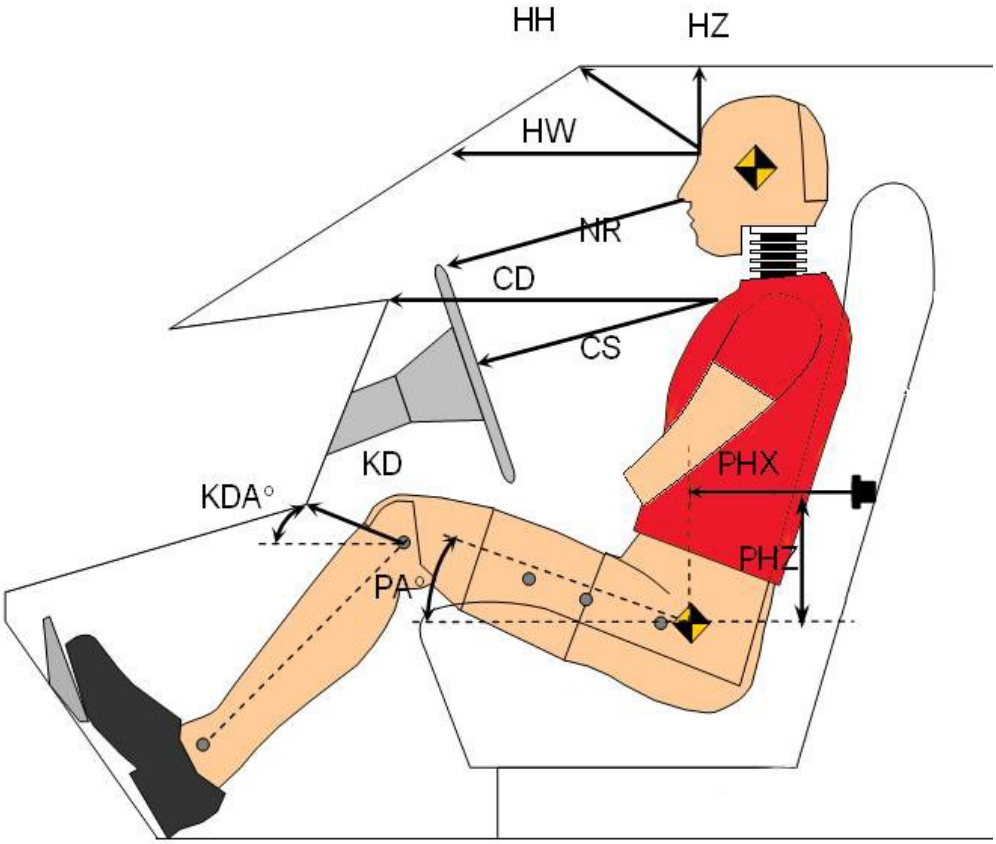
FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	55
Usable Capacity of "Optional" Tank (see Form No. 1)	NA
Usable Capacity of Standard Tank (see Owner's Manual)	55
Usable Capacity of Optional Tank (see Owner's Manual)	NA
93% of Usable Capacity	51.15
Actual Amount of Solvent Used in Test	51.1
1/3 of Usable Capacity	18.3

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated on Form No. 1? **X** YES ☐ NO

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

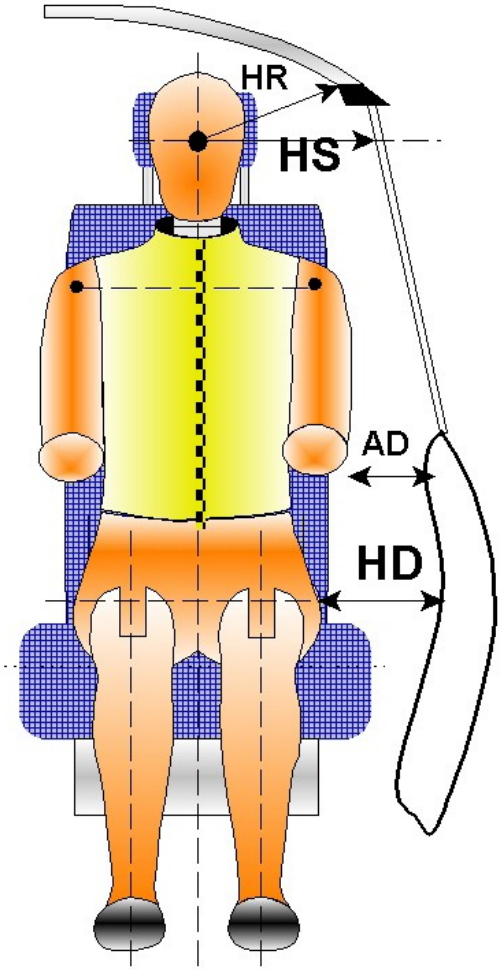
Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	368	
HW	Head to Windshield	616	
HZ	Head to Roof Liner	235	
NR	Nose to Rim	260	
CD	Chest to Dashboard	436	
CS	Chest to Steering Wheel	193	
KDL/KDLA°	Left Knee to Dash	155	36
KDR/KDRA°	Right Knee to Dash	150	36
PAX°	Pelvic Tilt Angle (X-axis)		22.2
PAY°	Pelvic Tilt Angle (Y-axis)		NA
PHX	Hip Point to Striker (X-Axis)	566	
PHZ	Hip Point to Striker (Z-Axis)	200	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

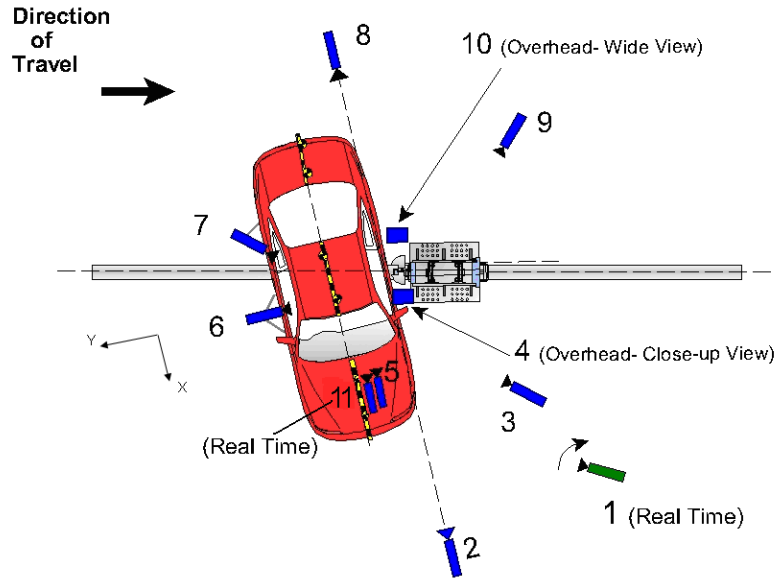
Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



Code	Measurement Description	Length (mm)
HR	Head to Side Header	255
HS	Head to Side Window	343
AD	Arm to Door	148
HD	Hip Point to Door	185

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



REFERENCE: (from point of impact for X and Y; from ground for Z)
+ X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				zoom	30
2	Front ground level – impact view	1562	5232	1340	12.5	1000
3	Impact side 45° – forward pole view	1841	3632	1335	16	1000
4	Overhead Close-up view of impact	0	0	5650	75	1000
5	Onboard – dummy front view				8.5	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				8.5	1000
8	Rear ground level – impact view	1537	-4394	1257	8.5	1000
9	Impact side 45° – rearward pole view	1079	-4699	1320	16	1000
10	Overhead wide view of impact	300	0	5650	8.5	1000
11	Real time dummy front view				zoom	30

All measurements accurate to +/- 6 mm.
NOTE: Vehicle was at a 75° angle to the rigid pole.

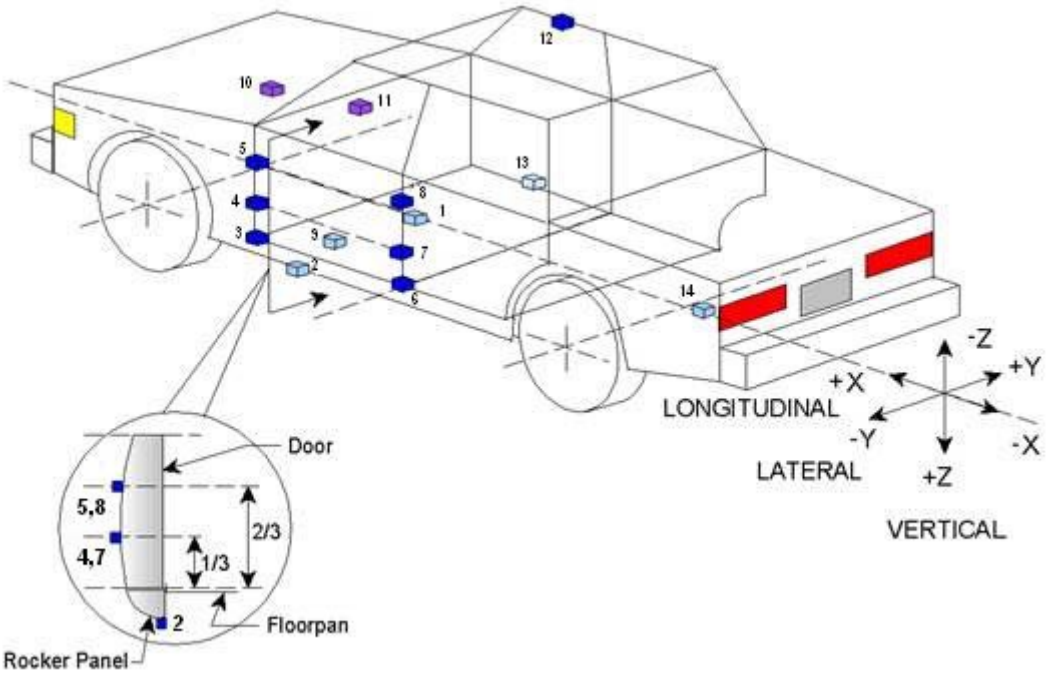
If applicable, explain why camera(s) did not run: _____

INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	18
Pole Load Cells	8
TOTAL	42

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



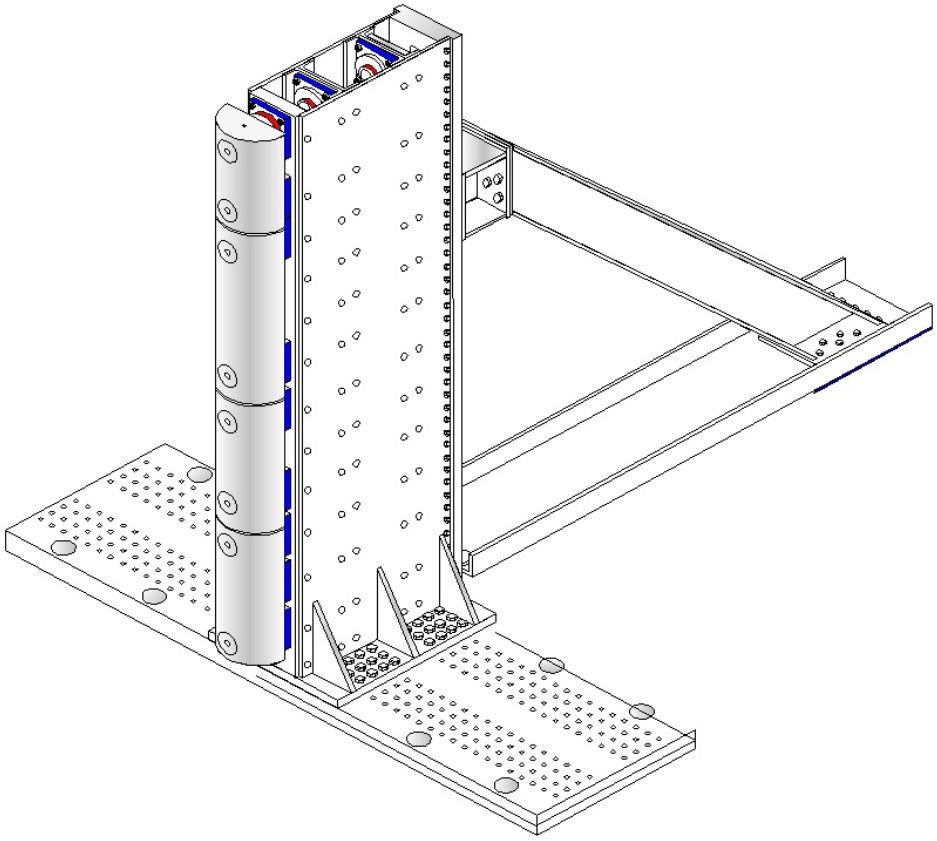
	Accelerometer/Sensor Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2570	120	-394
2	Left Floor Sill	2700	-685	-362
3	A-Pillar Sill	2860	-685	-364
4	A-Pillar Low	2940	-765	-474
5	A-Pillar Mid	2932	-770	-808
6	B-Pillar Sill	1890	-685	-272
7	B-Pillar Low	1795	-722	-585
8	B-Pillar Mid	1745	-722	-854
9	Driver Seat Track	2100	-585	-328
10	Engine Top	3665	385	-775
11	Firewall	3361	0	-810
12	Right Roof	2260	585	-1329
13	Right Floor Sill	2245	685	-360
14	Rear Floorpan	1055	0	-477

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

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

FOIL 300K RIGID POLE



Load Cell Locations	
ID	**Height From Ground (mm)**
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

DATA SHEET NO. 8
POST TEST OBSERVATIONS

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	NA
Top of Head	Side airbag
Left Side of Head	Side airbag
Back of Head	Head Restraint
Left Shoulder	Side airbag
Upper Torso	Side airbag
Lower Torso	Side airbag
Left Hip	None
Left Knee	None

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	NA	Yes	NA	Yes
Total Separation from Vehicle at Hinges or Latches	No	NA	No	NA	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	NA	No	NA	No
Disengaged from Latched Position	No	NA	No	NA	No
Latch Separated from Striker	No	NA	No	NA	No
Jammed Shut	Yes	NA	No	NA	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	NA	NA	NA	NA	NA

* Indicate “Yes”, “No”, or “NA”.

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	NA	No	NA
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	No	NA	No	NA
Seat Back Collapse	No	No	No	No

* Indicate “Yes”, “No”, or “NA”.

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar deformed but intact
Sill Separation	No
Windshield Damage	Broken
Side Window Damage	Shattered
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

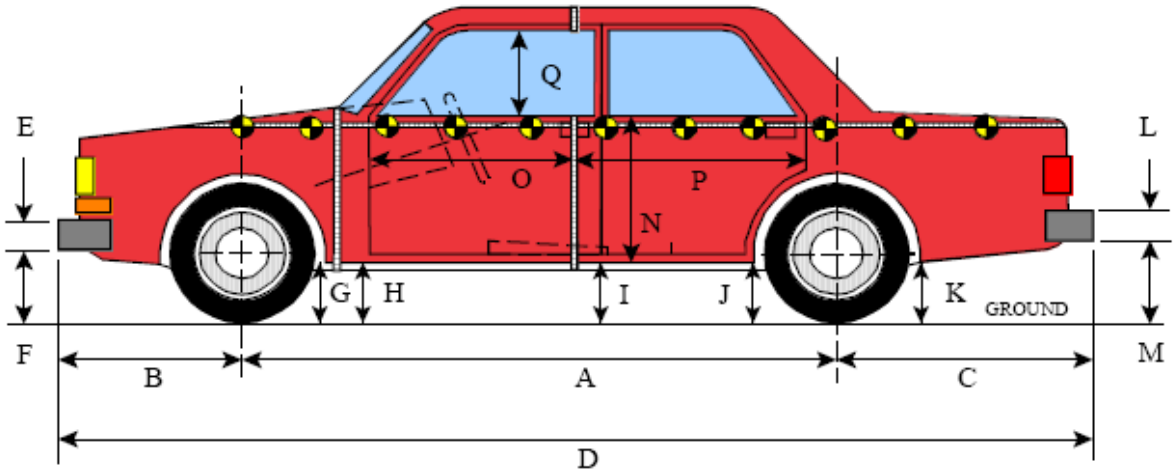
Restraint Type	Struck Side (Driver)		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	No		
Side Airbag (Head/Torso)	Yes	Yes	NA	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	NA	NA	NA	NA

VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1208
Actual Impact Point (Aft of Front Axle)	mm		1207
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	1 forward
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	73
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.3
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.3

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



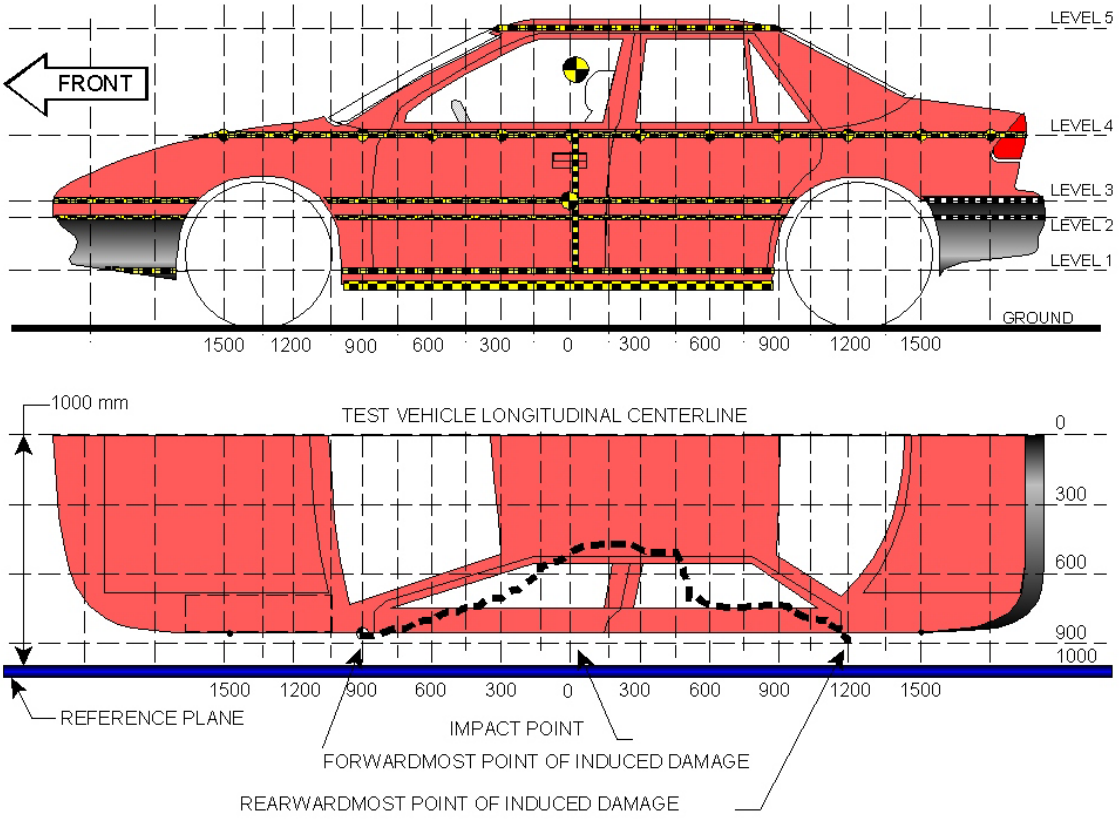
LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2540	2460	80
B	Front Axle to Front Surface of Vehicle	870	890	-20
C	Rear Axle to Rear Surface of Vehicle	860	855	5
D	Total Length at Centerline	4270	4230	40
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	415	411	4
G	Sill Height at Front Wheel Well	235	250	-15
H	Sill Height at Front Door Leading Edge	230	243	-13
I	Sill Height at B-Pillar	242	298	-56
J1	Sill Height at Rear Wheel Well	254	311	-57
J2	Pinch Weld Height at Rear Wheel Well	180	240	-60
K	Sill Height Aft of Rear Wheel Well	322	389	-67
L	Rear Bumper Thickness	242	242	0
M	Rear Bumper Bottom to Ground	353	416	-63
N	Sill Height to Bottom of Front Window Sill	NA	NA	NA
O	Front Door Leading Edge to Impact CL	NA	NA	NA
P	Rear Door Trailing Edge to Impact CL	NA	NA	NA
Q	Front Window Opening	353	338	15
R	Right Side Length	4140	4116	24
S	Left Side Length	4140	4163	-23
T	Vehicle Width at "B" Pillars	1315	1263	52

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



NOTE: All measurements are in millimeters (mm)

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	382	289	-150
2	Occupant H-Point	567	312	-150
3	Mid-Door	650	311	-150
4	Window Sill	944	248	0
5	Window Top	1379	111	-150

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

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

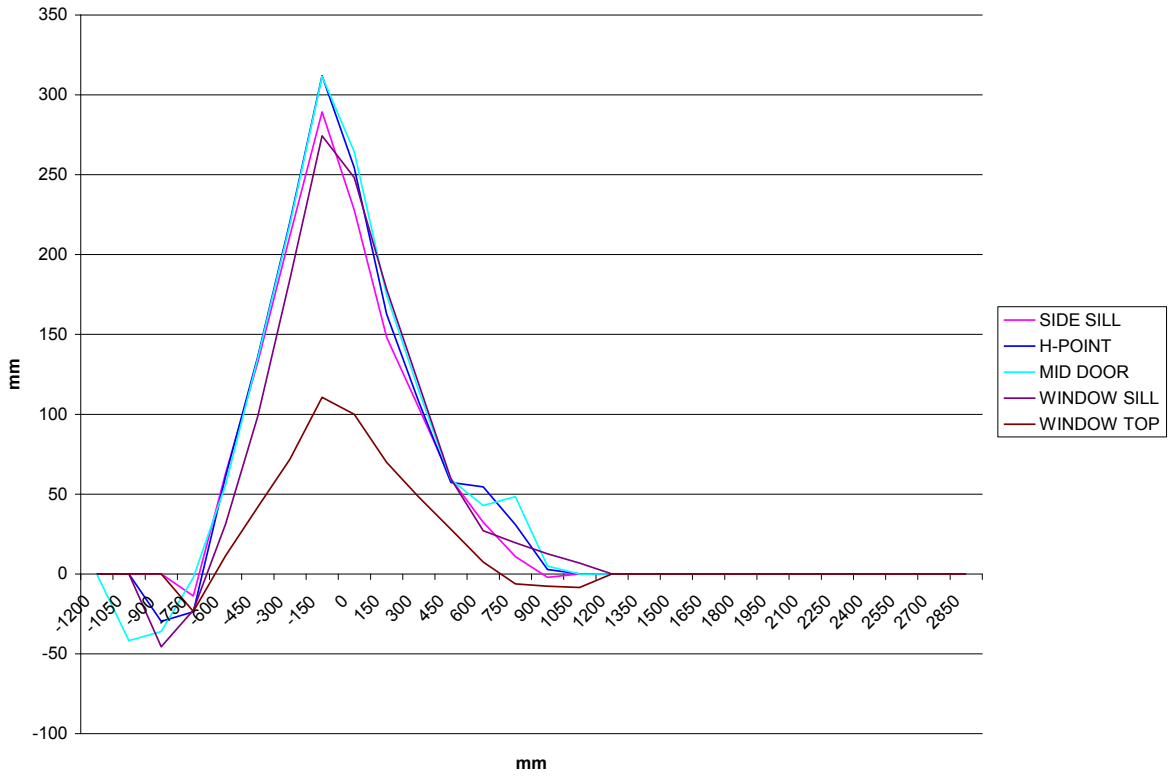
Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	879	871	746	0	-30	909	907	792	0	30	-30	-36	-46	0
-750	857	826	819	761	758	-24	850	821	784	782	881	-24	-2	-23	-24
-600	815	824	824	763	713	61	763	769	732	701	754	61	55	31	12
-450	817	828	830	774	664	136	692	695	675	622	681	136	135	99	42
-300	819	831	834	783	621	221	610	615	598	549	598	221	219	185	72
-150	820	833	835	790	601	312	521	524	516	490	508	312	311	274	111
0	821	833	836	796	592	254	579	571	548	492	567	254	265	248	100
150	820	832	835	797	585	163	669	661	619	515	657	163	174	178	70
300	819	829	831	796	580	108	721	717	677	532	711	108	114	119	48
450	817	825	826	792	578	57	768	767	733	550	760	57	59	59	28
600	814	821	821	786	580	54	767	778	759	572	760	54	43	27	8
750	808	813	812	777	586	31	782	764	758	593	777	31	48	19	-7
900	859	851	831	765	599	3	848	826	753	607	856	3	5	12	-8
1050	0	0	863	749	619	0	0	864	742	628	0	0	-1	7	-9
1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



DATA SHEET NO. 11
FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12

Test Time: 20:16 **Temperature:** 22

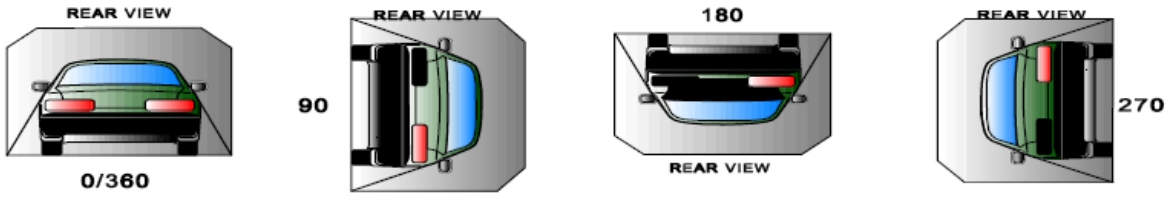
A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)

B. For the 5 minute period after motion ceases: 0
(Maximum allowable is 5 ounces)

C. For the following 25 minutes: 0
(Maximum allowable is 1 ounce/minute)

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	120	300	420
90 to 180	120	300	840
180 to 270	120	300	1260
270 to 360	120	300	1680

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

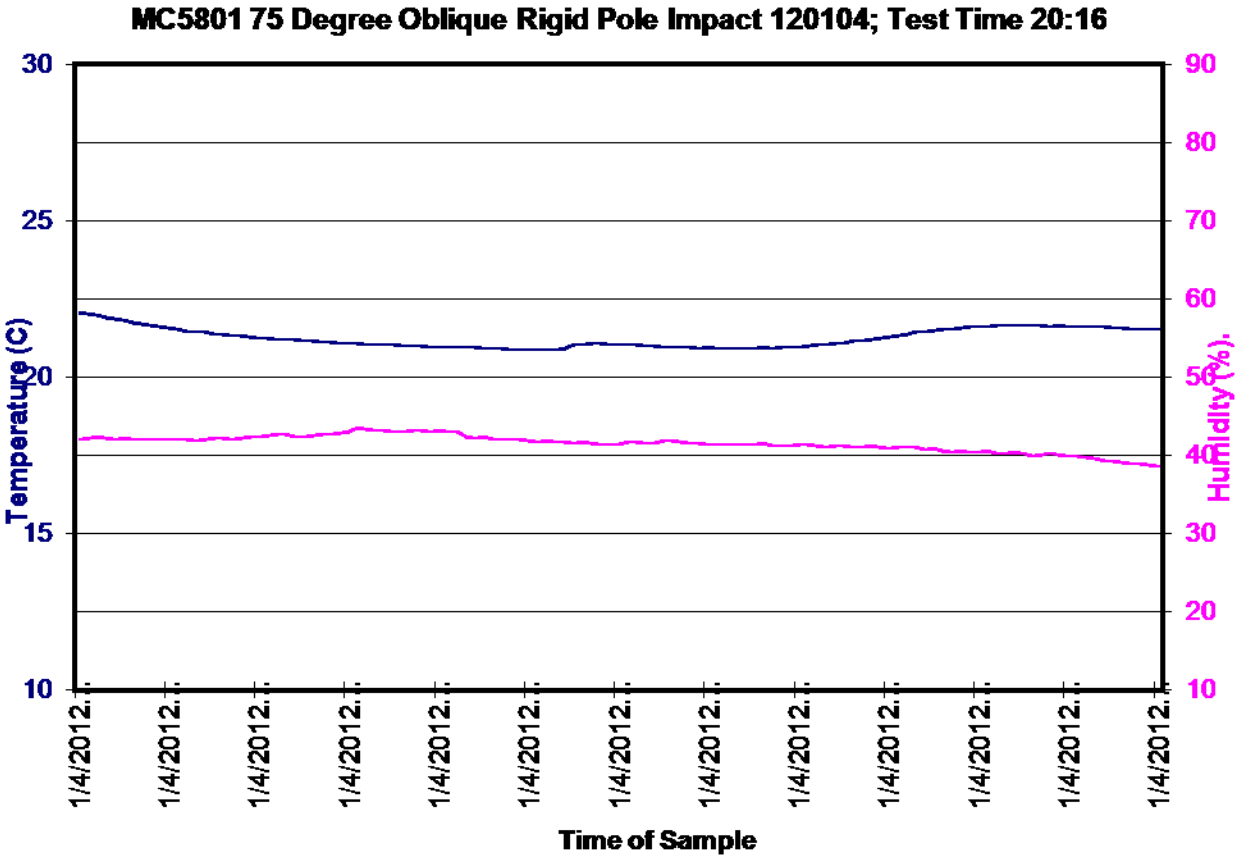
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0 to 90	0	0	0	NA
90 to 180	0	0	0	NA
180 to 270	0	0	0	NA
270 to 360	0	0	0	NA

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0 to 90	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 12
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2012 Volkswagen Beetle 2DR Coupe NHTSA No.: MC5801
Test Program: SPNCAP Side Impact Test Date: 01/04/12



APPENDIX A
PHOTOGRAPHS

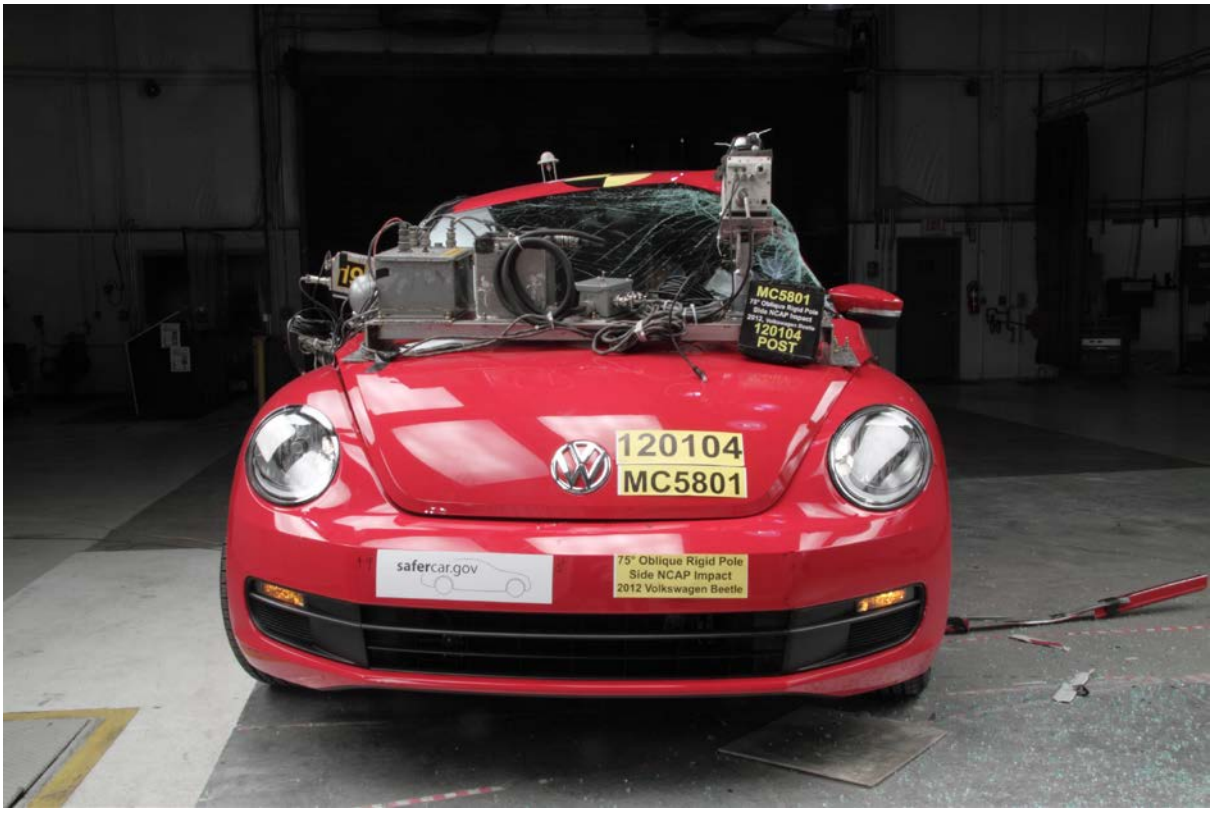
TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

001 As Delivered Right Front 3/4 View of Test Vehicle

002 As Delivered Left Rear 3/4 View of Test Vehicle

003 Pre-Test Frontal View of Test Vehicle



004 Post-Test Frontal View of Test Vehicle

005 Pre-Test Left Front 3/4 View of Test Vehicle

006 Post-Test Left Front 3/4 View of Test Vehicle

007 Pre-Test Left Side View of Test Vehicle

008 Post-Test Left Side View of Test Vehicle

009 Pre-Test Left Rear 3/4 View of Test Vehicle

010 Post-Test Left Rear 3/4 View of Test Vehicle

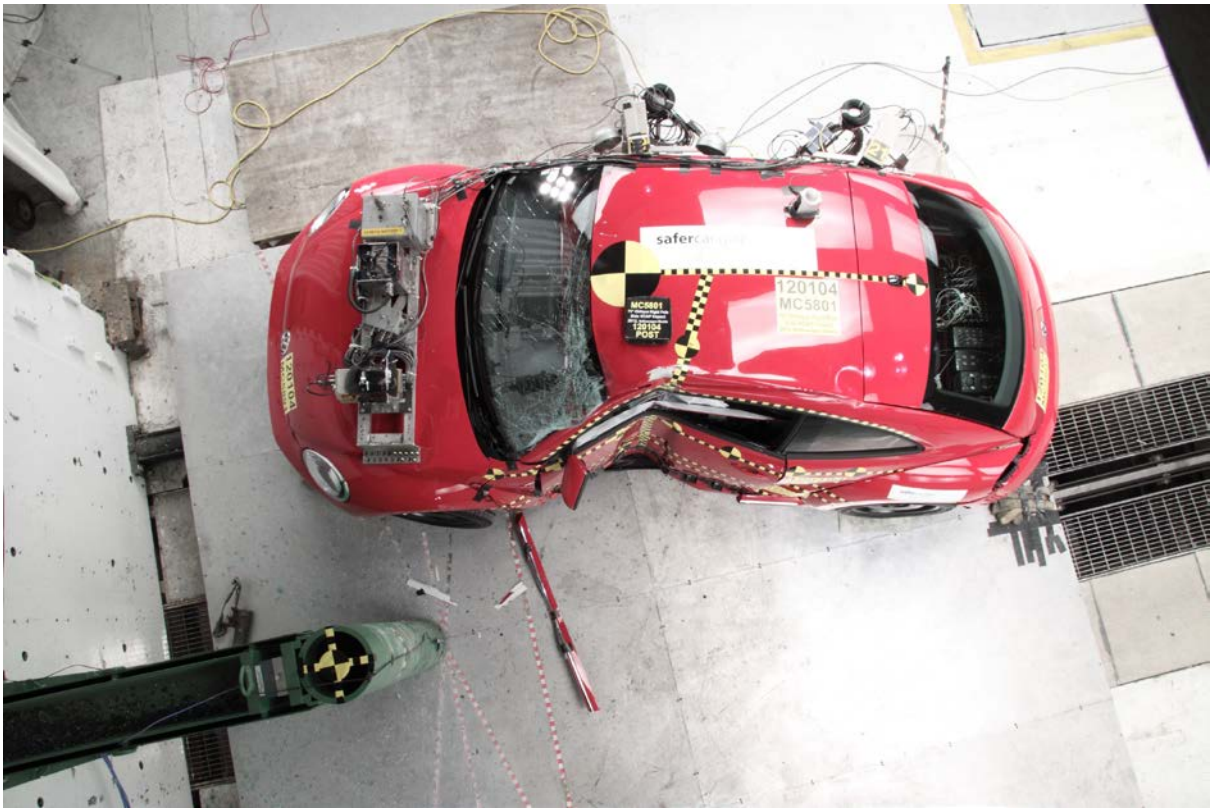
011 Pre-Test Rear View of Test Vehicle

012 Post-Test Rear View of Test Vehicle

013 Pre-Test Right Side View of Test Vehicle

014 Post-Test Right Side View of Test Vehicle

015 Pre-Test Overhead View of Test Area



016 Post-Test Overhead View of Test Area

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

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

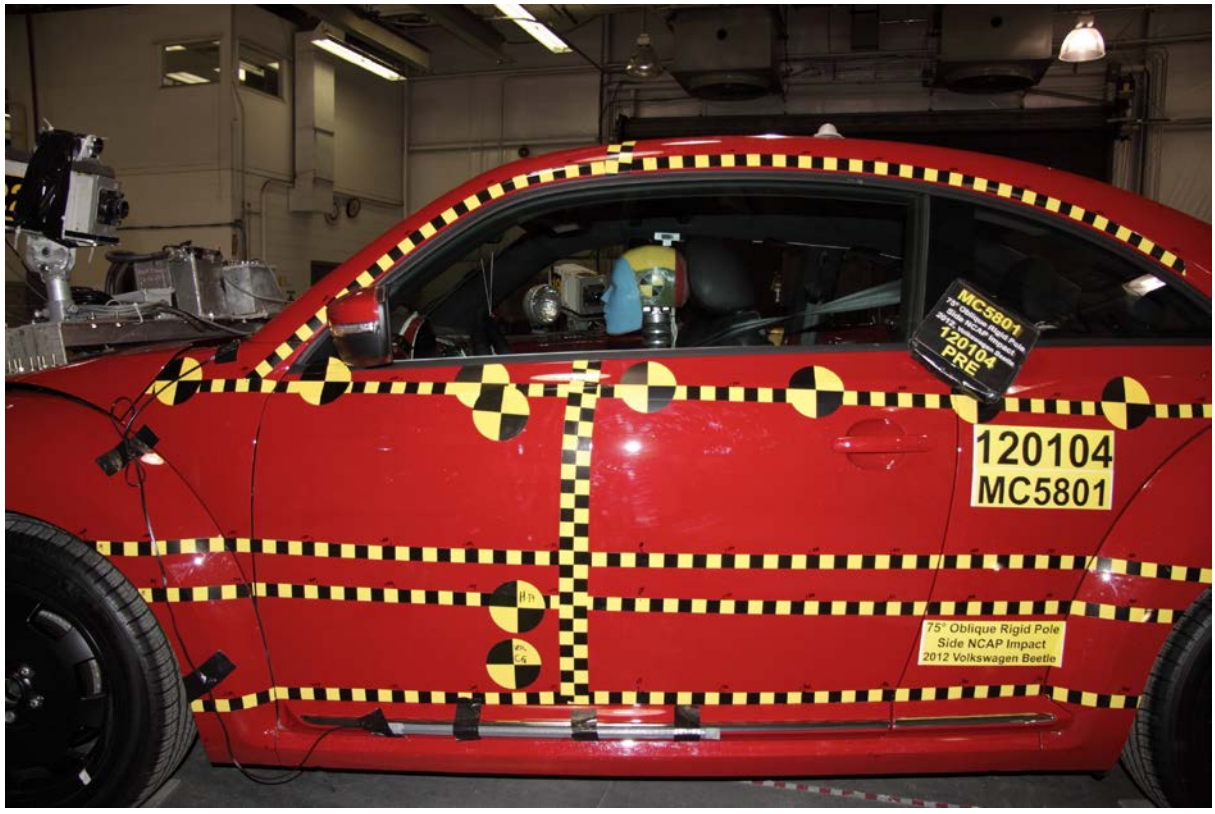
019 Pre-Test Close-Up View of Impact Point Target

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

021 Pre-Test Front Close-Up View of Dummy Head and Chest

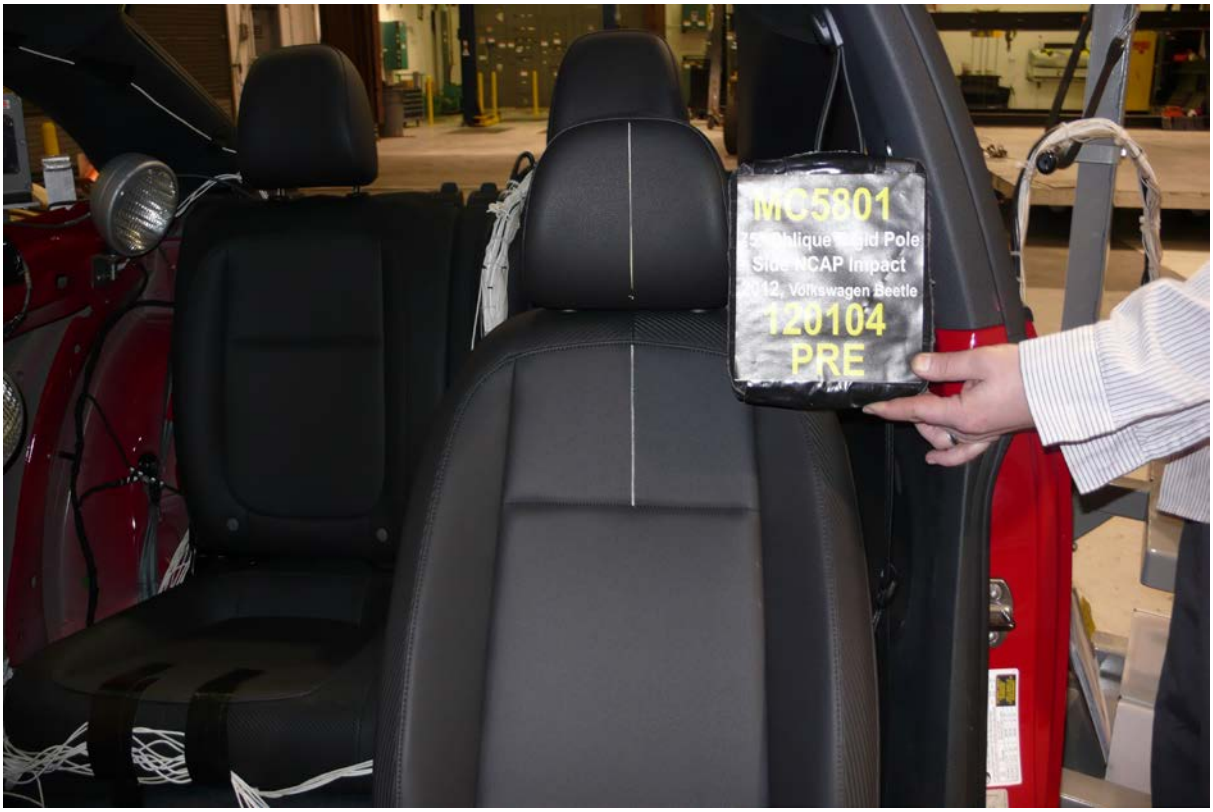
022 Post-Test Front Close-Up View of Dummy

023 Pre-Test Left Side View of Dummy Showing Belt and Chalking



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

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



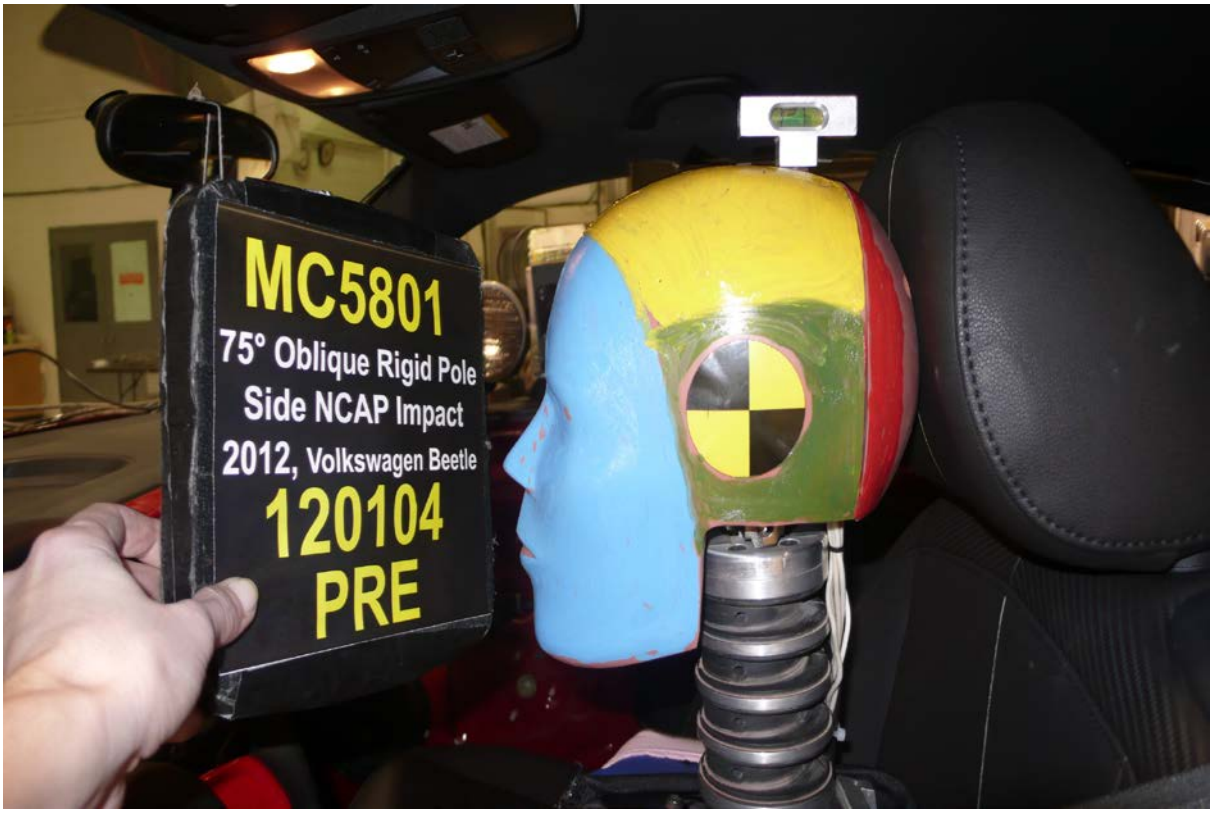
026 Pre-Test Front View of Seat Back Prior to Dummy Positioning

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

028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning

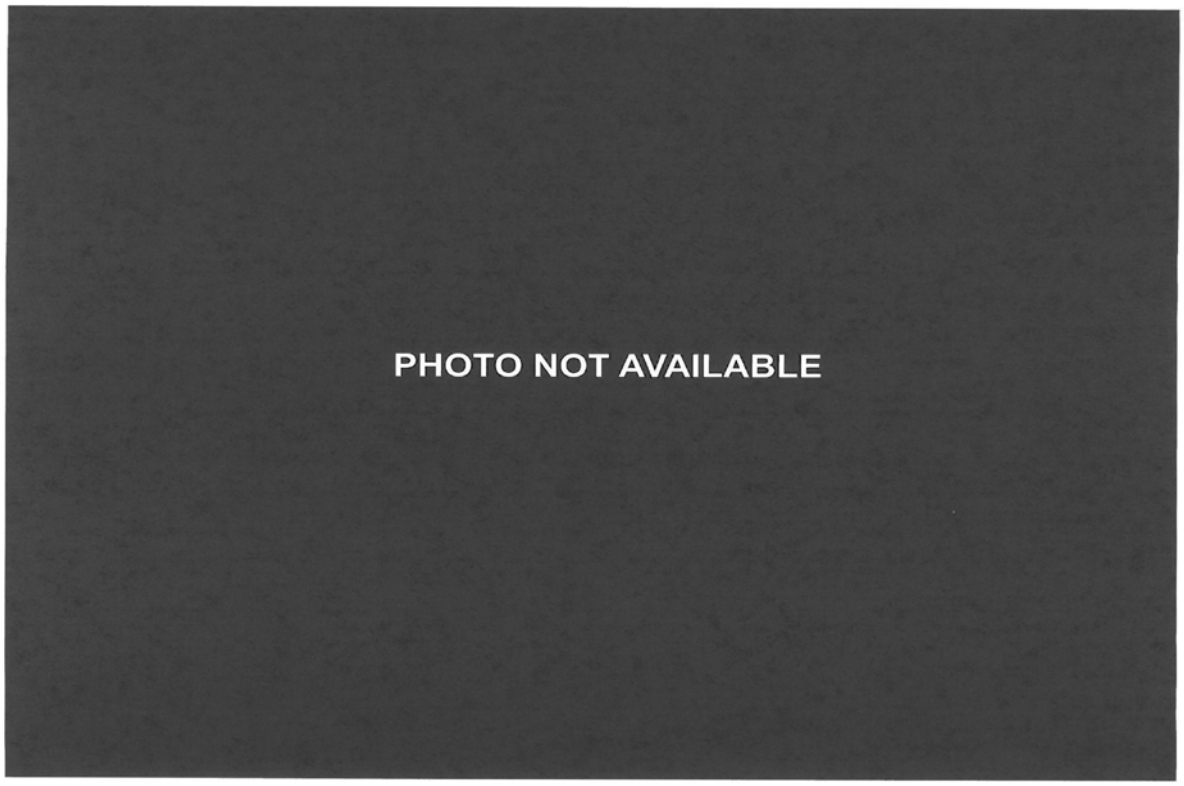
029 Pre-Test Overhead View of Dummy Thighs on Seat Pan

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



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

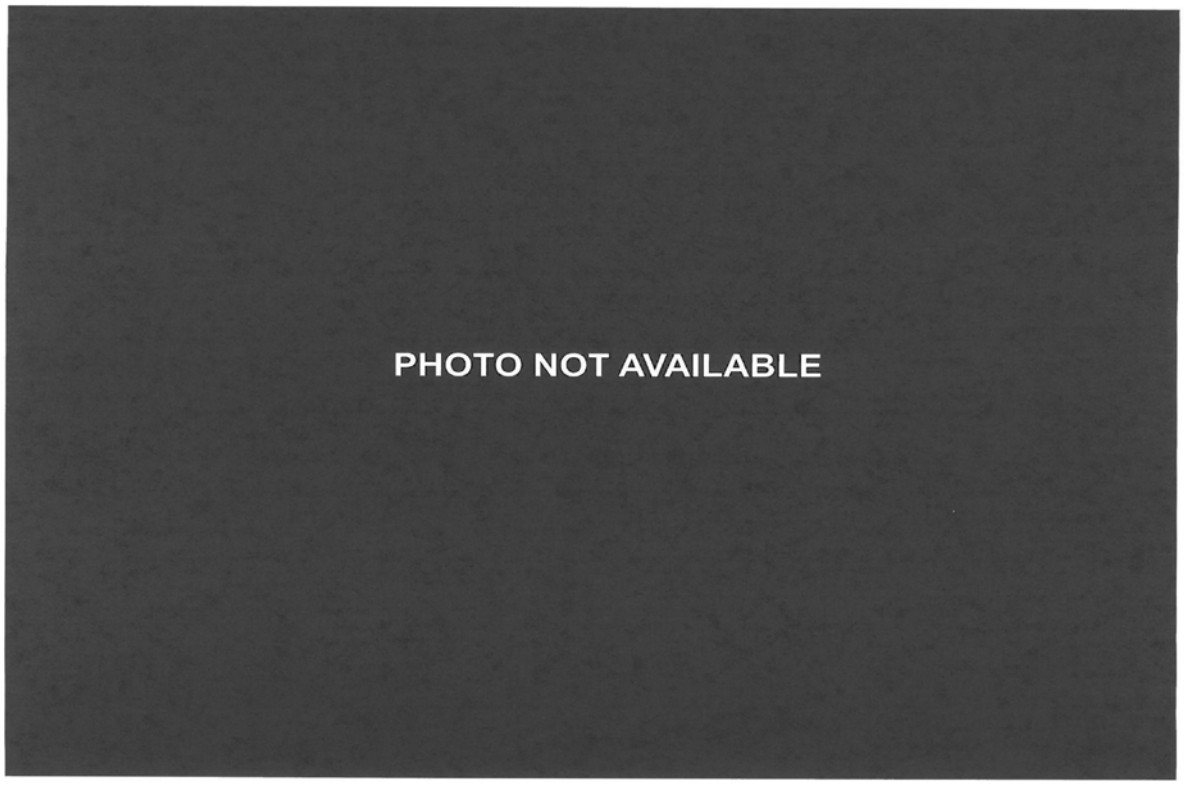
032 Pre-Test Placement of Dummy's Feet



033 Pre-Test View of Belt Anchorage for Dummy

034 Pre-Test Left Side View of Steering Wheel

035 Pre-Test View of Disengaged Parking Brake



036 Pre-Test View of Parking Brake

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

PHOTO NOT AVAILABLE

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

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

040 Pre-Test Dummy and Door Clearance View

041 Post-Test Dummy and Door Clearance View

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

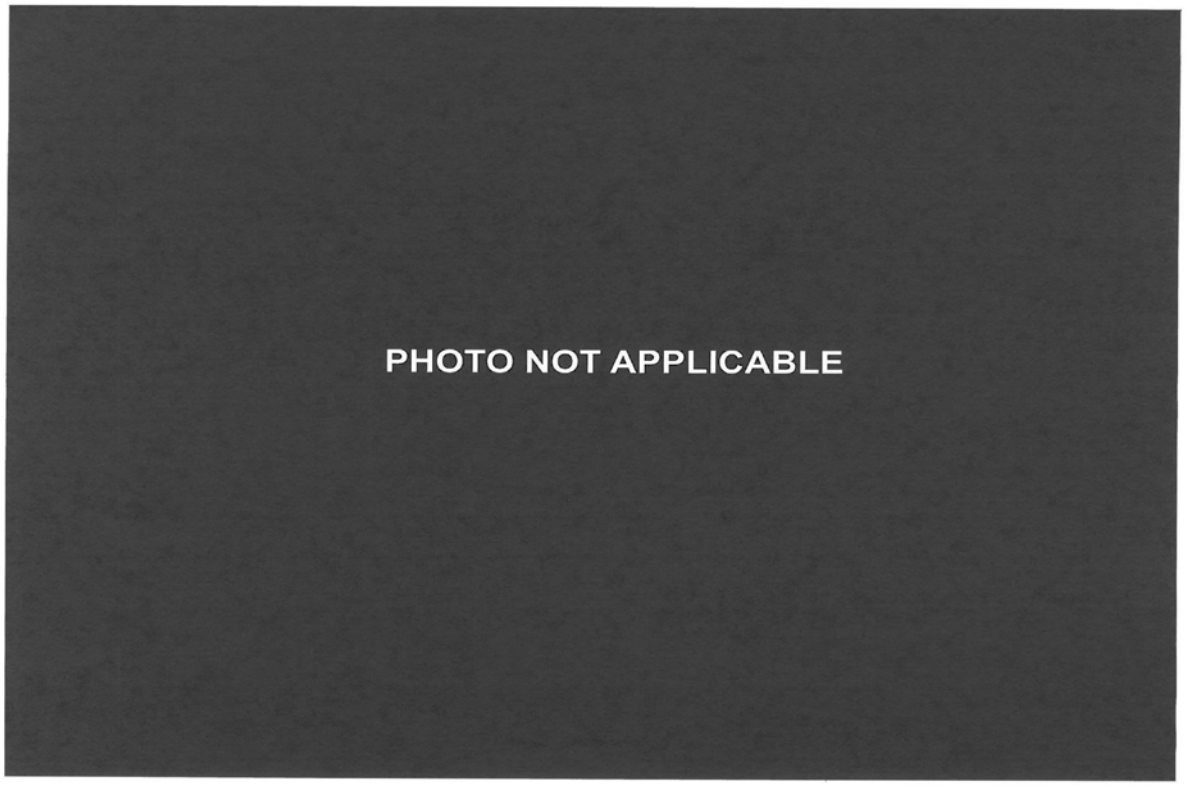
043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment

044 Pre-Test Inner Driver Door Panel View

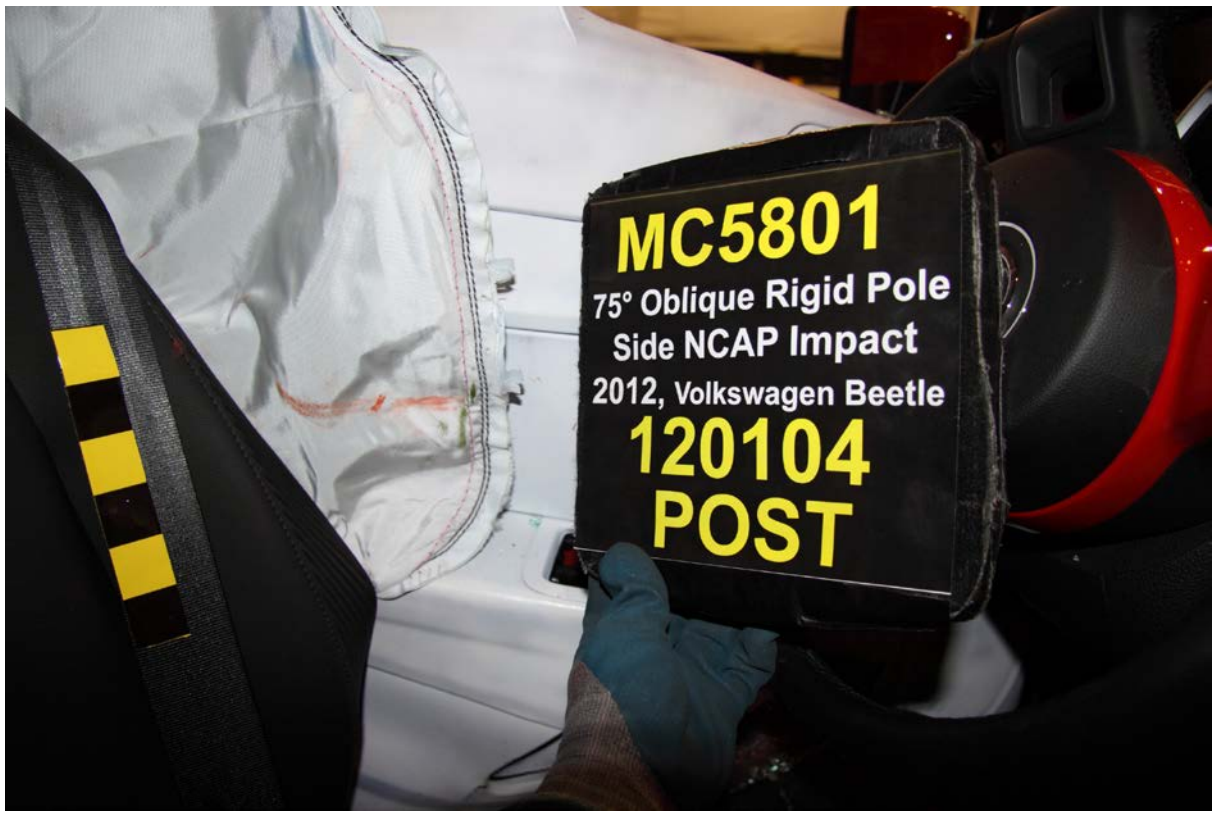
045 Post-Test Inner Driver Door Panel View Showing Dummy Contact Location

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

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

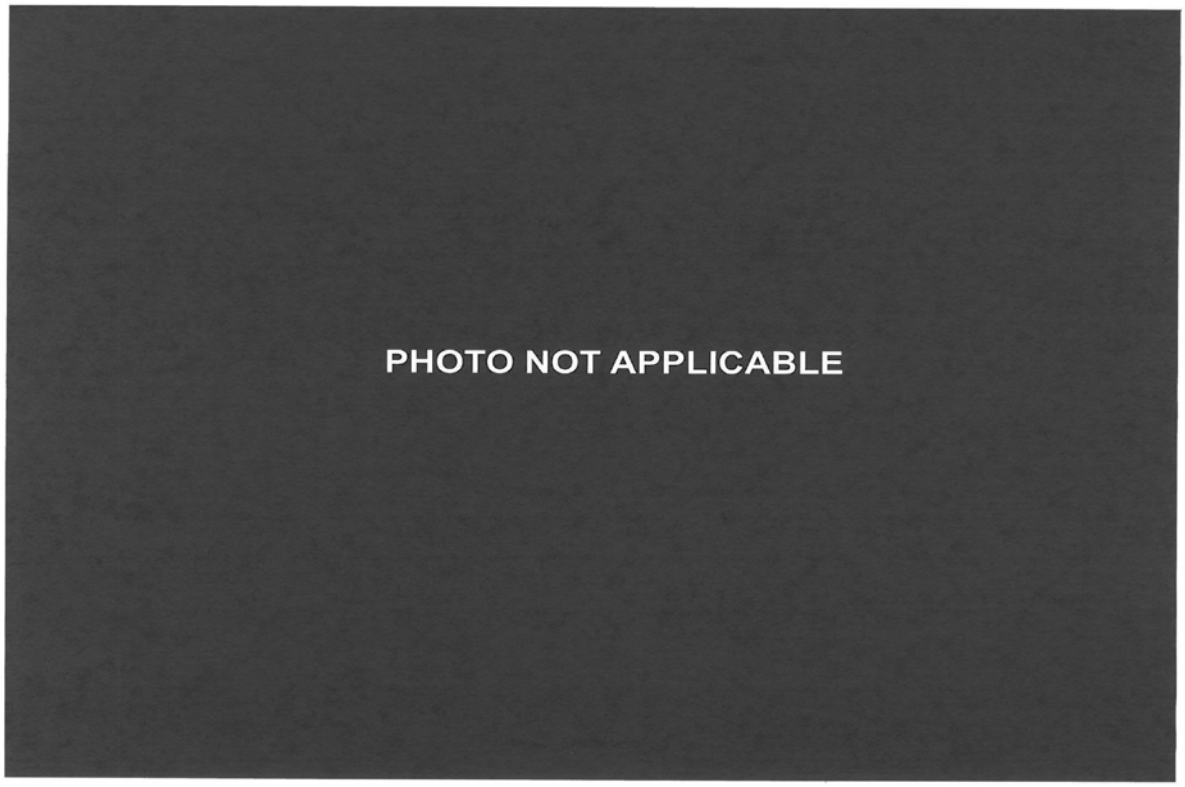


048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



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

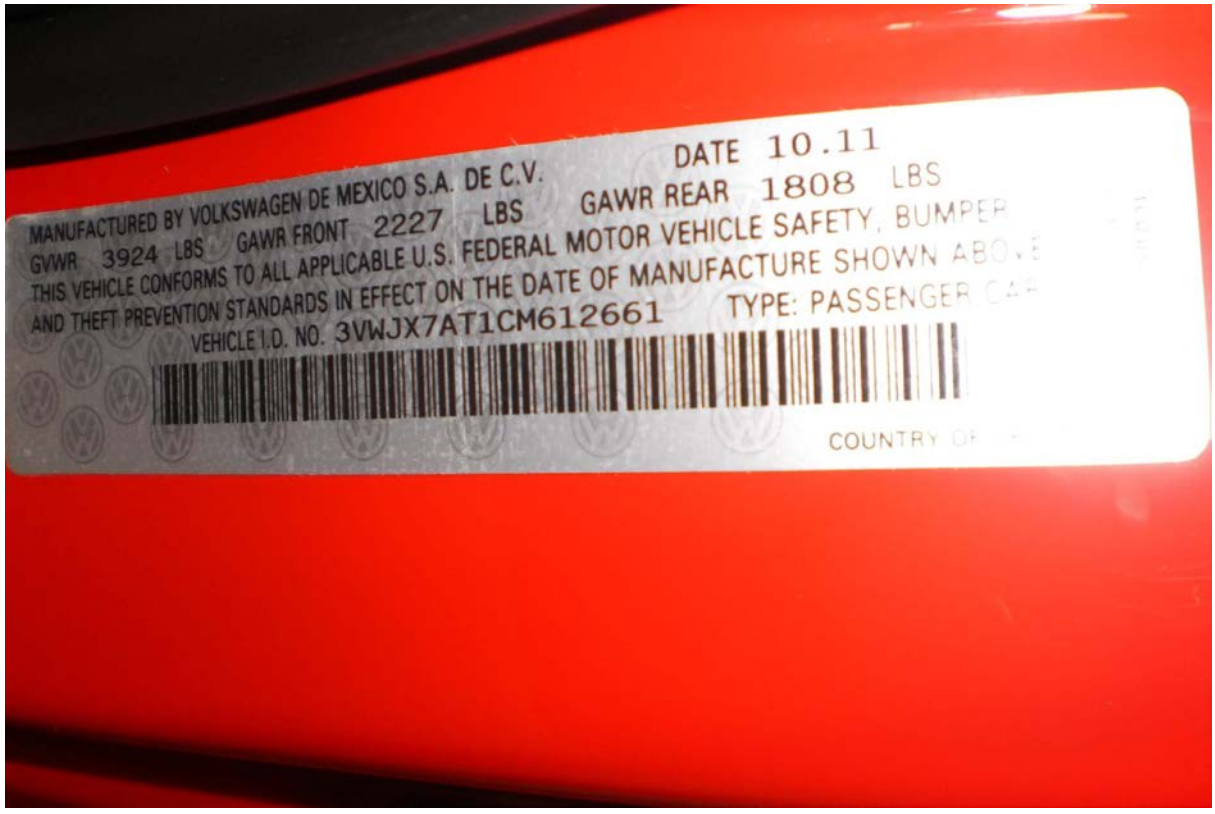
050 Post-Test Dummy Close-Up Pelvis Contact View



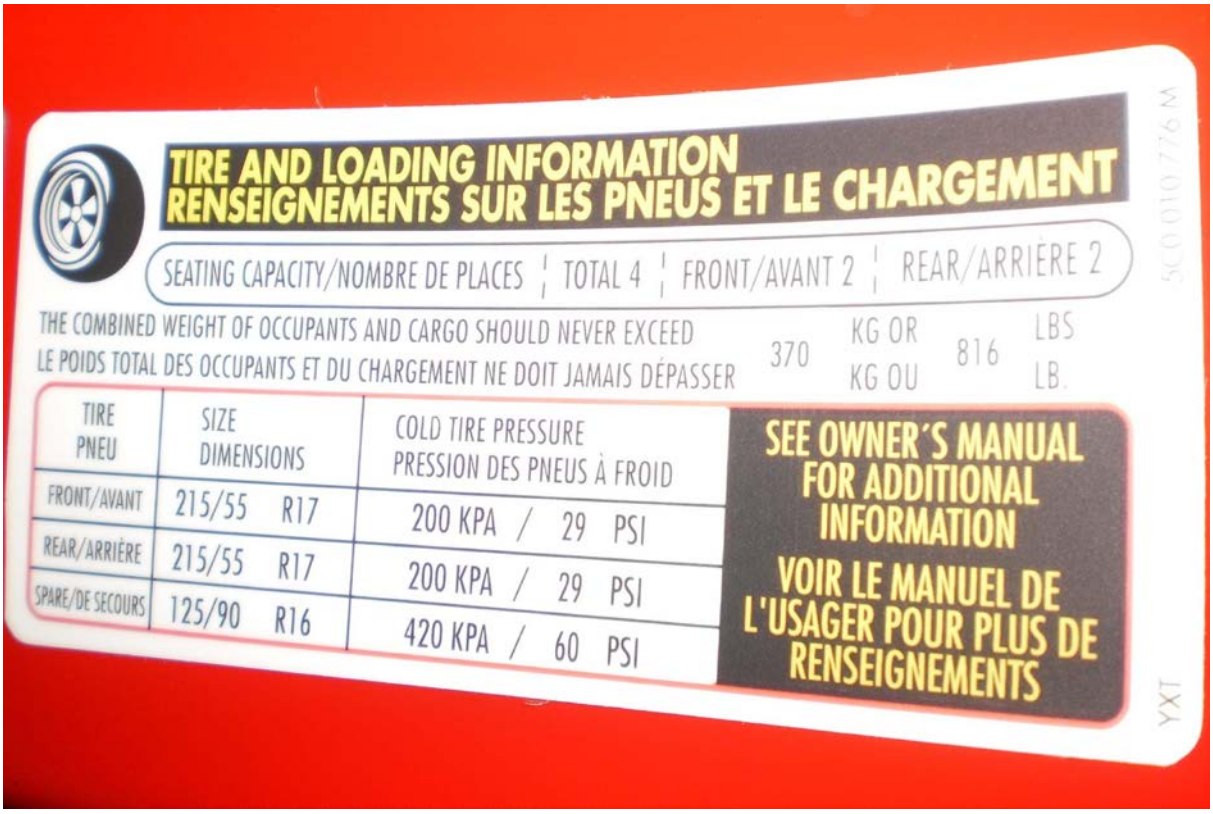
051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View

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

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

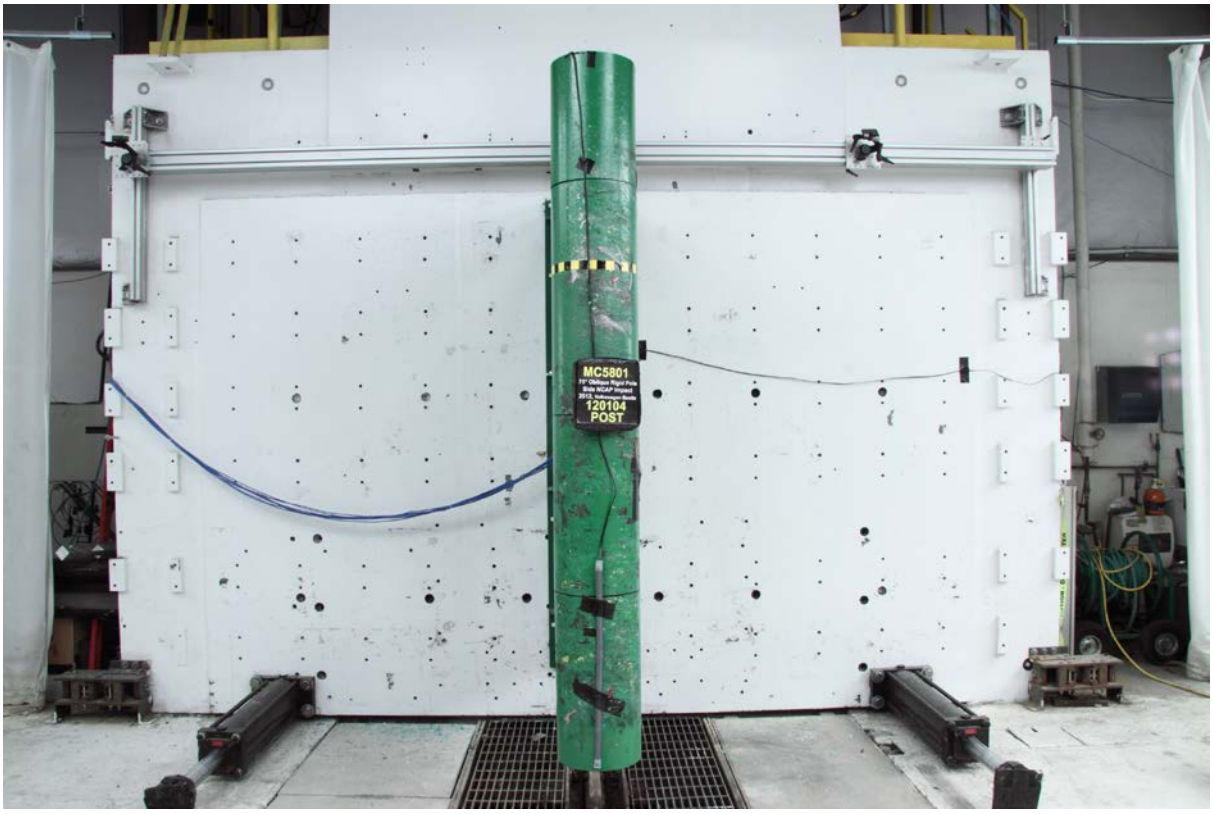


054 Close-Up View of Vehicle's Certification Label

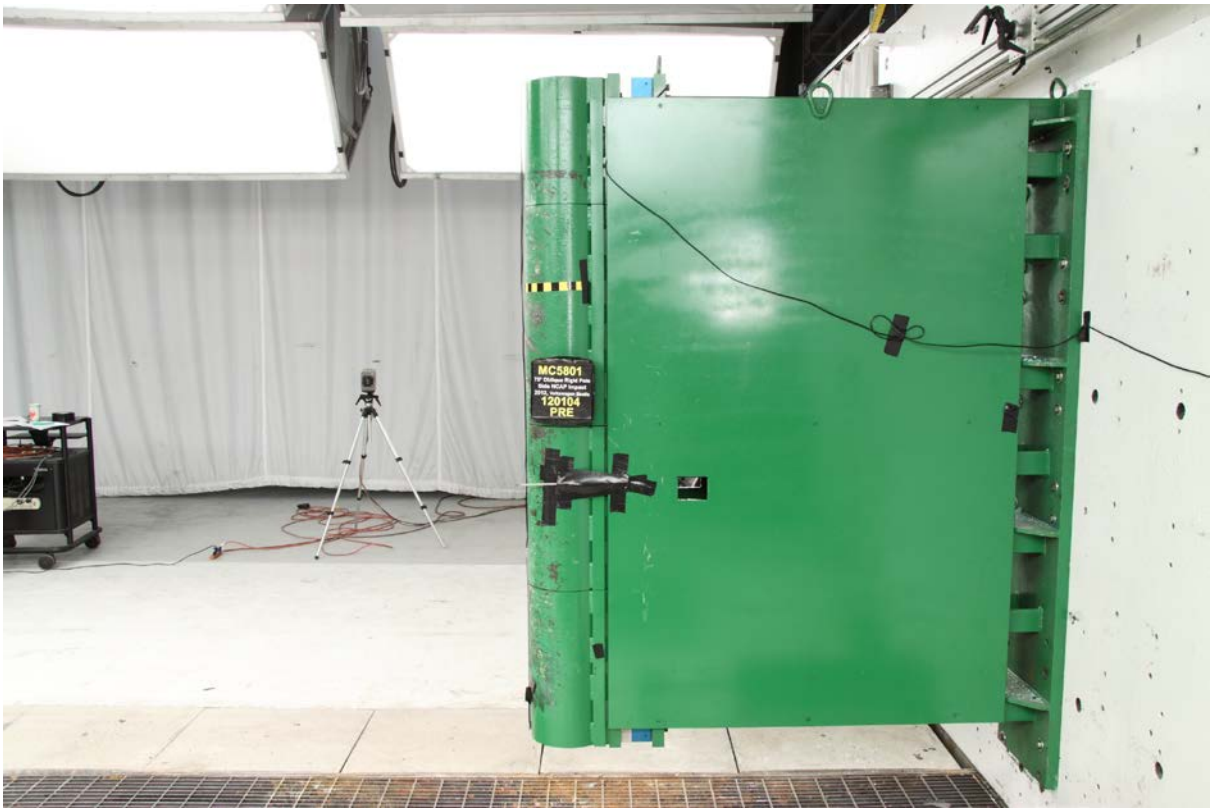


055 Close-Up View of Vehicle's Tire Information Placard or Label

056 Pre-Test Pole Barrier Front View



057 Post-Test Pole Barrier Front View



058 Pre-Test Pole Barrier Side View

059 Post-Test Pole Barrier Side View

PHOTO NOT APPLICABLE

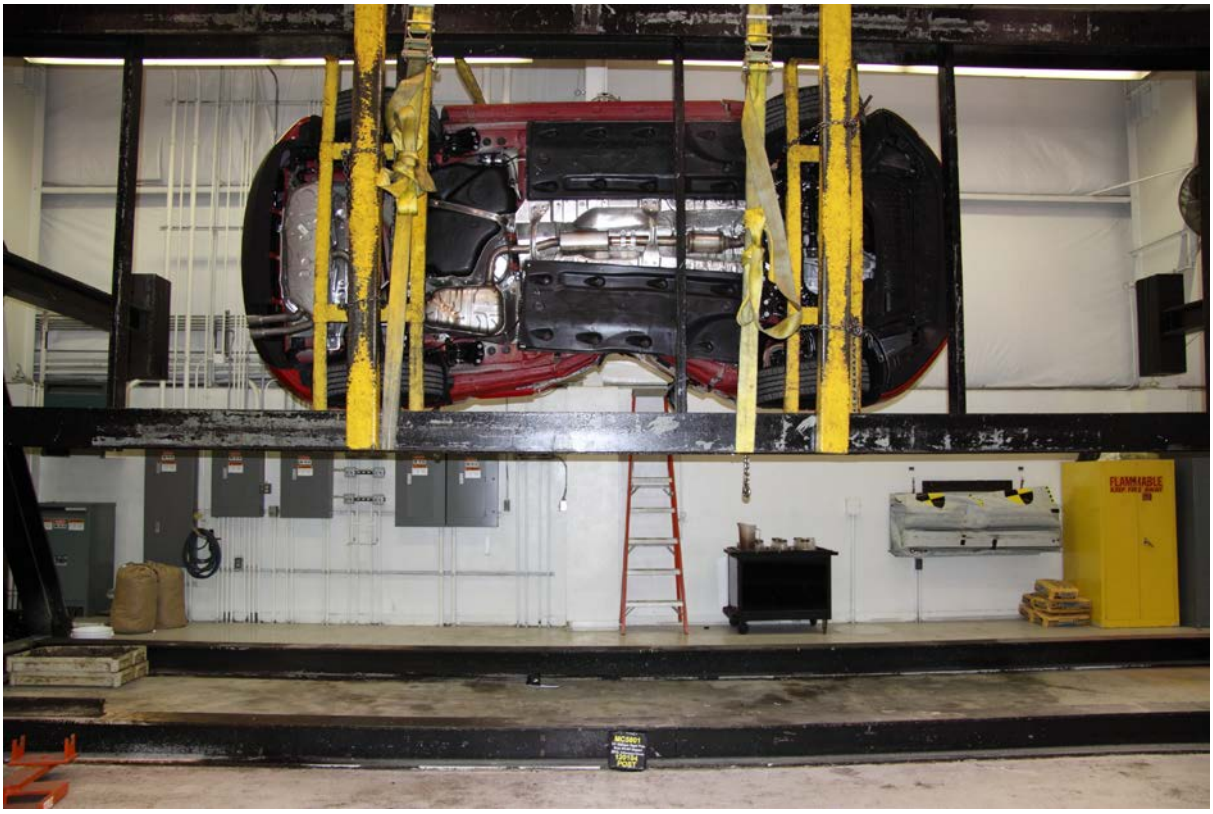
060 Pre-Test Ballast View

061 Post-Test Primary and Redundant Speed Trap Read-Out

062 FMVSS No. 301 Static Rollover 0 Degrees

063 FMVSS No. 301 Static Rollover 90 Degrees

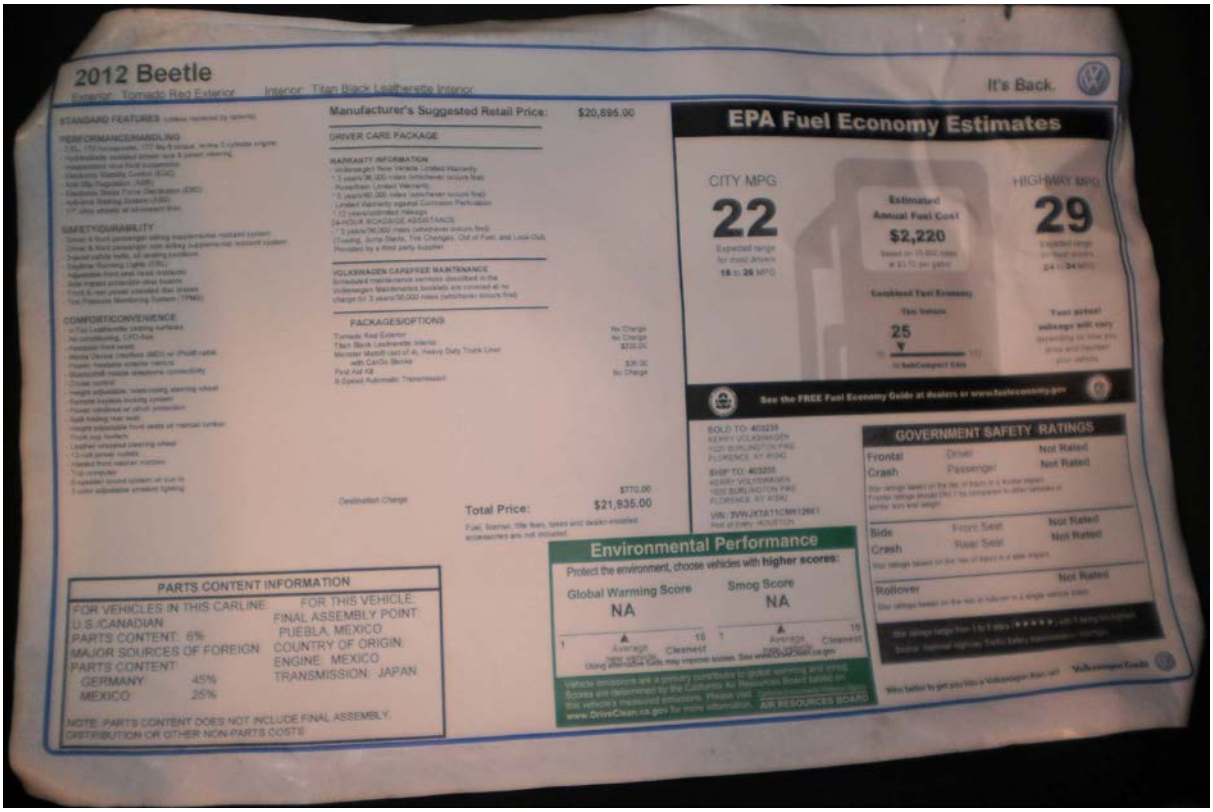
064 FMVSS No. 301 Static Rollover 180 Degrees



065 FMVSS No. 301 Static Rollover 270 Degrees

066 FMVSS No. 301 Static Rollover 360 Degrees

067 Impact Event



068 Monroney Label

Adjusting front or rear head restraints

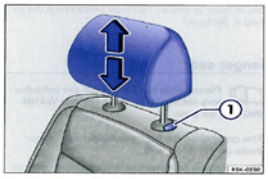


Fig. 32 Adjusting the front or rear head restraints.

Please first read and note the introductory information and heed the WARNINGS ⚠ on page 54.

All seats are equipped with head restraints.

Adjusting the height

- Push the head restraint up in the direction of the arrow or down when the button ⇒fig. 32 ① is pressed ⇒⚠.
- The head restraint must lock securely in the position selected.

Proper head restraint adjustment

Adjust head restraints so that the upper edge of the head restraint is at least at eye level or higher. Position the back of the head as close as possible to the head restraint.

Adjusting the head restraint for short people

Push the head restraint down as far as it will go, even if this means the person's head is still below the top edge of the head restraint. A small gap may remain between the head restraint and the backrest when the head restraint is all the way down.

Adjusting the head restraint for tall people

Pull the head restraint up as far as it will go.

⚠ WARNING

Driving without head restraints or with improperly adjusted head restraints increases the risk of serious injuries in a collision.

- **Always drive with the head restraints in place and properly adjusted to help minimize the risk of neck injury in crash.**
- **Every person in the vehicle must have a properly adjusted head restraint to minimize the risk of neck injury in a crash. Each head restraint must be adjusted according to the occupants' size so that the upper edge is even with the top of the person's head, but no lower than eye level. Always sit so that the back of your head is as close as possible to the head restraint.**
- **Never adjust head restraint while driving.** ◁

Removing and reinstalling front or rear head restraints

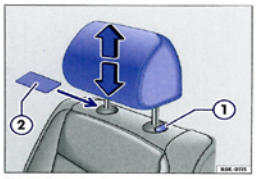


Fig. 33 Removing front or rear head restraints.

Please first read and note the introductory information and heed the WARNINGS ⚠ on page 54.

All seats are equipped with head restraints.

Removing the front head restraints

- Move the seat backrest back using the adjusting wheel.
- Pull the head restraint all the way up ⇒⚠. ▶
- If necessary, slide a flat object such as a plastic card between the backrest cover and the cover cap of the head restraint guide rod ⇒fig. 33 ② to unlock the head restraint.
- While pressing button ①, pull the head restraint out completely.

Installing the front head restraints

- Position head restraint properly over the head restraint guides of the respective seat back and insert the head restraint into the guides.
- Push the head restraint down as far as it will go while pressing button ①.
- Move the seat backrest into an upright position using the adjusting wheel.
- Adjust the head restraint according to the occupant's size ⇒page 58.

Removing the rear head restraint

- Unlock the backrest of the rear seat and fold it forward ⇒page 132.
- Pull the head restraint all the way up ⇒⚠.
- If necessary, slide a flat object such as a plastic card between the backrest cover and the cover cap of the head restraint guide rod ② to unlock the head restraint.
- While pressing button ①, pull the head restraint out completely.
- Fold the backrest of the rear seat so that it locks securely.

Installing the rear head restraint

- Unlock the backrest of the rear seat and fold it forward ⇒page 132.
- Position head restraint properly over the head restraint guides of the respective seat back and insert the head restraint into the guides.
- Push the head restraint down while pressing button ①.
- Fold the backrest of the rear seat so that it locks securely.
- Adjust the head restraint according to the occupant's size ⇒page 58.

⚠ WARNING

Driving without head restraints or with improperly adjusted head restraints increases the risk of serious personal injuries or death in a collision.

- **If a seat is occupied, always drive with the respective head restraint installed and properly adjusted.**
- **Always reinstall head restraints as soon as possible so that vehicle occupants are properly protected.**

NOTICE

When removing or reinstalling the head restraint, take care that the head restraint does not strike the headliner or the back of the front seat. The headliner or other parts of the vehicle could otherwise be damaged. ◁

069 Head Restraint Use and Adjustment Information from Vehicle Owner's Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

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

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)

NHTSA

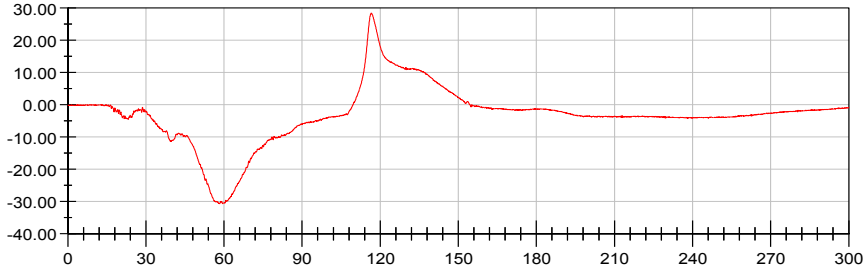
Test Date: 01/04/2012

Position #1 SID IIs Dummy (33)

Test Lab: CTF

Test Number: 120104 (MC5801)

Driver Head Acceleration (X) Primary (g) vs. Time [ms]



<Max>

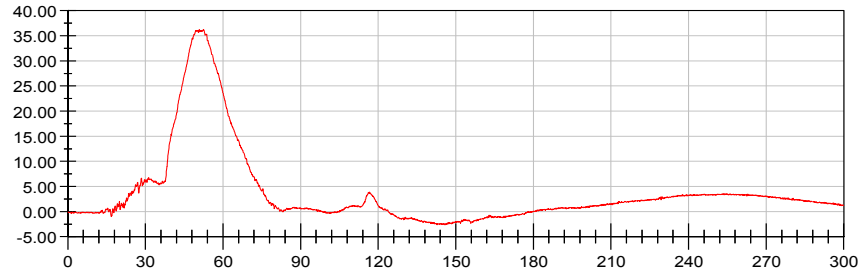
28.38 g at 116.48 ms

<Min>

-30.71 g at 59.44 ms

CFC_1000

Driver Head Acceleration (Y) Primary (g) vs. Time [ms]



<Max>

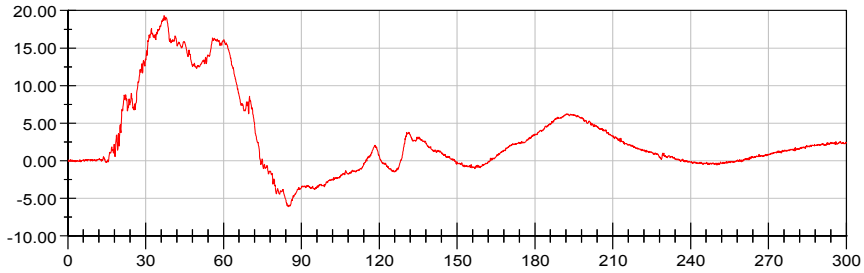
36.23 g at 50.80 ms

<Min>

-2.68 g at 142.80 ms

CFC_1000

Driver Head Acceleration (Z) Primary (g) vs. Time [ms]



<Max>

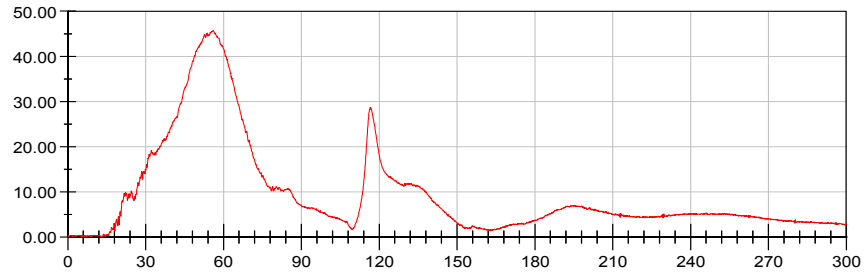
19.32 g at 37.12 ms

<Min>

-6.11 g at 84.96 ms

CFC_1000

Driver Head Acceleration Resultant Primary (g) vs. Time [ms]



<Max>

45.70 g at 55.84 ms

<Min>

0.05 g at 13.36 ms

CFC_1000

NHTSA

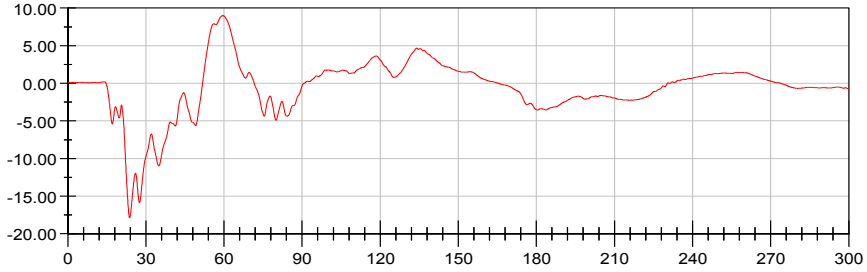
Test Date: 01/04/2012

Position #1 SID IIs Dummy (33)

Test Lab: CTF

Test Number: 120104 (MC5801)

Driver Lower Spine T12 Acceleration (X) Primary (g) vs. Time [ms]



<Max>

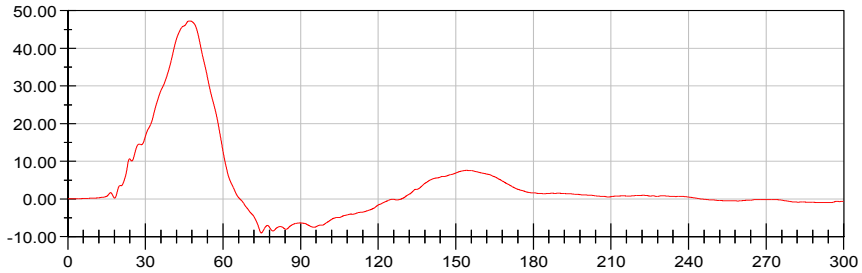
8.99 g at 59.60 ms

<Min>

-17.85 g at 23.76 ms

CFC_180

Driver Lower Spine T12 Acceleration (Y) Primary (g) vs. Time [ms]



<Max>

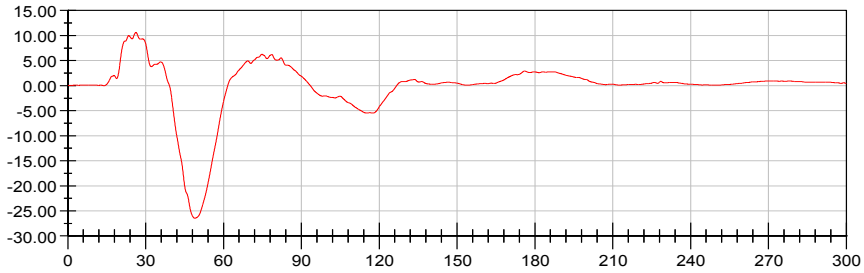
47.26 g at 47.12 ms

<Min>

-9.09 g at 74.80 ms

CFC_180

Driver Lower Spine T12 Acceleration (Z) Primary (g) vs. Time [ms]



<Max>

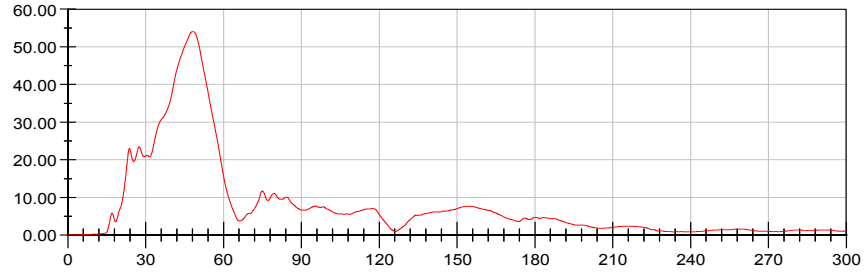
10.61 g at 26.24 ms

<Min>

-26.47 g at 48.96 ms

CFC_180

Driver Lower Spine T12 Resultant Primary (g) vs. Time [ms]



<Max>

54.04 g at 48.16 ms

<Min>

0.12 g at 1.36 ms

CFC_180

NHTSA

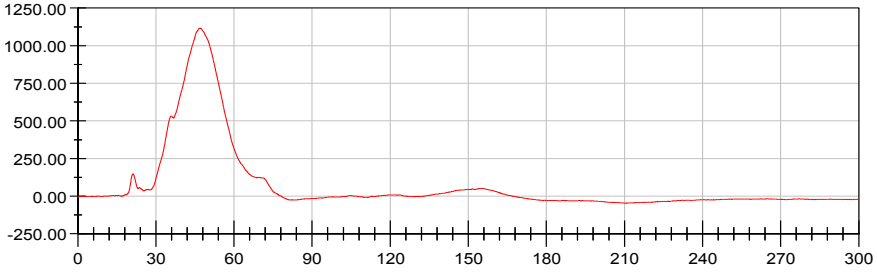
Test Date: 01/04/2012

Position #1 SID IIs Dummy (33)

Test Lab: CTF

Test Number: 120104 (MC5801)

Driver Iliac Wing Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

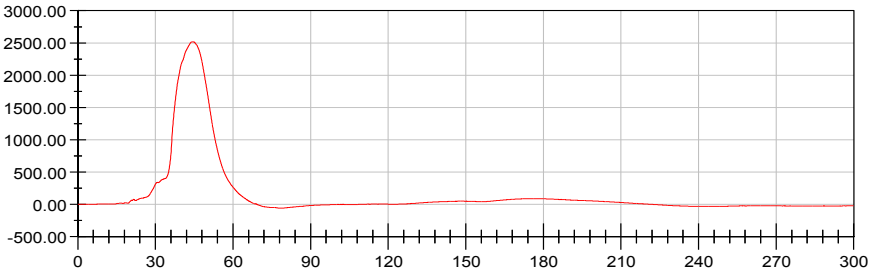
1,115.86 N at 47.04 ms

<Min>

-45.83 N at 210.40 ms

CFC_600

Driver Acetabulum Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

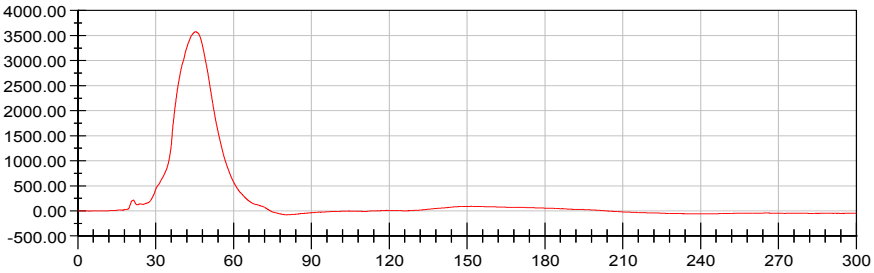
2,514.71 N at 44.80 ms

<Min>

-62.08 N at 77.76 ms

CFC_600

Driver Total Pelvis Force on Impact Side (Y) (N) vs. Time [ms]



<Max>

3,576.83 N at 45.36 ms

<Min>

-78.86 N at 80.48 ms

CFC_600

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

TABLE OF CALIBRATION MEASUREMENTS AND PLOTS
SID-IIs (Driver) Dummy
Description

Pre-Test Calibration Sheets

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 033 Certification No. 8-3
Test Date: 12/8/2011

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	28 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	119.0 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

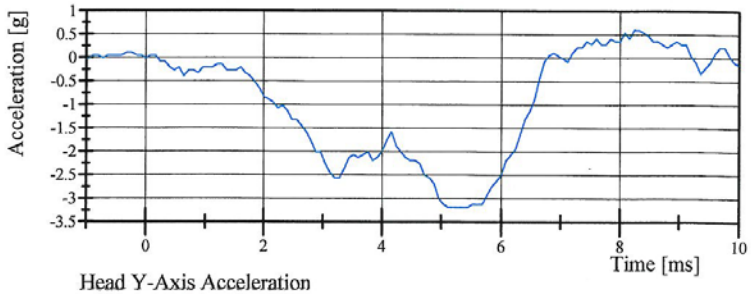
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 16:51:22 231

Transportation Research Center Inc.

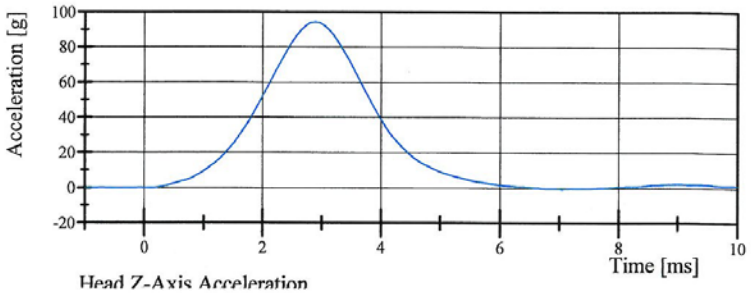
Left Lateral Head Drop
SID IIs Serial No. 033 Certification No. 8-3
Test Date: 12/8/2011

Head X-Axis Acceleration



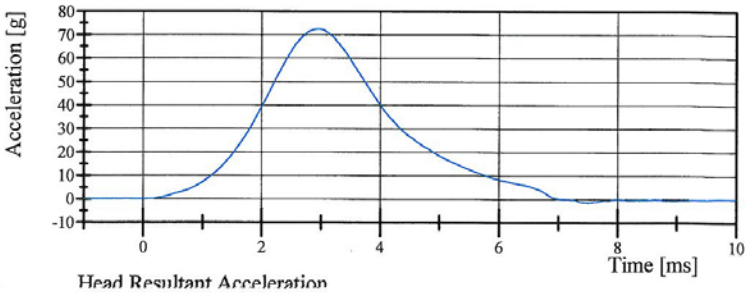
Filter Class: CFC_1000
Max: 0.6 gn at 8.2 ms
Min: -3.2 gn at 5.1 ms

Head Y-Axis Acceleration



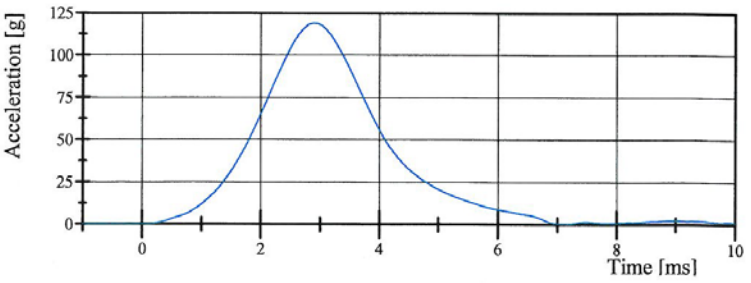
Filter Class: CFC_1000
Max: 94.4 gn at 2.9 ms
Min: -0.5 gn at 7.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 72.6 gn at 3.0 ms
Min: -1.5 gn at 7.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 119.0 gn at 2.9 ms
Min: 0.0 gn at 0.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 16:51:30 231

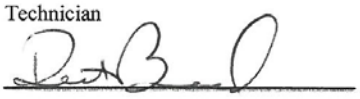
Transportation Research Center Inc.

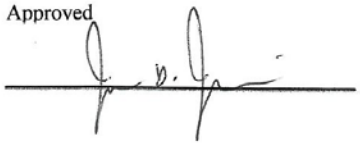
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 8-2
Test Date: 12/7/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.589 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.250 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.409 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.609 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.634 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.890 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-72.2 deg	Yes
Time of Peak	50 - 70 ms	63.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	39.9 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	119.3 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

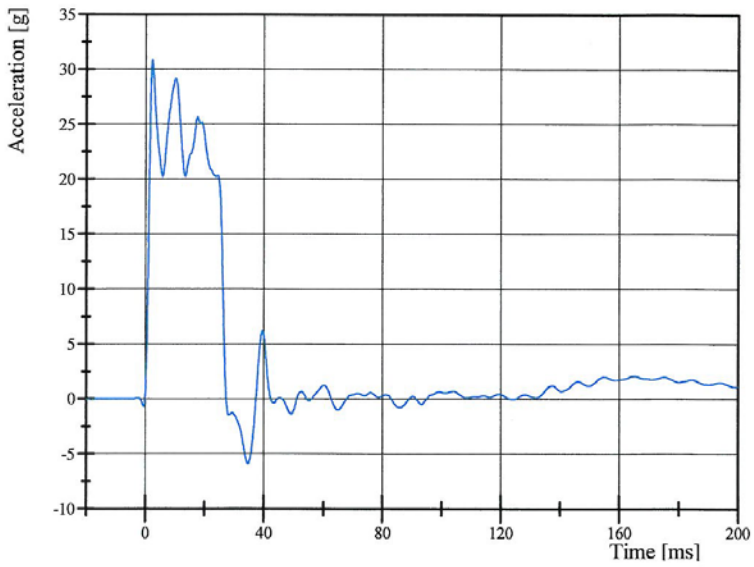
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 13:49:08 636

Transportation Research Center Inc.

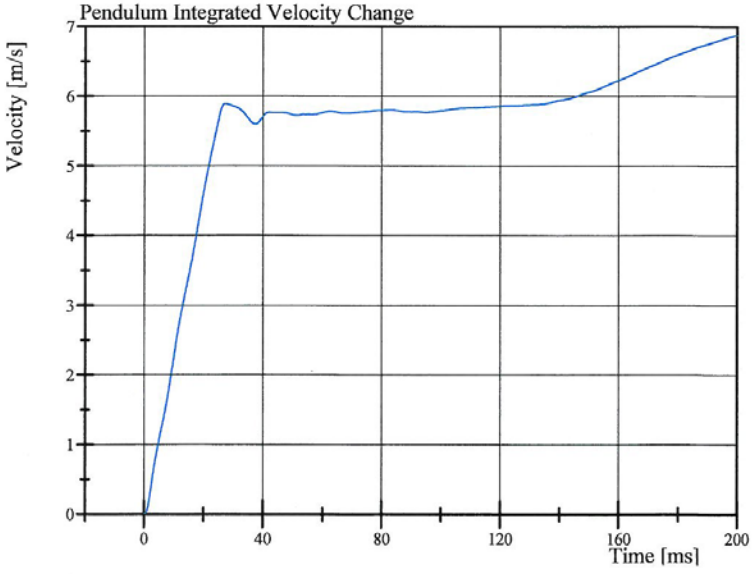
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 8-2
Test Date: 12/7/2011

Pendulum Acceleration



Filter Class: CFC_180
Max: 30.8 gn at 2.2 ms
Min: -5.9 gn at 34.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.9 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 13:49:16 636

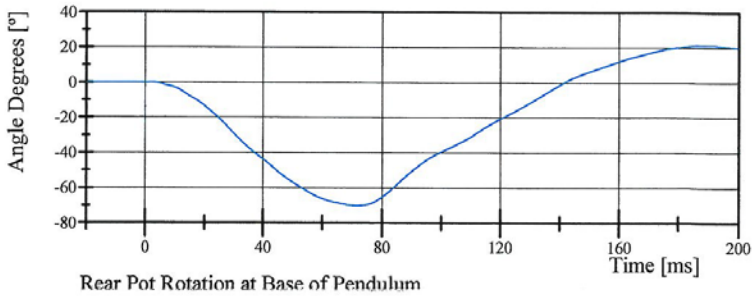
Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 8-2

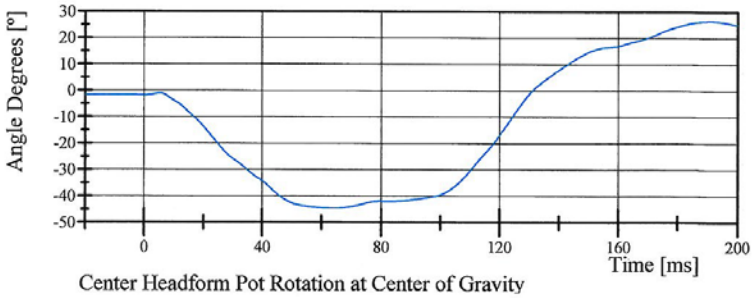
Test Date: 12/7/2011

Forward Pot Rotation at Base of Pendulum



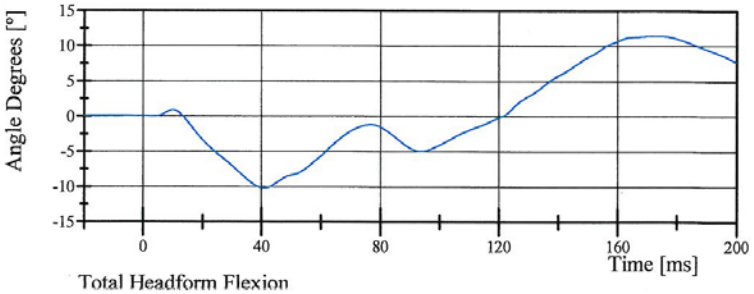
Filter Class: CFC_60
Max: 21.5 ° at 188.2 ms
Min: -70.2 ° at 71.6 ms

Rear Pot Rotation at Base of Pendulum



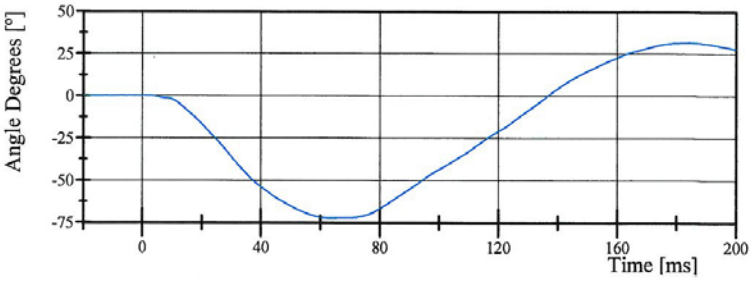
Filter Class: CFC_60
Max: 26.5 ° at 191.0 ms
Min: -44.6 ° at 64.2 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.5 ° at 173.5 ms
Min: -10.2 ° at 41.0 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 31.6 ° at 184.4 ms
Min: -72.2 ° at 63.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 13:49:16 636

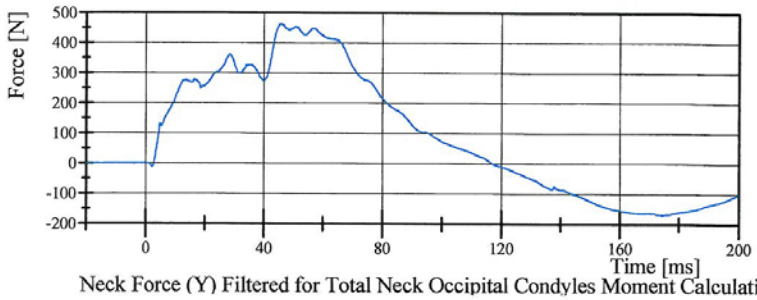
Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 8-2

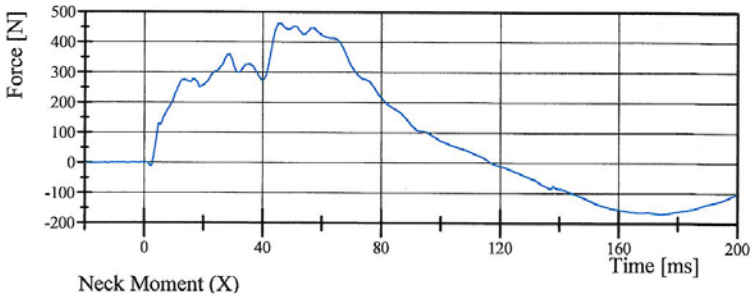
Test Date: 12/7/2011

Neck Force (Y)



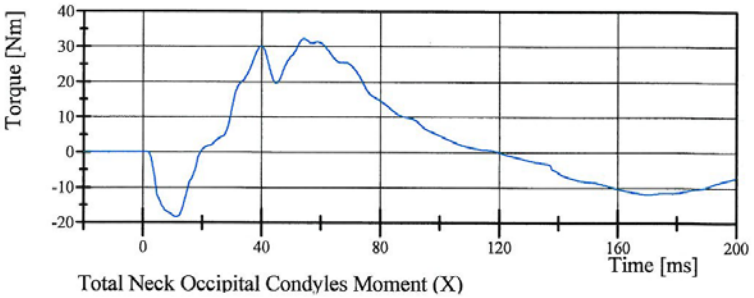
Filter Class: CFC_1000
Max: 463.4 N at 45.4 ms
Min: -168.0 N at 174.3 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



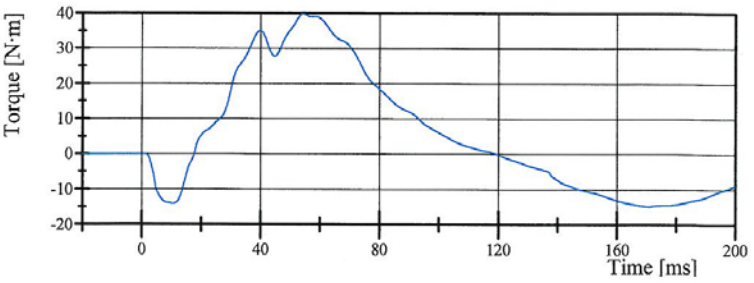
Filter Class: CFC_600
Max: 462.7 N at 45.4 ms
Min: -167.8 N at 174.4 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 32.3 Nm at 54.2 ms
Min: -18.4 Nm at 11.4 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Consta
Max: 39.9 N·m at 54.3 ms
Min: -14.7 N·m at 170.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 13:49:17 636

Transportation Research Center Inc.

Left Lateral Shoulder
SID IIs Serial No. 033 Certification No. 8-1
Test Date: 12/7/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.7 g	Yes
Shoulder Displacement	28 - 37 mm	29.4 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.9 g	Yes

Test meets specifications.

Comments:

Technician

Approved

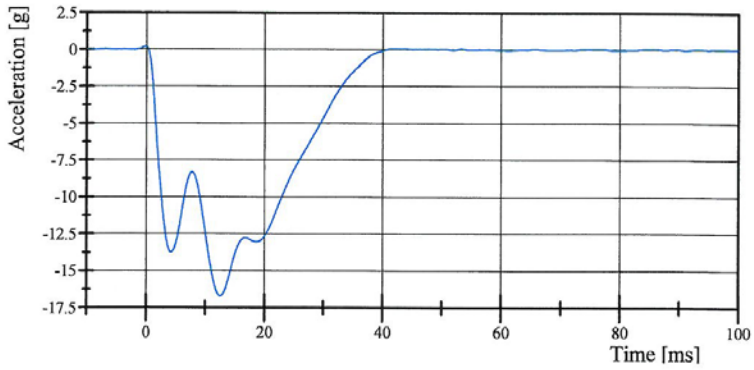
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 15:41:28 806

Transportation Research Center Inc.

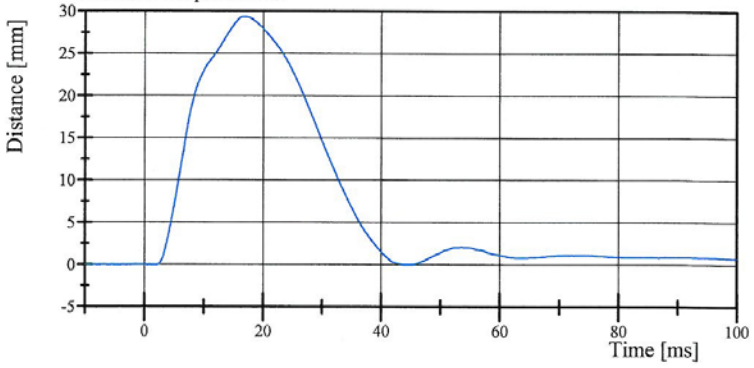
Left Lateral Shoulder
SID IIs Serial No. 033 Certification No. 8-1
Test Date: 12/7/2011

Probe Acceleration



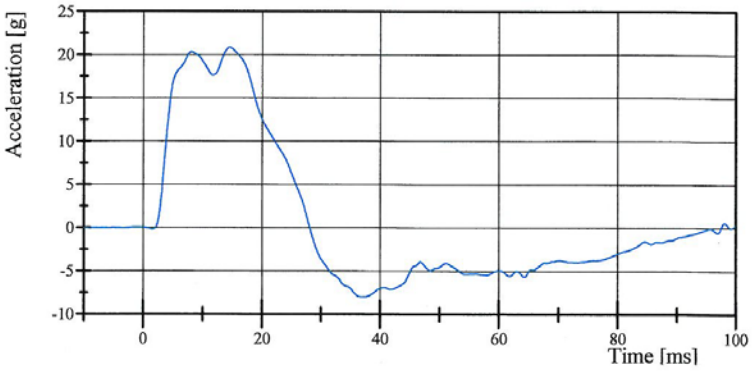
Filter Class: CFC_180
Max: 0.2 gn at -0.2 ms
Min: -16.7 gn at 12.6 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 29.4 mm at 17.0 ms
Min: -0.0 mm at 2.2 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 20.9 gn at 14.6 ms
Min: -8.0 gn at 37.1 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 15:41:36 806

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 8-10
Test Date: 12/8/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	27 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.331 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.9 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	37.8 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.2 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.3 g	Yes

Test meets specifications.

Comments:

Technician

Approved

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 16:03:20 834

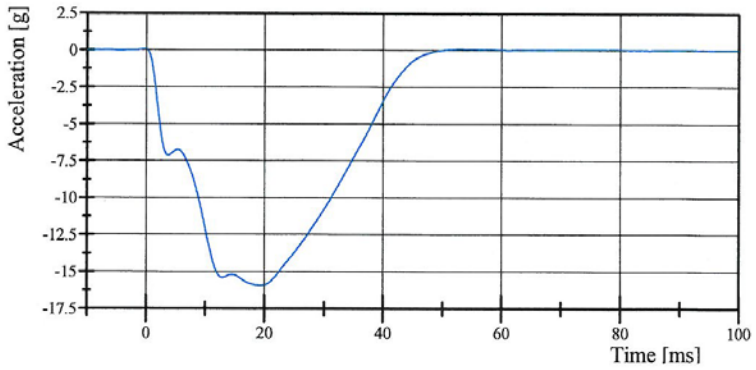
Transportation Research Center Inc.

Left Lateral Thorax without Arm

SID IIs Serial No. 033 Certification No. 8-10

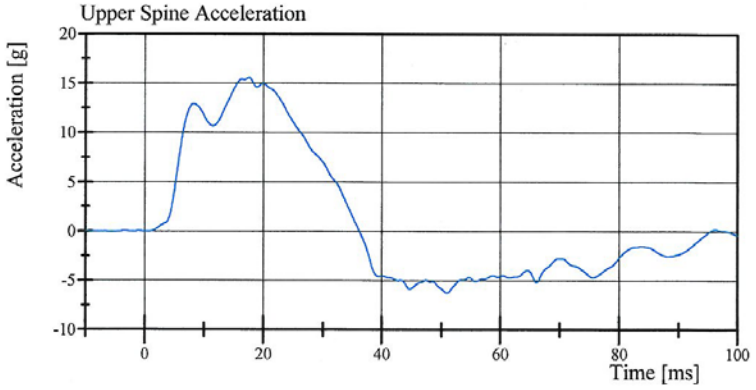
Test Date: 12/8/2011

Probe Acceleration



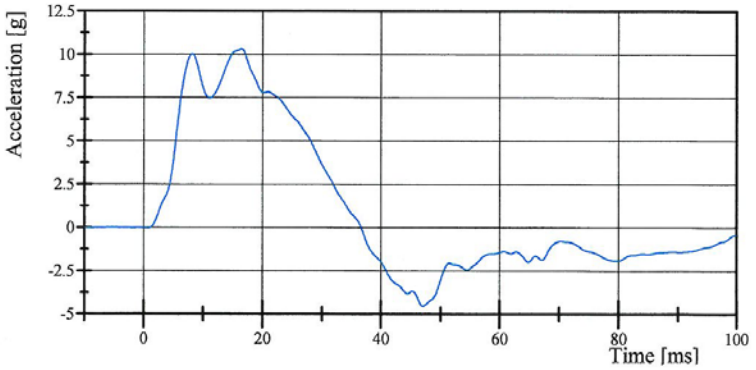
Filter Class: CFC_180
Max: 0.1 gn at 52.9 ms
Min: -15.9 gn at 19.4 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.6 gn at 17.6 ms
Min: -6.3 gn at 51.0 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 10.3 gn at 16.5 ms
Min: -4.5 gn at 47.0 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 16:04:00 834

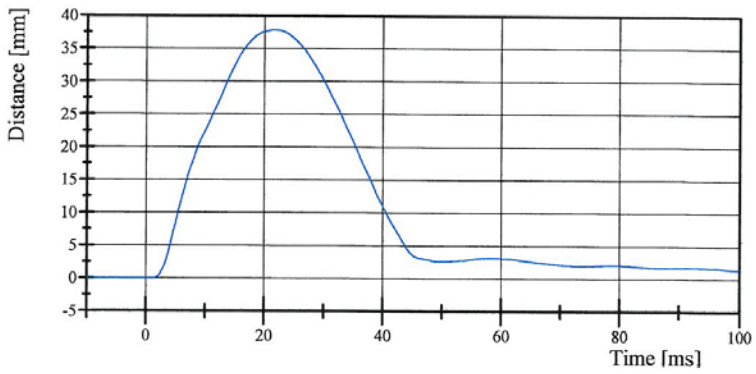
Transportation Research Center Inc.

Left Lateral Thorax without Arm

SID IIs Serial No. 033 Certification No. 8-10

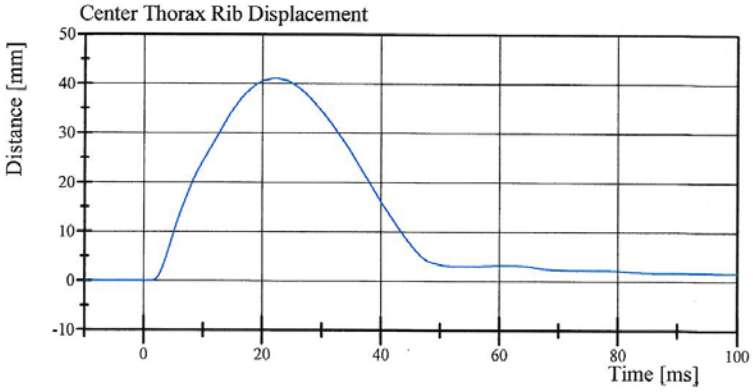
Test Date: 12/8/2011

Upper Thorax Rib Displacement



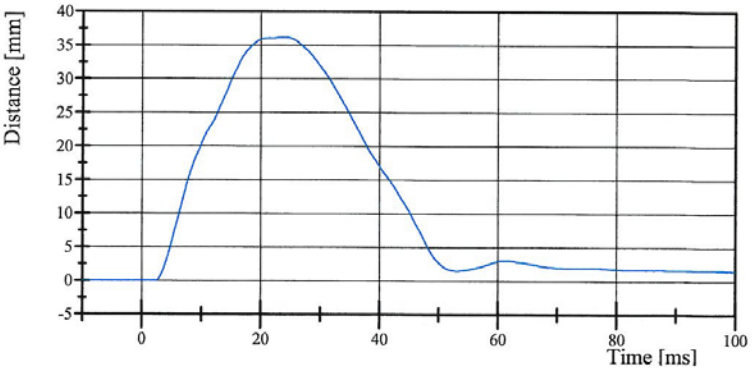
Filter Class: CFC_600
Max: 37.8 mm at 21.9 ms
Min: -0.0 mm at -9.4 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 41.1 mm at 22.2 ms
Min: -0.0 mm at 1.4 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 36.2 mm at 24.1 ms
Min: -0.0 mm at 2.3 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 16:04:01 834

Transportation Research Center Inc.

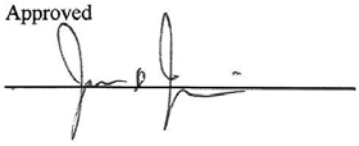
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 8-11
Test Date: 12/9/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.653 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.9 g	Yes
Shoulder Displacement	31 - 40 mm	33.3 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.0 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	41.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.8 g	Yes

Test meets specifications.

Comments:

Technician 

Approved 

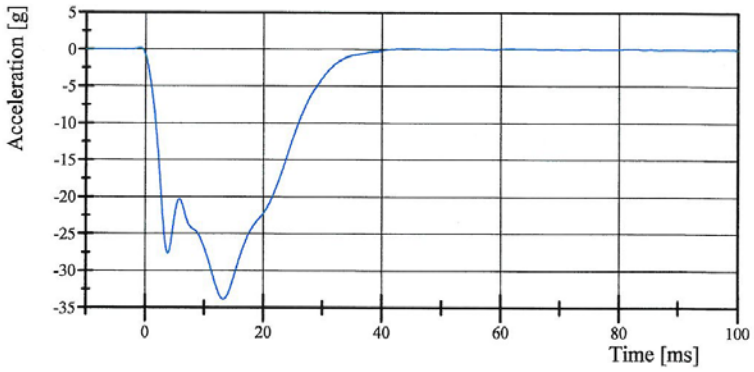
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.09.2011 10:02:38 614

Transportation Research Center Inc.

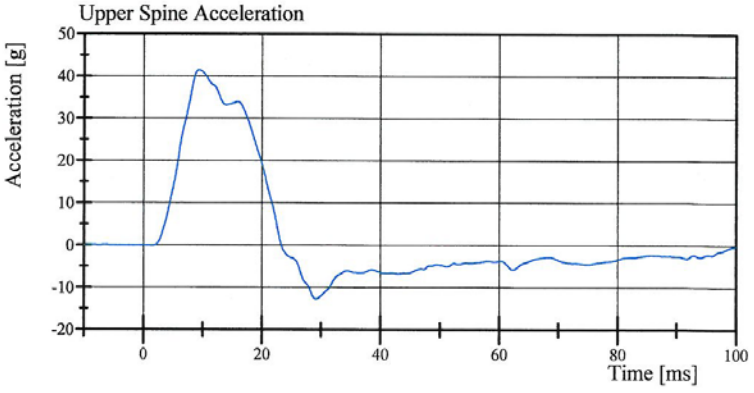
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 8-11
Test Date: 12/9/2011

Probe Acceleration



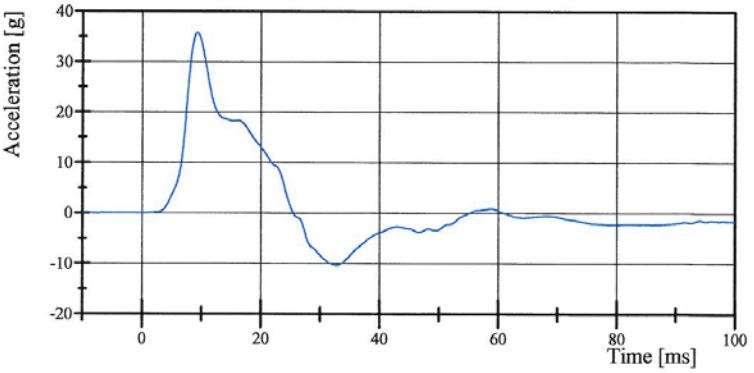
Filter Class: CFC_180
Max: 0.2 gn at -0.9 ms
Min: -33.9 gn at 13.2 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 41.5 gn at 9.3 ms
Min: -12.7 gn at 29.2 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 35.8 gn at 9.3 ms
Min: -10.4 gn at 32.8 ms

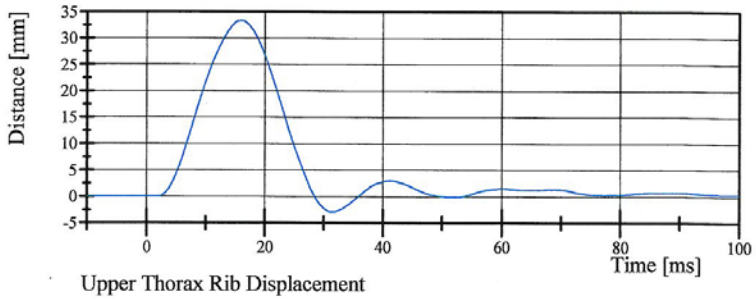
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.09.2011 10:02:48 614

Transportation Research Center Inc.

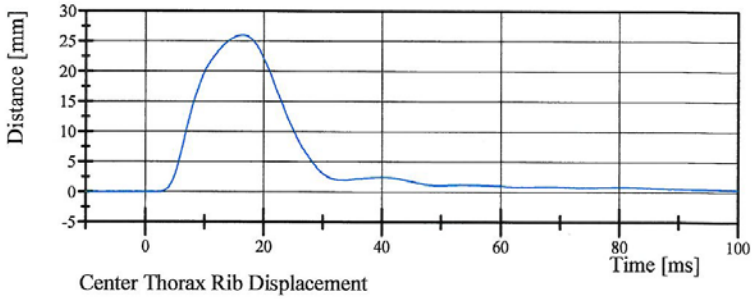
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 8-11
Test Date: 12/9/2011

Shoulder Rib Displacement



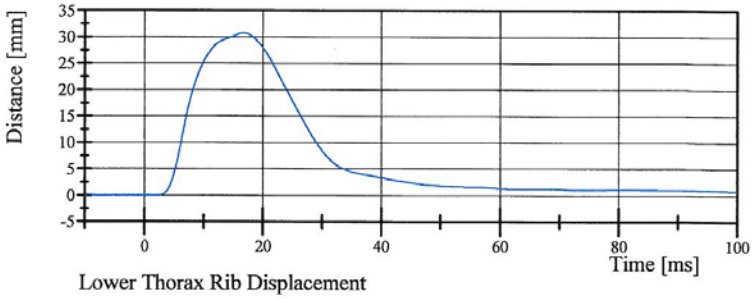
Filter Class: CFC_600
Max: 33.3 mm at 16.0 ms
Min: -2.9 mm at 31.4 ms

Upper Thorax Rib Displacement



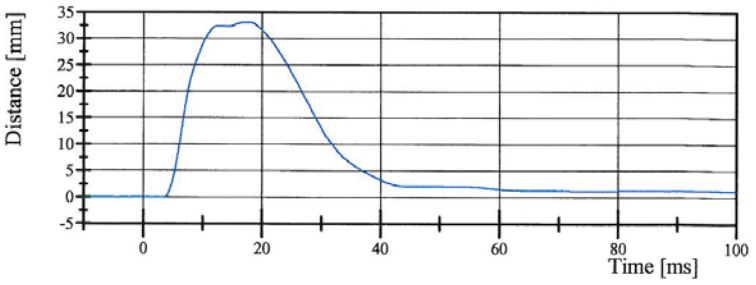
Filter Class: CFC_600
Max: 26.0 mm at 16.4 ms
Min: -0.0 mm at -7.2 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 30.7 mm at 16.7 ms
Min: -0.0 mm at -3.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 33.0 mm at 17.8 ms
Min: -0.0 mm at 3.4 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.09.2011 10:02:49 614

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 033 Certification No. 8-1
Test Date: 12/7/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	25 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.34 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.6 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.7 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	12.87 g	Yes

Test meets specifications.

Comments:

Technician

Approved

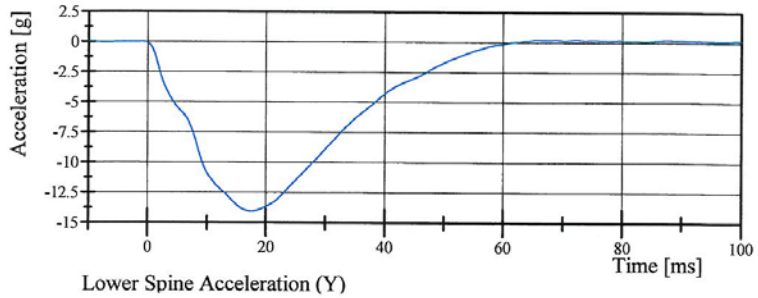
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 17:20:30 653

Transportation Research Center Inc.

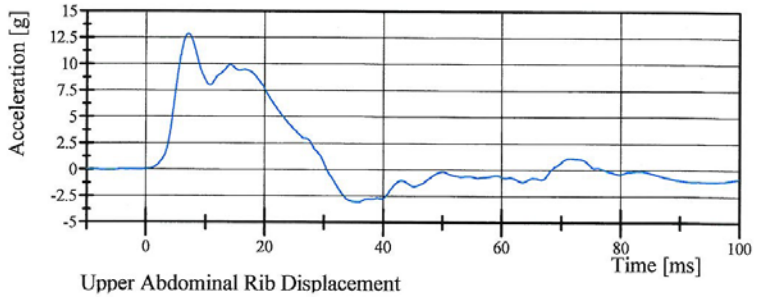
Left Lateral Abdomen
SID IIs Serial No. 033 Certification No. 8-1
Test Date: 12/7/2011

Probe Acceleration



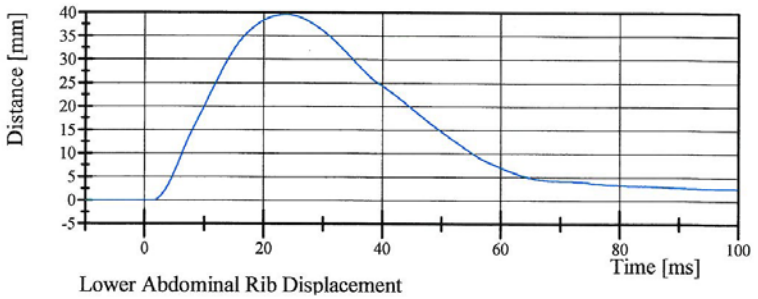
Filter Class: CFC_180
Max: 0.2 gn at 72.0 ms
Min: -14.0 gn at 17.5 ms

Lower Spine Acceleration (Y)



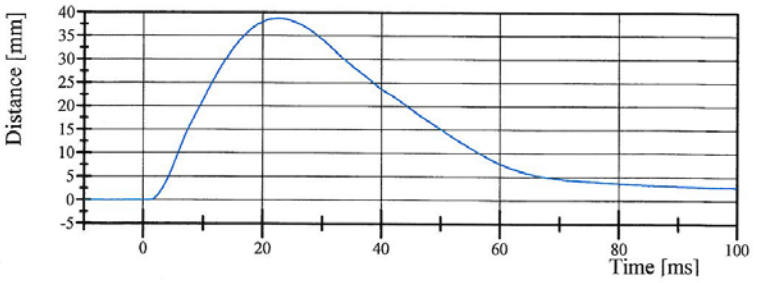
Filter Class: CFC_180
Max: 12.9 gn at 7.0 ms
Min: -3.1 gn at 35.8 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 39.6 mm at 23.8 ms
Min: -0.0 mm at 1.4 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 38.7 mm at 22.6 ms
Min: -0.0 mm at 1.1 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.07.2011 17:20:38 653

Transportation Research Center Inc.

Left Lateral Pelvis
SID IIs Serial No. 033 Certification No. 8-2
Test Date: 12/8/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	24 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.62 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.99 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	42.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	4,047.5 N	Yes

Test meets specifications.

Comments:

Technician

Approved

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 08:58:40 455

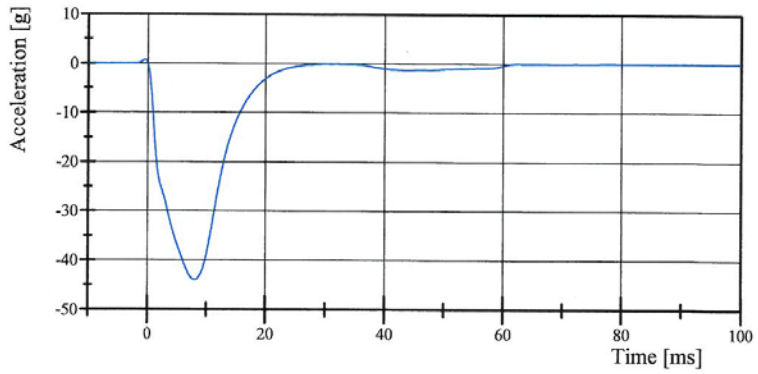
Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 033 Certification No. 8-2

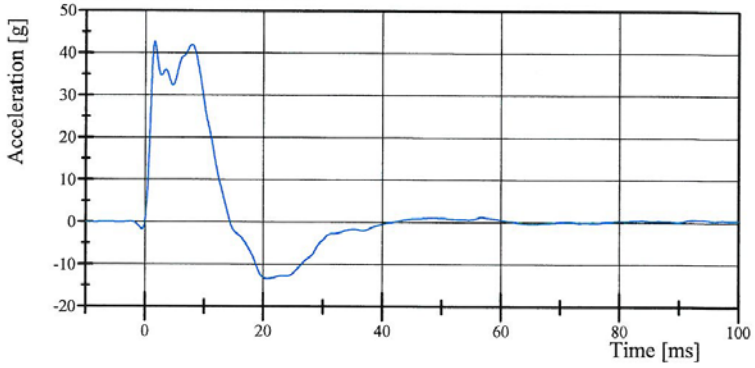
Test Date: 12/8/2011

Probe Acceleration



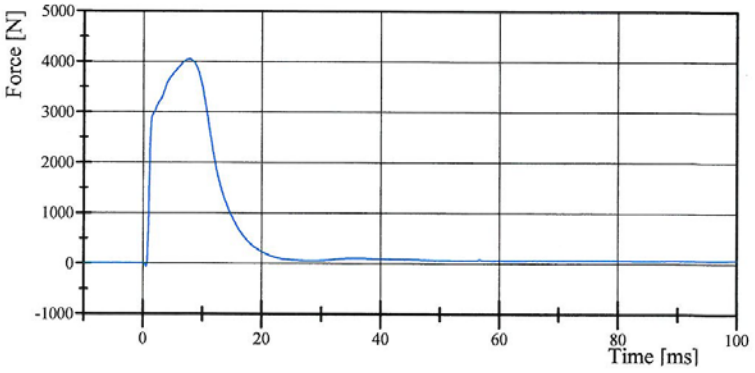
Filter Class: CFC_180
Max: 0.7 gn at -0.5 ms
Min: -44.0 gn at 8.0 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 42.7 gn at 1.6 ms
Min: -13.4 gn at 20.6 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 4,047.5 N at 7.8 ms
Min: -62.9 N at 0.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.08.2011 08:58:48 455

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 033 Certification No. 8-3
Test Date: 12/9/2011

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	26 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.7 g	Yes
Iliac Force	4,100 - 5,100 N	4,675.0 N	Yes

Test meets specifications.

Comments:

Technician

Approved

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.09.2011 07:30:48 642

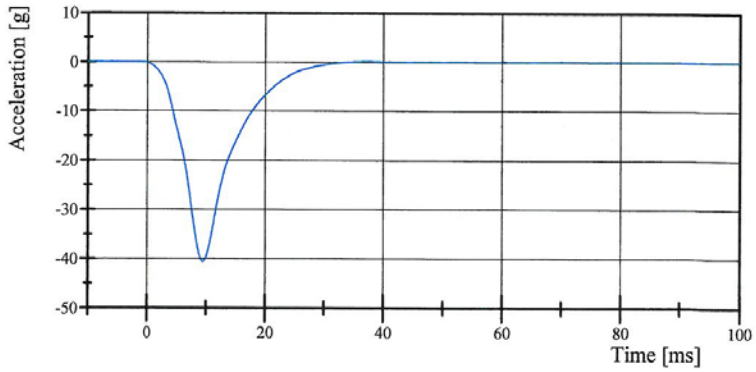
Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 8-3

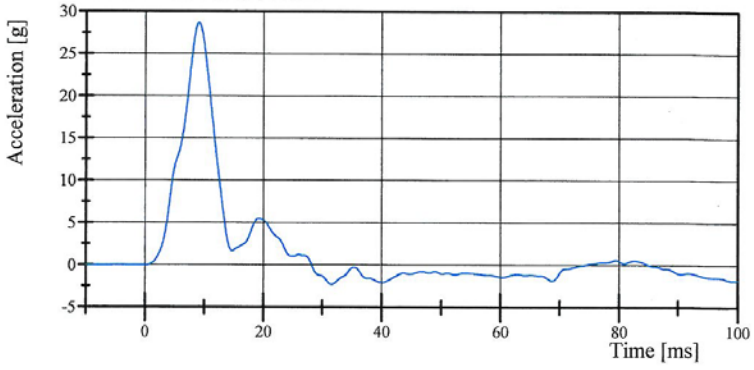
Test Date: 12/9/2011

Probe Acceleration



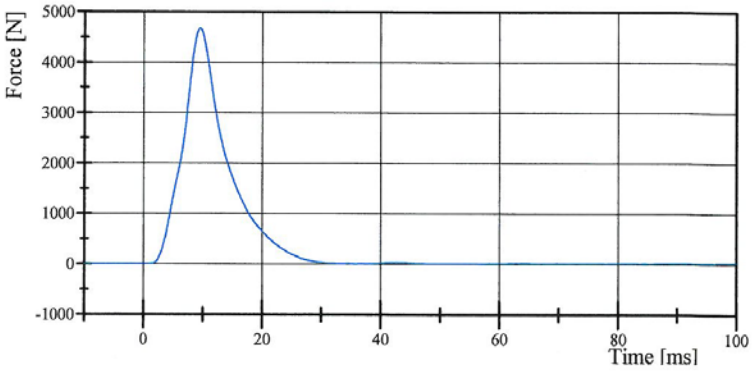
Filter Class: CFC_180
Max: 0.2 gn at 37.0 ms
Min: -40.5 gn at 9.5 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 28.7 gn at 9.0 ms
Min: -2.3 gn at 31.6 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,675.0 N at 9.5 ms
Min: -1.0 N at -3.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

12.09.2011 07:30:56 642

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 033 Calibration No.08
Date: 12/09/11

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	445	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	134	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	534	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	209	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	481	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Technician

Approved

Revised 9/29/2005

Post-Test Calibration Sheets

Transportation Research Center Inc.

Left Lateral Head Drop
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	136.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Approved

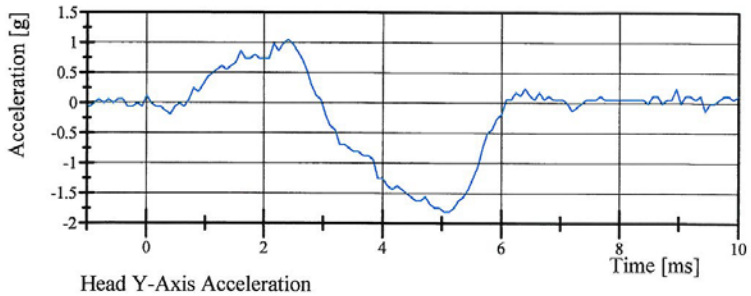
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 14:45:16 234

Transportation Research Center Inc.

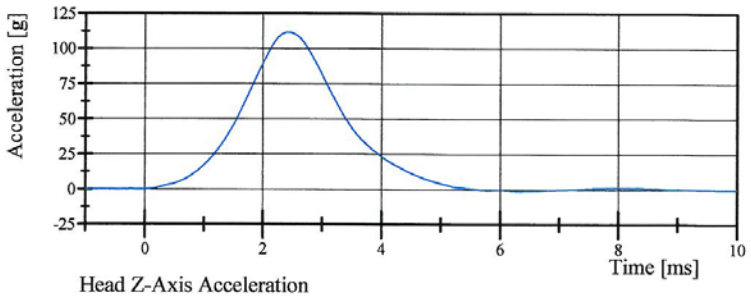
Left Lateral Head Drop
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Head X-Axis Acceleration



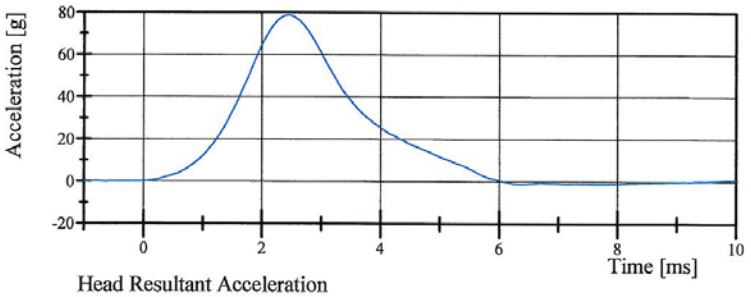
Filter Class: CFC_1000
Max: 1.0 gn at 2.4 ms
Min: -1.8 gn at 5.0 ms

Head Y-Axis Acceleration



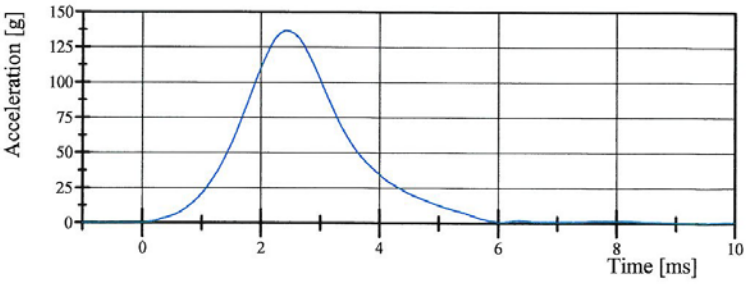
Filter Class: CFC_1000
Max: 111.7 gn at 2.4 ms
Min: -1.2 gn at 6.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 78.8 gn at 2.5 ms
Min: -1.2 gn at 6.4 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 136.6 gn at 2.4 ms
Min: 0.0 gn at -0.9 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 14:45:23 234

Transportation Research Center Inc.

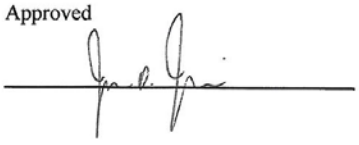
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.1 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.585 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.20 - 2.80 m/s	2.635 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.797 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.026 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.874 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.934 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-71.8 deg	Yes
Time of Peak	50 - 70 ms	60.3 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	102 - 126 ms	113.5 ms	Yes

Test meets specifications.

Comments:

Technician 

Approved 

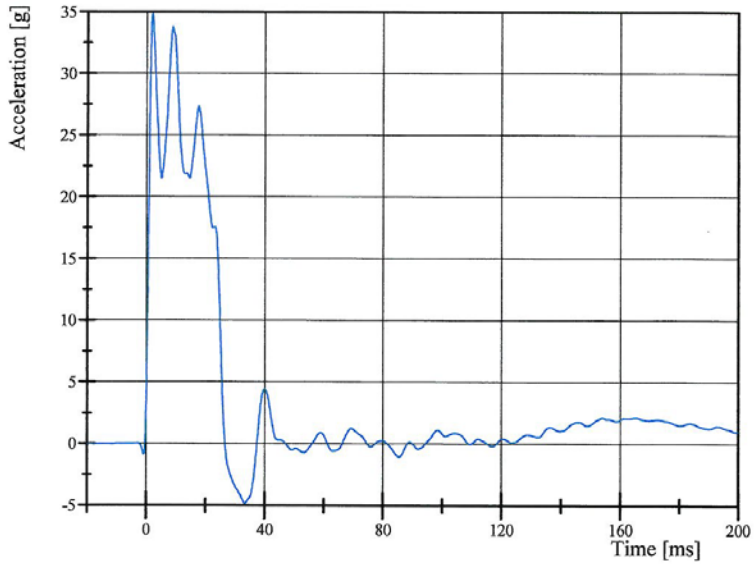
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 13:45:17 639

Transportation Research Center Inc.

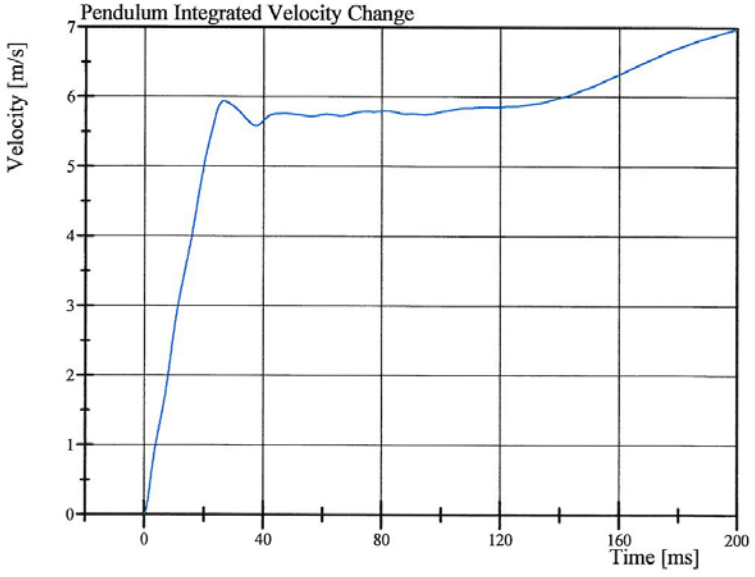
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Pendulum Acceleration



Filter Class: CFC_180
Max: 34.8 gn at 1.9 ms
Min: -4.9 gn at 33.4 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 7.0 m/s at 200.0 ms
Min: 0.0 m/s at 0.0 ms

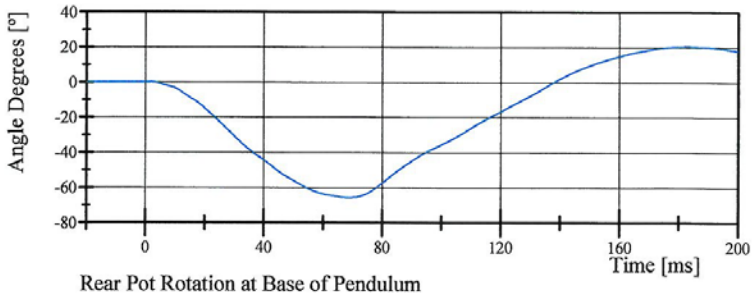
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 13:45:24 639

Transportation Research Center Inc.

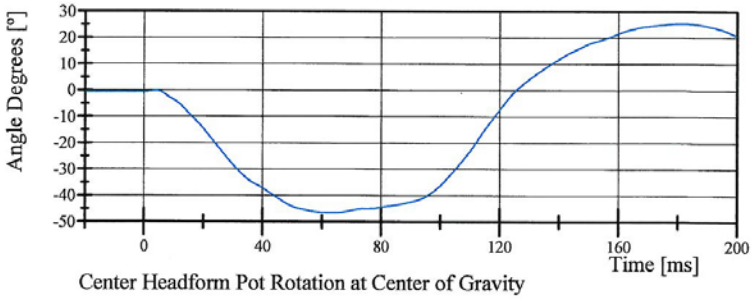
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Forward Pot Rotation at Base of Pendulum



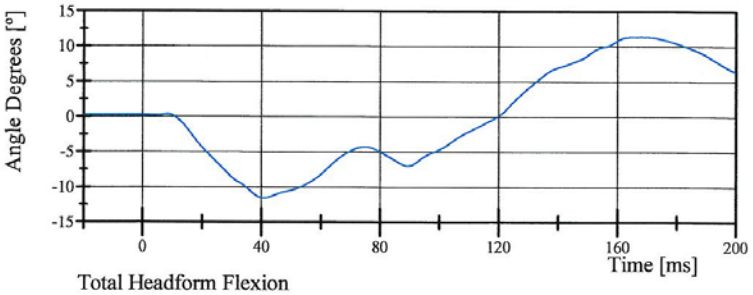
Filter Class: CFC_60
Max: 20.5 ° at 183.1 ms
Min: -65.7 ° at 68.7 ms

Rear Pot Rotation at Base of Pendulum



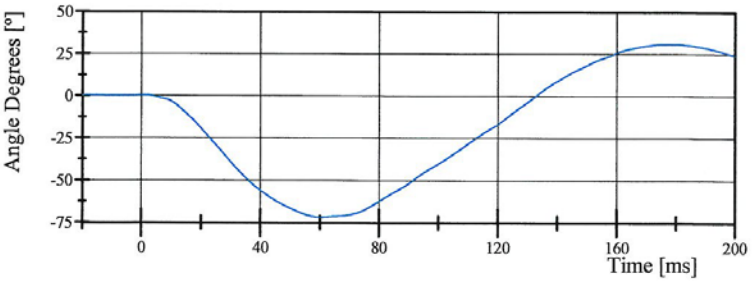
Filter Class: CFC_60
Max: 25.5 ° at 181.5 ms
Min: -46.5 ° at 63.7 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 11.4 ° at 168.0 ms
Min: -11.6 ° at 40.8 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 30.9 ° at 177.8 ms
Min: -71.8 ° at 60.3 ms

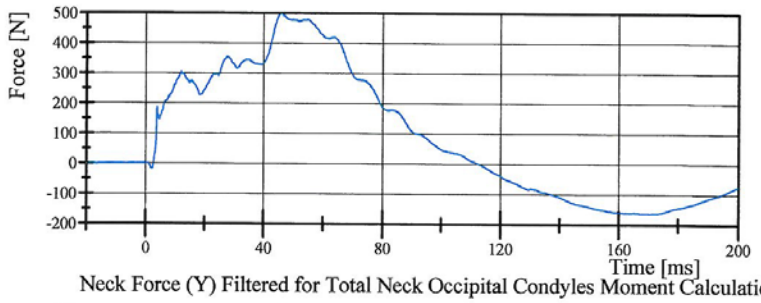
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 13:45:25 639

Transportation Research Center Inc.

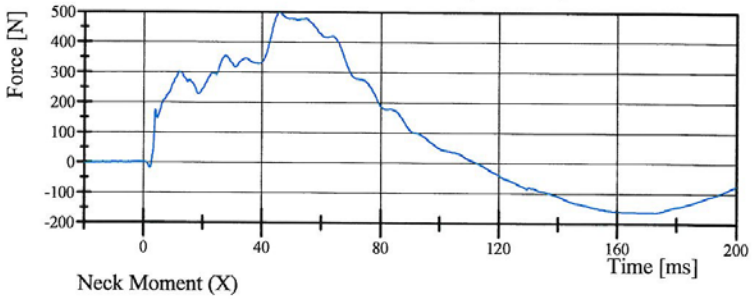
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Neck Force (Y)



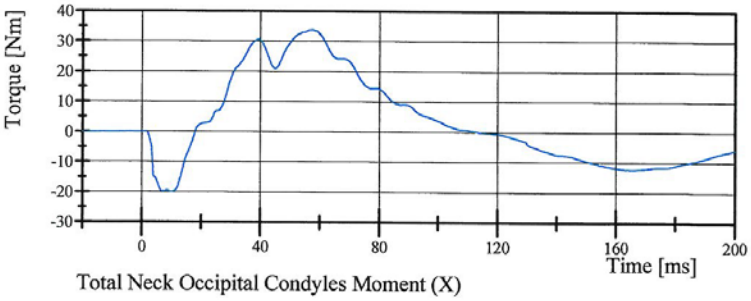
Filter Class: CFC_1000
Max: 499.0 N at 45.8 ms
Min: -162.9 N at 169.8 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



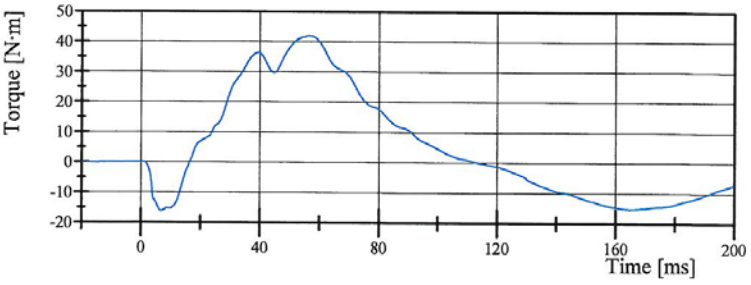
Filter Class: CFC_600
Max: 498.8 N at 45.8 ms
Min: -162.5 N at 168.7 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 33.8 Nm at 56.6 ms
Min: -20.1 Nm at 10.2 ms

Total Neck Occipital Condyles Moment (X)



Filter Class: Without_(Consta
Max: 42.0 N·m at 56.5 ms
Min: -16.1 N·m at 6.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 13:45:26 639

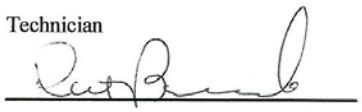
Transportation Research Center Inc.

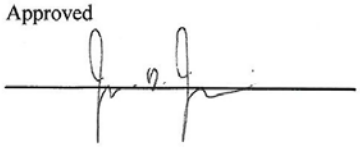
Left Lateral Shoulder
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.6 g	Yes
Shoulder Displacement	28 - 37 mm	30.0 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.4 g	Yes

Test meets specifications.

Comments:

Technician 

Approved 

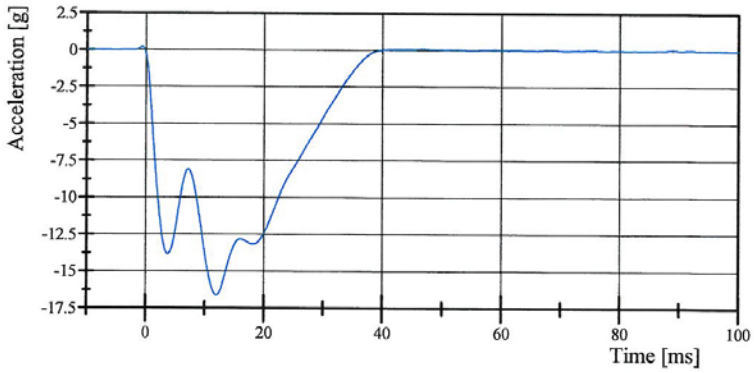
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 12:56:54 835

Transportation Research Center Inc.

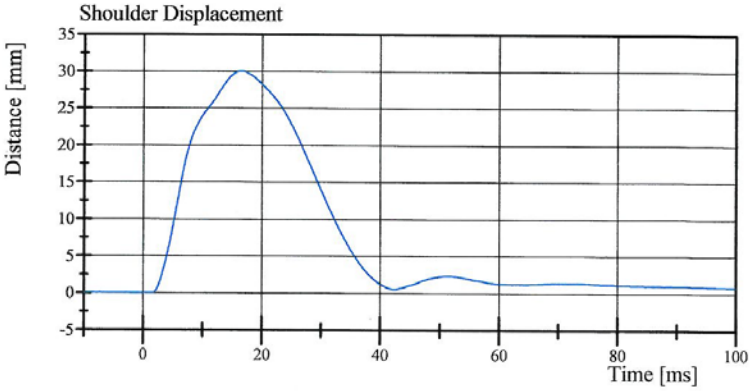
Left Lateral Shoulder
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Probe Acceleration



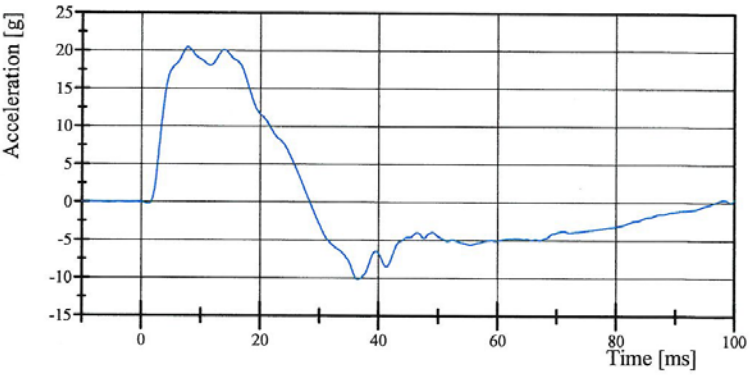
Filter Class: CFC_180
Max: 0.2 gn at -0.6 ms
Min: -16.6 gn at 12.0 ms

Shoulder Displacement



Filter Class: CFC_600
Max: 30.0 mm at 16.6 ms
Min: -0.0 mm at 1.6 ms

Upper Spine Acceleration (Y)



Filter Class: CFC_180
Max: 20.4 gn at 7.8 ms
Min: -10.2 gn at 36.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 12:57:03 835

Transportation Research Center Inc.

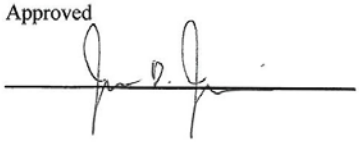
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.647 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-34.3 g	Yes
Shoulder Displacement	31 - 40 mm	33.4 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	26.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	30.7 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	32.9 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	41.5 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	36.3 g	Yes

Test meets specifications.

Comments:

Technician 

Approved 

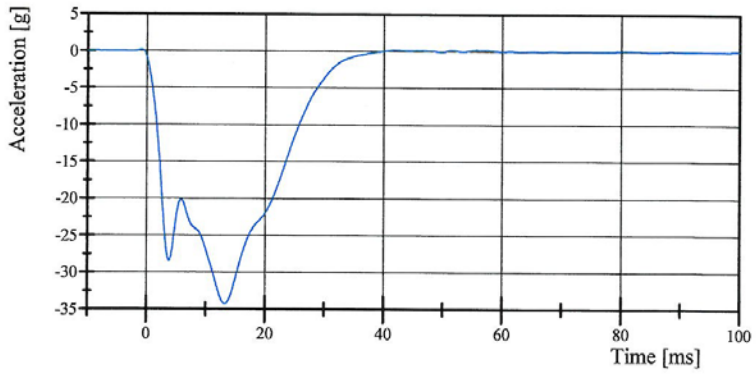
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 14:06:11 624

Transportation Research Center Inc.

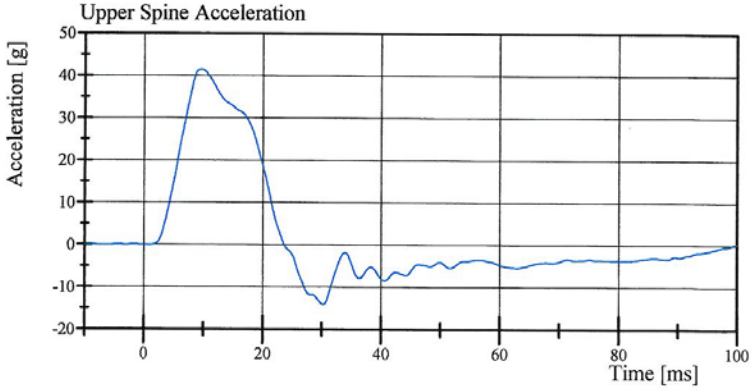
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Probe Acceleration



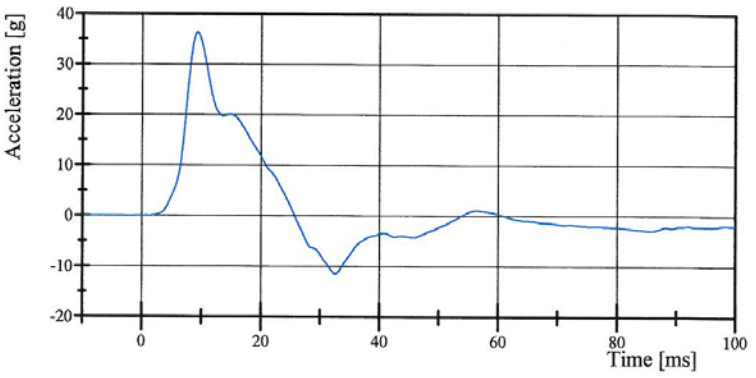
Filter Class: CFC_180
Max: 0.2 gn at 55.6 ms
Min: -34.3 gn at 13.2 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 41.5 gn at 9.8 ms
Min: -14.1 gn at 30.3 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 36.3 gn at 9.3 ms
Min: -11.5 gn at 32.6 ms

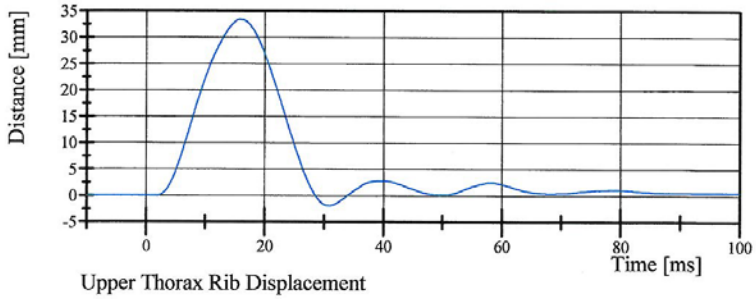
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 14:06:20 624

Transportation Research Center Inc.

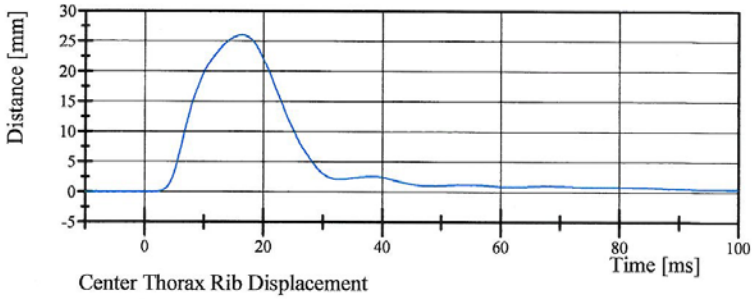
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Shoulder Rib Displacement



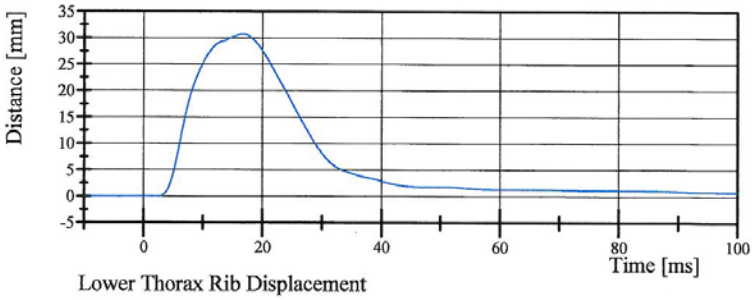
Filter Class: CFC_600
Max: 33.4 mm at 15.8 ms
Min: -2.0 mm at 30.8 ms

Upper Thorax Rib Displacement



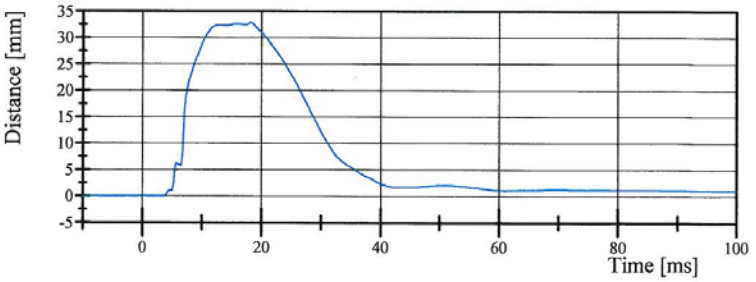
Filter Class: CFC_600
Max: 26.0 mm at 16.4 ms
Min: -0.0 mm at -2.0 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 30.7 mm at 16.7 ms
Min: -0.0 mm at -2.2 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 32.9 mm at 18.2 ms
Min: -0.0 mm at 3.5 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 14:06:20 624

Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/5/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.292 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	35.3 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	37.2 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.6 g	Yes

Test meets specifications.

Comments:

Technician

Approved

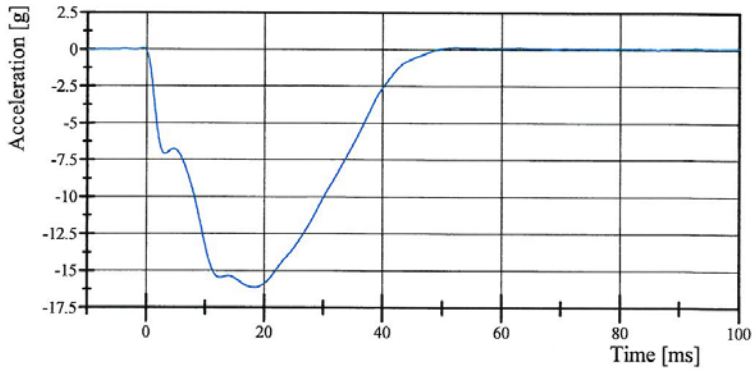
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 15:18:18 833

Transportation Research Center Inc.

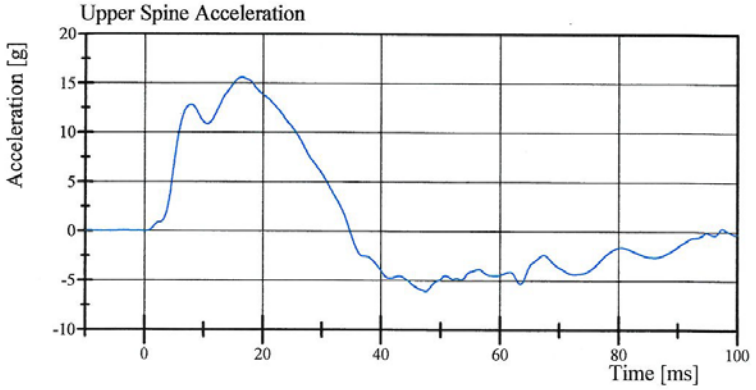
Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/5/2012

Probe Acceleration



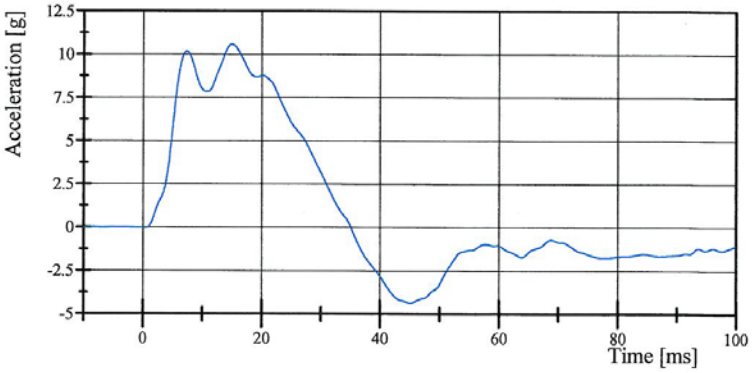
Filter Class: CFC_180
Max: 0.1 gn at 52.1 ms
Min: -16.1 gn at 18.4 ms

Upper Spine Acceleration



Filter Class: CFC_180
Max: 15.6 gn at 16.4 ms
Min: -6.1 gn at 47.5 ms

Lower Spine Acceleration



Filter Class: CFC_180
Max: 10.6 gn at 15.0 ms
Min: -4.4 gn at 45.1 ms

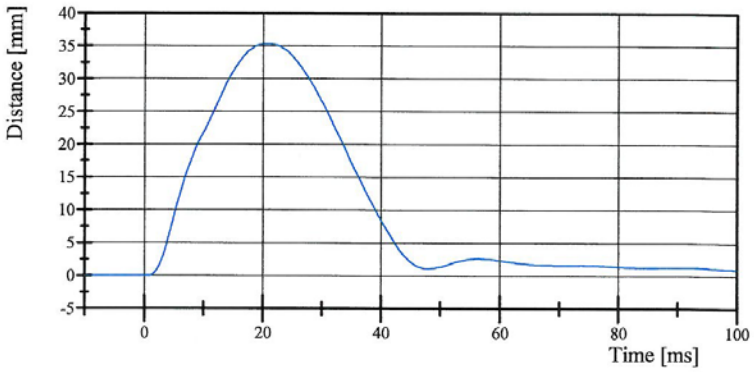
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 15:18:38 833

Transportation Research Center Inc.

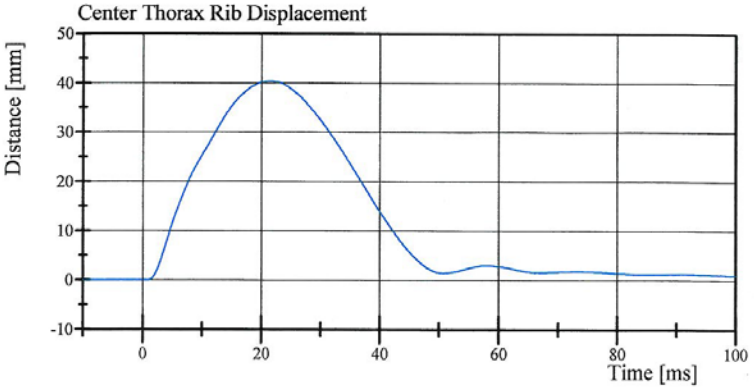
Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/5/2012

Upper Thorax Rib Displacement



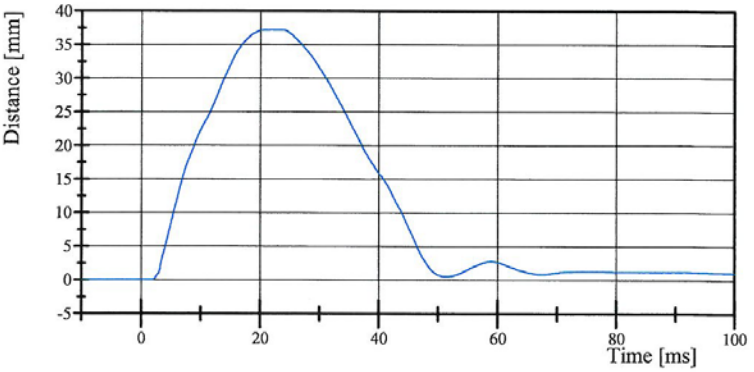
Filter Class: CFC_600
Max: 35.3 mm at 20.7 ms
Min: -0.0 mm at 0.8 ms

Center Thorax Rib Displacement



Filter Class: CFC_600
Max: 40.4 mm at 21.4 ms
Min: -0.0 mm at 0.9 ms

Lower Thorax Rib Displacement



Filter Class: CFC_600
Max: 37.2 mm at 21.7 ms
Min: -0.0 mm at 1.8 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 15:18:39 833

Transportation Research Center Inc.

Left Lateral Abdomen
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.1 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.5 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.4 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.90 g	Yes

Test meets specifications.

Comments:

Technician

Approved

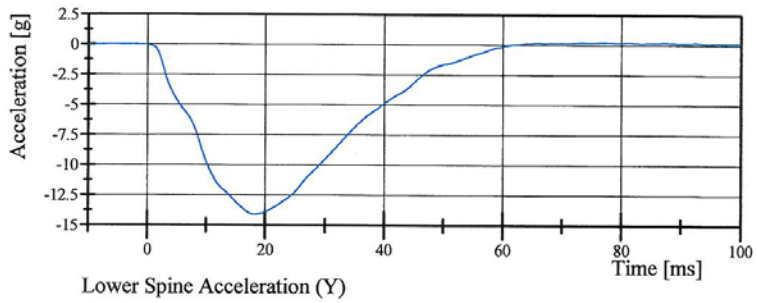
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 15:43:31 640

Transportation Research Center Inc.

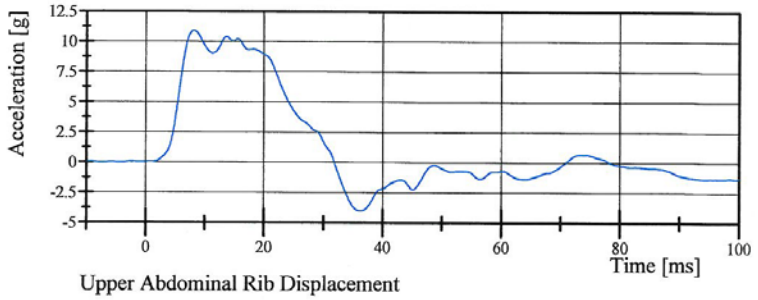
Left Lateral Abdomen
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/5/2012

Probe Acceleration



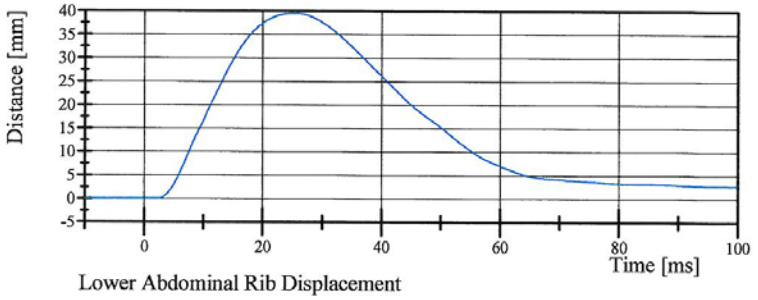
Filter Class: CFC_180
Max: 0.2 gn at 73.4 ms
Min: -14.1 gn at 18.2 ms

Lower Spine Acceleration (Y)



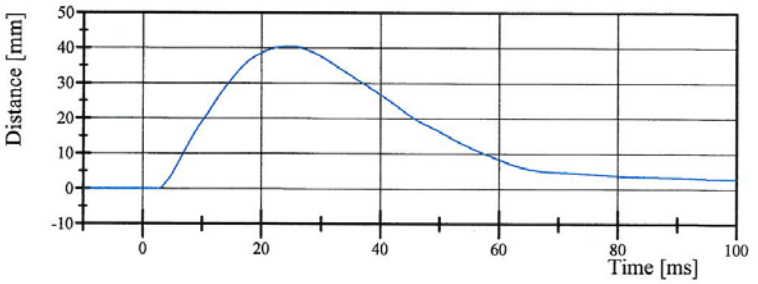
Filter Class: CFC_180
Max: 10.9 gn at 8.1 ms
Min: -4.0 gn at 36.2 ms

Upper Abdominal Rib Displacement



Filter Class: CFC_600
Max: 39.5 mm at 25.3 ms
Min: -0.0 mm at 2.4 ms

Lower Abdominal Rib Displacement



Filter Class: CFC_600
Max: 40.4 mm at 24.6 ms
Min: -0.0 mm at 2.6 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.05.2012 15:43:42 640

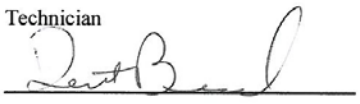
Transportation Research Center Inc.

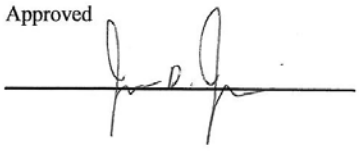
Left Lateral Pelvis
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.61 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.89 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.7 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,923.0 N	Yes

Test meets specifications.

Comments:

Technician 

Approved 

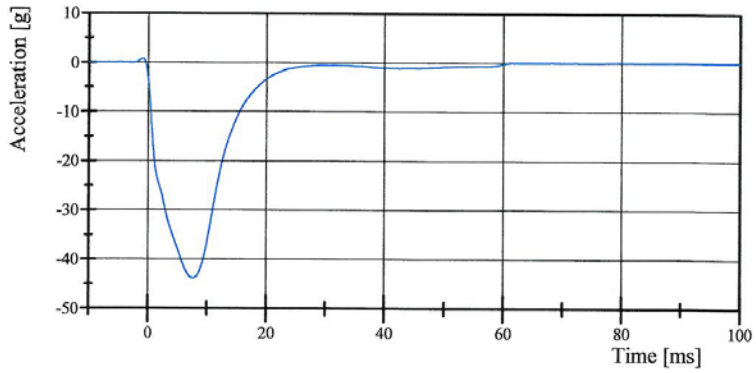
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 07:14:05 447

Transportation Research Center Inc.

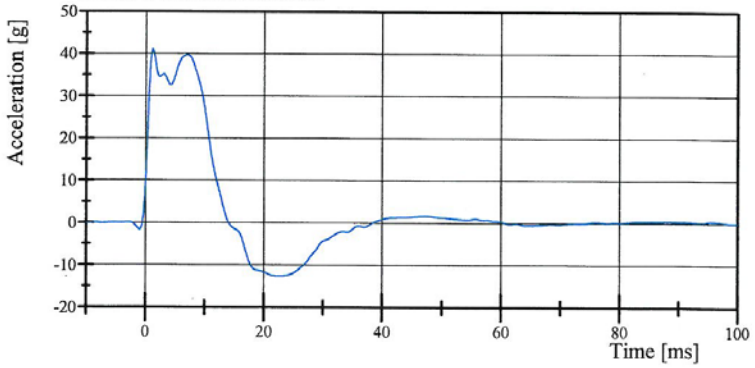
Left Lateral Pelvis
SID IIs Serial No. 033 Certification No. 9-2
Test Date: 1/6/2012

Probe Acceleration



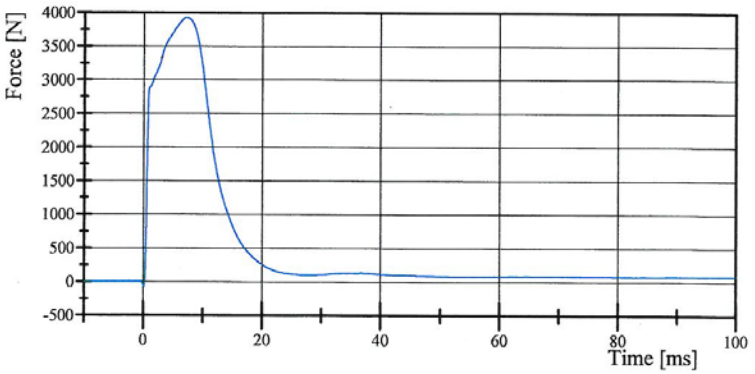
Filter Class: CFC_180
Max: 0.7 gn at -1.0 ms
Min: -43.9 gn at 7.7 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 41.0 gn at 1.2 ms
Min: -12.6 gn at 23.0 ms

Acetabulum Y-Axis Force



Filter Class: CFC_600
Max: 3,923.0 N at 7.3 ms
Min: -76.0 N at 0.1 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 07:14:18 447

Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/6/2012

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.40 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-38.7 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	28.2 g	Yes
Iliac Force	4,100 - 5,100 N	4,393.7 N	Yes

Test meets specifications.

Comments:

Technician

Approved

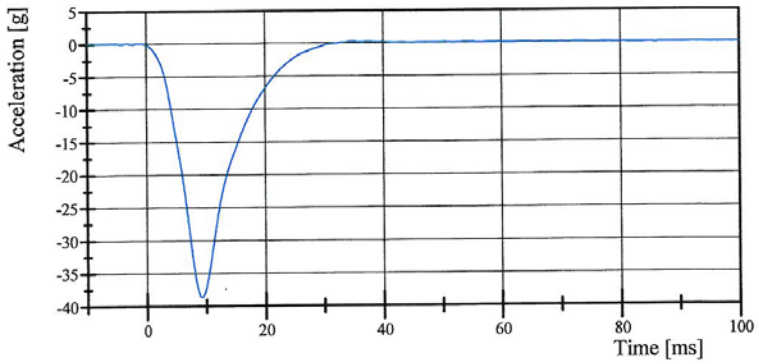
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 09:18:04 663

Transportation Research Center Inc.

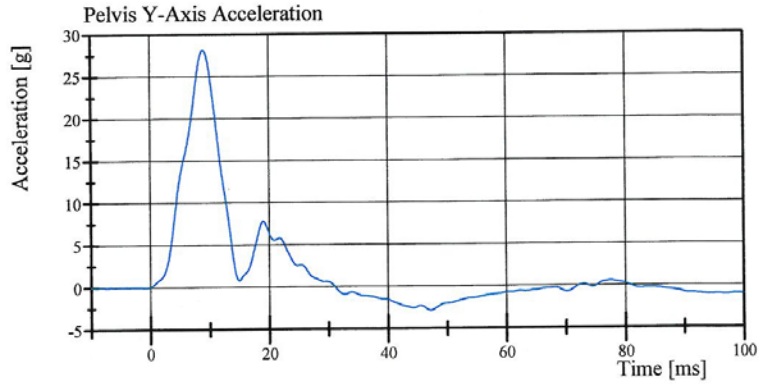
Left Lateral Iliac
SID IIs Serial No. 033 Certification No. 9-1
Test Date: 1/6/2012

Probe Acceleration



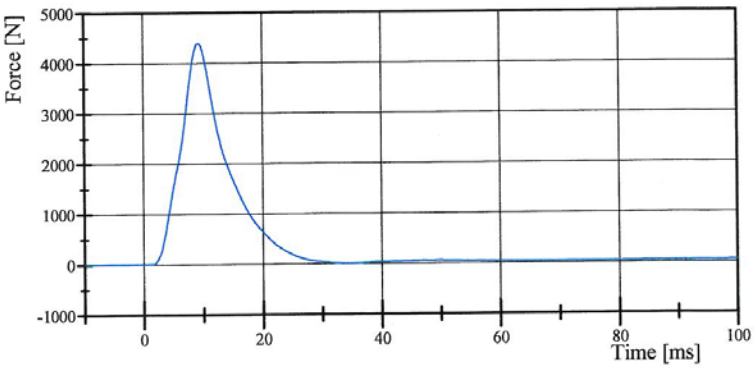
Filter Class: CFC_180
Max: 0.2 gn at 37.6 ms
Min: -38.7 gn at 9.3 ms

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 28.2 gn at 9.0 ms
Min: -2.9 gn at 47.2 ms

Iliac Y-Axis Force



Filter Class: CFC_600
Max: 4,393.7 N at 9.3 ms
Min: -0.5 N at -3.7 ms

Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.06.2012 09:18:18 663

Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 033 Calibration No.09
Date: 01/06/12

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	778	Yes
B	Shoulder Pivot Height	437.0 - 453.0	442	Yes
C	H-Point Height	79.0 - 89.0	85	Yes
D	H-Point from Seat Back	141.0 - 151.0	145	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	101	Yes
F	Thigh Clearance	119.0 - 135.0	134	Yes
G	Head Breadth	140.0 - 148.0	145	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	183	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	533	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	429	Yes
O	Chest Depth without Jacket	195.0 - 211.0	208	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	481	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	351	Yes
W	Foot Width (right)	78.0 - 94.0	84	Yes
W	Foot Width (left)	78.0 - 94.0	84	Yes
Y	Chest Circumference with Jacket	851.0 - 881.0	870	Yes
Z	Waist Circumference	761.0 - 791.0	778	Yes

Technician

Approved

Revised 9/29/2005

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	J32214	Endevco	11/16/11
			Y	J27040	Endevco	11/16/11
			Z	AGAC4	Endevco	11/16/11
Displacement Potentiometers	Shoulder		Y			
	Thoracic Rib	Upper	Y	3621-592	Servo	11/16/11
		Middle	Y	3725-213	Servo	11/16/11
		Lower	Y	3621-5714	Servo	11/16/11
	Abdominal Rib	Upper	Y	3621-918	Servo	11/16/11
		Lower	Y	3621-904	Servo	11/16/11
Lower Spine Accelerometers (T12)			X	00L13-F05	Entran	11/16/11
			Y	P63998	Endevco	11/09/11
			Z	04J04I20-A17	Entran	11/16/11
Acetabulum Load Cell			Y	235-FY	FTSS	11/16/11
Iliac Wing Load Cell			Y	113-FY	FTSS	11/16/11
Pelvis Plug (struck side)						
Pelvis Plug (non-struck side)						

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P73601	Endevco	11/28/11
Vehicle Center of Gravity	Y	P76296	Endevco	11/28/11
Vehicle Center of Gravity	Z	P73611	Endevco	11/22/11
Left Floor Sill	Y	P66894	Endevco	11/10/11
A-Pillar Sill	Y	P61357	Endevco	07/06/11
A-Pillar Low	Y	P69101	Endevco	08/09/11
A-Pillar Mid	Y	P73379	Endevco	08/09/11
B-Pillar Sill	Y	P73614	Endevco	11/30/11
B-Pillar Low	Y	P68749	Endevco	06/01/11
B-Pillar Mid	Y	P68771	Endevco	06/01/11
Driver Seat	Y	P73298	Endevco	11/22/11
Engine Top	X	P68766	Endevco	01/02/12
Engine Top	Y	P73385	Endevco	08/18/11
Firewall	Y	P73586	Endevco	08/18/11
Right Roof	Y	P73592	Endevco	08/16/11
Right Floor Sill	Y	P57185	Endevco	07/15/11
Rear Floor Pan	X	P49030	Endevco	08/17/11
Rear Floor Pan	Y	P66701	Endevco	08/17/11

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	86-FX	Denton	06/09/11
Load Cell 2	91-FX	Denton	06/09/11
Load Cell 3	89-FX	Denton	06/09/11
Load Cell 4	77-FX	Denton	06/09/11
Load Cell 5	90-FX	Denton	06/09/11
Load Cell 6	88-FX	Denton	06/09/11
Load Cell 7	92-FX	Denton	06/09/11
Load Cell 8	78-FX	Denton	06/09/11