

FINAL REPORT NUMBER: SPNCAP-TRC-13-005

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**Mazda Motor Corp.
2013 Mazda CX-9
NHTSA NUMBER: MD5404**

**PREPARED BY:
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Report Date: March 18, 2013

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: 
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Approval Date: 3/22/13

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 2013 Mazda CX-9 MPV, 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 15, 2013. The impact velocity was 32.19 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 22° C. The test vehicle's post-test maximum crush was 437 mm at Level 2. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th><th>Unit</th><th>Threshold</th><th>Front SID-IIs</th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td><td>NA</td><td>1000</td><td>457</td></tr> <tr> <td>Resultant Lower Spine Acceleration:</td><td>g's</td><td>82</td><td>54.9</td></tr> <tr> <td>Total Pelvic Force: (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td>4875.3</td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38</td><td>24.7</td></tr> <tr> <td>Maximum Abdomen Rib Deflection</td><td>mm</td><td>45</td><td>23.4</td></tr> </tbody> </table> The door struck by the pole did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.					Unit	Threshold	Front SID-IIs	Head Injury Criteria (HIC ₃₆):	NA	1000	457	Resultant Lower Spine Acceleration:	g's	82	54.9	Total Pelvic Force: (sum of acetabular and iliac forces)	N	5525	4875.3	Maximum Thoracic Rib Deflection	mm	38	24.7	Maximum Abdomen Rib Deflection	mm	45	23.4
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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 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 MY13 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 2013 Mazda CX-9 MPV manufactured by Mazda Motor Corp. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2012.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a model year 2013 Mazda CX-9. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.19 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on January 15, 2013. 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 September 2012. Camera locations and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

- Head CG Triaxial Accelerometers
- 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	457
Lower Spine Acceleration	G	82	54.9
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4875.3
Maximum Thoracic Rib Deflection	mm	38*	24.7
Maximum Abdominal Rib Deflection	mm	45*	23.4

* 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	No	NA		
Curtain	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	None	NA	None	NA

GENERAL COMMENTS

None

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MD5404	Traction Control System (TCS)	Yes
Model Year	2013	Auto-Leveling System	No
Make	Mazda	Automatic Door Locks (ADL)	Yes
Model	CX9	Power Window Auto-Reverse	No
Body Style	MPV	Other Optional Feature	None
VIN	JM3TB2CA9D0401499	Driver Front Airbag	Yes
Body Color	Silver	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	18	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.7	Driver Torso Airbag	Yes
Type/No. Cylinders	6	Driver Torso/Pelvis Airbag	No
Engine Placement	Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	No
Roof Rack	No	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	No	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	Yes	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Safety Restraint	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Corporation	GVWR (kg)	2645
Date of Manufacturer	10/12	GAWR Front (kg)	1276
Vehicle Type	MPV	GAWR Rear (kg)	1400

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	2	7
Vehicle Capacity Weight (VCW) (kg)				539
DSC X 68.04 kg				176.28
Rated Cargo and Luggage Weight (RCLW) (kg)				62.72

VEHICLE SEAT TYPE

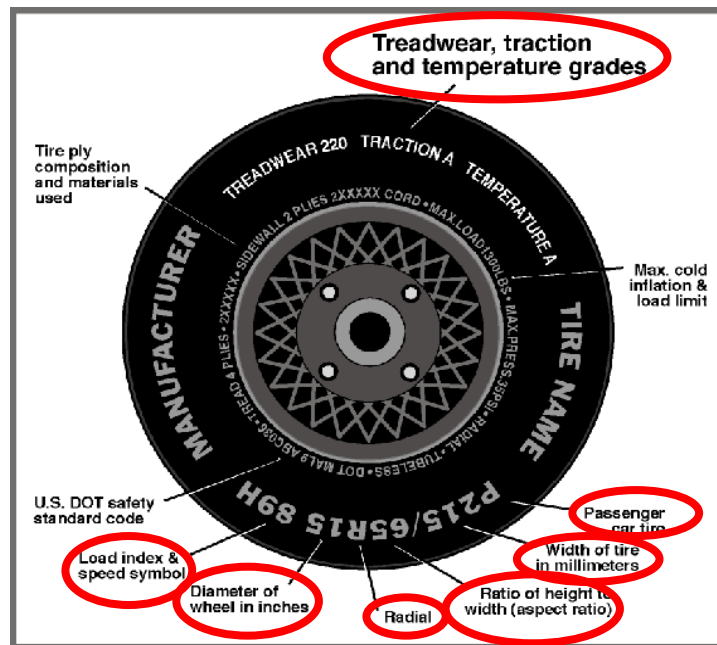
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	Yes	No	No		No	No	Yes
Rear or Second Row Seat	No	No	Yes	Yes	No	Yes	No
Third row seat	No	Yes	No	Yes	Yes	No	No

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	P245/60R18	P245/60R18
Tire Size on Vehicle	P246/60R18	P246/60R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/L 400	Dueler H/L 400
Treadwear	3	3
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	104H	104H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	H42L DEC4112	H42L DEC4112
DOT Safety Code Right	H42L DEC4112	H42L DEC4112

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

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	250	250	250	250
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

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	552.	436.8		600.8	432.4		570.8	491.6	
Right	kg	547.4	412.8		586.2	434.2		550.6	460.4	
Ratio	%	56.4	43.6		57.8	42.2		54.1	45.9	
Totals	kg	1099.4	849.6	1949.0	1187.0	866.8	2053.6	1121.4	952.0	2073.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	1949.0
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	49.0
Rated Cargo/Luggage Weight (RCLW)	kg	62.72
Calculated Vehicle Target Weight (TVTW)	kg	2060.72

(A)
 (B)
 (C)
 (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)? ☒ YES ☐ NO

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Removed spare tire & unused floor mats	19.2
Added steel plate to rear cargo area	3.2

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-1.5	2.0	-1.4	No
Front Passenger Sill Angle (front-to-rear)*	Deg.	-1.7	-2.4	-1.5	No
Front Bumper-Line Angle (left-to-right)**	Deg.	0.1	-0.5	0.1	No
Rear Bumper-Line Angle (left-to-right)**	Deg.	0.9	-0.5	0.9	No
Vehicle CG (Aft of Front Axle)	mm	1253	1213	1320	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+12.1	+5.0	+20.5	

*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: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

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	22.3	7.7	14.6
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat*	NA	NA	NA
Struck Side Rear Seat	NA	NA	NA
Non-Struck Side Rear Seat	NA	NA	NA
Rear Center Seat*	NA	NA	NA

* If applicable.

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rearmost	Mid- Fore/Aft	Forward- Most
Driver Seat	14.6	260	Max	283	283	283
			Mid	260	260	260
			Min	237	237	237
Front Passenger Seat	11.7	NA	Max	NA	NA	NA
			Mid	240	240	240
			Min	NA	NA	NA
Front Center Seat*	N/A	NA	Max	NA	NA	NA
			Mid	NA	NA	NA
			Min	NA	NA	NA
Struck Side Rear Seat	9.6	NA	Max	NA	NA	NA
			Mid	110	110	110
			Min	NA	NA	NA
Non-Struck Side Rear Seat	10.3	NA	Max	NA	NA	NA
			Mid	110	110	110
			Min	NA	NA	NA
Rear Center Seat*	11.1	NA	Max	NA	NA	NA
			Mid	110	110	110
			Min	NA	NA	NA

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

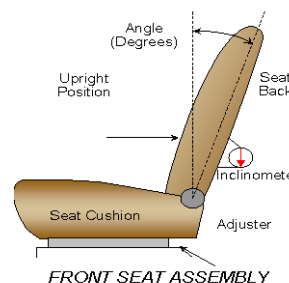
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	260	NA	0	NA
Front Passenger Seat	260	NA	NA	NA
Front Center Seat*	NA	NA	NA	NA
Struck Side Rear Seat	120	3	120	2
Non-Struck Side Rear Seat	120	3	120	2
Rear Center Seat*	120	3	120	2

* 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	89.5	NA	3.5	NA
Front Passenger Seat	89.1	NA	3.5	NA
Front Center Seat*	NA	NA	NA	NA
Struck Side Rear Seat	10.1	6	8.7	0
Non-Struck Side Rear Seat	10.0	6	9.0	0
Rear Center Seat*	10.1	6	8.7	0

* 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	4	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	4	3

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

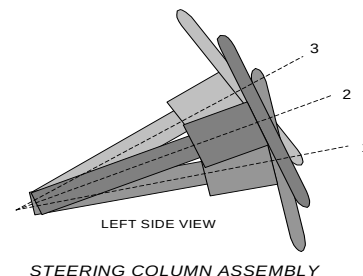
Test Vehicle: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13

STEERING COLUMN ADJUSTMENT

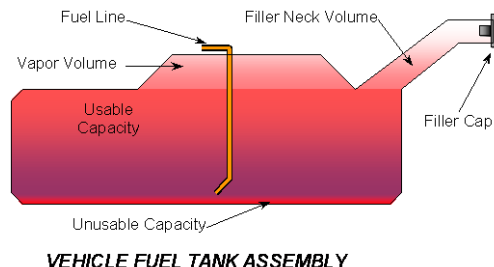
Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	63.2	25.5
Geometric Center, Position No. 2	60.5	25.5
Uppermost, Position No. 3	57.9	25.5
Telescoping Steering Wheel Travel		51.0
Test Position	60.5	25.5

**FUEL PUMP**

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

Fuel tank is located in front of the rear axle. Filler neck enters at top left rear corner of tank. Cap is on left rear quarter panel. Fuel lines run along the inside inner frame rail.

**FUEL TANK CAPACITY**

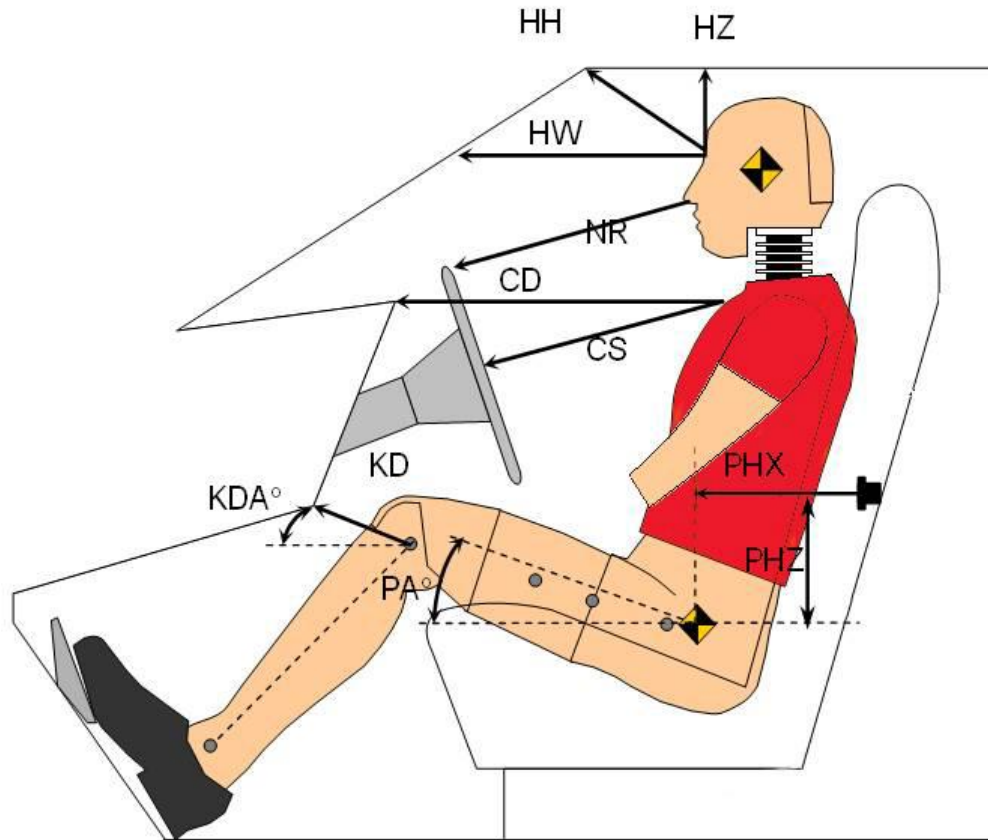
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	76.0
Usable Capacity of "Optional" Tank (see Form No. 1)	NA
Usable Capacity of Standard Tank (see Owner's Manual)	76.0
Usable Capacity of Optional Tank (see Owner's Manual)	NA
93% of Usable Capacity	70.7
Actual Amount of Solvent Used in Test	70.8
1/3 of Usable Capacity	25.3

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

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

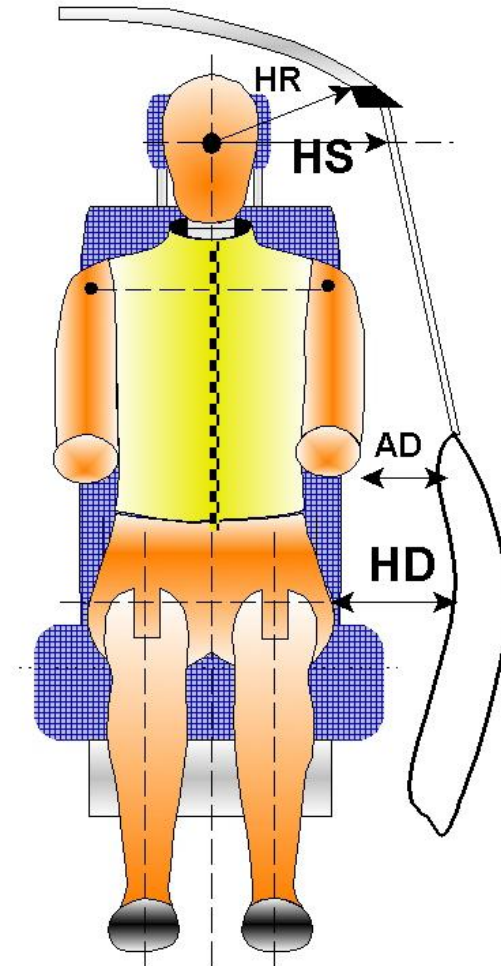


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	248	
HW	Head to Windshield	577	
HZ	Head to Roof Liner	178	
NR	Nose to Rim	217	
CD	Chest to Dashboard	386	
CS	Chest to Steering Wheel	136	
KDL/KDLA°	Left Knee to Dash	80	30
KDR/KDRA°	Right Knee to Dash	74	30
PAX°	Pelvic Tilt Angle (X-axis)		21.1
PAY°	Pelvic Tilt Angle (Y-axis)		0.8
PHX	Hip Point to Striker (X-Axis)	426	
PHZ	Hip Point to Striker (Z-Axis)	99	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13

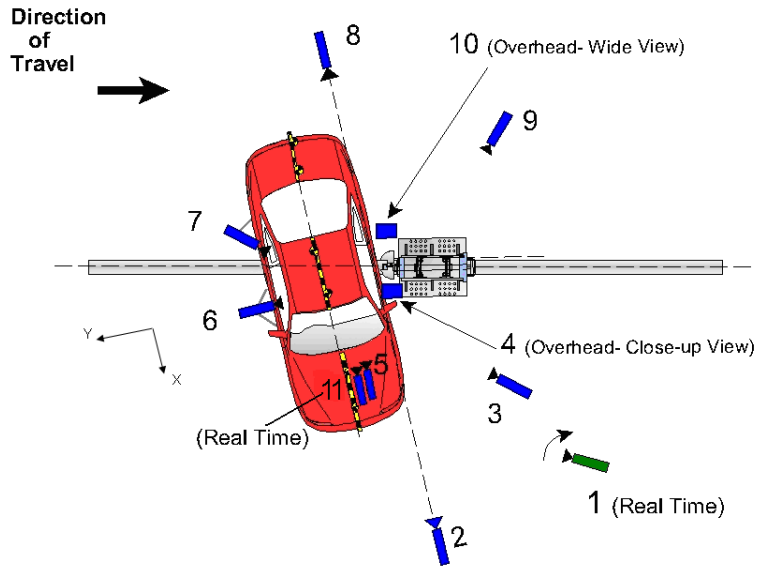


Code	Measurement Description	Length (mm)
HR	Head to Side Header	266
HS	Head to Side Window	393
AD	Arm to Door	181
HD	Hip Point to Door	212

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13



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	0	5933	-1262	12.5	1000
3	Impact side 45° – forward pole view	-824	3519	-1354	16	1000
4	Overhead Close-up view of impact	0	0	-5629	16	1000
5	Onboard – dummy front view				12.5	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				8.5	1000
8	Rear ground level – impact view	285	-5267	-1258	6	1000
9	Impact side 45° – rearward pole view	-2552	-3773	-1350	25	1000
10	Overhead wide view of impact	-305	-150	-5602	6	1000
11	Real time dummy front view	-1943	-5990	-1263	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: Not Applicable

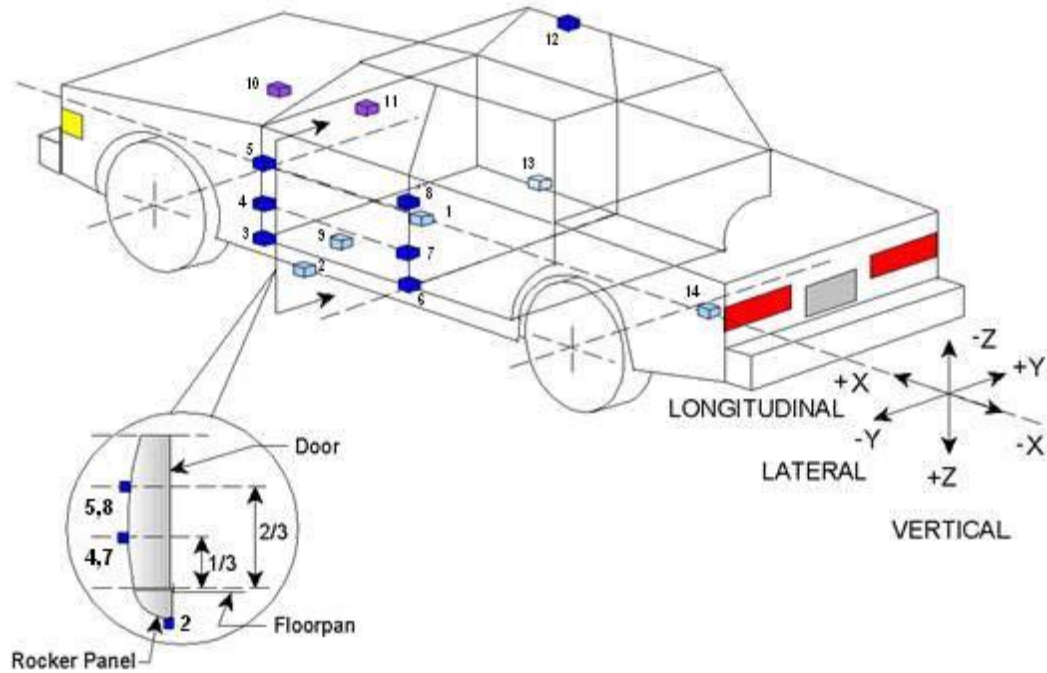
INSTRUMENTATION

	Number of Channels
Driver Dummy	19
Vehicle Structure	18
Pole Load Cells	8
TOTAL	45

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13



	Accelerometer/Sensor Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3670	0	-477
2	Left Floor Sill	3523	-690	-402
3	A-Pillar Sill	3855	-695	-407
4	A-Pillar Low	3995	-860	-556
5	A-Pillar Mid	4005	-870	-952
6	B-Pillar Sill	2935	-660	-452
7	B-Pillar Low	2910	-870	-672
8	B-Pillar Mid	2870	-860	-1032
9	Driver Seat Track	3182	-580	-537
10	Engine Top	4547	-20	-886
11	Firewall	4660	0	-1031
12	Right Roof	3313	630	-1558
13	Right Floor Sill	3510	700	-393
14	Rear Floorpan	1583	0	-593

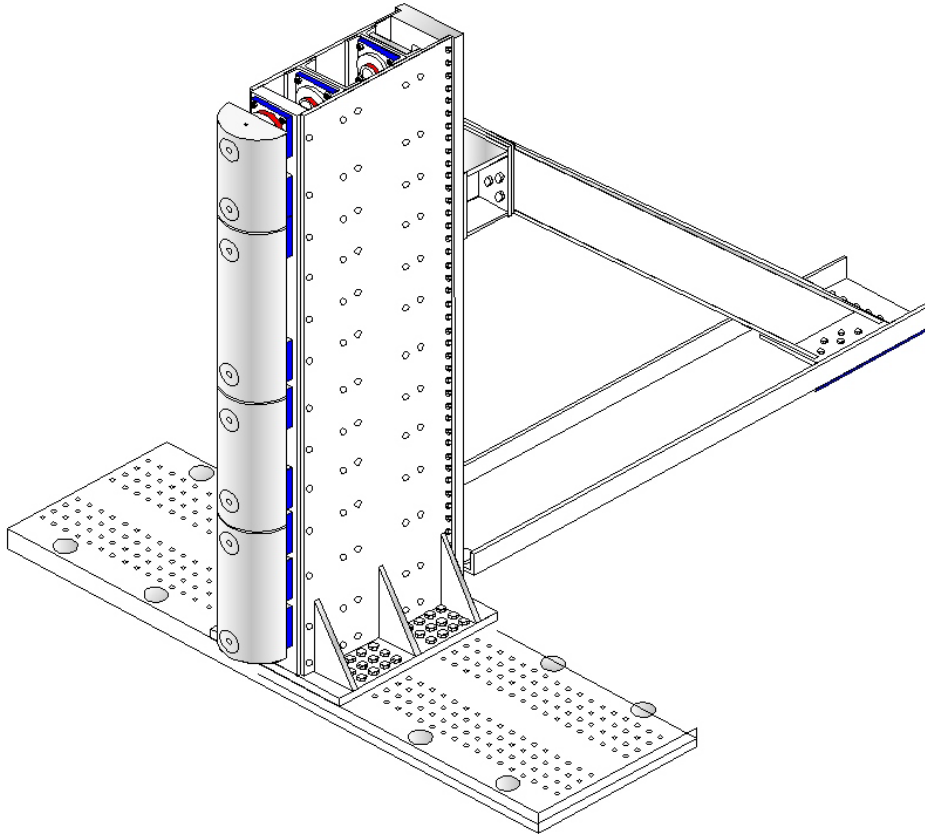
Reference: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (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: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	SCAB
Top of Head	SCAB
Left Side of Head	SCAB
Back of Head	SCAB
Left Shoulder	Torso Bag
Upper Torso	Torso Bag, Seat
Lower Torso	Torso Bag, Seat
Left Hip	Seat
Left Knee	Door Panel

POST TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	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	No	No	No
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
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	Good
Sill Separation	None
Windshield Damage	Broken
Side Window Damage	Broken
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	NA		
Curtain	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	None	NA	None	NA

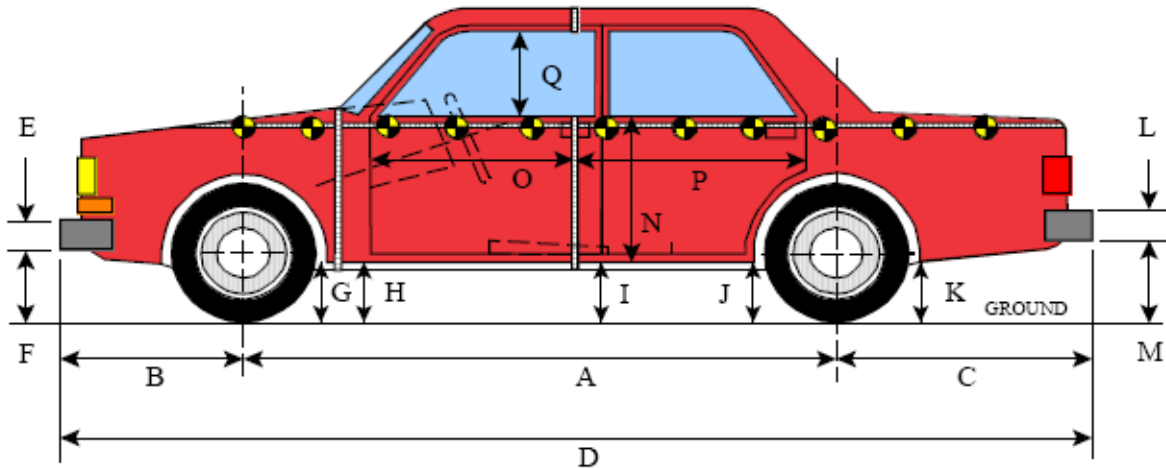
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1073
Actual Impact Point (Aft of Front Axle)	mm		1071
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	2
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	74.5
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.19
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.19

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13



LEFT SIDE VIEW

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

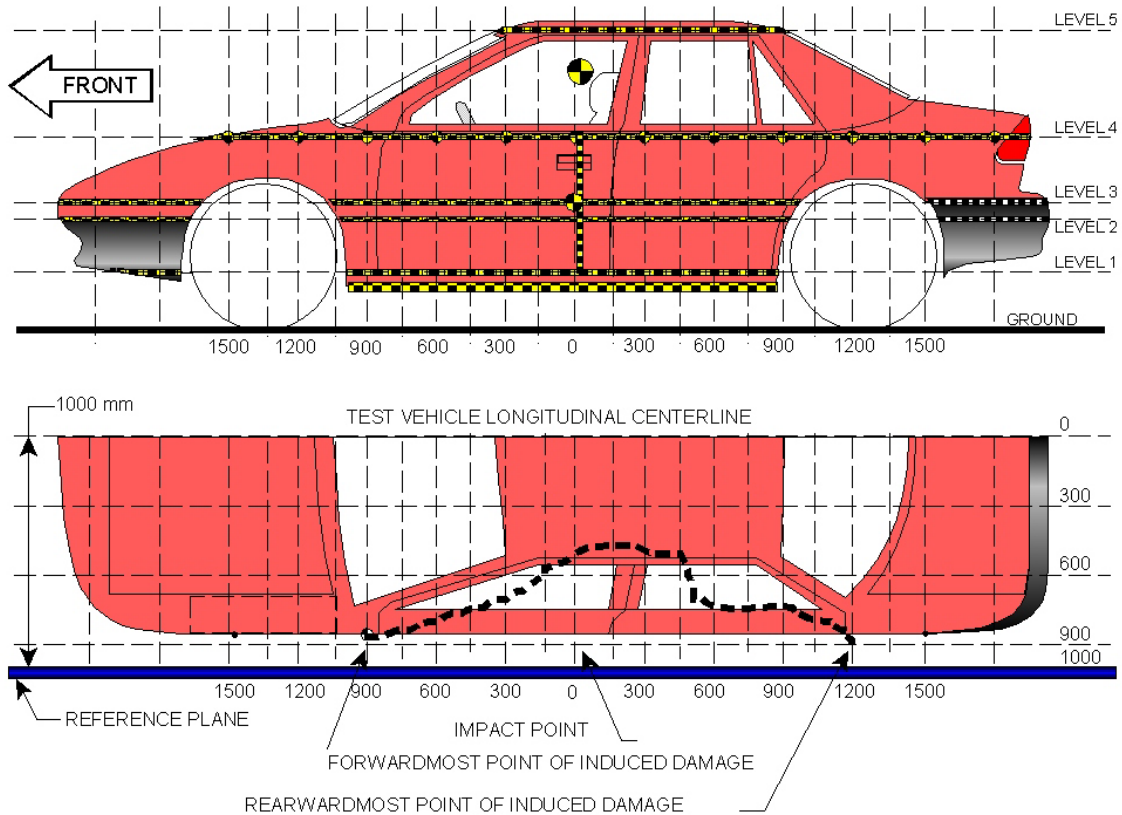
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2875	2800	75
B	Front Axle to Front Surface of Vehicle	1135	1135	0
C	Rear Axle to Rear Surface of Vehicle	1090	1090	0
D	Total Length at Centerline	5096	4996	100
E	Front Bumper Thickness	152	152	0
F	Front Bumper Bottom to Ground	605	635	-30
G	Sill Height at Front Wheel Well	442	448	-6
H	Sill Height at Front Door Leading Edge	451	464	-13
I	Sill Height at B-Pillar	468	514	-46
J1	Sill Height at Rear Wheel Well	480	550	-70
J2	Pinch Weld Height at Rear Wheel Well	261	295	-34
K	Sill Height Aft of Rear Wheel Well	525	581	-56
L	Rear Bumper Thickness	75	75	0
M	Rear Bumper Bottom to Ground	637	696	-59
N	Sill Height to Bottom of Front Window Sill	1000	1000	0
O	Front Door Leading Edge to Impact CL	560	520	40
P	Rear Door Trailing Edge to Impact CL	1729	1599	130
Q	Front Window Opening	465	425	40
R	Right Side Length	4680	4675	5
S	Left Side Length	4680	4675	5
T	Vehicle Width at "B" Pillars	1325	1210	115

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13



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	407	366	-150
2	Occupant H-Point	728	437	0
3	Mid-Door	704	435	0
4	Window Sill	1099	402	0
5	Window Top	1634	366	-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: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

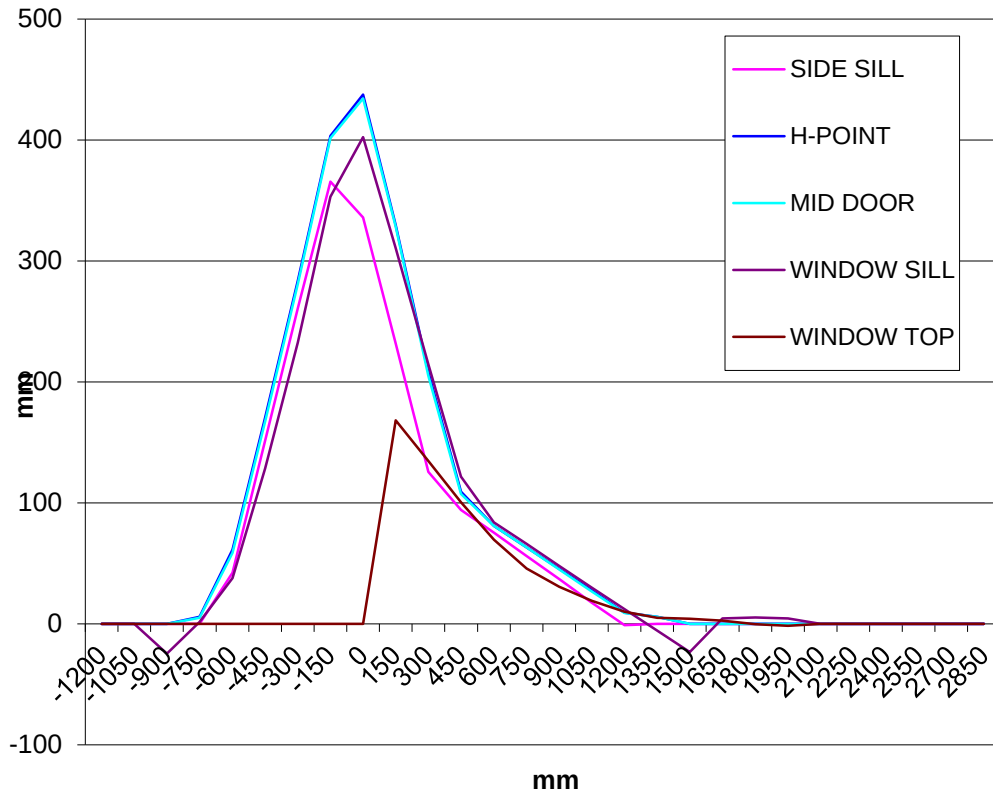
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	0	0	821	0	0	0	0	846	0	0	0	0	-25	0
-750	0	971	970	841	0	0	965	965	840	0	0	6	5	1	0
-600	947	962	963	869	0	905	901	904	831	0	42	61	59	38	42
-450	948	963	962	885	0	796	793	794	757	0	152	170	168	128	152
-300	949	965	964	895	0	688	681	683	662	0	261	284	281	233	261
-150	949	966	964	903	0	583	562	563	550	0	366	404	401	353	366
0	949	966	965	910	0	613	529	530	508	0	336	437	435	402	336
150	949	966	965	916	627	717	637	637	605	458	232	329	328	311	232
300	948	966	964	921	648	823	757	759	706	513	125	209	205	215	125
450	950	965	963	926	656	856	856	856	804	556	94	109	107	122	94
600	947	964	962	928	661	872	883	881	844	591	75	81	81	84	75
750	946	963	961	931	663	891	900	898	865	617	55	63	63	66	55
900	946	962	960	934	665	909	917	916	886	634	37	45	44	48	37
1050	944	961	960	936	664	926	934	933	906	645	18	27	27	30	18
1200	943	964	965	937	662	944	955	956	925	652	-1	9	9	12	-1
1350	0	972	972	950	658	0	966	967	956	653	0	6	5	-6	0
1500	0	0	0	953	653	0	0	0	976	649	0	0	0	-23	0
1650	0	0	0	936	646	0	0	0	932	643	0	0	0	4	0
1800	0	0	0	932	635	0	0	0	927	635	0	0	0	5	0
1950	0	0	0	926	616	0	0	0	922	617	0	0	0	4	0
2100	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: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13



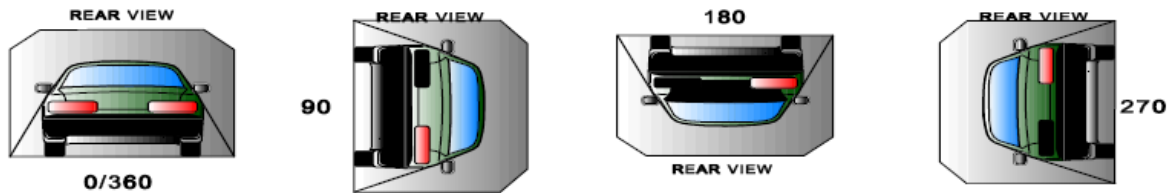
DATA SHEET NO. 11**FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA**

Test Vehicle: 2013 Mazda CX-9
 Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
 Test Date: 01/15/13

Test Time: 13:55 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

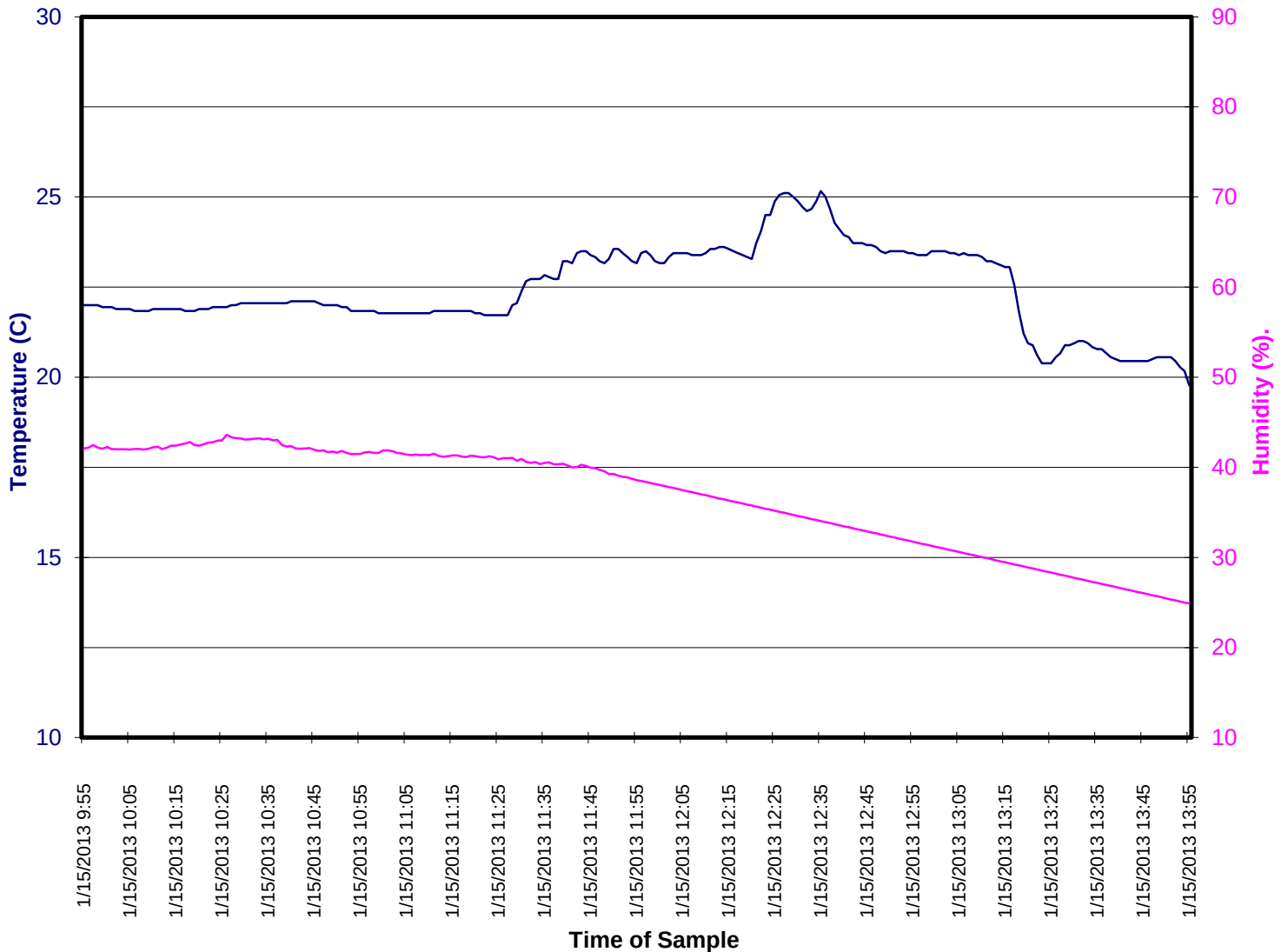
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2013 Mazda CX-9
Test Program: SPNCAP Side Impact

NHTSA No.: MD5404
Test Date: 01/15/13

MD5404 2013 Mazda CX-9 Touring MPV

75 Degree Oblique Rigid Pole Impact 130115; Test Time 13:55



APPENDIX A
PHOTOGRAPHS

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4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front 3/4 View of Test Vehicle	A-6
6	Post-Test Left Front 3/4 View of Test Vehicle	A-6
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8	Post-Test Left Side View of Test Vehicle	A-7
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13	Pre-Test Right Side View of Test Vehicle	A-10
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17	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-12
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26	Pre-Test Front View of Seat Back Prior to Dummy Positioning	A-16
27	Pre-Test Front View of Dummy Head and Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Front View of Seat Pan Prior to Dummy Positioning	A-17
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-18
31	Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level	A-19
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34	Pre-Test Left Side View of Steering Wheel	A-20

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38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-23
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-24
40	Pre-Test Dummy and Door Clearance View	A-24
41	Post-Test Dummy and Door Clearance View	A-25
42	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-25
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44	Pre-Test Inner Driver Door Panel View	A-26
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50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-29
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-30
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-30
53	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-31
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63	FMVSS No. 301 Static Rollover 0 Degrees	A-36
64	FMVSS No. 301 Static Rollover 90 Degrees	A-36
65	FMVSS No. 301 Static Rollover 180 Degrees	A-37
66	FMVSS No. 301 Static Rollover 270 Degrees	A-37
67	FMVSS No. 301 Static Rollover 360 Degrees	A-38
68	Impact Event	A-38
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71	Post-Test View of Shattered Vehicle Inner Door Panel	A-40



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



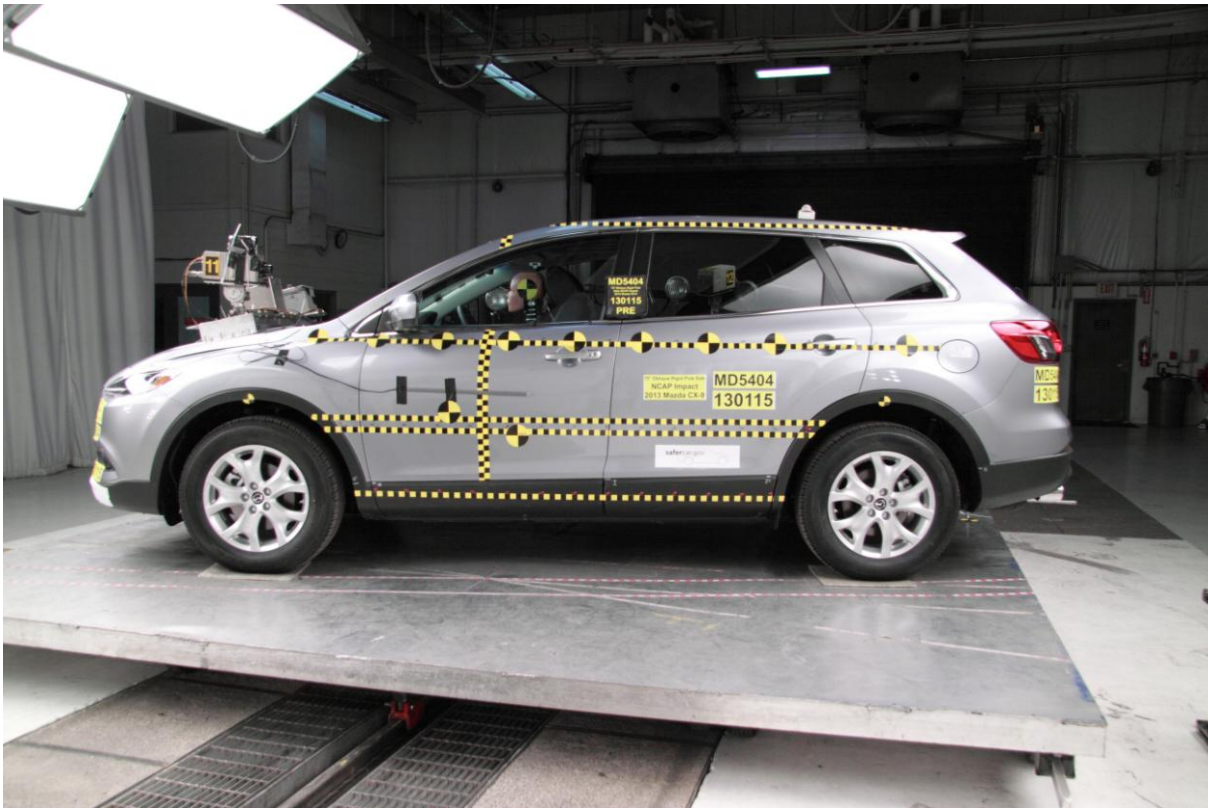
004 Post-Test Frontal View of Test Vehicle



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



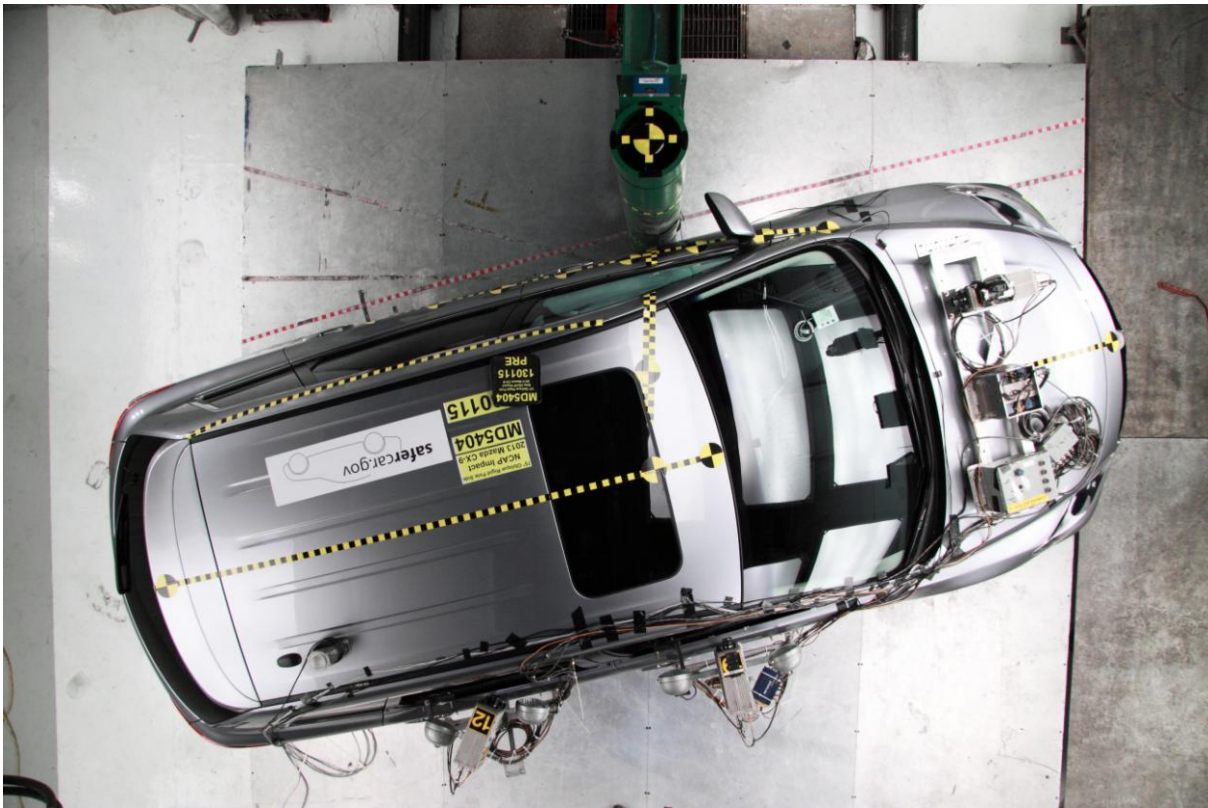
012 Post-Test Rear View of Test Vehicle



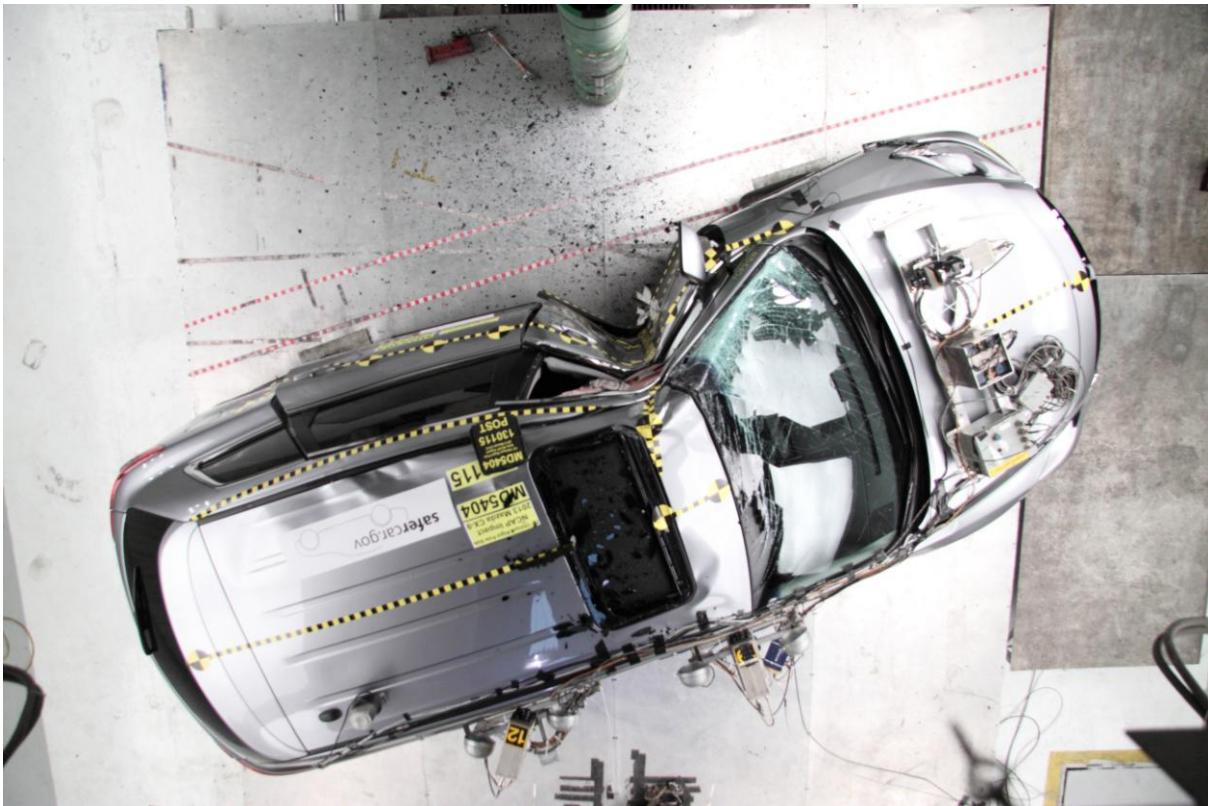
013 Pre-Test Right Side View of Test Vehicle



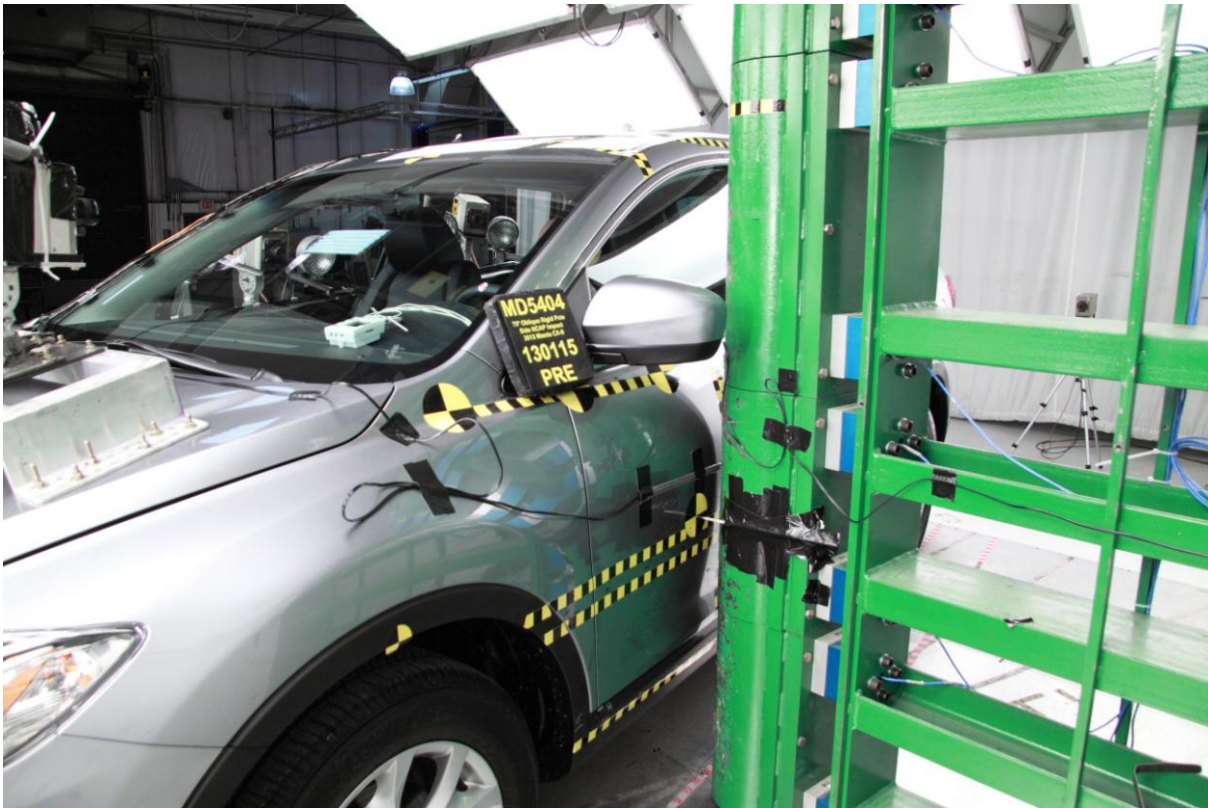
014 Post-Test Right Side View of Test Vehicle



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



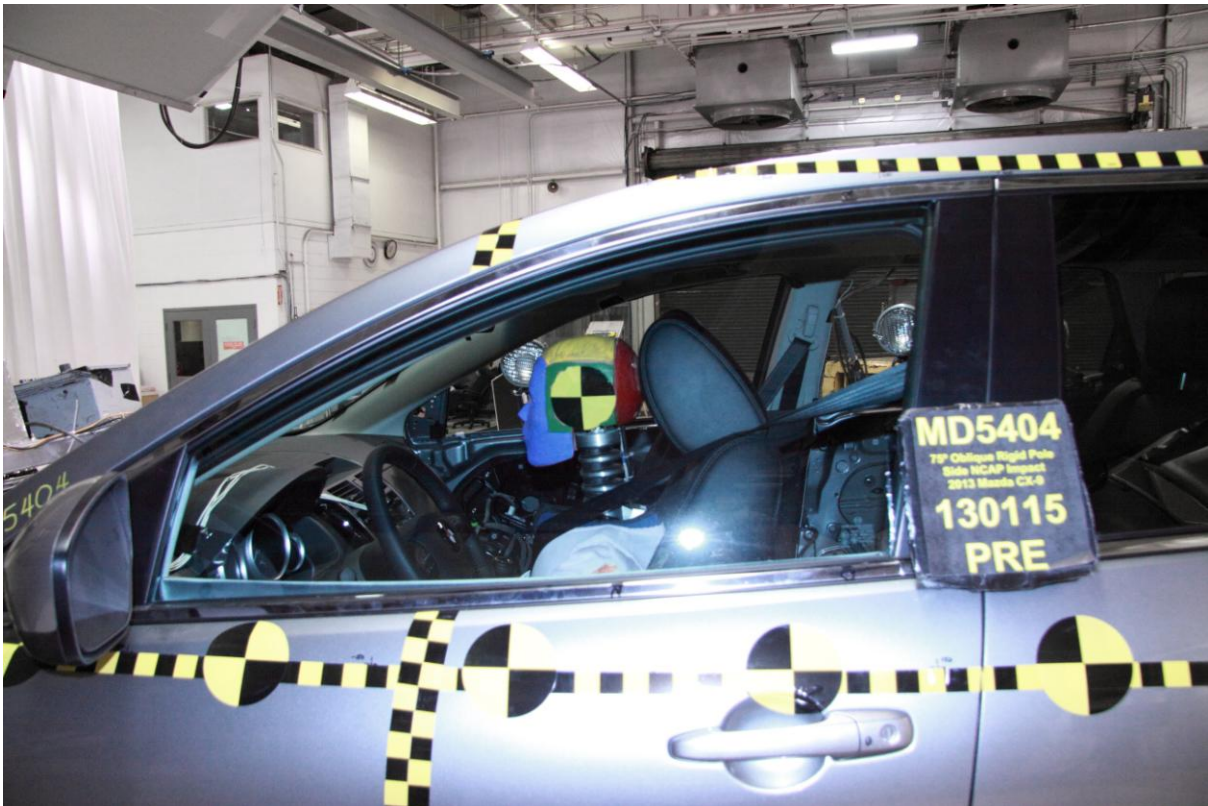
021 Pre-Test Front Close-Up View of Dummy Head and Chest



022 Post-Test Front Close-Up View of Dummy



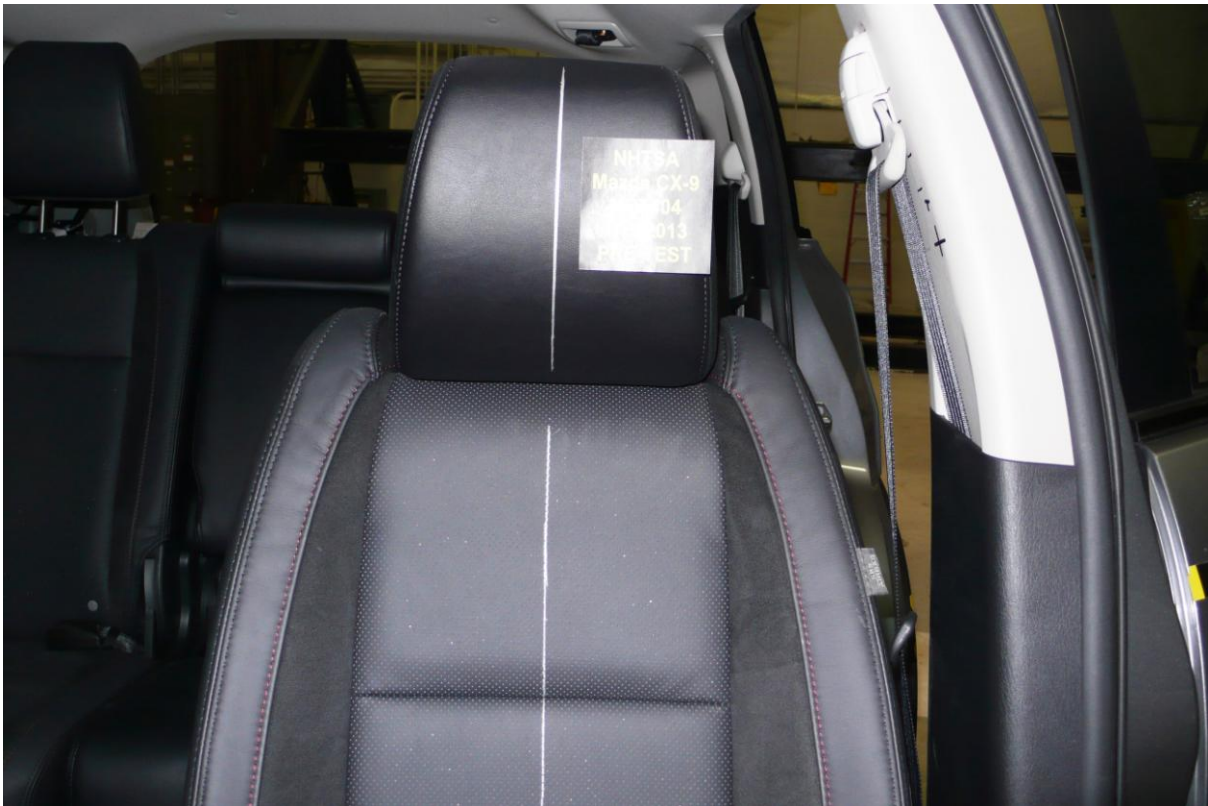
023 Pre-Test Left Side View of Dummy Showing Belt and Chalking



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 Neck Showing Position of Adjustable Neck Bracket



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



032 Pre-Test Placement of Dummy 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



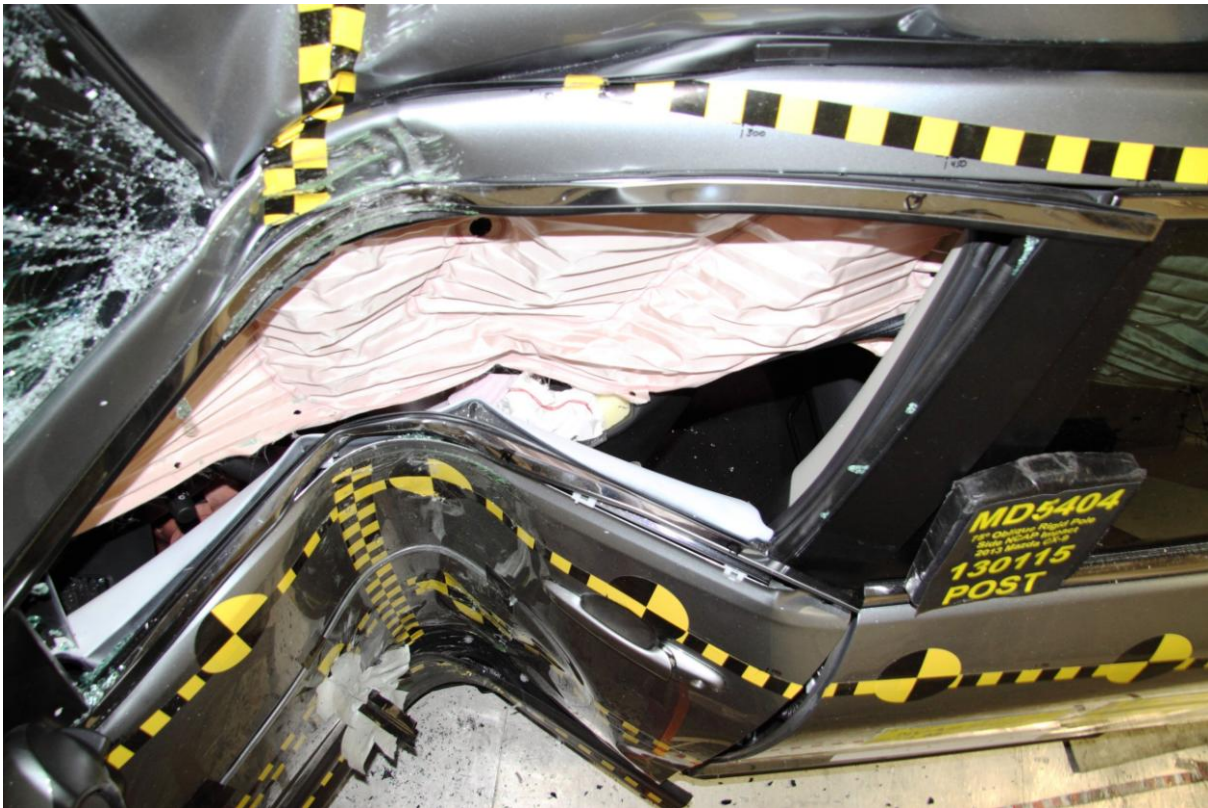
038 Pre-Test Close-Up Left Side View of Driver Seat Back



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 with Vehicle Interior View

PHOTO NOT APPLICABLE

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



052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



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



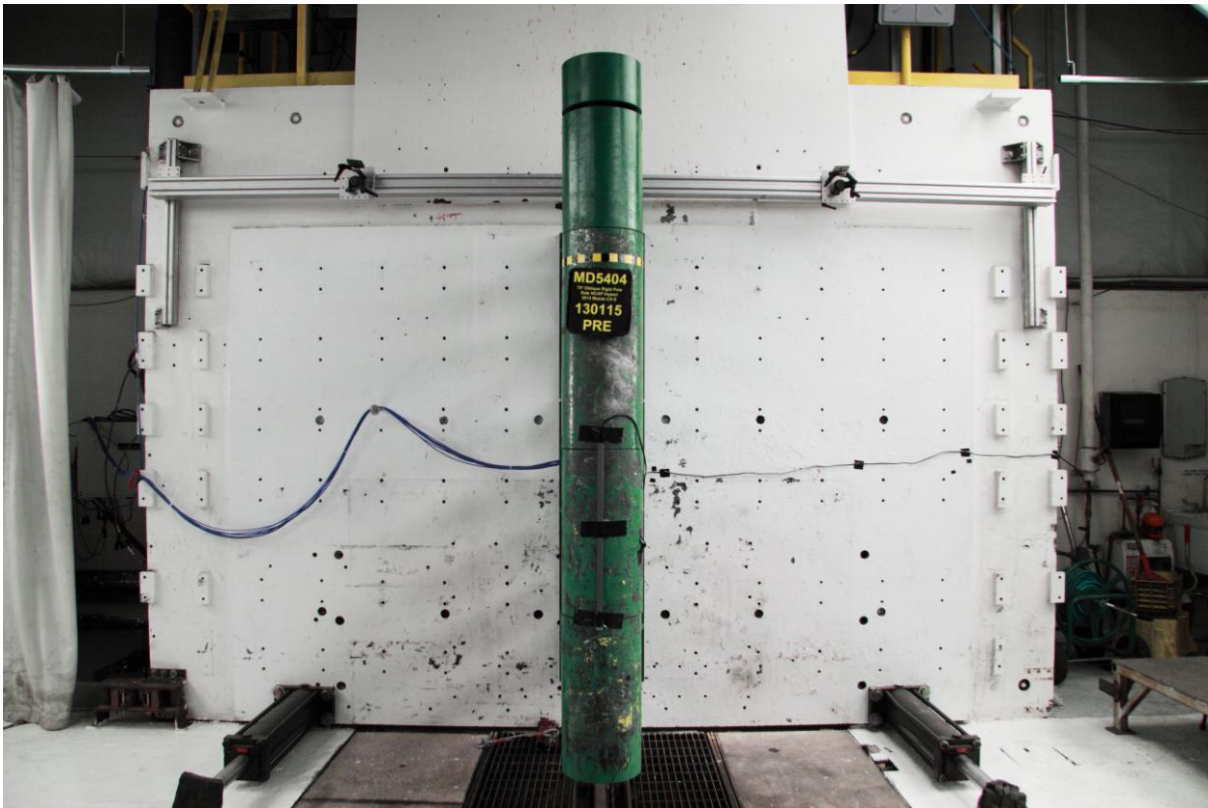
054 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



055 Close-Up View of Vehicle Certification Label



056 Close-Up View of Vehicle Tire Information Placard or Label



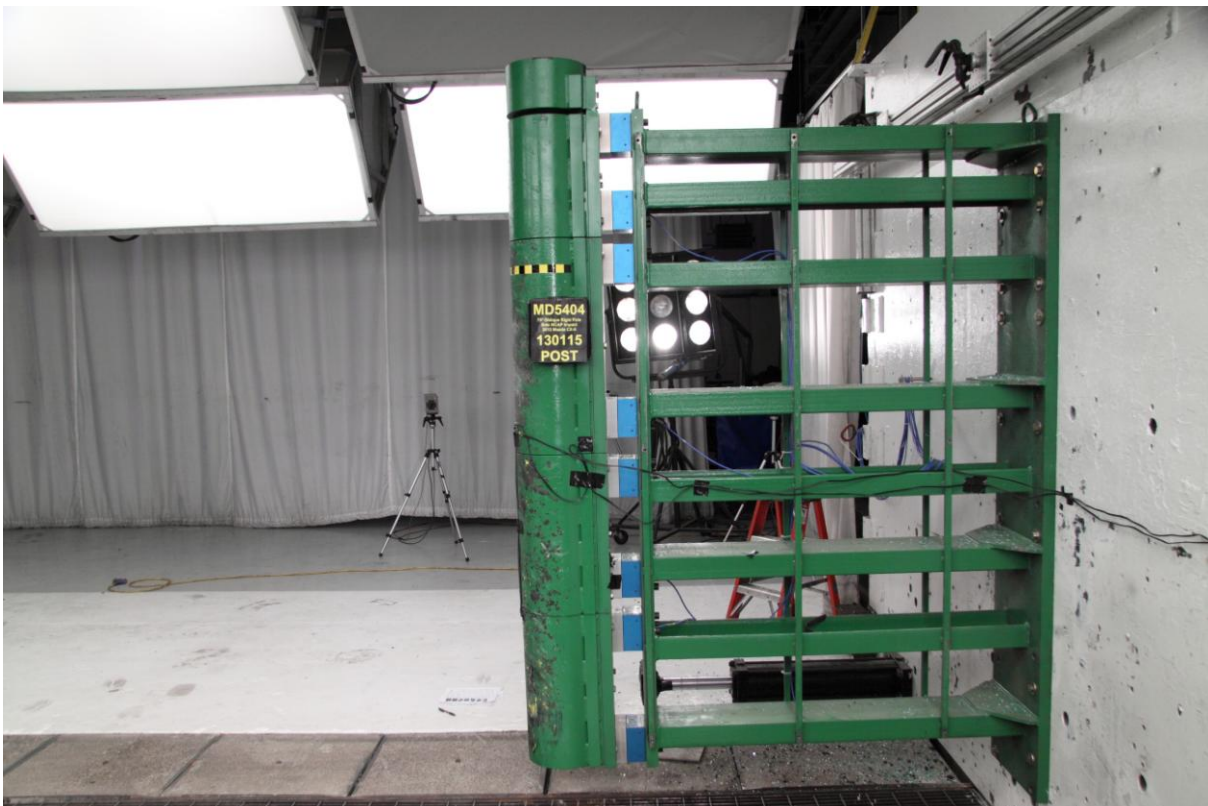
057 Pre-Test Pole Barrier Front View



058 Post-Test Pole Barrier Front View



059 Pre-Test Pole Barrier Side View



060 Post-Test Pole Barrier Side View



061 Pre-Test Ballast View



REDUNDANT



PRIMARY

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



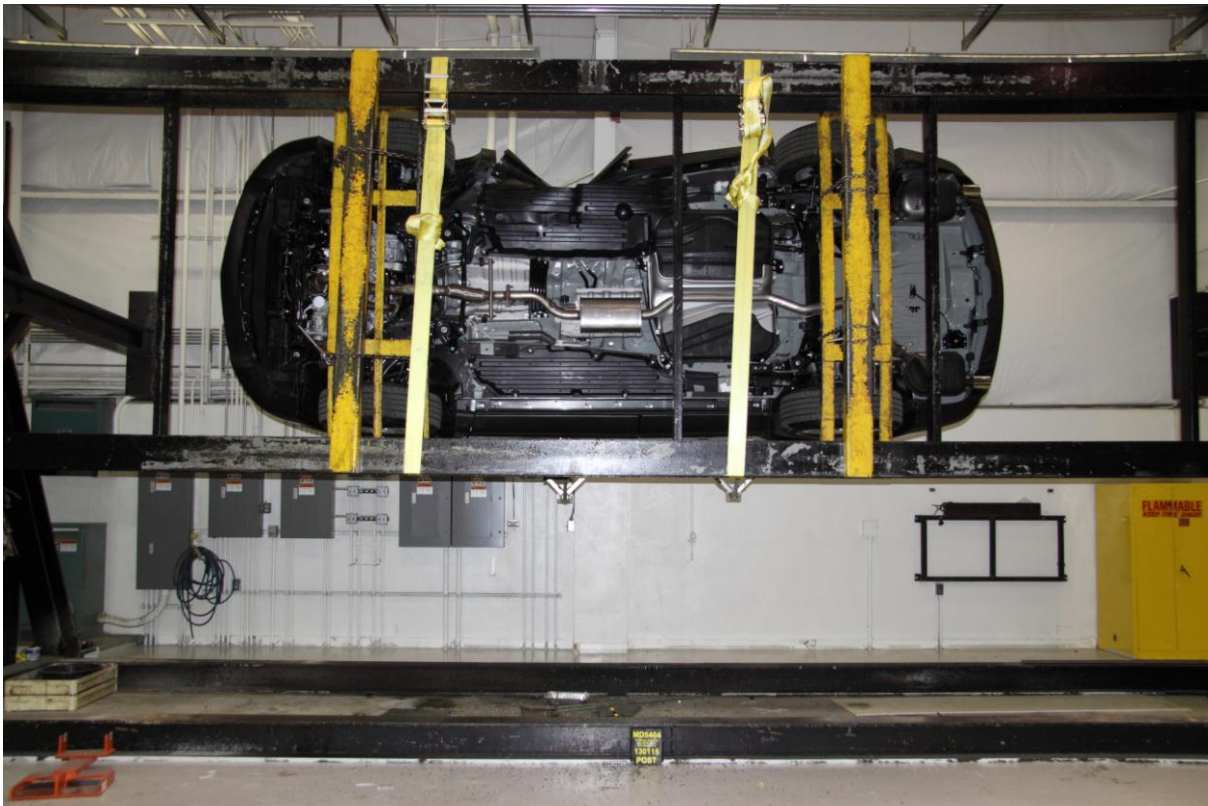
063 FMVSS No. 301 Static Rollover 0 Degrees



064 FMVSS No. 301 Static Rollover 90 Degrees



065 FMVSS No. 301 Static Rollover 180 Degrees



066 FMVSS No. 301 Static Rollover 270 Degrees



067 FMVSS No. 301 Static Rollover 360 Degrees



068 Impact Event

mazda

Scan for Vehicle Info and offers

2013 CX-9
Model: 2013 CX-9 TOURING FRONT WHEEL DRIVE
Exterior Color: LIQUID SILVER METALLIC
Interior Color: BLACK

EPA DOT Fuel Economy and Environment
Fuel Economy
19 MPG
combined city highway
5.3 gallons per 100 miles
Small SUVs range from 18 to 30 MPG. The best vehicle rates 11.2 MPG.

Gasoline Vehicle
You spend \$2,400 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$2,800
Fuel Economy & Greenhouse Gas Rating
1 4 10 15 20 Best
This vehicle emits 457 grams CO₂ per mile. The best emits 0 grams per mile (battery only). Producing and distributing fuel also results in emissions from more or less than ordinary gas.

Smog Rating
1 5 10 Best
This vehicle emits 457 grams CO₂ per mile. The best emits 0 grams per mile (battery only). Producing and distributing fuel also results in emissions from more or less than ordinary gas.

fuel economy.gov
Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS
Overall Vehicle Score Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.
Frontal Crash Driver Passenger Not Rated Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.
Side Crash Front seat Rear seat Not Rated Not Rated
Based on the risk of injury in a side impact.
Rollover ★★★★★
Based on the risk of rollover in a single vehicle crash.
Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

SAFETY AND SECURITY FEATURES
• 3.7L V6 DOHC 24-VALVE ENGINE
• 273 HP/ 270 LB-FT TORQUE
• 6-SPEED SPORT AT
• 18-INCH ALUMINUM ALLOY WHEELS
• P245/55R18 Tires
• HEATED POWER MIRRORS
• REAR BUMPER GUARD
• TRIP/SENDER SEATING
• 3-SPOKE TILT/TELESCOPIC STEERING
• WHEEL WALK/DO AND CRUISE CONTROLS
• SPEED SENSING AUTO DOOR LOCKS
• POWER FR WINDOWS W/AUTO UP/DOWN WITH REMOTE OPEN
• LEATHER WRAPPED SHIFT KNOB AND STEERING WHEEL
• HEATED 8-WAY PWR DRIVER SEAT
• HEATED PWR FRONT PASSENGER SEAT
• REMOTE KEYLESS ENTRY
• 36 MONTH / 50,000 MILE "BUMPER-TO-BUMPER" WARRANTY
• 60 MONTH / 60,000 MILE POWERTRAIN WARRANTY
• 24 HOUR ROADSIDE ASSISTANCE
• ABS WITH EBD AND BRAKE-ASSIST
• TIRE PRESSURE MONITORING SYSTEM
• 3-ROW SIDE AIR CURTAINS
• WHOL-OVER PROTECTION
• VENTILATED 4-WHEEL DISC BRAKES
• INDEPENDENT FRONT MACPHERSON STRUT REAR MULTI-LINK SUSPENSION
• HALOGEN HEADLIGHTS W/AUTO OFF
• ROOF SPOILER
• REAR SIDE WINDOW AND LIFT GATE PRIVACY GLASS
• 60/40 SPLIT FOLD DOWN 2ND ROW
• 50/50 SPLIT FOLD DOWN 3RD ROW
• USB AUDIO INPUT
• BLUETOOTH HANDS FREE PHONE/AUDIO
• 8-SPEAKER AUDIO W/6 SPEAKERS
• 3-ZONE AUTOMATIC CLIMATE CONTROL AIR CONDITIONING
• LEATHER TRIMMED SEATS, 1ST/2ND ROW OUTBOARD SEATING POSITIONS
• TRIP COMPUTER
• 8.4" COLOR DISPLAY W/REAR CAMERA
• DYNAMIC STABILITY CONTROL AND TRACTION CONTROL SYSTEM
• ADVANCED DUAL FRONT AND SIDE IMPACT AIR BAGS
• BLIND SPOT MONITORING SYSTEM
• REAR BACKUP SENSORS
• ROLL STABILITY CONTROL
• ANTI-THIEF ENGINE IMMOBILIZER
• SIDE-IMPACT DOOR BEAMS

OPTIONAL EQUIPMENT
TE TOURING TECH PKG \$3,000
• BOSE AUDIO SYSTEM
• MAZDA ADVANCED KEYLESS ENTRY & START SYSTEM
• SIRIUS SATELLITE RADIO
• 104 MONTH SUBSCRIPTION
• FOG LAMP
• FULL COLOR TOUCH-SCREEN NAVI
• POWER MOONROOF
• POWER OPEN/LOSE LIFT GATE
Total Vehicle and Options \$38,230
Delivery, Processing and Handling Fee \$750
Total MSRP \$39,025

MSRP \$32,230

SOLD TO: 23658
TOM BUSH MAZDA
980 ATLANTIC BLVD
JACKSONVILLE, FL 32225

SHIP TO: 23658
TOM BUSH MAZDA
980 ATLANTIC BLVD
JACKSONVILLE, FL 32225

JM3TB2CA9D0401499
MAZDAUSA.COM
CX-9-19-2A-1728A42-28-18-2812307

069 Monroney Label

Head Restraints
Your vehicle is equipped with head restraints on all outboard seats and the second-row center seat. The head restraints are intended to help protect you and the passengers from neck injury.
WARNING
Always drive with the head restraints installed when seats are being used and make sure they are properly adjusted. In addition, always raise the head restraints mentioned below when they are being used:
• Driving with the head restraints adjusted too low or removed is dangerous. With no support behind your head, your neck could be seriously injured in a collision.
• (Head restraints which must be raised for use)
➢ Second-row center head restraint
➢ Third-row outboard head restraints

Essential Safety Equipment Seats
Normal Head Restraints
Height Adjustment
To raise a head restraint, pull it up to the locked position.
To lower the head restraint, press the stop-release, then push the head restraint down.
Adjust the head restraint so that the center is even with the top of the passenger's ears.
Second-Row outboard seat/Third-Row outboard seat
Second-Row center seat
Front outboard seat
Removal/Installation
To remove the head restraint, pull it up while pressing the stop-release.
To install the head restraint, press the stop-release into the holes while pressing the stop-release.
WARNING
Always drive with the head restraints set up when seats are being used and make sure they are properly set up. Driving with the head restraints not set up is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

Foldable Head Restraints*
The third-row seats are equipped with foldable head restraints.
NOTE
The foldable head restraints cannot be adjusted or removed.
To fold the head restraint, pull the strap and fold the head restraint downward. To return the head restraint to its upright position, lift it upward.
WARNING
Always drive with the head restraints in their upright positions when the third-row seats are occupied, and make sure they are securely locked in place. Driving with the head restraints folded down is dangerous. With no support behind your head, your neck could be seriously injured in a collision.

Seat Warmer*
The front seats are electrically heated. The ignition must be switched ON.
Press the seat warmer switch to illuminate the indicator light while the ignition is switched ON. The mode changes as follows each time the seat warmer switch is pressed.
OFF
High
Low
*Seat warmer. 2-17

070 Head Restraint Use and Adjustment Information from Vehicle Owner Manual



071 Post-Test View of Shattered Vehicle Inner Door Panel

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

No.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-4
4	Driver Head Acceleration Resultant Primary vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-7

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

www.nhtsa.dot.gov.

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)

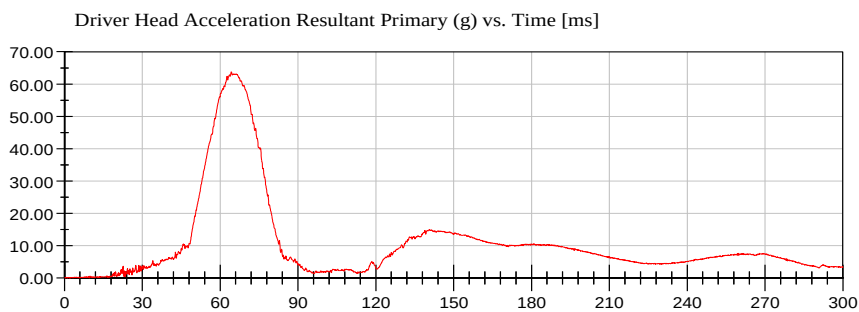
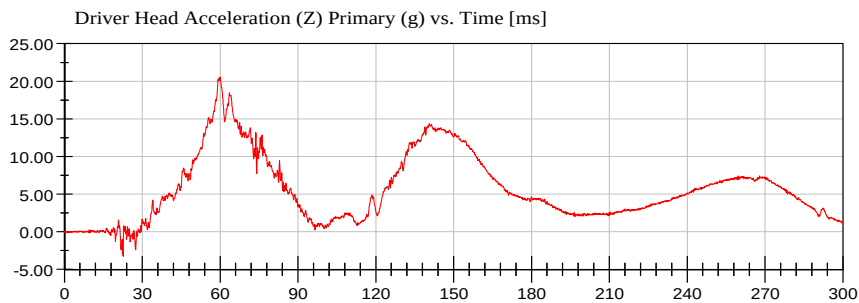
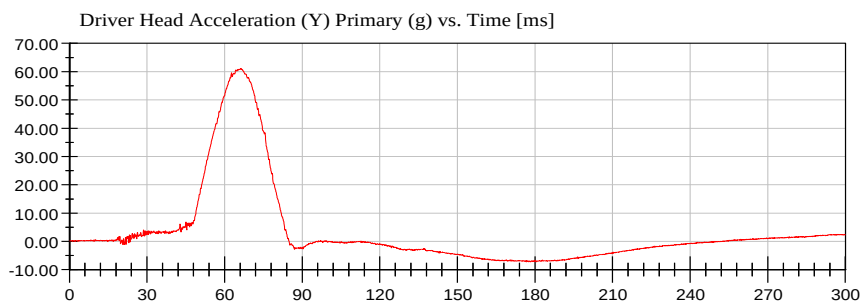
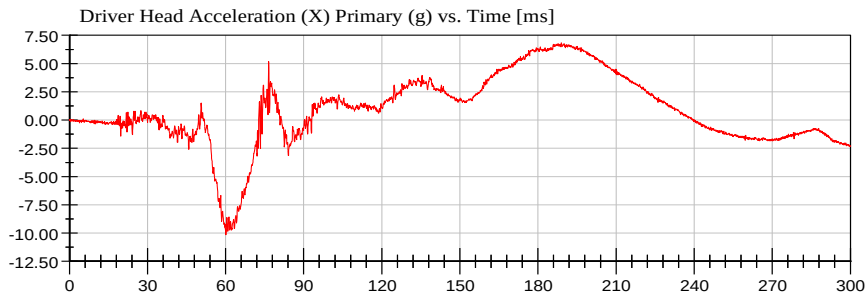
NHTSA

Test Lab: CTF

Test Number: 130115 (MD5404)

Position #1 SID IIs Dummy (033)

Test Date: 01/15/2013



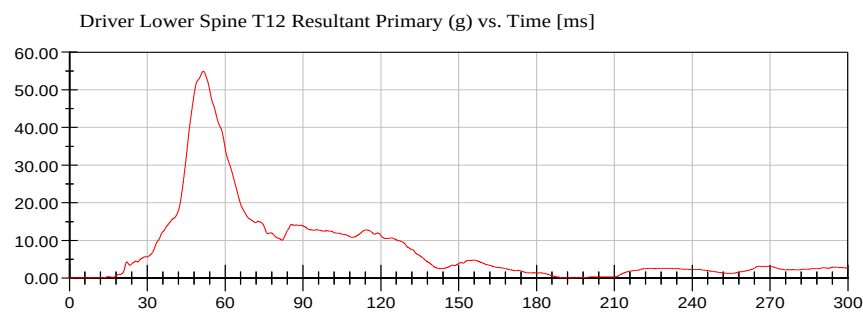
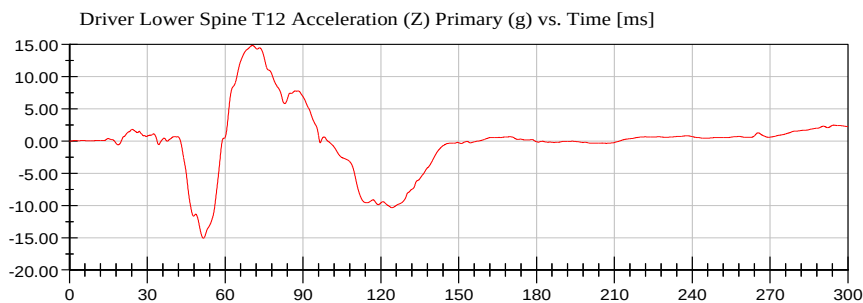
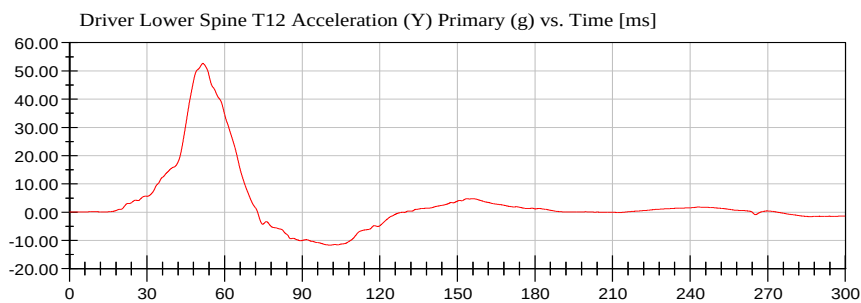
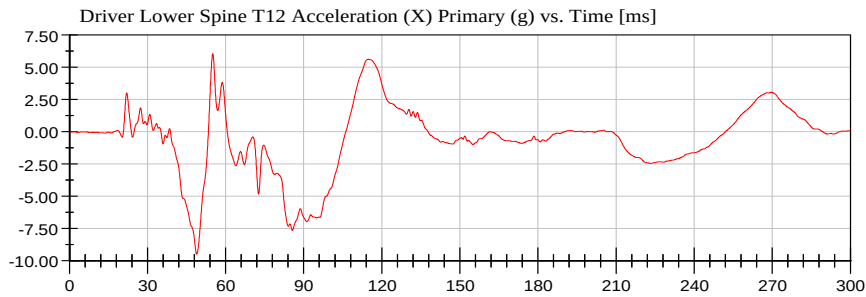
NHTSA

Test Lab: CTF

Test Number: 130115 (MD5404)

Position #1 SID IIs Dummy (033)

Test Date: 01/15/2013



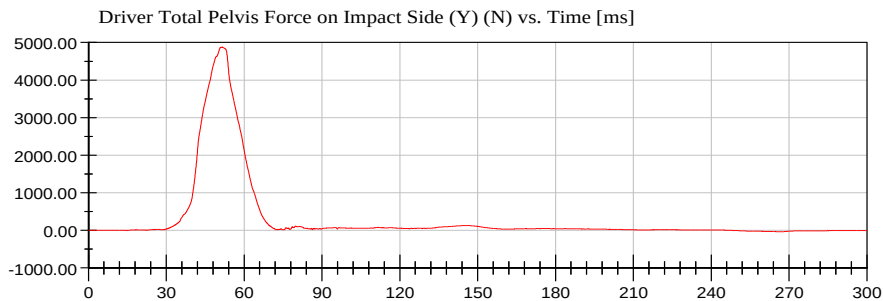
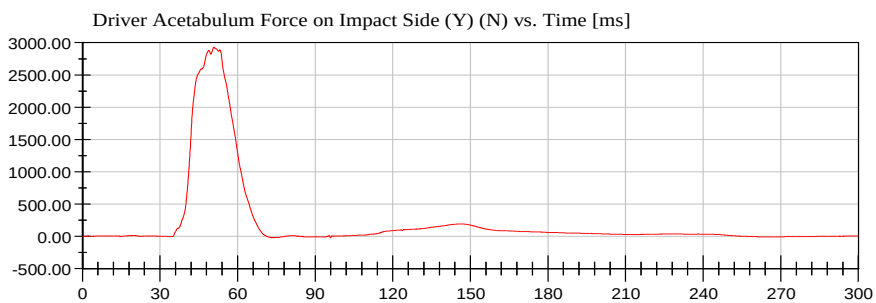
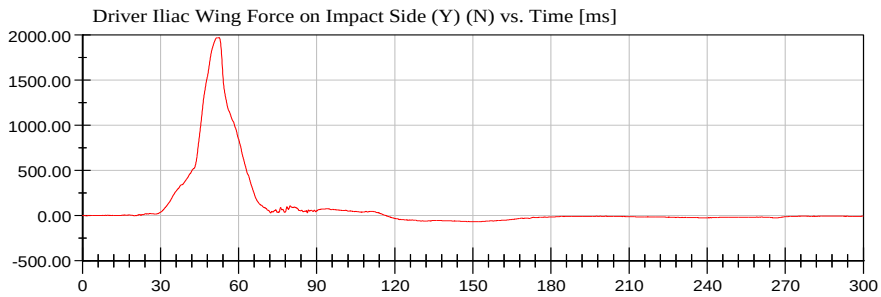
NHTSA

Test Lab: CTF

Test Number: 130115 (MD5404)

Position #1 SID IIs Dummy (033)

Test Date: 01/15/2013



APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Table 1. External Measurements

Table 2. Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)
Head (X) Acceleration (G's) vs. Time (ms)
Head (Y) Acceleration (G's) vs. Time (ms)
Head (Z) Acceleration (G's) vs. Time (ms)

Table 3. Lateral Neck Pendulum Test

Pendulum Velocity (m/s) vs. Time (ms)
Flexion Angle (°) vs. Time (ms)
Moment About Occipital Condyle (Nm) vs. Time (ms)

Table 4. Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)

Table 5. Thorax (With Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Shoulder Displacement (mm) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 6. Thorax (Without Arm) Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Rib Displacement (mm) vs. Time (ms)
Middle Rib Displacement (mm) vs. Time (ms)
Lower Rib Displacement (mm) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 7. Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Upper Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 8. Pelvis Plug Quasi-Static Test (Optional*)

Table 9. Pelvis Acetabulum Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Acetabulum Force (N) vs. Time (ms)

Table 10. Pelvis Iliac Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Pelvis (Y) Acceleration (G's) vs. Time (ms)
Iliac Force (N) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N 033

Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 033 Certification No. 16-3

Test Date: 1/11/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	117.9 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	3.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

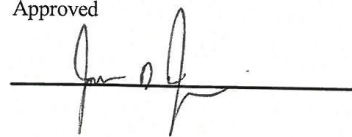
Test meets specifications.

Comments:

Technician



Approved



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

01.11.2013 17:07:39 197

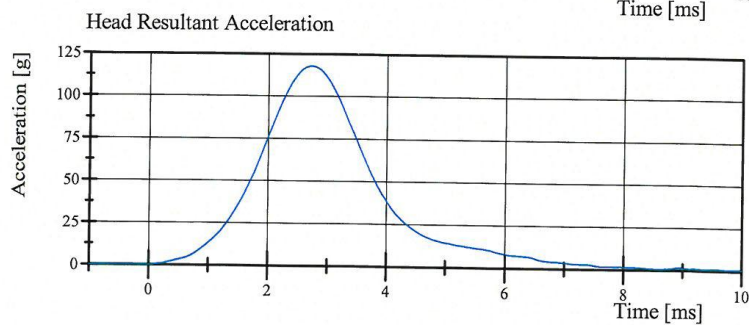
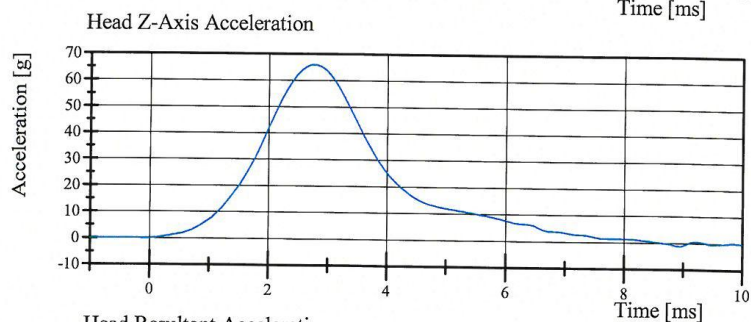
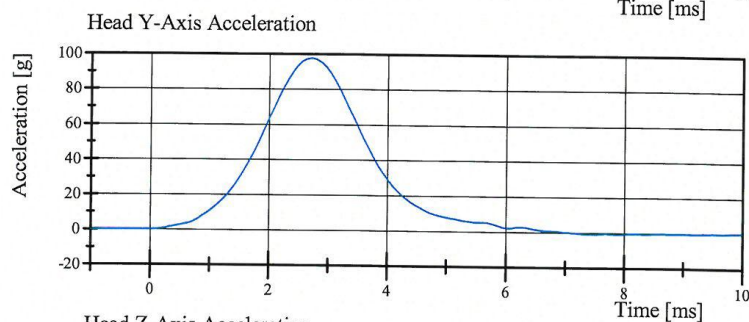
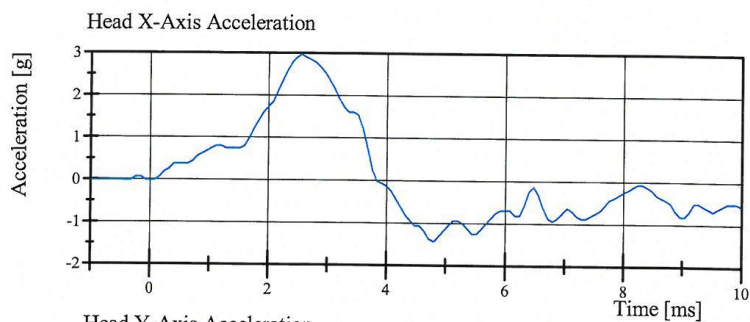


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 033 Certification No. 16-3

Test Date: 1/11/2013



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

01.11.2013 17:07:49 197



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 16-1

Test Date: 1/11/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.624 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.550 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.743 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	5.037 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.824 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.827 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-75.6 deg	Yes
Time of Peak	50 - 70 ms	61.0 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	42.3 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	109.7 ms	Yes

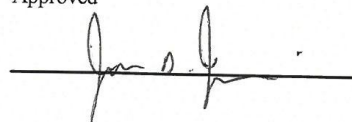
Test meets specifications.

Comments:

Technician



Approved



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

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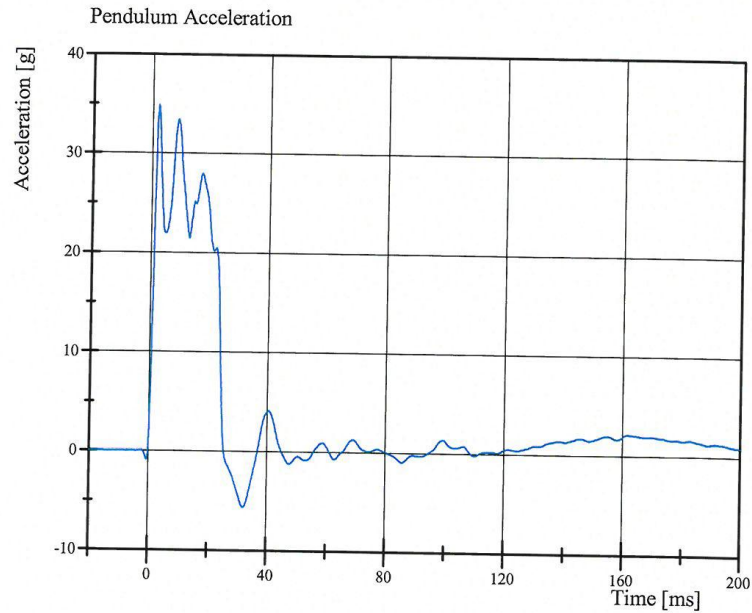


Transportation Research Center Inc.

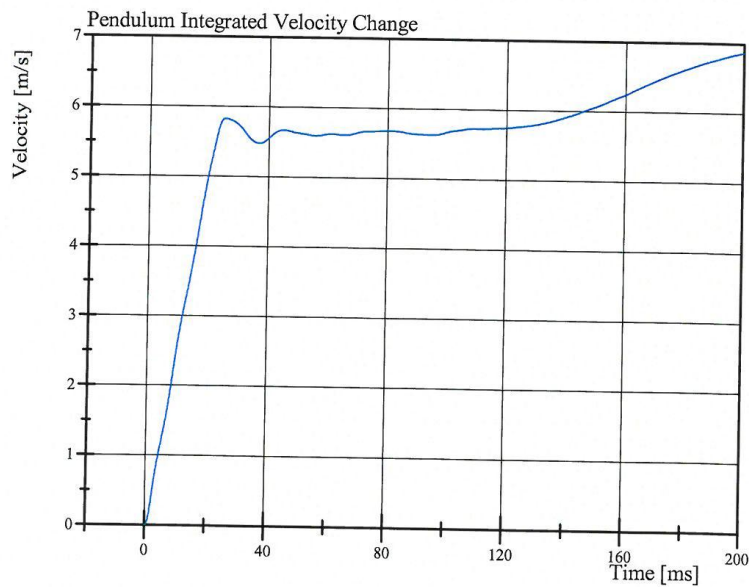
Left Lateral Neck

SID IIs Serial No. 033 Certification No. 16-1

Test Date: 1/11/2013



Filter Class: CFC_180
Max: 34.8 gn at 2.2 ms
Min: -5.6 gn at 32.2 ms



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.

01.11.2013 15:25:47 599



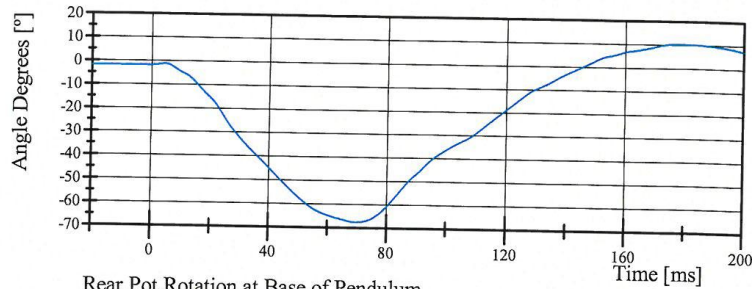
Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 16-1

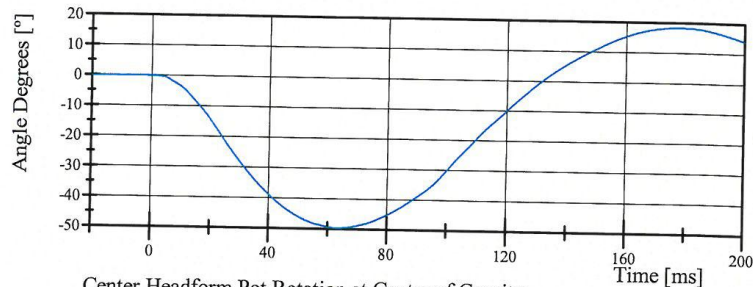
Test Date: 1/11/2013

Forward Pot Rotation at Base of Pendulum



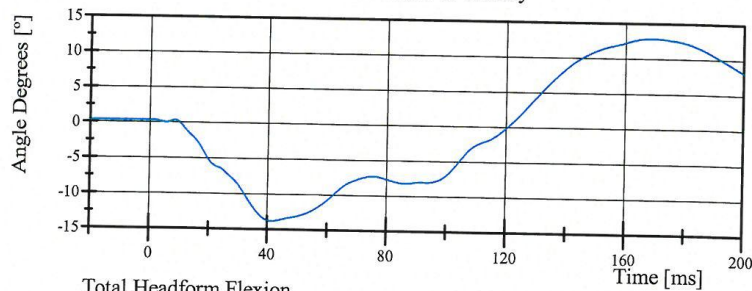
Filter Class: CFC_60
Max: 10.3 ° at 177.8 ms
Min: -67.6 ° at 69.7 ms

Rear Pot Rotation at Base of Pendulum



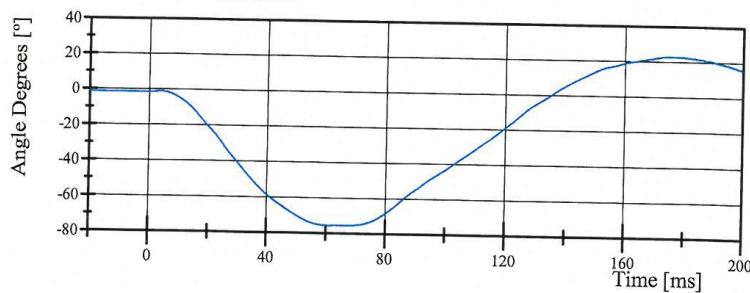
Filter Class: CFC_60
Max: 18.3 ° at 177.7 ms
Min: -49.8 ° at 63.4 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 12.9 ° at 168.2 ms
Min: -13.8 ° at 41.5 ms

Total Headform Flexion



Filter Class: CFC_60
Max: 22.9 ° at 176.1 ms
Min: -75.6 ° at 61.0 ms

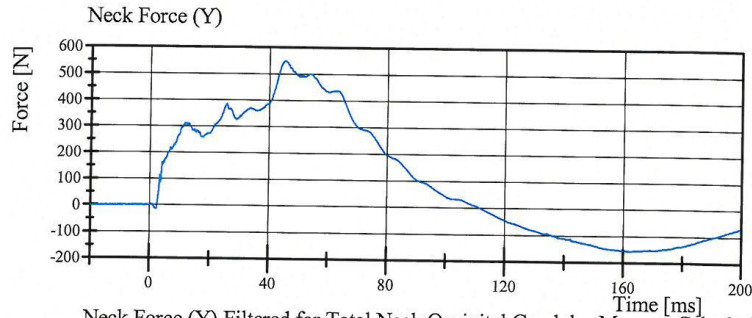
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Polarity in accordance with SAE J211.

01.11.2013 15:25:48 599

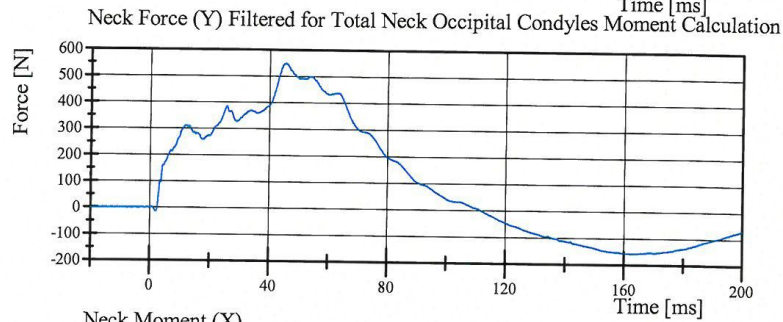


Transportation Research Center Inc.

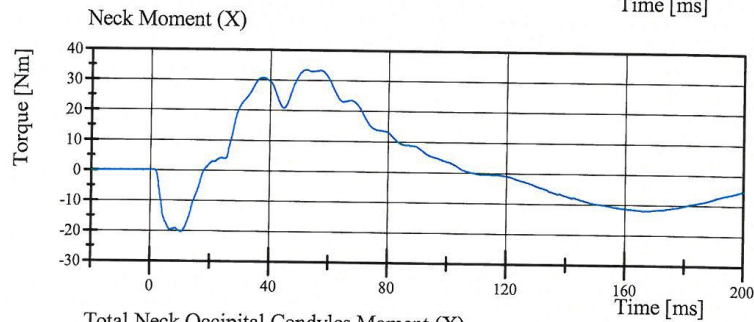
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 16-1
Test Date: 1/11/2013



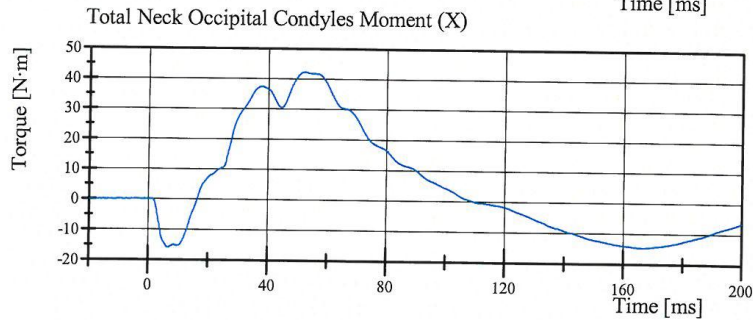
Filter Class: CFC_1000
Max: 549.7 N at 45.4 ms
Min: -157.7 N at 162.9 ms



Filter Class: CFC_600
Max: 549.4 N at 45.3 ms
Min: -157.3 N at 162.9 ms



Filter Class: CFC_600
Max: 33.6 Nm at 52.2 ms
Min: -20.4 Nm at 10.4 ms



Filter Class: Without_Constar
Max: 42.3 N·m at 52.2 ms
Min: -16.0 N·m at 6.7 ms

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

01.11.2013 15:25:49 599



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 033 Certification No. 16-1

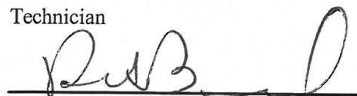
Test Date: 1/11/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	32.5 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.4 g	Yes

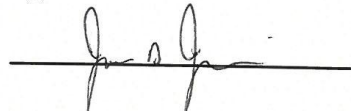
Test meets specifications.

Comments:

Technician



Approved



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

01.11.2013 09:24:22 809

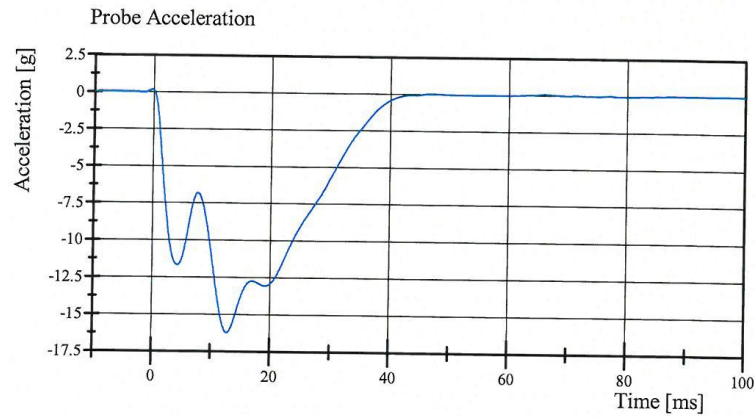


Transportation Research Center Inc.

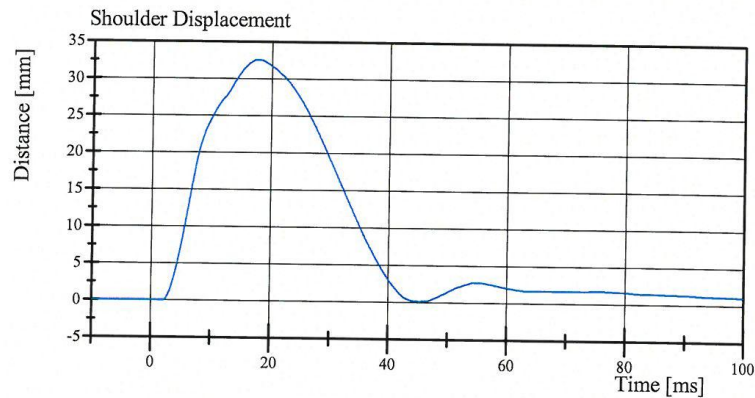
Left Lateral Shoulder

SID IIs Serial No. 033 Certification No. 16-1

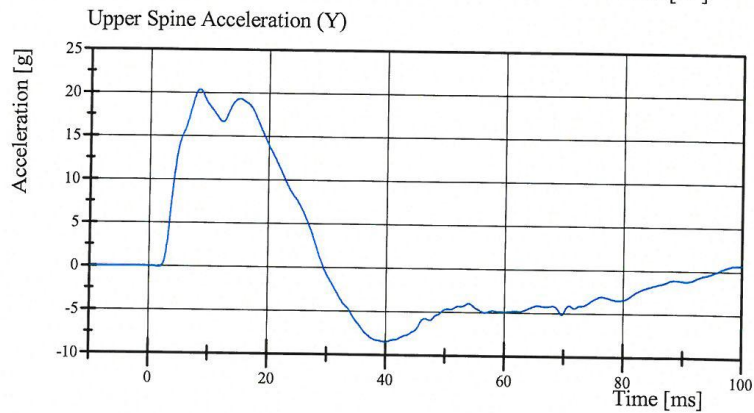
Test Date: 1/11/2013



Filter Class: CFC_180
Max: 0.1 gn at -0.2 ms
Min: -16.2 gn at 12.8 ms



Filter Class: CFC_600
Max: 32.5 mm at 17.5 ms
Min: -0.0 mm at 2.0 ms



Filter Class: CFC_180
Max: 20.4 gn at 8.3 ms
Min: -8.5 gn at 40.0 ms

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

01.11.2013 09:24:32 809



Transportation Research Center Inc.

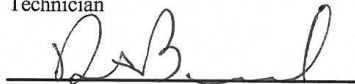
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 16-4
Test Date: 1/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.703 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.3 g	Yes
Shoulder Displacement	31 - 40 mm	35.5 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.4 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	35.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	38.4 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	35.9 g	Yes

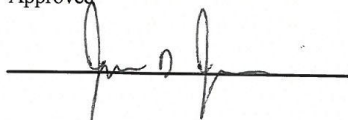
Test meets specifications.

Comments:

Technician



Approved



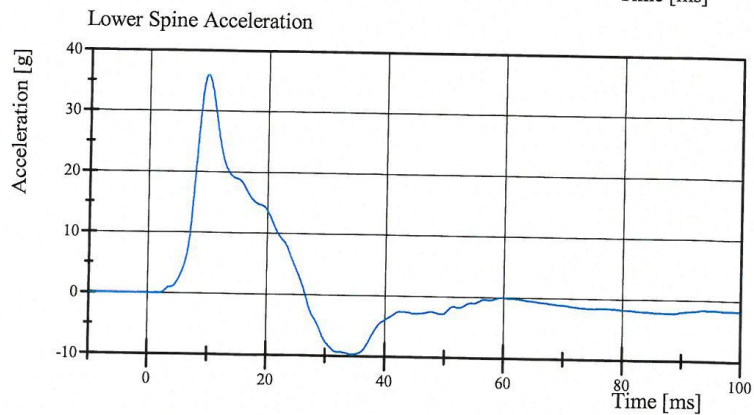
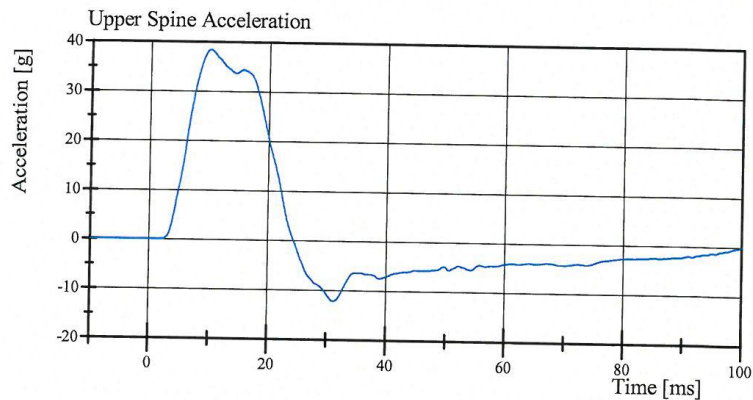
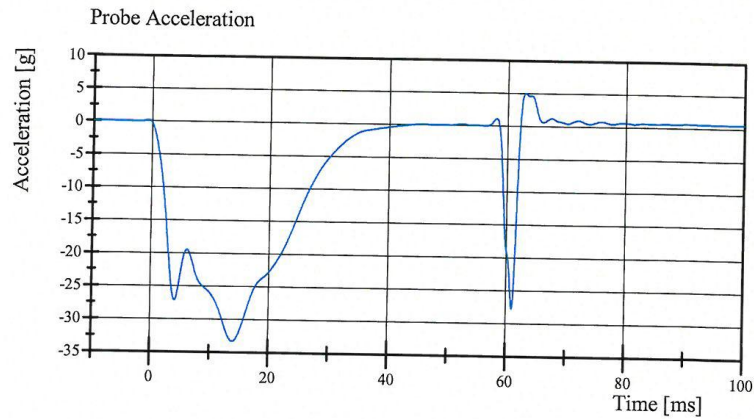
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.14.2013 08:00:50 574



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 16-4
Test Date: 1/14/2013



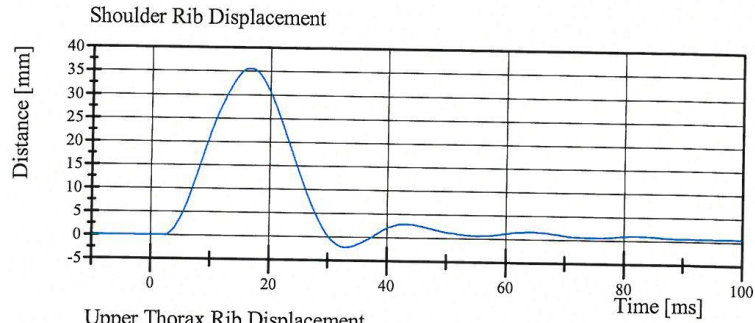
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.14.2013 08:00:58 574

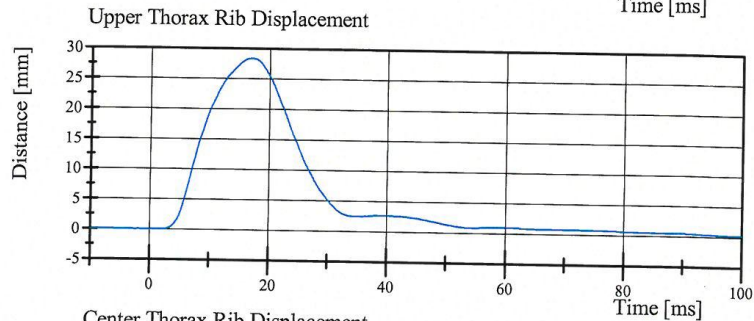


Transportation Research Center Inc.

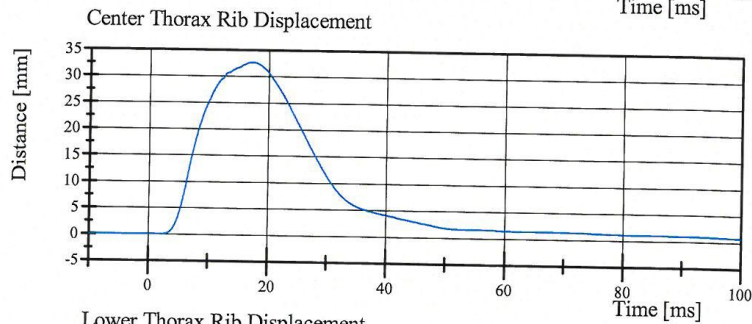
Left Lateral Thorax with Arm
SID II_s Serial No. 033 Certification No. 16-4
Test Date: 1/14/2013



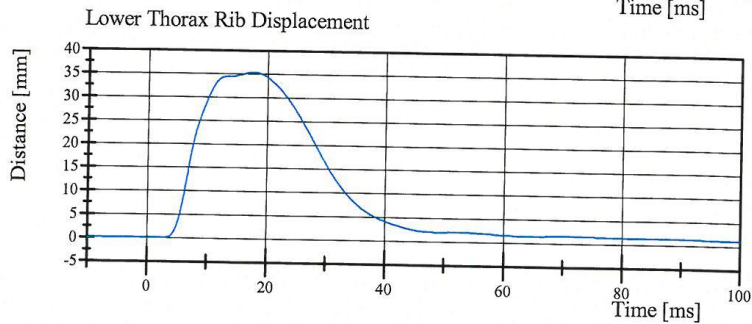
Filter Class: CFC_600
Max: 35.5 mm at 16.6 ms
Min: -2.2 mm at 33.0 ms



Filter Class: CFC_600
Max: 28.4 mm at 17.0 ms
Min: -0.0 mm at 1.8 ms



Filter Class: CFC_600
Max: 32.6 mm at 17.2 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_600
Max: 35.3 mm at 17.8 ms
Min: -0.0 mm at 2.8 ms

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

01.14.2013 08:00:59 574



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID II_s Serial No. 033 Certification No. 16-2
Test Date: 1/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.303 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-16.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	34.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.6 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	39.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.6 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	10.1 g	Yes

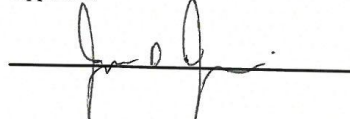
Test meets specifications.

Comments:

Technician



Approved



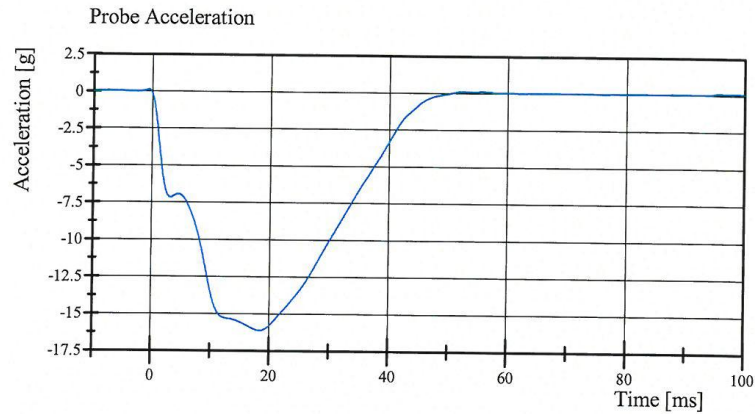
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.14.2013 08:33:08 796

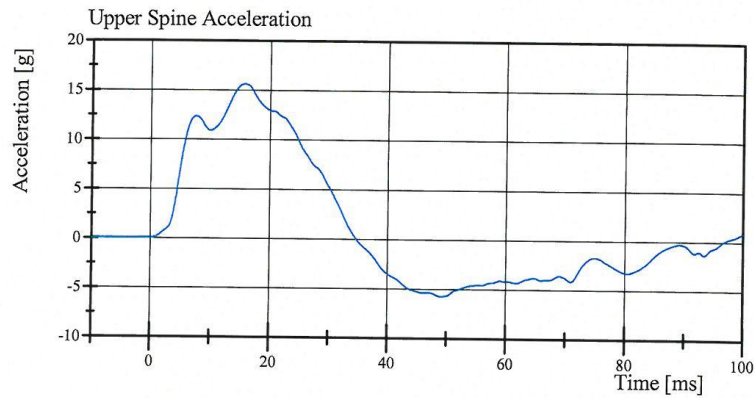


Transportation Research Center Inc.

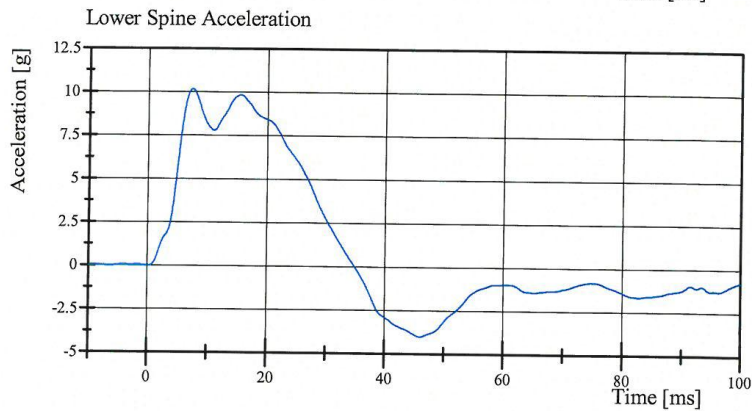
Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 16-2
Test Date: 1/14/2013



Filter Class: CFC_180
Max: 0.1 gn at 55.8 ms
Min: -16.1 gn at 18.3 ms



Filter Class: CFC_180
Max: 15.6 gn at 15.8 ms
Min: -5.8 gn at 49.0 ms



Filter Class: CFC_180
Max: 10.1 gn at 7.4 ms
Min: -4.0 gn at 46.0 ms

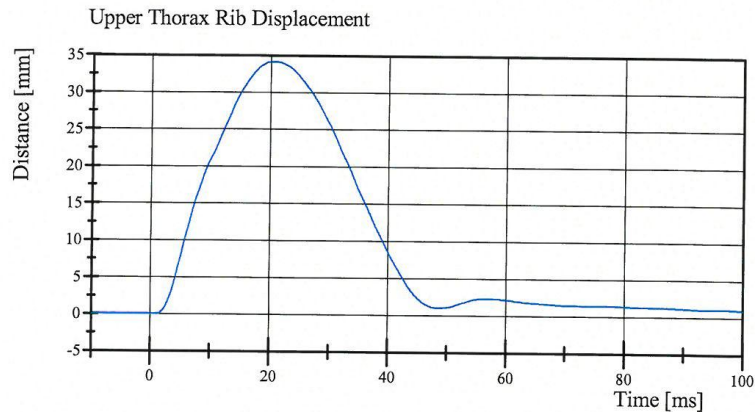
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.14.2013 08:33:16 796

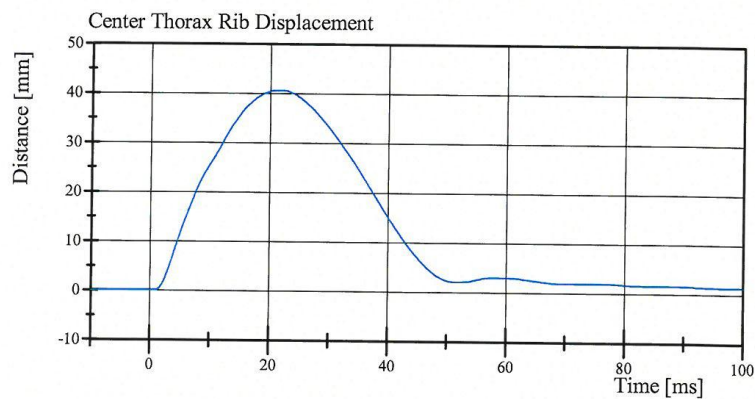


Transportation Research Center Inc.

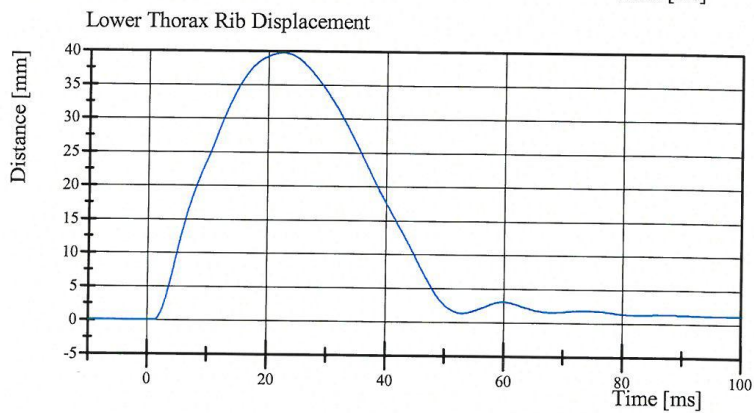
Left Lateral Thorax without Arm
SID II_s Serial No. 033 Certification No. 16-2
Test Date: 1/14/2013



Filter Class: CFC_600
Max: 34.1 mm at 20.6 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 40.6 mm at 21.7 ms
Min: -0.0 mm at 0.8 ms



Filter Class: CFC_600
Max: 39.7 mm at 22.6 ms
Min: -0.0 mm at 1.0 ms

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

01.14.2013 08:33:16 796



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 033 Certification No. 16-2

Test Date: 1/11/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.7 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	40.0 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	40.0 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.30 g	Yes

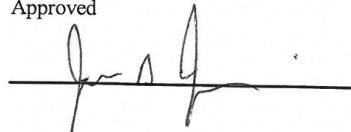
Test meets specifications.

Comments:

Technician



Approved



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

01.11.2013 14:38:40 600

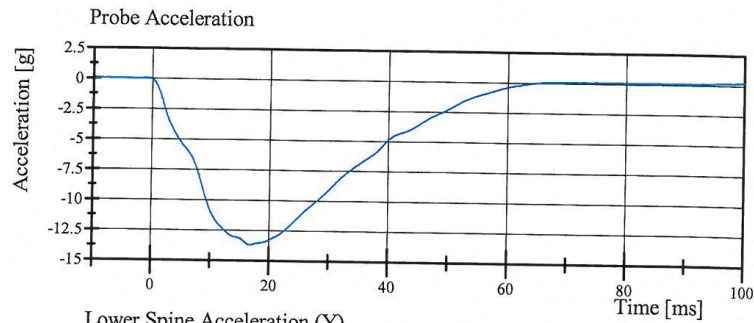


Transportation Research Center Inc.

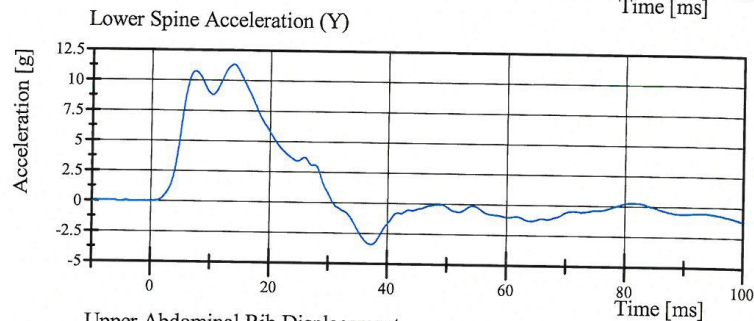
Left Lateral Abdomen

SID II_s Serial No. 033 Certification No. 16-2

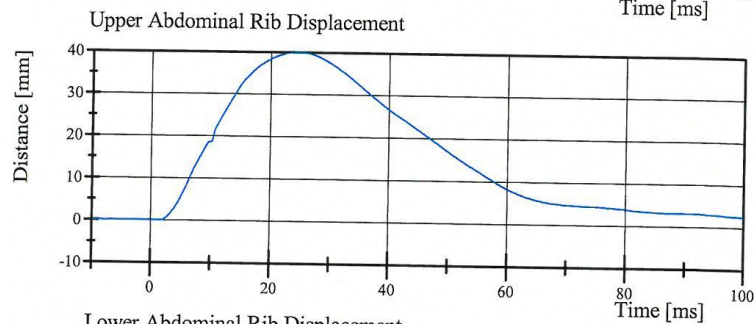
Test Date: 1/11/2013



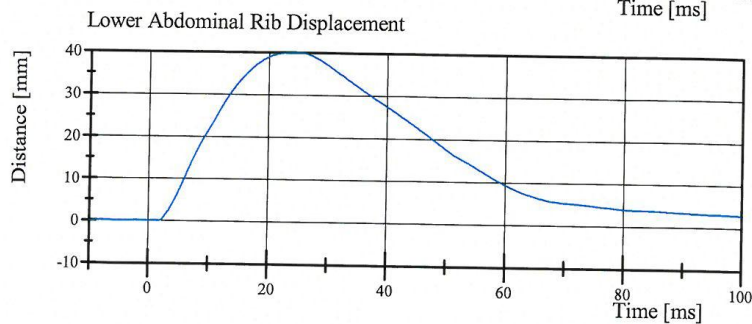
Filter Class: CFC_180
Max: 0.2 gn at 100.0 ms
Min: -13.7 gn at 16.8 ms



Filter Class: CFC_180
Max: 11.3 gn at 13.8 ms
Min: -3.4 gn at 37.3 ms



Filter Class: CFC_600
Max: 40.0 mm at 24.6 ms
Min: -0.0 mm at 1.4 ms



Filter Class: CFC_600
Max: 40.0 mm at 23.8 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.

01.11.2013 14:39:05 600



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 16-1

Test Date: 1/12/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-40.7 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	32.3 g	Yes
Iliac Force	4,100 - 5,100 N	4,652.6 N	Yes

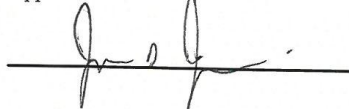
Test meets specifications.

Comments:

Technician



Approved



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

01.12.2013 12:07:36 582

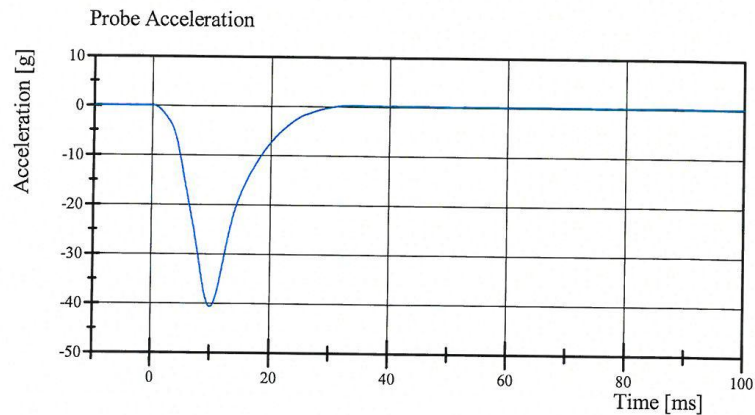


Transportation Research Center Inc.

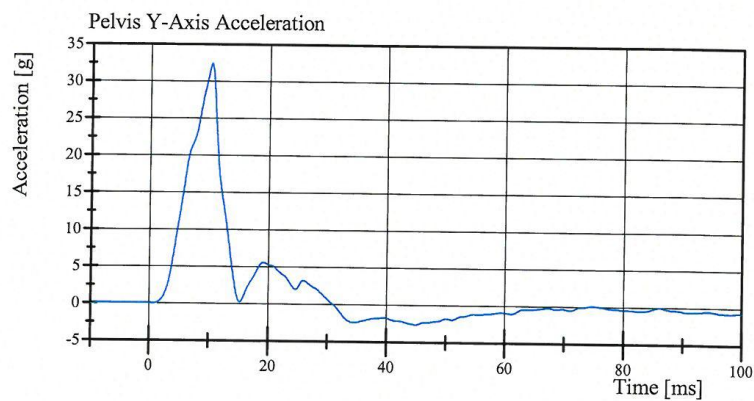
Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 16-1

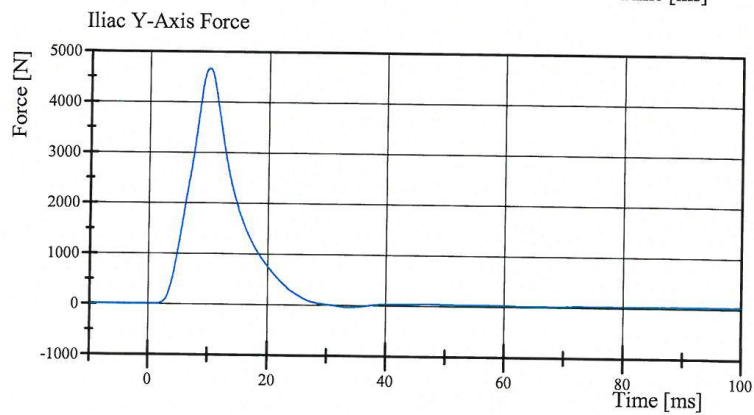
Test Date: 1/12/2013



Filter Class: CFC_180
Max: 0.2 gn at 34.0 ms
Min: -40.7 gn at 10.0 ms



Filter Class: CFC_180
Max: 32.3 gn at 10.3 ms
Min: -2.6 gn at 45.0 ms



Filter Class: CFC_600
Max: 4,652.6 N at 10.2 ms
Min: -34.2 N at 33.5 ms

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

01.12.2013 12:07:47 582



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 033 Certification No. 16-7

Test Date: 1/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	32 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.65 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.09 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	40.2 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,755.8 N	Yes

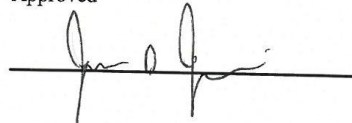
Test meets specifications.

Comments:

Technician



Approved



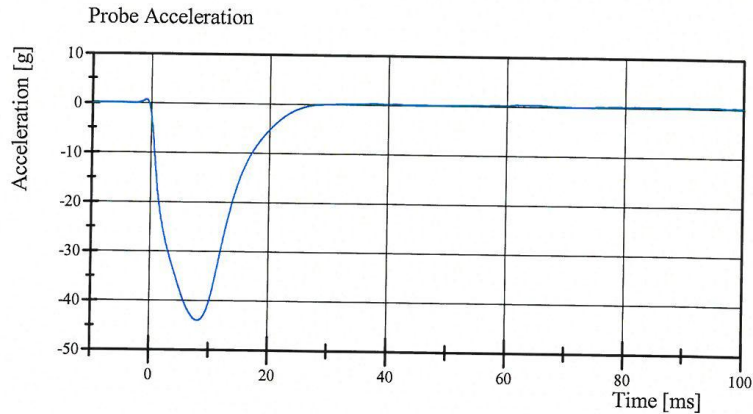
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.14.2013 11:09:13 396

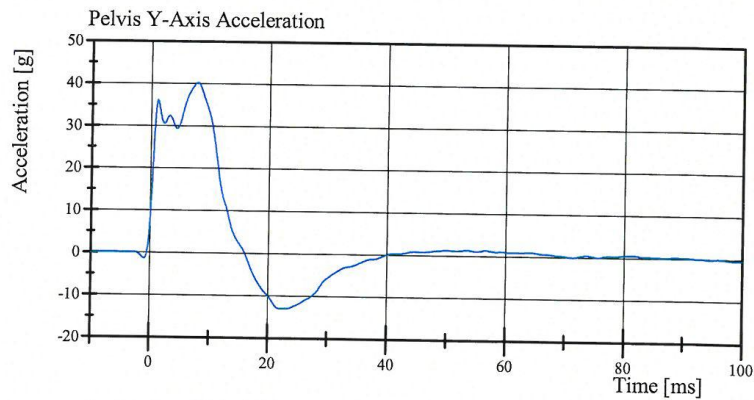


Transportation Research Center Inc.

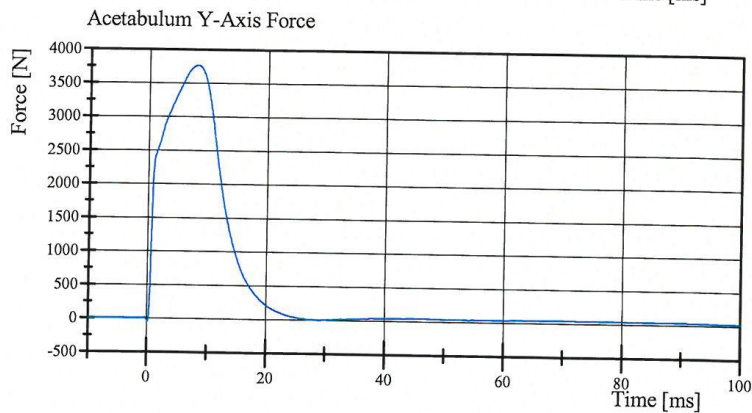
Left Lateral Pelvis
SID IIs Serial No. 033 Certification No. 16-7
Test Date: 1/14/2013



Filter Class: CFC_180
Max: 0.6 gn at -0.9 ms
Min: -44.1 gn at 8.1 ms



Filter Class: CFC_180
Max: 40.2 gn at 7.8 ms
Min: -13.0 gn at 22.1 ms



Filter Class: CFC_600
Max: 3,755.8 N at 8.1 ms
Min: -53.8 N at 0.2 ms

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

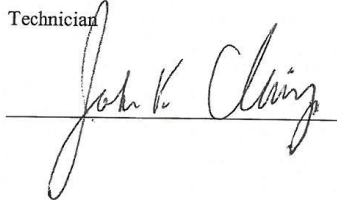
01.14.2013 11:09:24 396



Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. 033 Calibration No.16
Date: 01/14/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	444	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	102	Yes
F	Thigh Clearance	119.0 - 135.0	130	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	532	Yes
L	Popliteal Height	343.0 - 369.0	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	431	Yes
O	Chest Depth without Jacket	195.0 - 211.0	204	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	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	484	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	869	Yes
Z	Waist Circumference	761.0 - 791.0	781	Yes

Technician



Approved



Revised 9/29/2005



Driver S/N 033

Post-Test Calibration Sheets

Transportation Research Center Inc.

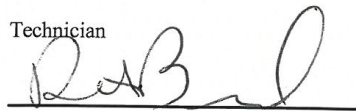
Left Lateral Head Drop
SID IIs Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	123.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

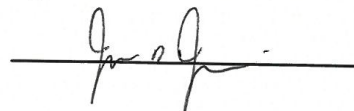
Test meets specifications.

Comments:

Technician



Approved



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

01.16.2013 08:34:16 198

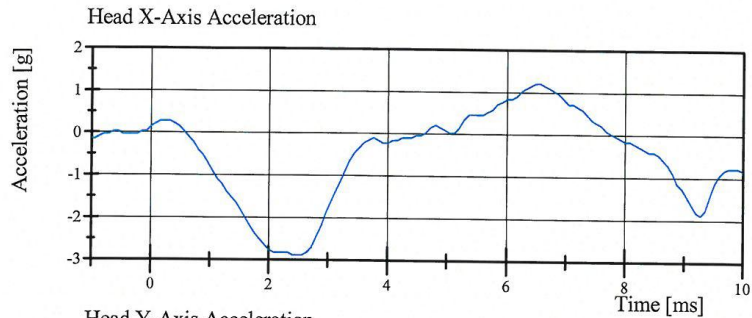


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. 033 Certification No. 17-1

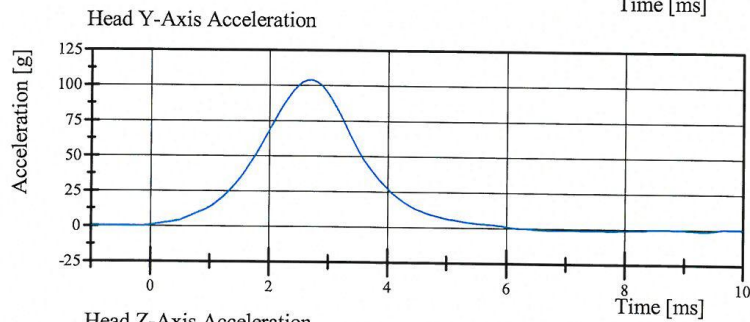
Test Date: 1/16/2013



Filter Class: CFC_1000

Max: 1.2 gn at 6.5 ms

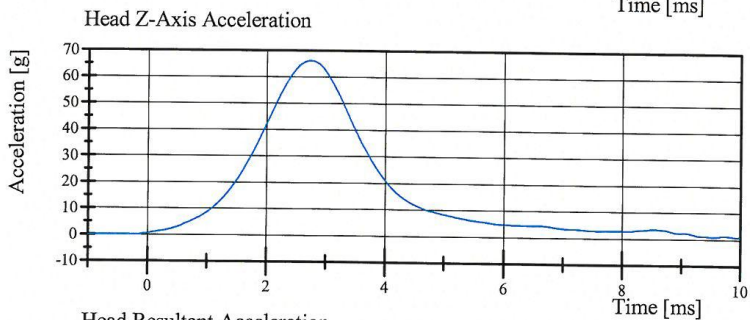
Min: -2.9 gn at 2.4 ms



Filter Class: CFC_1000

Max: 104.0 gn at 2.7 ms

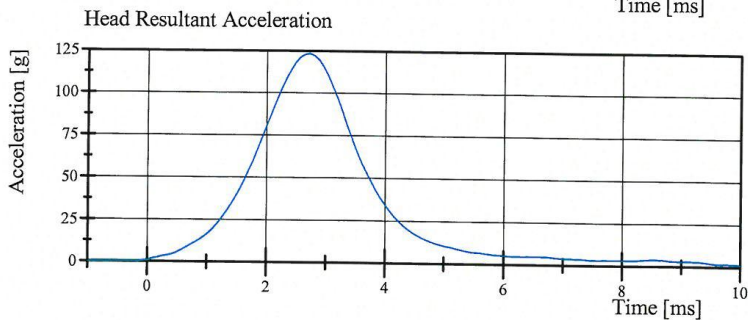
Min: -1.3 gn at 7.7 ms



Filter Class: CFC_1000

Max: 66.1 gn at 2.7 ms

Min: -0.0 gn at -1.0 ms



Filter Class: CFC_1000

Max: 123.2 gn at 2.7 ms

Min: 0.0 gn at -0.6 ms

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

01.16.2013 08:34:34 198



Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 17-1

Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.627 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.598 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.742 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.964 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.833 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.847 m/s	Yes
Maximum Headform Flexion			
occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-72.3 deg	Yes
Time of Peak	50 - 70 ms	62.3 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	41.4 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	110.8 ms	Yes

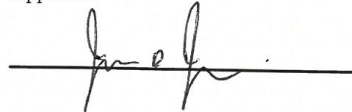
Test meets specifications.

Comments:

Technician



Approved



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

01.16.2013 09:13:37 600

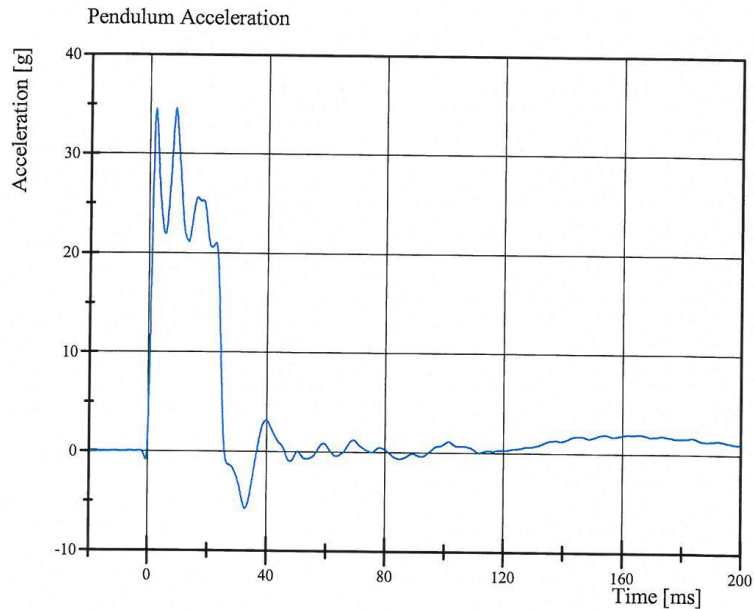


Transportation Research Center Inc.

Left Lateral Neck

SID IIs Serial No. 033 Certification No. 17-1

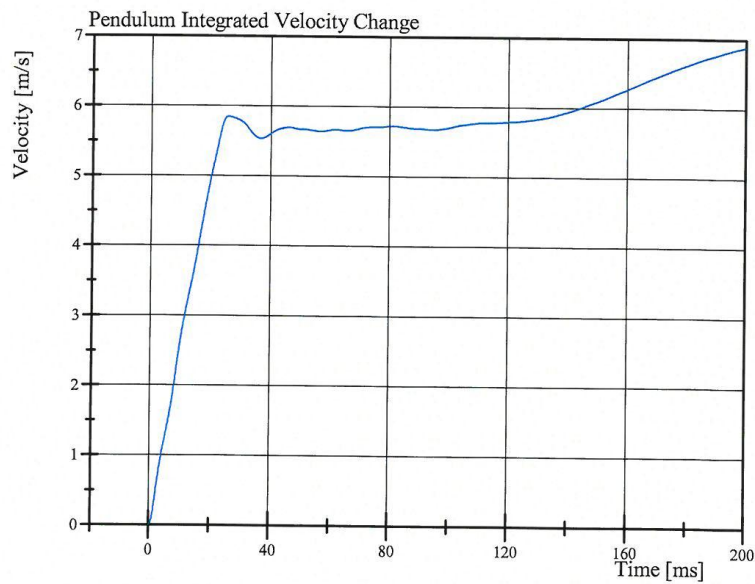
Test Date: 1/16/2013



Filter Class: CFC_180

Max: 34.5 gn at 8.8 ms

Min: -5.8 gn at 32.8 ms



Filter Class: CFC_180

Max: 6.9 m/s at 200.0 ms

Min: 0.0 m/s at 0.0 ms

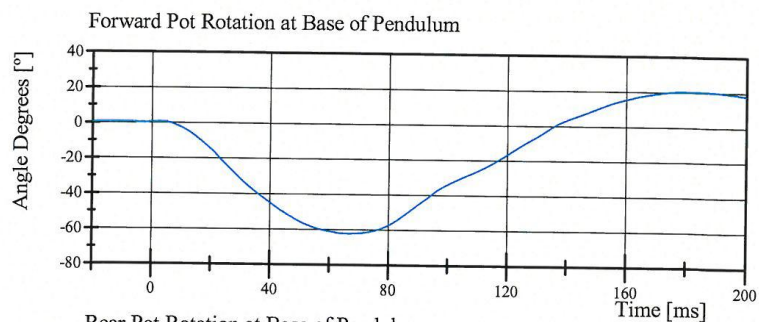
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2013 09:13:54 600

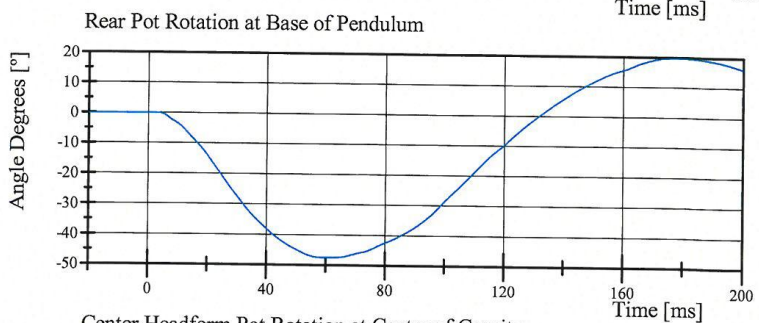


Transportation Research Center Inc.

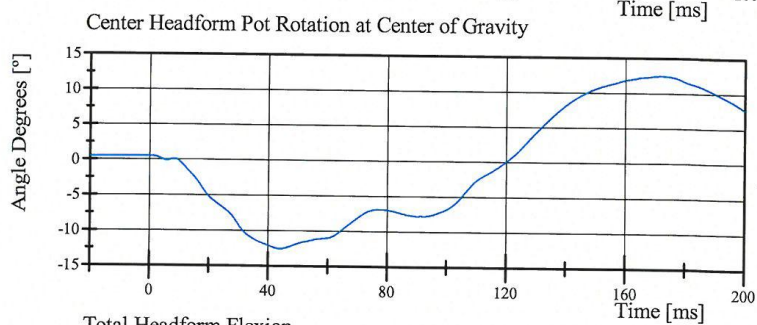
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013



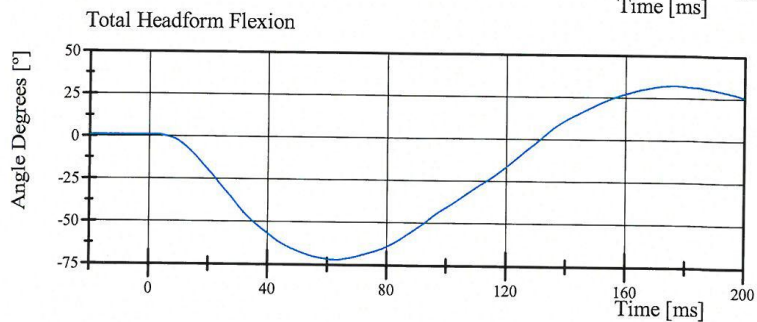
Filter Class: CFC_60
Max: 20.3 ° at 179.4 ms
Min: -62.2 ° at 66.8 ms



Filter Class: CFC_60
Max: 19.8 ° at 177.6 ms
Min: -47.6 ° at 60.5 ms



Filter Class: CFC_60
Max: 12.5 ° at 171.8 ms
Min: -12.6 ° at 44.0 ms



Filter Class: CFC_60
Max: 32.4 ° at 176.2 ms
Min: -72.3 ° at 62.3 ms

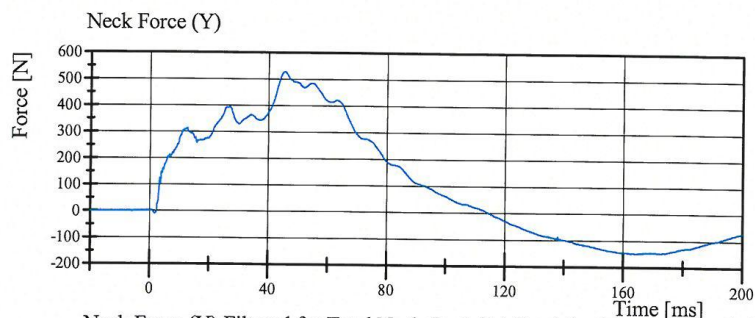
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2013 09:13:55 600

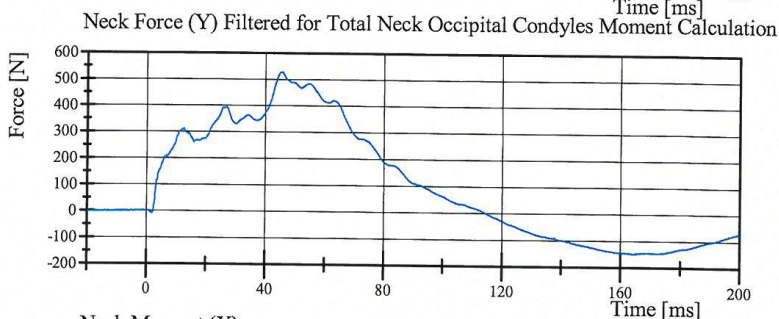


Transportation Research Center Inc.

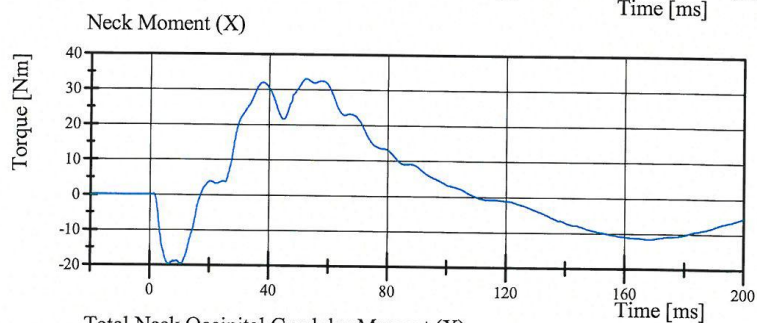
Left Lateral Neck
SID IIs Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013



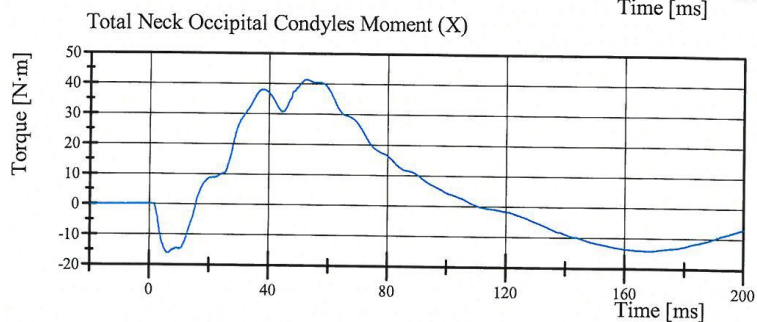
Filter Class: CFC_1000
Max: 528.1 N at 45.4 ms
Min: -149.3 N at 164.2 ms



Filter Class: CFC_600
Max: 527.6 N at 45.4 ms
Min: -149.1 N at 164.2 ms



Filter Class: CFC_600
Max: 33.1 Nm at 52.2 ms
Min: -19.8 Nm at 6.2 ms



Filter Class: Without (Consta
Max: 41.4 N·m at 52.5 ms
Min: -16.2 N·m at 6.2 ms

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

01.16.2013 09:13:56 600



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. 033 Certification No. 17-1

Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-16.2 g	Yes
Shoulder Displacement	28 - 37 mm	32.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	20.2 g	Yes

Test meets specifications.

Comments:

Technician



Approved



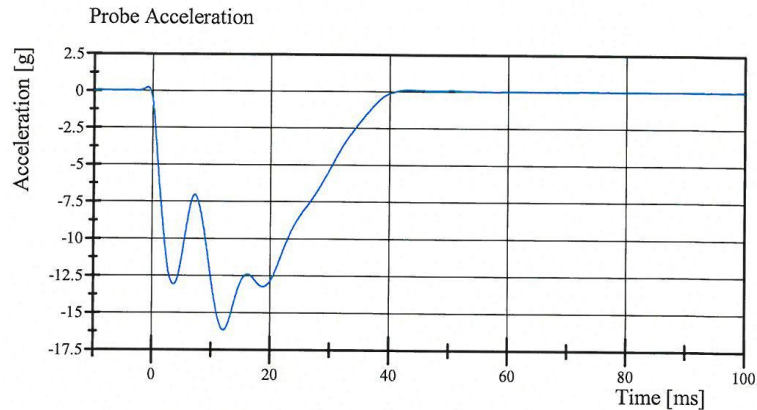
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2013 10:42:51 822

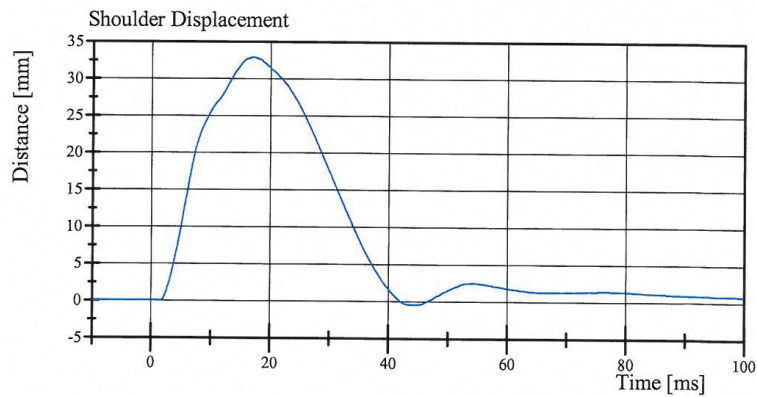


Transportation Research Center Inc.

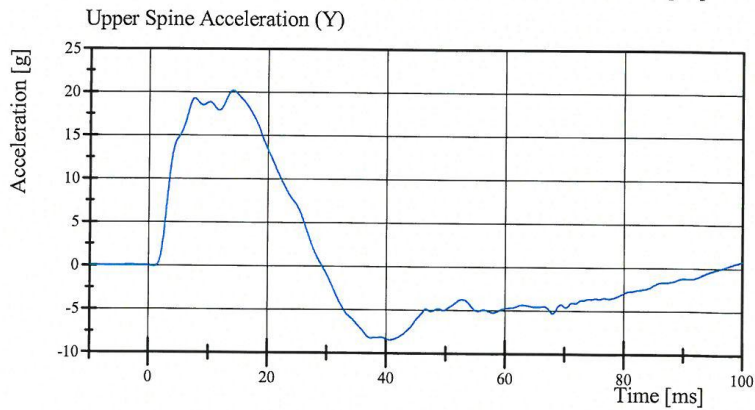
Left Lateral Shoulder
SID IIs Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013



Filter Class: CFC_180
Max: 0.2 gn at -0.8 ms
Min: -16.2 gn at 12.1 ms



Filter Class: CFC_600
Max: 32.9 mm at 17.0 ms
Min: -0.5 mm at 44.1 ms



Filter Class: CFC_180
Max: 20.2 gn at 14.0 ms
Min: -8.5 gn at 40.6 ms

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

01.16.2013 10:42:58 822



Transportation Research Center Inc.

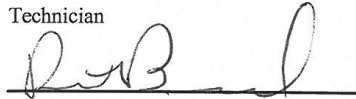
Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 17-3
Test Date: 1/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.703 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.2 g	Yes
Shoulder Displacement	31 - 40 mm	35.8 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	29.1 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.0 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	34.2 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	37.3 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	34.4 g	Yes

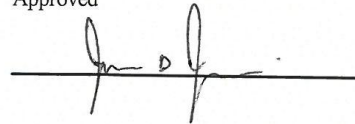
Test meets specifications.

Comments:

Technician



Approved



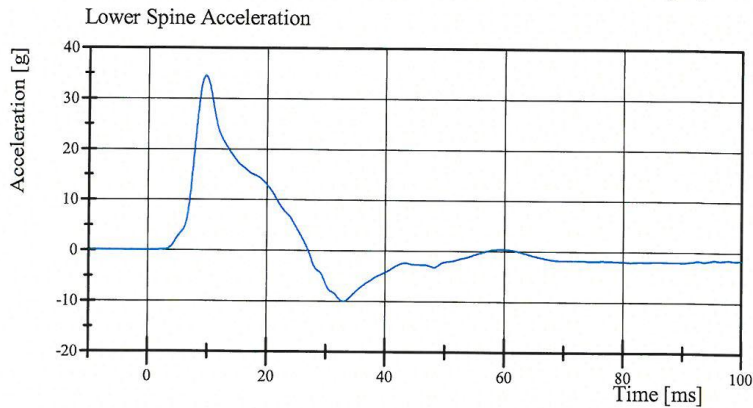
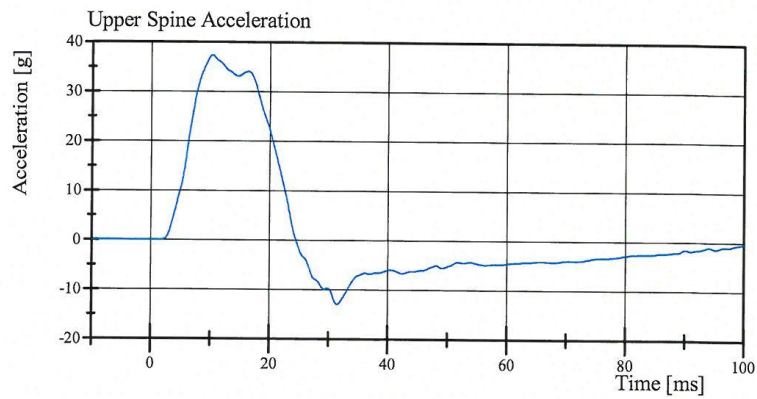
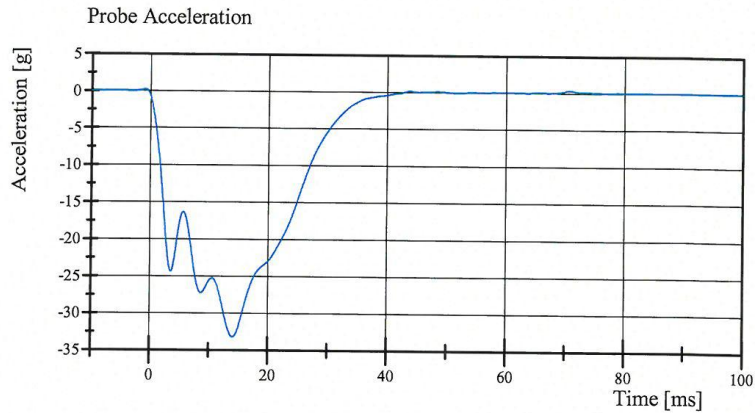
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.17.2013 13:24:59 571



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 17-3
Test Date: 1/17/2013



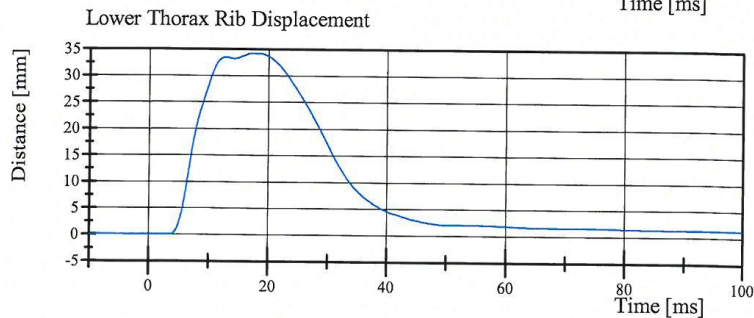
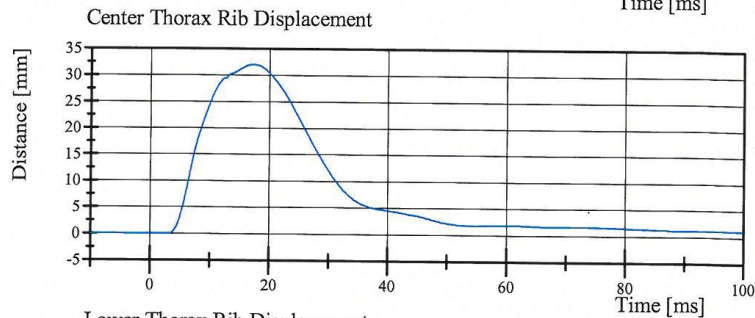
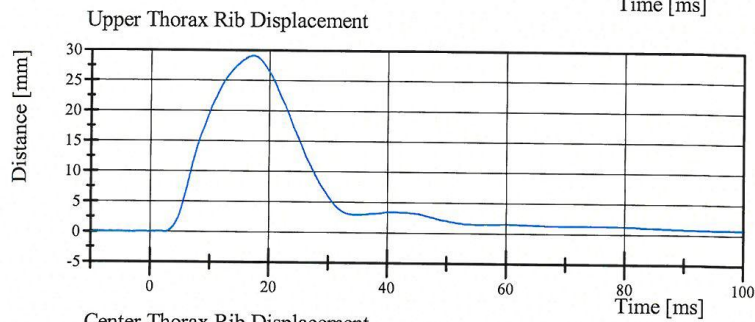
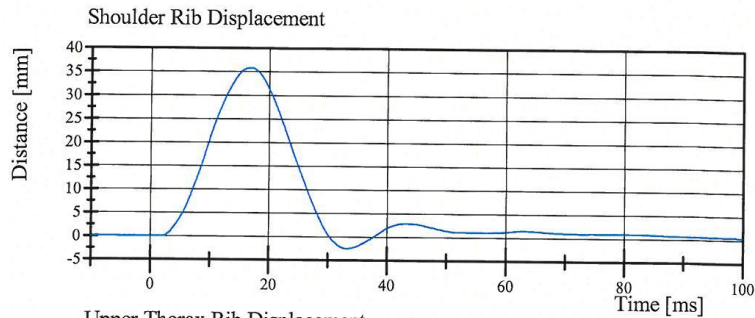
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.17.2013 13:25:14 571



Transportation Research Center Inc.

Left Lateral Thorax with Arm
SID IIs Serial No. 033 Certification No. 17-3
Test Date: 1/17/2013



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

01.17.2013 13:25:15 571



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.309 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.4 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	37.1 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	40.4 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.5 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	15.7 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

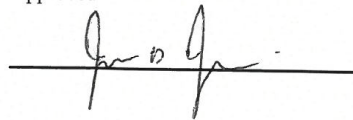
Test meets specifications.

Comments:

Technician



Approved



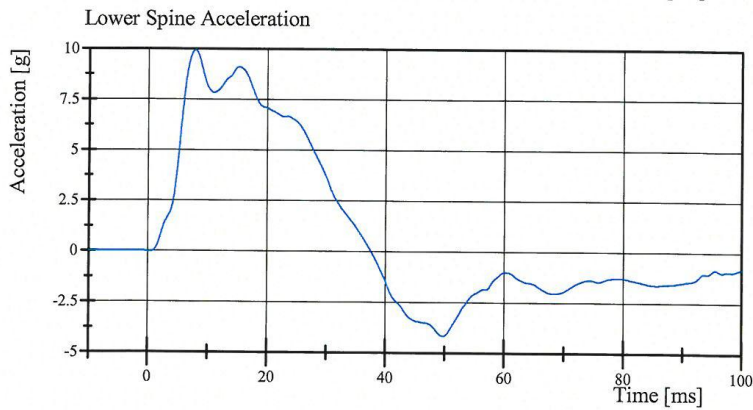
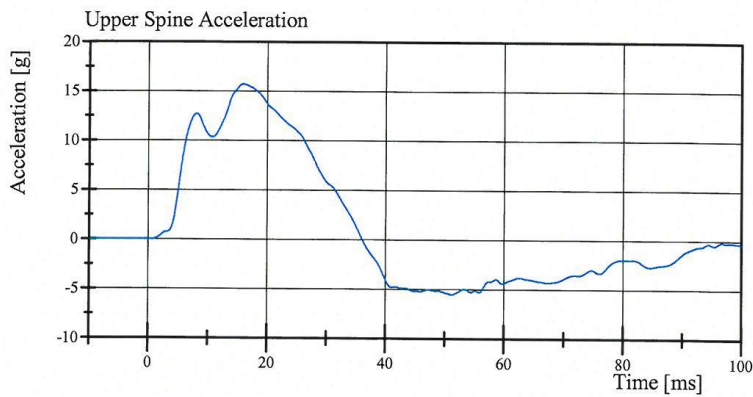
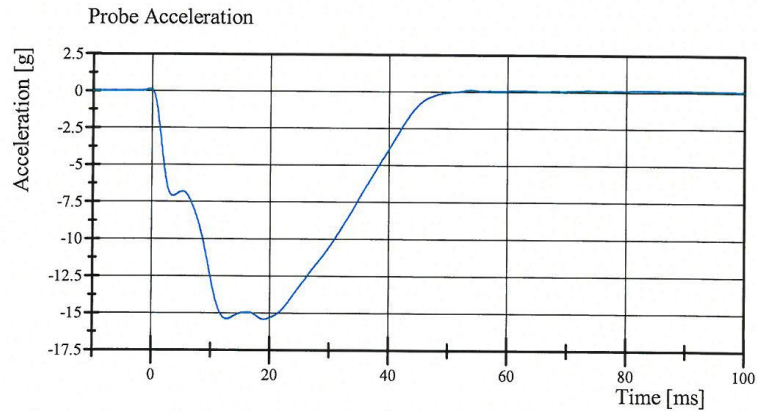
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2013 11:00:39 786



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID II_s Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013



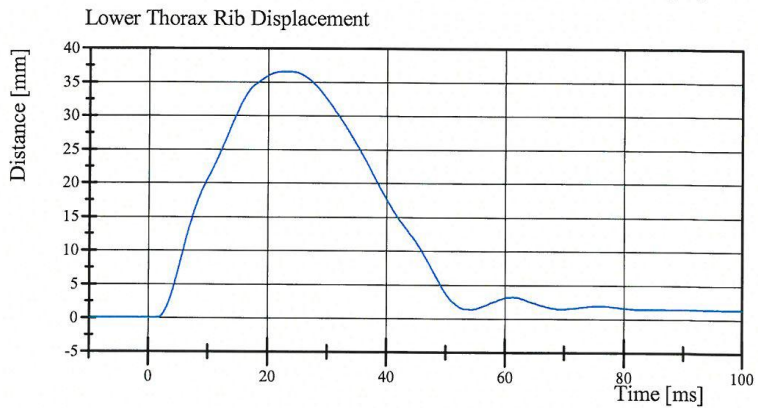
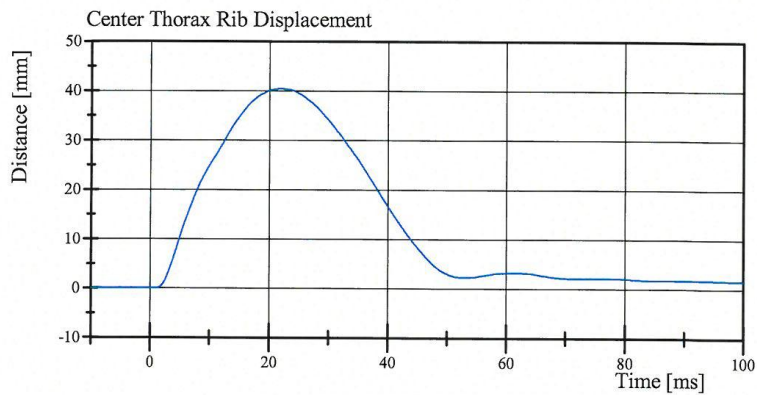
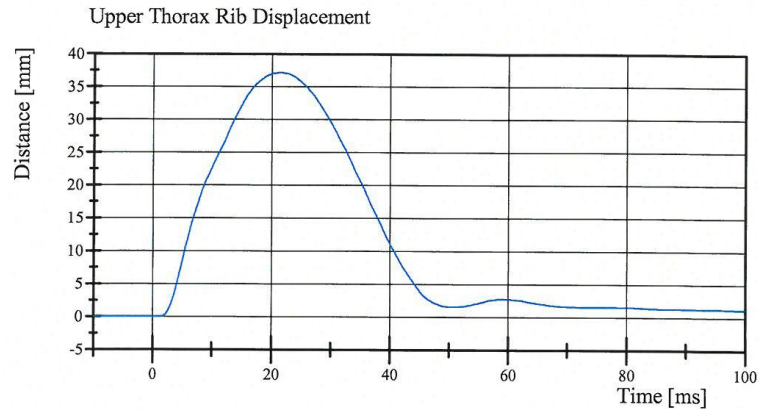
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.16.2013 11:00:47 786



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID II_s Serial No. 033 Certification No. 17-1
Test Date: 1/16/2013



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

01.16.2013 11:00:48 786



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. 033 Certification No. 17-4

Test Date: 1/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	29 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	43.2 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	38.3 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	11.18 g	Yes

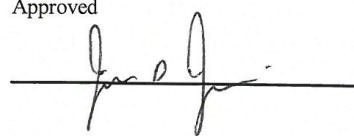
Test meets specifications.

Comments:

Technician



Approved



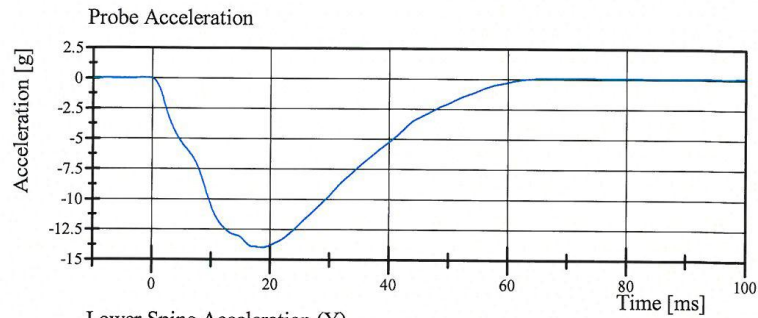
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

01.17.2013 12:33:53 564

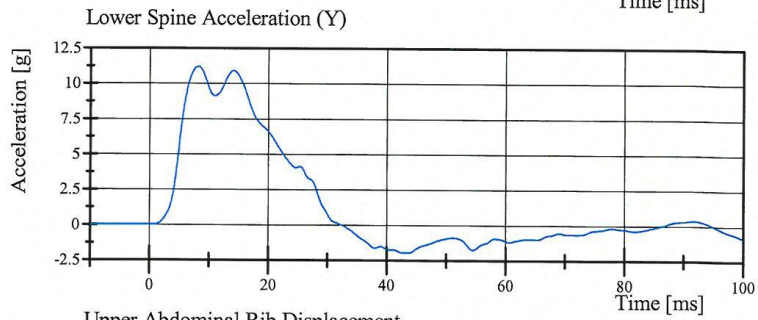


Transportation Research Center Inc.

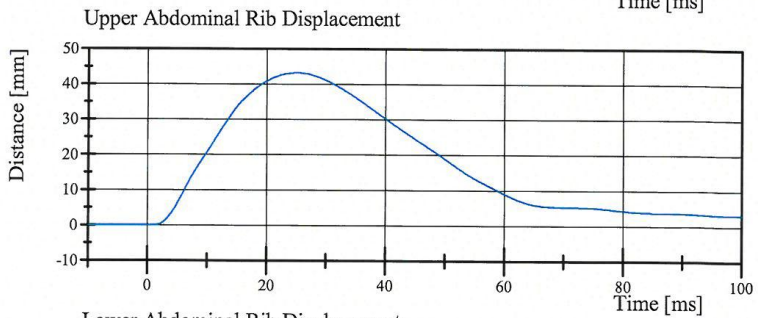
Left Lateral Abdomen
SID II_s Serial No. 033 Certification No. 17-4
Test Date: 1/17/2013



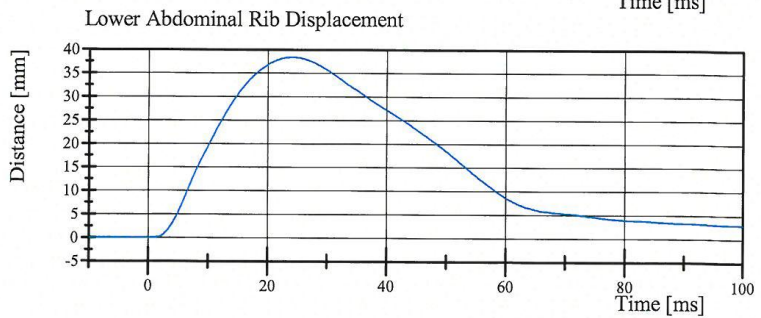
Filter Class: CFC_180
Max: 0.1 gn at 74.0 ms
Min: -14.0 gn at 18.7 ms



Filter Class: CFC_180
Max: 11.2 gn at 8.1 ms
Min: -2.0 gn at 43.4 ms



Filter Class: CFC_600
Max: 43.2 mm at 25.0 ms
Min: -0.0 mm at -4.3 ms



Filter Class: CFC_600
Max: 38.3 mm at 24.1 ms
Min: -0.0 mm at 1.0 ms

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

01.17.2013 12:34:06 564



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. 033 Certification No. 17-3

Test Date: 1/16/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.65 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-43.30 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	42.7 g	No
Acetabulum Force	3,600 - 4,300 N	3,660.3 N	Yes

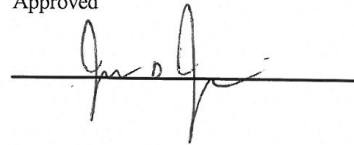
Test does not meet specifications.

Comments:

Technician



Approved



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

01.16.2013 15:07:27 398

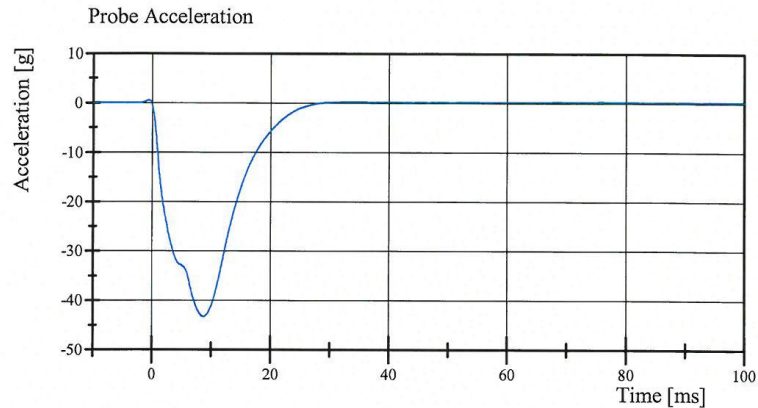


Transportation Research Center Inc.

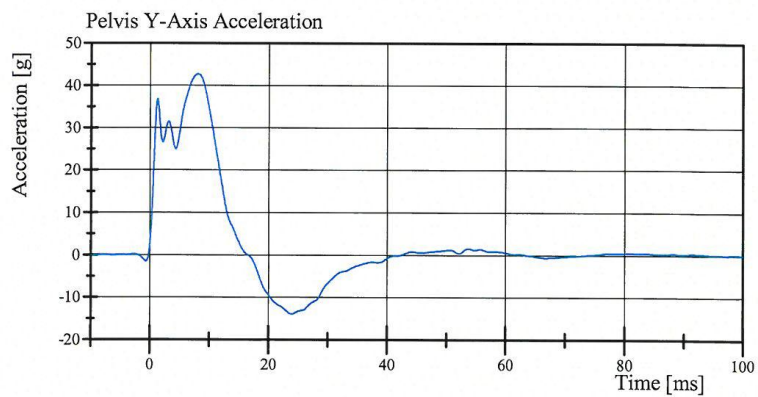
Left Lateral Pelvis

SID IIs Serial No. 033 Certification No. 17-3

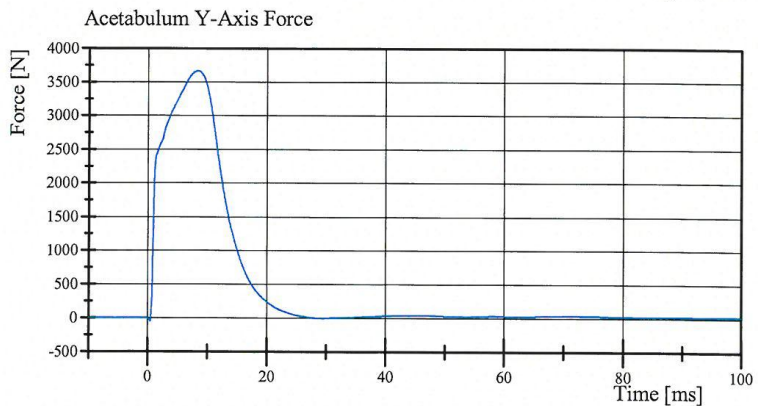
Test Date: 1/16/2013



Filter Class: CFC_180
Max: 0.5 gn at -0.6 ms
Min: -43.3 gn at 8.6 ms



Filter Class: CFC_180
Max: 42.7 gn at 8.0 ms
Min: -13.9 gn at 23.9 ms



Filter Class: CFC_600
Max: 3,660.3 N at 8.3 ms
Min: -49.3 N at 0.4 ms

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

01.16.2013 15:07:48 398



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 17-1

Test Date: 1/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.38 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-41.5 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	31.5 g	Yes
Iliac Force	4,100 - 5,100 N	4,697.1 N	Yes

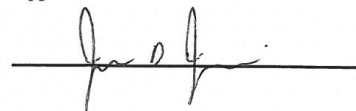
Test meets specifications.

Comments:

Technician



Approved



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

01.17.2013 07:03:58 604

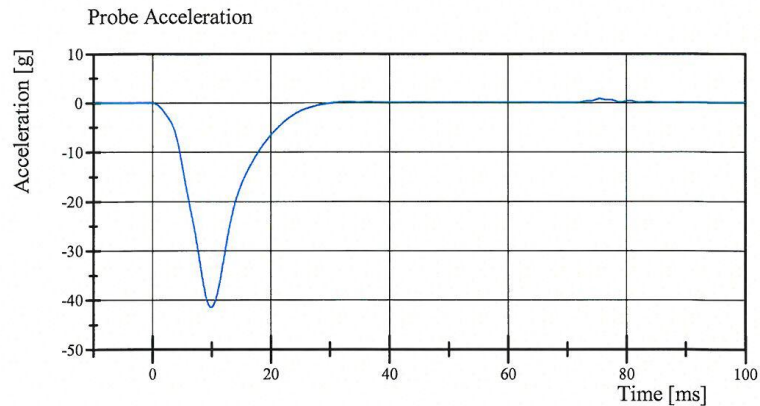


Transportation Research Center Inc.

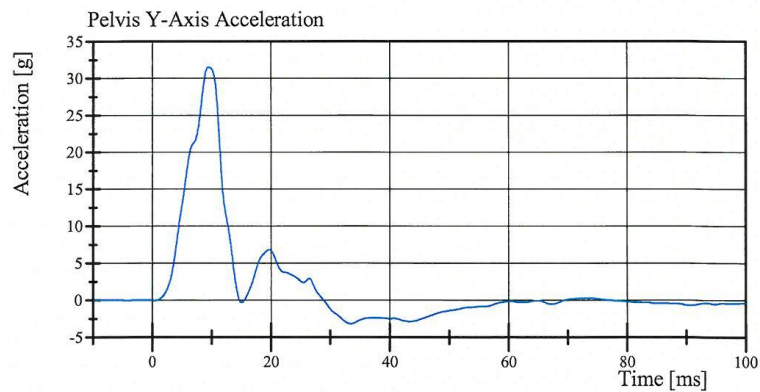
Left Lateral Iliac

SID IIs Serial No. 033 Certification No. 17-1

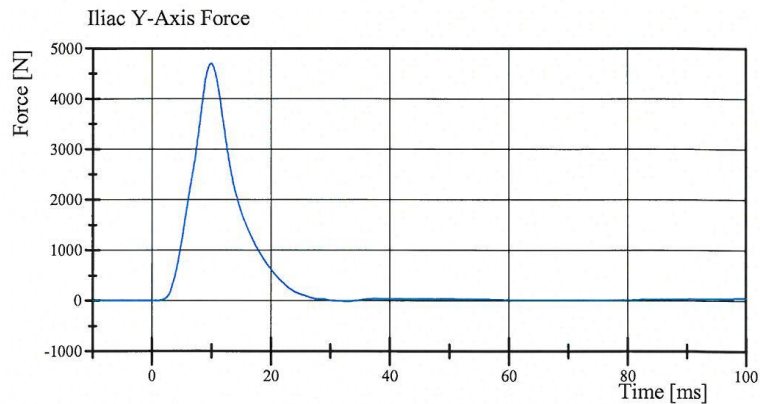
Test Date: 1/17/2013



Filter Class: CFC_180
Max: 0.8 gn at 75.5 ms
Min: -41.5 gn at 9.9 ms



Filter Class: CFC_180
Max: 31.5 gn at 9.4 ms
Min: -3.2 gn at 33.4 ms



Filter Class: CFC_600
Max: 4,697.1 N at 9.9 ms
Min: -10.0 N at 32.7 ms

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

01.17.2013 07:04:04 604



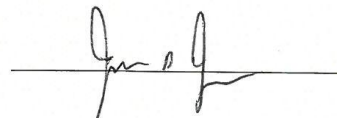
Transportation Research Center Inc.
SIDI's Dummy - Level D
External Dimensions
Serial No. 033 Calibration No.17
Date: 01/22/13

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	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	130	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	353	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	400	Yes
N	Buttock Popliteal Length	416.0 - 442.0	431	Yes
O	Chest Depth without Jacket	195.0 - 211.0	205	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	316	Yes
R	Arm Length	249.0 - 259.0	253	Yes
S	Knee Joint to seat Back	478.0 - 493.0	483	Yes
V	Shoulder Width (only one arm installed)	341.0 - 357.0	350	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	781	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 033			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	J32214	Endevco	1-Oct-12
				Y	J27040	Endevco	1-Oct-12
				Z	AGAC4	Endevco	1-Oct-12
Displacement Potentiometers	Shoulder		Y	NA	NA	NA	
	Thoracic Rib	Upper	Y	3621-592	Servo	2-Oct-12	
		Middle	Y	3725-213	Servo	2-Oct-12	
		Lower	Y	3621-931	Servo	11-Jan-13	
	Abdominal Rib	Upper	Y	3621-918	Servo	2-Oct-12	
		Lower	Y	3621-904	Servo	2-Oct-12	
Lower Spine Accelerometers (T12)				X	00L13-F05	Entran	1-Oct-12
				Y	P63998	Endevco	1-Oct-12
				Z	04J04I20-A17	Entran	1-Oct-12
Acetabulum Load Cell				Y	235-FY	FTSS	2-Oct-12
Iliac Wing Load Cell				Y	113-FY	FTSS	2-Oct-12
Pelvis Plug (struck side)					36258	FTSS	22-Sep-10
Pelvis Plug (non-struck side)					36500	FTSS	24-Sep 10

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P74518	Endevco	19-Jul-12
Vehicle Center of Gravity	Y	P75718	Endevco	14-Sep-12
Vehicle Center of Gravity	Z	P74519	Endevco	17-Aug-12
Left Floor Sill	Y	P76335	Endevco	18-Sep-12
A-Pillar Sill	Y	P76171	Endevco	16-Oct-12
A-Pillar Low	Y	P76397	Endevco	10-Oct-12
A-Pillar Mid	Y	P76254	Endevco	10-Oct-12
B-Pillar Sill	Y	P76453	Endevco	27-Sep-12
B-Pillar Low	Y	P78135	Endevco	9-Oct-12
B-Pillar Mid	Y	P74250	Endevco	20-Aug-12
Driver Seat	Y	P76410	Endevco	2-Jan-13
Engine Top	X	P74478	Endevco	24-Jul-12
Engine Top	Y	P74479	Endevco	24-Jul-12
Firewall	Y	P74442	Endevco	20-Aug-12
Right Roof	Y	P74495	Endevco	24-Jul-12
Right Floor Sill	Y	P75528	Endevco	27-Nov-12
Rear Floor Pan	X	P74527	Endevco	24-Jul-12
Rear Floor Pan	Y	P49016	Endevco	7-Aug-12

TABLE 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	5763-78-FX	Denton	23-Jul-12
Load Cell 2	5763-90-FX	Denton	23-Jul-12
Load Cell 3	5763-92-FX	Denton	23-Jul-12
Load Cell 4	5763-88-FX	Denton	20-Jul-12
Load Cell 5	5763-89-FX	Denton	20-Jul-12
Load Cell 6	5763-77-FX	Denton	23-Jul-12
Load Cell 7	5764-89-FX	Denton	5-Nov-12
Load Cell 8	5764-77-FX	Denton	5-Nov-12