

FINAL REPORT NUMBER: SPNCAP-TRC-14-001

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

**General Motors LLC
2014 Chevrolet Impala 4-Door Sedan
NHTSA NUMBER: M20140101**

**PREPARED BY:
Transportation Research Center Inc.
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P. O. Box B-67
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Report Date: July 19, 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: 
Margaret Susan, Project Manager

Approval Date: July 19, 2013

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 2014 Chevrolet Impala 4-door sedan, 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 June 18, 2013. The impact velocity was 32.36 km/h, and the ambient temperature at the struck (left) side of the target vehicle at the time of impact was 21° C. The test vehicle's post-test maximum crush was 340 mm at Level 3. The test or target vehicle's performance is given below: <table border="1"> <thead> <tr> <th></th><th><u>Unit</u></th><th><u>Threshold</u></th><th><u>Front SID-IIs</u></th></tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆):</td><td>NA</td><td>1000</td><td><u>315</u></td></tr> <tr> <td>Resultant Lower Spine Acceleration:</td><td>g's</td><td>82</td><td><u>37.9</u></td></tr> <tr> <td>Total Pelvic Force: (sum of acetabular and iliac forces)</td><td>N</td><td>5525</td><td><u>2453.0</u></td></tr> <tr> <td>Maximum Thoracic Rib Deflection</td><td>mm</td><td>38</td><td><u>24.3</u></td></tr> <tr> <td>Maximum Abdomen Rib Deflection</td><td>mm</td><td>45</td><td><u>18.9</u></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.					<u>Unit</u>	<u>Threshold</u>	<u>Front SID-IIs</u>	Head Injury Criteria (HIC ₃₆):	NA	1000	<u>315</u>	Resultant Lower Spine Acceleration:	g's	82	<u>37.9</u>	Total Pelvic Force: (sum of acetabular and iliac forces)	N	5525	<u>2453.0</u>	Maximum Thoracic Rib Deflection	mm	38	<u>24.3</u>	Maximum Abdomen Rib Deflection	mm	45	<u>18.9</u>
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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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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Test Purpose and Procedure	1
2	Summary of Test Results	2
3	Occupant and Vehicle Information	4
<u>Data Sheet No.</u>		<u>Page No.</u>
1	General Test and Vehicle Parameter Data	5
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	8
3	Dummy Longitudinal Clearance Dimensions	11
4	Dummy Lateral Clearance Dimensions	12
5	Camera and Instrumentation Data	13
6	Vehicle Accelerometer Data	14
7	Rigid Pole Load Cell Data	15
8	Post-Test Observations	16
9	Vehicle Profile Measurements	18
10	Vehicle Exterior Crush Measurements	19
11	FMVSS No. 301 Fuel Integrity Post-Impact Data	22
12	Dummy/Vehicle Temperature and Humidity Stabilization Data	23
<u>Appendix</u>		<u>Page No.</u>
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1
D	Test Equipment And Instrumentation Calibration Data	D-1

SECTION 1

TEST PURPOSE AND PROCEDURE

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY14 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 2014 Chevrolet Impala 4-door sedan manufactured by General Motors LLC. 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 2014 Chevrolet Impala 4-door sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.36 km/h. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on June 18, 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	315
Lower Spine Acceleration	G	82	37.9
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2453.0
Maximum Thoracic Rib Deflection	mm	38*	24.3
Maximum Abdominal Rib Deflection	mm	45*	18.9

* 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	Yes	No		
Curtain	Yes	Yes	Yes	Yes
Side Torso Airbag	No	No	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	No
Seat Belt Pretensioner	Yes	Yes	No	NA
Seat Belt Load Limiter	Yes	Unknown	No	NA
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: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20140101	Traction Control System (TCS)	Yes
Model Year	2014	Auto-Leveling System	No
Make	Chevrolet	Automatic Door Locks (ADL)	Yes
Model	Impala	Power Window Auto-Reverse	Yes
Body Style	4-door sedan	Other Optional Feature	None
VIN	1G11Y5SL0EU101209	Driver Front Airbag	Yes
Body Color	Silver	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	52 mi.	Driver Head/Torso Airbag	No
Engine Displacement (L)	2.5	Driver Torso Airbag	No
Type/No. Cylinders	4	Driver Torso/Pelvis Airbag	Yes
Engine Placement	Transverse	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	Yes
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	FWD	Rear Pass. Torso Airbag	Yes
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?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors LLC	GVWR (kg)	2103
Date of Manufacturer	04/13	GAWR Front (kg)	1050
Vehicle Type	Pass Car	GAWR Rear (kg)	1053

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	0	5
Vehicle Capacity Weight (VCW) (kg)				428
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				87.8

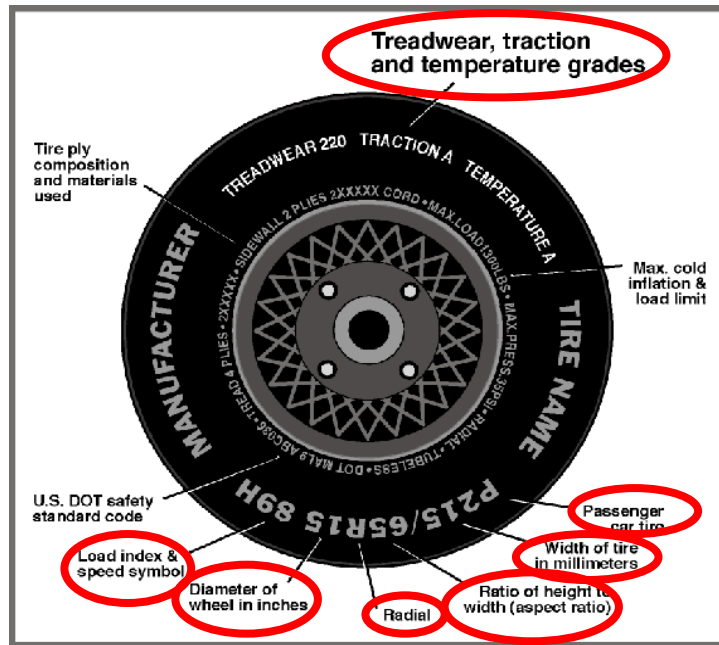
VEHICLE SEAT TYPE

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	Yes	No
Rear or Second Row Seat	No	No	Yes	No	Yes	N/A	N/A
Third row seat	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/50R18	P235/50R18
Tire Size on Vehicle	P235/50R18	P235/50R18
Tire Manufacturer	Firestone	Firestone
Tire Model	Firehawk GT	Firehawk GT
Treadwear	460	460
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	97H	97H
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	8XPM FCH 1013	8XPM FCH 1013
DOT Safety Code Right	8XPM FCH 1013	8XPM FCH 1013

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

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	240	240	240	240
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

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	502.8	346.4		532.8	363.8		522.6	421.8	
Right	kg	463.2	331.4		504.2	374.6		462.8	393.8	
Ratio	%	58.8	41.2		58.4	41.6		54.7	45.3	
Totals	kg	966.0	677.8	1643.8	1037.0	738.4	1775.4	985.4	815.6	1801.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total As Delivered Weight (UVW)	kg	1643.8
Actual Weight of 1 P572V ATD (SID-IIs) Dummy Used	kg	49
Rated Cargo/Luggage Weight (RCLW)	kg	87.8
Calculated Vehicle Target Weight (TVTW)	kg	1780.6

(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: Rear fascia, left & right tail lights, left rear wheelhouse insulation.	10.2

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	0.0	0.2	0.4	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.3	-0.1	0.3	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	-0.3	-0.3	-0.3	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	-0.3	-0.3	-0.4	Yes
Vehicle CG (Aft of Front Axle)	mm	1168	1179	1284	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+25	+8	+37	

*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: 2014 Chevrolet Impala 4-door sedan

NHTSA No.: M20140101

Test Program: SPNCAP Side Impact

Test Date: 06/18/13

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	24.1	13.3	18.7
Front Passenger Seat	23.3	18.7	21.0
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	18.7	143	Max	147	160	170
			Mid	123	133	143
			Min	100	106	115
Front Passenger Seat	21.0	116	Max			
			Mid	104	116	128
			Min			
Front Center Seat*	N/A	N/A	Max			
			Mid	N/A	N/A	N/A
			Min			
Struck Side Rear Seat	13.7	Fixed	Max			
			Mid	N/A	N/A	N/A
			Min			
Non-Struck Side Rear Seat	14.0	Fixed	Max			
			Mid	N/A	N/A	N/A
			Min			
Rear Center Seat*	12.4	Fixed	Max			
			Mid	N/A	N/A	N/A
			Min			

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

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

Test Vehicle: 2014 Chevrolet Impala 4-door sedan

NHTSA No.: M20140101

Test Program: SPNCAP Side Impact

Test Date: 06/18/13

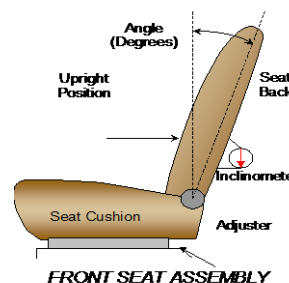
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	244	N/A	0	N/A
Front Passenger Seat	244	55	0	0
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Non-Struck Side Rear Seat	Fixed	N/A	Fixed	N/A
Rear Center Seat*	Fixed	N/A	Fixed	N/A

* 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	87.0	N/A	26.1	N/A
Front Passenger Seat	89.7	31	25.7	N/A
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	N/A	19.5	N/A
Non-Struck Side Rear Seat	Fixed	N/A	19.3	N/A
Rear Center Seat*	Fixed	N/A	20.5	N/A

* 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	5	0, Uppermost

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	9	8, Lowermost

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

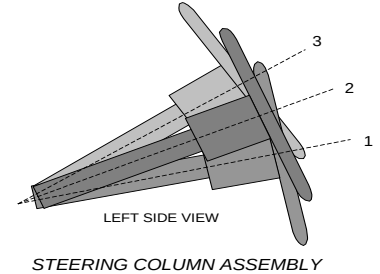
Test Vehicle: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13

STEERING COLUMN ADJUSTMENT

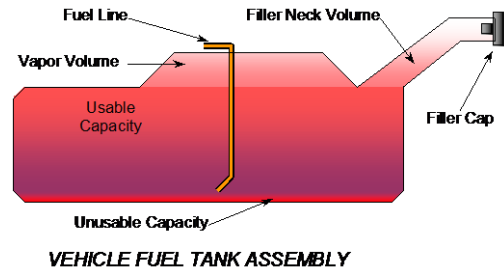
Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	20.8	26
Geometric Center, Position No. 2	23.2	26
Uppermost, Position No. 3	25.5	26
Telescoping Steering Wheel Travel		52
Test Position	23.1	26

**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**

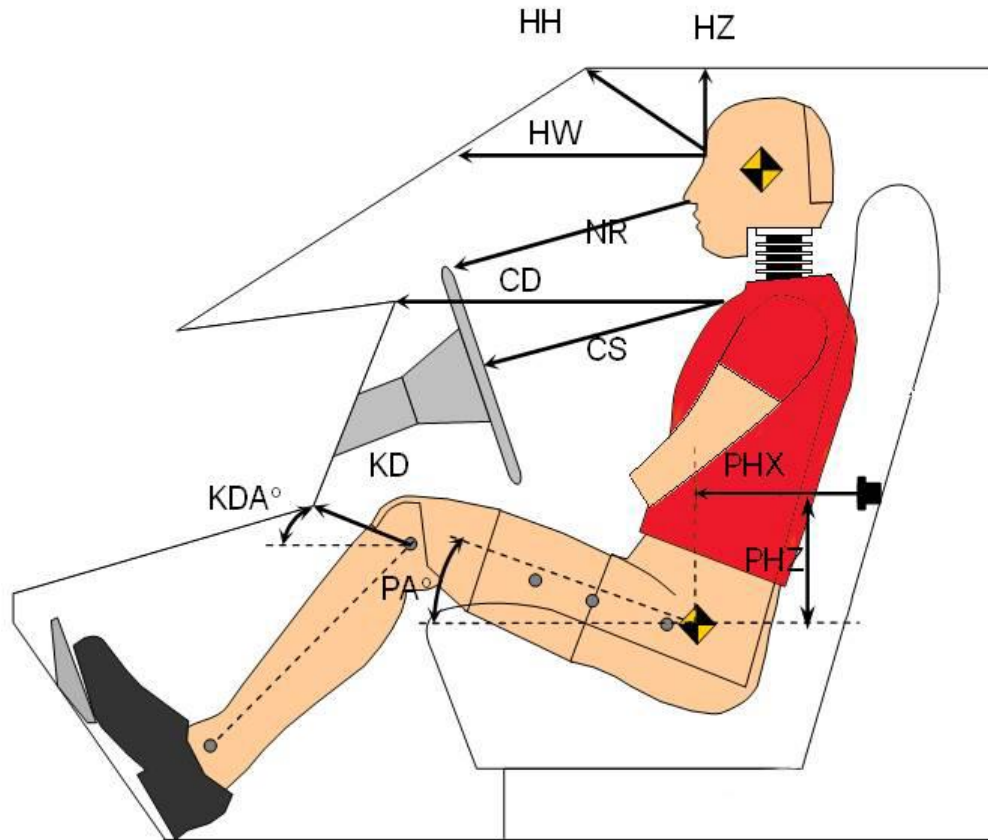
	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	70.0
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	70.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	65.1
Actual Amount of Solvent Used in Test	65.1
1/3 of Usable Capacity	23.3

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: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13

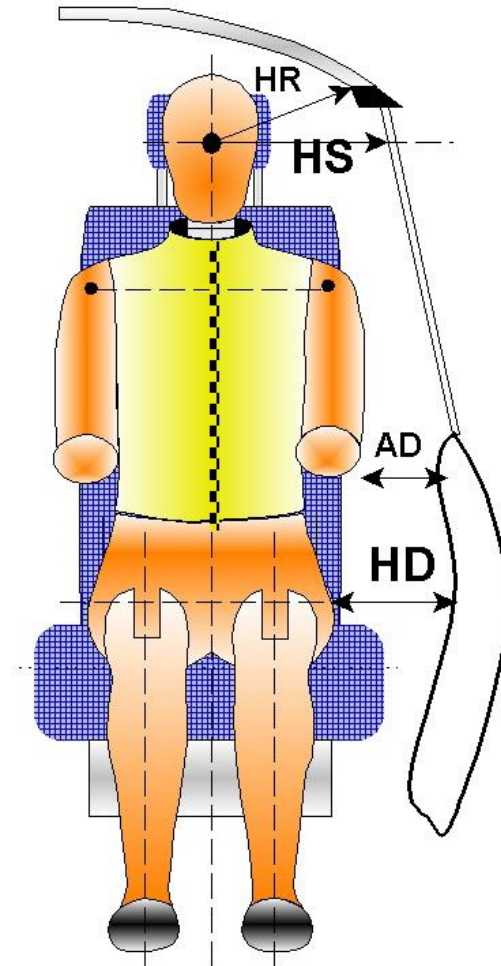


Code	Measurement Description	Driver	
		Length (mm)	Angle (°)
HH	Head to Header	269	
HW	Head to Windshield	567	
HZ	Head to Roof Liner	170	
NR	Nose to Rim	240	
CD	Chest to Dashboard	410	
CS	Chest to Steering Wheel	201	
KDL/KDLA°	Left Knee to Dash	157	29.5
KDR/KDRA°	Right Knee to Dash	124	45.0
PAX°	Pelvic Tilt Angle (X-axis)		0.7
PAY°	Pelvic Tilt Angle (Y-axis)		22.5
PHX	Hip Point to Striker (X-Axis)	307	
PHZ	Hip Point to Striker (Z-Axis)	140	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13

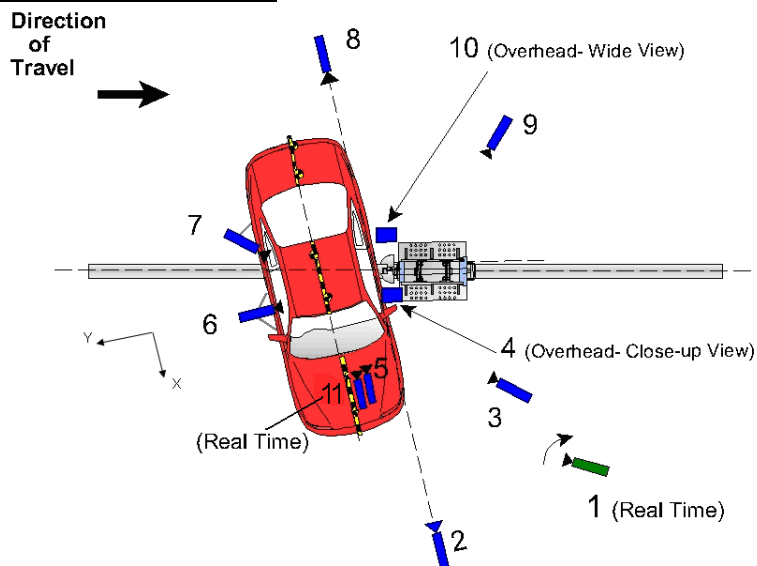


Code	Measurement Description	Length (mm)
HR	Head to Side Header	223
HS	Head to Side Window	371
AD	Arm to Door	173
HD	Hip Point to Door	179

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13



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	5719	0	1336	12.5	1000
3	Impact side 45° – forward pole view	3519	-787	1168	16	1000
4	Overhead Close-up view of impact	0	0	5563	25	1000
5	Onboard – dummy front view				12.5	1000
6	Onboard – dummy side view				8.5	1000
7	Onboard – dummy rear oblique view				6	1000
8	Rear ground level – impact view	-6925	0	1152	8.5	1000
9	Impact side 45° – rearward pole view	-3698	-2272	1282	16	1000
10	Overhead wide view of impact	101	406	5563	8.5	1000
11	Real time dummy front view				Zoom	30

All measurements accurate to +/- 6 mm.

NOTE: Vehicle was at a 75° angle to the rigid pole.

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

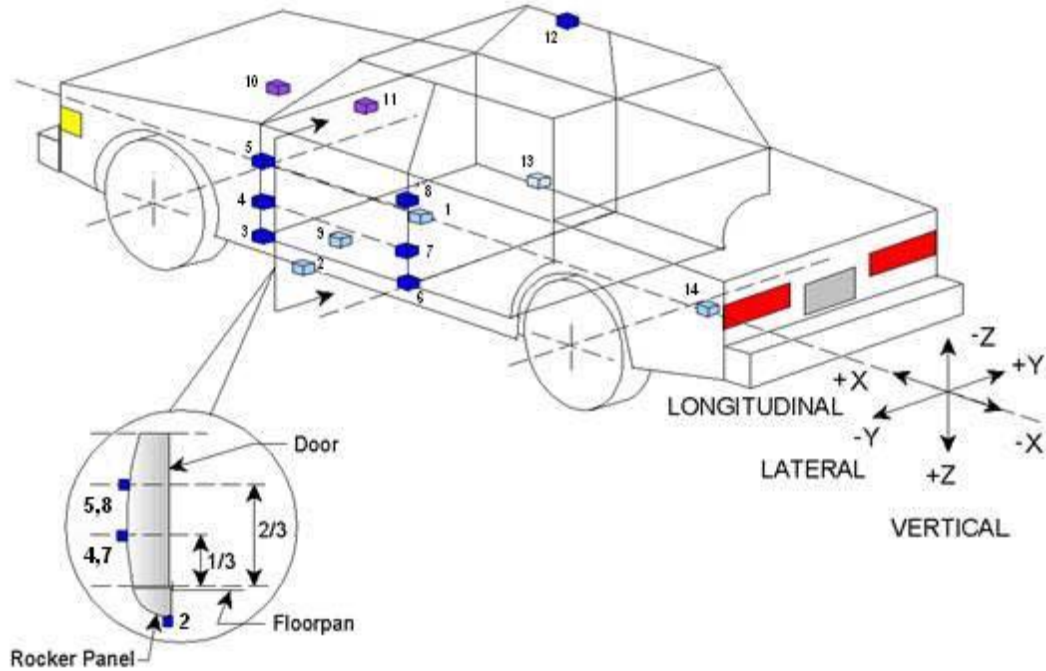
INSTRUMENTATION

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

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
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	Accelerometer/Sensor Location			
	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3262	105	-293
2	Left Floor Sill	3162	-660	-289
3	A-Pillar Sill	3532	-734	-396
4	A-Pillar Low	3607	-846	-429
5	A-Pillar Mid	3617	-836	-878
6	B-Pillar Sill	2494	-660	-301
7	B-Pillar Low	2492	-820	-571
8	B-Pillar Mid	2477	-810	-814
9	Driver Seat Track	2889	-736	-370
10	Engine Top	4080	15	-781
11	Firewall	2940	195	-850
12	Right Roof	2402	620	-1452
13	Right Floor Sill	3167	660	-324
14	Rear Floorpan	1250	0	-530

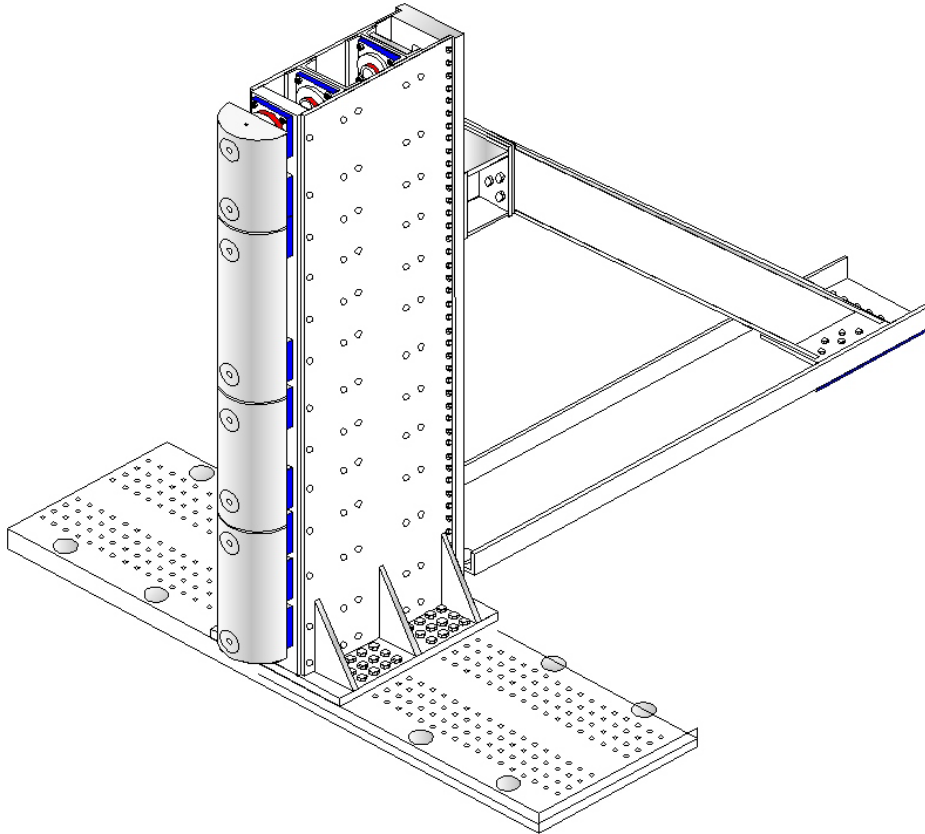
Reference: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13

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: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver SID-IIs Dummy
Face	Side Curtain Airbag
Top of Head	Side Curtain Airbag
Left Side of Head	Side Curtain Airbag
Back of Head	Side Curtain Airbag, Head Restraint
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Torso/Pelvis Airbag
Lower Torso	Torso/Pelvis Airbag
Left Hip	Torso/Pelvis Airbag
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	Yes	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	No	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

* 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	Yes	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	Minor deformation of B-pillar
Sill Separation	None
Windshield Damage	Extensively Cracked
Side Window Damage	Extensively Cracked
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

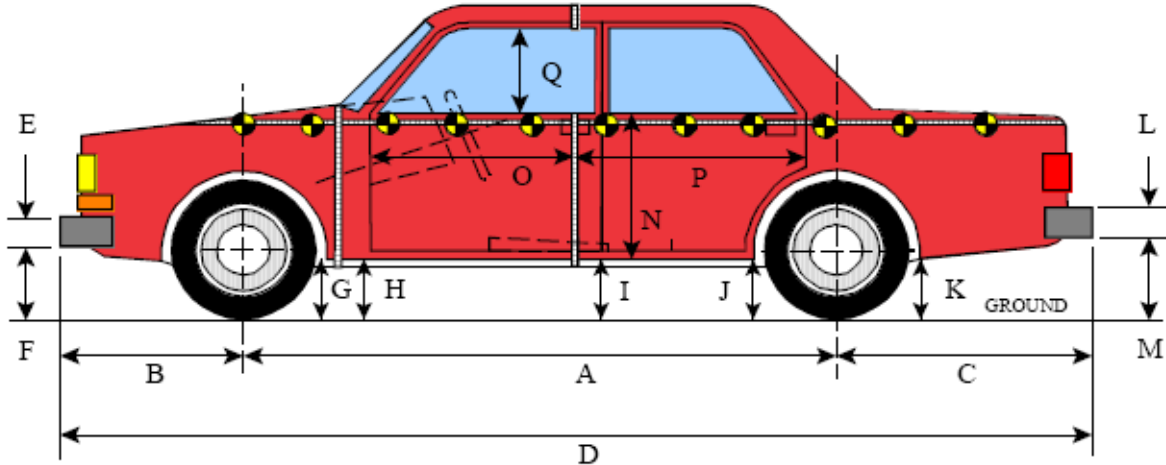
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1137
Actual Impact Point (Aft of Front Axle)	mm		1137
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact point	0
Angle Between Vehicle's Longitudinal Centerline and Line of Motion	degrees	75 +/- 3	76
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	32.36
Trap No. 2 Velocity (Redundant)	km/h	31.4 to 33.0	32.36

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13



LEFT SIDE VIEW

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

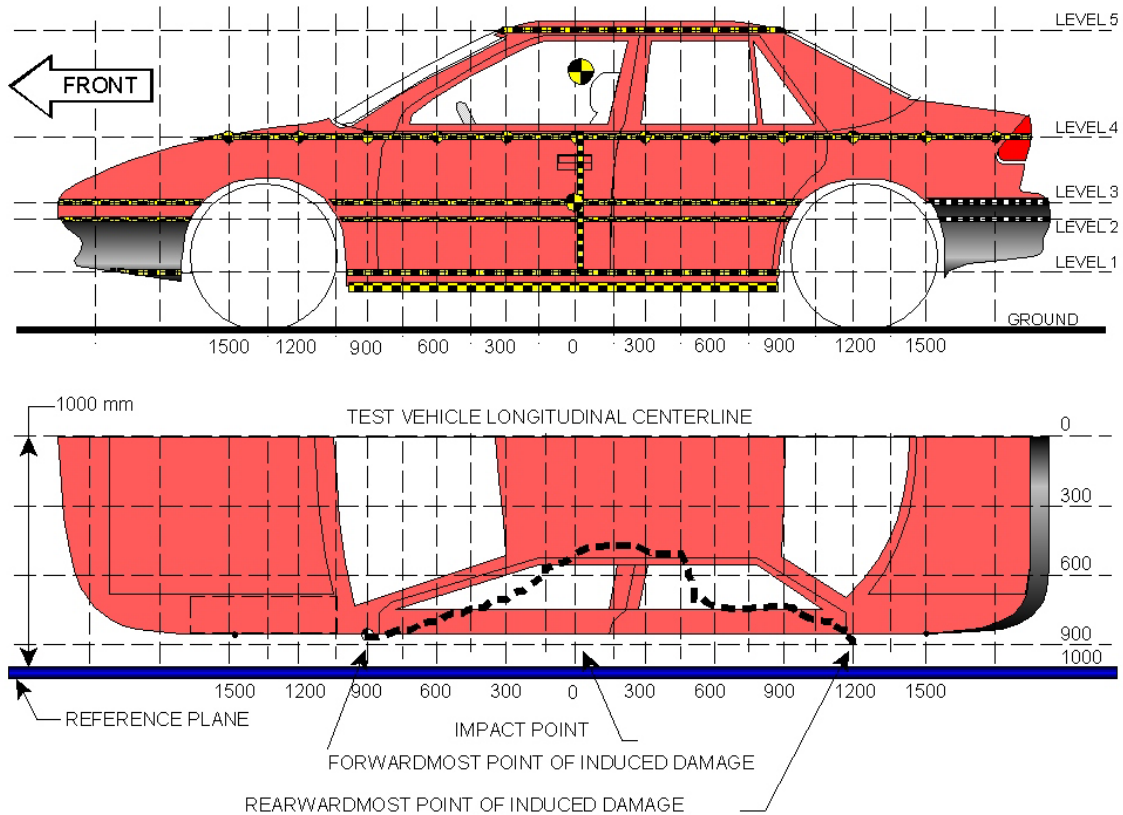
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2835	2778	57
B	Front Axle to Front Surface of Vehicle	1015	1015	0
C	Rear Axle to Rear Surface of Vehicle	1275	1275	0
D	Total Length at Centerline	5125	5075	50
E	Front Bumper Thickness	130	130	0
F	Front Bumper Bottom to Ground	410	458	-48
G	Sill Height at Front Wheel Well	210	239	-29
H	Sill Height at Front Door Leading Edge	218	240	-22
I	Sill Height at B-Pillar	262	302	-40
J1	Sill Height at Rear Wheel Well	200	244	-44
J2	Pinch Weld Height at Rear Wheel Well	190	227	-37
K	Sill Height Aft of Rear Wheel Well	262	308	-46
L	Rear Bumper Thickness	178	178	0
M	Rear Bumper Bottom to Ground	485	516	-31
N	Sill Height to Bottom of Front Window Sill	790	715	75
O	Front Door Leading Edge to Impact CL	654	802	-148
P	Rear Door Trailing Edge to Impact CL	1353	1225	128
Q	Front Window Opening	397	381	16
R	Right Side Length	4796	4796	0
S	Left Side Length	4793	4721	72
T	Vehicle Width at "B" Pillars	1822	1698	124

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13



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	396	329	-150
2	Occupant H-Point	598	338	-150
3	Mid-Door	639	340	-150
4	Window Sill	959	313	0
5	Window Top	1437	109	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: 2014 Chevrolet Impala 4-door sedan
 Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
 Test Date: 06/18/13

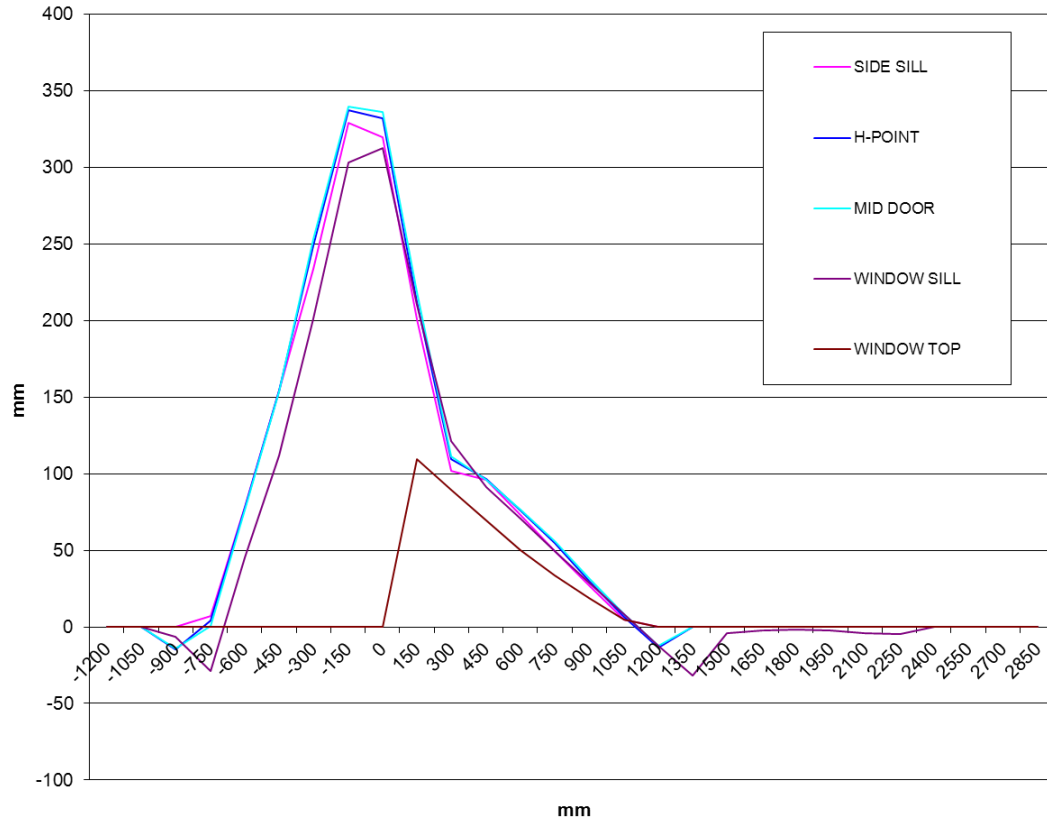
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900	0	920	919	823	0	0	935	933	829	0	0	-15	-14	-6	0
-750	904	910	909	833	0	897	906	909	862	0	7	4	0	-29	0
-600	901	906	906	842	0	823	828	830	797	0	78	78	76	45	0
-450	901	905	907	851	0	746	751	753	738	0	155	154	154	113	0
-300	901	906	908	858	0	668	657	655	656	0	233	249	253	202	0
-150	902	906	908	864	0	573	568	568	561	0	329	338	340	303	0
0	903	905	907	869	0	583	573	571	556	0	320	332	336	313	0
150	904	903	906	861	594	704	691	687	651	485	200	212	219	210	109
300	906	901	904	872	600	804	792	792	751	511	102	109	112	121	89
450	906	898	900	873	601	810	802	804	781	532	96	96	96	92	69
600	908	897	898	873	602	835	821	822	802	552	73	76	76	71	50
750	908	897	898	872	600	859	843	842	823	567	49	54	56	49	33
900	905	902	901	869	594	878	872	870	841	576	27	30	31	28	18
1050	904	910	909	893	581	899	903	901	884	577	5	7	8	9	4
1200	0	918	918	882	0	0	931	930	894	0	0	-13	-12	-12	0
1350	0	0	0	876	0	0	0	0	908	0	0	0	0	-32	0
1500	0	0	0	875	0	0	0	0	879	0	0	0	0	-4	0
1650	0	0	0	866	0	0	0	0	868	0	0	0	0	-2	0
1800	0	0	0	857	0	0	0	0	858	0	0	0	0	-1	0
1950	0	0	0	845	0	0	0	0	847	0	0	0	0	-2	0
2100	0	0	0	831	0	0	0	0	835	0	0	0	0	-4	0
2250	0	0	0	816	0	0	0	0	821	0	0	0	0	-5	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: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13



DATA SHEET NO. 11

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan

NHTSA No.: M20140101

Test Program: SPNCAP Side Impact

Test Date: 06/18/13

Test Time: 18:04 Temperature: 21.5

A. From impact until vehicle motion ceases: 0 oz.

(Maximum allowable is 1 ounce)

B. For the 5 minute period after motion ceases: 0

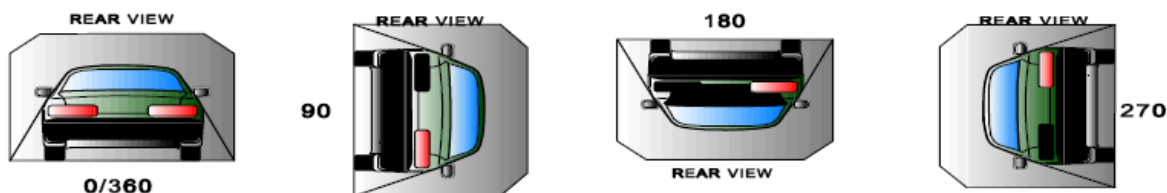
(Maximum allowable is 5 ounces)

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

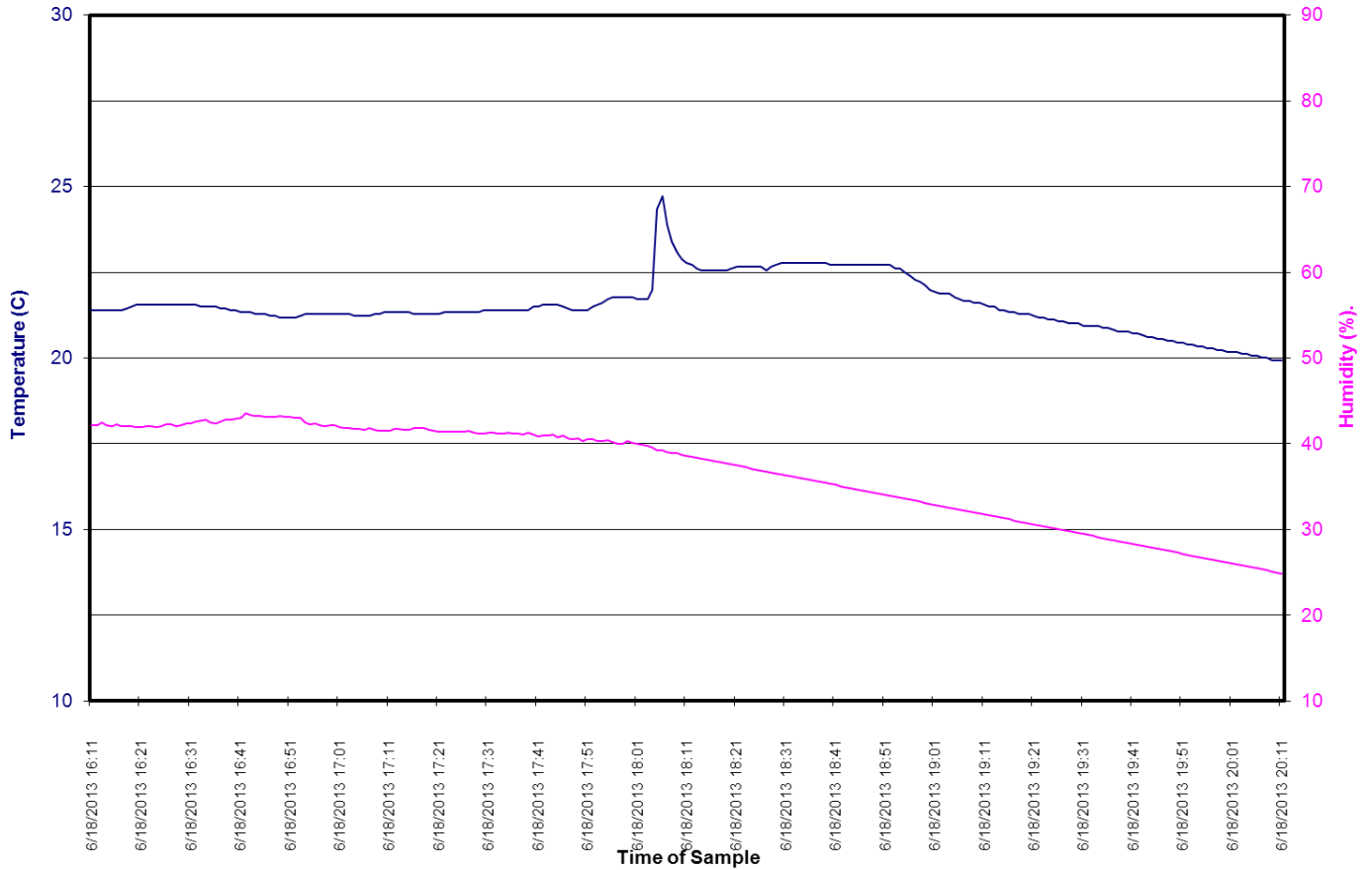
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2014 Chevrolet Impala 4-door sedan
Test Program: SPNCAP Side Impact

NHTSA No.: M20140101
Test Date: 06/18/13

M20140101 2014 Chevrolet Impala 4-door sedan

75 Degree Oblique Rigid Pole Impact 130618; Test Time 18:04



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

No.	Description	Page
1	As Delivered Right Front 3-4 View of Test Vehicle	A-4
2	As Delivered Left Rear 3-4 View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
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
7	Pre-Test Left Side View of Test Vehicle	A-7
8	Post-Test Left Side View of Test Vehicle	A-7
9	Pre-Test Left Rear 3-4 View of Test Vehicle	A-8
10	Post-Test Left Rear 3-4 View of Test Vehicle	A-8
11	Pre-Test Rear View of Test Vehicle	A-9
12	Post-Test Rear View of Test Vehicle	A-9
13	Pre-Test Right Side View of Test Vehicle	A-10
14	Post-Test Right Side View of Test Vehicle	A-10
15	Pre-Test Overhead View of Test Area	A-11
16	Post-Test Overhead View of Test Area	A-11
17	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-12
18	Pre-Test Right Side View of Pole Positioned Against Side of Vehicle	A-12
19	Pre-Test Close-Up View of Impact Point Target	A-13
20	Post-Test Close-Up View of Impact Point Target Showing Impact Location	A-13
21	Pre-Test Front Close-Up View of Dummy Head and Chest	A-14
22	Post-Test Front Close-Up View of Dummy	A-14
23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
24	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-15
25	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-16
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
32	Pre-Test Placement of Dummy's Feet	A-19
33	Pre-Test View of Belt Anchorage for Dummy	A-20
34	Pre-Test Left Side View of Steering Wheel	A-20

TABLE OF PHOTOGRAPHS (CONTINUED)

No.	Description	Page
35	Pre-Test View of Disengaged Parking Brake	A-21
36	Pre-Test View of Parking Brake	A-21
37	Pre-Test Close-Up Left Side View of Driver Seat Track	A-22
38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-22
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-23
41	Post-Test Dummy and Door Clearance View (Photo Not Available)	A-24
42	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-24
43	Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-25
44	Pre-Test Inner Driver Door Panel View	A-25
45	Post-Test Inner Driver Door Panel View Showing Dummy Contact Location	A-26
46	Post-Test Dummy Close-Up Head Contact with Vehicle View	A-26
47	Post-Test Dummy Close-Up Head Contact with Side Airbag View	A-27
48	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-27
49	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-28
50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-29
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-29
53	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-30
54	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-30
55	Close-Up View of Vehicle's Certification Label	A-31
56	Close-Up View of Vehicle's Tire Information Placard or Label	A-31
57	Pre-Test Pole Barrier Front View	A-32
58	Post-Test Pole Barrier Front View	A-32
59	Pre-Test Pole Barrier Side View	A-33
60	Pre-Test Pole Barrier Side View	A-33
61	Pre-Test Ballast View (Photo Not Applicable)	A-34
62	Post-Test Primary and Redundant Speed Trap Read-Out	A-34
63	FMVSS No. 301 Static Rollover 0 Degrees	A-35
64	FMVSS No. 301 Static Rollover 90 Degrees	A-35
65	FMVSS No. 301 Static Rollover 180 Degrees	A-36
66	FMVSS No. 301 Static Rollover 270 Degrees	A-36
67	FMVSS No. 301 Static Rollover 360 Degrees	A-37
68	Impact Event	A-37
69	Monroney Label	A-38
70	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-38
71	Post-Test View of Shattered Vehicle Inner Door Panel	A-39



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



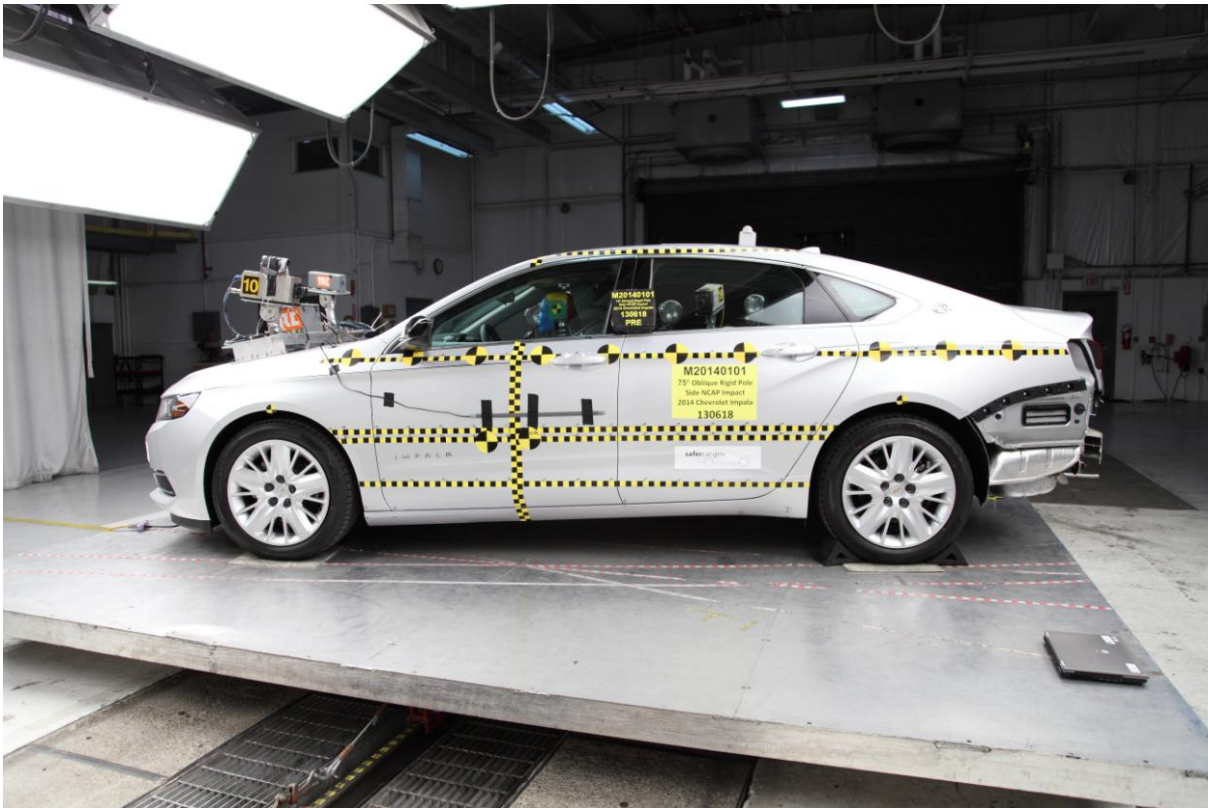
004 Post-Test Frontal View of Test Vehicle



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



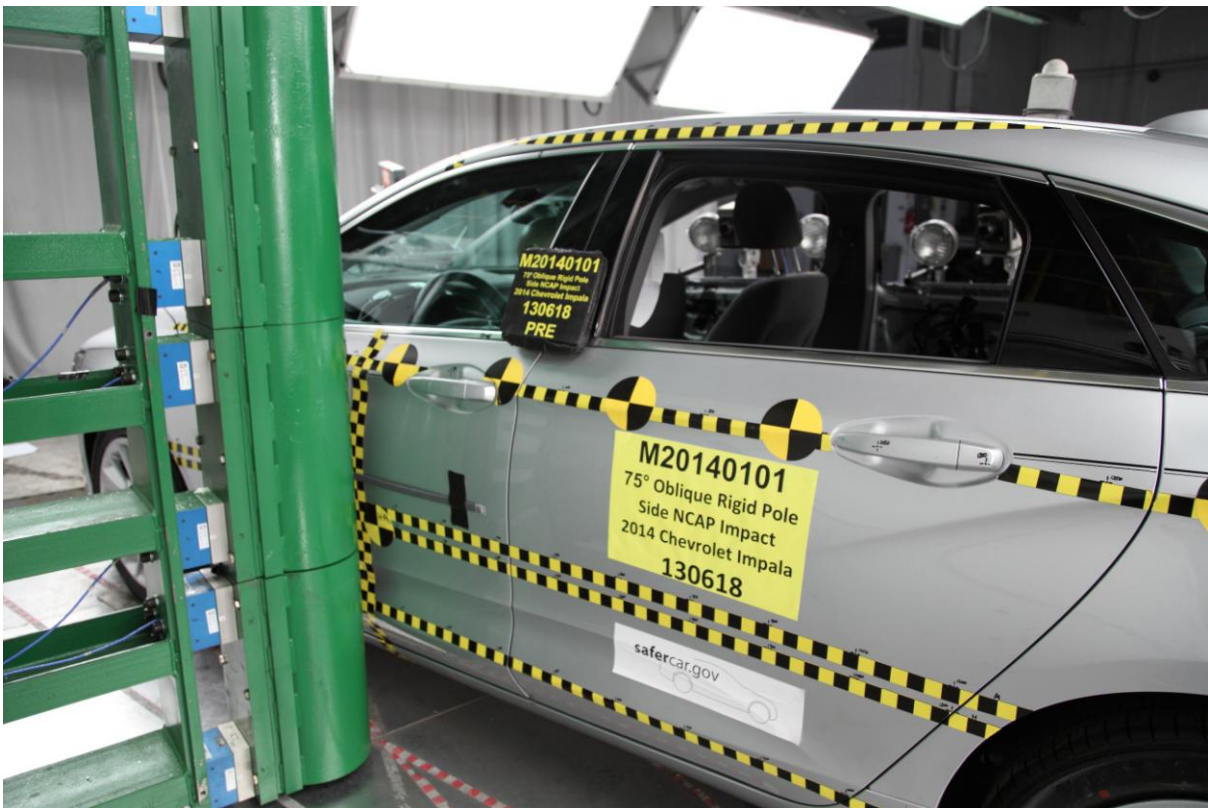
015 Pre-Test Overhead View of Test Area



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



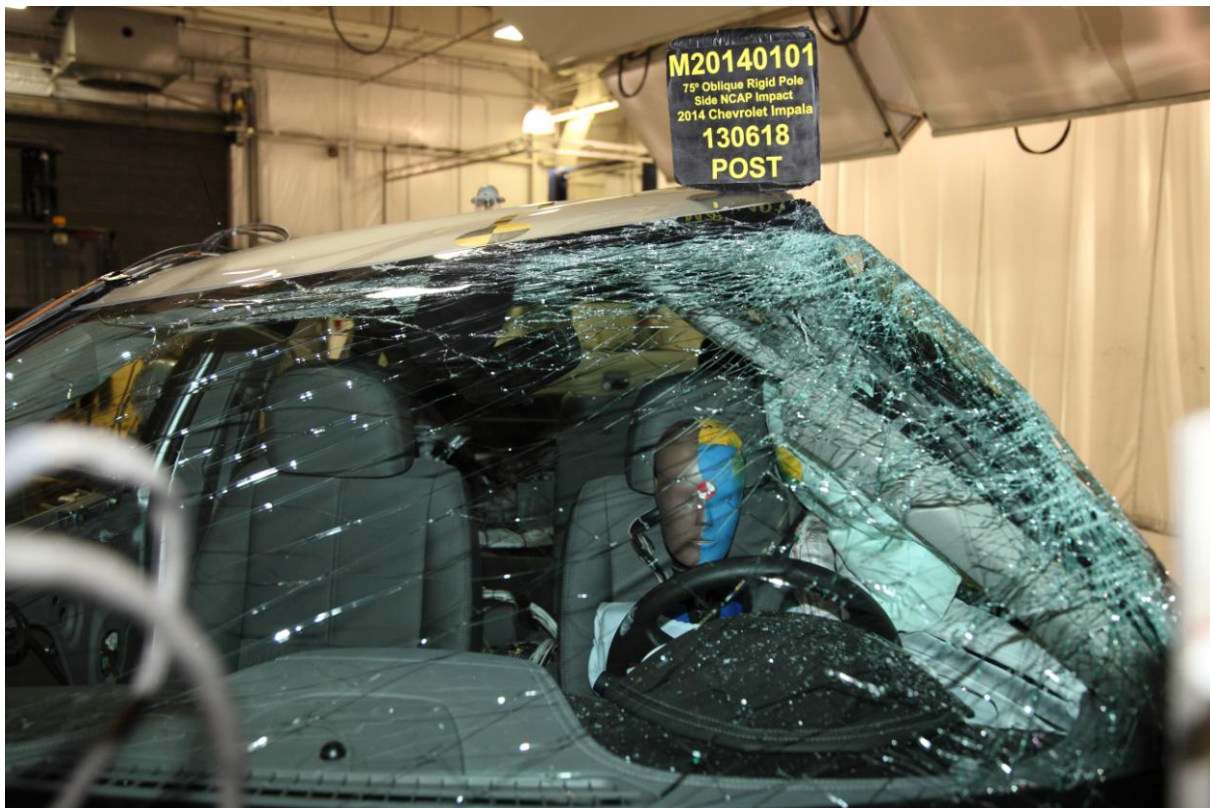
019 Pre-Test Close-Up View of Impact Point Target



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



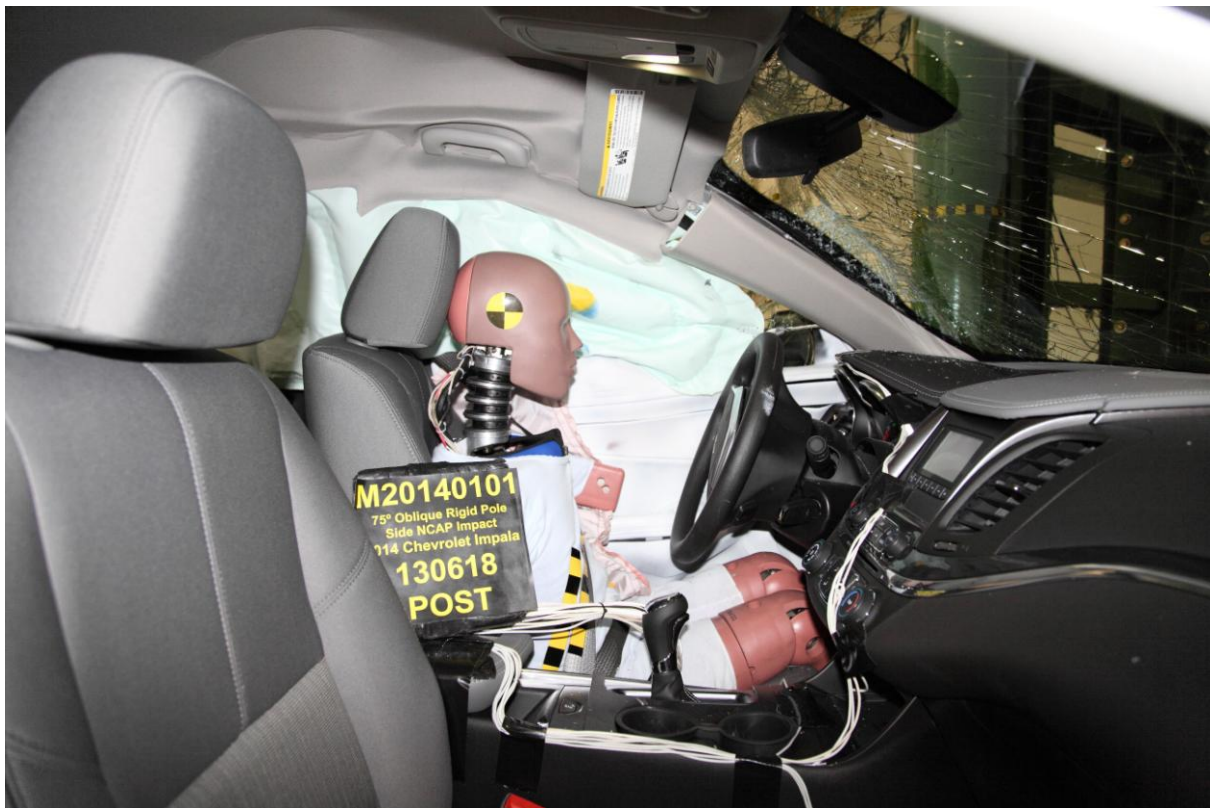
040 Pre-Test Dummy and Door Clearance View

PHOTO NOT AVAILABLE

041 Post-Test Dummy and Door Clearance View



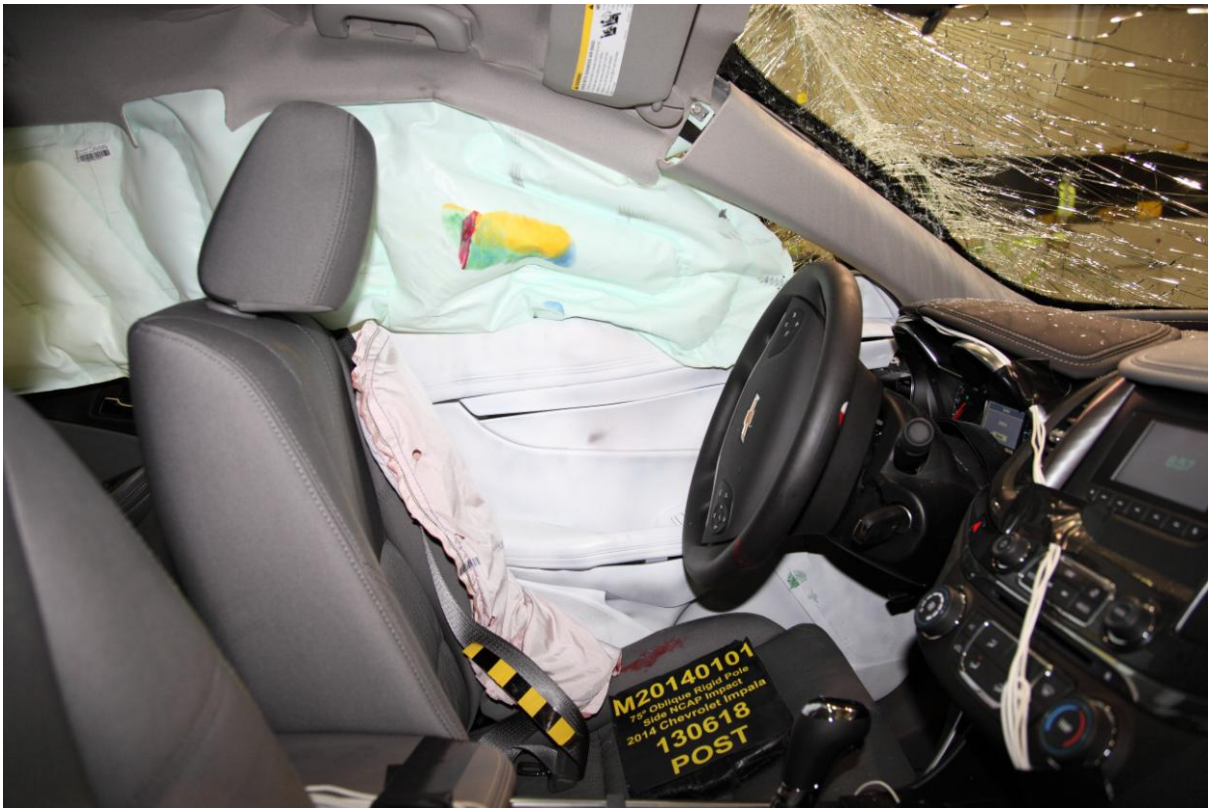
042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



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



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



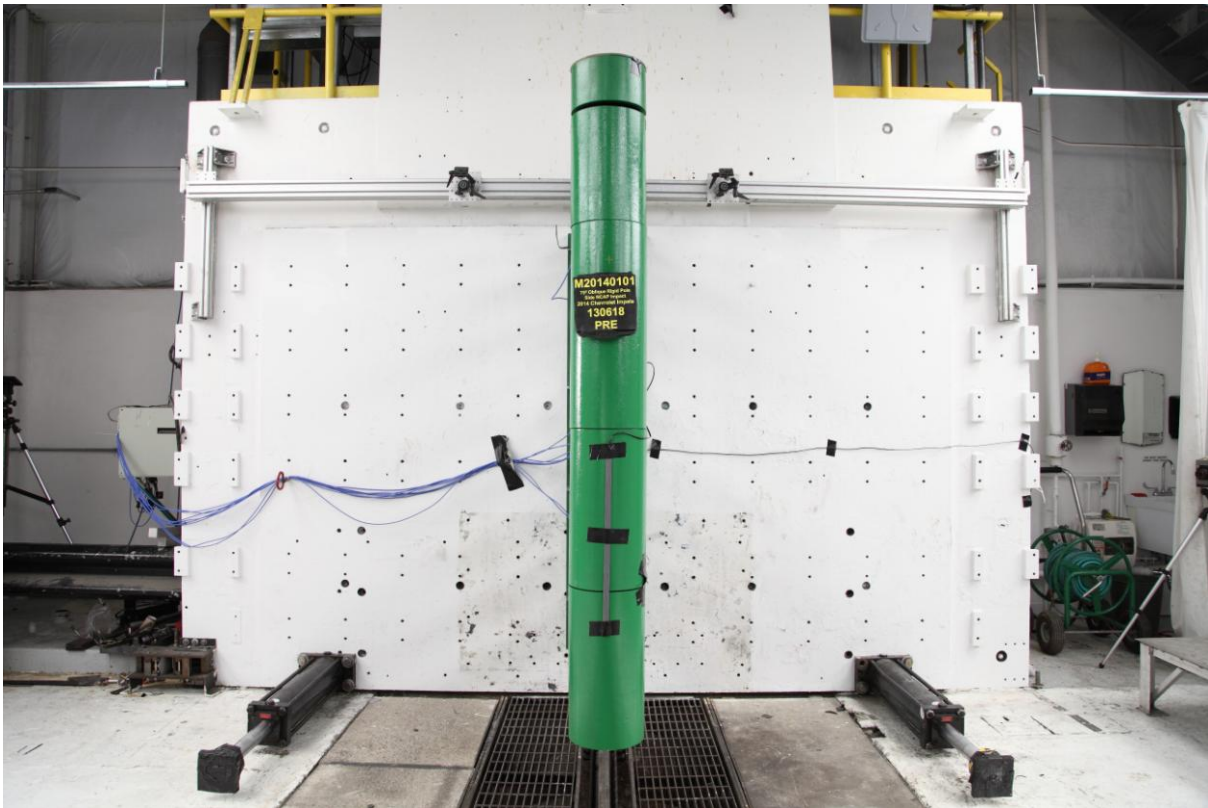
054 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



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



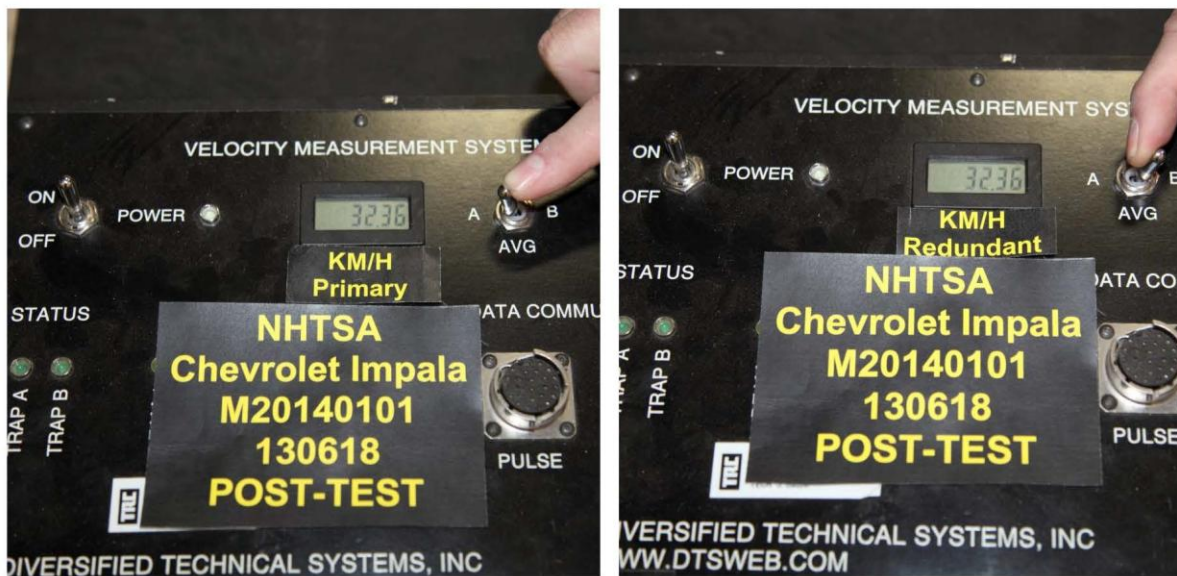
059 Pre-Test Pole Barrier Side View



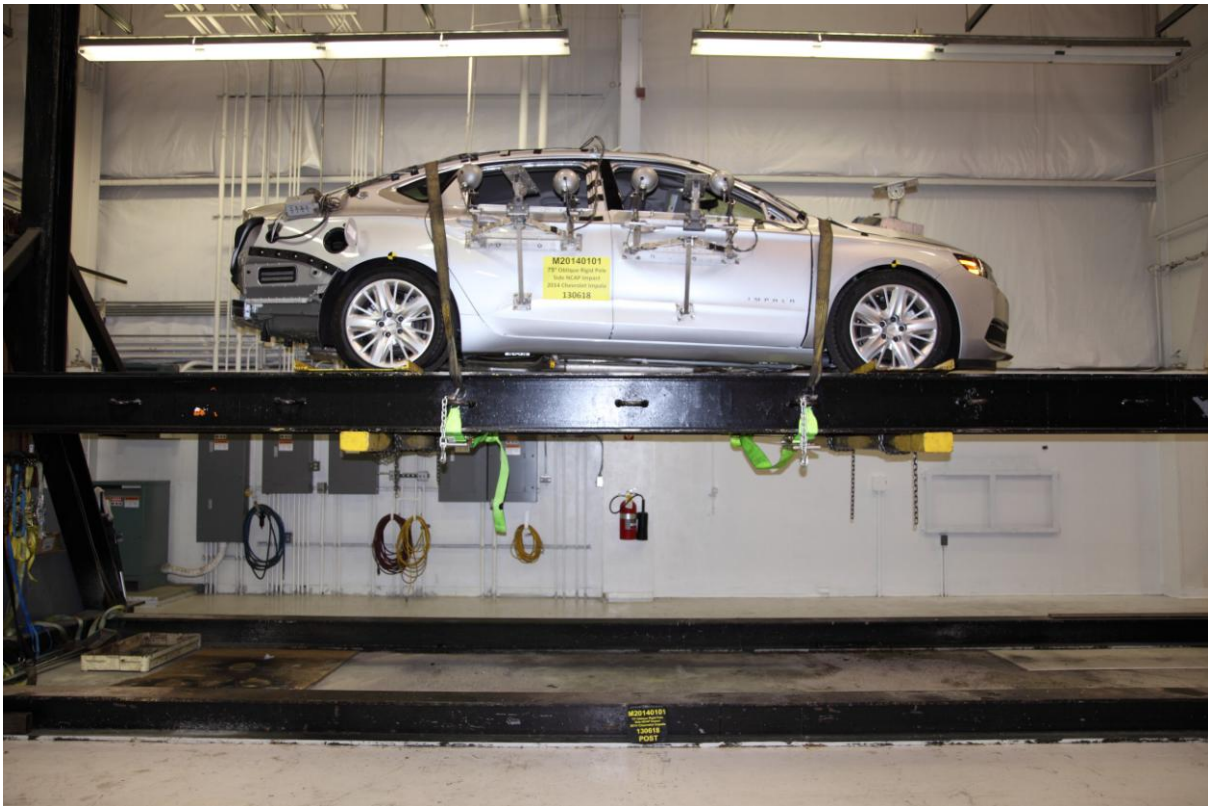
060 Post-Test Pole Barrier Side View

PHOTO NOT APPLICABLE

061 Pre-Test Ballast View



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



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-6

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)

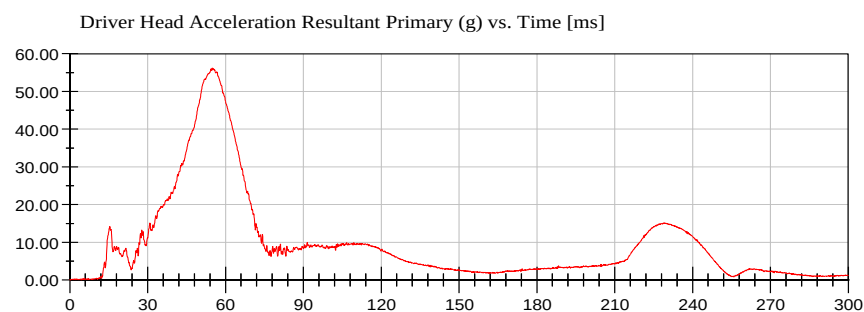
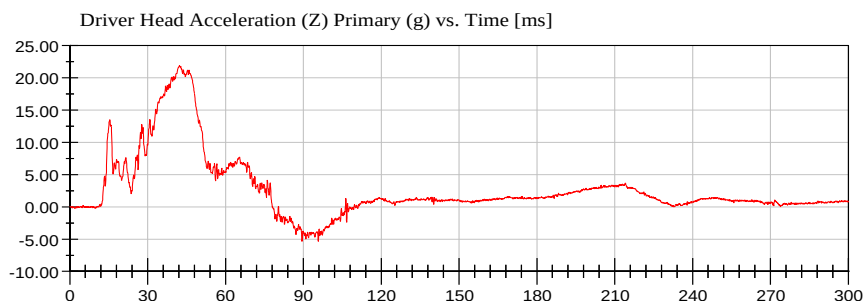
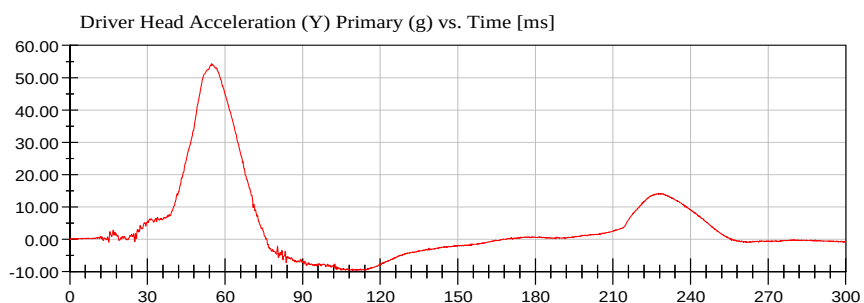
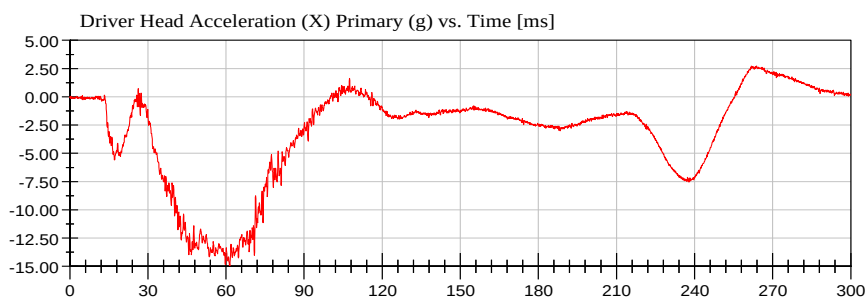
NHTSA

Test Lab: CTF

Test Number: 130618 (M20140101)

Position #1 SID II's Dummy (DI8818)

Test Date: 06/19/2013



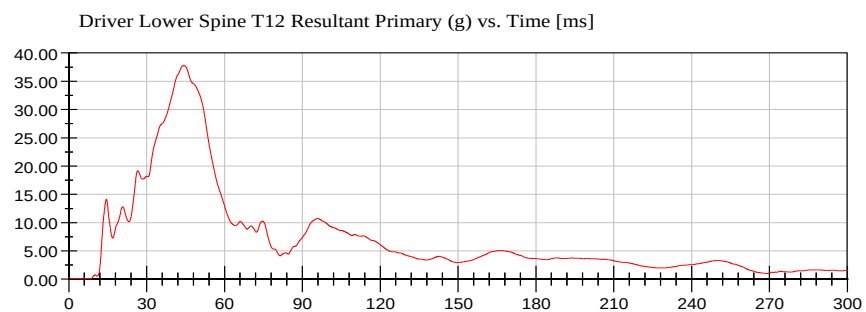
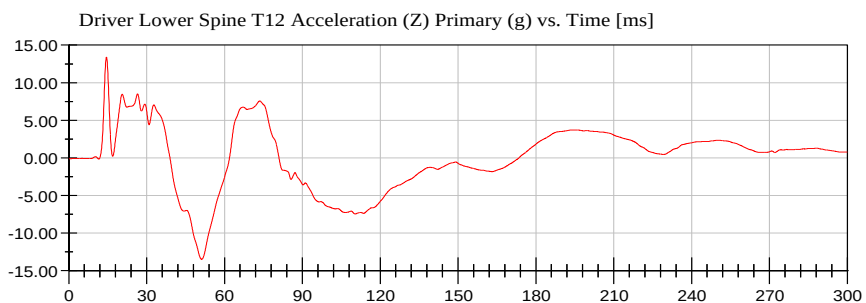
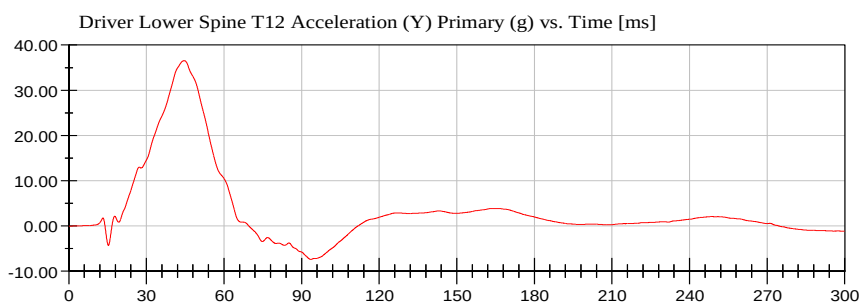
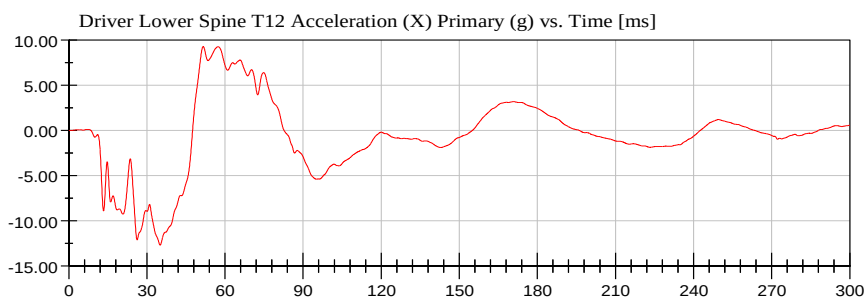
NHTSA

Test Lab: CTF

Test Number: 130618 (M20140101)

Position #1 SID II's Dummy (DI8818)

Test Date: 06/19/2013



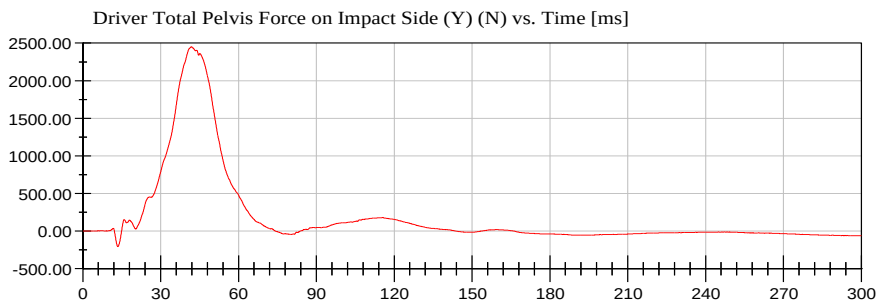
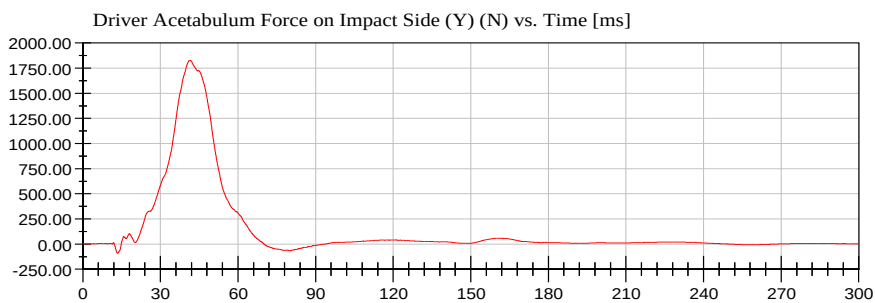
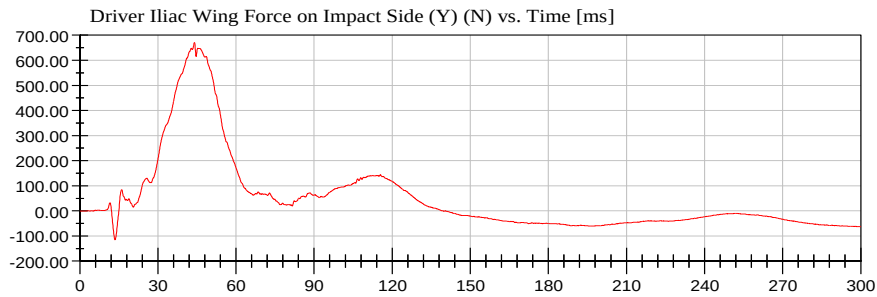
NHTSA

Test Lab: CTF

Test Number: 130618 (M20140101)

Position #1 SID II's Dummy (DI8818)

Test Date: 06/19/2013



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 DI8818

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

**SID-IIs Dummy
Serial No. DI8818
Calibration No. 02**

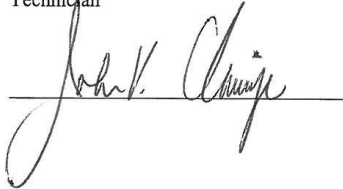


**Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367**

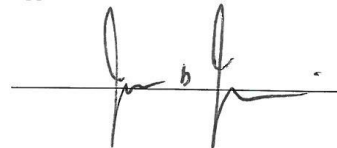
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DI8818 Calibration No.02

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	440	Yes
C	H-Point Height	79.0 - 89.0	82	Yes
D	H-Point from Seat Back	141.0 - 151.0	142	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	129	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	543	Yes
K	Buttock to Knee Length	514.0 - 540.0	537	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	255	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	771	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 2-1

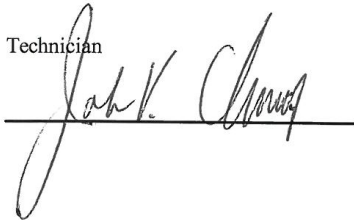
Test Date: 6/7/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	130.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	4.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal within 15% of Peak?	Yes	Yes	Yes

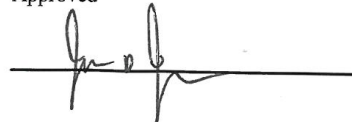
Test meets specifications.

Comments:

Technician



Approved



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

06.07.2013 13:09:43 234

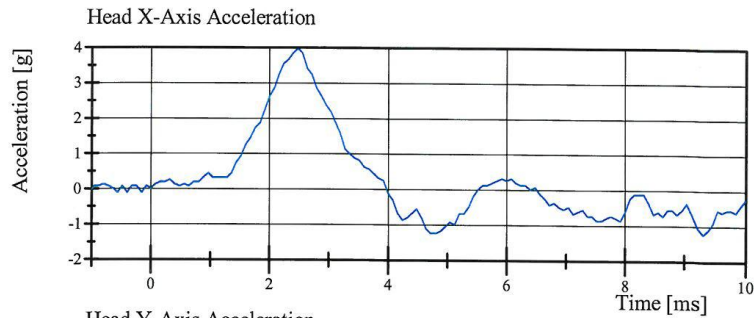


Transportation Research Center Inc.

Left Lateral Head Drop

SID II_s Serial No. DI8818 Certification No. 2-1

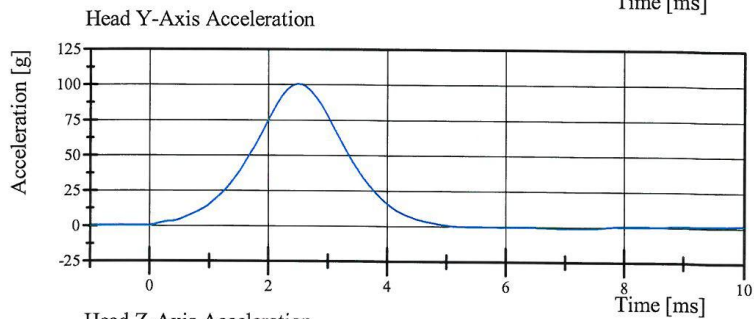
Test Date: 6/7/2013



Filter Class: CFC_1000

Max: 4.0 g at 2.5 ms

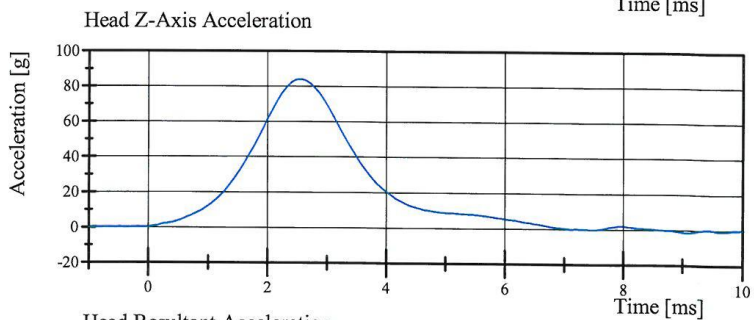
Min: -1.2 g at 4.7 ms



Filter Class: CFC_1000

Max: 100.3 g at 2.5 ms

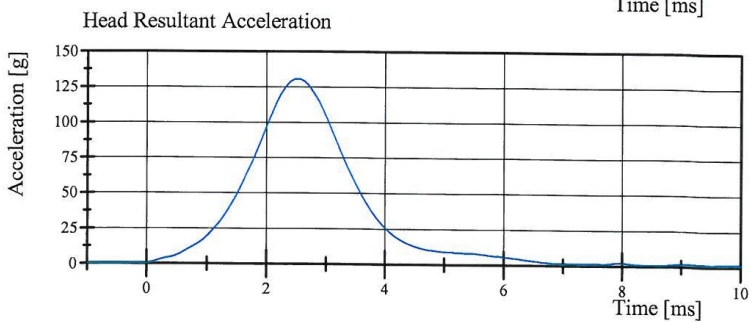
Min: -1.1 g at 6.9 ms



Filter Class: CFC_1000

Max: 84.0 g at 2.6 ms

Min: -1.5 g at 9.1 ms



Filter Class: CFC_1000

Max: 130.6 g at 2.6 ms

Min: 0.1 g at -0.1 ms

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

06.07.2013 13:09:50 234



Transportation Research Center Inc.

Left Lateral Neck

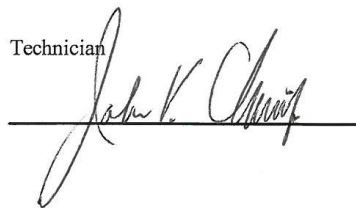
SID IIs Serial No. DI8818 Certification No. 2-1

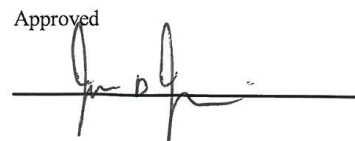
Test Date: 6/11/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.580 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.518 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.723 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.904 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.744 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.767 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-73.0 deg	Yes
Time of Peak	50 - 70 ms	61.6 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	43.0 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	111.4 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.

06.11.2013 13:18:33 637

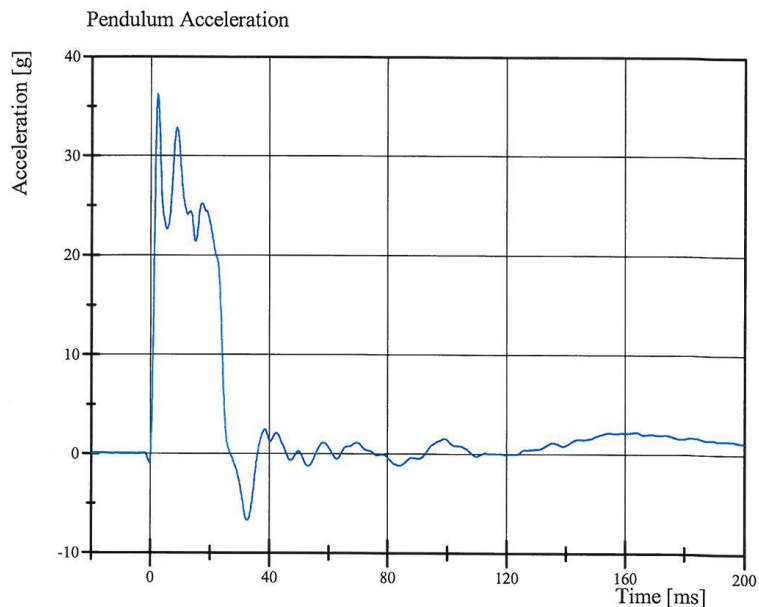


Transportation Research Center Inc.

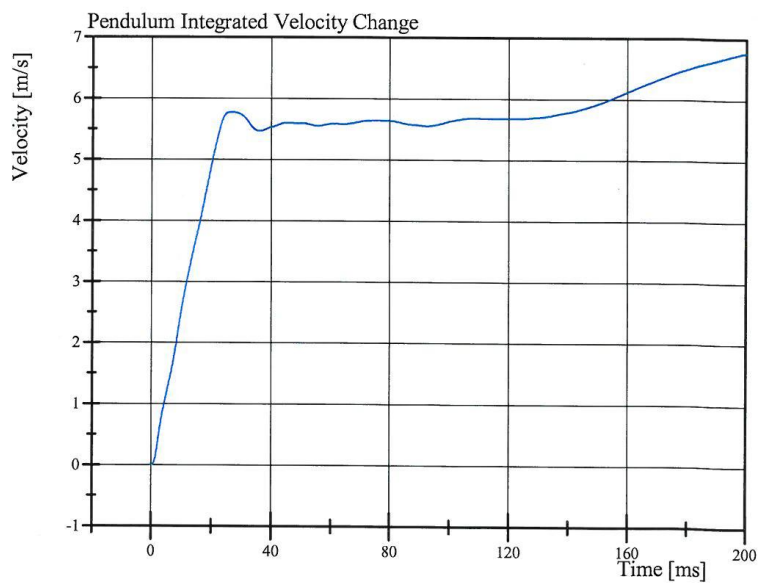
Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 2-1

Test Date: 6/11/2013



Filter Class: CFC_180
Max: 36.2 g at 2.3 ms
Min: -6.7 g at 32.6 ms



Filter Class: CFC_180
Max: 6.8 m/s at 200.0 ms
Min: -0.0 m/s at 0.1 ms

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

06.11.2013 13:18:49 637

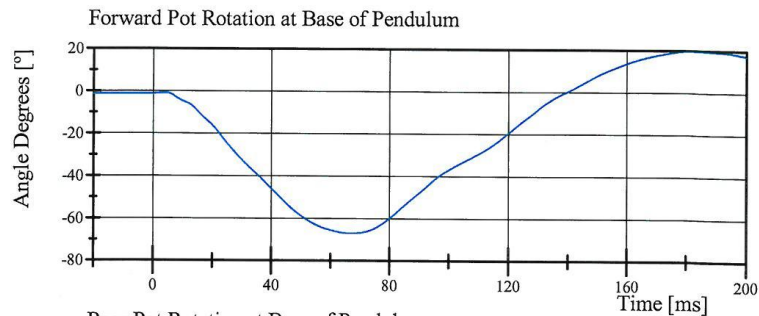


Transportation Research Center Inc.

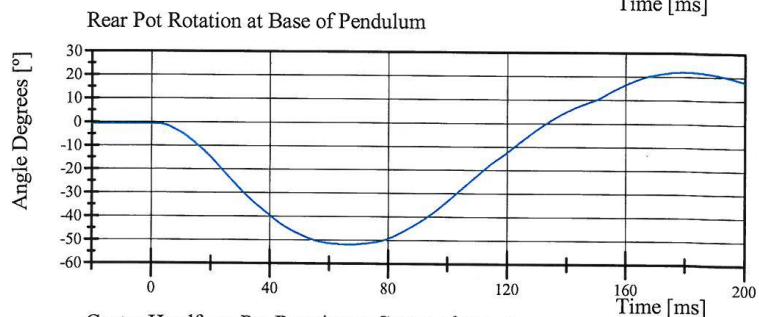
Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 2-1

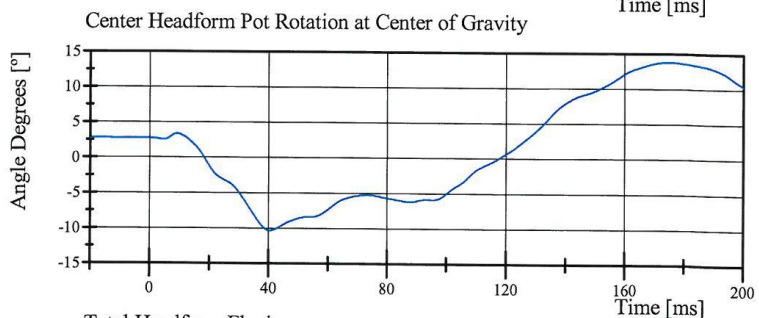
Test Date: 6/11/2013



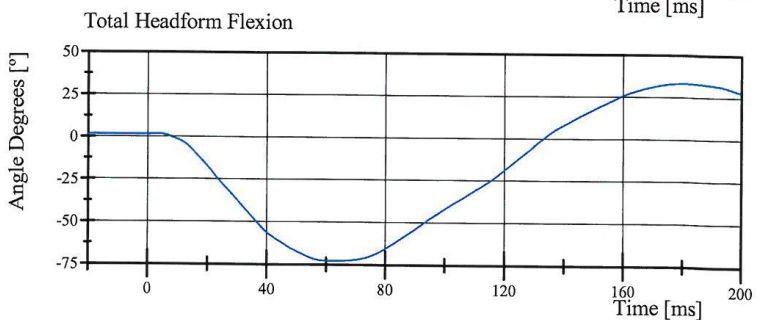
Filter Class: CFC_60
Max: 19.7 ° at 181.7 ms
Min: -67.1 ° at 67.0 ms



Filter Class: CFC_60
Max: 22.0 ° at 180.7 ms
Min: -52.0 ° at 65.8 ms



Filter Class: CFC_60
Max: 13.8 ° at 175.0 ms
Min: -10.3 ° at 40.5 ms



Filter Class: CFC_60
Max: 33.3 ° at 180.5 ms
Min: -73.0 ° at 61.6 ms

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

06.11.2013 13:18:50 637

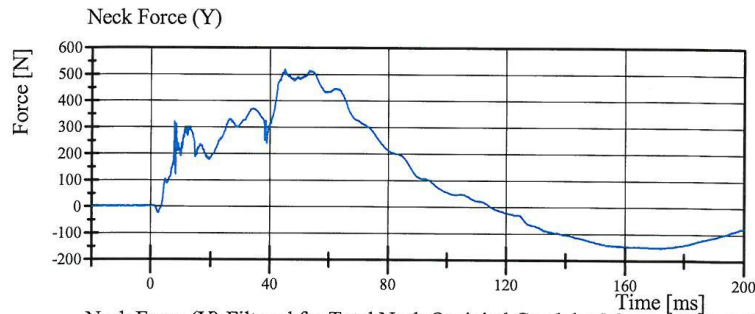


Transportation Research Center Inc.

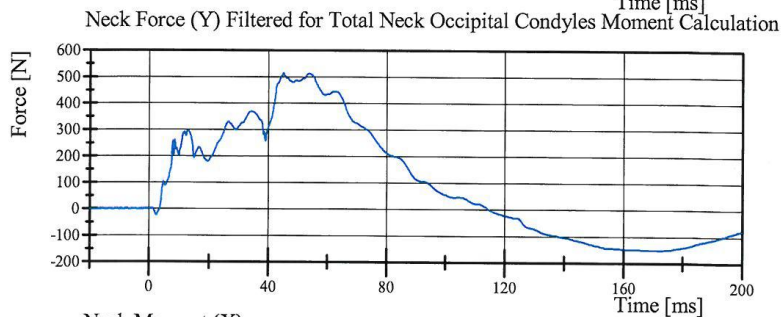
Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 2-1

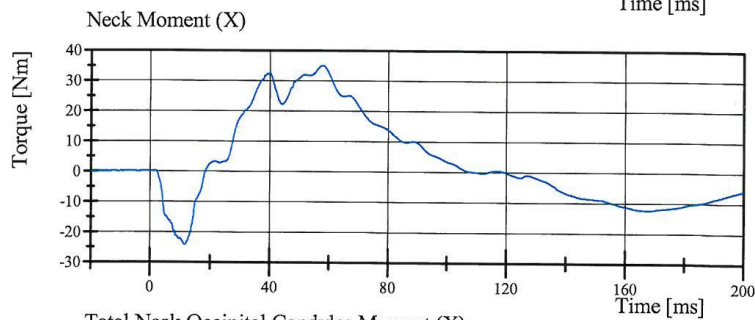
Test Date: 6/11/2013



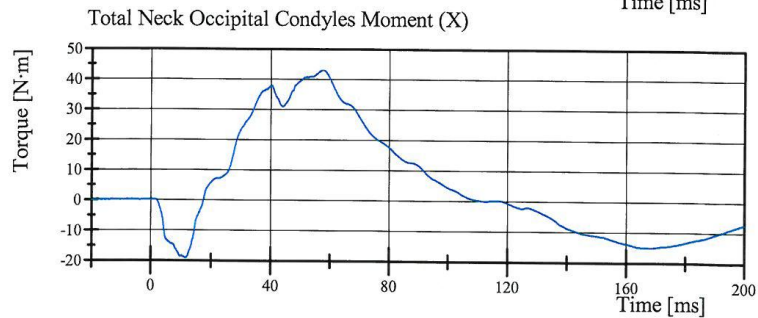
Filter Class: CFC_1000
Max: 515.8 N at 45.0 ms
Min: -153.0 N at 172.0 ms



Filter Class: CFC_600
Max: 513.6 N at 45.0 ms
Min: -152.6 N at 172.0 ms



Filter Class: CFC_600
Max: 35.1 Nm at 57.9 ms
Min: -24.3 Nm at 11.8 ms



Filter Class: Without_(Consta
Max: 43.0 N·m at 57.7 ms
Min: -19.1 N·m at 11.7 ms

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

06.11.2013 13:18:51 637



Transportation Research Center Inc.

Left Lateral Shoulder

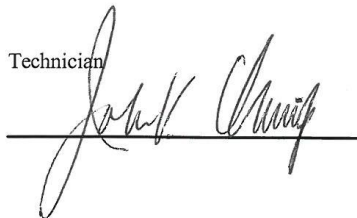
SID IIs Serial No. DI8818 Certification No. 2-1

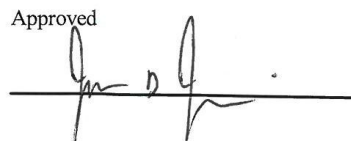
Test Date: 6/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-14.5 g	Yes
Shoulder Displacement	28 - 37 mm	31.9 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	19.0 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.

06.14.2013 08:04:23 813

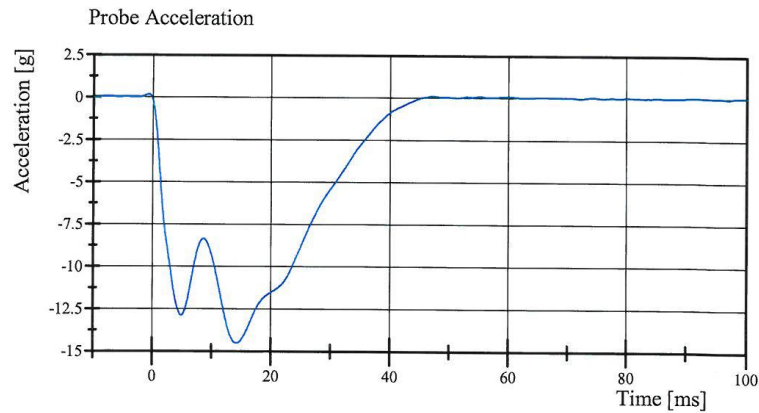


Transportation Research Center Inc.

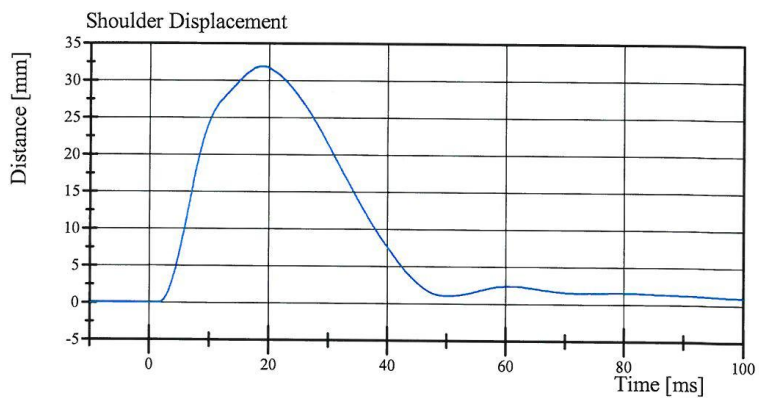
Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 2-1

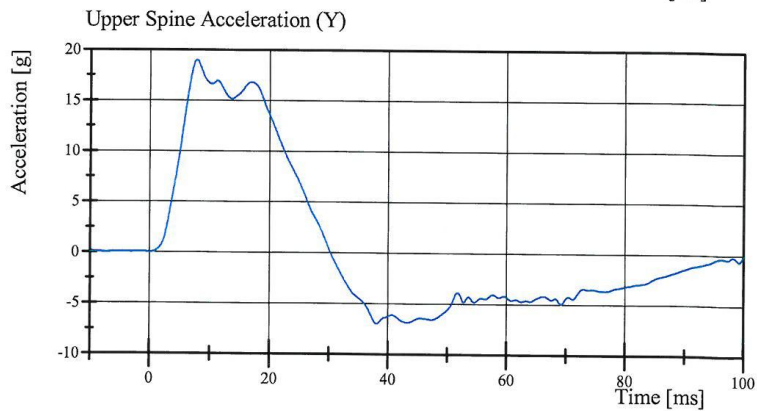
Test Date: 6/14/2013



Filter Class: CFC_180
Max: 0.1 g at -0.7 ms
Min: -14.5 g at 14.2 ms



Filter Class: CFC_600
Max: 31.9 mm at 18.9 ms
Min: -0.0 mm at 1.5 ms



Filter Class: CFC_180
Max: 19.0 g at 7.8 ms
Min: -7.0 g at 38.1 ms

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

06.14.2013 08:04:33 813



Transportation Research Center Inc.

Left Lateral Thorax with Arm

SID IIs Serial No. DI8818 Certification No. 2-3

Test Date: 6/18/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.751 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.9 g	Yes
Shoulder Displacement	31 - 40 mm	37.6 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	28.7 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	31.6 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.3 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.6 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.5 g	Yes

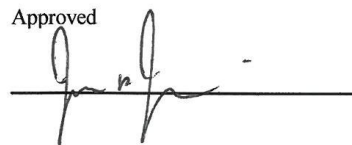
Test meets specifications.

Comments:

Technician



Approved



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

06.18.2013 08:10:55 621

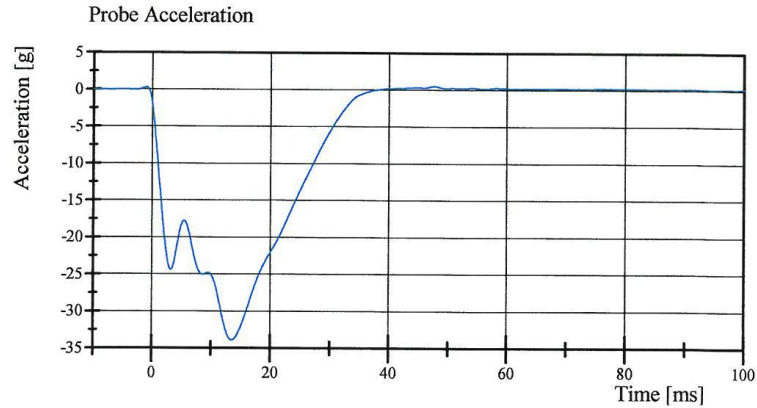


Transportation Research Center Inc.

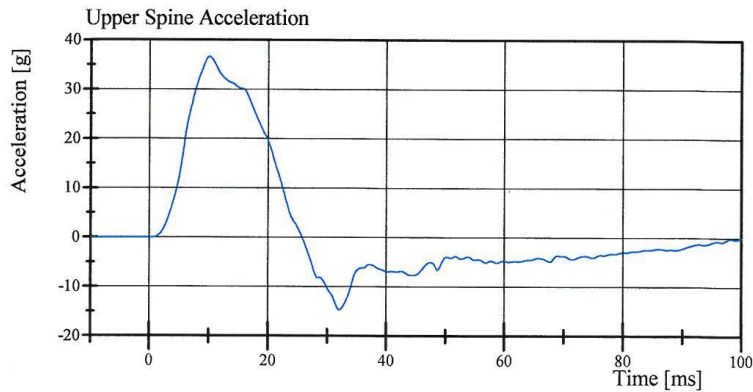
Left Lateral Thorax with Arm

SID IIs Serial No. DI8818 Certification No. 2-3

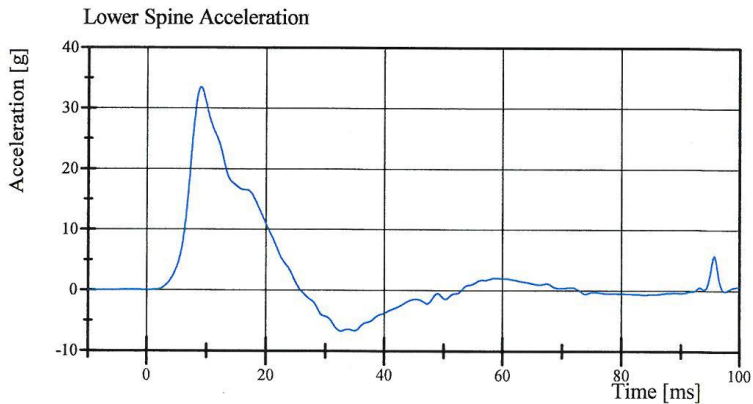
Test Date: 6/18/2013



Filter Class: CFC_180
Max: 0.5 g at 47.6 ms
Min: -33.9 g at 13.5 ms



Filter Class: CFC_180
Max: 36.6 g at 10.1 ms
Min: -14.7 g at 32.1 ms



Filter Class: CFC_180
Max: 33.5 g at 9.0 ms
Min: -6.7 g at 32.6 ms

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

06.18.2013 08:11:04 621

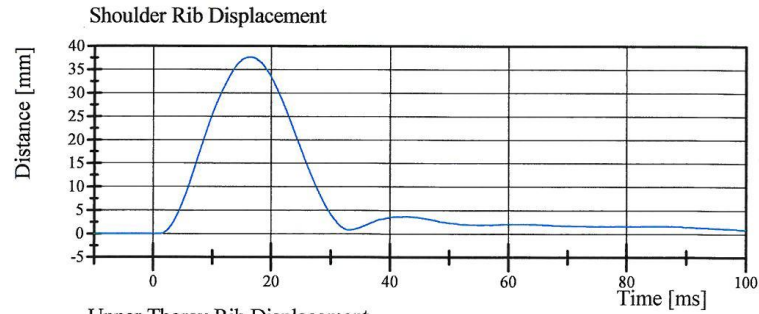


Transportation Research Center Inc.

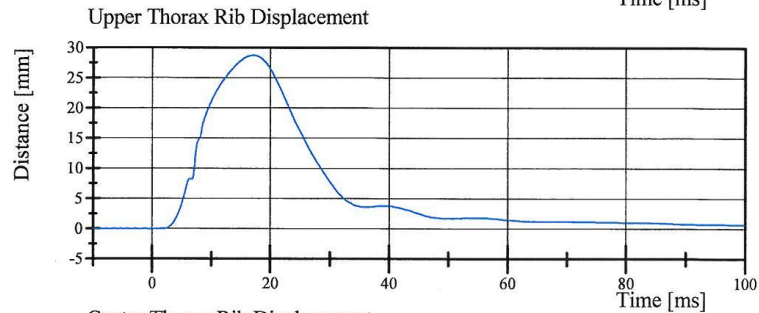
Left Lateral Thorax with Arm

SID II_s Serial No. DI8818 Certification No. 2-3

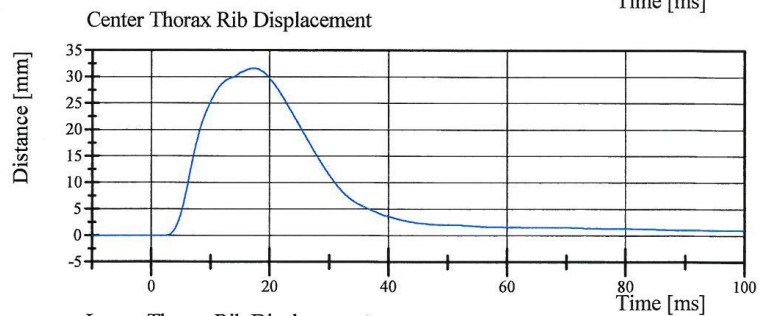
Test Date: 6/18/2013



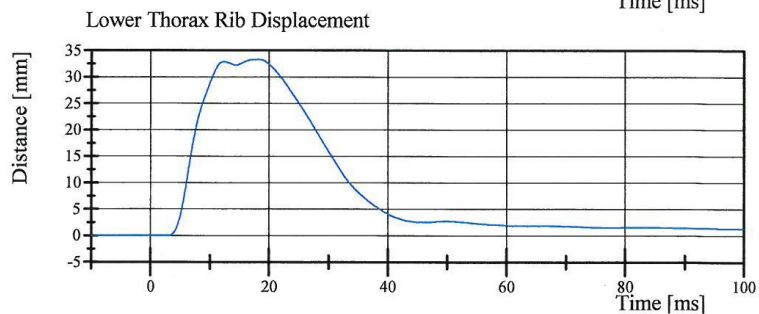
Filter Class: CFC_600
Max: 37.6 mm at 16.4 ms
Min: -0.0 mm at 1.2 ms



Filter Class: CFC_600
Max: 28.7 mm at 17.1 ms
Min: -0.0 mm at -2.0 ms



Filter Class: CFC_600
Max: 31.6 mm at 17.3 ms
Min: -0.0 mm at 2.2 ms



Filter Class: CFC_600
Max: 33.3 mm at 18.2 ms
Min: -0.0 mm at 1.6 ms

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

06.18.2013 08:11:05 621



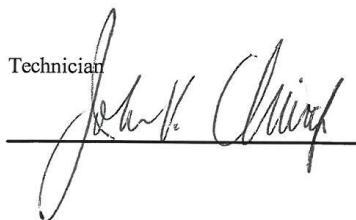
Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DI8818 Certification No. 2-1
Test Date: 6/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.250 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.1 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	38.7 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	41.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	36.7 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	14.0 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.9 g	Yes

Test meets specifications.

Comments:

Technician 

Approved 

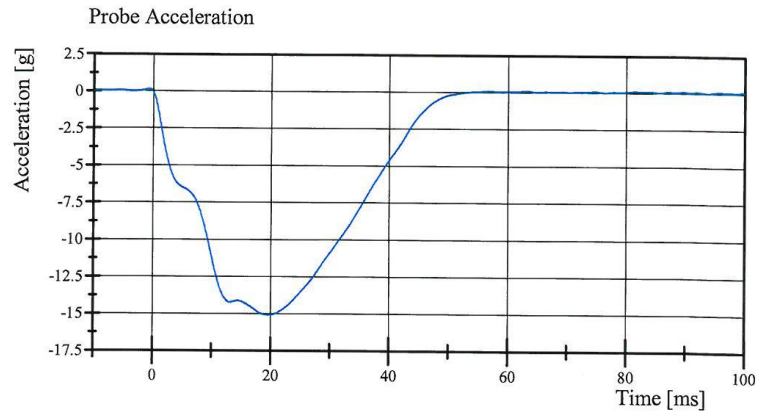
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.14.2013 12:20:13 839

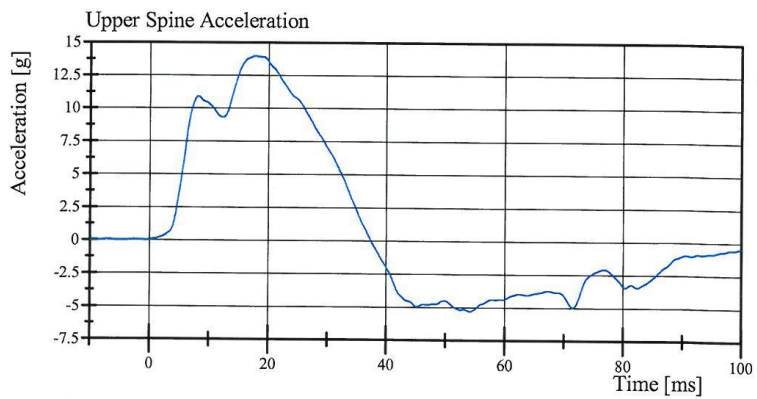


Transportation Research Center Inc.

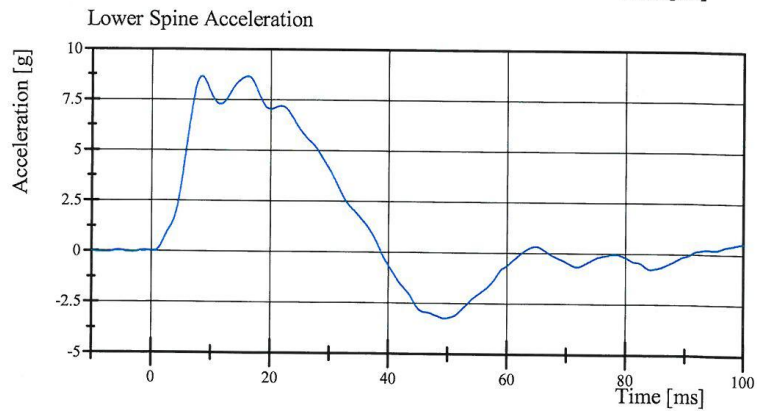
Left Lateral Thorax without Arm
SID IIa Serial No. DI8818 Certification No. 2-1
Test Date: 6/14/2013



Filter Class: CFC_180
Max: 0.1 g at -0.6 ms
Min: -15.1 g at 19.7 ms



Filter Class: CFC_180
Max: 14.0 g at 17.8 ms
Min: -5.3 g at 54.2 ms



Filter Class: CFC_180
Max: 8.6 g at 16.2 ms
Min: -3.3 g at 49.4 ms

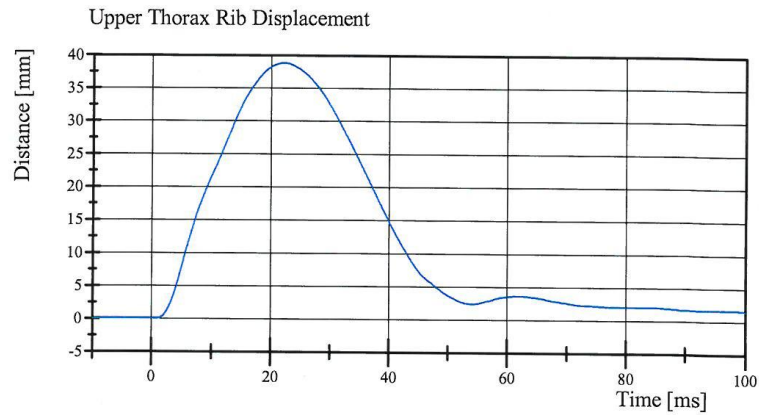
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.14.2013 12:20:31 839

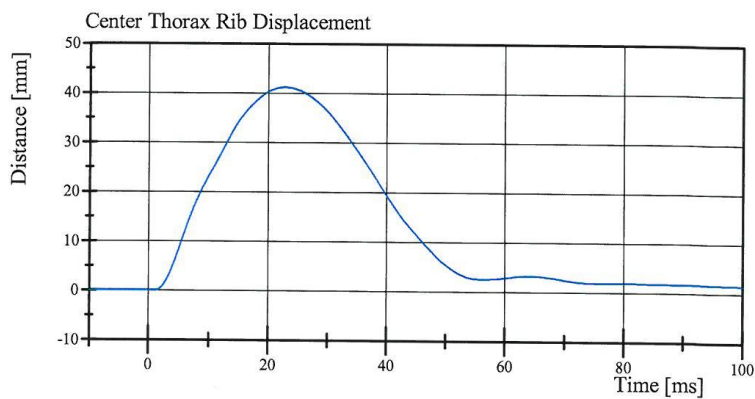


Transportation Research Center Inc.

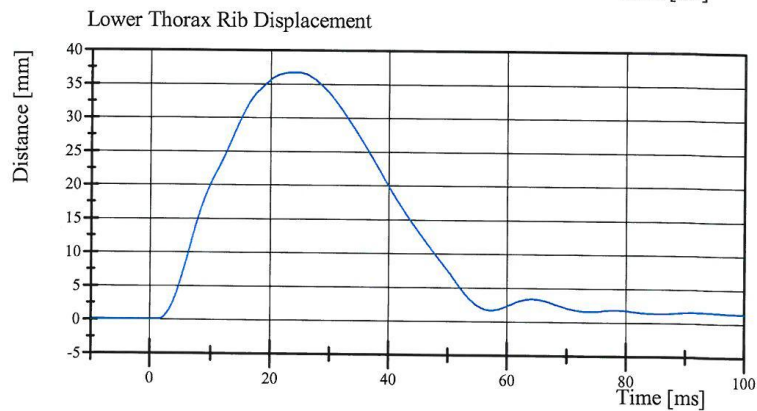
Left Lateral Thorax without Arm
SID IIs Serial No. DI8818 Certification No. 2-1
Test Date: 6/14/2013



Filter Class: CFC_600
Max: 38.7 mm at 21.9 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 41.1 mm at 22.7 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 36.7 mm at 24.0 ms
Min: -0.0 mm at 0.9 ms

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

06.14.2013 12:20:32 839



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. DI8818 Certification No. 2-2

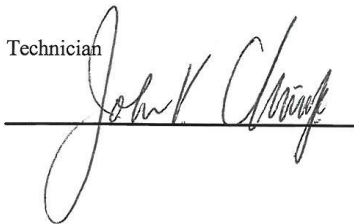
Test Date: 6/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.27 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-14.0 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	40.0 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	39.0 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.83 g	Yes

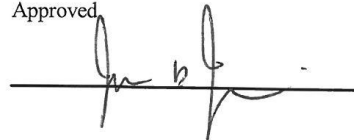
Test meets specifications.

Comments:

Technician



Approved



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

06.14.2013 13:52:56 651

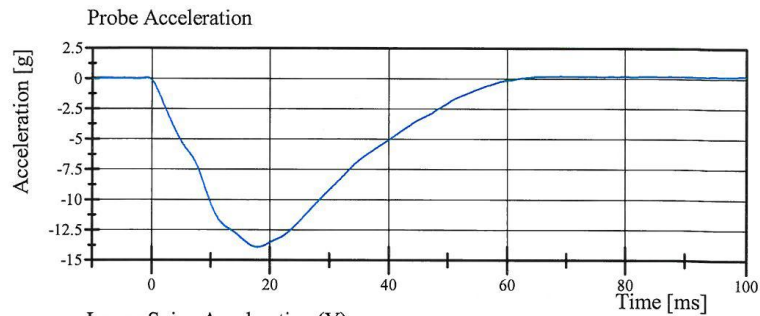


Transportation Research Center Inc.

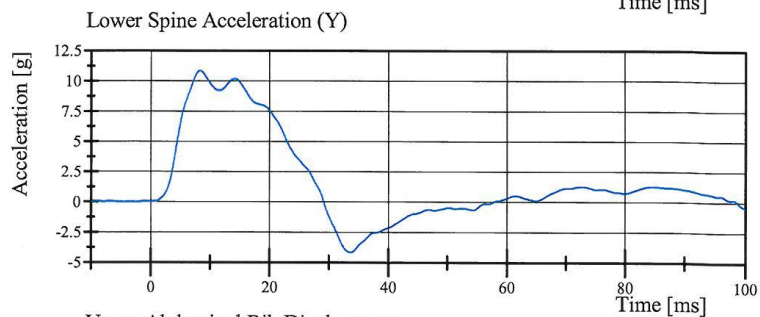
Left Lateral Abdomen

SID IIs Serial No. DI8818 Certification No. 2-2

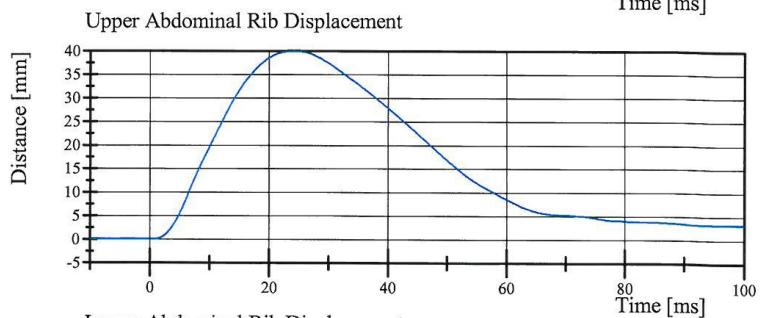
Test Date: 6/14/2013



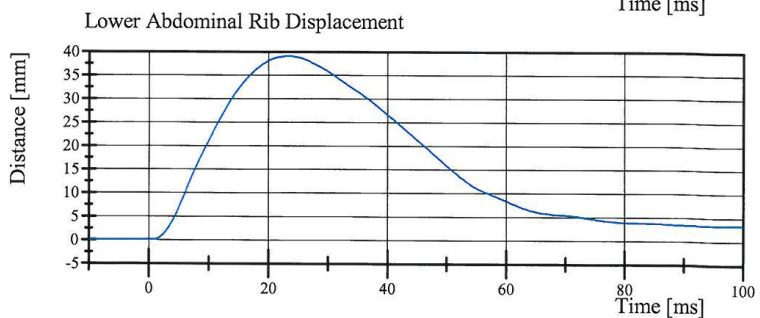
Filter Class: CFC_180
Max: 0.2 g at 84.3 ms
Min: -14.0 g at 17.8 ms



Filter Class: CFC_180
Max: 10.8 g at 8.2 ms
Min: -4.2 g at 33.6 ms



Filter Class: CFC_600
Max: 40.0 mm at 24.0 ms
Min: -0.0 mm at 1.0 ms



Filter Class: CFC_600
Max: 39.0 mm at 23.7 ms
Min: -0.0 mm at 0.9 ms

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

06.14.2013 13:53:05 651



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 2-4

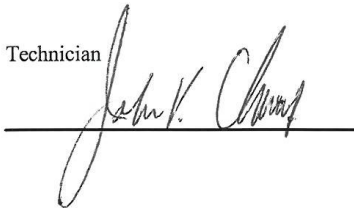
Test Date: 6/17/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.78 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-44.66 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	39.4 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,768.9 N	Yes

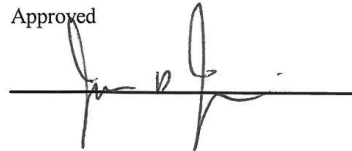
Test meets specifications.

Comments:

Technician



Approved



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

06.17.2013 10:18:16 438

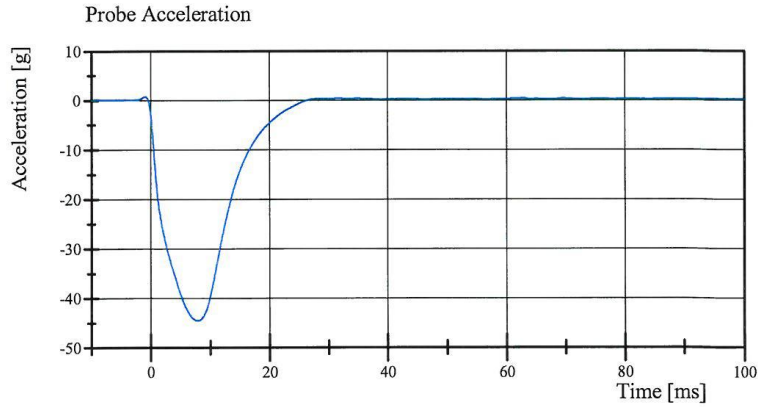


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 2-4

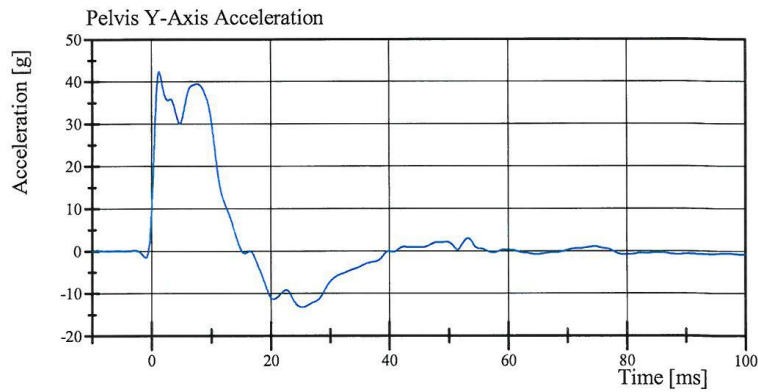
Test Date: 6/17/2013



Filter Class: CFC_180

Max: 0.6 g at -1.0 ms

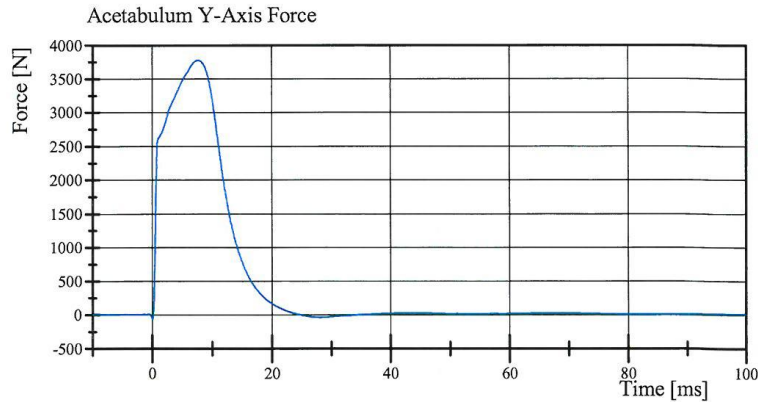
Min: -44.7 g at 7.8 ms



Filter Class: CFC_180

Max: 42.3 g at 1.3 ms

Min: -13.3 g at 25.3 ms



Filter Class: CFC_600

Max: 3,768.9 N at 7.6 ms

Min: -61.6 N at 0.1 ms

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

06.17.2013 10:20:39 438



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 2-1

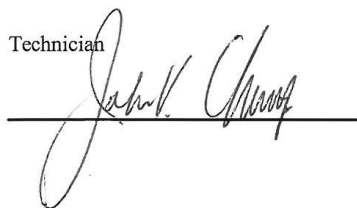
Test Date: 6/14/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-42.2 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	35.6 g	Yes
Iliac Force	4,100 - 5,100 N	4,884.9 N	Yes

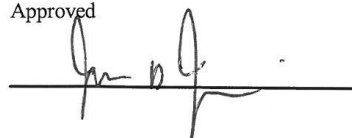
Test meets specifications.

Comments:

Technician



Approved



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

06.14.2013 11:06:25 645

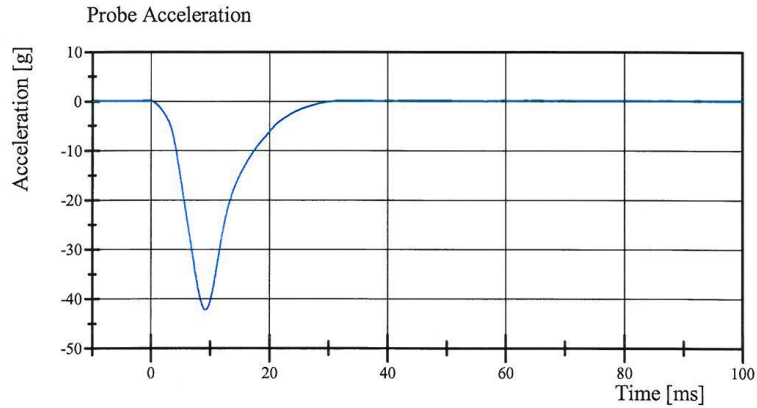


Transportation Research Center Inc.

Left Lateral Iliac

SID II_s Serial No. DI8818 Certification No. 2-1

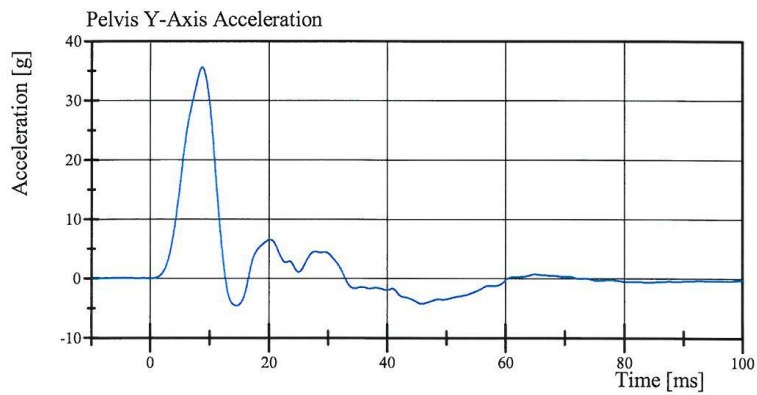
Test Date: 6/14/2013



Filter Class: CFC_180

Max: 0.1 g at 46.2 ms

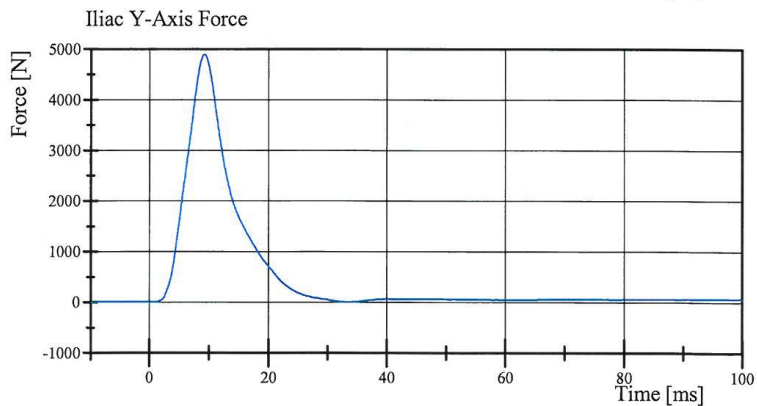
Min: -42.2 g at 9.2 ms



Filter Class: CFC_180

Max: 35.6 g at 8.7 ms

Min: -4.6 g at 14.6 ms



Filter Class: CFC_600

Max: 4,884.9 N at 9.2 ms

Min: -1.1 N at -9.7 ms

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

06.14.2013 11:06:33 645



Driver S/N D18818

Post-Test Calibration Sheets

Transportation Research Center Inc.

ATD Calibration Report

for

NHTSA

**SID-IIs Dummy
Serial No. DI8818
Calibration No. 03**

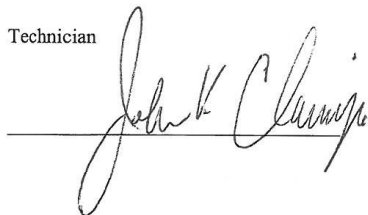


**Transportation Research Center Inc.
P.O. Box B-67
10820 St. Rt. 347
East Liberty, OH 43319-0367**

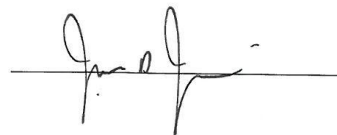
Transportation Research Center Inc.
SIDIIs Dummy - Level D
External Dimensions
Serial No. DI8818 Calibration No.03

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	772.0 - 788.0	780	Yes
B	Shoulder Pivot Height	437.0 - 453.0	441	Yes
C	H-Point Height	79.0 - 89.0	82	Yes
D	H-Point from Seat Back	141.0 - 151.0	142	Yes
E	Shoulder Pivot from Backline	97.0 - 107.0	100	Yes
F	Thigh Clearance	119.0 - 135.0	128	Yes
G	Head Breadth	140.0 - 148.0	143	Yes
H	Head Back from Backline	40.0 - 46.0	45	Yes
I	Head Depth	178.0 - 188.0	182	Yes
J	Head Circumference	541.0 - 551.0	544	Yes
K	Buttock to Knee Length	514.0 - 540.0	536	Yes
L	Popliteal Height	343.0 - 369.0	352	Yes
M	Knee Pivot to Floor Height	393.0 - 409.0	397	Yes
N	Buttock Popliteal Length	416.0 - 442.0	427	Yes
O	Chest Depth without Jacket	195.0 - 211.0	203	Yes
P	Foot Length (right)	216.0 - 232.0	220	Yes
P	Foot Length (left)	216.0 - 232.0	220	Yes
Q	Hip Breadth	313.0 - 323.0	313	Yes
R	Arm Length	249.0 - 259.0	255	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	869	Yes
Z	Waist Circumference	761.0 - 791.0	771	Yes

Technician



Approved



Revised 9/29/2005



Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 3-1

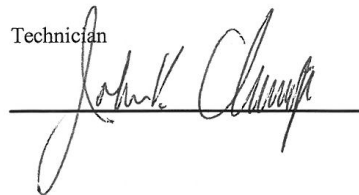
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Head Resultant Acceleration	115 - 137 g	130.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	2.7 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.

06.19.2013 09:22:40 234

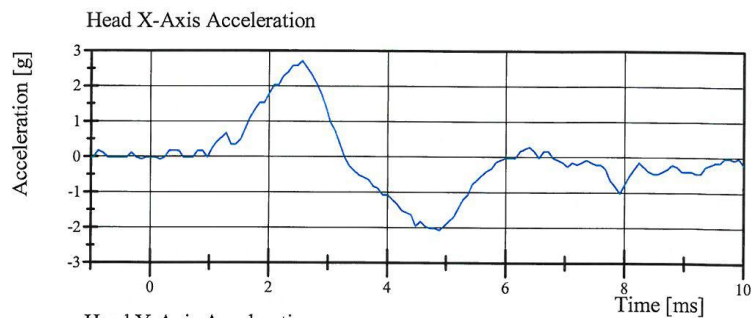


Transportation Research Center Inc.

Left Lateral Head Drop

SID IIs Serial No. DI8818 Certification No. 3-1

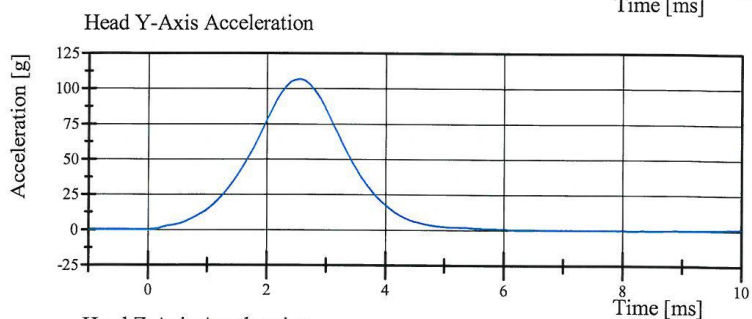
Test Date: 6/19/2013



Filter Class: CFC_1000

Max: 2.7 g at 2.6 ms

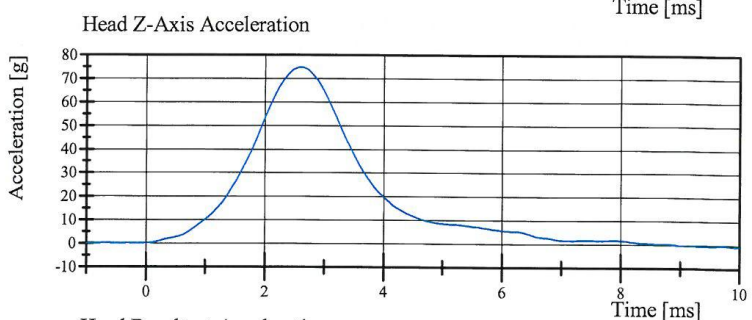
Min: -2.1 g at 4.9 ms



Filter Class: CFC_1000

Max: 106.6 g at 2.6 ms

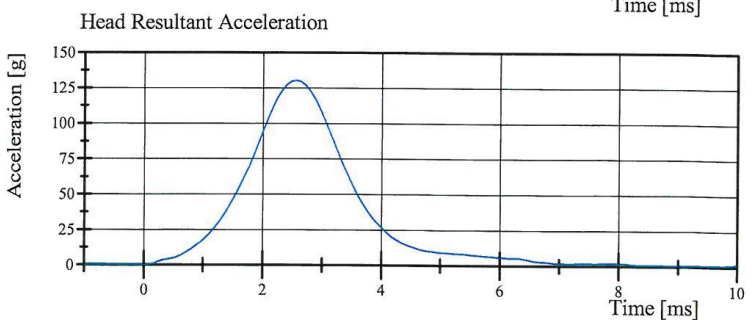
Min: -0.5 g at 8.2 ms



Filter Class: CFC_1000

Max: 74.6 g at 2.6 ms

Min: -0.8 g at 9.9 ms



Filter Class: CFC_1000

Max: 130.1 g at 2.6 ms

Min: 0.0 g at -1.0 ms

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

06.19.2013 09:22:47 234



Transportation Research Center Inc.

Left Lateral Neck

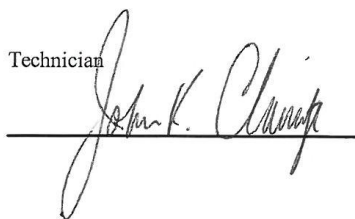
SID IIs Serial No. DI8818 Certification No. 3-1

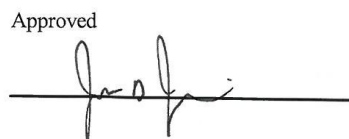
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Pendulum Velocity	(-5.51) - (-5.63) m/s	-5.585 m/s	Yes
Pendulum Integrated Velocity			
Change at 10 ms	2.20 - 2.80 m/s	2.228 m/s	Yes
Change at 15 ms	3.30 - 4.10 m/s	3.301 m/s	Yes
Change at 20 ms	4.40 - 5.40 m/s	4.496 m/s	Yes
Change at 25 ms	5.40 - 6.10 m/s	5.484 m/s	Yes
Change at 25 to 100 ms	5.50 - 6.20 m/s	5.757 m/s	Yes
Maximum Headform Flexion occurring between 50ms and 70ms.			
Peak	(-71) - (-81) deg	-72.7 deg	Yes
Time of Peak	50 - 70 ms	62.8 ms	Yes
Total Neck Occipital Condyles Moment	36 - 44 N·m	40.4 N·m	Yes
Total Neck Occipital Condyles Moment			
Decay Time to 0 N·m	102 - 126 ms	118.2 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.

06.19.2013 09:54:04 638

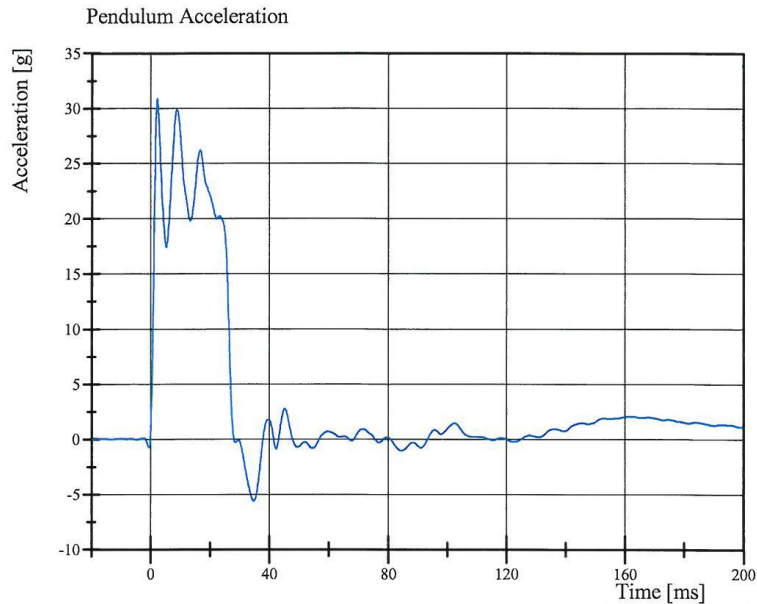


Transportation Research Center Inc.

Left Lateral Neck

SID II_s Serial No. DI8818 Certification No. 3-1

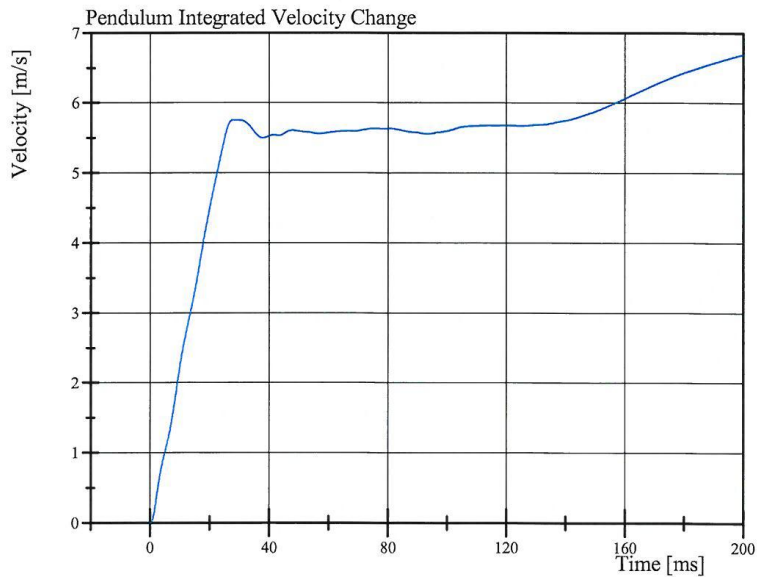
Test Date: 6/19/2013



Filter Class: CFC_180

Max: 30.8 g at 2.2 ms

Min: -5.6 g at 34.7 ms



Filter Class: CFC_180

Max: 6.7 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.

06.19.2013 09:54:10 638

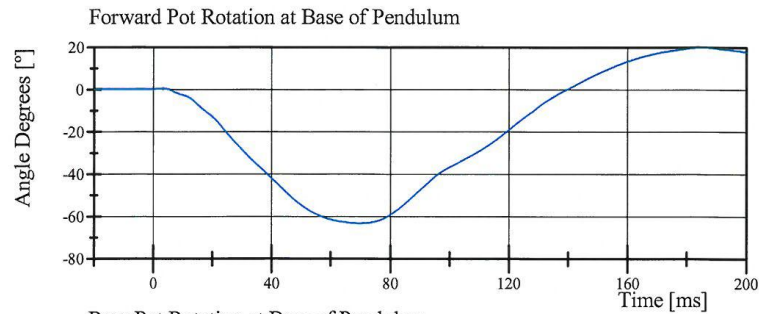


Transportation Research Center Inc.

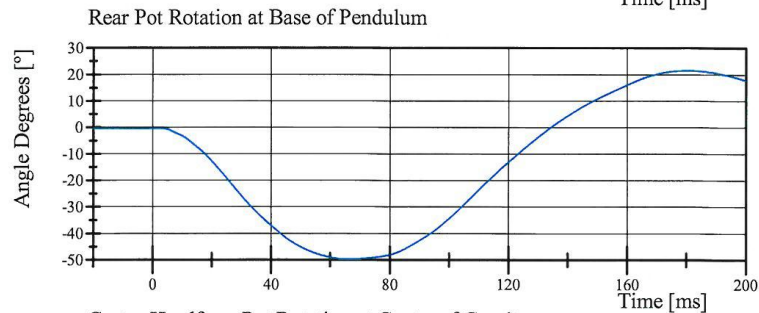
Left Lateral Neck

SID IIs Serial No. DI8818 Certification No. 3-1

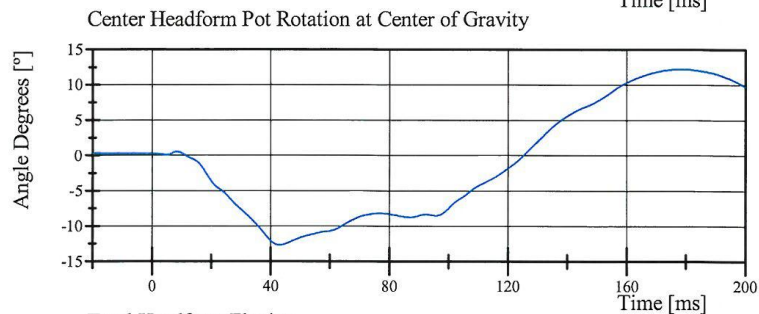
Test Date: 6/19/2013



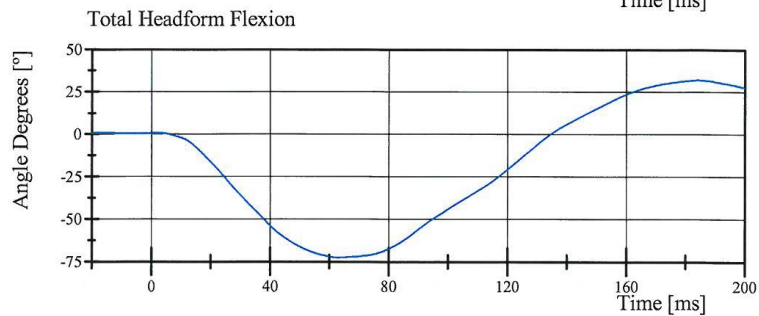
Filter Class: CFC_60
Max: 20.0 ° at 185.0 ms
Min: -63.3 ° at 69.7 ms



Filter Class: CFC_60
Max: 21.5 ° at 180.6 ms
Min: -49.8 ° at 65.8 ms



Filter Class: CFC_60
Max: 12.2 ° at 178.6 ms
Min: -12.7 ° at 43.0 ms



Filter Class: CFC_60
Max: 32.0 ° at 184.2 ms
Min: -72.7 ° at 62.8 ms

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

06.19.2013 09:54:11 638

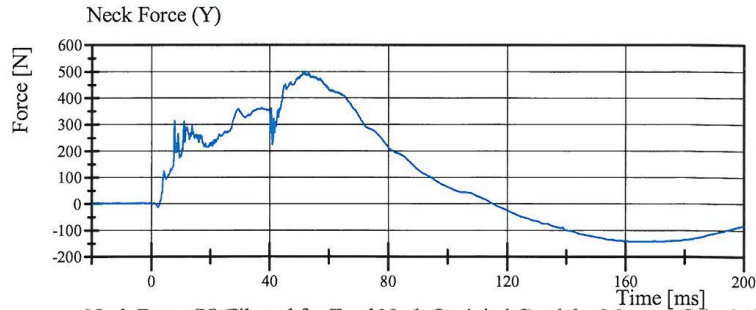


Transportation Research Center Inc.

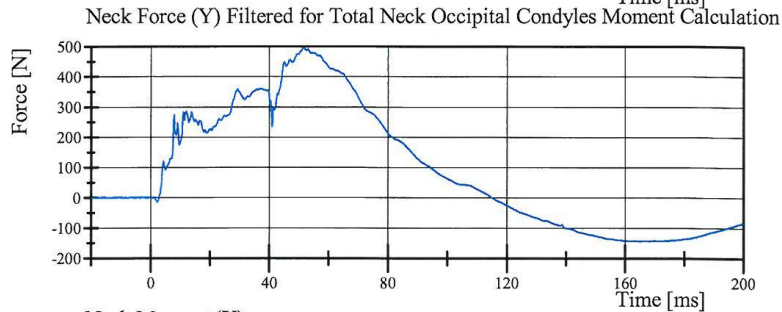
Left Lateral Neck

SID IIa Serial No. DI8818 Certification No. 3-1

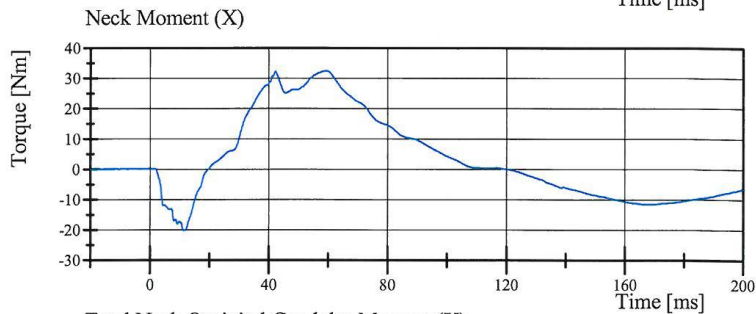
Test Date: 6/19/2013



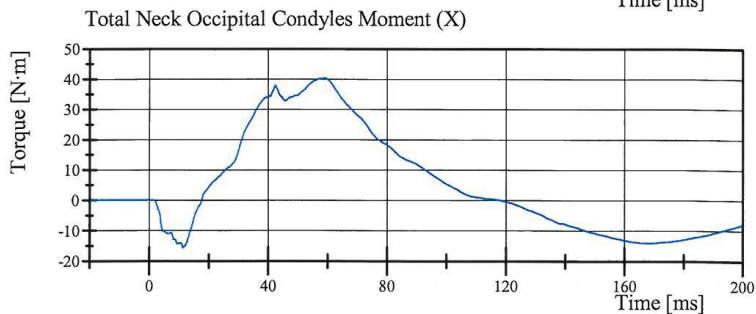
Filter Class: CFC_1000
Max: 501.2 N at 51.6 ms
Min: -143.9 N at 164.9 ms



Filter Class: CFC_600
Max: 496.2 N at 51.6 ms
Min: -143.7 N at 165.0 ms



Filter Class: CFC_600
Max: 32.5 Nm at 59.0 ms
Min: -20.3 Nm at 11.2 ms



Filter Class: Without_(Consta
Max: 40.4 N·m at 58.9 ms
Min: -15.7 N·m at 11.3 ms

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

06.19.2013 09:54:12 638



Transportation Research Center Inc.

Left Lateral Shoulder

SID IIs Serial No. DI8818 Certification No. 3-1

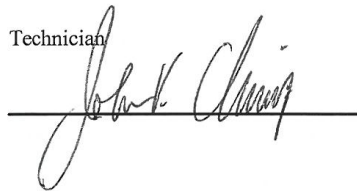
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Acceleration	(-13) - (-18) g	-14.6 g	Yes
Shoulder Displacement	28 - 37 mm	32.1 mm	Yes
Upper Spine Lateral Acceleration	17 - 22 g	18.3 g	Yes

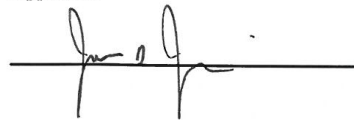
Test meets specifications.

Comments:

Technician



Approved



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

06.19.2013 12:30:25 852

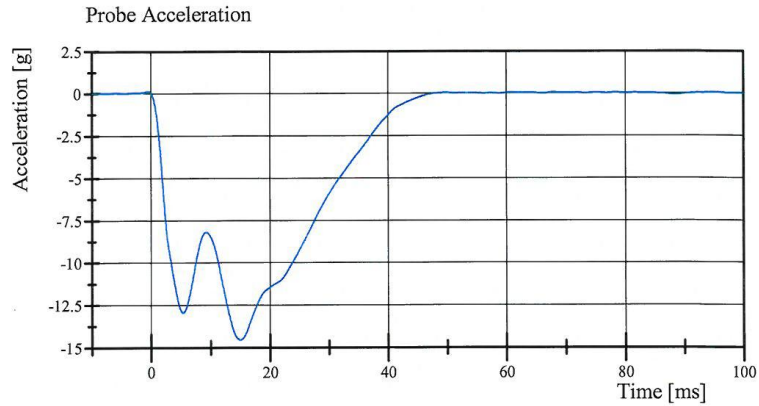


Transportation Research Center Inc.

Left Lateral Shoulder

SID IIa Serial No. DI8818 Certification No. 3-1

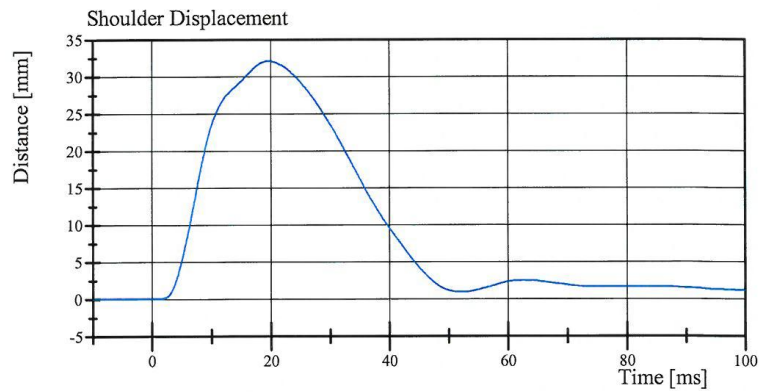
Test Date: 6/19/2013



Filter Class: CFC_180

Max: 0.1 g at -0.5 ms

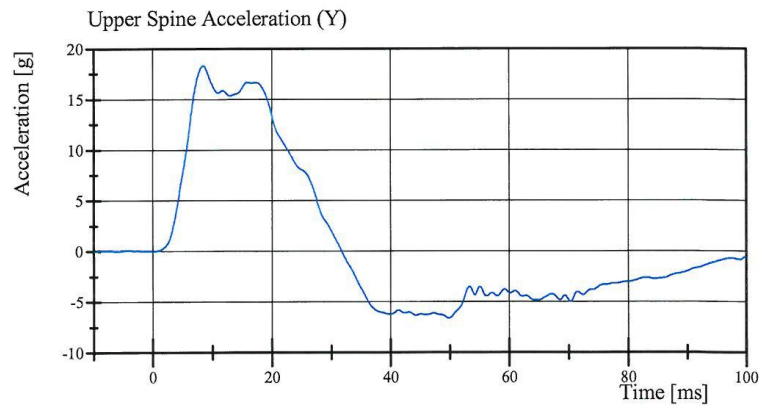
Min: -14.6 g at 15.0 ms



Filter Class: CFC_600

Max: 32.1 mm at 19.4 ms

Min: -0.0 mm at 1.4 ms



Filter Class: CFC_180

Max: 18.3 g at 8.4 ms

Min: -6.6 g at 49.8 ms

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

06.19.2013 12:30:33 852



Transportation Research Center Inc.

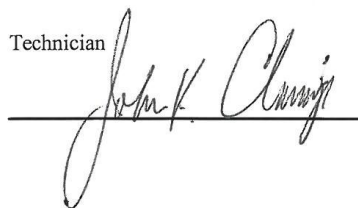
Left Lateral Thorax with Arm
SID II_s Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.738 m/s	Yes
Impactor Acceleration	(-30) - (-36) g	-33.1 g	Yes
Shoulder Displacement	31 - 40 mm	39.7 mm	Yes
Upper Thorax Rib Displacement	25 - 32 mm	30.0 mm	Yes
Center Thorax Rib Displacement	30 - 36 mm	32.2 mm	Yes
Lower Thorax Rib Displacement	32 - 38 mm	33.0 mm	Yes
Upper Spine Lateral Acceleration	34 - 43 g	36.0 g	Yes
Lower Spine Lateral Acceleration	29 - 37 g	33.8 g	Yes

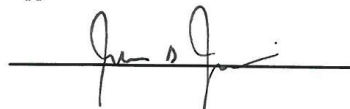
Test meets specifications.

Comments:

Technician



Approved



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

06.19.2013 13:58:37 600

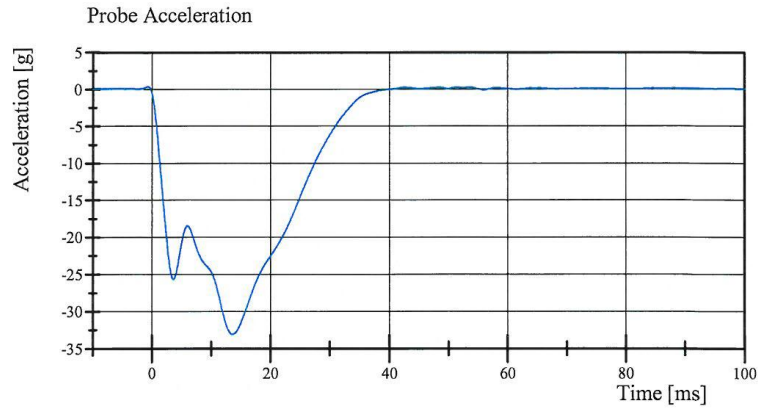


Transportation Research Center Inc.

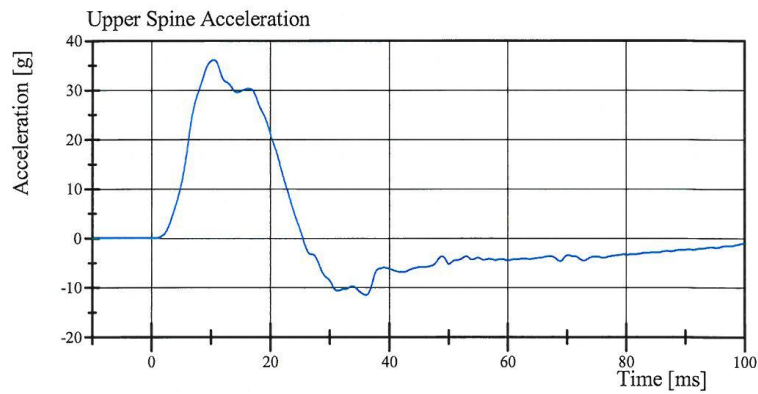
Left Lateral Thorax with Arm

SID IIs Serial No. DI8818 Certification No. 3-1

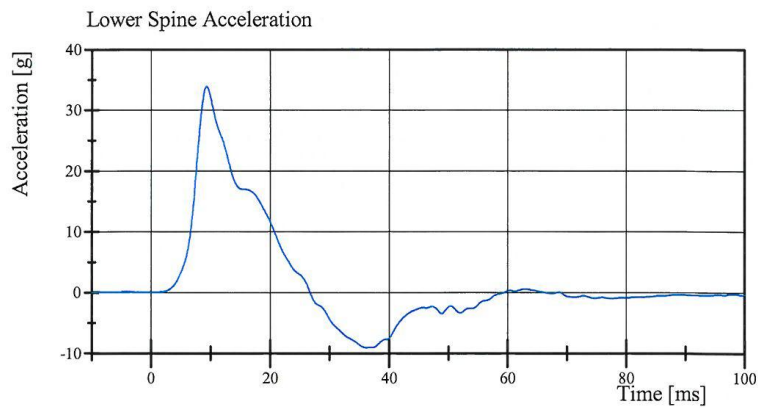
Test Date: 6/19/2013



Filter Class: CFC_180
Max: 0.3 g at -0.7 ms
Min: -33.1 g at 13.6 ms



Filter Class: CFC_180
Max: 36.0 g at 10.5 ms
Min: -11.5 g at 36.1 ms



Filter Class: CFC_180
Max: 33.8 g at 9.3 ms
Min: -9.1 g at 36.2 ms

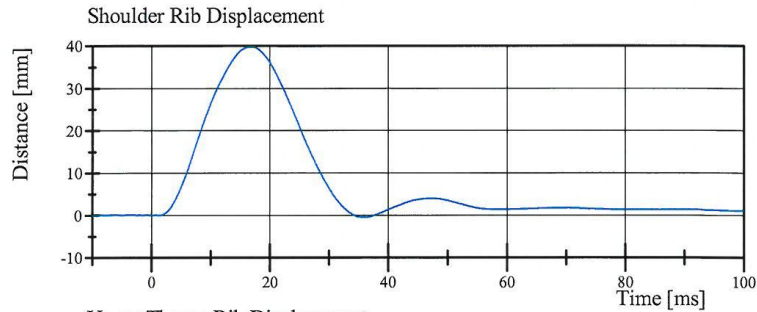
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.19.2013 13:58:46 600

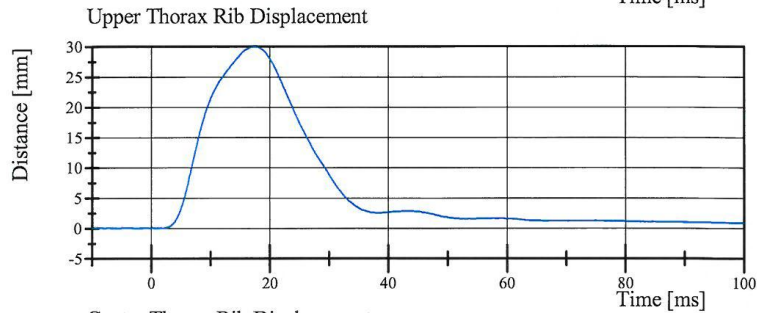


Transportation Research Center Inc.

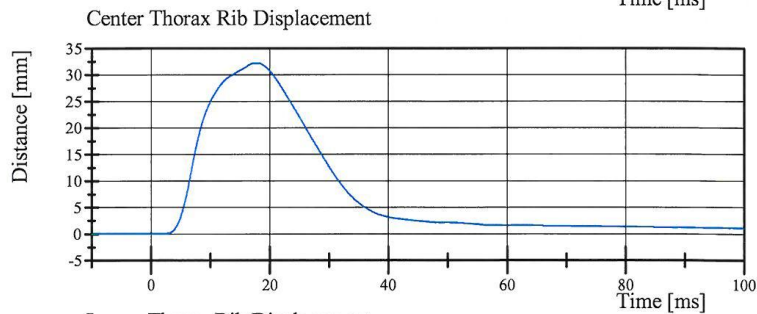
Left Lateral Thorax with Arm
SID IIs Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013



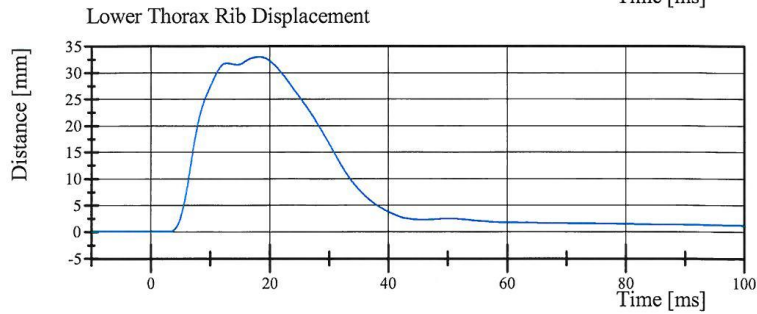
Filter Class: CFC_600
Max: 39.7 mm at 17.0 ms
Min: -0.5 mm at 35.9 ms



Filter Class: CFC_600
Max: 30.0 mm at 17.4 ms
Min: -0.0 mm at 2.0 ms



Filter Class: CFC_600
Max: 32.2 mm at 17.7 ms
Min: -0.0 mm at 1.1 ms



Filter Class: CFC_600
Max: 33.0 mm at 18.2 ms
Min: -0.0 mm at 1.4 ms

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

06.19.2013 13:58:47 600



Transportation Research Center Inc.

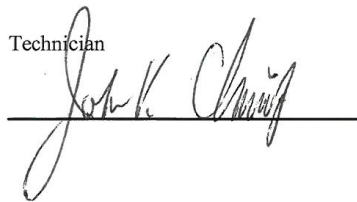
Left Lateral Thorax without Arm
SID II_s Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.235 m/s	Yes
Impactor Acceleration	(-14) - (-18) g	-15.2 g	Yes
Upper Thorax Rib Displacement	32 - 40 mm	36.9 mm	Yes
Center Thorax Rib Displacement	39 - 45 mm	42.1 mm	Yes
Lower Thorax Rib Displacement	35 - 43 mm	39.8 mm	Yes
Upper Spine Lateral Acceleration	13 - 17 g	13.4 g	Yes
Lower Spine Lateral Acceleration	7 - 11 g	9.7 g	Yes

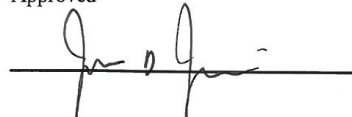
Test meets specifications.

Comments:

Technician



Approved



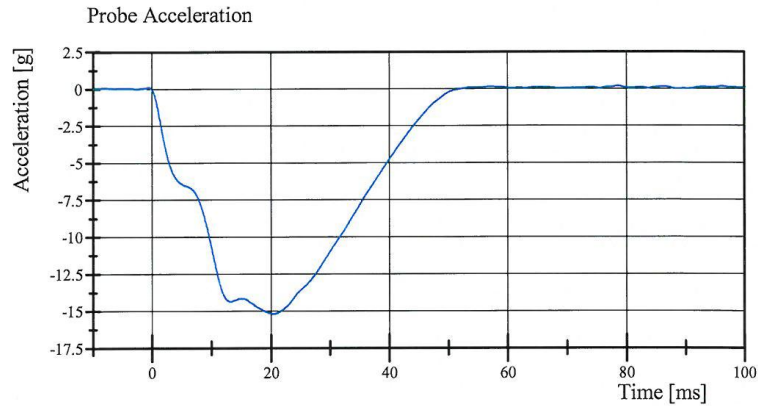
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.19.2013 12:49:33 834

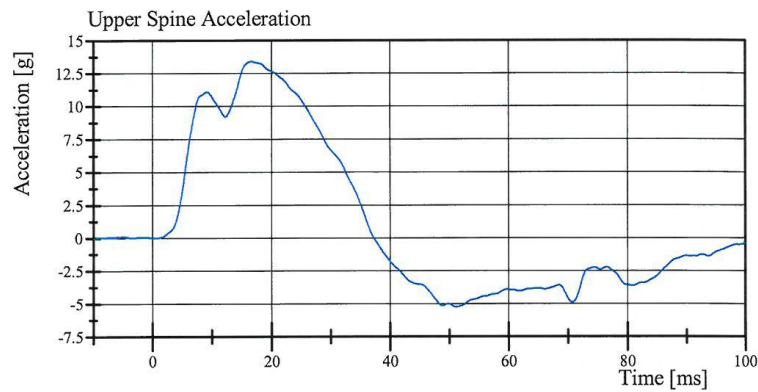


Transportation Research Center Inc.

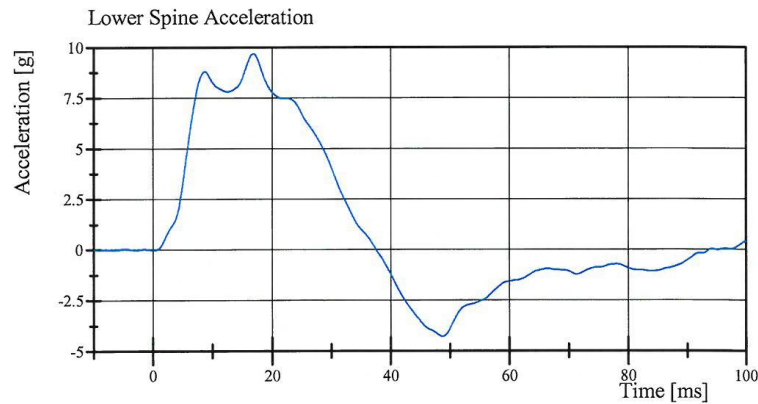
Left Lateral Thorax without Arm
SID IIa Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013



Filter Class: CFC_180
Max: 0.2 g at 78.5 ms
Min: -15.2 g at 20.4 ms



Filter Class: CFC_180
Max: 13.4 g at 16.6 ms
Min: -5.3 g at 51.1 ms



Filter Class: CFC_180
Max: 9.7 g at 16.9 ms
Min: -4.3 g at 48.7 ms

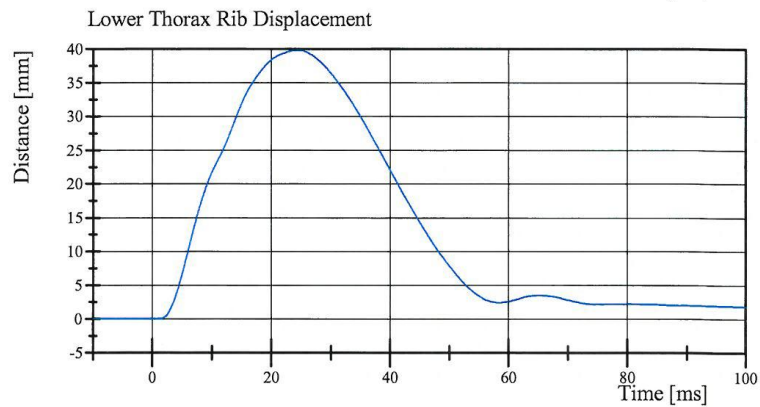
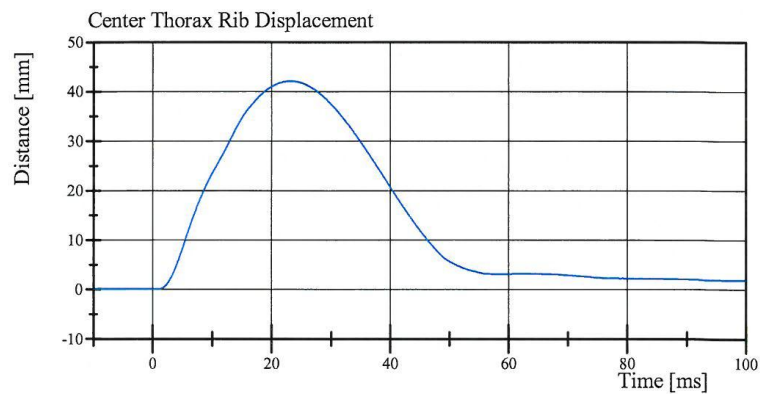
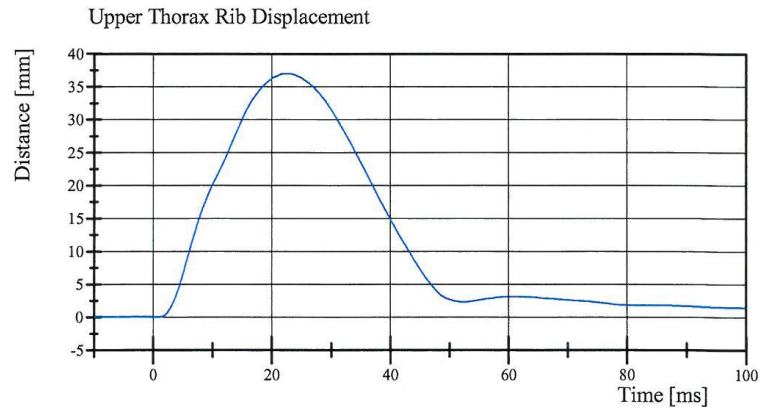
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.19.2013 12:49:41 834



Transportation Research Center Inc.

Left Lateral Thorax without Arm
SID IIs Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013



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

06.19.2013 12:49:42 834



Transportation Research Center Inc.

Left Lateral Abdomen

SID IIs Serial No. DI8818 Certification No. 3-3

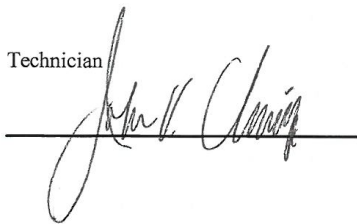
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.24 m/s	Yes
Impactor Acceleration	(-12) - (-16) g	-13.9 g	Yes
Upper Abdominal Rib Displacement	36 - 47 mm	39.8 mm	Yes
Lower Abdominal Rib Displacement	33 - 44 mm	37.6 mm	Yes
Lower Spine Lateral Acceleration	9 - 14.0 g	10.83 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.

06.19.2013 15:04:11 689

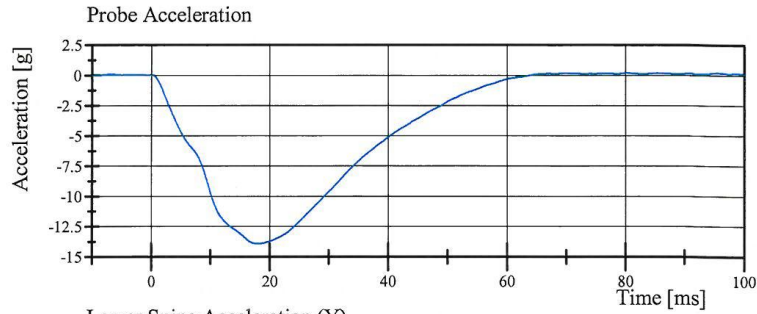


Transportation Research Center Inc.

Left Lateral Abdomen

SID II_s Serial No. DI8818 Certification No. 3-3

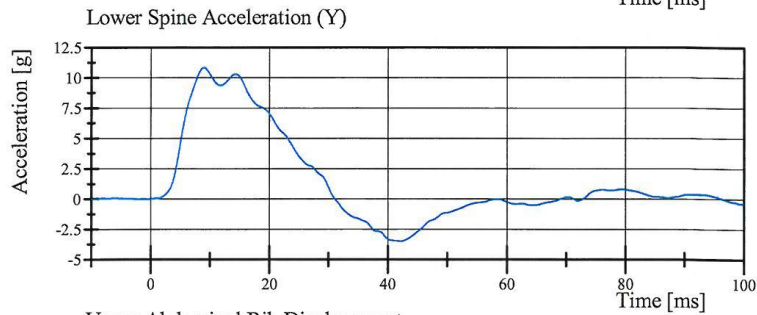
Test Date: 6/19/2013



Filter Class: CFC_180

Max: 0.2 g at 95.4 ms

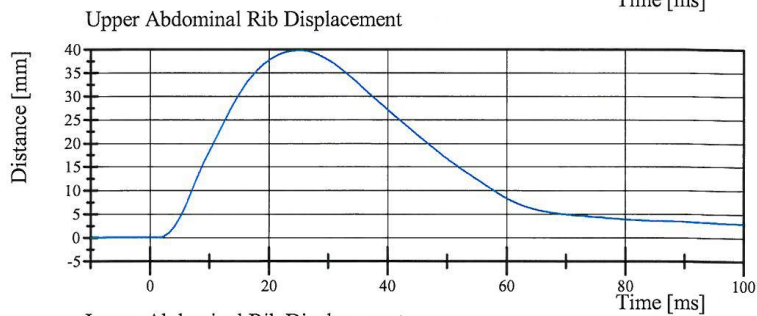
Min: -13.9 g at 17.9 ms



Filter Class: CFC_180

Max: 10.8 g at 9.0 ms

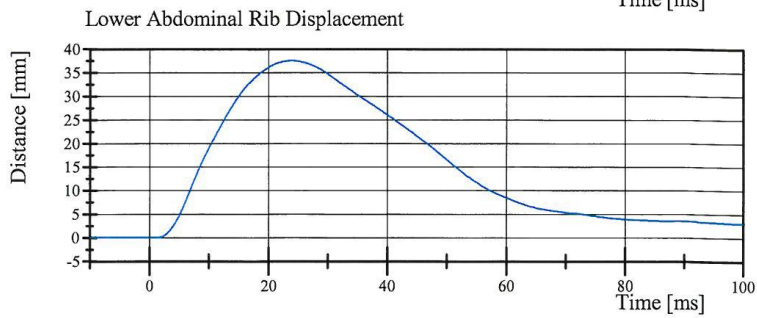
Min: -3.5 g at 42.2 ms



Filter Class: CFC_600

Max: 39.8 mm at 25.0 ms

Min: -0.0 mm at -2.8 ms



Filter Class: CFC_600

Max: 37.6 mm at 23.8 ms

Min: -0.0 mm at -2.6 ms

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

06.19.2013 15:04:25 689



Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 3-1

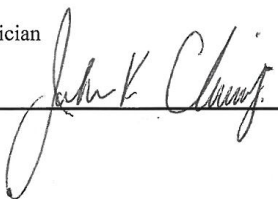
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	6.6 - 6.8 m/s	6.79 m/s	Yes
Impactor Acceleration	(-38.0) - (-47.0) g	-45.39 g	Yes
Peak Pelvis Lateral Acceleration after 6ms	34 - 42 g	41.0 g	Yes
Acetabulum Force	3,600 - 4,300 N	3,911.0 N	Yes

Test meets specifications.

Comments:

Technician



Approved



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

06.19.2013 11:31:32 444

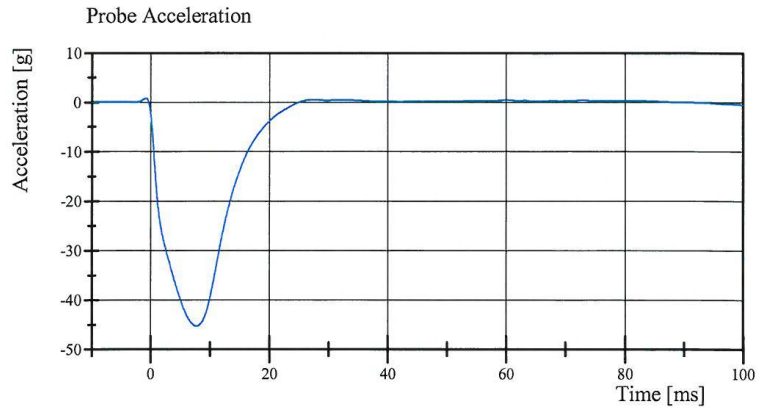


Transportation Research Center Inc.

Left Lateral Pelvis

SID IIs Serial No. DI8818 Certification No. 3-1

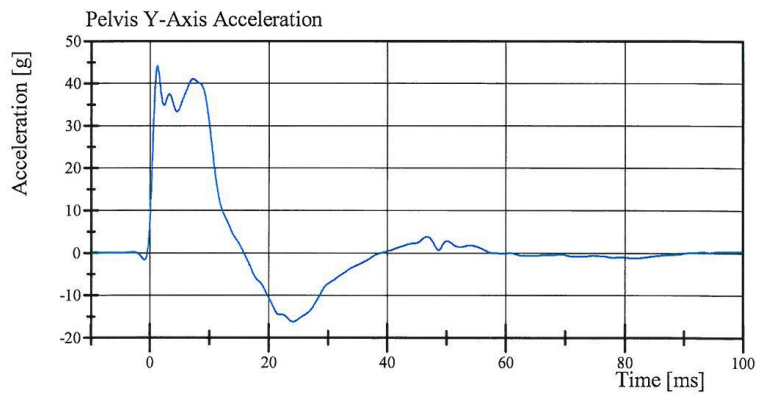
Test Date: 6/19/2013



Filter Class: CFC_180

Max: 0.7 g at -0.9 ms

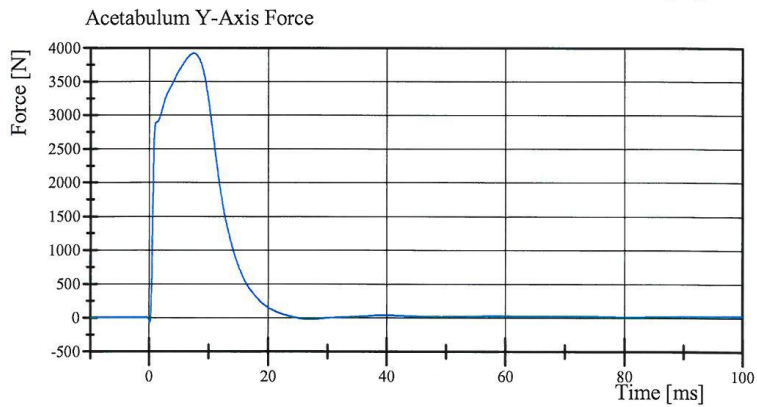
Min: -45.4 g at 7.7 ms



Filter Class: CFC_180

Max: 44.0 g at 1.3 ms

Min: -16.3 g at 24.1 ms



Filter Class: CFC_600

Max: 3,911.0 N at 7.4 ms

Min: -68.0 N at 0.2 ms

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

06.19.2013 11:31:41 444



Transportation Research Center Inc.

Left Lateral Iliac

SID IIs Serial No. DI8818 Certification No. 3-1

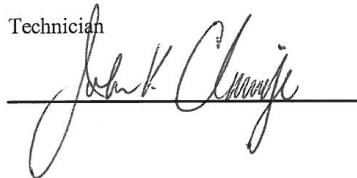
Test Date: 6/19/2013

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	4.2 - 4.4 m/s	4.39 m/s	Yes
Impactor Acceleration	(-36) - (-45) g	-43.7 g	Yes
Peak Pelvis Lateral Acceleration	28 - 39 g	35.7 g	Yes
Iliac Force	4,100 - 5,100 N	5,023.6 N	Yes

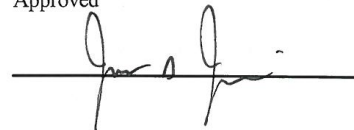
Test meets specifications.

Comments:

Technician



Approved



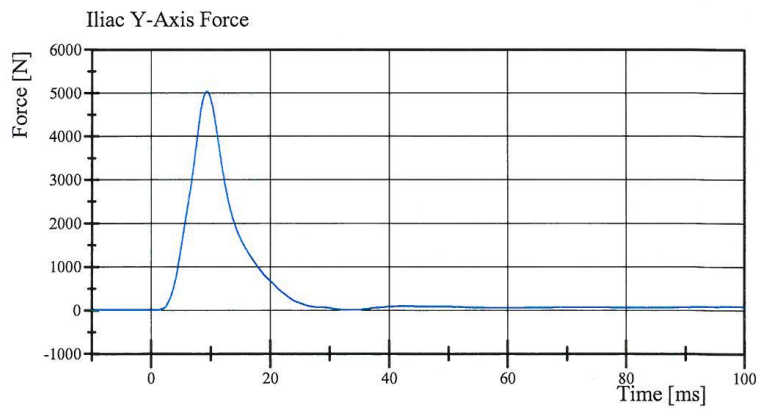
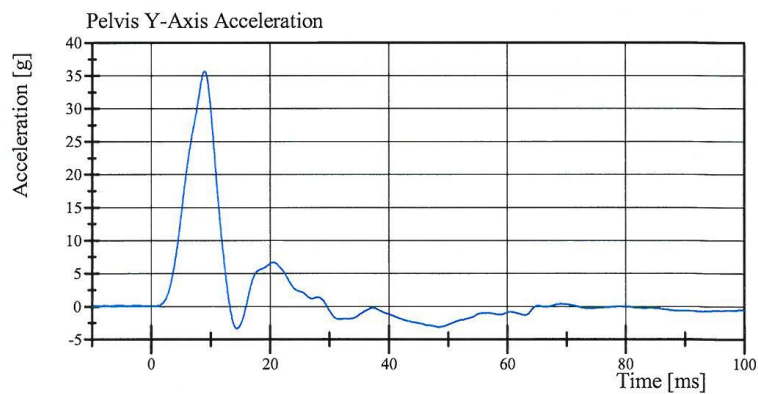
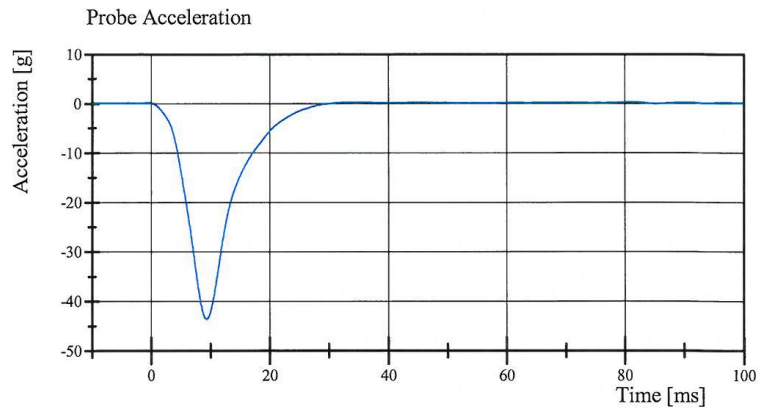
Specification Source: Procedures based on Final Rule effective 8/24/2009
Polarity in accordance with SAE J211.

06.19.2013 13:22:38 659



Transportation Research Center Inc.

Left Lateral Iliac
SID IIs Serial No. DI8818 Certification No. 3-1
Test Date: 6/19/2013



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

06.19.2013 13:22:53 659



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N DI8818			
				Serial Number	Manufacturer	Calibration Date	
Head Accelerometers				X	J32214	Endevco	12-Jun-13
				Y	J27040	Endevco	13-Jun-13
				Z	AGAC4	Endevco	13-Jun-13
Displacement Potentiometers	Shoulder		Y	NA	NA	NA	
	Thoracic Rib	Upper	Y	3745-00564	Servo	13-Jun-13	
		Middle	Y	3745-01815	Servo	13-Jun-13	
		Lower	Y	3745-01803	Servo	13-Jun-13	
	Abdominal Rib	Upper	Y	3745-01811	Servo	13-Jun-13	
		Lower	Y	3745-00557	Servo	13-Jun-13	
Lower Spine Accelerometers (T12)				X	00L13-F05	Entran	13-Jun-13
				Y	04J04I20-A17	Entran	13-Jun-13
				Z	P64093	Endevco	13-Jun-13
Acetabulum Load Cell				Y	235-FY	FTSS	24-Jan-13
Iliac Wing Load Cell				Y	113-FY	FTSS	2-Oct-12
Pelvis Plug (struck side)					46888	FTSS	6-Oct-11
Pelvis Plug (non-struck side)					46014	FTSS	20-Sept-11

TABLE 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	P77676	Endevco	31-Jan-13
Vehicle Center of Gravity	Y	P77739	Endevco	5-Feb-13
Vehicle Center of Gravity	Z	P80468	Endevco	27-Mar-13
Left Floor Sill	Y	P78150	Endevco	6-Feb-13
A-Pillar Sill	Y	P76408	Endevco	27-Feb-13
A-Pillar Low	Y	P76403	Endevco	29-May-13
A-Pillar Mid	Y	P80459	Endevco	2-Apr-13
B-Pillar Sill	Y	P80453	Endevco	28-Mar-13
B-Pillar Low	Y	P78116	Endevco	18-Dec-12
B-Pillar Mid	Y	P78114	Endevco	18-Dec-12
Driver Seat	Y	P80465	Endevco	28-May-13
Engine Top	X	P75726	Endevco	13-Feb-13
Engine Top	Y	P76251	Endevco	13-Feb-13
Firewall	Y	P80451	Endevco	17-Apr-13
Right Roof	Y	P80450	Endevco	17-Apr-13
Right Floor Sill	Y	P79364	Endevco	17-Apr-13
Rear Floor Pan	X	P80140	Endevco	25-Feb-13
Rear Floor Pan	Y	P75567	Endevco	12-Mar-13

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